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**WHITE COUNTY SOLID WASTE  
REGIONAL PLAN**

**APRIL 1994**

Prepared by:

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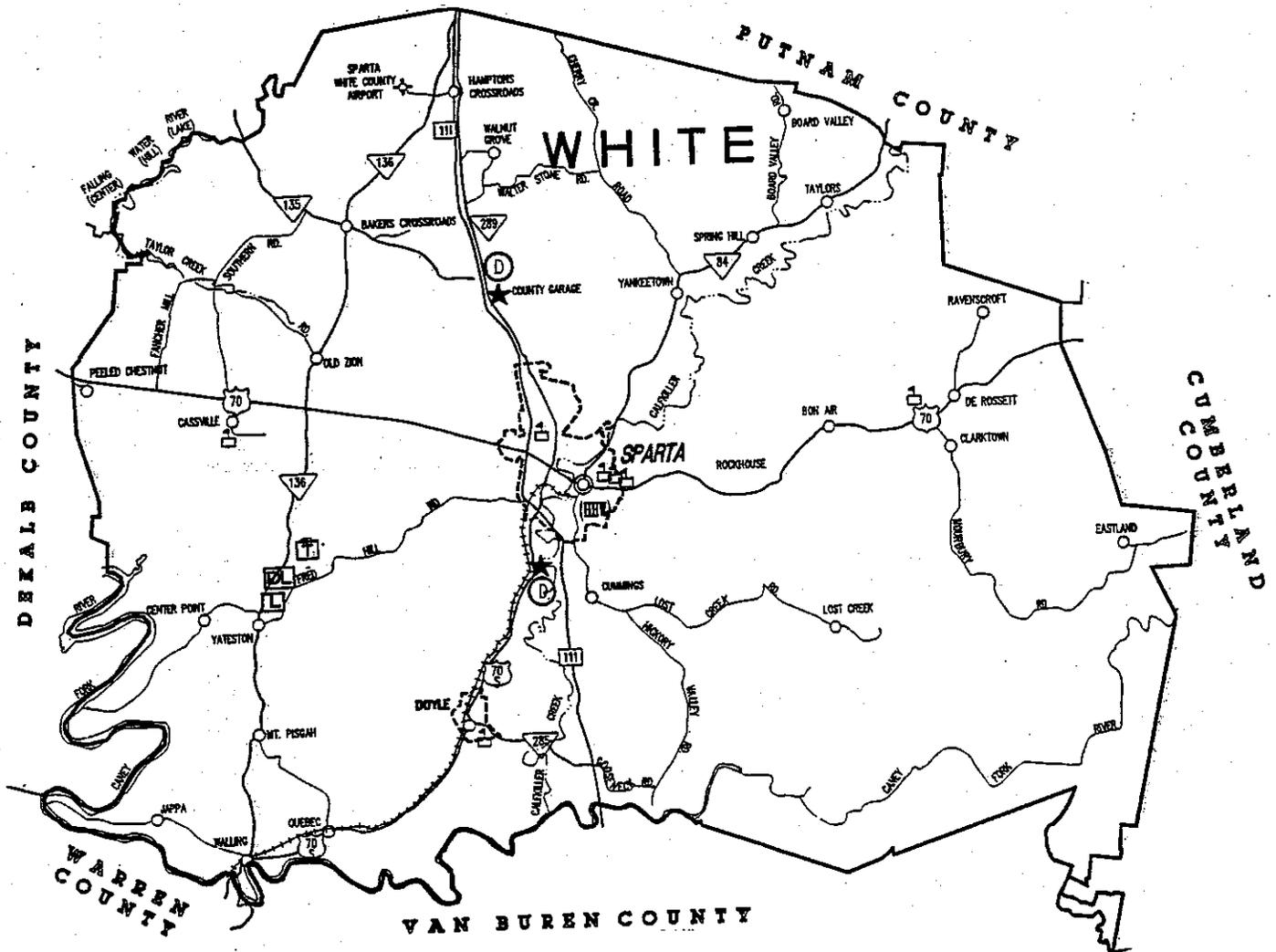
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April 15, 1994



**TABLE OF CONTENTS  
WHITE COUNTY  
SOLID WASTE REGIONAL PLAN**

	Page
<b><u>PART I</u></b>	
<b>EXECUTIVE SUMMARY</b>	ES-1
<b><u>PART II</u></b>	
<b>CHAPTER I - DESCRIPTION OF MUNICIPAL SOLID WASTE REGION</b>	
A. General Description	I-1
B. Rational For Regional Formation	I-1
C. Institutional Structure	I-1
D. Demographics	I-2
E. Economic Activity	I-6
<b>CHAPTER II - ANALYSIS OF THE CURRENT SOLID WASTE MANAGEMENT SYSTEM FOR THE REGION</b>	
A. Waste Stream Characterization	II-1
B. Waste Collection And Transportation	II-5
C. Source Reduction And Recycling Programs	II-5
D. Waste Processing, Composting, And Waste-To-Energy/Incineration Systems	II-5
E. Disposal Facilities	II-5
F. Cost Of The Current System	II-11
G. Revenues	II-13
<b>CHAPTER III - GROWTH TRENDS, WASTE PROJECTS AND PRELIMINARY SYSTEM STRUCTURE</b>	
A. Preliminary System Structure	III-1
<b>CHAPTER IV - WASTE REDUCTION</b>	
A. Establish A Base Year Quantity	IV-1
B. Waste Reduction Goals	IV-1
C. Methodology For Meeting Reduction Goal	IV-3
D. Synopsis Of Plan	IV-10

## CHAPTER V - WASTE COLLECTION AND TRANSPORTATION

A.	Comparison Of Existing System To Requirements	V-1
B.	Regional Needs	V-3
C.	Meeting Identified Needs	V-3
D.	Schedule For Convenience Center And Staffing	V-4
E.	Ten Year Budget - Collection And Transportation	V-5

## CHAPTER VI - RECYCLING

A.	Regional Goals And Objectives	VI-1
B.	Expansion Of Recycling Collection To Unserved Areas	VI-2
C.	Funding Plan	VI-4
D.	Data Collection Plan	VI-4
E.	Ten Year Budget For Administration Of Recycling Programs	VI-5

## CHAPTER VII - COMPOSTING, SOLID WASTE PROCESSING, WASTE-TO-ENERGY, AND INCINERATION CAPACITY

A.	Quantitative Needs	VII-1
B.	Implementation Steps	VII-3
C.	Implementation Schedule	VII-5
D.	Implementation Responsibility	VII-5

## CHAPTER VIII - DISPOSAL CAPACITY

A.	Background	VIII-1
B.	Class I Capacity	VIII-1
C.	Implementation Schedule	VIII-6
D.	Capacity Control	VIII-7
E.	Long Term Disposal (In Excess Of Ten Years)	VIII-7
F.	Ten Year Budget	VIII-10

## CHAPTER IX - PUBLIC INFORMATION AND EDUCATION

A.	Introduction	IX-1
B.	Regional Needs For Education	IX-1
C.	Goals And Objectives	IX-2
D.	Target Groups And Audiences, Amount And Kind Of Information, Specific Methods To Be Used	IX-3
E.	Staffing And Budget Needs	IX-13
F.	10-Year Implementation Schedule	IX-14

CHAPTER X - PROBLEM WASTES

A.	Household Hazardous Waste	X-1
B.	Waste Tires	X-9
C.	Waste Oil	X-12
D.	Lead Acid Batteries	X-16
E.	Litter Grant Program	X-17

CHAPTER XI - IMPLEMENTATION: SCHEDULE, STAFFING AND FUNDING

A.	System Definition	XI-1
B.	Implementation Schedule	XI-3
C.	Staffing and Training Requirements	XI-4
D.	Budget	XI-5

CHAPTER XII - ALLOCATION OF IMPLEMENTATION RESPONSIBILITIES: PLAN ADOPTION AND SUBMISSION XII-1

CHAPTER XIII - FLOW CONTROL AND PERMIT APPLICATION REVIEW XIII-1

PART III

APPENDICES

**Part I**  
**Executive Summary**

## **EXECUTIVE SUMMARY**

### **Description**

White County is planning as a single county planning region. White County is located in the west-central portion of Middle Tennessee, 85 miles east of Nashville and 100 miles west of Knoxville. Interstate 40, five miles to the north, provides convenient access to White County with other major transportation routes being U.S. Highway 70 running east and west and State Route 111 running north and south. Sparta is the county seat of White County with the only other incorporated city being the City of Doyle. According to the 1990 census, White County's population was 20,090 with Sparta and Doyle having populations of 4,681 and 345 respectively.

The "Solid Waste Management Act of 1991" (The Act) requires all counties to prepare a solid waste plan with the major requirements as follows:

- prepare a 10-year plan for solid waste disposal
- provide an adequate collection system to all residents
- reduce the amount of waste disposed of 25 percent by weight
- recommend an education system to aid in waste reduction

Although the act recommends multi-county regions, White County has chosen to be a single county region. The reason for planning alone as stated in the resolution in forming the region is that White County recognized the advantages of multi-county regions but until the needs assessment could be reviewed in its entirety, it was in the best interest of the citizens of White County is to form a single county region. The resolution also states that White County will continue to plan and cooperate with its neighbors for an effective solid waste management system.

White County's existing solid waste management system consists of the following components:

- White County owned Class I sanitary landfill with capacity for 20 years or more
- White County is constructing a Class III/IV landfill to begin operation in Summer 1994
- White County operates green box collection throughout the county
- City of Sparta operates house-to-house pick up for City residents and has an enclosed transfer station for solid waste
- There are two private haulers that provide house-to-house pick up within White County
- Commercial, industrial and schools are picked up by White County and the City of Sparta

## Regional Needs

In order to meet the requirements of the act and provide an integrated solid waste management system for White County, the following is a summary of regional needs:

- Convenience centers as per current guidelines with drop-off recycling for newspaper, aluminum cans, cardboard, glass.
- Yard waste composting in the City of Sparta to be expanded.
- White goods and scrap metal collection.
- Recycle bins at county schools for white paper and corrugated cardboard.
- Curbside collection for newspapers in City of Sparta.
- Waste reduction through education.
- Recycling for commercial businesses and industries.
- Construct Class III/IV landfill for yard waste & demolition waste
- Upgrade its current Class I landfill to conform with Subtitle D regulations.

## Goals And Objectives

The following is a list of regional goals for White County:

- To provide an integrate solid waste management system to meet the requirements of the "Solid Waste Management Act of 1991", that is cost effective for its citizens.
- To implement recycling and education programs to reduce the amount of waste disposed of.
- To construct two convenience centers in order to provide the citizens a more effective means of collection.
- To dispose of waste at a Subtitle "D" landfill in order to help protect the environment.

## System Elements

### Waste Reduction and Recycling

White County must reduce or divert 4,628 tons of waste beginning in 1995 in order to meet the 25% waste reduction goal. Each year after 1995 the amount will increase as waste generation increases. In order to meet this reduction a combination of programs will be implemented including construction of a Class III/IV landfill, expanding the current yard waste composting program in the City of Sparta, provide white good and scrap metal collection for the entire county, recycling at the convenience centers, education at schools,

industries, civic groups and area businesses, and an aggressive source reduction program for businesses and industries.

### Collection

White County must construct two convenience centers by January 1, 1996 in order to meet the requirements established by the Tennessee Department of Environment and Conservation - Division of Solid Waste Management to provide collection of household waste for the residents of the County. The cities of Sparta and Doyle will continue to provide house to house collection to residents within the corporate limits. The convenience centers should be located near more densely populated areas and be easily accessible to the residents of White County. Recommendations are to locate one on State Highway 111 N. at the County garage and the other a few miles south of Sparta. Components of a convenience center will include a 42 cubic yard container with a compactor for household waste, recycling containers for white paper, newspaper, aluminum cans, cardboard, glass containers, scrap metal, and white goods (stoves, washing machines, etc.). The existing "green box" containers will be phased out in areas served by a convenience center. The convenience center will be staffed full time during hours of operation and the perimeter will be fenced with a gate that is locked when not open. Days and hours of operation will be based on need with a minimum of 40 hours per week. The operator will inspect each load to make sure that no hazardous or problem waste (tires, lead acid batteries, used oil, paint, etc.) is disposed of in the compactor with the household waste. Provisions will be made to accept these items at the convenience centers or at a designated place. The operator will also help promote recycling and make sure that recyclable material is placed in the proper container.

### Disposal

The current Class I landfill has capacity to serve White County for the next twenty years without taking out of county waste and accounting for moderate population and economic growth as indicated in Chapter VIII. White County will operate as is until October 1996 in its current cell. No later than January 1996, White County will need to contract for construction of a new cell so that by October 1996 the cell can be in place conforming to Subtitle "D" requirements.

White County has evaluated other disposal options as outlined in Chapter VIII including contracting with private companies for disposal. In January 1996 the county could decide to contract with private companies as opposed to continued operation of its own landfill.

## Problem Waste

White County is required to provide a permanent collection site for household hazardous waste by January 1, 1996. Household hazardous wastes include: paint thinners, solvents, paints and varnishes, cleaners, cosmetics (nail polish remover), pesticides, fertilizers, bleach, automobile fluids, photo and hobby chemicals, swimming pool chemicals, batteries, wood preservatives, motor oil, air conditioning refrigerants, adhesives, herbicides, fungicides, etc. The benefits of HHW collection programs go beyond the collection and disposal of these potentially dangerous chemicals. The programs can include public education elements that identify HHW, outline proper ways to store the wastes, and suggest alternative products. Collection programs increase the public's awareness of HHW in the home and encourage safer use and proper disposal.

Other problem wastes include tires, used oil, and lead acid batteries. White County currently has a tire storage facility at the landfill. The City of Sparta and the White County landfill both provide used motor oil collection. Lead acid batteries are also accepted at the landfill and are sold to be properly disposed of.

Guidelines and recommendations are provided in Chapter X. The current state mobile collection program will provide collection once a year for all counties through 1995 that request this program.

## Allocation of Responsibility

The White County Solid Waste Planning Board has developed this regional plan and will be responsible for implementation. White County Commission will be responsible for funding all programs except for the current collection and composting program provided by the City of Sparta, which Sparta will maintain and be responsible for.

## Implementation Schedule

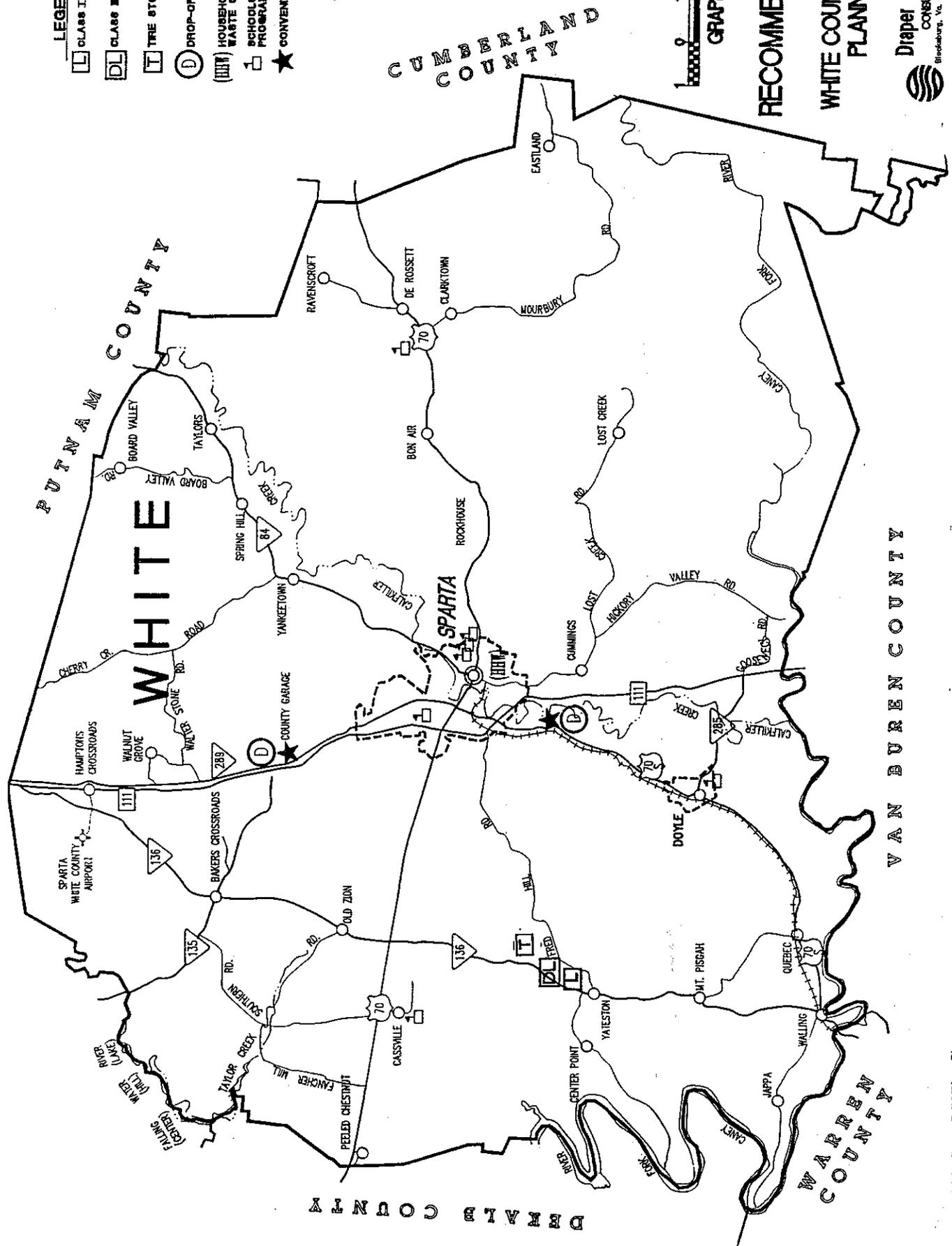
<u>Activity</u>	<u>Date</u>
Solid Waste Plan Submitted	June 1994
Begin Operation of Class III/IV Landfill	Summer 1994
Begin White Good/Scrap Metal Collection	Summer 1994
Apply for Convenience Center Grant	Fall 1994
Solid Waste Plan Approved	October 1994
Hire Diversion Manager	October 1994
Begin Phase One Drop-off Recycling Program	January 1995
Funding in Place for Two Convenience Centers	Summer 1995
Begin Phase Two Drop-off Recycling Program	June 1995
Begin School Recycling and Education Program	August 1995
Begin Sparta Curbside (if needed)	November 1995
Construction of Two Convenience Centers	Fall 1995
All Planned Programs Associated With Diversion Operating at 100%	December 1995
25% Diversion Goal Met	January 1, 1996

- LEGEND**
- [L] CLASS I LANDFILL
  - [DL] CLASS II/III LANDFILL
  - [T] TIRE STORAGE FACILITY
  - (D) DROP-OFF RECYCLING CENTER
  - (H) HOUSEHOLD HAZARDOUS WASTE COLLECTION
  - [S] SCHOOLS (EDUCATIONAL PROGRAMS)
  - [★] CONVENIENCE CENTERS



**RECOMMENDED SYSTEM  
MAP  
WHITE COUNTY SOLID WASTE  
PLANNING REGION**

**Draper Aden Associates**  
CONSULTING ENGINEERS  
Birmingham, Va. - Richmond, Va. - Nashville, Tenn.



**COST ESTIMATE FOR INTEGRATED SOLID WASTE MANAGEMENT SYSTEM**

**WHITE COUNTY**

	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Waste Reduction	4,019	54,214	56,925	59,771	62,760	65,898	69,193	72,653	76,286	80,100
Collection & Transportation	165,178	169,800	184,410	193,009	202,037	219,139	229,475	240,326	251,720	251,244
Recycling	5,000	5,250	5,513	5,789	6,078	6,382	6,701	7,036	7,388	7,757
Disposal	248,122	260,528	494,031	529,027	544,455	570,423	588,291	606,291	631,790	651,480
Education	1,700	1,700	1,700	1,700	1,700	1,700	1,700	1,700	1,700	1,700
Problem Waste	2,000	2,000	2,500	15,000	15,000	20,000	20,000	25,000	25,000	30,000
<b>Total</b>	<b>426,019</b>	<b>493,492</b>	<b>745,079</b>	<b>804,296</b>	<b>832,030</b>	<b>883,542</b>	<b>915,360</b>	<b>953,006</b>	<b>993,884</b>	<b>1,022,281</b>



**Part II**

**Regional Solid Waste Management Plan**



## Chapter I - Description of Municipal Solid Waste Region

### A. General Description

White County is planning as a single county region. There are two incorporated cities within the county. Sparta is the county seat with a 1990 census population of 4,681. Doyle had a population of 345 in 1990. In 1990, the total county population was 20,090 and the total land area was 377 square miles.

Geographically, White County is located 85 miles east of Nashville and 100 miles west of Knoxville. Geologically, White County is located in the Highland Rim and Cumberland Plateau regions of middle Tennessee. The topography varies from nearly level to very steep with elevations ranging from 650 to 1,650 feet above sea level. The majority of the watershed flows to the Caney Fork River which empties into the Cumberland River.

There are several major highways in White County including US Highways 70 and 70S, State Routes 84, 111, 135 and 136, and many city streets and roads for a total of 694 miles. Rail service is available to Sparta running southwest to CSX mainline at Tullahoma via the Caney Fork and Western Shortline Railroad.

### B. Rational for Regional Formation

The "Solid Waste Management Act of 1991" requires all counties to prepare a 10-year solid waste plan. Although the act recommends multi-county regions, White County has chosen to be a single county region. The reason for planning alone as stated in the resolution in forming the region is that White County recognizes the advantages of multi-county regions, they feel that until the data from the needs assessment is adequately reviewed, it is in the best interest of the citizens that White County form a single county region. Also noted in the resolution is that White County will continue to plan and cooperate with its neighbors for an effective solid waste management system.

### C. Institutional Structure

The White County solid waste planning board consists of seven members. They are:

Member	Term	Term Expires
Mr. David Copeland, Chairman	6 Years	January 18, 1999
Ms. Margaret Cope, Secretary	4 Years	January 18, 1997
Mr. Ord Crouch	4 Years	January 18, 1997
Mr. Eric Eaton	2 Years	January 18, 1995
Mr. Charles Humphrey	2 Years	January 18, 1995
Mr. Dorsie Poole	2 Years	January 18, 1995
Mr. Herd Sullivan	6 Years	January 18, 1999

The board was formed on January 18, 1993 by resolution passed by the county commission. Five members of the board were appointed by the county executive. They are Eric Eaton, Margaret Cope, Ord Crouch, Herd Sullivan and David Copeland. Charles Humphrey represents the City of Sparta and Dorsie Poole represents the City of Doyle. The board has met twice a month throughout the development of this plan and will meet as needed once the plan is submitted for approval. The board will meet as needed for implementation of the plan and a minimum of once a year to make any updates required.

#### **D. Demographics**

The population for White County from the 1990 census was 20,090. Population for 1993 is projected at 20,266 which equates to a population density of 54 persons per square mile. The county population is projected to grow only slightly over the next ten years at approximately 0.3% per year for a 2003 population of 20,825.

Table I-1 through I-6 gives a summary of the demographics for White County.

## CHAPTER I: FORMS

### A. REGIONAL SUMMARY: DEMOGRAPHICS

1. Name of Region: White County
2. Regional Population: 20,090 (1990)
3. Regional Area 376.7 square miles
4. Population and Population Density

**Table I-1**

County	Area (Sq. Miles)	Population	Avg. Density Population/sq. miles
White	376.7	20,090	53.3
<b>Regional Total</b>	376.7	20,090	53.3

Comments and Calculations:

5. Distribution of the Total Regional Population, by urban and rural areas:

**Table I-2**

County	URBAN		RURAL	
	Population	%	Population	%
White	4,681	23.3	15,409	76.7
<b>Regional Total</b>	4,681	23.3	15,409	76.7

Comments and Calculations:

6. Distribution of the Total Regional Population by Sex and Age

Table I-3

Age	Total	Male	%	Female	%
0-4	1,239	623	50.3	616	49.7
5-17	3,565	1,859	52.1	1,706	47.9
18-44	7,619	3,755	49.3	3,864	50.7
45-64	4,431	2,160	48.7	2,271	51.3
65+	3,236	1,313	40.6	1,923	59.4
<b>Regional Total</b>	<b>20,090</b>	<b>9,710</b>	<b>48.3</b>	<b>10,380</b>	<b>51.7</b>

Comments and Calculations:

7. Distribution of Regional Population by Education (Age  $\geq$  25)

Table I-4

	Number	%
Less than 9th Grade	4,021	29.8
High School	6,953	51.6
College	2,147	15.9
Post Graduate/Professional	365	2.7
<b>Regional Total</b>	<b>13,486</b>	<b>100.0</b>

Comments and Calculation:

8. Total Number of Households in Region 7,722

9. Distribution by Type of Housing and Occupancy

Table I-5

	Total Units (Persons)	Occupied	Owner	Rented
Single Family 1, Detached	15,758	15,758	13,500	2,258
1, Attached	103	103	53	50
Multi-Family 2	267	267	39	228
3-4	199	199	3	196
5-9	213	213	15	198
10-19	144	144	6	138
20-49	0	0	0	0
50 or more	0	0	0	0
Institutional	210	n/a	n/a	n/a
Mobile Home/Trailer	3,015	3,015	2,488	527
Other	181	181	143	38
<b>Regional Total</b>	<b>20,090</b>	<b>19,880</b>	<b>16,247</b>	<b>3,633</b>

Comments and Calculations:

10. Regional Population Projections 1994-2003

Table I-6

Regional Population 1993:20,266

Projection Year

County	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
White	20,324	20,383	20,442	20,501	20,560	20,620	20,679	20,707	20,766	20,825
<b>Regional Total</b>	<b>20,324</b>	<b>20,383</b>	<b>20,442</b>	<b>20,501</b>	<b>20,560</b>	<b>20,620</b>	<b>20,679</b>	<b>20,707</b>	<b>20,766</b>	<b>20,825</b>

Comments and Calculations:

## E. Economic Activity

Economic activity has a direct relationship with population and waste generation. As the economy grows, so will population and waste generation. The type of economic growth does have a bearing on waste generation, for instance, a new industry would probably create more waste per capita than a new service organization. Economic growth has been steady over the past few years but is very difficult to forecast over the next ten years.

The NSWMA Technical Bulletin #85-6 gave waste generation estimates for various types of developments as listed below:

apartment:	2.5#/person
cafeteria:	1#/meal served
discount store:	60# cardboard/\$1000 sales 10# other/\$1000 sales
fast food:	200#/\$1000 sales
hospital:	16#/occupied bed
hotel:	2-3#/room plus 1.5#/meal
manufacturing:	3-7#/person
nursing home:	5#/person
office:	1#/100 square foot
restaurant:	1.5#/meal served
school:	1#/person (w/cafeteria)
shopping mall:	2.5#/100 square foot
supermarket:	100# cardboard/\$1000 sales 64# other/\$1000 sales
warehouse:	1#/100 square foot

Tables I-7 through I-14 provides a summary of the economic activity.

**ECONOMIC ACTIVITY**

1. Basic economic information, for each county, and the region in 1991.

**Table I-7**

County	Population	MSA County (yes/no)	Total Employment	Total <sup>2</sup> Earnings (thousands)	Per Capita Income	% Population Below the Poverty Line
White	20,090	no	10,188 <sup>1</sup>	153,695	12,777	17.0
<b>Regional Total</b>	20,090		10,188	153,695	12,777	17.0

**Comments and Calculations:**

<sup>1</sup>Total employment based on current data but previous to 1991.

<sup>2</sup>Total earnings is not total income.

2. Non-Agricultural Employment, by Sector, 8,119<sup>1</sup>

**Table I-8**

**% of Total Employment**

County	Manufac- turing	Construction	Trade	Finance	Service	Gov't	Transportation Pub. Utilities
White	3,772	374	1,329	159	1,296	892	297
<b>Regional Total</b>	3,772	374	1,329	159	1,296	892	297
<b>%</b>	46.4	4.6	16.4	2.0	16.0	11.0	3.6

**Comments and Calculations:**

<sup>1</sup>Employment figures based on current data available but previous to 1991.

3. Total Agricultural Employment in 1991 1,419

Table I-9

Agricultural Employees

County	Employment
White	1,419
<b>Regional Total</b>	<b>1,419</b>

4. Prepare a regional summary of major generators of commercial and non-hazardous industrial waste in 1991. Use data from Table II-2 in the County Economic Activity Profiles, in District Needs Assessment, or data collected subsequently for the regional plan. State size criteria applied in each county (i.e., all generators > 100 employees, all generators > 50 employees, etc.)

Table I-10

County	Screening Criteria* Applied	Number of Generators	Estimated Total Tons Quantity of Waste Yr
White	> 50 employees	30	2,800
<b>Regional Total</b>	<b>&gt; 50 employees</b>	<b>30</b>	<b>2,800</b>

Comments and Calculations:

5. Prepare a Regional summary of institutions housing more than 100 persons.

**Table I-11**

County	Total Number of Institutions	Total Number of Students - Prisoners/Residents	Estimated Quantity of Waste Generated
White	n/a		
<b>Regional Total</b>			

Comments and Calculations:

6. Provide summary data on major health care facilities (larger than 50 beds), (hospitals, nursing homes) in the region.

**Table I-12**

**Infectious Waste Management**

County	No. of Facilities	No. of Beds	OnSite/Offsite	Type Treatment	Est. Quantity of Solid Waste Generated
White	2	210	n/a	n/a	n/a
<b>Regional Total</b>	2	210			

Comments and Calculations:

7. Sources of local revenue utilized in the region. Total Tax Income (1991):

**Table I-13**

County	Property Tax	Local Sales Tax	Wheel Tax	Local Waste Collection Fee	User Fee/ Tipping Fee	Other*
White	x	x			x	
<b>Regional Total</b>	x	x			x	

Comments and Calculations:

\* General Fund

8. Provide the following data for fiscal 1993.

**Table I-14**

County	Total Assessed Property Value <sup>1</sup>	Total Property Tax Revenue <sup>1</sup>	Total Sales Subject to Sales Tax <sup>1</sup>	Total Local Sales Tax Revenue <sup>1</sup>	# Registered Vehicles <sup>2</sup>	Total Wheel Tax Revenue
White	131,551,394	3,294,834	81,261,000	1,202,957	22,300	n/a
<b>Regional Total</b>	131,551,394	3,294,834	81,261,000	1,202,957	22,300	

Comments and Calculations:

<sup>1</sup> Information provided by Keith Ryder, White County Finance Director

<sup>2</sup> Information from State of Tennessee, Department of Motor Vehicles

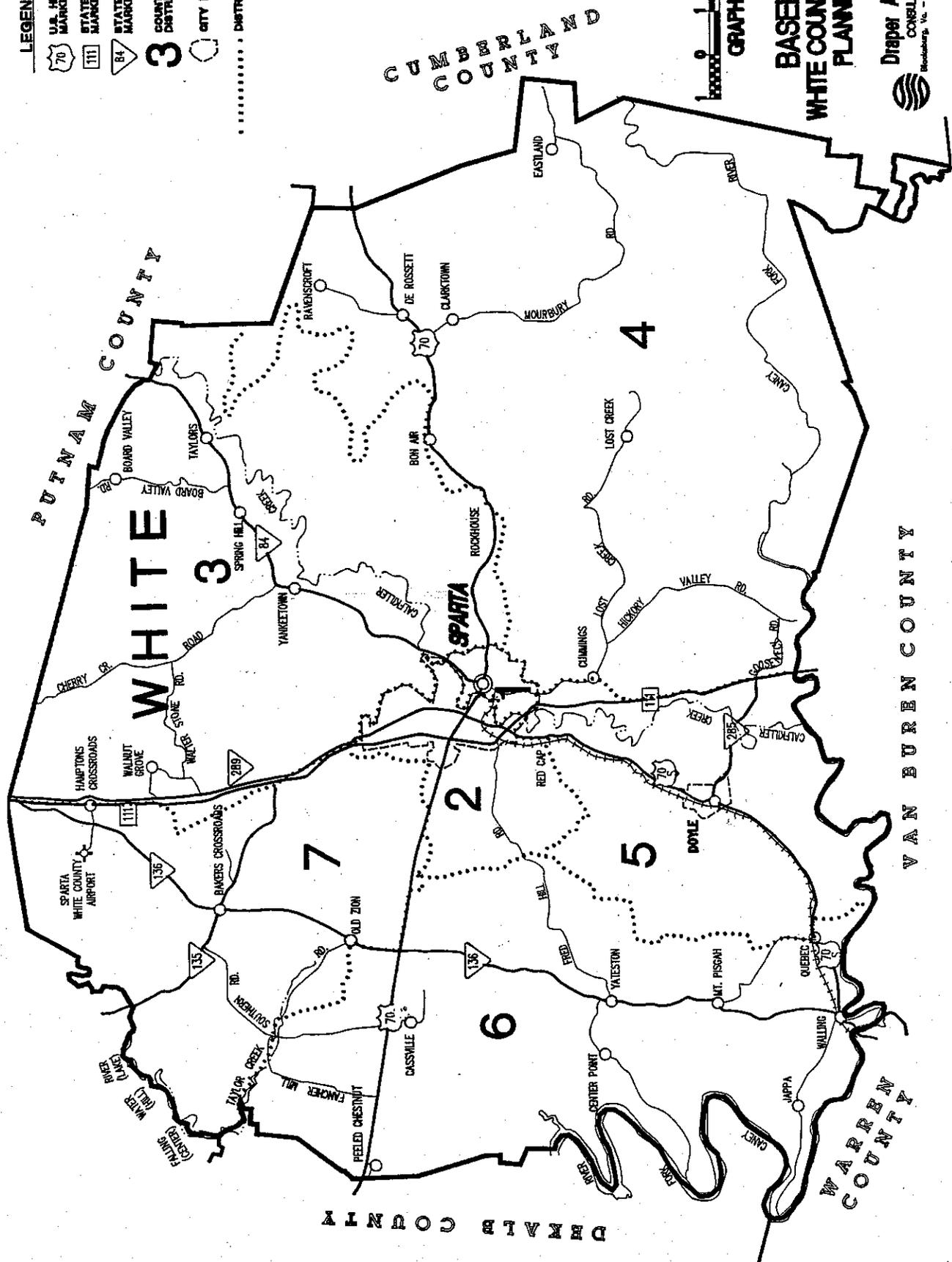
**LEGEND**

- U.S. HIGHWAY MARKER
- STATE PRIMARY MARKER
- STATE SECONDARY MARKER
- COUNTY COMMISSION DISTRICT
- CITY LIMITS
- DISTRICT BOUNDARY



**BASELINE MAP  
WHITE COUNTY SOLID WASTE  
PLANNING REGION**

**Draper Aden Associates**  
CONSULTING ENGINEERS  
Baltimore, Md. - Richmond, Va. - Houston, Texas.





## **Chapter II - Analysis of the Current Solid Waste Management System for the Region**

### **A. Waste Stream Characterization**

The Needs Assessment prepared by the Upper Cumberland Development District used the national averages for waste stream characterization as no detailed study has been performed. Based on experience in rural Tennessee, the national averages are not representative of this region. For the purpose of this study, the waste stream characterization will be estimated based on existing studies in Tennessee and the industrial waste load in White County.

Contacts were made to 30 industries with 50 or more employees to aid in determining the content of the industrial waste load as well as any recycling or waste reduction effort currently in place. There are several garment industries in White County which is typical for Tennessee and indicates a higher textile content than the national average. Paper and paperboard (corrugated cardboard) calculated less than the national average which is typical for rural areas. There are several industries that produce hardwood furniture, wood trim, pallets and other wood products, which verifies the higher percent of wood in the waste stream. The only other material in the waste stream that varies from the national average is yard waste, which is significantly lower. This is typical for rural Tennessee and confirmed in White County, since the City of Sparta generates most of the yard waste.

Tables II-1 through II-5 provides a summary of the waste stream characterization.

## CHAPTER II: FORMS

### A. Regional Summary: Waste Stream Characterization

#### 1. Quantity of Solid Waste Received for Disposal/Incineration in Calendar 1991

**Table II-1**

County	Tons Disposed <sup>1</sup>	Population (1991)	Waste Disposed Per Capita
White	20,244	20,090	1.01
<b>Regional Total</b>	20,244	20,090	1.01

<sup>1</sup> Data from district needs assessment. Current data in Chapter III forms.

Comments and Calculations:

#### 2. Origin of Regional Solid Waste in 1991

**Table II-2**

County	Residential	Institutional/ Commercial	Non-Hazardous Industrial	Special	Other
White	10,122	5,061	5,061	n/a	n/a
<b>Regional Total</b>	10,122	5,061	5,061		

Comments and Calculations:

Data from district needs assessment.

3. Acceptance of Certain Categories of Solid Waste for Disposal or Incineration

Table II-3

Quantity in Tons/Yr

County/Facility	Yard Waste (Clippings- leaves-grass)		Sewage Sludge		Construction Demolition		Tires		White Goods	
	Y/N	Qty	Y/N	Qty	Y/N	Qty	Y/N	Qty	Y/N	Qty
White Co LF	y	unknown	y	350	y	250	y		y	20
<b>Regional Total</b>		unknown		350		250				20

Comments and Calculations:

4. Description of the Waste Stream By Materials

Table II-4

<u>Waste Category</u>	<u>National %</u>	<u>White County%<sup>1</sup></u>	<u>Regional Tons<sup>2</sup></u>
Paper & paperboard	40.0	37.6	6,092
Glass	7.0	8.5	1,377
Ferrous Metals	6.5	6.3	1,021
Aluminum	1.4	1.1	178
Other Non-Ferrous Metals	0.6	0.8	130
Plastics	8.0	7.7	1,247
Rubber & Leather	2.5	2.7	437
Textiles	2.1	4.6	745
Wood	3.6	10.0	1,620
Food Waste	7.4	8.7	1,409
Yard Waste	17.6	6.0	972
Misc. Inorganic Waste	1.5	2.1	340
Other	<u>1.7</u>	<u>3.9</u>	<u>632</u>
<b>TOTAL MUNICIPAL SOLID WASTE</b>	<b>100.0</b>	<b>100.0</b>	<b>16,200</b>

Comment and Calculations:

<sup>1</sup> Calculated using existing studies within Tennessee and a survey of the industrial waste load in White County. See MSW Waste Characterization Generation Study at the end of Chapter II in the Appendix.

<sup>2</sup> Using White County percentages and 1993 White County waste figures.

5. Unmanaged Waste\*

Table II-5

County	Potential Waste <sup>1</sup> Generation 1991 tpy	Actual Waste Disposed 1991 tpy	Unmanaged Waste 1991 (potential/actual) tpy	Percent of Potential Total
White	21,999	20,244	1,755	8.0
<b>Regional Total</b>	21,999	20,244	1,755	8.0

\* Waste that is "outside" the collection system such as materials in roadside dumps, litter, etc.

<sup>1</sup> Potential waste calculated by using 6#/person/day from the Needs Assessment.

Comments and Calculations:

## **B. Waste Collection and Transportation**

White County currently provides collection through a "green box" system throughout the county. The city of Sparta provides house to house collection for all residents as well as pick up for commercial/industrial businesses within the city. There are two private haulers that provide collection in the rural area of White County.

## **C. Source Reduction and Recycling Programs**

The following is a list of recycling programs within the region:

City of Sparta Sanitation Department  
Transfer Station Recycling and Composting Program  
Contact: Clay Parker

This is a municipality operated recycling and composting program which consists of permanent drop-off sites as well as curbside residential service. The city picks up curbside green/yard waste year round. Commercial green waste is not accepted at the landfill unless it is chipped. Finished compost/mulch is available to the public free year round. Recyclables collected for resale are steel, iron, aluminum cans and aluminum scrap. Operating hours are Monday - Friday 7AM to 3:30PM and on Saturday 7AM to 12PM.

Coopers Recycling  
Contact: Steve Cooper

This is a privately owned business which consists of drop-off sites. The sites accept cans, aluminum scrap metals, copper and batteries. Operating hours are Monday - Friday 8AM - to 5PM and on Saturday 8AM to 2PM.

## **D. Waste Processing, Composting, and Waste-to-Energy/Incineration Systems**

The City of Sparta composts yard waste picked up within the city limits. All brush and limbs are chipped and mixed with leaves and grass clippings to form a compost pile.

## **E. Disposal Facilities**

The White County Solid Waste Planning Region has one disposal facility, the White County Landfill (SNL 93-102-0136). The site has an operating Class I area and a Class III/IV landfill permit pending. The site is approximately seven miles west of Sparta on the west side of Fred Hill Road on a 58.5 acre tract of land. The operations manual refers to 16.3 acres available for fill operations with the remaining 42.2 acres unsuitable for use as a landfill. The design plans show a Class I area closer to 22 acres. The site began operation as a sanitary landfill in 1977.

Under current regulation, the operating footprint can continue until the approved final grades are reached, but no later than October 1996. At that point, if the County continues operation at this site, it needs to come into full compliance with the siting and design requirements outlined under Subtitle "D" of RCRA. Once these requirements are met, the Class I facility has a remaining life of approximately 20 years for disposal of White County's waste.

Tables II-6 through II-11 provide information on disposal capacity.

## REGIONAL SUMMARY: FACILITIES

Table II-6

### 6. Operating and Planned Composting Facilities in the Region

Existing:

County	Facility Location	Tons of Waste Processed/Yr	Composted Materials		
			Yard Waste	Sewage Sludge	Solid Waste
White	Sparta City Garage	40 <sup>1</sup>	40	0	0

<sup>1</sup> Estimated based on information provided by Clay Parker with the City of Sparta.

Planned: None

County	Facility Location	Tons of Waste Processed/Yr	Composted Materials		
			Yard Waste	Sewage Sludge	Solid Waste
<b>Regional Total</b>					

7. Municipal Solid Waste Incinerators or Waste-to-Energy Facilities in the Region

Table II-7

Operating Facilities: None

County	Facility Location	Design Capacity tons/year	Current Use tons/year	Anticipated Operating Life of Facility
White				

Planned Facilities: None

County	Facility Location	Design Capacity tons/year	Current Use tons/year	Anticipated Operating Life of Facility

8. Existing Municipal Solid Waste Landfills in the Region

Table II-8

County	Name of Landfill	Location	Permitted Capacity (years)	Current Rate of Waste Accepted (tons/day)	Remaining Capacity (tons)
White	White Co LF	Fred Hill Rd.	20	41 <sup>1</sup>	318,000
<b>Regional Total</b>			20	41	318,000

Comments and Calculations:

<sup>1</sup> Based on 365 days/yr.

9. Existing Landfills Expected to Close Before 2003

NONE

Table II-9

County	Location	Current Use Tons/Day	Current Annual Use (Tons/Year)	Anticipated Date of Closure
White				
<b>Regional Total</b>				

Comments and Calculation:

10. Planned Expansions and Planned New Facilities Which Will Operate for Ten Years or More

No New Class I facilities planned.

Table II-10

County	Proposed Facility Expan. New	Location	When Will Capacity be Available	Permitted Capacity Sought (acre)	Design Rate of Waste (tpd) Disposed	Potential Expansion Yes/No
White						
<b>Planned New Regional Capacity</b>						

Comments and Calculations:

11. Total Existing and Planned Capacity in the Region at the Close of the Next Ten Years

Table II-11

TONS

Year	Existing <sup>1</sup>	Planned	Total
FY 1993	340,000	0	340,000
FY 1994	318,000	0	318,000
FY 1995	295,352	0	295,352
FY 1996	272,618 <sup>2</sup>	0	272,618
FY 1997	257,865	0	257,865
FY 1998	243,054	0	243,054
FY 1999	228,183	0	228,183
FY 2000	213,251	0	213,251
FY 2001	198,259	0	198,259
FY 2002	183,226	0	183,226
FY 2003	168,131	0	168,131

Comments and Calculations:

<sup>1</sup> Existing capacity based on current plans of the landfill, annual disposal based on Table III-7 and assuming out-of-county waste ceased in 1996.

<sup>2</sup> Existing landfill will need to be upgraded to conform with Subtitle "D" regulations by October 1996.

**F. Cost of the Current System**

**1993 - 1994 Solid Waste Budget Expenditures**

Supervisor	\$ 23,487
Salaries/Wages	\$113,028
Overtime/Holiday Pay	\$ 5,000
Telephone	\$ 600
Equipment Maintenance	\$ 40,000
Permits	\$ 8,000
Diesel Fuel	\$ 20,000
Gasoline	\$ 3,500
Lubricants	\$ 5,000
Office Supplies	\$ 500
Utilities	\$ 4,000
Other Supplies	\$ 3,000
Building & Equipment Insurance	\$ 18,000
Workers' Comp. Insurance	\$ 13,000
Other Charges (85 cent tax)	\$ 20,000
Site Development	\$ 50,000
Equipment	\$ 49,000
FICA	\$ 11,000
Retirement	\$ 6,000
Trustee Commission	<u>\$ 3,500</u>
<b>TOTAL</b>	<b>\$393,615</b>

**Summary of Current System Cost**

Each of the Expenditure items have been broken down in three categories, collection transportation, and disposal, in order to estimate the annual cost of the current system. These figures will be used as a comparison to the proposed system costs.

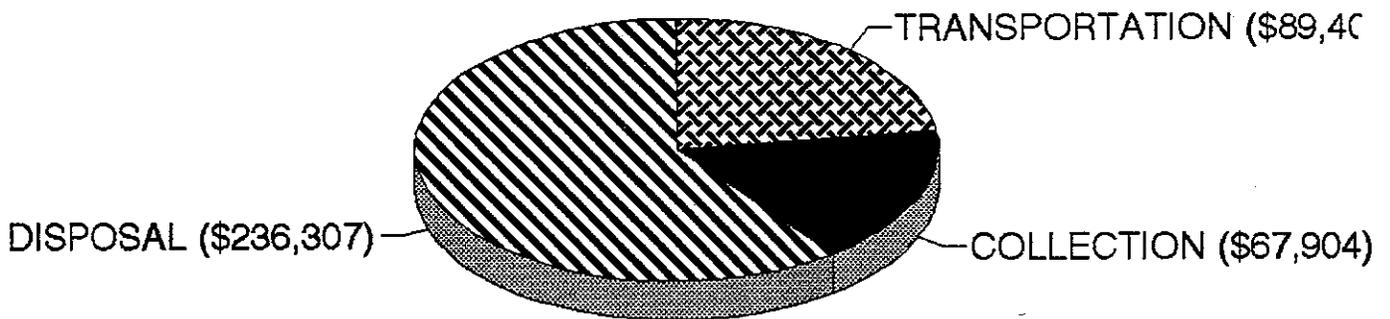
Collection	\$ 67,904
Transportation	\$ 89,404
Disposal	<u>\$236,307</u>
<b>TOTAL</b>	<b>\$393,615</b>

Present landfill operations cost \$236,307/16,200 tons = \$14.59/ton

The following chart displays the current system expenditures:

# CURRENT SYSTEM EXPENDITURES

## WHITE COUNTY SOLID WASTE REGION



## G. Revenues

Most of the revenues to support the White County Solid Waste System comes from user fees at the landfill. Currently all of the fees come from out of county waste or from in county commercial and industrial. The residential sector in White County and the City of Sparta pay no user fees and only a small portion of the total revenues come from property tax dollars. The following table gives the current system revenues.

### Current System Revenues

Disposal Fees	\$344,000
Litter Grant	\$ 14,000
Transfer from Special Revenue	
Fund (from property tax)	<u>\$ 35,615</u>
TOTAL	\$393,615

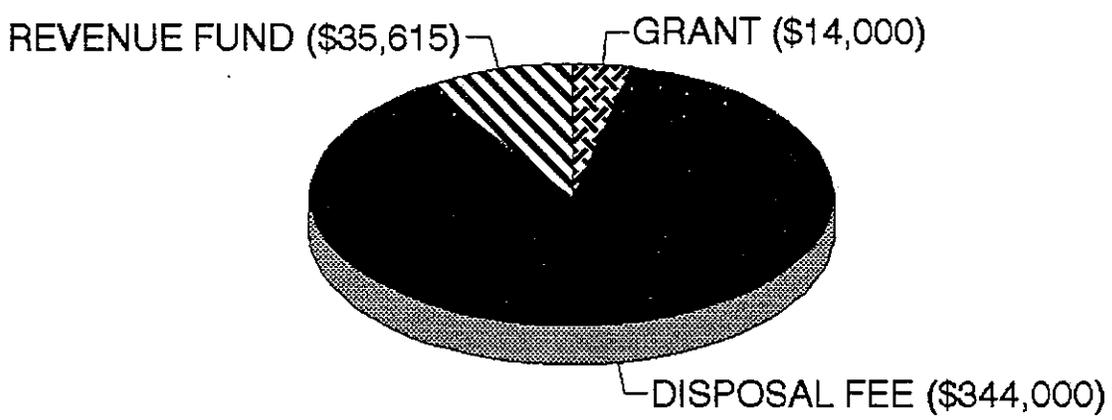
Of the \$344,000 from disposal fees, the following is an estimated breakdown from each source.

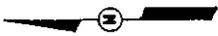
Out of County Waste	
5,800 tons/yr @\$25.00/ton =	\$145,000
In County Commercial/Industrial	
9,500 tons/yr @\$21.00/ton =	<u>\$199,000</u>
	\$344,000

The following chart displays the current system revenues.

# CURRENT SYSTEM REVENUES

## WHITE COUNTY SOLID WASTE REGION





**LEGEND**

**L** CLASS I LANDFILL

**●** CLUSTER SITES

**T** TRANSFER STATION

**C** COMPOSTING FACILITY

**☒** GREEN BOXES



HOUSE TO HOUSE PICK-UP



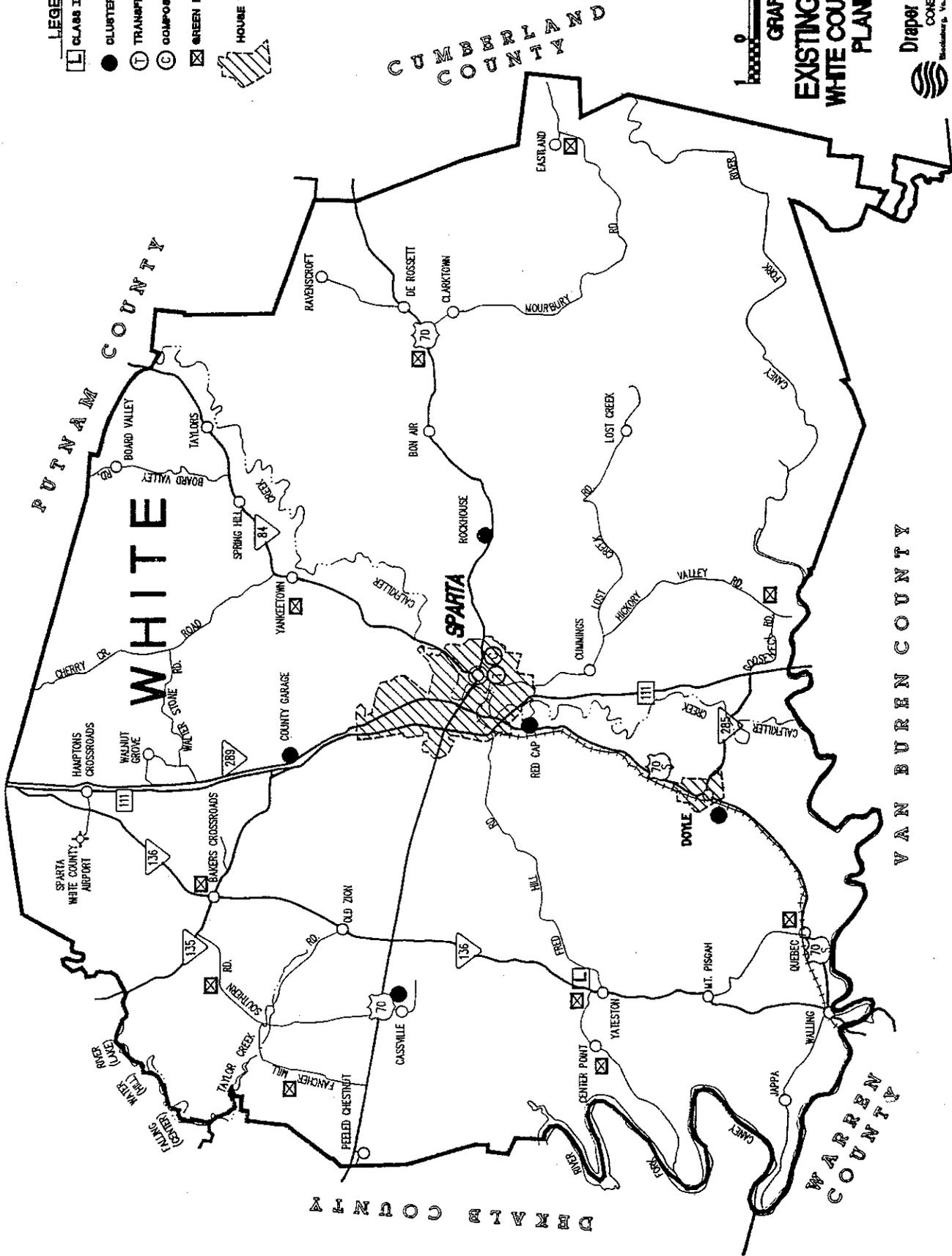
GRAPHIC SCALE

**EXISTING SYSTEM MAP  
WHITE COUNTY SOLD WASTE  
PLANNING REGION**

**Draper Aden Associates**  
CONSULTING ENGINEERS



Roanoke, Va. - Richmond, Va. - Nashville, Tenn.





**Appendix II**

**MSW Waste Stream Characterization Study**



**Appendix II**

**MSW Waste Stream Characterization Study**



**MSW WASTE CHARACTERIZATION GENERATION STUDY**

**WHITE COUNTY**

EPA NATIONAL AVERAGE	AVERAGE OF 9 SE STUDIES	AVERAGE OF 5 TESTS OF SUMNER CO	NORTHWEST ALABAMA REGION		RUTH'FORD BFI MIDDLEPOIN QUAIL HOLL		COFFEE CO. SANIFILL		SMR ROBERTSON FALL		SMR ROBERTSON BI-COUNTY SPRING		CENT TENN PLANNING REGION		SMR PLANNING REGION		SE TENN PLANNING REGION	AVERAGE OF STUDIES (%) [SEE NOTES]
			38.0	10.0	34.4	10.5	37.1	7.3	37.1	10.5	37.1	7.3	37.1	10.5	37.1	7.3		
PAPER	40.0	38.8	30.7	34.4	32.5	19.7	23.9	37.1	37.1	37.1	37.1	37.1	37.1	37.1	37.1	37.1	38.0	37.6
GLASS	7.0	8.4	5.6	10.5	29.0	11.1	11.1	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.0	8.5
FERROUS ALUMINUM	6.5	5.3	0.8	6.2	5.3	8.9	8.9	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2	7.0	6.3
NON-FERROUS PLASTIC	0.6	1.5	0.3	0.3	0.4	1.7	1.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	1.5	1.1
RUBBER/LEATHER	8.0	8.5	6.2	0.1	0.5	0.8	0.8	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	0.5	0.8
TEXTILES	2.5	2.1	5.9	7.6	5.6	7.8	10.5	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	9.0	7.7
WOOD	3.7	3.8	4.3	6.0	0.3	0.8	4.6	3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.0	2.7
FOOD WASTE	7.4	20.5	4.1	13.6	7.6	7.8	2.7	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	4.0	4.6
YARD WASTE	17.5	10.0	10.4	9.8	12.1	5.6	6.8	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	18.0	10.0
MISC. INORGANICS	1.5	3.2	32.0	8.0	6.0	6.5	2.7	7.5	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	9.0	8.7
OTHER	1.7	3.2	32.0	2.2	0.5	14.3	6.9	8.1	8.1	8.1	8.1	8.1	8.1	8.1	8.1	8.1	3.0	6.0
TOTAL	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

NOTES: AVERAGE REMAINING DATA AFTER ELIMINATING HIGHS AND LOWS SHOWN THUS [REDACTED] NON-FERROUS, WOOD, AND YARD WASTE CATEGORIES ARE ROUNDED OFF TO REFLECT WHITE COUNTIES INDUSTRIAL LOAD. MISC. INORGANICS AND OTHER CATEGORIES ADJUSTED TO GIVE TOTAL OF 100%.



## **Chapter III - Growth Trends, Waste Projects and Preliminary System Structure**

### **A. Preliminary System Structure**

A preliminary system design for White County was conducted in order to determine which elements of an integrated solid waste management system would be considered. Of all the options considered, preliminary recommendations were made to the White County Solid Waste Board on September 16, 1993 at a regular board meeting. All options were evaluated using Wasteplan, a computer modeling program developed by TVA for use in Tennessee for developing system costs. This software combines collection, recycling, transportation and disposal and generates a single cost per ton. The preliminary recommendations reflect the most economical design for White County in order to meet the requirements of "The Solid Waste Management Act of 1991."

The following is a list of all the options considered followed by the recommendations for the preliminary system design.

#### **OPTIONS CONSIDERED**

##### Disposal

Composting - Bedminster, Buhler, Tunnel Reactor, Agitated Bed System, Site Specific, Valorga

Waste-to-Energy/Incineration

Class I Landfill - White County only, regional, private

##### Diversion / Reduction

Yard Waste Composting - Ecology System, Non Vendor

Class III/IV Landfill

Recycling Collection and Processing (Blue Bag, Co-mingled, Wet/Dry, Source Separated)

##### Collection/Transportation

Convenience Centers - Roll off Containers, Green Boxes, Transfer Station

**White County Solid Waste Planning Region  
Technology Overview  
Consultant's Recommendations Concerning Preliminary System Design**

<u>Item</u>	<u>Option</u>
Disposal	Regional Landfill
Yard Waste	Small Low-End Composting Facility For Sparta
Demolition Waste	Class III/IV Demolition Landfill For The County
Convenience Centers	Eliminate Green Boxes - Construct 2 Manned, Fenced Convenience Centers To Serve County By January 1996, And 4 More As Needed For A Total Of 6 Centers
Curbside Garbage P'up	Compare Private Hauler W/ Public Service In Sparta
Transfer Stations	Install As Needed
Recycling Drop-Off	Expand System Using Convenience Centers And Offer Roll-Offs And Collection To Schools And Industries
Recycling Curbside	Study A Program For Sparta
Other Recycling	Study Potential Blue Bag Collection For Private Haulers

Tables III-1 through III-8 provide a summary of the adjusted waste loads.

## CHAPTER III: FORMS

1. Complete the following Table, summarizing calculations of annual per capita solid waste generation rates, for each county in the region.

**Table III-1**

County	Total Waste Disposed in FY 1993	Projected Population 1993	Annual Per Capita Generation Tons/Persons/Year
White	16,200 <sup>1</sup>	20,266	0.80
<b>Total</b>	16,200 <sup>1</sup>	20,266	0.80

<sup>1</sup> Information provided by Keith Ryder, County Finance Director, from July to Sept 1993 and multiplied by four (4) for yearly average.

2. Summarize the projected quantity of solid waste requiring disposal (generation) in the region in each projected year, adjusted for population changes.

**Table III-2\***

### Quantity of Solid Waste Requiring Disposal (tons)

County	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
White	16,259	16,306	16,354	16,401	16,448	16,496	16,543	16,566	16,613	16,660
<b>Total</b>	16,259	16,306	16,354	16,401	16,448	16,496	16,543	16,566	16,613	16,660

\* Aggregate from Tables IV-1 in District Needs Assessment County Profiles, as extended.

3. Summarize the projected quantity of solid waste requiring disposal in the region for each projection year, adjusted for population growth and economic growth.

Table III-3\*

Quantity of Solid Waste Requiring Disposal (in tons)  
Adjusted for Population and Economic Growth

County	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
White	16,794	16,858	16,924	16,989	17,055	17,122	17,189	17,233	17,301	17,370
<b>Total</b>	16,794	16,858	16,924	16,989	17,055	17,122	17,189	17,233	17,301	17,370

\* Aggregate from Table IV-3 in District Needs Assessment County Profiles, as extended.

4. Summarize the projected quantities of solid waste requiring disposal (=generation) for each projection year, adjusted for population growth, economic growth, and source reduction, recycling and industrial process change.

Table III-4\*

Quantity of Waste Requiring Disposal (in tons) Adjusted for Population Changes,  
Economic Growth, and Waste Reduction and Recycling

County	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
White	16,794	16,858	14,753	14,811	14,871	14,932	14,992	15,033	15,095	15,158
<b>Total</b>	16,794	16,858	14,753	14,811	14,871	14,932	14,992	15,033	15,095	15,158

\* Aggregate from Table IV-4 in District Needs Assessment County Profiles, as extended.

Omitting Tables 5 and 6 - N/A

7. Summarize projected waste generation for each projection year, adjusting for all net imports or exports of wastes. (Omit the table if no exported or imported waste adjustments were made by any county in the region).

**Table III-7\***

**Annual Projections of Solid Waste Requiring Disposal Adjusted for Waste Imports or Exports (in tons/year)**

County	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
White	22,648	22,734	14,753	14,811	14,871	14,932	14,992	15,033	15,095	15,158
<b>Total</b>	<b>22,648</b>	<b>22,734</b>	<b>14,753</b>	<b>14,811</b>	<b>14,871</b>	<b>14,932</b>	<b>14,992</b>	<b>15,033</b>	<b>15,095</b>	<b>15,158</b>

\* Aggregate from Table IV-7, in District Needs Assessment County Profiles ,if applicable. (N/A)  
Assume outside waste ceased by 1996.

8. Prepare a Summary Table indicating projected quantities of solid waste which will require collection and disposal in each projection year, after adjustment for all applicable factors.

**Table III-8**

**Annual Projections of Solid Waste Requiring Disposal Adjusted for All Applicable Factors (in tons/year)**

County	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
White	22,648	22,734	14,753	14,811	14,871	14,932	14,992	15,033	15,095	15,158
<b>Total</b>	<b>22,648</b>	<b>22,734</b>	<b>14,753</b>	<b>14,811</b>	<b>14,871</b>	<b>14,932</b>	<b>14,992</b>	<b>15,033</b>	<b>15,095</b>	<b>15,158</b>

Doesn't include import waste which is assumed to cease by 1996.



## Chapter IV - Waste Reduction

### A. Establish a Base Year Quantity

#### 1989 Data

The following data table is compiled of information taken from "Managing Our Waste: Solid Waste Planning in Tennessee," published February, 1990 by the University of Tennessee.

<u>County</u>	<u>Population</u>	<u>Waste(TPY)</u>	<u>Per Capita</u>
White County	20,700	8,795	0.4249
Regional Total	20,700	8,795	0.4249

#### 1993 Data

The following data is taken from multiple sources and consists of the most up-to-date data available. The needs assessments were the starting point for the data, but interviews and information provided by the individual cities and counties provided the majority of the information.

### B. Waste Reduction Goals

The following represents the waste generation in tons per capita per year which is required to meet the waste reduction goal.

$$0.4249 \times .75 = 0.3187$$

#### Yearly Generation Goals (With No Variance)

<u>Year</u>	<u>Pop.</u>	<u>Tons</u>	<u>Year</u>	<u>Pop.</u>	<u>Tons</u>
1995	20,383	6,496	2000	20,679	6,590
1996	20,442	6,515	2001	20,707	6,599
1997	20,501	6,533	2002	20,766	6,618
1998	20,560	6,552	2003	20,825	6,637
1999	20,620	6,572			

Variances to be Requested

1. Base Year Variance Request to 1993

BASE YEAR VARIANCE

Due to obvious errors in the tonnage reported in 1989, a base year variance was requested to 1993. This generates the following:

<u>County</u>	<u>Population</u>	<u>Waste (TPY)</u>	<u>Per Capita</u>
White	20,266	16,200	0.80

Revised Waste Generation Goal:  $0.80 * 0.75 = 0.60$  tons/capita/year

Yearly Generation Goals:

<u>Year</u>	<u>Pop.</u>	<u>Generation (TPY)</u>	<u>Year</u>	<u>Pop.</u>	<u>Generation (TPY)</u>
1995	20,383	12,230	2000	20,679	12,407
1996	20,442	12,265	2001	20,707	12,424
1997	20,501	12,301	2002	20,766	12,460
1998	20,560	12,336	2003	20,825	12,495
1999	20,620	12,372			

Yearly Waste Diversion Goals

<u>Year</u>	<u>Generation Goal (TPY)</u>	<u>Estimated Generation (TPY)</u>	<u>Required Diversion (TPY)</u>
1995	12,230	16,858	4,628
1996	12,265	16,924	4,659
1997	12,301	16,989	4,688
1998	12,336	17,055	4,719
1999	12,372	17,122	4,750
2000	12,407	17,189	4,782
2001	12,424	17,233	4,809
2002	12,460	17,301	4,841
2003	12,495	17,370	4,875

## C. Methodology for Meeting Reduction Goal

### Short Term Reduction Goals and Objectives:

In order to meet the 25% diversion goal in a rural area, it is necessary to phase in the diversion program. An effort to implement a single large-scale program which meets the criteria in a single stroke is inordinately expensive as well as a tremendous gamble. By utilizing a phased approach, the county will be able to implement the program incrementally and judge each phase before proceeding. In the event that a phase diverts more waste than is predicted, a later phase might be deleted until diversion past 25% is desired. In the event that a phase does not meet expectations, the plan can be reviewed and additional programs added.

The recommended phases are as follows:

#### Phase One

1. Refuse to accept yard waste at the landfill or proposed convenience centers. Assist the City of Sparta in education concerning the existing composting program.
2. Provide a reduced rate for disposal of white goods and scrap metal. Collect said materials at the landfill and work with a scrap dealer for sale.
3. Provide a reduced rate for source separated Class III/IV wastes. Construct and operate a Class III/IV landfill at the existing landfill site.
4. Provide drop-off recycling collection at the convenience centers and at the landfill. Phase One collection to include newspaper and aluminum cans.
5. Provide large-scale education effort for businesses and industry.

#### Phase Two

1. Upgrade the drop-off recycling collection to include corrugated cardboard, and glass.
2. Provide recycling bins at county schools to collect white paper and corrugated cardboard.

### Phase Three

1. Provide curbside collection for newspaper only.

### Long-Term Options

1. Expand Sparta curbside to collect aluminum cans, metal cans, cardboard, and glass.

### Previous Waste Reduction Credit

Draper Aden Associates researched the region in an effort to determine significant recycling efforts which were in place between 1985 and 1989. None were found which were of sufficient significance to request this credit.

Therefore, no cause was found within the region to file for a previous waste reduction credit.

### Quantities of Materials Diverted Per Year

1991 (from Needs Assessment)	
1994 (projected)	235 tons
1995 (projected)	4,628 tons
1996 (projected)	4,659 tons
1997 (projected)	4,688 tons
1998 (projected)	4,719 tons
1999 (projected)	4,750 tons
2000 (projected)	4,782 tons
2001 (projected)	4,809 tons
2002 (projected)	4,841 tons
2003 (projected)	4,875 tons

### Regulatory Bans

In the event that the region has sufficient control of the disposal site to enforce such bans, the following items will be banned from acceptance at any Class I landfill facility:

Yard Waste

Wood Waste

Construction/Demolition Debris

Sewage Sludge (unless dewatered sufficiently to pass the Paint Filter Test)

All Liquid Wastes (defined by the Paint Filter Test)

## Economic Incentives and Disincentives

Variable rates are proposed such that the following items can be disposed of at the Class III/IV Landfill at reduced rates:

Wood Waste  
Construction/Demolition Debris

No economic disincentives are proposed due to the negative impacts such programs have on roadside littering and illegal dumping.

## Other Waste Reduction Strategies

Commercial/Industrial Source Reduction:

**Goal 1 -- Increase Source Reduction and Program Involvement Through Education-- Education in the Area Offices and Stores**

### **Target Groups and Audiences:**

The primary target for this program are those establishments which generate large amounts of paper. This includes governments offices, insurance offices, legal firms, professional firms, etc.

### **Amount and Kind of Information and Specific Methods to be Utilized:**

This program must be very simple and not time consuming. The primary purpose of the program is to overcome the fallacy that paper recycling is difficult. As such, an brochure must be simple and preferably on a single page. The brochure should include an offer for a region representative to come to the office and assist them in setting up the recycling collection program.

Some simple points which should be added to the educational package are:

1. Always have a paper recycling box at the copy machine.
2. Another good location for a paper collection box is at the coffee machine.
3. A system which does not work well is the use of desk-top "in" boxes for recycling. Such a box on someone's desk is usually being used for something else within a week.
4. Individual boxes next to each employee's desk work only when someone in the office is designated to take the recyclables to a central point on at least a weekly basis.

## **Method For Evaluation and Reporting of Program**

The region must keep records of all offices which have requested assistance in setting up in-office recycling programs. In addition, each of these offices should be contacted on an annual basis to determine if they have continued their recycling efforts. In the event that an office has discontinued, the region should make a personal call on the business to determine if there is any way to reinstate the program.

## **Goal 2 -- Increase Source Reduction and Program Involvement Through Education-- Education in Area Industries**

The primary purpose of this program is to get industries working with one another to identify problem wastes and potential solutions within the region. The stories are getting less rare of situations where one industry was throwing away large quantities of a material which a nearby industry purchases as a raw material.

The offices associated with industry would be handled under the office program.

### **Target Groups and Audiences:**

The target group for this program is those industries identified in this report as being major waste generators.

### **Amount and Kind of Information and Specific Methods to be Utilized:**

The region should perform an inventory of the manufacturers in the region which includes the raw materials and waste products associated with their process. All other materials which are disposed of in bulk should be cataloged. This listing should then be made available to the industries in the region. Regular meetings between area industries should be sponsored by the Solid Waste Region in order to motivate communication among the industries.

## **Method For Evaluation and Reporting of Program**

Area industries should be contacted on an annual basis and questioned concerning recycling programs and any programs which have been worked out in coordination with other area industries. Multi-industry programs should be charted for progress. In the event that one of these programs is canceled, the region representative should meet personally with the industries involved to determine if the arrangement can be continued.

## Area Industries

Bee-Jay Apparel, Inc.	LTD Supply, Inc.
Dunn Precision Tooling	Mallory Controls, Inc.
Casual Apparel, Inc.	Moeller Manufacturing
Scepter Hardwoods, Inc.	NOD Company
Jeld-Wen of Tennessee	Allied Signal Engineering Plastics
Doyle Shirt Manufacturing Corp.	Precision Molding Services, Inc.
Farmhouse Foods, Inc.	Red-Kap Industries
Figoshen Mills	Richardson C & D Manufacturing Co.
Jasp Prewash	Rigsby Manufacturing Co.
Harvie Johnson Pallets	Rogers Group
Sparta Turntable	Spartan Furniture
S & S Screw Machine Company	Tennessee Custom Manufacturing
Savage Lumber Company, Inc.	Thomas Industries
Sullivan & Son Lumber Company	Townsend Textron - Spencer
Shaffield Industries	U.S.A. Enterprises
Southern Wood Products	Volunteer Specialty Co., Inc.
Sparta Concrete Company	Wagner
Sparta Spoke Factory	White County Lumber Company
Dunn & Bybee Tool Co., Inc.	Hope Manufacturing
S & W Pallet Materials	Sparta Steel
Mullins Oakwood	Great Bay Timber
ABC Machine & Tool Company	Better Built Furniture
K. D. Apparel	Mar-Fab, Inc.
Zorro Bait Company	Tennessee Woods
Valley Barn Builders	White County Tool & Die
Townsend Textron - Sparta	

## Staffing Requirements Narrative

It is recommended that the county designate one person working within the solid waste department to coordinate diversion, recycling, and education. This person will be described from here on as the Diversion Manager.

## 10-Year Implementation Schedule

Spring 1994	Begin Construction of Class III/IV
Summer 1994	Begin White Goods/Scrap Metal Collection
October 1994	Hire Diversion Manager, Begin Working With Industries And Businesses
January 1995	Begin Phase One Drop-off Recycling Program
June 1995	Begin Phase Two Drop-off Recycling Program
August 1995	Begin School Recycling Program
November 1995	Begin Sparta Curbside (if needed)
December 1995	All Planned Programs Associated With Diversion Operating at 100%.
January 1, 1996	25% Diversion Goal Met.

### Allocation of Responsibility

White County will be responsible for all aspects of the program with the exception of the Sparta Composting Program which is presently existing.

The county will need to negotiate with the city on responsibility concerning the curbside pick-up of newspaper within the city limits. This program serves only the city due to the cost-efficiencies associated with collection in the more densely populated environment.

### Data Collection System Narrative

As stated above, the Diversion Manager is responsible for all data collection and report preparation.

All recyclable and compost materials will be run across the scales at the landfill and a record will be kept of all materials, tonnages, markets, and dates. These files will be utilized in the preparation of the quarterly reports to the State Division of Solid Waste Assistance.

**D. Synopsis of Plan**

<u>Phase</u>	<u>Method</u>	1995 <u>Tons Diverted</u>	<u>Annual Cost</u>	<u>Cost/Ton</u>
Existing	Sparta Composting Program	42	\$0	\$0
1	White Goods & Scrap Metal	492	\$ 4,019	\$ 8.17
1	Drop-Off Recycling	596	\$ 10,540	\$ 17.68
1	Class III/IV Landfill	891	\$ 33,007	\$ 37.04
1	Industrial/Commercial Source Reduction	1,824	\$0	\$0 (See Education)
2	Upgrade Drop-Off Recycling	417	\$ 23,378	\$ 56.06
2	School Recycling	63	\$ 16,277	\$258.37
3	Sparta Newspaper Curbside	<u>303</u>	<u>\$ 27,275</u>	<u>\$ 90.02</u>
<b>TOTALS</b>		<b>4,628*</b>	<b>\$114,496*</b>	<b>\$ 40.83*</b>

\* Note: Cost per ton does not include tonnage diverted through industrial source reduction.

The above costs assume that convenience centers are handled by roll-off containers and trucks. In the event that front loading trucks are utilized the total costs decrease somewhat to the following:

Total Annual Cost:	\$106,274
Total Cost Per Ton:	\$ 37.90

It should be noted that, in most cases, roll-off transportation of waste is the most cost-effective. The reasons that the two options are so similar is due to the ability of the front end loading system to utilize smaller containers. In servicing the schools for example where recyclable loads are relatively small, the roll-off bins must be hauled at times when they are only partially full. In this system, the ability of the front end loader to service several schools without having to haul to the distant market saves substantial total costs.

The annual costs associated with the construction of a materials processing facility to process, store, and compact the recyclables for more cost-effective transportation was about \$500,000 per year which includes debt service on construction and equipment, labor, utilities, equipment, fuel, transportation, and revenues. Therefore, the option of constructing a MRF to serve White County alone was not considered cost-effective compared to direct transport to market.

**E. Ten Year Budget For Waste Reduction (5% Inflation After 1996)**

The annual cost of waste reduction including recycling cost and not including administrative cost (included in Chapter VI) is shown in the following table:

1994	\$4,019
1995	\$54,214
1996	\$56,925
1997	\$59,771
1998	\$62,760
1999	\$65,898
2000	\$69,193
2001	\$72,653
2002	\$76,286
2003	\$80,100

Notes: 1994 cost includes white good and scrap metal collection only.

1995 cost includes white good and scrap metal collection, drop-off recycling, upgrade drop-off recycling and school recycling. Class III/IV cost included in disposal cost in Chapter VIII. Figures shown on page IV-10 are for reference only. Cost for Sparta newspaper curbside is not included in the above table, but may be added if necessary to meet the waste reduction goal.

1996-2003 costs are utilizing 1995 cost plus a 5% inflation per year increase.



## Chapter V - Waste Collection and Transportation

### A. Comparison of Existing System to Requirements

The "Solid Waste Management Act of 1991" requires counties to provide an adequate collection to all residents within the county. An adequate collection system can be convenience centers or house to house pickup. The minimum number of convenience centers required by the act is based on the following criteria:

- one center per 12,000 people excluding cities with house to house pickup, or
- one center per 180 square miles of land area excluding cities with house to house pickup, government owned land and forestry reserves held by the wood processing industry.

COUNTY	AREA SQ. MI.	CENTERS REQUIRED	2003 POPULATION	CENTERS REQUIRED	MINIMUM REQUIRED
White	377*	2	20,825	2	2

\* Includes City of Sparta

Based on the above criteria, White County is required to provide two convenience centers at a minimum. A convenience center is defined as an area which is staffed and fenced that has waste receptacles on site, and that are open to the public, when an attendant is present to receive household waste, municipal solid waste and recyclable material. Waste receptacles can be green boxes or a compactor accompanied with a roll off container. The fence is required to control the type of waste as the operator can monitor all waste as it is dropped off. Beginning on January 1, 1995, convenience centers cannot accept tires, lead-acid batteries, waste oil, paint or household hazardous waste along with the regular waste. Convenience centers must have a shelter for inclement weather and to store necessary records, water for wash down, sanitary facilities, and communication maintained during operating hours to notify authorities in an emergency. Storm runoff must be controlled to a single point enabling the center to contain runoff if a problem occurs. Process water must be contained and disposed of in a sanitary sewer system or a septic system.

White County's current collection system consist of green boxes located throughout the county at 15 unstaffed locations which five of the locations contain from 14 to 19 green boxes. The remainder of the locations contain 3 to 7 green boxes. The City of Sparta provides house to house pick up to all residents within the city limits. The county also provides green boxes at schools and several commercial/industrial businesses. The following is a list of current green box locations:

<u>Location</u>	<u>Number of Green Boxes</u>	<u>Fenced</u>
Cassville	19	x
County Garage	18	
Doyle	14	
Red Capp	15	x
Rock House	19	x
Bakers Crossroads	6	
Bon-De-Croft	5	
Eastland	4	
Fanchers Mill Rd	3	
Hickory Valley	4	
Landfill	7	
Southard Road	4	
Walter Stone Road	3	
Yankeetown	5	
Yatestown	3	

**B. Regional Needs**

As indicated above White County is required to have two convenience centers at a minimum. Recommendations are to locate one on State Highway 111 N. at the County garage and the other a few miles south of Sparta. Components of a convenience center will include a 42 cubic yard container with a compactor for household waste, recycling containers for white paper, newspaper, aluminum cans, cardboard, glass containers, scrap metal, and white goods (stoves, washing machines, etc.). The existing "green box" containers will be phased out in areas served by a convenience center. The convenience center will be staffed full time during hours of operation and the perimeter will be fenced with a gate that is locked when not open. Days and hours of operation will be based on need with a minimum of 40 hours per week. The operator will inspect each load to make sure that no hazardous or problem waste (tires, lead acid batteries, used oil, paint, etc.) is disposed of in the compactor with the household waste. Provisions will be made to accept these items at the convenience centers or at a designated place. The operator will also help promote recycling and make sure that recyclable material is placed in the proper container.

**C. Meeting Identified Needs**

By January 1, 1996 the county must establish at least two convenience centers.

Current Waste Loads

From scale data received from the White County landfill, solid waste generation within White County is 16,200 tons per year. The following is a breakdown of waste from each sector:

	<u>Yearly Waste Generation (Tons)</u>
City Of Sparta	6,700
White County Public	6,700
Commercial/Business/Schools	<u>2,800</u>
Total	16,200

From the 1990 census information, White County's total population is 20,090 and City of Sparta had a population of 4,681. The population within the County excluding the City of Sparta is 15,409. Based on these waste loads and populations, waste generation for each are as follows:

Sparta: 6700 TPY/4,681 = 1.43 tons/capita/yr.  
White Co.: 6700 TPY/15,409 = 0.43 tons/capita/yr.

**D. Schedule for Convenience Center and Staffing**

<u>Activity</u>	<u>Date</u>
Apply for Convenience Center Grant	Fall 1994
Funding in Place for Two Convenience Centers	Summer 1995
Construction of Two Convenience Centers	Fall 1995

**E. Ten Year Budget - Collection and Transportation**

**WHITE COUNTY**

**Convenience Center Operation**

YEAR	CAPITOL <sup>1</sup> COST	EQUIPMENT <sup>2</sup> REPLACEMENT	OPERATIONS <sup>3</sup> /MAINTANCE	TRANSPORTATION COST	TOTAL COST
1994	0	0	0		0
1995	0	0	0		0
1996	12,440	0	35,620	9000	57,060
1997	12,440	0	37,401	9,450	59,291
1998	12,440	0	39,271	9,923	61,634
1999	12,440	7,622	41,235	10,419	71,716
2000	12,440	8,003	43,297	10,940	74,680
2001	12,440	8,403	45,462	11,487	77,792
2002	12,440	8,823	47,735	12,061	81,059
2003	0	9,264	50,122	12,664	72,050

<sup>1</sup> Use grant funds for capitol cost of two convenience centers. One roll-off truck amoritized over 7 years at 5% interest.

<sup>2</sup> Replacement cost for equipment after 5 years is \$3,811/ year for depreation.

<sup>3</sup> Yearly operations and maintenance cost is \$17,810/ center.

## WHITE COUNTY

### Total Collection and Transportation Cost

- 1994 and 1995 figures based on current budget figures provided by White County.

- 1996 cost is 25% less than 1995 cost for green box collection assuming that 25% of the waste will be handled through the convenience centers.

- 1997 - 2003 figures based on 1996 cost with a 5% inflation factor.

Year	Convenience Centers	Green Box	TOTAL
1994	0	165,178	165,178
1995	0	169,800	169,800
1996	57,060	127,350	184,410
1997	59,291	133,718	193,009
1998	61,634	140,403	202,037
1999	71,716	147,423	219,139
2000	74,680	154,795	229,475
2001	77,792	162,534	240,326
2002	81,059	170,661	251,720
2003	72,050	179,194	251,244

## Chapter VI - Recycling

### A. Regional Goals and Objectives

The primary goal of the recycling program is to augment the waste diversion program. Therefore many of the goals and objectives are shared between recycling and waste diversion. In order for the waste diversion program to be able to meet the goals as outlined in Chapter 4, the following recycling goals will have to be met:

<u>Year</u>	<u>Recycling Goal</u>	
1995	1,871 tons recycled	Note: Tonnages include Phases 1, 2 and 3 of program.
1996	1,873 tons recycled	
1997	1,875 tons recycled	
1998	1,876 tons recycled	
1999	1,879 tons recycled	
2000	1,882 tons recycled	
2001	1,884 tons recycled	
2002	1,885 tons recycled	
2003	1,887 tons recycled	

The above numbers do not include yard waste composting or demolition landfilling under the heading recycling. The above numbers must be met through the collection and successful marketing of the following materials: white paper, newspaper, glass containers, ferrous containers, aluminum containers, and cardboard. These numbers represent a program which is much more comprehensive than the existing programs within the region.

The following goals and objectives are given as a means to accomplishing this increase (for clarity, the definition of a goal is a basic target of the program and the objectives are the steps toward the goal):

**Goal 1: Make Recycling Easily Available to All Residences in the Region**

**Objective a:** Provide facilities where drop-off customers can bring their commingled recyclables. This is to be accomplished utilizing the convenience center network within the region.

**Objective b:** Provide a system for residents within the urban areas of the county. This is to be accomplished with a convenience center outside of Sparta and the curbside newspaper collection in Sparta.

**Goal 2: Make Recycling Available to Business Customers**

Objective a: Adapt the collection and processing system to allow business participation.

**Goal 3: Make Recycling Available for Industrial Customers**

Objective a: Adapt a recyclable collection program to any industry which generates more than 100 tons of recyclables per year.

Objective b: Provide a Roll-Off or Dumpster service for cardboard at the above industries.

Objective c: Set up a program to research industrial waste products within the region for potential markets

**B. Expansion of Recycling Collection to Unserved Areas**

The convenience centers are being planned to serve the entire county. By utilizing these facilities, service should be provided to all citizens.

**Description of Planned Programs and Location of Proposed Facilities**

**Drop-off Collections:**

Drop off collections will be maintained at the proposed convenience centers and at the landfill. These will consist of compartmentalized roll-off containers and roll-off trucks (or optionally 8 CY dumpsters and front loading trucks). Scrap metal and white goods collection will be at the landfill in bins as requested by the end market. A curbside collection program for newspaper is proposed for Sparta.

Cooperative Marketing Plan

All recyclable materials will be processed and marketed through the Diversion Manager (See Chapter IV). Marketing will be coordinated by the Diversion Manager. It is the responsibility of the Diversion Manager to work with surrounding counties for cooperative marketing.

Interaction with the Tennessee Office of Cooperative Marketing

The Diversion Manager will be responsible for coordinating with the Tennessee Office of Cooperative Marketing (TOCM). The following information will be provided to the TOCM on at least a quarterly basis:

1. Tonnage and Type of Materials Recycled and Marketed
2. Tonnage and Type of Materials Backlogged On Site
3. Age and Type of Materials Backlogged On Site
4. New and Available Markets in the Region
5. Prices Obtained for Recycled Materials
6. Potential Materials Being Planned for Collection/Separation

Actions to Expand/Create Markets

In this plan, this program falls under the purview of the Diversion Manager. The goals and objectives associated with it are detailed as Goal 3 in Chapter IX *Public Information and Education*.

Education Programs

In this plan, educational programs fall under the purview of the Diversion Manager. The goals and objectives associated with it are detailed in Chapter IX *Public Information and Education*.

10-Year Staffing Plan

Administration:

The Waste Diversion Manager will be responsible for coordinating and providing the paperwork for the county-operated systems such as the demolition landfills and yard waste composting facilities. The Waste The Diversion Manager will also be responsible for recycling and education programs.

10-Year Budget

The Administrative Staffing Budget for the Program is estimated as follows:

Supplies:	\$1,000
Office Equipment:	1,000
Travel:	1,000
Printing:	1,000
Advertising:	<u>1,000</u>
<b>TOTAL</b>	<b>\$5,000</b>

This translates into about \$2.36 per ton additional for the tipping fee.

The cost per year (1996) of operating the entire waste reduction program is \$120,521 (see Chapter 4 for breakdown). This represents an additional cost of \$7.44 per ton of waste.

**C. Funding Plan**

Funding for the recycling program will be from the Solid Waste Fund in the White County Budget. Chapter IV, pages IV-10 and IV-11 of this report provides estimate costs for this program.

**D. Data Collection Plan**

The Waste Diversion Manager is responsible for all data collection and is charged with collecting sufficient data to make the quarterly reports to the state as required by regulations and by this plan.

**E. Ten Year Budget For Administration Of Recycling Programs (5% Inflation)**

The cost for recycling is included in Chapter IV - Waste Reduction on pages IV-7 and IV-8.

1994	\$5,000
1995	\$5,250
1996	\$5,513
1997	\$5,789
1998	\$6,078
1999	\$6,382
2000	\$6,701
2001	\$7,036
2002	\$7,388
2003	\$7,757



## **Chapter VII - Composting, Solid Waste Processing, Waste-to-Energy, and Incineration Capacity**

### **A. Quantitative Needs**

A following is a listing and a brief description of the needs and waste types which would require the above-listed facilities:

#### Yard Waste Composting

Yard waste composting can be utilized to process and divert grass, leaves, brush, and untreated wood wastes. In addition, given appropriate conditions, certain sanitary sewage sludges can be mixed into the yard waste compost to make a compost product which has higher nitrogen content and is thus a higher quality soil conditioner. The handling of sewage sludges is not within the scope of this plan and will be noted only to the point that if White County desires to add sewage sludge into the composting process, the EPA 503 regulations would have to be addressed through the Tennessee Department of the Environment and Conservation, Division of Water Quality as well as the Solid Waste Regulations and the Division of Solid Waste Management.

White County's waste stream is approximately 6% yard waste and 10% wood waste which represents about 2,500 tons of waste per year. The vast majority of this waste that can be diverted from the waste stream is planned to be diverted into a county-operated Class III/IV landfill. In addition it is planned to continue the small yard waste composting program which is presently being operated by the City of Sparta.

#### Solid Waste Composting

Solid waste composting is a capital-intensive process which requires large-scale processing of the entire waste stream to separate and compost those items which are compostable. Approximately 67% of White County's waste stream appears to be compostable which represents about 11,000 tons per year. This option was reviewed as a part of this plan and costs associated with the development of such a facility for White County were about \$98 per ton. As it does not appear that this system will be required to meet the 25% reduction requirement within the ten year time frame of the plan, large-scale solid waste composting was not recommended.

### Solid Waste Processing (Baling)

Many large solid waste facilities use baling of solid waste as a method of reducing land and soil requirements over the life of the facility. Approximately 92% (15,000 tons per year) of the waste stream could be processed through a horizontal baler. Baling increases waste densities from about 1,000 pounds per cubic yard to about 1,250 pounds per cubic yard. This results in a waste volume reduction of 25%. In addition, variances are available for daily cover requirements which reduce the amount of soil needed in the landfill. This can increase the available volume of a landfill by about 30% to 35%. The capital cost of a baling facility serving White County would be about \$500,000. This cost includes a single horizontal baler with installation and a pre-fabricated metal structure with concrete floor and conveyor system. Assuming a 10-year payback at 5% yields an annualized cost of about \$64,750 per year. Given that the landfill is expected to utilize about 1 acre per year and the land costs in the area can be conservatively estimated at \$5,000 per acre, the baling option is not justified based upon cost.

### Solid Waste Processing (Shredding)

Shredding of solid waste prior to landfilling is utilized to reduce the volume of the material and thereby preserve land and landfill volume. Approximately 92% (15,000 tons per year) of the waste stream could be processed through a shredder. Shredding is most effective with container type wastes and wastes which contain a large amount of air and do not compress well (plastics, cans, bottles, brush). Shredding can reduce the volume of waste in the landfill by as much as 25%. The costs of a solid waste shredder of this type would be about \$150,000. This cost is for a 100 HP shredder installed out of doors. Assuming a 10-year payback at 5% yields an annualized cost of about \$19,500 per year. Given that the landfill is expected to utilize about 1 acre per year and the land costs in the area can be conservatively estimated at \$5,000 per acre, the shredding option is not justified based upon cost.

### Yard Waste Incineration

Incineration of yard and untreated wood waste can be performed through the use of a pit burner or air curtain destructor. White County's waste stream is approximately 6% yard waste and 10% wood waste which represents about 2,500 tons of waste per year. The vast majority of this waste that can be diverted from the waste stream is planned to be diverted into a county-operated Class III/IV landfill. Pit burning and air curtain destruction are allowable as a portion of the 25% reduction program. They were not recommended due to the fact that they were not needed to meet the reduction goals and that air quality regulations may remove them from approved waste disposal methodologies in the near future.

## Waste-to-Energy

Preliminary evaluation of this alternative yielded costs well in excess of \$100 per ton for solid waste disposal through this alternative. It is therefore not recommended as a part of the 10-year plan.

### **B. Implementation Steps**

The only composting, processing, incineration, or waste-to-energy facility planned for the region is the continuation of the City of Sparta Composting program. This program is presently located at the city garage and is low-tech in that yard waste is collected, chipped, piled up, allowed to decompose, and finally given away and utilized by the City.

#### **1. Goals and Objectives**

The goal of this facility is to continue with its present operation and to work with the county/region diversion and education manager such that at least 42 tons of yard waste per year reaches the facility and is processed and distributed or utilized. 42 tons per year represents about 420 cubic yards which is a pile 30 feet across and 14 feet high. For information, 420 cubic yards of yard waste will become about 210 cubic yards of compost after 12 months.

#### **2. Type, Capacity, and Location**

The facility is a simple "chipper and pile" system with a capacity of about 50 tons per year. The capacity is limited by the space available at the garage more than by the chipper which could process substantially more. The facility is located within the Town of Sparta at the city garage.

#### **3. Materials Composted**

The materials composted will be yard waste including leaves and brush which are generated in and around the Town of Sparta.

#### **4. Siting, Designing, Permitting, Constructing, and Operation**

The facility is presently sited, designed, constructed, and in operation. It will be the responsibility of the Town of Sparta working with the region to apply for and receive any required permits.

5. Market for Compost

The market for compost is the citizens and government of Sparta. This market should be sufficient to divert the quantities planned to be generated.

6. Quantities of Residuals to be Disposed

The residuals from this system are planned to be minimal based upon separated collection of the yard waste. Any materials found in the yard waste which cannot be composted will be taken to the Sparta transfer station and hauled to the county landfill for proper disposal.

7. Staffing and Training

The facility is presently staffed by the Sparta Public Works Department. Due to the size and scope of the facility, no special training should be necessary. It will be the responsibility of the county/region diversion and education manager to coordinate the documentation of the diversion rates.

8. Estimated Capital Costs and Financing

As the facility is existing, no such costs will be forthcoming.

9. 10-Year Operating and Maintenance Budget

The staff and chipping of the yard waste is performed as a portion of the Town of Sparta waste collection system and, as such, will have no special budget requirements of its own.

10. Integration with Other Elements of the Regional Solid Waste System

The yard waste composting is a small part of the overall waste diversion plan and operates fairly independently of the remainder of the system. The composting facility is not essential to the remainder of the plan but provides a service to the people of Sparta and does divert the yardwaste from the landfills where disposal is substantially more expensive. Coordination of the documentation of the facility is the responsibility of the county/region diversion and education manager.

**C. Implementation Schedule**

January 1, 1995                      Hire Diversion Manager

The Diversion Manager works with the City of Sparta and provides public awareness of the facility and the program.

January 1, 1995                      Have Program In-Place to Compost 42 Tons in 1995

**D. Implementation Responsibility**

Single-county region. County will provide education and awareness programs, City of Sparta will provide facility and operations.



## **Chapter VIII - Disposal Capacity**

### **A. Background**

The White County Solid Waste Planning Board has evaluated several options for at least the next ten years for disposal of solid waste that is not being recycled, reused or composted. These options include:

- Continued operations of current Class I facility
- Contract for disposal at a private landfill
- Regional public landfill if available

White County Planning Board recognizes that disposal of solid waste is the most costly component of their Solid Waste Management System. White County has decided that the primary option for disposal would be continued operations of its Class I landfill as it has approximately 20 years of permitted capacity.

White County has evaluated disposal at a private landfill. The Planning Board has received estimated cost for disposal at two private landfills in Middle Tennessee. These cost estimates are provided in Appendix VIII-A at the end of this chapter.

A new regional public landfill was also evaluated by the White County Planning Board. Although a regional landfill would probably be more economical (dependent upon size of region and waste load), there are none planned at this time and would not be available by October 1996 when the County has to upgrade its current landfill or go elsewhere for disposal. Therefore, the Planning Board has decided a regional landfill will not be considered because assurance of disposal would not be available.

### **B. Class I Capacity**

The White County Solid Waste Planning Region has one disposal facility, the White County Landfill which has a Class I (municipal solid waste) area and a permit pending for a Class III/IV area. Reportedly the Class III/IV landfill has a proposed life of in the vicinity of 100 years. The County anticipates opening the Class III/IV area spring of 1994.

The most recent design plans for the Class I area dated June 10, 1991 (revised July 30, 1992) with supporting operations manual dated June 1991 were submitted to the State as a minor modification. These plans supersede the previous design plans dated February 1989. Both sets of plans were prepared by Cumberland Engineers. The plans basically show two fill areas. The 1991 plans provide a containment system for Fill Area 2. However, since the County recently closed out Fill Area 1 they moved into Fill Area 2 without the containment system indicated on the plans. This will require another modification of the plans to document the contained versus uncontained areas of the landfill

modification of the plans to document the contained versus uncontained areas of the landfill and adjustment of the liner and leachate collection system to accommodate the change in the footprint.

As part of these evaluations the Tennessee Division of Solid Waste Management field office in Cookeville was contacted to discuss the permitting status of the facility. The State field engineer indicated the State was close to issuing a permit for the Class IV area. The State engineer indicated the proposed life of the Class IV was in the vicinity of 100 years.

The State indicated the current plans for the Class I area need revision to address the modified footprint of the operating facility and its impact on the footprint of the proposed lined area. The State indicated some additional design work on the plans may be needed to show compliance with new regulations and guidance documents.

Regarding the status of the hydrogeological evaluation of the site, the operations manual refers to two geologic evaluations conducted. One study was conducted in July 1976 (by the Tennessee Department of Public Health) and the other in August 1984 (by the Tennessee Division of Solid Waste Management). Currently, four monitoring wells are in place. The State indicated additional hydrogeologic information is needed for the facility to continue operations subsequent to October 1996. The permit modification review is pending the County's response to a request from the State for a "karst demonstration study". A guidance document from the State's central office which outlines the requirements for a karst demonstration is included in Appendix VIII-C at the end of this chapter. This additional, potentially costly, hydrogeologic investigation will affect the overall site development schedule.

The landfill is in the process of developing a sediment pond for storm water management. Grading the landfill and providing diversion ditches and/or berms can minimize the amount of infiltration into the waste. Perimeter ditches can direct the stormwater to a sediment pond prior to discharge off site to minimize the affects of sediment transport on offsite drainageways. Suitable daily, intermediate and final cover can also work towards diverting stormwater away from the waste fill areas.

The landfill operating equipment consists of two 816 Caterpillar compactors, one 983 Caterpillar track loader, one D6 Caterpillar dozer, and two Clark Michigan scrapers. The landfill also recently acquired a wood chipper. Scales have been in place at the landfill since March 1993.

The design plans were generally reviewed for the current status of the site and capacity issues. During this review, a few items were noted and outlined below for the County's general information and consideration. These issues will need to be resolved during the permit review process. This does not represent a comprehensive design evaluation of the plans.

The plans include a general grading plan for the excavation of the fill area. The plans generally show bottom depths on the cross sections. Either excavation or top of liner grades needs to be shown on a grading plan. A top of liner grading plan assists in development of an effective leachate collection/drainage plan. The plans also do not show containment along the sides of the fill area.

The leachate collection system needs some reevaluation to maximize the removal of the leachate off of the liner. The design and capacity of the leachate storage facility needs to be reconsidered as well.

More detail is needed in general on the plans. For instance specifications on the flexible membrane liner are needed.

The June 1991 plans (revised July 1992) and the February 1989 plans indicate some differences in the groundwater monitoring program. Based on the information available it could not be determined if this was intentional, but redesignating wells could confuse the groundwater evaluation.

The Class I landfill has two fill areas. Fill Area 1 was recently closed out. The engineering plans currently under review by the State show Fill Area 2 as a lined cell with leachate collection. However, the County moved into this area upon completion of Fill Area 1, encroaching on the lined portion of Fill Area 2. The design engineer indicates that the current fill operation (part of Fill Area 2) has sufficient capacity to last until October 1996. The exact capacity for the current unlined area of 2 cannot be broken out of the total estimated capacity without documentation (survey information) regarding the size of the current fill operations.

To remain operational after October 1996, the County needs to address the outstanding issues associated with the landfill obtaining compliance with Subtitle "D". This will allow the operation of the remaining portion of Fill Area 2 in a contained cell. The exact life of the lined area is difficult to determine without the current unlined, operational footprint.

The June 1991 (revised July 1992) plans provide the following capacity information:

"Fill Area 1 - acreage 4.3, life span 2.42 years; Fill Area 2 - acreage 12.3, life span 27.79 years. Total fill capacity 30.21 years. This was based on 76.4 in place yards<sup>3</sup> per day (5 day week) and a 4 to 1 waste to cover ratio.

#### EXCAVATION AND FILL BALANCE - CUBIC YARDS

	fill area 1*	fill area 2	total
trench excavation	-0-	60,000	60,000
berms	24,000	38,400	62,400
trench volume	85,000	758,000	843,000
refuse	48,000	552,000	600,000
daily/intermediate	12,000	138,000	150,000
borrow	61,000	199,400	260,400
final cover	25,000	68,000	93,000

note: borrow for fill area 2 includes 15,000 yards<sup>3</sup> for construction of earth pad to raise fill area to elevation 990."

\*this appears to be the remaining life for Fill Area 1 as of June 1991.

In reviewing the plans, the expected capacities of the fill areas were double checked with rough estimates based on the footprints shown on the plans. Fill Area 1 acreage on the plans (based on a planimeter calculation) is about 7.8 acres and Fill Area 2 about 14.8 acres. This makes the landfill footprint about 22.6 acres. The rough air space calculations for total air space for Fill Area 1 - 500,000 yards<sup>3</sup> and total air space for Fill Area 2 - 1,000,000 yards<sup>3</sup>; total site air space 1,500,000 yards<sup>3</sup>. This would lead to an expected life as follows:

Expected life for Fill Area 1:

$$(500,000 \text{ yd}^3(800 \text{ \#/yd in place})(.80 \text{ waste to cover})) / (16,200 \text{ tons/yr})(2000 \text{ \#/ton}) = 10 \text{ years}$$

Fill Area 1 was recently completed, it had operated since 1977; the waste flow was probably less than 16,200 tons/yr during the initial operation, therefore the capacity lasted longer than estimated 10 years

Expected life for Fill Area 2:

$$(1,000,000 \text{ yd}^3(800 \text{ \#/yd in place})(.80 \text{ waste to cover})) / (16,200 \text{ tons/yr})(2000 \text{ \#/ton}) = 20 \text{ years}$$

1993-2013 based on current waste flow of 16,200 tons per year

The current footprint established in a portion of Fill Area 2 can continue operations until the approved final grades are reached, but no later than October 1996. At that point, if the County continues operation at this site they will need to come into full compliance with the siting and design requirements outlined under Subtitle "D" of RCRA. The following Implementation Schedule outlines the steps towards establishing a Subtitle "D" cell at the existing site.

### C. Implementation Schedule

To remain in the current disposal facility long term, the following schedule outlines critical steps needed to proceed forward with the development of a Subtitle "D" landfill area. The County would stay in the current fill area until the fall of 1996, at which point a new cell is needed to meet regulations. The schedule is general since certain tasks, such as regulatory review time frames, are difficult to predict.

Date	Task	Cost Estimate
January 1994	County contracts with qualified consultant to proceed with responding to the State's request for additional hydrogeological investigation	*
May 1994	Consultant submits "karst demonstration study" to the State	*
August 1994	State returns review comments on the karst demonstration to County	
October 1994	Consultant responds to State review comments	*
December 1994	State approves karst demonstration	
January 1995	County contracts with consultant for design modifications	
March 1995	Consultant submits modified design to State	
June 1995	State responds to design modification	
August 1995	Consultant responds to State review	\$5,000 - \$10,000
October 1995	State approves design	
October 1995	County authorizes Consultant to prepare bid documents for construction	\$10,000 - \$25,000
November 1995	County bids construction of first cell sufficient for 2-4 years waste	\$5,000 - \$10,000
January 1996	County awards/signs construction contracts	
February 1996	Contractor begins construction of contained landfill cell (estimate 2-4 acres)	\$300,000 - \$500,000
July 1996	County begins operations in new contained cell	

\* These tasks are currently under contract with a consultant.

#### **D. Capacity Control**

White County has sufficient capacity at the Class I landfill to last almost 20 years based on current waste flow rate of 16,200 tons per year. The County can control the waste flow going to the landfill since it is a County owned and operated facility. The County can consider accepting up to twice the current waste flow rate and still provide sufficient capacity for the ten year planning period. The County can coordinate with neighboring counties during the ten year planning period to accept out of county waste as needed to offset the high cost of operating a Subtitle "D" landfill.

In the event the waste flow dramatically increases during the ten year planning period, the County will proceed with the process for new facility development with sufficient time to avoid a loss of service to the community at the local level. The County will annually evaluate the capacity remaining at the landfill. At the point that five years capacity remains, the County will begin the reevaluation process for long term disposal options.

#### **E. Long Term Disposal (in excess of ten years)**

The evaluation process will begin through communication with neighboring counties/regions regarding a regional approach to solid waste disposal. Once the County establishes the size and members of a region they can proceed through the site selection process. The site will be selected by a process based on technical and economic merit of specific areas. The sites will be evaluated on certain technical factors:

hydrogeologic considerations - depth to groundwater and bedrock, stability of the geology, amount of clay on site, suitability of buffer material

environmental issues - wetlands, endangered species, floodplains, surface water, natural resources

social impacts - buffer from surrounding land uses, proximity to schools, churches, tourist attractions, populated areas, historical sites, archeological concerns, local issues

engineering concerns - airports, topography, stability, drainage, current land use, access to the fill area

And certain economical factors:

location in relation to waste generation

infrastructure available - access roads, available waste water treatment for leachate, water source (municipal), power, etc

technical issues impact on cost, such as availability of soil

The initial site selection process will involve preliminary hydrogeological, environmental and engineering evaluations. This process is expected to take six months to one year. Once the site is chosen, the full site characterization, design and permitting process is expected to take two to three years. The construction is expected to take six months to one year.

1. Projected Demand and Supply, and Identification of Potential Shortfalls or Surplus in Disposal Capacity.

County: White

Table VIII-1

Tons Per Year

Year	DEMAND: Tons of Waste Requiring Disposal	SUPPLY: Existing & Planned Capacity	Surplus (+)	Shortfall (-)
1993	22,000	340,000	+318,000	
1994	22,648	318,000	+295,352	
1995	22,734	295,352	+272,618	
1996	14,753	272,618	+251,865	
1997	14,811	251,865	+243,054	
1998	14,871	243,054	+228,183	
1999	14,932	228,183	+213,251	
2000	14,992	213,251	+198,259	
2001	15,033	198,259	+183,226	
2002	15,095	183,226	+168,131	
2003	15,158	168,131	+152,973	

2. Regional Disposal Capacity: Potential Shortfalls or Surplus in Project Years

Table VIII-2

Projected Net Disposal Capacity (Tons Per Year)  
White County

Year	1 Class I	2	3	4	5	6	Regional Total
1993 base year	340,000						
1994	318,000						
1995	295,352						
1996	272,618						
1997	251,865						
1998	243,054						
1999	228,183						
2000	213,251						
2001	198,259						
2002	183,226						
2003	168,131						

**F. Ten Year Budget**

This budget assumes the following:

- White County will operate in its current cell until 1996.
- In 1996 White County will construct a Subtitle "D" landfill.
- Cost for years 1994 & 1995 were developed using White County 1993 Budget and adding 5% inflation.
- Costs for years 1996 - 2003 are calculated using budget figures provided by White County for FY 95-96 and FY 96-97 and extrapolated to year 2003 with 5% inflation. A copy of the White County Budget Projections are included in the Appendix at the end of this chapter.

**Table VIII-3**

**Landfill Development Cost**

Year	Cost Provided by White County	Operations Cost *	Development Cost *	Development Cost Amortized over 3 years at 5% interest
1993	236,307			
1994	248,122			
1995	260,528			
1996	614,450	273,554	340,896	125,177
1997	308,550			125,177
1998	323,978			125,177
1999	707,677	340,177	367,500	134,946
2000	357,186			134,946
2001	375,045			134,946
2002	779,672	393,797	385,875	141,693
2003	413,487			141,693

\* Operations and development cost for 1996 provided by White County for a lined cell with a three year life. Cost for 1999 and 2002 are based on 1996 cost plus 5% inflation per year.

Table VIII-4

Ten Year Budget for Disposal

	Operations Cost Provided by White County	Development Cost Amortized over 3 Years at 5% Interest <sup>1</sup>	Closure/ Post Closure Cost <sup>2</sup>	TOTAL COST
1993	236,307			\$236,307*
1994	248,122			\$248,122*
1995	260,528			\$260,528*
1996	273,554	125,177	95,300	\$494,031
1997	308,550	125,177	95,300	\$529,027
1998	323,978	125,177	95,300	\$544,455
1999	340,177	134,946	95,300	\$570,423
2000	357,045	134,946	96,300	\$588,291
2001	375,045	134,946	96,300	\$606,291
2002	393,797	141,693	96,300	\$631,790
2003	413,487	141,693	96,300	\$651,480

\* These costs do not include closure/post-closure of current landfill.

<sup>1</sup> From table VIII-3.

<sup>2</sup> Closure/post closure cost developed by Draper Aden using the Landfill Cost Analysis Study.



**Appendix VIII-A**

**Private Landfill Disposal Cost**



## PRIVATE LANDFILL DISPOSAL

These prices were submitted to the Planning Board as requested from the private companies. The prices are for planning only and do not reflect actual bids. Below is a summary of prices received. BFI's prices were given in a range and an average was used for this comparison. The consumer price index was assumed at 3.5% for BFI's proposal.

### TOTAL PRICE/TON FOR DISPOSAL & TRANSPORTATION

	Sanifill Cedar Ridge Facility Marshall County	BFI Middle Point Facility Rutherford County
1994	32.45	39.00
1995	34.07	40.36
1996	35.77	41.78
1997	37.57	43.24
1998	39.44	44.76
1999	41.42	46.32
2000	43.48	47.94
2001	45.66	49.62
2002	47.95	51.36
2003	50.34	53.15

Total annual cost for disposal at a private facility in 1996:

#### Sanifill

14,753 tons (\$36) = \$531,108

#### BFI

14,753 tons (\$42) = \$619,626



**Appendix VIII-B**

**Karst Guidance Policy**



# **DRAFT**

07/29/93

## **CARBONATE ROCK INVESTIGATION GUIDANCE POLICY**

The purpose of this document is to create an outline for the minimum level of effort for executing investigations within carbonate rock formations. The scope of the investigation should include a characterization of the aquifer and an evaluation of the potential for both catastrophic and long term subsidence at the proposed site.

### **CHARACTERIZATION OF THE CARBONATE ROCK AQUIFER**

The soluble limestone and dolostone rock formations characteristic of many areas of Tennessee generally develop a complex groundwater flow system that is often a mix of slow flow (velocity less than .001 m/s) and high flow (velocity more than .001 m/s). It is for this reason that development of a groundwater monitoring system in carbonate rock terranes requires more than the installation of several randomly located monitoring wells. The objective of this section is to provide some guidance in developing a functional groundwater monitoring system that may or may not include monitoring wells. A basic procedure for performing the initial investigation of karst aquifers is provided in the following paragraphs. Additional steps may be necessary depending on specific site conditions.

1. Determine the geologic formation(s) and review the hydrologic literature of the site and surrounding area.
2. Carefully review geologic, soil survey and topographic maps of the area upon which the proposed site is to be situated.
3. Perform a carbonate rock features inventory of the proposed site and contiguous properties by identifying such carbonate landforms as caves, springs, karst windows, losing streams, streams and sinkholes. In addition, a door to door domestic use survey within a mile radius of the site is recommended for all residences not on utility water.
4. Prepare a Potentiometric Surface of the water table aquifer beneath the proposed site and contiguous properties at the low flow condition and at the high flow condition with a contour interval of ten feet.
5. Perform a Qualitative Dye Trace from selected locations during low and high flow conditions. Dye trace procedures and the type of dye to be utilized should be included in a dye trace workplan that must be submitted and approved by the Division of Solid Waste before the trace is executed. In addition, it should be noted that the state of Tennessee now requires tracer tests to be registered with the Groundwater Management Section of the Division of Water Supply.

6. Evaluate the results of the Qualitative Dye Trace to find which springs within the groundwater basin are hydraulically connected to the site.
7. The hydrogeologic report should include at a minimum the following items;
  - A. A narrative describing the carbonate aquifer and geologic formation(s) beneath the site,
  - B. A potentiometric map of the site,
  - C. Flow velocities at both low flow and high flow conditions,
  - D. A map depicting the locations of the dye trace monitoring points,
  - E. Prepare dye breakthrough curves and a map depicting groundwater flow paths.
  - F. Carbonate rock features (sinkholes, sinking streams springs, caves ...) observed at the site.

It should be noted that this is a minimum level of effort that is expected during the preliminary field investigation. The extent of any further investigation will be determined from an evaluation of the data generated during this preliminary phase.

8. The type of groundwater monitoring system should only be determined after sufficient data has been generated from the groundwater investigation to characterize the carbonate rock aquifer.

#### EVALUATION OF THE POTENTIAL FOR SINKHOLE SUBSIDENCE AND COLLAPSE

Ground subsidence resulting from the gradual settling of the ground as well as sudden movements referred to herein as collapses are both phenomenon that are characteristic of karst terranes. Such subsidence and collapses beneath landfill sites could destroy the integrity of the low permeability clay liner and partially or totally inhibit the ability of the leachate collection system to adequately manage leachate. The purpose of this section is to provide some guidance for evaluating the potential for ground subsidence within the limits of proposed sites.

Subsidence within carbonate rock terranes can be attributable to a number of natural and manmade conditions. The evaluation of subsidence and collapse potential in carbonate rock regions is recognized as a relatively new area that has not yet been extensively researched. However, certain geologic settings are more susceptible to sinkhole subsidence and collapse. Ground subsidence often proceeds at a rate that is not readily discernible from casual observations. Often this type of movement precedes regolith or soil overburden type collapses. Generally, there are two basic

types of sinkhole collapses referred to as bedrock collapses and regolith collapses. Bedrock collapses, occur when the cave roof collapses due to the enlargement of cave openings. These types of collapses are generally considered rare. It is for this reason that this document shall concentrate primarily on conducting investigations at proposed sites that have the potential to develop regolith collapses which are a much more common type of sinkhole collapse. Regolith collapses result from the collapse of soil overburden materials falling into voids within the underlying limestone bedrock.

## BEDROCK COLLAPSES

Bedrock type collapses occur as a result of a cave roof collapse. A number of factors such as diameter of the cave, joint patterns, joint strengths, intact rock compressive and tensile strengths, in situ elastic modulus, Poisson's ratio and the at rest coefficient of pressure  $K_0$  (the ratio of the horizontal effective stress to the vertical effective stress) contribute to these cave roof collapse failures. W. B. White has developed a general relationship between passage width and bedding thickness (Table 4.1 and Figure 4.10) that can be used as a rough guide for estimating bedrock roof collapse. A ceiling that is comprised of solid rock and spans the entire passage as one unit is classified as a fixed beam. Ceilings that are comprised of open joints and fractures that separate the ceiling into two units would be considered cantilever. White has also indicated that a "tension dome" (Figure 4.11) develops over a cavity that extends as much as 1.5 times the cavity diameter. White has stated that loading changes above the top of the dome are independent of the cavity opening since the load will be distributed over the walls of the cavity and are thus dependent on the load bearing capacity of the rock. However, if the tension dome extends to the surface or to the bottom of an excavation additional loading could increase the shear along the walls substantially enough to cause a collapse of the cavity.

## REGOLITH COLLAPSES

The following conditions contribute to regolith type collapses:

1. Conduit Flow through cavernous bedrock during storm events often backs up such that the water rises into the soil overburden materials. As the water level drops some of the soil is taken into solution and a void within the soil overburden forms above the limestone bedrock. This soil arching phenomenon often continues until finally the soil above the void collapses into the bedrock due to loss of buoyant support of the water table after a storm event and the increased weight of saturated soils above the void.
2. Modified drainage at or near the proposed site that concentrates surface water runoff directly into sinkholes, retention basins and ponds.

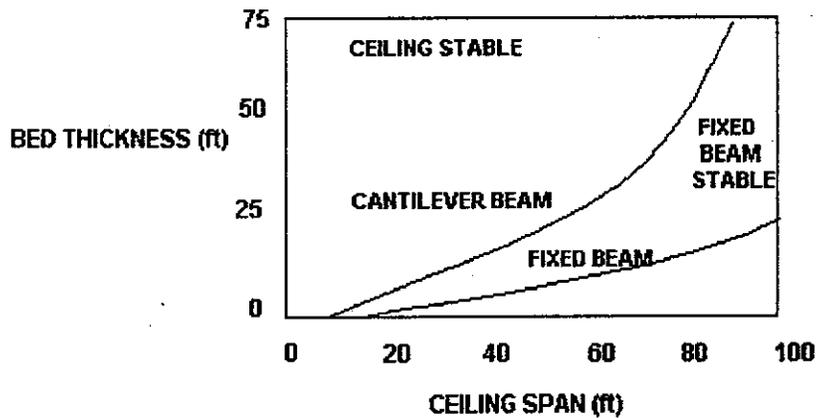
**RELATIONSHIP BETWEEN BEAM SPAN (PASSAGE WIDTH) AND MINIMUM BEAM THICKNESS (BEDDING THICKNESS)**

Span	Minimum Thickness of Beam	
	Fixed	Cantilever
03 ft.	0.03 in	0.09 in
10	0.26	0.76
20	1.02	3.06
30	2.30	6.88
40	3.79	12.23
50	6.37	19.11
65	11.23	33.98
98	25.48	76.46

TABLE 4.1

Source: White (1988)

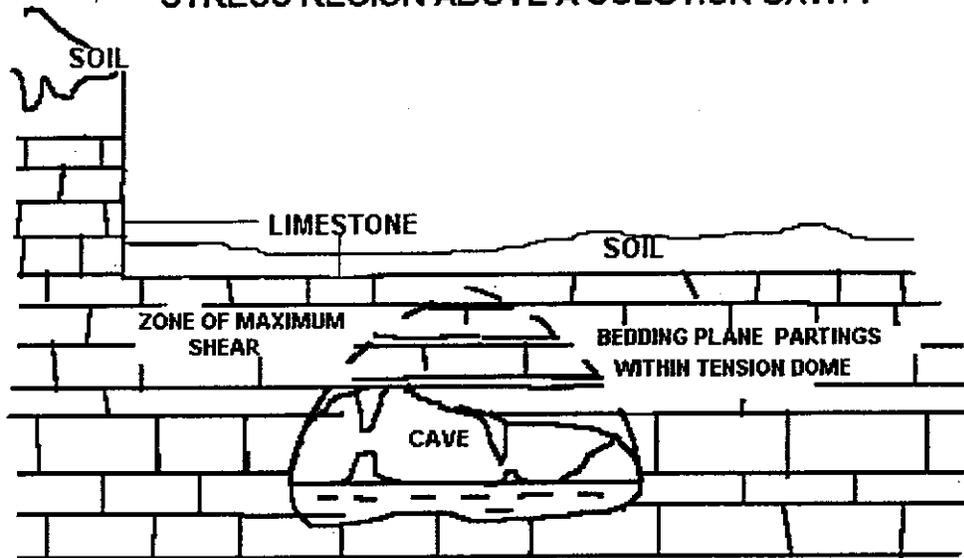
**CEILING SPAN VS. BEAM OR BED THICKNESS  
FIXED AND CANTILEVER BEAMS**



Source: White (1988)

Figure 4.10

## STRESS REGION ABOVE A SOLUTION CAVITY



Source: White (1988)

Figure 4.11

3. A fluctuating water table that rises within the regolith or soil overburden materials and then drops to depths below the soil bedrock interface as a result of drought or high volume well pumping can cause collapses within the soil overburden materials.
4. Leaking pipes that traverse a site increase the downward movement of water which could result in soil type collapses.

Hydrogeologic investigations for proposed landfill sites in carbonate rock formations should include additional soil and rock borings. Utilizing air track drilling rigs is a cost effective means for identifying soft soil zones as well as open voids within the soil overburden. Certain geophysical investigations may provide some useful information regarding voids within the subsurface. However, geophysical testing should be supplemented with drilling to substantiate anomalies identified during the geophysical investigation.

It should be understood that a certain amount of risk must be assumed when constructing solid waste landfills within carbonate rock formations. However, employing the aforementioned guidance for characterizing the aquifer and evaluating collapse potential in combination with a detailed site specific hydrogeologic investigation can help minimize the risk of constructing solid waste landfills within carbonate rock formations.



WHITE COUNTY SOLID WASTE  
PROJECTIONS 1993 - 1997  
=====

	<u>1993-1994</u>	<u>1994-1995</u>	<u>1995-1996</u>	<u>1996-1997</u>
<b>Revenues:</b>				
Fees	344,000	344,000	344,000	344,000
Grants	29,000		50,000	
Other	12,000			
<b>Total</b>	<b>385,000</b>	<b>344,000</b>	<b>394,000</b>	<b>344,000</b>
<b>Expenditures:</b>				
Supervisor	23,500	24,400	25,400	26,400
Other Salaries/Wages	119,000	124,000	137,000	151,000
Telephone	500	500	600	600
Equipment Maintenance	50,000	55,000	60,000	60,000
Permits	4,300	4,300	4,300	4,300
Diesel	15,000	20,000	25,000	20,000
Gasoline	3,000	3,200	3,400	3,600
Lubricants	2,500	3,000	3,500	4,000
Office Supplies	500	700	800	800
Utilities	1,000	1,000	1,000	1,000
Other Supplies	2,000	2,100	2,200	2,300
Insurance	14,000	15,000	16,000	17,000
Workers' Compensation	14,000	15,000	16,000	18,000
Other Charges (85 cents)	17,000	17,000	17,000	17,000
Site Development	40,000	75,000	515,000	100,000
Equipment	47,000	50,000	50,000	50,000
Fica	11,000	12,000	13,000	14,000
Retirement	6,000	6,000	6,200	6,800
Trustee Commission	3,700	3,500	3,900	3,500
<b>Total</b>	<b>374,000</b>	<b>431,700</b>	<b>900,300</b>	<b>500,300</b>
<b>Surplus/(Deficit)</b>	<b>11,000</b>	<b>( 87,700)</b>	<b>( 506,300)</b>	<b>( 156,300)</b>

**Notes:**

-- Does not include hiring Diversion Manager

Only includes hiring one Convenience Center Attendant in 1995-1996

-- Does not include any financial provisions for closure/post-closure



## Chapter IX - Public Information and Education

### A. Introduction

Note: The following publications were utilized liberally in the preparation of this section:

*Getting the Word Out!*  
*A Guide to Publicity*  
New Jersey Department of Environmental Protection  
Office of Recycling  
101 Commerce Street  
Newark, New Jersey 07102  
(201)648-6295

*Let's Reduce and Recycle:*  
*Curriculum for Solid Waste Awareness*  
EPA/530-SW-90-005  
August 1990  
United States Environmental Protection Agency

The central focus of both public information (publicity) and education is to help the public understand the various solid waste programs ongoing in the region and to motivate participation in such programs as source reduction, recycling, backyard composting, household hazardous waste collection, special waste collection (e.g. waste oil, batteries, tires), and litter abatement. While some overlap does exist between them, *Publicity* is generally considered a means of capturing an audience's attention through the use of mass media and promotional techniques. *Education* sustains public interest and involvement and refers to formal classroom instruction, seminars, workshops, as well as informal presentations. The ultimate goal of the publicity and education program is to change attitudes and behavior towards the handling of household, office, commercial, and industrial waste such that recycling and other forms of environmental stewardship become routine. For this to happen, the program must become a part of a comprehensive plan.

### B. Regional Needs for Education

The county needs an expansion of the existing educational and promotional programs into the rural area of the county in an organized approach to prepare and motivate the community concerning all of the programs available under the comprehensive solid waste plan.

### **C. Goals and Objectives**

For clarification, goals are defined as the primary targets of the education and publicity program and objectives are the stepping stones to the goals. In the listing below, the goals are shown in **bold** and the objectives associated with each goal are listed beneath it.

**Goal 1-- Increase Source Reduction and Program Involvement Through Education**

- a. Educational Programs in the Schools
- b. Backyard Composting Programs
- c. Education in the Area Offices
- d. Education in Area Stores
- e. Education in Area Industries
- f. Seminars for Civic Groups
- g. Increased Mass Media Involvement

**Goal 2-- Increase Rural Interest and Participation in Programs**

- a. Increase Area Yard Sales and Garage Sales
- b. Work with Area Churches and Pastor's Organizations

**Goal 3-- Develop Markets for Recyclables and Recycled Materials**

- a. Recommended Governmental and School Purchasing Policy
- b. Coordinate Area Business for Mass Buys of Recycled Products
- c. Work with local nurseries for Compost Market

**D. Target Groups and Audiences, Amount and Kind of Information, Specific Methods to Be Used**

**Goal 1, Objective a-- Increase Source Reduction and Program Involvement Through Education-- Educational Programs in the Schools**

This program is best divided into two subprograms based upon age and grade level of the participants.

**Subprogram 1-- Basic Family Information**

This educational program is to be developed for younger students and is primarily geared toward providing the student with stimulating topics to take home and discuss with the family. The primary focus will be not to fill the child's head with facts and figures but instead to provide colorful and exciting material which will motivate the child to begin discussions at home.

**Target Groups and Audiences:**

Elementary School Students, 5th Grade.

**Amount and Kind of Information and Specific Methods to be Utilized:**

Presented here is a five unit study with 28 associated activities. A seminar should be hosted by the solid waste region to which the 5th grade teachers from the above-listed schools are invited. The purpose of this seminar is to go through the units and activities in detail.

It should be noted that many of the activities included within the program are publicity programs for the community-at-large and the family which are prepared and performed by the students. It must be left up to the individual teacher as to which of the activities are appropriate for the class.

**Subprogram 2-- Environmental and Waste Education**

This educational program is more involved and gives details concerning waste, waste processing, and waste disposal. The purpose of this section is to give the older student the information needed to vote and make decisions concerning solid waste as an adult.

**Target Groups and Audiences:**

High School Level Students, 10th Grade

**Amount and Kind of Information and Specific Methods to be Utilized:**

Presented here is a five unit study with 36 associated activities. A seminar should be hosted by the solid waste region to which the 10th grade science teachers from the above-listed schools are invited. The purpose of this seminar is to go through the units and activities in detail. The amount of effort which the individual teachers must exert to prepare to teach this program must be minimal.

It is recommended although not essential that the above program be presented within a science curriculum. As can be seen, the curriculum is intended to last about one week although it can be utilized in a variety of fashions to last five weeks or throughout the school year as individual projects. The program is not intended to be a curriculum in itself.

This program is much more detailed than subprogram 1 and therefore lends itself more readily to providing examination material.

**Method For Evaluation and Reporting of Program**

The following two pages constitute a form with which the individual teachers can evaluate the provided program. It will be the responsibility of the region to provide a method for gathering the completed forms through the school systems and utilizing the provided information to revise and improve the curriculum.

**Goal 1, Objective b-- Increase Source Reduction and Program Involvement Through Education-- Backyard Composting Programs**

**Target Groups and Audiences:**

For a backyard composting program to be successful a subdivision-type housing environment is required. In other words, large amounts of single-family housing located on lots of one acre or less. The primary area in the region which would have sufficient amounts of this environment is Sparta.

In addition, garden clubs are an excellent source for master composters.

### **Amount and Kind of Information and Specific Methods to be Utilized:**

The information utilized must be very brief and very simple. The primary factor that must be overcome in a backyard composting program is the fallacy that composting is difficult. A brief flyer similar to the one on the following page should be printed for the region and utilized within a "master composter" program.

The "Master Composter" program is a pyramid style organization in which the solid waste region trains interested persons from the target areas identified above in backyard composting. These persons should be from different neighborhoods. These people become the master composters. The region then supplies them with the flyers and materials they need to interest others in their neighborhood in composting. It is important that the majority of the information pass directly from person to person that the flyers do not attempt to be overly comprehensive or complex.

The region may choose to provide composting bins either free or at cost to interested residents or may choose to construct a composting demonstration project in an area park. The purpose behind this project is to have various composting bins in-use and on display. The park should be staffed at certain hours (preferably by master composters on a volunteer basis). If such a park is desired, it would be recommended that it be constructed in the Sparta area.

### **Method For Evaluation and Reporting of Program**

The evaluation of the program must come through the master composters. It is virtually impossible to determine a percent diversion through this method (or any source reduction method). At the end of each year, the master composters should fill out a form which answers the following questions:

1. How many new household have begun composting this year? \_\_\_\_
2. How many households continued composting this year? \_\_\_\_
3. How many households have attempted composting since the beginning of the program and have quit? \_\_\_\_\_

**Goal 1, Objective c & d-- Increase Source Reduction and Program Involvement Through Education-- Education in the Area Offices and Stores**

**Target Groups and Audiences:**

The primary target for this program are those establishments which generate large amounts of paper. This includes governments offices, insurance offices, legal firms, professional firms, etc.

**Amount and Kind of Information and Specific Methods to be Utilized:**

This program must be very simple and not time consuming. The primary purpose of the program is to overcome the fallacy that paper recycling is difficult. As such, an brochure must be simple and preferably on a single page. The brochure should include an offer for a region representative to come to the office and assist them in setting up the recycling collection program.

Some simple points which should be added to the educational package are:

1. Always have a paper recycling box at the copy machine.
2. Another good location for a paper collection box is at the coffee machine.
3. A system which does not work well is the use of desk-top "in" boxes for recycling. Such a box on someone's desk is usually being used for something else within a week.
4. Individual boxes next to each employee's desk work only when someone in the office is designated to take the recyclables to a central point on at least a weekly basis.

**Method For Evaluation and Reporting of Program**

The region must keep records of all offices which have requested assistance in setting up in-office recycling programs. In addition, each of these offices should be contacted on an annual basis to determine if they have continued their recycling efforts. In the event that an office has discontinued, the region should make a personal call on the business to determine if there is any way to reinstate the program.

**Goal 1, Objective e-- Increase Source Reduction and Program Involvement Through Education-- Education in Area Industries**

The primary purpose of this program is to get industries working with one another to identify problem wastes and potential solutions within the region. The stories are getting less rare of situations where one industry was throwing away large quantities of a material which a nearby industry purchases as a raw material.

The offices associated with industry would be handled under the office program.

**Target Groups and Audiences:**

The target group for this program is those industries identified in this report as being major waste generators.

**Amount and Kind of Information and Specific Methods to be Utilized:**

The region should perform an inventory of the manufacturers in the region which includes the raw materials and waste products associated with their process. All other materials which are disposed of in bulk should be cataloged. This listing should then be made available to the industries in the region. Regular meetings between area industries should be sponsored by the Solid Waste Region in order to motivate communication among the industries.

**Method For Evaluation and Reporting of Program**

Area industries should be contacted on an annual basis and questioned concerning recycling programs and any programs which have been worked out in coordination with other area industries. Multi-industry programs should be charted for progress. In the event that one of these programs is canceled, the region representative should meet personally with the industries involved to determine if the arrangement can be continued.

**Goal 1, Objective f-- Increase Source Reduction and Program Involvement Through Education-- Seminars for Civic Groups**

**Target Groups and Audiences:**

Target groups for this program include the organized and active civic, professional, and service groups within the region.

### **Amount and Kind of Information and Specific Methods to be Utilized:**

The amount and kind of information utilized will vary with the type of organization. The primary methods of publicity will be through personal presentations given before these groups or the boards of directors of these groups. In some instances, volunteer support will be requested. However, in most instances the presentation will be concerning the programs available through the region and source reduction strategies.

### **Method For Evaluation and Reporting of Program**

Follow-up questionnaires should be mailed to each group after a presentation to determine if the information was presented was informative to them and if they had any use for it.

### **Goal 1, Objective g-- Increase Source Reduction and Program Involvement Through Education--Increased Mass Media Involvement**

#### **Target Groups and Audiences:**

The target group and audience for this objective is the overall population of the region. Radio, television, and newspaper advertisements and public service announcements should be regularly distributed throughout the area media.

#### **Amount and Kind of Information and Specific Methods to be Utilized:**

**Television:** Public Service Announcements should be brief and visual. Voice-only announcements should be avoided if possible.

**Radio:** Public service Announcements should be bright and include either music or upbeat phrasing. Dry schedules and announcements should be avoided.

**Newspaper:** Newspaper should be approached about including information on solid waste programs in a thematic portion of the newspaper. For example, an environmental section coinciding with Earth Day could include a large amount of information about the overall program. Small single articles concerning solid waste go largely unread.

## **Method For Evaluation and Reporting of Program**

Statistics should be maintained which allow for charting various programs. This charting should be done on a small enough interval that increases and decreases in participation due to these advertisements can be noted.

### **Goal 2, Objective a-- Increase Rural Interest and Participation in Programs-- Increase Area Yard Sales and Garage Sales**

#### **Target Groups and Audiences:**

The target group of this program will be that portion of the population which lives in a rural environment and therefore does not have easy access to the more modern forms of recycling. The purpose of this program is to build on and increase existing forms of source reduction and reuse through expanding the opportunities for large-scale yard sales and garage sales. It is hoped that those persons already actively participating in yard sales will invite and assist others who otherwise would not participate if the yard sale is made into a neighborhood event.

#### **Amount and Kind of Information and Specific Methods to be Utilized:**

This method will be to work through local neighborhoods, civic groups, community centers, and churches to coordinate large-scale neighborhood yard sales utilizing publicly accessible parking lots. The region will contact and create a network of "block leaders" to coordinate the yard sales throughout the rural areas of the region. This block leader will be responsible establishing a location and a date for the sale and for providing participants from the area and advertising. The block leader must be allowed charge a percentage of sales in order to cover costs including a personal stipend. Maximum allowable percentages and stipends, as well as recommended budgets for advertising and other associated costs.

## **Method For Evaluation and Reporting of Program**

The block leader must file the following information with the recycling and education coordinator:

Location of Yard Sale: \_\_\_\_\_

Dates of Yard Sale: \_\_\_\_\_

Number of Participants: \_\_\_\_\_

Approximate Number of Households Represented: \_\_\_\_\_

Approximate Number of Shoppers: \_\_\_\_\_

## **Goal 2, Objective b-- Increase Rural Interest and Participation in Programs-- Work with Area Churches and Pastor's Organizations**

### **Target Groups and Audiences:**

The target group of this program will be that portion of the population which lives in a rural environment and therefore does not have easy access to the more modern forms of recycling. The ministerial alliances in the four counties should be contacted in an effort to inform the church community of the available programs which might be used for fundraising activities as well as to request the assistance of the pastors and congregation in source reduction and recycling.

### **Amount and Kind of Information and Specific Methods to be Utilized:**

The primary means of publicity and education for this objective will be through the passing out of simple flyers and personal speaking engagements.

## **Method For Evaluation and Reporting of Program**

A record of speaking engagements should be maintained.

### **Goal 3, Objective a-- Develop Markets for Recyclables and Recycled Materials, Recommended Governmental and School Purchasing Policy**

A purchasing policy should be prepared and then presented to all governmental bodies within the region. The policy may be similar to the one included as an appendix to this document, but should include as a minimum the following:

1. Plan for gradually working the governmental body up to 100% purchase of recycled paper. The policy should work gradually toward that goal with no more than 15% increase in recycled material purchase per year.
2. Definition of recycled paper by post-consumer content. A 30% post-consumer content is recommended as a minimum definition of recycled paper.
3. A bid multiplier for nonrecycled materials when bidding against recycled materials. For example, when bidding buckets made of virgin plastics against buckets made of recycled plastics, multiply all costs associated with the virgin plastics buckets by 1.05 for comparative purposes.
4. A plan for phasing out disposable products where reusable products are available.
5. A plan for requiring written reasons for utilizing toxic chemicals and materials where less toxic chemicals and materials are available.

#### **Target Groups and Audiences:**

Local municipal and county governments.

#### **Amount and Kind of Information and Specific Methods to be Utilized:**

The purchasing policy itself will be utilized along with personal presentations to governing bodies. It is recommended that a pilot program be developed for one year with one municipality within the region and the cost increases due to the policy be charted before presenting the policy to other governmental bodies.

#### **Method For Evaluation and Reporting of Program**

A listing of the governmental bodies which have adopted the policy along with the revisions and changes which each made to it should be kept on file. Annual checks should be made with the purchasing officers to follow-up on progress made towards the percentage goals presented within the policy.

**Goal 3, Objective b-- Develop Markets for Recyclables and Recycled Materials, Coordinate Area Business for Mass Buys of Recycled Products**

**Target Groups and Audiences:**

Local business and industry.

**Amount and Kind of Information and Specific Methods to be Utilized:**

All local distributors of recycled products should be kept on file. Special prices for bulk purchases should be worked out. These special prices would then be presented to a grouping of businesses and industries as a mass purchase. This would obviously only be applicable on universally used items such as copy paper. In addition, local businesses should be encouraged to join the Buy Recycled Business Alliance which is a no cost organization which assists businesses in buying recycled materials.

**Method For Evaluation and Reporting of Program**

A listing of businesses that have participated in this program as well as those that have expressed an interest should be maintained along with the materials that each would be interested in purchasing.

**Goal 3, Objective b-- Develop Markets for Recyclables and Recycled Materials, Work with Local Nurseries for Compost Market**

**Target Groups and Audiences:**

Local Nurserymen

**Amount and Kind of Information and Specific Methods to be Utilized:**

The information presented would consist of samples and analyses of available compost materials. These materials would be generated both within and without the region although those generated within the region would be given precedence. This program would acquaint the nurserymen with the local compost quality and markets and would establish lines of communication between the two.

A regular newsletter for the nurserymen updating them on the compost "crop" in the region and the availability of compost materials.

Sewage sludge could also be featured with articles on how to become approved as a land disposal location.

### Method For Evaluation and Reporting of Program

Quantities of compost material utilized by nurserymen in White County would be recorded and maintained.

### E. Staffing and Budget Needs

For White County, it is assumed that the Diversion Manager will handle Public Education, Publicity, Recycling, and Waste Diversion. The budgeting for his position will primarily come from the recycling budget (See Chapter 6).

A budget for this group would be as follows:

Salary and Benefits:	\$ 0 (See Chapter 6)
Overhead:	0 (See Chapter 6)
Supplies:	500
Office Equipment:	0 (See Chapter 6)
Travel:	200
Printing:	500
Advertising:	500
	_____
TOTAL	\$ 1,700

\* Denotes expense shared with another department.

### Funding Options and Allocation of Responsibility

Two options exist for the funding of this program. The first is funding through the tipping fee and the second is direct government line item.

Utilizing the tipping fee to fund this program would result in an additional \$0.14 being added per ton.

Another funding option includes having White County provide the funds to the region for this position.

## **F. 10-Year Implementation Schedule**

January 1, 1995	Hire Diversion Manager
Ongoing	Prepare Press Releases and Provide Photo Ops at the Beginnings of All Programs. Prepare Monthly Press Releases. Goal 1, Objective g
February 1995	Begin Work with Block Leaders for Community Yard Sales Goal 2, Objective a
February 1995	Work with Pilot Community for Implementing Purchasing Policy Goal 3, Objective a
March 1995	Backyard Composting Program Kick-off Goal 1, Objective b
March 1995	Begin Seminars for Civic Groups Goal 1, Objective f Schedule one presentation per month
April 1995	Begin Education in Area Industries Goal 1, Objective e
May 1995	Schedule Meetings with Ministerial Alliances in the Region Goal 2, Objective b
August 1995	Begin Educational Programs in Schools Goal 1, Objective a
September 1995	Begin Work with Local Nurseries Goal 3, Objective c
October 1995	Begin Education in Area Offices Target Three Offices Per Month Goal 1, Objective c

February 1996

Begin Education in Area Stores  
Target Two Stores per Month  
Goal 1, Objective d

February 1996

First Mass Purchase of Recycled Products  
Goal 3, Objective b

## Home Compost Demonstration Facility

### Master Composter Program\*

#### Cost Estimate

##### Construction:

Parking Spaces	\$3,000	
Water Service	500	
Sidewalk	120	
Clearing	1,000	
Path Construction	500	
Seed & Straw	800	
Landscaping	3,000	Annualized
	<hr/>	
Subtotal	\$8,920	\$1,150

##### Equipment and Materials:

Bins for Demo Site	\$ 500	
Chipper	NA (Already Available)	
Handtools	300	
Brochures (10,000)	2,500	
	<hr/>	
Subtotal	\$3,300	\$ 500

##### Operation:

Labor	\$10,000	
	<hr/>	
Subtotal	\$10,000	\$10,000
<b>TOTAL ANNUALIZED COSTS</b>		<b>\$11,650</b>

Additional Cost per Ton Tipping Fee \$0.97

\* This Program is not required as part of this Plan and costs are for information only if White County of the City of Sparta decided to implement program.

**Appendix IX-A**  
**School Curriculum**  
**Grade 5**



# UNIT ONE

## What Is Waste?

K-6



**Objective:**  
To define waste and discuss where it comes from.

**Vocabulary:** waste garbage landfill combustor

To lead into this activity, initiate a discussion based on the following questions:

- Q** Who knows what *waste* or *garbage* is?
- Q** What are some other names we have for waste?
- Q** Where do we put our classroom waste?

Have children cut out pictures from magazines of things that could be thrown out when they are used up or no longer needed and create a montage. You may want to have the entire class create one giant montage.

Then discuss with children where all of this trash might go:

- Q** What happens to our waste when it leaves the school?
- Q** What kinds of waste do we throw away at home? (Write them on the blackboard.)

**Q** Where does it go?

**Q** Has anyone ever seen a big *landfill* or *combustor*? (Explain that a landfill is a place where garbage is buried and a combustor is a place where garbage is burned. Activities 7 and 8 describe landfills and combustors in more detail.)

A followup activity might be to have the children draw their impressions of a landfill. The children could go on a field trip to a sanitary landfill or study magazine or newspaper photos, then draw or write their reactions.



**Objective:**  
To introduce children to the Garbage Gremlin and what he stands for.

Photocopy the Clip Art illustration of the Garbage Gremlin riding beside the school bus and the older students' car, and distribute it to the class. Have children react to the picture.

**Q** What do you see in this picture?

**Q** What do you notice about the character at the bottom of the page?

Explain to children that this character is called the Garbage Gremlin. Ask children why they think he might be called that. Help them to understand that the Garbage Gremlin is a fictional character who is very wasteful and lazy. The Gremlin loves to litter and makes his home in garbage. Tell children that they will see him throughout these lessons and that they should pay close attention to whether his actions are helpful or harmful.

Have children color the picture. Then encourage them to draw their own Garbage Gremlins. You may want to use these pictures in a bulletin board display.



**Objective:**  
To identify the many different types of waste.

**Vocabulary:** metal plastic paper cardboard  
glass aluminum tin steel

Have each child bring in one or two examples of waste from his or her home. (Ask children to be sure the waste has been cleaned as much as possible before bringing it in.) You may wish to bring in some examples, as well. The collection should include *plastic*, *paper*, *cardboard*, different types of cans, and *glass*. (It may be inappropriate for very young children to be collecting or handling glass.)

Label boxes or piles at the front of the classroom and have the children sort the waste into categories such as paper waste, *metal*, glass, and plastic. They should manipulate it as much as possible to feel the different textures and shapes.

Have the children determine which objects are attracted to a magnet. Explain to children that *aluminum* cans are not magnetic. *Tin* and *steel* cans will be attracted to a magnet.

Have the younger children trace outlines of the objects and make pictures of them to color. What are their shapes?

Older children might like to try making animals or useful objects out of the waste that has been collected. For example, children could decorate cans to use as pencil holders or make plastic containers or cartons into planters. At the conclusion of the activity, help children to understand that they have found one constructive way to use waste.



# UNIT TWO

## Where Does Waste Go?

K-6



**Objective:**  
To illustrate the importance of clean air, water, and land.

**Vocabulary:** air water soil

For this activity, you will need a balloon, paper for folding fans, a glass of water, and a potted plant.

Ask a volunteer to blow up the balloon. Then let the air out slowly so that children can feel it with their hands. Explain to them that it is *air* that they feel.

**Q** Why do we need *air*?

Have children take a deep breath to understand that without clean air we could not live. Have them make a fan out of folded paper to see how air can be moved and felt. Discuss with them the wind, airplanes, whistles — these all illustrate air and its movements.

Show them the water.

**Q** Why do we need *water*?

Have children relate their experiences with water. Make a list on the board of all things they use water for.

Show them the potted plant.

- Q** What grows in the *soil*?
- Q** Does anyone have a garden?
- Q** If we had no soil could we have any food?

Discuss with children why soil is necessary for our survival.



**Objective:**  
To introduce children to the concept of pollution and the different forms pollution may take.

**Vocabulary:**      pollution

- Q** Who knows what *pollution* is?
- Q** How many have ever seen pollution? Where have you seen it? (land, air, water)
- Q** How does the waste we produce pollute the land, air, and water?
- Q** Why is pollution bad for us?

You might want to have children vote on which kind of pollution is the worst (land, air, or water). There is obviously no "right" answer, but make sure children can support their opinions with concrete examples.

Tell children that they will be performing some activities that demonstrate how pollution affects the land, air, and water.



**Objective:**  
To help children identify litter  
in the world around them.

**Vocabulary:** litter litterbug

Have the children look for signs of pollution on the way to and from school. Tell them to focus on the garbage they see strewn along the ground. Alternatively, you could take younger children on a "litter hunt" and have them record the number of different types of litter they see.

- Q** What is the most common type of *litter*?
- Q** Where is the most litter found?
- Q** What is a *litterbug*?
- Q** Do you think the Garbage Gremlin is a litterbug? Why?

Organize a litter cleanup of your school or neighborhood, or a local recreational area. As children collect the litter, have them sort it into proper categories (paper, plastic, aluminum, tin cans, etc.). A variation would be to conduct a "litter rap" around the school grounds or a block adjacent to school property. With a rap beat playing on a portable tape player in the background, have children spot pieces of litter, then make up short "raps" one at a time to describe them. For example:

Can on the street is not too neat,  
Ugly litter I kick with my feet.

I see a bottle beside that fence.  
Let's bring it in and earn five cents!

That paper's from a burger and fries —  
Wish someone hid it away from my eyes.

You might wish to record the song as children make it up a verse at a time, or have children write down their own "raps." Then compile them into a song to perform for the grade or school.

**Objective:**

To allow children to compare what happens to waste in a dump and in a landfill.

**Vocabulary:**      open dump      sanitary landfill  
                          contaminate      leachate

In partners, have children construct both a mini-landfill and a mini-dump and compare the two over the course of several weeks. Or you may wish to have each child construct a mini-landfill, but make just one mini-dump for the whole class.

To make the landfill, have children cut three quarters of the way around the top of a 1-gallon plastic milk or water jug. Have them place a layer of soil on the bottom, then alternate layers of soil and garbage, leaving a layer of soil at the top. The garbage should include a variety of organic and inorganic items: a metal barrette or paper clip, a piece of plastic, a piece of aluminum foil, a piece of newspaper, a candy or gum wrapper, a piece of food (apple, orange skin). Sprinkle with water, seal the openings with masking tape, and cover with the lid. Open the lid to air and water the landfill approximately every other day.

For the dump, fill a second plastic jug with soil and place the garbage on top. Sprinkle the dump periodically with water, and leave it uncovered.

Have children list all of the items they have placed into their dumps and landfills and keep separate charts monitoring the changes in both. At the end of the observation period, discuss with children the differences between what happened in the dump and in the landfill.

In the dump, over a period of time you can expect the food to rot and smell slightly. The newspaper will also begin to break down. (You may wish to explain the process of decomposition to children. Refer to Activities 21 and 22.) Paper wrappers will decompose as well, but plastic will not. The metal barrette will gradually rust and nothing will happen to the plastic or aluminum foil. Very little decomposition should take place in the landfill and it should not smell.

**Q** Can you think of any problems that might result from disposing of garbage in an *open dump*? (Answers might include odors; attract rats or other pests; disease; ugly; trash could spread to other areas and pollute them; run out of space to put more garbage.)

Point out to children that, in the past, dumps did not protect the surrounding environment from the trash dumped into them. Landfills present better ways of disposing of our garbage. Modern *sanitary landfills* prevent waste from polluting or *contaminating* the land around them. Deposited waste is covered daily with soil for added protection. Modern landfills also

control any liquid, or *leachate*, that accumulates in the buried waste so that it does not leak into the environment. (A diagram showing one modern sanitary landfill design appears on p. 63 of this guide. You may wish to distribute copies of this diagram to older children during the discussion.)

Children should be aware that many of the environmental problems associated with dumps have been eliminated with sanitary landfills, which will continue to be the major form of disposal for many years to come. They should also realize that little decomposition occurs in this type of landfill.



### Objective:

To learn about the harmful effects of burning and the alternative of waste combustion.

### Vocabulary: burning ash combustor waste-to-energy plants

Some problems with open *burning* of waste may be examined by using a tin can with air holes punched around the bottom. Loosely place in it small pieces of waste food (such as apple core, egg shell, small piece of carrot), aluminum foil, plastic wrap, glass, and newspaper. In a safe place outdoors, light a match to the contents. Have the children observe what happens.

**Q** Which items burn and which don't?

**Q** Which things melt?

The paper will burn easily. The food will char, but not really burn. The plastic will catch on fire and drip down into the pan, giving off fumes as a result of its petroleum base, and leaving a sticky residue. The metals will not burn at all.

**Q** When we burn our garbage, where does the smoke go? Is this air pollution?

**Q** What can happen to us when too much smoke gets into the air?

**Q** What happens to the *ash* produced?

**Q** Could the heat given off be used? For what?

Explain that waste can be burned safely and that harmful effects on the environment can be greatly reduced by using properly constructed and operated waste *combustors*. These combustors must have special controls to avoid polluting the air. Tell children that after the waste has been burned, there is still ash left over. This ash should be disposed of in a specially constructed sanitary landfill.

Modern combustors also create energy through the heat given off when waste is burned. This energy can be used to heat homes or provide electricity. Waste combustors that also produce energy are known as *waste-to-energy plants*. (A diagram of a waste-to-energy plant is shown on p. 60 of this guide.)

Tell children that land disposal and combustion are two ways that communities can manage their waste. Source reduction — or reducing waste before it is produced — and recycling are two other methods which will be discussed in later activities. (Source reduction, Activity 16; Recycling, Activity 23).



**Objective:**  
To demonstrate how garbage can pollute the water.

**Vocabulary:** runoff

Explain that garbage can also pollute water. Illustrate by having the children place different types of garbage such as shredded paper, food scraps, a tin can, and a dark liquid such as coffee into a clear bowl containing clean water. Let the children observe the changes in the water after each addition.

Tell children that water becomes polluted by garbage even when the garbage is not put directly into the water. Illustrate by pouring some ink onto a mound of sand that has been placed in a bowl. Explain that the ink represents the pollutants in garbage. Sprinkle water over the mound (to represent rain) until it drains into the bowl.

Explain that in the environment this water would run off into rivers and lakes or would seep down into the ground and pollute the water there. Ask if anyone has a well. Help children to understand that there is water in the ground that we use for drinking and bathing, and that this water can become polluted by *runoff* from garbage that is not properly managed.

# UNIT THREE

## How Does Waste Affect Our Resources?

K-6

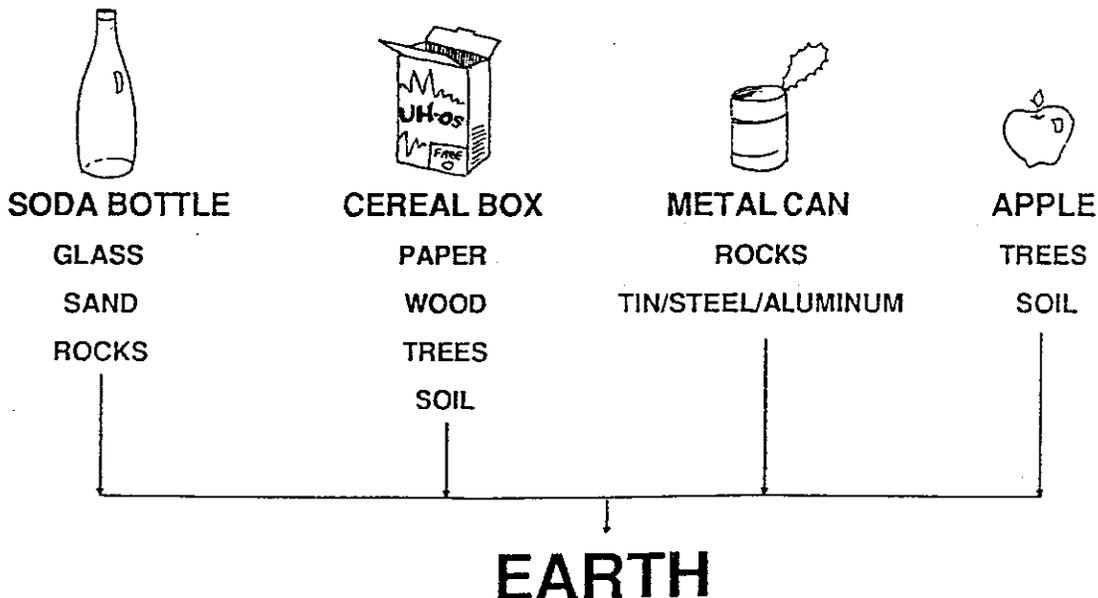


**Objective:**  
To introduce the concept of natural resources.

**Vocabulary:** earth natural resources energy

Have the children name objects made of paper, metal, and glass, and a favorite type of food.

Using the blackboard or a large piece of paper, help the children trace these materials back to their source. For example, a soda bottle is made from sand mixed with soda ash and lime and melted down to form a liquid, which is then molded into glass. See if the children can trace the origin of the other objects illustrated below. (Refer to the "Resource Tree" on p. 69 to trace the origins of additional everyday objects.)



Ask the children if they can think of anything that they use that is not provided by the *earth*. (The children will probably name some things, but on close examination, it will be seen that these things also come from the earth.) Explain to children that raw materials that we take from the earth to make into other things are known as *natural resources*. Help children to list the natural resources used in the objects named on the previous page. Remind them that *energy*, which is also a natural resource, is needed to change objects from their natural forms into the products we use.

**Q** What are some forms of energy? (solar, wind, thermal, electrical, nuclear, mechanical)

**Q** What kind of energy does a tree need to produce fruit? (solar)

**Q** What kind of energy does a windmill use? (wind)



**Objective:**  
**To illustrate the use of a natural resource.**

**Vocabulary:** reuse fuels

Pass out clay from a container labeled "earth," explaining that this is an example of one of the earth's resources. Let the children make models of things that they like to use.

Write the words BURY, BURN, and THROW AWAY on three small boxes or cups. Let the children place their clay product into one of the three boxes.

**Q** After we bury, burn, or throw away these objects, what will happen to them?

Repeat several times to show that as we buy and use products, we use up the supply of the earth's materials. When there is no more clay, point out that the resource container is now empty and that the resources have been used up. Point out how heavy the boxes are, and that someone will have to take them to the disposal site, where they will take up room and may contribute to pollution. Also, point out that the clay is still valuable material that can be used.

**Q** Can we ever get back the things we throw away? Which ones?

**Q** What is going to happen if we keep taking materials from the earth? What will happen when we run out?

Suggest that instead of burying, burning, or throwing the clay away children could *reuse* it. Explain that if we did this with all our garbage, very little would have to be buried in a landfill or burned, and we would not take as much from the earth. Point out that even the burning of waste can generate heat, which can be used in creating energy, thereby saving precious *fuels*, such as oil and coal.



**Objective:**

To illustrate that by wasting things in our home and at play we are using up the vital resource supply of the earth.

**Vocabulary:** waxed cardboard

Ask each child to list all the different containers that provide his or her evening meal; include all the materials used to make the container. For example, a child who eats soup, hamburger, ketchup, apple sauce, carrots, ice cream, and milk might have a list resembling the following:

Soup — metal can with label

Hamburger — plastic tray and clear plastic wrap

Ketchup — glass bottle, metal cap, paper label

Apple sauce — glass jar with metal top and paper label

Carrots — plastic or paper bag

Ice cream — paper or cardboard container

Milk — waxed cardboard container

Ask each child to count the number of containers that use each different material (glass, metal, paper, etc.) and the total number of containers used in his or her household. Children will be interested in seeing which family threw away the most items. Stress accuracy — there will be a tendency to give elaborate totals and to magnify the amount used.

Ask each child to divide the total number of containers used by his or her household by the number of people in the household. This number will be an estimate of the amount thrown away at one meal by one individual. Then have children multiply this number by three to get an estimate for 1 day. To continue this illustration, estimate the number of containers thrown away in 1 day by the whole class. This total will be amazing to them.

Have the children imagine that all the containers the class threw away yesterday were stacked up in a corner of the room.

**Q** How much of the room would it occupy?

**Q** How much of the room would a week's worth of garbage occupy?

Use the figure representing the number of containers thrown away by one person in 1 day. Multiply by the number of people in the community to determine the total number of containers thrown away in your community for 1 day. Multiply that number by 365 days a year. Review that these containers are made of resources that are necessary for survival.



**Objective:**  
**To give children an appreciation of waste disposal costs.**

**Vocabulary:**    pound    ton    cost    tipping fees

Bring in a scale and a bag of clean garbage containing an assortment of glass and plastic bottles, cans, cartons, and paper waste. (Or use some of the garbage brought in for Activity 3 if you were able to store it.) Call on a volunteer to weigh the bag of garbage and then weigh him or herself. Write the two numbers on the board.

Tell children that the average person in the United States throws away 4 *pounds* of garbage each day. Based on this statistic, ask children to answer the following questions:

**Q** How many days' worth of garbage was contained in the bag we just weighed?

**Q** How many days would it take you to throw away an amount of garbage equal to your own weight?

If each person in your community (pop. \_\_\_\_\_) throws away 4 pounds of garbage each day:

**Q** How many pounds does this equal in 1 day?

**Q** How many *tons* is this?

To help children grasp the concept of a ton (2,000 pounds), you might want to ask them how many tons some familiar objects weigh (an average 4-door compact automobile weighs about 1 ton).

Have the children try to imagine where all this refuse is being put every day of every year in every community.

You can also go further and get population statistics for your state and the entire United States, and multiply these numbers by 4 pounds. Remind children that much of this garbage is made up of resources that could be put to good use.

Tell children that it *costs* money to dispose of all of this waste. Have children imagine that it costs your community about \$30 for each ton of refuse that is disposed of in a landfill or burned in a waste combustor (or use the amounts for *tipping fees* from your Community Profile):

**Q** How much would waste disposal or combustion cost your community each day?

**Q** How much would it cost per year?

**Q** Where does this money come from?

To give children a better appreciation of this sum of money, ask them the price of a cassette tape or compact disk of a popular group. (For younger children, you might ask how much they get for an allowance or how much it costs to buy lunch at school.)

**Q** Approximately how many cassettes or CDs could you buy with the money your community spends on landfill or combustion in 1 day? In 1 year?

You might want to have children calculate how much money could be saved if each person in the community reduced the amount he or she threw away each day by 1 pound.



**Objective:**  
To help children realize the enormous amount of resources Americans throw away.

**vocabulary:** population statistic

Draw a square on the floor with chalk, approximately 5 feet by 5 feet. This square can also be delineated by grouping chairs to form the perimeters. Ask one child to step inside the square holding one piece of solid waste, probably scrap paper. Emphasize that each person involved cannot step outside the square once he or she is in it.

Then ask another to step in, representing a couple. Assume they then have two children, those two marry and have two children, etc. The number of children in the square will go up very quickly, yet the square remains constant. Ask the children how they would be able to get anyone *out* of the square. As the square grows more crowded, obvious reactions will be observed, especially pushing, restlessness, and generally aggressive behavior.

Ask all the children to drop their pieces of solid waste into the square and return to their seats. The result will certainly be solid waste pollution. This vividly illustrates the concepts that an increasing *population* creates more waste, that our crowded cities have limited space, and that the amount of waste pollution increases every year.

Share with children the following *statistics*.

**Every 2 weeks, we throw away enough bottles and jars to fill the 1,350-foot twin towers of New York's World Trade Center.**

**We throw away 31.6 million tons of yard waste each year.**

**With the aluminum we throw away in 3 months, the United States could rebuild its entire commercial airfleet.**

**We throw away 2.5 million plastic bottles every hour (22 billion plastic bottles a year).**

**With the office and writing paper we throw away every year, we could build a 12-foot high wall from Los Angeles to New York City.**

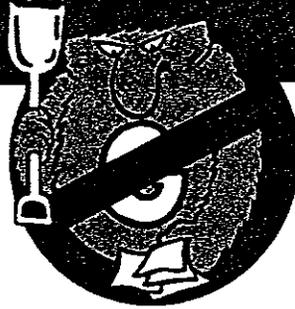
**We throw away over 200 million tires every year (one for every person in the United States).**

Children may want to try illustrating some of these enormous quantities or creating posters for the classroom based on these figures. (See the Clip Art pages for some illustration ideas.)

# UNIT FOUR

## How Can We Produce Less Waste?

K-6



**Objective:**  
To explore changes in lifestyle that have led to increased production of waste.

**Vocabulary:** disposable product durable

**Q** What do you do when your pen runs out of ink?

Most children will say that they throw it away or get a new one. Explain that an item that is made to be used once or for a short period of time and then thrown away is called *disposable*.

**Q** What are some examples of disposable *products* that you have used? (diapers, pens, razors, cameras, shopping bags, wrapping paper, fast food containers, plastic eating utensils, paper plates, paper napkins, paper towels)

**Q** Why do you think people use these disposable products rather than more *durable*, or long-lasting, alternatives?

Help children to understand that people often use disposable items because it is easier, and sometimes cheaper, to replace these items than to clean, refill, or repair nondisposable products. However, although it may be more convenient to throw out paper plates, paper cups, and plastic utensils than to wash dishes, these disposables create a tremendous amount of waste.



Do you think people have always thrown away as many things as they do now? Why or why not?

Discuss with children what kinds of changes in lifestyle have caused us to create more waste in our day-to-day lives. Some examples might include:

- Buying new clothing instead of mending socks and patching worn clothing.
- Eating prepared foods or "fast foods" rather than cooking food from scratch.
- Buying individual servings or amounts convenient for storage instead of buying foods in bulk quantities.
- Getting plastic or paper bags with each purchase instead of shopping with baskets or reusable bags brought from home.
- Replacing broken items rather than repairing them.

This would be a good opportunity to read the skit "Throwaway Three" at the back of the guide, focusing on the issue of waste production through the ages. You might also conduct this activity in conjunction with a social studies unit on how people lived at a certain period of time in history. Compare their use of resources and generation of garbage with our own. Have children work in groups to prepare skits showing the contrast between the two societies.

A simple line drawing of a cylindrical can with a jagged top edge, resembling a lid. The word "ACTIVITY" is written on the side of the can, and the number "16" is written below it.

**Objective:**  
To introduce children to the concept of source reduction.

**Vocabulary:** source reduction

Review with children some of the problems associated with having too much garbage:

- Air, land, and water pollution.
- No place to put all of the waste.
- Shortages of natural resources.
- High costs of burying or burning garbage.

Have children imagine that for 1 week they are not allowed to throw anything out in a garbage can at home or at school.

- Q** How would you eat?  
(Bake your own quick breads and cookies, drink juice in the largest containers you could find, buy vegetables without any wrapping, buy huge boxes of cereal.)
- Q** How would you clean up a spill?  
(Use reusable rags and sponges instead of paper towels.)
- Q** What would you do if you tore your clothes?  
(Patch them or sew up the hole.)
- Q** Can you think of any other habits you would have to change for that week?

Explain to the class that eventually they would probably have to start throwing out some things — the empty juice container, the cereal box, the wrapper from a new bar of soap. However, putting into practice some of the ideas they just mentioned could drastically reduce the amount of garbage they produce.

Tell children that what they have just been talking about are methods of *source reduction*. Explain that source reduction is the concept of using up fewer materials so that less waste is produced. Define for children or call on volunteers to define the words *source* and *reduce* to give children a better understanding of the term. There are several components of source reduction:

1. **Cutting down on the quantity and weight of waste, including cutting down on packaging of the products you use.**
2. **Making things last as long as possible, thereby extending the useful life of products.**
3. **Using things more than once for the same or for different purposes, such as taking a clean jug back to a farmstand to be refilled with cider or using a specially designed jelly glass as a drinking glass.**
4. **Using products that are less toxic, meaning those that contain potentially harmful ingredients.**

These components will be discussed in more detail in the next few activities. Help children to understand that the less waste we produce, the fewer problems we will have disposing of it.



**Objective:**  
To help make children conscious of packaging and ways that it can be reduced.

**Vocabulary:** ecological packaging green product toxicity

Construct a visual aid in the form of a bulletin board or display using packages and pictures of packaging brought from home by teachers and children. Actual packages work best, but carefully chosen pictures are also valuable. The bulletin board display can evolve into a comparison of "good" and "bad" packaging. The board can be broken down into three categories:

1. Nature's packaging: coconut, bananas, peanuts, etc.
2. Older types of packaging: paper bags, pottery, returnable bottles.
3. Modern packaging: plastic wrap, plastic foam, plastic-coated milk and juice containers, and individually wrapped packets.

**Q** What are these packages made of?

**Q** What natural resources were used to make them?

**Q** Which packages can be reused?

Ask children to consider what materials might need elaborate packaging and why (for example, aspirin capsules need to be sealed for health reasons). Point out the ways in which packaging can prevent waste by reducing spoilage and providing individual servings. Ask if some packages use excessive materials, and thus contribute to the waste problem (for example, packages of gum in which each piece is individually wrapped in two wrappers).

**Q** How would you design an *ecological package* (one that requires as little energy and as few resources as possible for its production or disposal)?

Tell children that another name for a product that uses ecological packaging and does not harm the environment is a *green product*. You might ask children to take a trip to the supermarket or drugstore and look for the most ecological and the most wasteful packaging.

Remind children that cutting down on product packaging and reusing packaging materials are important aspects of source reduction. Tell children that they can encourage their households to buy products with less packaging and to bring containers from home when they shop. You might have them prepare a list of source reduction "shopping tips," individually or as a class.



**Objective:**  
To show children that some things that are thrown out have value.

**Vocabulary:** valuable

**Q** What might there be in one person's trash that would not be trash or waste to someone else?

Set up a "swap box" where the children can bring in old toys or objects that might be thrown out. They can trade an old toy for another one that is new to them. An alternative would be to set up a collection box for a local Goodwill or Salvation Army collection.

As a homework assignment, ask the children to write a short story, real or imaginary, describing something *valuable* that they found buried in the garbage. The stories should include accounts of the previous owners and reasons why the objects were thrown away.

Explain to children that one way to make something last longer — or extend its "life" — is to share it with someone else once you have outgrown or grown tired of it.



**Objective:**  
**To introduce children to the concept of reuse as an alternative to disposal.**

**Vocabulary:** reuse

Ask children how many uses they can think of for a large peanut butter jar or a coffee can. Write them on the board. Tell children that many things can be used again, or reused in the same or in different ways.

Set up a "use-it-again" box for your classroom. Have the children paint, color, or paste pictures on it. Suggest that children place in it all materials that can be used again. Encourage children to contribute to the "use-it-again" box on a day-to-day basis. For example, paper that has only been used on one side can be used again for drawing paper, quiz sheets, etc. Craft items from home (egg cartons, margarine tubs, thread spools, etc.) can also be brought in to make collages and other art projects.



**Objective:**  
**To understand product toxicity and explore ways to reduce it.**

**Vocabulary:** toxic nontoxic

You might want to introduce this activity by asking children to have their parents help them find five things around the house that could be harmful to the earth. Stress that children should not handle these items. Begin a discussion by talking about what children have found.

**Q** Have you ever seen a product with a label that says "warning," "danger," or "caution"? What does this mean? What kinds of products have these labels? (ammonia, turpentine, bug spray, drain cleaner, nail polish remover)

**Q** What does the label usually warn you against doing? (swallowing, getting it in your eyes, maybe getting it on your skin) Why?

Explain to children that substances that contain ingredients that may be poisonous are called *toxic*. Encourage children to consider where waste from toxic products might end up and why it might cause problems to people or to the environment. Explain to them that many of these toxic substances can be replaced by *nontoxic* or less toxic products that do the same job.

Ask children if any of them have seen boxes of baking soda in refrigerators or sachets of herbs in closets or drawers. Explain that these are nontoxic substitutes for air fresheners that may contain toxic ingredients.

Let children know that some products, such as household batteries, also contain ingredients that become harmful only after they are thrown out and may leak into the environment. (See Activity 7.)

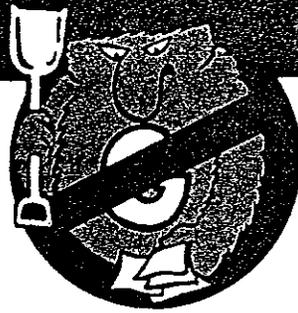
You may want to conduct the following demonstration of a nontoxic substitute for the class. Tell children you are going to show them a homemade "silver polish" that is safe and can be made from ingredients they have around the house. Boil 2 to 3 inches of water in a shallow pan with 1 teaspoon of salt, 1 teaspoon baking soda, and a sheet of aluminum foil. Totally submerge a piece of silverware and boil for 2 to 3 minutes. Wipe the utensil with a cloth; tarnish should come off. Repeat the procedure if any tarnish remains.



# UNIT FIVE

## What Can We Do About Waste?

K-6



**Objective:**  
To show children the function  
of mold in nature.

**Vocabulary:** mold decomposition

Ask children if they have ever noticed anything growing on food when it is old. As a demonstration, place very small pieces of fruit such as apple, orange skin, and bread on top of some moist soil in a container. Cover with clear plastic and a rubberband. Observe the changes over a few days.

Ask the children if they know what is growing on the food. Explain to them that these are *molds* and that they feed on this food, converting it to nutrients and organic matter in the process. The nutrients and organic matter then become available for reuse by plants. Tell children that this process, known as *decomposition*, is one way nature reuses its resources.



**Objective:**  
To introduce children to the concept of natural cycles.

**Vocabulary:** organism natural cycle compost

Collect dead leaves in several stages of breakdown or take a field trip to a wooded area to show children what happens to leaves after they fall.

**Q** Do you know what becomes of all the leaves that are on the ground in the fall?

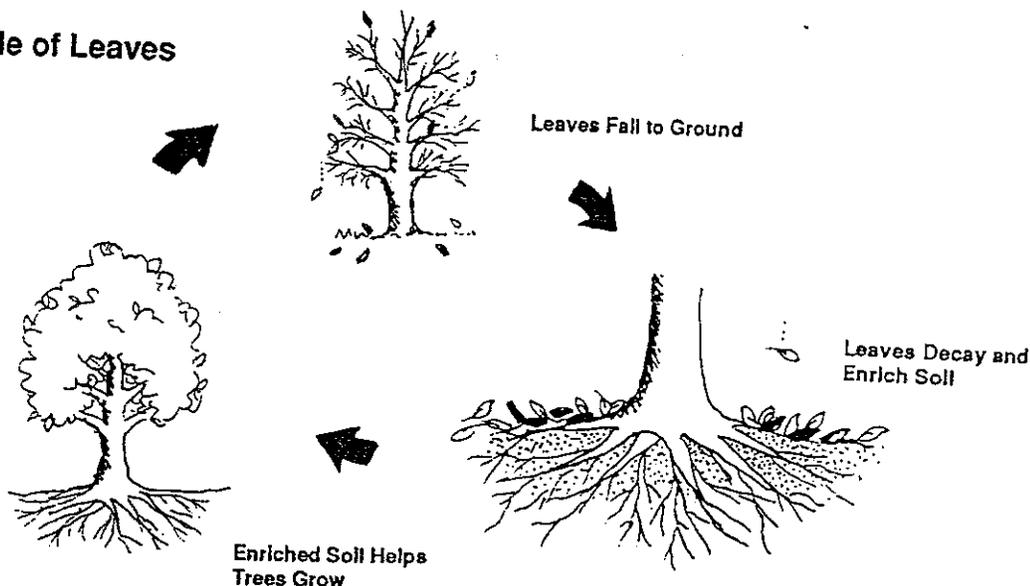
**Q** Where do they go next summer?

Make the connection that leaves become soil by letting the children see and feel the layers of leaf and soil that you collected. Have children make sketches and take notes on what they observe. Explain to children that, along with molds, other tiny *organisms* break leaves down into soil.

Help children to understand that a tree's leaves fall, decay into the soil, nourish the tree by making the soil richer, and thus help the tree to grow and produce more leaves. Tell them that a series of events in nature that repeat over and over is called a *natural cycle*.

Using their sketches, have children make a large art mural showing all the stages in the cycle of leaves. (You may wish to refer to the illustration below.)

**Cycle of Leaves**



Another way to illustrate the leaf cycle for younger children would be to print the following words on 3 x 5 cards: *soil, roots, trunk, branch, buds, green leaves, dead leaves*. Distribute the seven cards to seven children at random. After each child has shown his or her card to the class, give a long piece of string to the child holding the card marked "soil." Ask the children to arrange themselves in order according to stages of growth and decay. As each determines his or her corresponding position, he or she should take hold of the string. They should end up in a circle.

Explain to children that some households and communities put their food and yard waste in outdoor piles called *compost* piles. These materials will also decompose into the soil, and can then be used as compost to enrich soil for gardening or other planting. Recall for children the statistic in Activity 14: *We throw away 31.6 million tons of yard waste a year*. (Also, see Clip Art, p. 12.) Composting helps reduce the amount of waste that must be landfilled or combusted. Tell children that composting is a form of *recycling*, which they will learn more about in the next activity.



**Objective:**  
To introduce the concept of recycling as an alternative to disposal.

**Vocabulary:** recycle

Write the word *recycle* on the board or a large sheet of paper. Next to it draw a picture of a bicycle wheel. Point out to the children that both end in the word *cycle*.

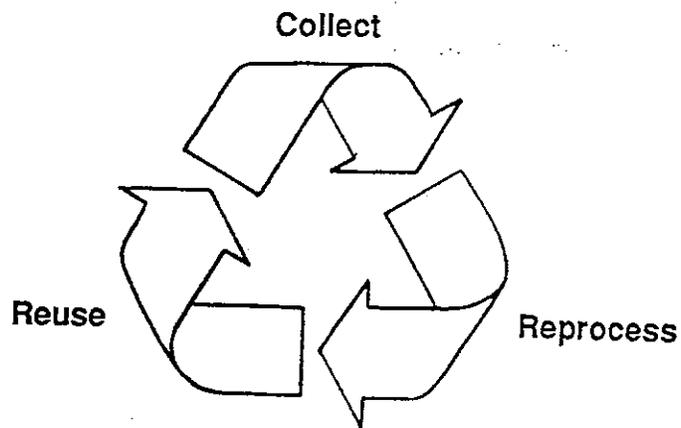
A bicycle wheel goes around and around — the word *recycle* means to use over and over again, or to go around. Show children the recycling symbol on the following page and explain to them that the three arrows represent the three stages involved in recycling materials: collect, remake, and reuse. You might wish to have children practice drawing the symbol.

Point out that when we recycle a product, it does not add to our garbage but goes back around into something new. As the leaves go back into the soil to help a new tree grow, manmade materials can also be broken down and used to make new materials. Old paper can become new paper; old cans and glass become new cans and glass, etc.

Have each child list the possible advantages of recycling. Call on volunteers to read from their lists, and write the major advantages on the board:

1. Reduces pollution
2. Saves natural resources
3. Saves energy
4. Saves money
5. Saves landfill space

As a result of this activity, the children should become very familiar with the word *recycle* and use it frequently.



**Objective:**  
To review the ideas of recycling and reuse.

Have a show-and-tell session where the children bring in objects and discuss how they could be either reused or recycled. Children can put all objects that can be used again in the classroom into the "use-it-again" box that they set up in Activity 19.



**Objective:**  
 To increase children's awareness of recycling in their community and get them involved in school recycling efforts.

**Vocabulary:** recyclable

If there is a recycling center in your community where you can bring paper, cans, bottles, plastic, or other *recyclables*, set up recycling boxes for the classroom. You should have a separate clearly labeled box for each type of recyclable collected (aluminum, white paper, newspaper, plastic soda bottles, glass bottles, etc.). Stress to children the importance of separating their waste for recycling. Use the exercise on pp. 44-45 to test children's knowledge of recyclables and waste separation.

When you take the materials to the center, bring the class to see how it is run. Find out if your class could bring in recyclables from a 1-day community collection or an ongoing recycling program at the school.

If there are no recycling centers in your area, research with children possible markets for your waste materials. Look in the Yellow Pages of the telephone book under *recycling programs*, *waste paper*, or *scrap dealers*, and consult the list of State Solid Waste Agencies at the back of this guide.

Have children start a school recycling program. They could begin by setting up collection boxes for used writing paper in all of the classrooms. A collection drive for certain recyclables, such as aluminum, could be used as a fundraiser for a class trip. You might organize a competition between grades for the most recyclables collected, and offer a prize of a movie or a trip to the winning grade. The U.S. EPA has published a brochure, "School Recycling Programs: A Handbook for Educators," which should be very helpful. (See list of Resources at the back of this guide.) Use Clip Art pages at the beginning of the guide to design posters or brochures to promote the program.

**Note:** Be sure you have suitable markets for your recyclables before you begin a collection program! Find out exactly what kinds of material each market will accept. For example, must paper be high grade paper?



# Save! Sort! Recycle!

Color the recyclables in the boxes on this page. Then cut them out and paste them into the proper recycling bins on the other page.





**COMPOST**

**PLASTIC**

**METALS**

**SECOND HAND SHOP**

**PAPER**

**GLASS**





**Objective:**  
To illustrate how a common manufacturing process uses resources.

Take a field trip to a papermill or glass manufacturer that uses recycled paper or glass, or to another type of facility that uses recyclables in its manufacturing processes. Discuss with children how many resources the manufacturing process uses (for example, trees, water, energy for papermaking) and how these resources could be saved by using recyclables. Arrange to have someone from the facility speak to the class about its use of recyclables. Find out where the papermill or manufacturer gets the materials that it uses in its processes.

This activity could be followed by making recycled paper out of old waste paper in the classroom.

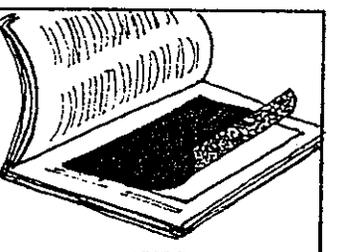
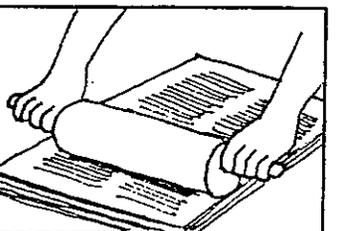
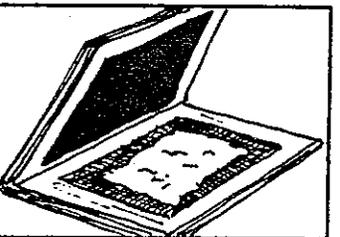
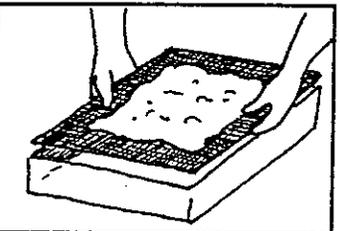
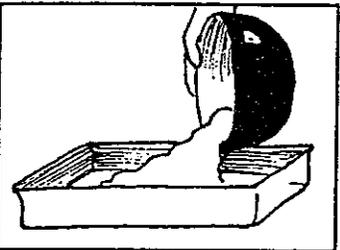
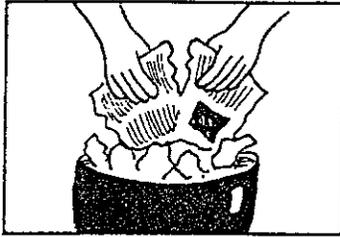
## MAKE YOUR OWN PAPER

### What You Need

- Old paper (anything but newspaper)
- A piece of screen
- A flat dish, a little larger than the screen
- 4 pieces of blotting paper the size of the screen
- A bowl
- An egg beater (a blender would be better)
- A round jar or rolling pin
- Newspaper and blotter paper
- 2 cups of hot water
- 2 teaspoons of instant starch (for stronger paper, if desired)



## What to Do



**1** Tear the paper into very small bits into the bowl. Pour in the hot water.

**2** Beat the tissue and water to make pulp.

**3** Mix in the starch if desired.

**4** Pour the mixture into the flat dish.

**5** Slide the screen into the bottom of the dish and move it around until it is evenly covered with pulp.

**6** Lift the screen out carefully. Hold it level and let it drain for a minute.

**7** Put the screen, pulp side up, on a blotter on some newspaper. Put another blotter over the pulp, more newspaper over that.

**8** Roll the jar over the sandwich to squeeze out the rest of the water.

**9** Take off the top newspaper. Turn the blotter sandwich over so that the screen is on top. Then take off the blotter and the screen very carefully. Don't move the pulp. There is your paper.

**10** Put a dry blotter on the pulp and let it dry.

**11** Use the paper for an art or writing lesson. How is this paper different from normal drawing or writing paper?





**Objective:**  
To encourage children to extend their new awareness of source reduction and recycling outside of the classroom.

Discuss with children what they can do to reduce waste and recycle at home:

Use all of your paper on both sides.

Use grocery bags to hold garbage instead of buying garbage bags.

Use grocery bags to wrap packages to send through the mail.

Use grocery bags for art projects.

Buy food in bulk quantities.

Pack your lunch in reusable containers.

Use silverware and dishes instead of disposable plastic utensils and plates.

Reuse plastic and glass containers to store food.

Use returnable glass and plastic bottles.

Compost yard wastes.

Save paper, glass, aluminum, and other recyclables and bring them to a recycling center.

Participate in a local recycling program.

Get involved in starting a school recycling program.

Give things that you no longer use to people who can use them.

Borrow things that you don't use very often, instead of buying them.





**Objective:**  
To allow children to present what they have learned about recycling to the school and/or community.

Organize a play or a fair (or both) centered around the theme of recycling and its possibilities. For the fair, you might include exhibits of artwork related to recycling, collages made out of scrap, and inventions made entirely out of recycled materials. You could display drawings showing how recycling works, present information on recycling centers, and show how to prepare materials for recycling (separation, cleaning, etc.). This might also be a good opportunity to perform the skit, "Throwaway Three," at the back of the guide.

If your town does not recycle, this class learning experience could turn into an educational opportunity for your whole community.



**Appendix IX-B**  
**School Curriculum**  
**Grade 10**



## What Is Waste?

**Objective:**

To investigate the origins and vocabulary of waste.

**Vocabulary:**

waste  
refuse

garbage  
rubbish

trash  
scrap

junk

Q

What is *waste*?

Q

What types of waste does an average household produce?

Q

Which types are in the greatest quantity?

Q

What are some of the other names we have for waste?

Using a good dictionary, look up and discuss the cultural origins of the words *garbage*, *trash*, *junk*, *refuse*, *rubbish*, *scrap*, and any other words the students come up with. Have students list the above words in order of their offensiveness.

Q

Does this list have any relation to the origin of the various words?



**Objective:**  
**To identify the components of waste and their sources.**

Have students identify the types of waste that result from the production, consumption, and disposal of a can of beef stew or some other prepared food that students are familiar with, such as a TV dinner or frozen pot pie. Have each student make a list of components and their waste, then call on volunteers to write them on the board one at a time. For the stew, the main components to be traced are the meat, potatoes, tin can, and paper label.

For example: MEAT — beef comes from steers, steers eat grain, grain grows in the earth. Wastes produced — grain waste, manure waste, slaughter waste, table scraps, sewage waste.



**Objective:**  
**To familiarize students with the Garbage Gremlin as a representation of our wasteful habits.**

Show students the cover of the curriculum guide or photocopy the Clip Art page in the front and distribute. Tell students that the creature driving the beatup car at the bottom of the page is a character known as the Garbage Gremlin. Explain that the U.S. EPA has chosen the Garbage Gremlin to represent our wasteful habits and careless attitudes toward the garbage problem in this country. The Garbage Gremlin is portrayed as a creature who loves garbage and revels in any action that contributes to the evergrowing solid waste heap. On the other hand, anyone or anything that decreases waste makes him furious! He appears throughout this guide, as well as in a number of other U.S. EPA publications.

Discuss with students how the use of a character such as the Garbage Gremlin might help foster a more responsible attitude toward our solid waste problem. Encourage students to use their imagination to think of other possible characters, symbols, or slogans that might accomplish the same purpose.

# UNIT TWO

## How Do We Manage Our Waste?

7-12



### Objective:

To explore current methods of waste disposal and management.

**Vocabulary:** landfill combustion composting recycling  
source reduction Department of Sanitation  
integrated waste management

**Q** What is meant by “throwing something away”?

**Q** Where is away?

**Q** What do we do with waste in our society? (littering, landfill, waste combustion, composting, recycling)

Elicit from students different methods of waste disposal and management and talk a little bit about each one. Help students understand that *landfill* involves controlled burying of waste in the ground, *waste combustion* means controlled burning of waste for energy recovery, *composting* involves converting food and yard wastes into a material capable of enriching soil, and *recycling* means reusing waste to make new materials. All of these topics are discussed in more detail later in the guide.

**Q** How does our town manage its residential waste?

If students cannot answer this question, you might want to research it as a class by contacting the *Department of Sanitation* or town planning board or arrange to have a representative from the Department of Sanitation or a town planning official visit the classroom to discuss local waste management options. Ask students to prepare some questions in advance.

You may want to plan a field trip to a local landfill, waste combustion plant, or recycling facility so that students can see firsthand how waste is managed in your community.

Define for students the concept of *integrated waste management*. Tell them that most communities cannot rely exclusively on one method of waste disposal or management. For example, even if a community combusted most of its waste, the ash would need to be disposed of in a landfill and some materials would not burn. To effectively manage all of a community's waste requires a combination of techniques. The techniques currently available are *source reduction* or reducing the amount and toxicity of waste generated, recycling or reusing waste materials, and waste combustion for energy recovery and landfilling. A plan that combines all of these techniques to safely and effectively handle a community's solid waste is known as integrated waste management.



**Objective:**  
**To introduce students to the principles of waste combustion.**

**Vocabulary:**      properties    toxic    combustors  
                         pollution control technologies  
                         scrubber      filters    waste-to-energy

**Note:** This activity should take place in a laboratory with the proper equipment, including goggles, bunsen burner, tongs, and a fume hood. If the proper facilities are not available, you should probably skip this activity. **Proper ventilation and safety should be stressed at the beginning of the lesson.** Tell students to be especially careful when burning plastics.

Break the class into teams. Give each team 5 to 10 materials to burn. The items should represent a variety of household waste including food, metal, plastic, paper, etc. For the plastic items, select plastic wrap and/or plastic milk jugs or soda bottles. Do not burn anything that may contain polyvinyl chloride (PVC) or cadmium (yellow or with a yellowish cast).

Prepare a data sheet or a chart for noting the initial weight and residue weight of each item burned, the color of flame and smoke, and the odors produced. You can use the chart on p. 58 to record the *properties* of each item.

After students have filled in the chart, ask the following questions:

**Q** Do you think any of the smoke produced could be harmful? Why and in what way?

Explain to students that some plastics and certain other materials can produce poisonous, or *toxic*, chemicals when they are burned.

**Q** Are there ways to make the process less harmful to our health or the environment?

Explain to students that modern waste *combustors* differ significantly from the kind of old-fashioned combustor that their experiment was designed to simulate. Modern facilities use a variety of *pollution control technologies* to greatly reduce the amount of toxic materials given off in smoke. Among these are *scrubbers*, which spray a compound into the smoke that helps to neutralize acid gases, and *filters* that remove tiny ash particles from the smoke. Burning waste at extremely high temperatures is another way of destroying harmful chemical compounds and disease-causing bacteria.

**Q** What are the advantages of burning waste?

1. The primary advantage of combustion is that it reduces the amount of waste. Waste combustors shrink garbage up to 90 percent by volume and 75 percent by weight.
2. Most combustors and all new *waste-to-energy* facilities create energy through the heat given off when waste is burned. In 1989, modern waste-to-energy facilities generated enough electricity to supply 1.2 million households for a year.
3. With the increasing costs of land disposal, combustion is becoming a more economical alternative, even though the costs of constructing a waste-to-energy facility are very high.

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## Chart for Recording Properties of Materials Burned

Material	Initial Wt.	Residue Wt.	Flame Color	Smoke Color	Odor
Tissue					
Newspaper					
Plastic Bag					
Plastic Bottle					
Tin Can					
Bread					
Banana Peel					

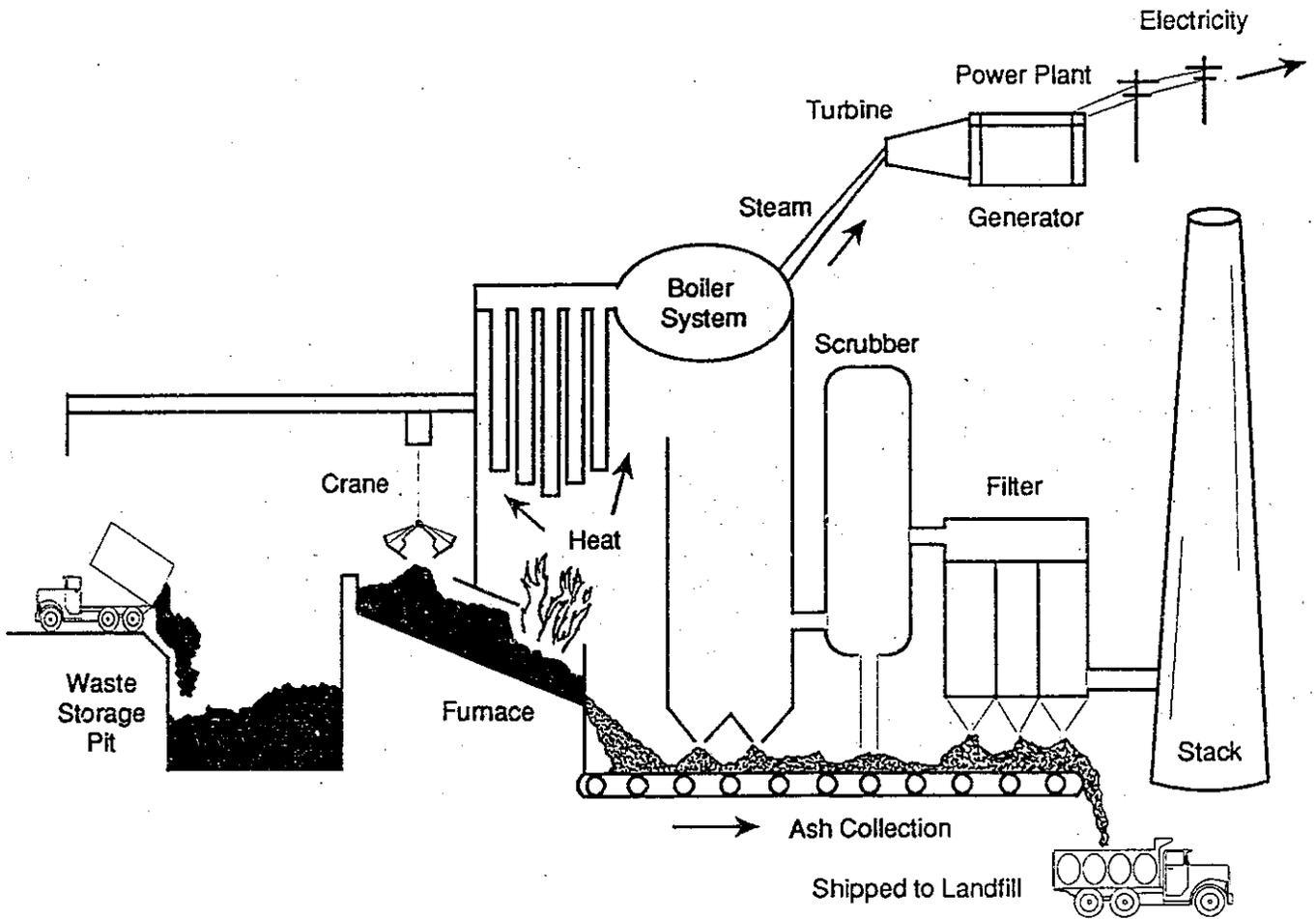
Distribute copies of, or project on an overhead, the diagram of a combustor on p. 60. Help students trace the following steps:

1. Trucks dump waste into a pit.
2. The waste is moved to the furnace by a crane.
3. The furnace burns the waste at an extremely high temperature.
4. The furnace heats a boiler that produces steam for generating electricity and heat.
5. Ash collects at the bottom of the furnace, where it is removed for disposal to a landfill.

Point out to students that the combustor in the diagram also has two pollution control devices: a scrubber and a fine-particle filter.

Remind students that, as they learned from their experiment, burning does not get rid of all the waste. There is still ash that remains. This ash can be dangerous to the environment, and should be disposed of in a specially designed landfill. One reason that ash can be hazardous is that toxic substances (such as lead in automobile batteries and cadmium in household batteries and some plastic) are more concentrated in the ash than they were in the original garbage. One way to reduce the toxicity of combustor ash is to separate potentially toxic substances from the waste before it is burned. Some of these materials may be able to be recycled. (Refer to Activity 26 for recyclable materials.)

# Waste Combustion Plant with Pollution Control System





**Objective:**  
**To introduce students to the principles of land disposal.**

**Vocabulary:** leachate wetlands ecosystem

Have students work in pairs to construct mini-dumps. Have each pair cut off the top of a 1-gallon plastic jug and fill it with moist soil. Add small pieces of the following objects: a metal barrette or paper clip, newspaper, plastic, food (apple core, potato peelings), and aluminum foil. Add a little "rain" from time to time.

Explain that the jug represents the way that garbage used to be piled in an open dump. Over the following weeks, periodically examine the objects in the jug to see what, if anything, happens to them. You might want to have students keep a log of their observations or have one log for the whole class.

Over a period of time you can expect the food and newspaper to begin to degrade. (For further discussion of the decomposition process, you may wish to refer to Activities 23 and 24.) The metal will rust. Nothing will happen to the plastic or aluminum foil. Make a chart to display your findings.

Discuss with students why some objects change and others do not. Ask them to think about what implications this has for the environment.

**Q**

How would an uncovered dump like this pollute the environment?

1. Liquids and metals could leak to the ground-water supply. Students should be able to observe liquid waste collecting at the bottom of the jug. Tell students that liquid waste that comes from a landfill or other solid waste source is called *leachate*. Modern landfills control any leachate that is produced.
2. Gases produced by decomposing materials pollute the air, and may even set off fires and explosions if not controlled. Some modern landfills capture this gas and use it as a source of energy.
3. Many old landfills were constructed in fragile or unstable environments, such as *wetlands*, earthquake zones, or flood plains, where they posed a threat to *ecosystems* or nearby communities.
4. Uncovered dumps produce odors and can be breeding grounds for rats and other disease-causing pests.



**Objective:**  
**To familiarize students with modern sanitary landfills.**

**Vocabulary:** sanitary landfill contaminate

Tell students that “open dumps” similar to the one they constructed in the last activity are no longer being built. Current methods for building *sanitary landfills* are safer and more protective of the environment. You might begin this activity by asking students if they can think of ways to build a more environmentally safe landfill.

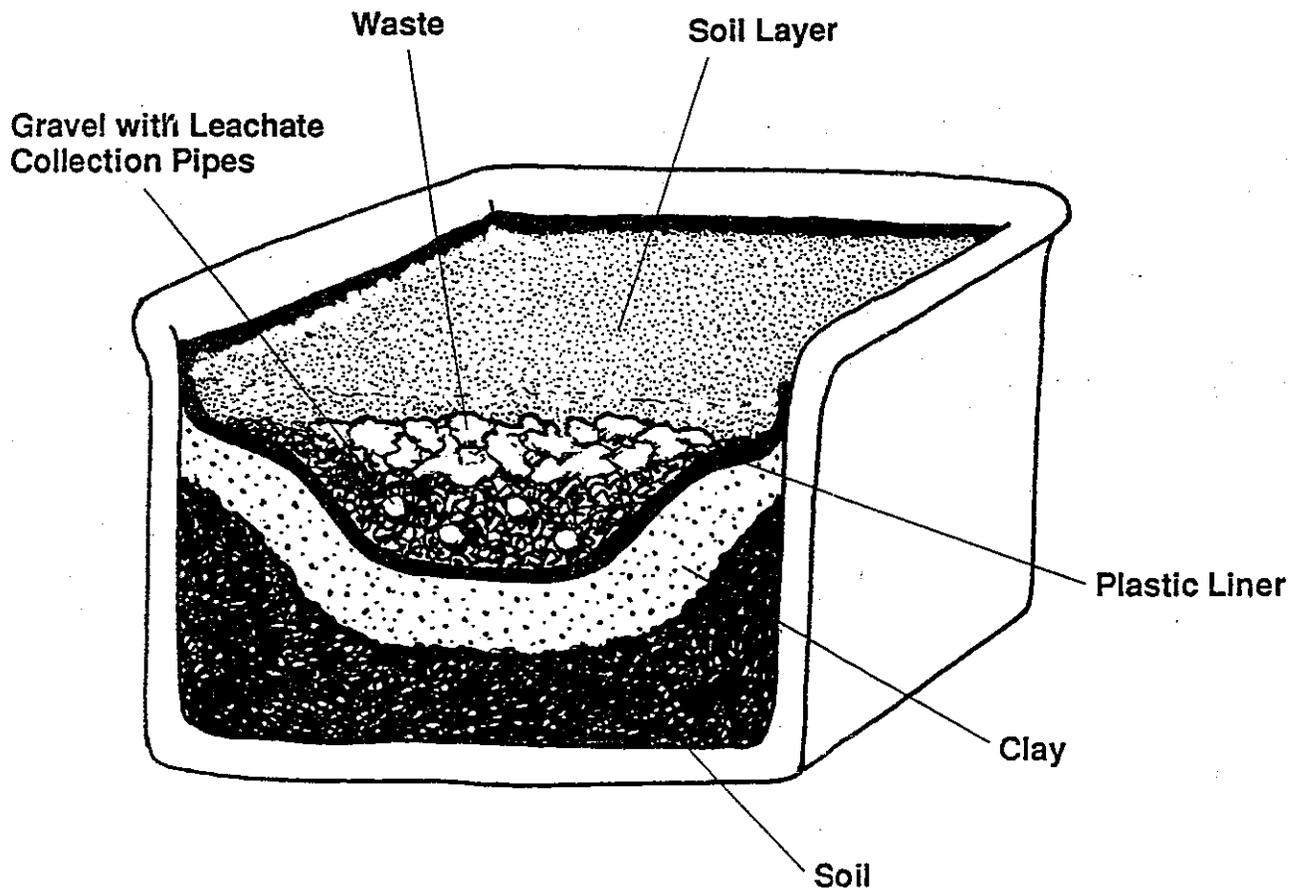
Draw on the board a simplified diagram or distribute copies of the illustration of a model landfill on p. 63. Explain to students that this is an example of one of the more protective landfill designs. Highlight the layers of soil, clay, gravel with collection pipes, plastic liner, and waste. Newly collected waste is covered daily by a layer of soil. Tell students that modern landfills now also control the leachate so that it doesn't *contaminate* the environment.

As a classroom activity, construct a “mini-sanitary landfill” in a terrarium or large glass-bottomed box. Place a variety of wastes (metal, food, paper, plastic) onto the gravel, and cover with a light layer of soil. Sprinkle occasionally with water to simulate rain. Observe changes in the waste materials over time and watch for “leachate” collecting at the bottom.

There should be far fewer changes to materials in this modern landfill than there were in the jug.

- Q** In what ways would it be better if waste was buried in a sanitary landfill—one designed to collect and prevent leachate and to collect gas buildup from decomposition?
- Q** What problems might still remain?
- Q** What might happen if we run out of space to create new landfills?

## "Bathtub" Model of Modern Sanitary Landfill





**Objective:**  
**To sensitize students to the problems of litter.**

**Vocabulary:**      **litter**

Discuss litter.

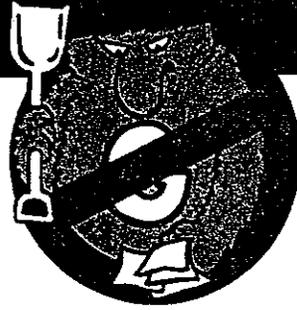
- Q** What is *litter*? Name some types of litter found on the way to school.
- Q** What is the most common type?
- Q** Who are the worst litterbugs?
- Q** What are the social and environmental costs of litter?
- Q** How could littering be reduced or stopped?

Organize a litter cleanup at a community park or recreational area. Discuss ways to encourage people not to litter. If cameras are available for student use (or students have their own), encourage students to take pictures of areas of unsightly litter in the community. Create a bulletin board display, labeling the photos with captions describing where the pictures were taken, and what, if any, steps are being taken to alleviate the litter problem. Such a display might even be used at a town meeting or by a community action group.

**Appendix IX-B**  
**School Curriculum**  
**Grade 10**



## What Is Waste?



### Objective:

To investigate the origins and vocabulary of waste.

### Vocabulary:

waste  
refuse

garbage  
rubbish

trash  
scrap

junk



What is *waste*?



What types of waste does an average household produce?



Which types are in the greatest quantity?



What are some of the other names we have for waste?

Using a good dictionary, look up and discuss the cultural origins of the words *garbage*, *trash*, *junk*, *refuse*, *rubbish*, *scrap*, and any other words the students come up with. Have students list the above words in order of their offensiveness.



Does this list have any relation to the origin of the various words?



**Objective:**  
**To identify the components of waste and their sources.**

Have students identify the types of waste that result from the production, consumption, and disposal of a can of beef stew or some other prepared food that students are familiar with, such as a TV dinner or frozen pot pie. Have each student make a list of components and their waste, then call on volunteers to write them on the board one at a time. For the stew, the main components to be traced are the meat, potatoes, tin can, and paper label.

For example: MEAT — beef comes from steers, steers eat grain, grain grows in the earth. Wastes produced — grain waste, manure waste, slaughter waste, table scraps, sewage waste.



**Objective:**  
**To familiarize students with the Garbage Gremlin as a representation of our wasteful habits.**

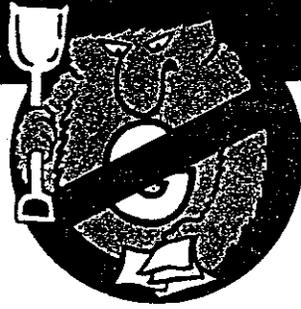
Show students the cover of the curriculum guide or photocopy the Clip Art page in the front and distribute. Tell students that the creature driving the beatup car at the bottom of the page is a character known as the Garbage Gremlin. Explain that the U.S. EPA has chosen the Garbage Gremlin to represent our wasteful habits and careless attitudes toward the garbage problem in this country. The Garbage Gremlin is portrayed as a creature who loves garbage and revels in any action that contributes to the evergrowing solid waste heap. On the other hand, anyone or anything that decreases waste makes him furious! He appears throughout this guide, as well as in a number of other U.S. EPA publications.

Discuss with students how the use of a character such as the Garbage Gremlin might help foster a more responsible attitude toward our solid waste problem. Encourage students to use their imagination to think of other possible characters, symbols, or slogans that might accomplish the same purpose.

# UNIT TWO

## How Do We Manage Our Waste?

7-12



### Objective:

To explore current methods of waste disposal and management.

**Vocabulary:** landfill combustion composting recycling  
source reduction Department of Sanitation  
integrated waste management

**Q** What is meant by “throwing something away”?

**Q** Where is away?

**Q** What do we do with waste in our society? (littering, landfill, waste combustion, composting, recycling)

Elicit from students different methods of waste disposal and management and talk a little bit about each one. Help students understand that *landfill* involves controlled burying of waste in the ground, *waste combustion* means controlled burning of waste for energy recovery, *composting* involves converting food and yard wastes into a material capable of enriching soil, and *recycling* means reusing waste to make new materials. All of these topics are discussed in more detail later in the guide.

**Q** How does our town manage its residential waste?

If students cannot answer this question, you might want to research it as a class by contacting the *Department of Sanitation* or town planning board or arrange to have a representative from the Department of Sanitation or a town planning official visit the classroom to discuss local waste management options. Ask students to prepare some questions in advance.

You may want to plan a field trip to a local landfill, waste combustion plant, or recycling facility so that students can see firsthand how waste is managed in your community.

Define for students the concept of *integrated waste management*. Tell them that most communities cannot rely exclusively on one method of waste disposal or management. For example, even if a community combusted most of its waste, the ash would need to be disposed of in a landfill and some materials would not burn. To effectively manage all of a community's waste requires a combination of techniques. The techniques currently available are *source reduction* or reducing the amount and toxicity of waste generated, recycling or reusing waste materials, and waste combustion for energy recovery and landfilling. A plan that combines all of these techniques to safely and effectively handle a community's solid waste is known as integrated waste management.



**Objective:**  
**To introduce students to the principles of waste combustion.**

**Vocabulary:**      properties    toxic    combustors  
                         pollution control technologies  
                         scrubber    filters    waste-to-energy

**Note:** This activity should take place in a laboratory with the proper equipment, including goggles, bunsen burner, tongs, and a fume hood. If the proper facilities are not available, you should probably skip this activity. **Proper ventilation and safety should be stressed at the beginning of the lesson.** Tell students to be especially careful when burning plastics.

Break the class into teams. Give each team 5 to 10 materials to burn. The items should represent a variety of household waste including food, metal, plastic, paper, etc. For the plastic items, select plastic wrap and/or plastic milk jugs or soda bottles. Do not burn anything that may contain polyvinyl chloride (PVC) or cadmium (yellow or with a yellowish cast).

Prepare a data sheet or a chart for noting the initial weight and residue weight of each item burned, the color of flame and smoke, and the odors produced. You can use the chart on p. 58 to record the *properties* of each item.

After students have filled in the chart, ask the following questions:

**Q** Do you think any of the smoke produced could be harmful? Why and in what way?

Explain to students that some plastics and certain other materials can produce poisonous, or *toxic*, chemicals when they are burned.

**Q** Are there ways to make the process less harmful to our health or the environment?

Explain to students that modern waste *combustors* differ significantly from the kind of old-fashioned combustor that their experiment was designed to simulate. Modern facilities use a variety of *pollution control technologies* to greatly reduce the amount of toxic materials given off in smoke. Among these are *scrubbers*, which spray a compound into the smoke that helps to neutralize acid gases, and *filters* that remove tiny ash particles from the smoke. Burning waste at extremely high temperatures is another way of destroying harmful chemical compounds and disease-causing bacteria.

**Q** What are the advantages of burning waste?

1. The primary advantage of combustion is that it reduces the amount of waste. Waste combustors shrink garbage up to 90 percent by volume and 75 percent by weight.
2. Most combustors and all new *waste-to-energy* facilities create energy through the heat given off when waste is burned. In 1989, modern waste-to-energy facilities generated enough electricity to supply 1.2 million households for a year.
3. With the increasing costs of land disposal, combustion is becoming a more economical alternative, even though the costs of constructing a waste-to-energy facility are very high.

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## Chart for Recording Properties of Materials Burned

Material	Initial Wt.	Residue Wt.	Flame Color	Smoke Color	Odor
Tissue					
Newspaper					
Plastic Bag					
Plastic Bottle					
Tin Can					
Bread					
Banana Peel					

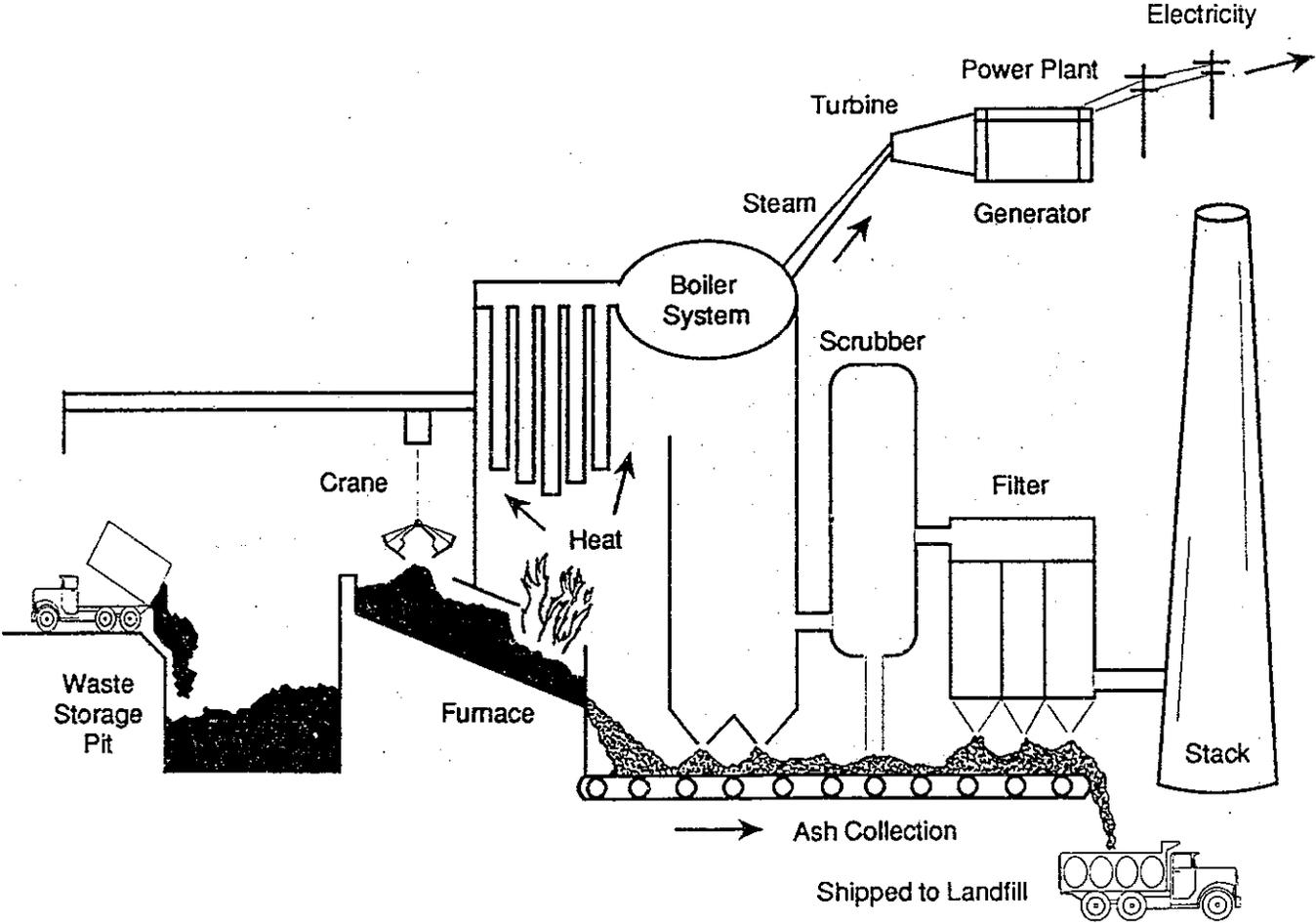
Distribute copies of, or project on an overhead, the diagram of a combustor on p. 60. Help students trace the following steps:

1. Trucks dump waste into a pit.
2. The waste is moved to the furnace by a crane.
3. The furnace burns the waste at an extremely high temperature.
4. The furnace heats a boiler that produces steam for generating electricity and heat.
5. Ash collects at the bottom of the furnace, where it is removed for disposal to a landfill.

Point out to students that the combustor in the diagram also has two pollution control devices: a scrubber and a fine-particle filter.

Remind students that, as they learned from their experiment, burning does not get rid of all the waste. There is still ash that remains. This ash can be dangerous to the environment, and should be disposed of in a specially designed landfill. One reason that ash can be hazardous is that toxic substances (such as lead in automobile batteries and cadmium in household batteries and some plastic) are more concentrated in the ash than they were in the original garbage. One way to reduce the toxicity of combustor ash is to separate potentially toxic substances from the waste before it is burned. Some of these materials may be able to be recycled. (Refer to Activity 26 for recyclable materials.)

# Waste Combustion Plant with Pollution Control System





**Objective:**  
**To introduce students to the principles of land disposal.**

**Vocabulary:** leachate wetlands ecosystem

Have students work in pairs to construct mini-dumps. Have each pair cut off the top of a 1-gallon plastic jug and fill it with moist soil. Add small pieces of the following objects: a metal barrette or paper clip, newspaper, plastic, food (apple core, potato peelings), and aluminum foil. Add a little "rain" from time to time.

Explain that the jug represents the way that garbage used to be piled in an open dump. Over the following weeks, periodically examine the objects in the jug to see what, if anything, happens to them. You might want to have students keep a log of their observations or have one log for the whole class.

Over a period of time you can expect the food and newspaper to begin to degrade. (For further discussion of the decomposition process, you may wish to refer to Activities 23 and 24.) The metal will rust. Nothing will happen to the plastic or aluminum foil. Make a chart to display your findings.

Discuss with students why some objects change and others do not. Ask them to think about what implications this has for the environment.

**Q**

How would an uncovered dump like this pollute the environment?

1. Liquids and metals could leak to the ground-water supply. Students should be able to observe liquid waste collecting at the bottom of the jug. Tell students that liquid waste that comes from a landfill or other solid waste source is called *leachate*. Modern landfills control any leachate that is produced.
2. Gases produced by decomposing materials pollute the air, and may even set off fires and explosions if not controlled. Some modern landfills capture this gas and use it as a source of energy.
3. Many old landfills were constructed in fragile or unstable environments, such as *wetlands*, earthquake zones, or flood plains, where they posed a threat to *ecosystems* or nearby communities.
4. Uncovered dumps produce odors and can be breeding grounds for rats and other disease-causing pests.



**Objective:**  
**To familiarize students with modern sanitary landfills.**

**Vocabulary:** sanitary landfill contaminate

Tell students that “open dumps” similar to the one they constructed in the last activity are no longer being built. Current methods for building *sanitary landfills* are safer and more protective of the environment. You might begin this activity by asking students if they can think of ways to build a more environmentally safe landfill.

Draw on the board a simplified diagram or distribute copies of the illustration of a model landfill on p. 63. Explain to students that this is an example of one of the more protective landfill designs. Highlight the layers of soil, clay, gravel with collection pipes, plastic liner, and waste. Newly collected waste is covered daily by a layer of soil. Tell students that modern landfills now also control the leachate so that it doesn't *contaminate* the environment.

As a classroom activity, construct a “mini-sanitary landfill” in a terrarium or large glass-bottomed box. Place a variety of wastes (metal, food, paper, plastic) onto the gravel, and cover with a light layer of soil. Sprinkle occasionally with water to simulate rain. Observe changes in the waste materials over time and watch for “leachate” collecting at the bottom.

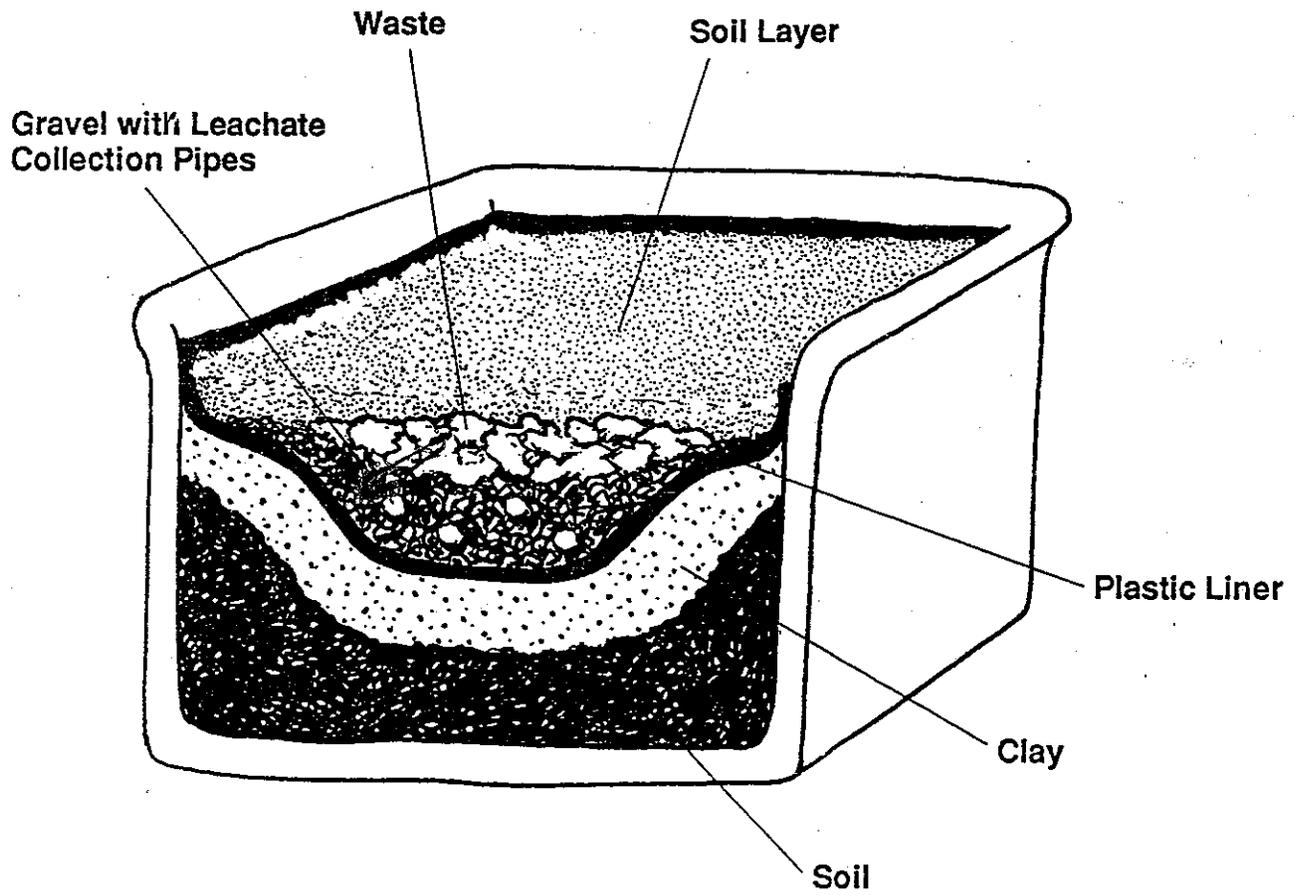
There should be far fewer changes to materials in this modern landfill than there were in the jug.

**Q** In what ways would it be better if waste was buried in a sanitary landfill—one designed to collect and prevent leachate and to collect gas buildup from decomposition?

**Q** What problems might still remain?

**Q** What might happen if we run out of space to create new landfills?

## "Bathtub" Model of Modern Sanitary Landfill





**Objective:**  
**To sensitize students to the problems of litter.**

**Vocabulary:**      **litter**

Discuss litter.

- Q** What is *litter*? Name some types of litter found on the way to school.
- Q** What is the most common type?
- Q** Who are the worst litterbugs?
- Q** What are the social and environmental costs of litter?
- Q** How could littering be reduced or stopped?

Organize a litter cleanup at a community park or recreational area. Discuss ways to encourage people not to litter. If cameras are available for student use (or students have their own), encourage students to take pictures of areas of unsightly litter in the community. Create a bulletin board display, labeling the photos with captions describing where the pictures were taken, and what, if any, steps are being taken to alleviate the litter problem. Such a display might even be used at a town meeting or by a community action group.

**Objective:**

**To increase students' awareness of the quantities of waste in their own community and the costs of disposal and management.**

**Vocabulary:** tipping fees true costs

Discuss with students the types and quantities of waste they throw out in their own homes. As a homework assignment, have the students collect and weigh all the garbage that their household throws out in 1 day. Make sure they include newspapers, writing paper, bags, bottles, jars, cans, food wastes, yard wastes, and packages.

- Q** How many pounds of garbage does your household throw away each day? (Students will need to weigh bags of garbage at home.)
- Q** How many pounds does one person in your household throw out in 1 day? (Divide first value by number in the household.)
- Q** How does this compare to the national average of 4 pounds per person per day?
- Q** Where else except our homes do we throw things away? (Consider waste generated at school, shopping malls, at a friend's house, etc.)

Find out the population in your community. Based on the amount of waste generated each day by an individual in your household, answer the following:

- Q** How many tons of solid waste are generated in your community per week, month, and year? (Remind students that 1 ton = 2,000 pounds. You might wish to relate the weight of a familiar object, such as a car, to a ton.)
- Q** How many tons of garbage do U.S. households throw away each year based on your calculations? (U.S. population = approximately 248 million [1989 projection])

Tell students that an estimated 180 million tons of solid waste are generated in the United States each year. This is enough to fill a convoy of garbage trucks reaching halfway to the moon.

Find out from your Department of Sanitation the waste management costs of 1 ton of refuse. (Landfill *tipping fees* range among communities from \$6 to over \$100 per ton; tipping fees for

waste combustion range from \$20 to over \$60 per ton.) These costs may not include the initial capital costs of buying land for building waste facilities or the costs of cleanup of already contaminated areas. The total or *true cost* of waste management is difficult to assess and far exceeds the day-to-day costs of disposal or combustion.

**Q** Based on the cost of managing 1 ton of refuse, how much would waste management cost your community in 1 year?

**Q** Where does this money come from? If this cost were divided equally, how much would your household need to contribute to waste management? Is this more than what you are able to save in a year?

To follow up, find out how much the weight and cost of waste management has changed in your community over as many years as records are available. Graph the results to show the increase. You might wish to have students speculate on the costs of waste management in another 10 years, 20 years, etc., based on current rates of increase.

# UNIT THREE

## How Does Waste Affect Our Resources?

7-12



**Objective:**  
To introduce students to the concept of natural resources.

**Vocabulary:** natural resource

List on the blackboard the different materials that compose refuse. Trace each of these back to its original source. (Paper to wood to trees to soil to earth; glass to sand to rocks to earth; metal to rocks to earth; plastic to petroleum to fossil plants to earth; food to animals and plants to earth.) You may wish to refer to the illustration on p. 25.

Investigate where different objects in your classroom come from.

Introduce the term *natural resource* as anything that is supplied by nature that has plant, animal, or human utility.

- Q** What are the natural resources in the list on the board?
- Q** Why are natural resources important?
- Q** Are our resources in endless supply?
- Q** What will happen if we continue to waste our natural resources by burning, littering, or burying them?
- Q** Can you think of anything that does not use up natural resources?



**Objective:**  
**To introduce the concept of renewable versus nonrenewable natural resources.**

**Vocabulary:**      renewable      nonrenewable      aluminum  
                          petroleum      bauxite

Obtain a collection of items that would normally be included in the waste stream. The collection should include examples of products from natural resources that both can and cannot be renewed (or recreated).

Reproduce the "Resource Tree" on p. 69 and distribute to the class.

Using the diagram, have students identify the raw materials used to make each item and decide whether they are *renewable* or *nonrenewable*. In the discussion, point out that *aluminum*, tin, steel, and *petroleum* are all *nonrenewable resources*. Help students to understand that some materials are not renewable because they are the result of geological processes that take millions of years to complete. Nonrenewable resources are in limited supply and once they are used up, they are gone forever.

Paper and cardboard come from the *renewable* source of wood (trees), but wood is being used at a faster rate than it can be produced commercially. At the conclusion of the discussion, students should be able to place any piece of solid waste into the categories of renewable and nonrenewable resources.

Aluminum cans, from *bauxite* (nonrenewable)

Tin-plated steel cans, from iron and tin (nonrenewable)

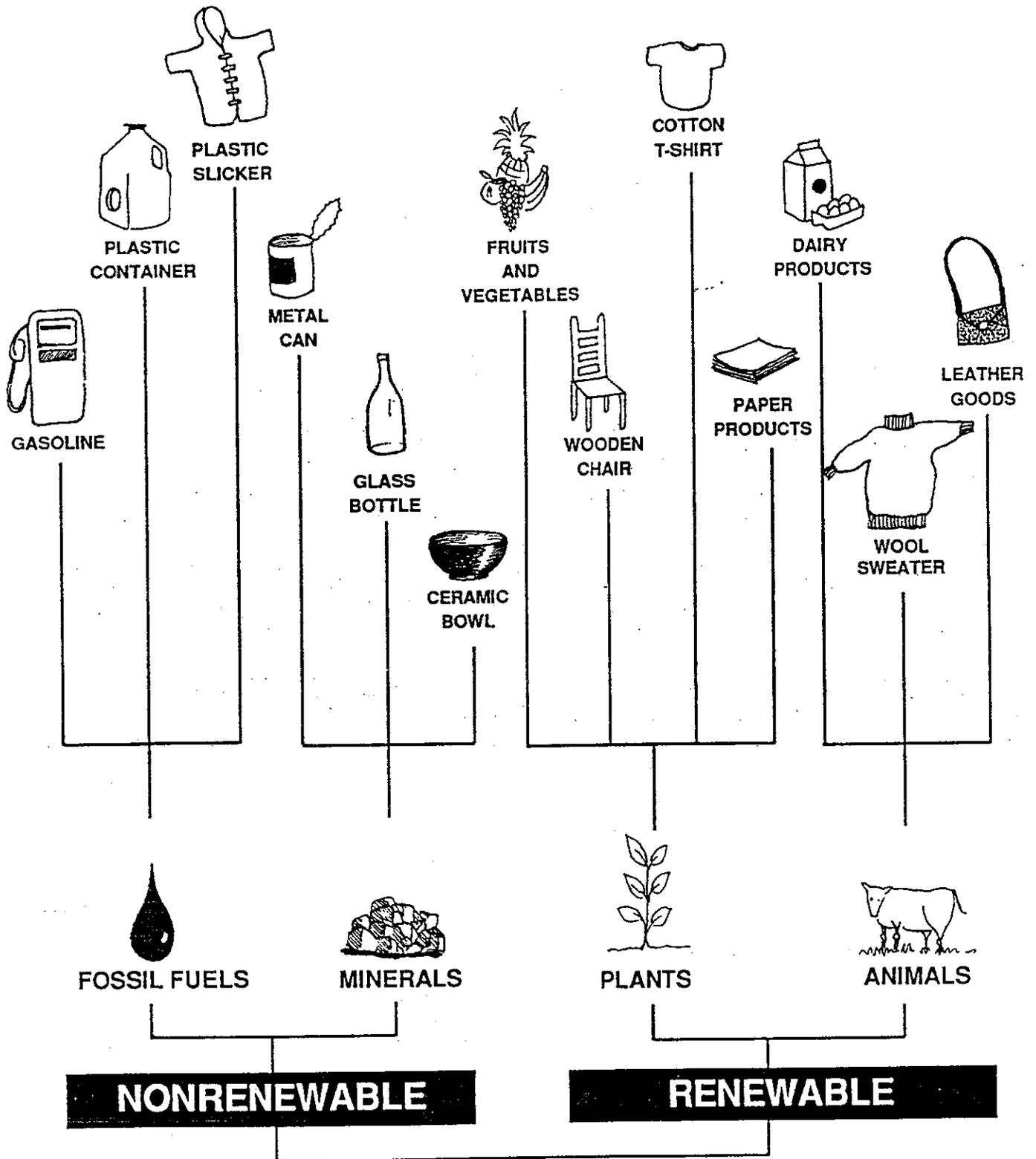
Glass bottles, from sand, soda ash, and limestone (nonrenewable, but in plentiful supply)

Paper, from wood (renewable)

Cardboard, from wood (renewable)

Organic waste, such as plant clippings and food scraps (renewable)

Plastic containers or bags, from *petroleum* (nonrenewable)



# EARTH'S RESOURCES



**Objective:**  
**To acquaint students with the components of solid waste.**

**Vocabulary:**            **municipal solid waste stream**

Reproduce the "pie chart" trash can on p. 71 showing the constituents of the *municipal solid waste stream*.

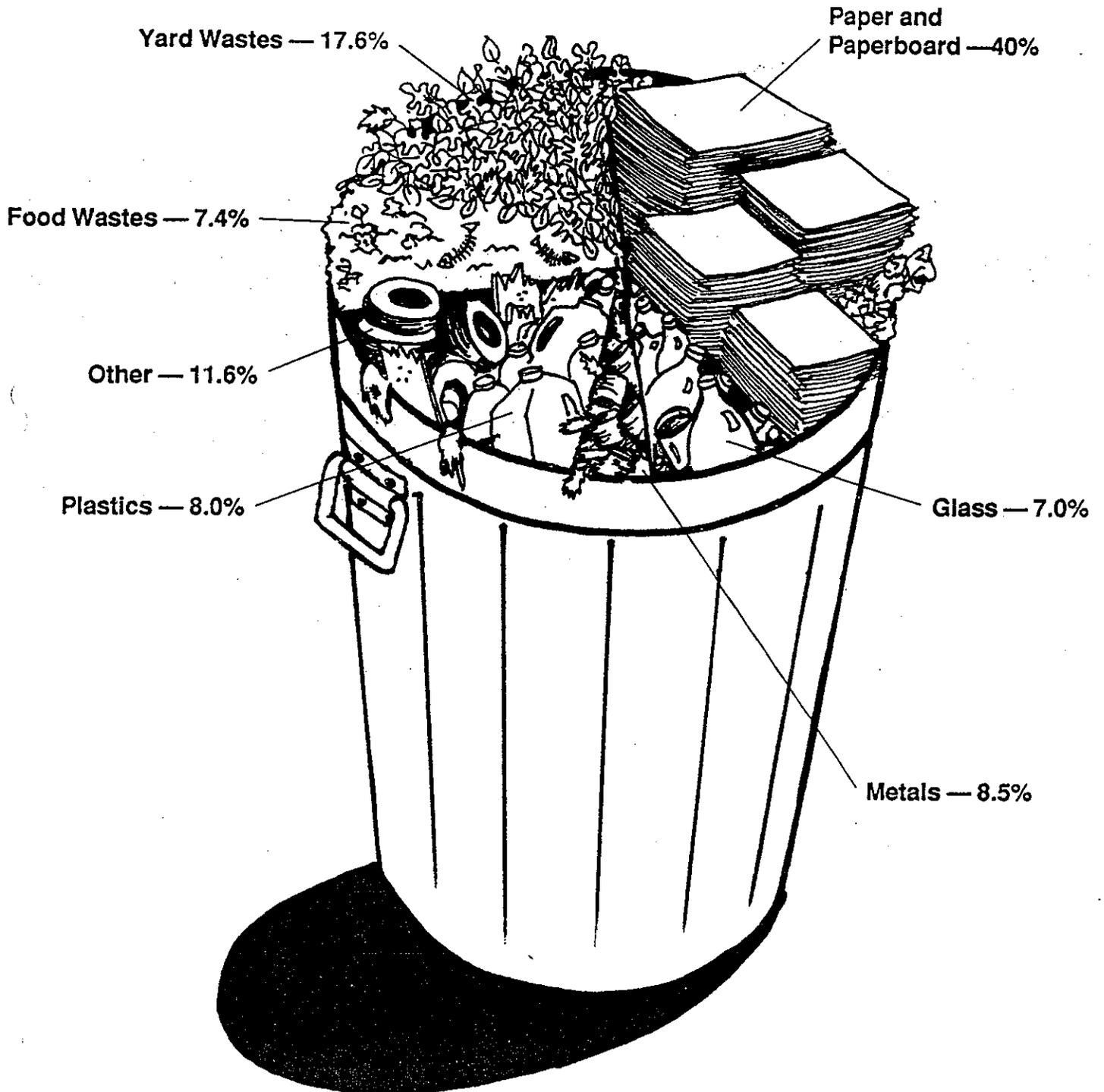
**Q**    What percentage of the total solid waste stream represents nonrenewable resources?

Remind students that the total amount of waste generated by Americans each year is 180 million tons. Based on that figure, ask students to calculate approximately how many tons we generate of each of the materials on the chart.

Have the students imagine the land space required to dispose of these items. Also remember that these are only final products; much more waste is generated in the manufacturing processes for many of these items.

You might want to impress students with the "mind-boggling" statistics in Activity 14 (K-6) or reproduce the Clip Art on p. 12 for distribution to the class.

# Materials Discarded into the Municipal Waste Stream\*



\* Numbers do not add up to 100% due to rounding.



**Objective:**  
**To identify the sources of natural resources and gain an appreciation of their scarcity.**

**Vocabulary:** raw materials consumption import export

Mount a map of the world on the wall. Have the students list the *raw materials* used to make paper, plastic, metal cans, aluminum cans, rubber, etc. Include oil as the energy source to manufacture these products. (Activity 14 presents a more detailed discussion of energy as a resource.)

Pinpoint the primary source(s) for each material on the map. You may wish to turn this into a short research activity, providing students with encyclopedias or other reference books to locate resource suppliers.

Have students find out the populations of the United States and several other countries (for example, China, India, France, Saudi Arabia, Brazil). Then have them compare resource *consumption* among these countries.

- Q** What countries do we *import* natural resources from?
- Q** Does our consumption of resources affect the people in these countries?
- Q** What resources might we *export* to other countries?
- Q** What could happen if other countries begin to consume as much as we do?
- Q** What could happen if available resources begin to run low? What would be the effects on society?
- Q** How might scarcity of resources affect relationships between countries?
- Q** How can we begin to lessen our dependence on foreign countries for resources? How might these actions affect individuals in our society?

Discuss solutions including reducing consumption and reusing materials.



**Objective:**  
**To explore energy as a resource  
 and discuss different sources  
 of energy.**

**Vocabulary:** solar nuclear geothermal conservation

**Q** Is energy a resource? Why?

**Q** What sources of energy are available for human use? (Answers may include oil, coal, wind, water, *solar, nuclear, geothermal*, etc.)

You might want to briefly review any energy sources or processes that students are not familiar with.

**Solar** - Energy from the sun. Remind students that "solar" energy keeps the earth warm and allows living things to grow. Tell them also that solar energy can be captured and stored so that it can be used to heat air and water in homes and for industrial uses.

**Nuclear** - The energy that is released when one of the smallest units of matter, the atom, is split. Nuclear energy is used to heat homes and power industry.

**Geothermal** - Energy captured from the internal heat of the earth.

**Q** Are any of these in short supply?

Identify and list the types of energy and points where energy is required in the mining, transportation, and manufacture of glass, paper, plastic, or metal items. Point out that resource *conservation* reduces energy use and that recycling some used materials takes less energy than manufacturing the original product (aluminum and motor oil, for example).

**Q** What are some of the effects on the environment of producing and transporting different types of energy?

Elicit from students some of the problems associated with energy production:

**Offshore oil drilling can pollute coastal waters and can harm marine wildlife.**

**Oil spills, such as the 1989 *Exxon Valdez* accident, contaminate millions of gallons of water and can harm wildlife.**

**Dams built to produce electricity change land geography and sometimes make regions more vulnerable to flooding.**

**Burning coal produces air pollution.**



**What types of energy produce the fewest adverse environmental effects? (Answers may include solar, geothermal, and wind energy.)**

**Discuss the option of burning solid waste to generate energy and reduce the need for other fuels. Remind students that, as they learned in Activity 5, modern waste combustors generate electricity or steam as they burn garbage.**

# UNIT FOUR

## How Can We Produce Less Waste?

7-12



**Objective:**  
To introduce students to the concept of source reduction.

**Vocabulary:** source reduction toxicity

**Q**

What comes to mind when you think of sources of pollution? (cars, factories, sewers, litterbugs)

**Q**

Have you ever thought of yourself as a pollution source? In what way?

Elicit from students that whenever they throw something away, they are acting as a pollution source.

**Q**

What do you think the term *source reduction* might mean?

Help students understand that source reduction refers to any activity that reduces waste before it can be generated — at the source. Explain that source reduction involves reducing both the amount and the *toxicity*, or harmful ingredients, of what we throw away. Important source reduction activities include:

**Making products last longer.**

**Cutting down on product packaging.**

**Substituting nontoxic or less toxic products for those containing potentially harmful ingredients.**

**Reusing products.**

Brainstorm with students on ways they could cut down the amount of waste that they produce at school or at home. Ask them to keep a running list as they work through the activities that follow.



**Objective:**  
**To explore historical changes that have contributed to increased waste.**

**Vocabulary:**      **disposable**    **durable**

Call on volunteers to name examples of *disposable* items they have used and list them on the board. Ask students to give specific reasons why they choose certain disposable items over more *durable*, long-lasting products. (cost, availability, convenience, effectiveness, novelty, attractiveness)

Tell students that in 1989, people in the United States threw away approximately 1.6 billion pens, 2 billion razors and blades, and 16 billion diapers.

**Q** Do you think people living 100 years ago used as many things that could be thrown out after one use? Why or why not?

Elicit from students that people in the past often did not have the choice to buy disposable products. Because there were fewer products available and less variety, people bought what they could find and tried to make them last as long as possible. Advances in industry and technology have made certain products cheaper and easier to mass produce so that it is now sometimes less expensive to buy a new product than to fix an old one. You might ask students whether they have ever encountered this situation.

To answer the question raised above in more depth, investigate the way people lived in your community 50 or 100 years ago. Contact a local historical society or museum, or conduct research in a local library. Based on their research, have students form groups to invent



Chicken — clear plastic over *polystyrene foam* plate

Carrots — plastic or paper bag, or box if frozen

Milk — waxed cardboard carton

Rice pilaf — cardboard box, one or more plastic packages

Cookies — plastic container or box with inner wrappers

**Q** What purposes do the packages from the meal we've selected serve? (preserve food, hold liquid, keep components of a product together, convenience, visual appeal)

**Q** Are any of these products overpackaged? Can you give some examples of overpackaging? (gum wrappers with each stick double wrapped and a box enclosing the entire package, individually boxed servings of drinks or snacks, microwave or TV dinners)

**Q** Can you suggest some alternative packaging for your imagined meal? (use of refillable containers, buying in *bulk quantities*, fewer layers of packaging, juice concentrates)

**Q** What kinds of packaging have changed and which have remained the same over the last few years? (Juice, milk, and soda containers have changed from glass to plastic; cereal boxes and salt containers have remained relatively unchanged.)

**Q** Are there any examples of packaging actually being reduced? (Some manufacturers have begun to offer detergent in concentrates, more products are available in bulk quantities, bouillon cubes have replaced some canned stock, many juices are now available in frozen concentrates.)

Ask students to speculate about why packaging practices may have changed. (to reduce the amount of waste generated, attractiveness, to make product stand out from others, in response to consumer demands for convenience, health and safety reasons)

**Q** Explain to students that in addition to looking at the *amount* of product packaging, they should also consider whether the packaging materials can be recycled.

**Q** Which of the packages chosen for your imagined meal could be recycled or could be made from recycled materials? (cardboard boxes, plastic or glass beverage containers)



**Objective:**  
**To explore options for reducing packaging.**

Send students on a survey of their local supermarket looking for examples of the following three types of packaging:

1. **Natural packages (oranges, nuts)**
2. **Older and reusable packages (paper bags, paper wrapping, glass jars that become drinking glasses, returnable bottles)**
3. **Modern packages (plastic, polystyrene, tin foil, individual wrappings)**

Ask students to list five examples from category 1, five from 2, and ten from 3. Compile their findings and make a combined list for the entire class.

- Q** What purpose does the packaging serve for each of the items on the list?
- Q** How dependent is the product on the package?
- Q** How could each package be reused or recycled?
- Q** What alternate packaging could be used that is more environmentally sound?

For each item on the list, decide which packages create excessive waste and which minimize waste.

Discuss some other packaged products students might find in a grocery store. Have students distinguish between products that must be packaged the way they are, and ones that could use less packaging. Initiate a discussion of what students could do to promote the use of less packaging when they shop. Elicit from them that they could buy only products that have no unnecessary packaging and contain no materials that could be harmful to the environment. They could also bring some of their own containers (for bulk cereals, nuts, etc.) from home or reuse shopping bags. Emphasize to students that buying products in bulk quantities produces less waste.

Suggest to students that they write to product manufacturers or store managers to encourage them to make or to stock items that use less packaging. You might also want to choose one particular manufacturer, and write a letter as a class.



**Objective:**  
To introduce students to the idea that certain types of waste can be reused.

**Vocabulary:** junkyards antiques

Have students think about the different kinds of things people throw away.

**Q** Where did the used items at scrap or *junkyards* and *antique* stores come from? What might there be in one person's trash that might be a treasure to others? Relate any personal experiences with such discoveries.

**Q** Has anyone in the class sold scrap metals, used appliances, or furniture for money?

Emphasize that many things that we throw away have value and can be reused.

To practice reuse in the classroom, hold a clothing drive or toy collection and donate what you collect to a local Goodwill or Salvation Army.

Ask students to think of other ways in which waste could be used rather than disposed of. Briefly discuss with students the possibility of recycling certain materials such as bottles, plastic, soda cans, and newspapers.

**Q** What can we do with yard wastes such as grass clippings and raked leaves?

Elicit from students the idea that yard wastes can be composted to produce fertilizer that enriches and improves the consistency of poor soils.

**Note:** Further discussion of recycling begins with Activity 25. Composting is discussed in more detail in Activity 24.



**Objective:**  
**To explore options for reducing the toxicity of products.**

**Vocabulary:** household hazardous waste green products

Ask students to identify some household products that contain ingredients that may be harmful to their health or to the environment. Household batteries contain lead and cadmium, which are both toxic elements. Other examples are turpentine, drain cleaner, chlorine bleach, flea repellent, mothballs, bug spray, air fresheners, and chemical fertilizer. Discuss with students the problem of disposing of these *household hazardous wastes*. Help them to understand that these products should not be thrown away in the trash to be landfilled or combusted because the poisonous components could contaminate the environment. Instead, many communities hold special collection drives or have dropoff centers to coordinate the safe disposal of household hazardous wastes. If there is one in your community, take students to see how it is run. (Note: Do not allow students to run such a collection themselves.)

Emphasize to students that an important way to reduce the problem of household hazardous waste disposal is to use less-toxic products. Explain that nontoxic substitutes exist for many of the products named above. Baking soda, lemon juice, and vinegar are a few common items that can be used instead of many toxic cleaners.

Have students conduct the following experiment to demonstrate the use of a nontoxic substitute for silver polish. If possible, conduct this activity in a laboratory equipped with stations for pairs of students.

Boil 2 to 3 inches of water in a shallow pan with 1 teaspoon salt, 1 teaspoon baking soda, and a sheet of aluminum foil. Submerge a piece of tarnished silverware in the solution and boil for 2 to 3 minutes. Use a cloth to wipe away tarnish. Repeat the procedure if tarnish remains.

Emphasize that all of the ingredients they have just used are safe and can be found in their own homes. For some grade levels, you may want to conduct this activity in conjunction with a chemistry unit on ion exchange.

Have students research the use of nontoxic substitutes as alternatives to toxic products. Local organizations such as chapters of the League of Women Voters and local conservation commissions may be able to provide you with information about toxic products and lists of alternatives.

Tell students that the term *green products* is often used to refer to products that are “environmentally friendly” — don’t harm or unnecessarily pollute the environment. Here are some examples of toxic products and nontoxic substitutes:

**Turpentine** — Use water with water-based paints instead

**Drain cleaner** — Plunger; boiling water mixed with baking soda

**Flea repellent** — Garlic, brewers yeast; herbs such as fennel and rosemary

**Mothballs** — Cedar chips or herbal sachets

**Bug spray (ants and roaches)** — Lines of chalk or charcoal dust, talcum powder, and cayenne pepper; borax

**Air fresheners** — Baking soda, fresh flowers, herbs

**Chemical fertilizer** — Compost

Remind students that they can also reduce the amount of toxic material they throw away by purchasing reusable products, such as rechargeable rather than disposable batteries.

Have students compile their findings into a bulletin board display or a fact sheet for distribution to the school or community. They might also create a promotional brochure or poster for a local household hazardous waste collection.

# UNIT FIVE

## What Can We Do About Waste?

7-12



### Objective:

To introduce students to the concept of natural cycles, and how they can be disturbed.

**Vocabulary:** natural cycle    nutrient    photosynthesis  
carbon dioxide    greenhouse effect    acid rain

Ask students to describe what is meant by a cycle in nature. Elicit examples of *natural cycles* from students and write them on the board. Discuss the following natural cycles with students.

#### Nutrient Cycle

1. Plants take up *nutrients* from soil to make sugar.
2. Animals eat plants and return nutrients to soil through body wastes.
3. Plants and animals die and decay, returning nutrients from decaying parts to the soil.

#### Oxygen Cycle

1. Plants give off oxygen as a waste product of *photosynthesis*.
2. Animals take in oxygen for respiration.
3. Animals exhale *carbon dioxide* (CO<sub>2</sub>).
4. Plants use CO<sub>2</sub> for photosynthesis.

### Water Cycle

1. Sun evaporates water from oceans and lakes.
2. Cooled water vapor forms clouds.
3. Clouds release water as rain.
4. Plants and animals use water.
5. Water not used runs into lakes and oceans or seeps into the ground.

### Mineral Cycle

1. Matter is continually being built up into mountains and then eroded into sediment.
2. New mineral matter is vented from volcanos while other minerals are returned to the earth's interior.

**Q**

Can you give any examples of ways these natural cycles are disturbed by human beings?

**Oxygen Cycle.** Too much CO<sub>2</sub> in the atmosphere may contribute to the *greenhouse effect*. CO<sub>2</sub> and other gases in the upper atmosphere act like a pane of glass in a greenhouse, trapping heat and reflecting it back to earth, causing a gentle warming. This warming could cause catastrophic changes in the earth's temperature. Excess carbon dioxide comes from the burning of fuels such as coal, oil, and natural gas; as well as the destruction of vast regions of forest, such as the rain forests in South America.

**Water Cycle.** Air pollutants react with sunlight and water vapor in the earth's upper atmosphere to form acidic compounds. These compounds then fall to the earth as rain or snow during storms, or with dust or other dry particles in the air. This *acid rain* damages both plant life and soil.



**Objective:**  
To demonstrate the principles  
of the water cycle.

**Vocabulary:** terrarium condensation

To illustrate the water cycle, make or show students a *terrarium*. The following materials are needed: glass container with an airtight top, gravel, soil, and various types of small plant life.

Once the terrarium is in operation, have the students observe the water droplets clinging to the top.

**Q** Where does this water come from? Is it necessary to ever add water to a terrarium?

To further illustrate *condensation*, point out to the students that when the weather is cold they “see their breath.” This is due to water vapor being released as we exhale warm air and condensing on contact with colder air. The same process is involved in cloud formation. Steam is another example.



**Objective:**  
To demonstrate the  
nutrient cycle.

**Vocabulary:** fungi bacteria

To illustrate the nutrient cycle, divide the students into groups and have each group take a soil profile by digging out a wedge of soil about 4 to 6 inches deep. Select a location where there are freshly fallen leaves. Have students observe the layers of leaf breakdown into the rich topsoil by peeling off each layer.

**Q** What other things besides leaves can you find in the profile that might hasten decay? Look closely.

Explain to students that plant material is returned to the soil by the action of *fungi* and microscopic *bacteria*. These organisms are vital links in nutrient cycles.

Conduct the same type of investigation using a rotting log.

**Q** How do its "inhabitants" hasten decay?

Explain to students that the group of organisms called fungi include mushrooms, toadstools, and molds. Together with bacteria, they feed on organic matter, breaking it down, and converting it into nutrients that can then be used by plants.



**Objective:**  
**To introduce students to the principles of composting.**

**Vocabulary:**      **composting    windrows**

Explain to students that *composting* is a process by which plant material is returned to the soil, as it is in the nutrient cycle. The composting process enriches and improves the consistency of the soil while reducing the amount of solid waste requiring disposal.

Have students make and investigate their own compost operation.

1. Place the following or similar food wastes in a plastic bag or outdoors in a marked area: apple peels, leaves, old bread, coffee grounds, green tops of vegetables, potato peels. Meat and grease should not be included.
2. Chop and mix them up with some water and yard waste such as leaves or grass clippings.
3. Twist and tie the bag securely, or cover the mound with earth.
4. Open the bag once a day to allow oxygen inside. Explain that oxygen is needed by the microscopic organisms to break down the materials.

Discuss what is going to happen. (Wastes will begin to decompose, and to grow uniform in color and texture.) Have the students keep a record of the process of decay. Note odors, texture, and other changes.

- Q** Which materials decay the fastest?
- Q** How long does the complete decay process take?

Prepare a wet-mount microscope slide and stain to microscopically examine the organisms involved in the process of decomposition.

- Q** How many different types of organisms can be found?
- Q** What would our landscape look like if these organisms did not exist?
- Q** What objects would not decay if placed in our compost pile?

You might want to try using the compost generated to fertilize a garden at the school and monitor its growth.

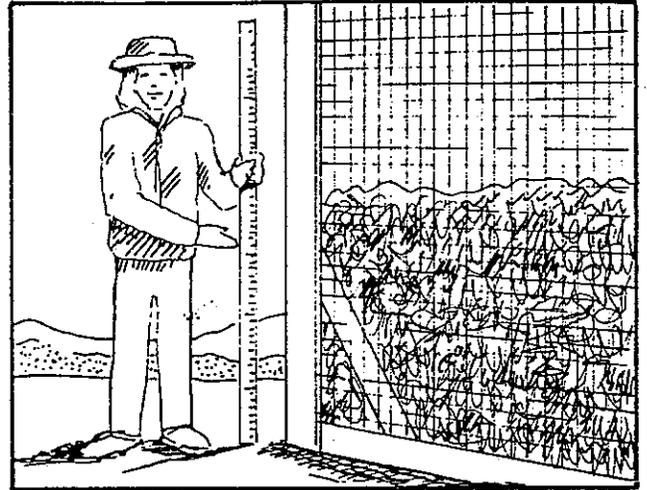
Ask students if their households have ever kept compost piles of yard or kitchen wastes. Have them discuss their experiences. Tell students that some cities use large composting operations to process a portion of their residential waste. Most often yard waste from the entire community is collected with the local trash pickup and laid out in elongated piles or *windrows*. The windrows are turned periodically and the compost is used by residents in their yards and gardens, or by landscapers on golf courses, along highways, or in local parks.

Encourage students to start their own compost piles at home with their parents' permission. Photocopy the illustration on p. 88 and distribute to the class. Go over the simple set of instructions and have students study and discuss the picture. (For more information about composting, refer to the Community Compost Education Program materials in the Resources section.)

## Steps to Backyard Composting



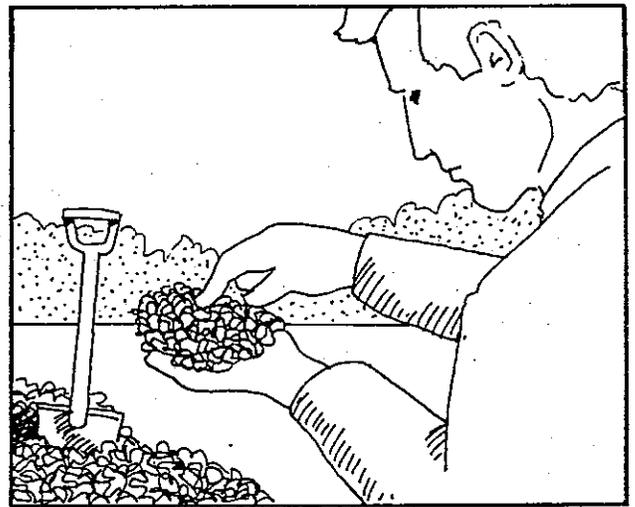
1. Spread a layer of leaves, grass, weeds, or straw inside an enclosed area. Add food wastes, garden refuse, and/or animal wastes. Avoid meat scraps, fats, and oils.



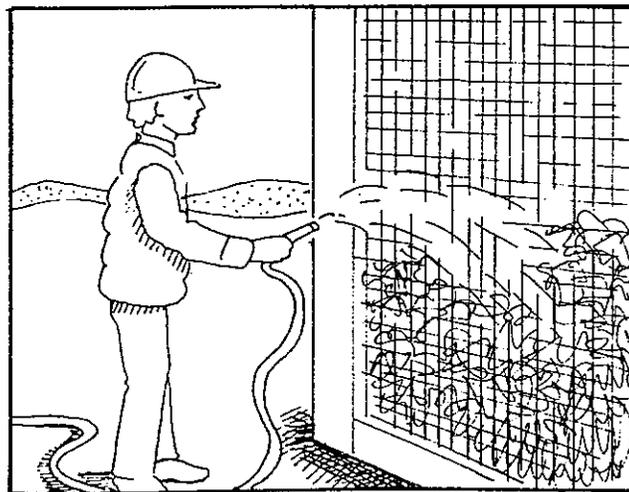
2. Layer the materials to a depth of 5 to 10 feet.



3. Sprinkle with an inch or two of soil, and moisten with water.



4. Turn the pile occasionally to circulate air and distribute moisture.



5. When pile no longer heats up, it is ready to use. Compost should be dark and crumbly.



**Objective:**  
To acquaint students with the meaning of the word “recycle” and the recycling symbol.

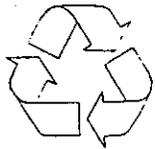
**Vocabulary:** recycle recyclable

Write the word *recycle* on the board. Ask students to break up the word into its parts: RE-CYCLE.

- Q** What does the prefix “re” mean?
- Q** What are some other words that begin with that prefix? (Examples: repair, redo return, resource, renew, restore.)
- Q** What does the word “cycle” mean?

Elicit from students the meaning of the word *recycle*: to do or use over and over again. Considering what they have learned about natural cycles, ask students how the word recycle might apply to our use of resources.

Explain to students that although we can greatly reduce the amount of waste we generate, some waste materials will continue to be produced. Many of these, however, can be remade into useful products. Have students name some waste materials that can be recycled. Show students the recycling symbols below. Explain that the three arrows of the symbol represent the three stages necessary to recycle materials: collect, remake, reuse. Tell students that products made of recycled materials may have the symbol on a black background displayed somewhere on the package. Products made of *recyclable* materials, materials that could be recycled, display the symbol against a white background. Ask students if they have ever purchased any products that they know were made of recycled materials.



Made of  
Recyclable Materials



Made of  
Recycled Materials

- Q** How can recycling reduce pollution and the cost of waste disposal?

**Objective:**

To review solid waste problems and learn how glass, paper, plastic, used oil, aluminum, yard waste, and tin-plated steel cans are recycled.

**Vocabulary:**      cullet      ore      caustic      pulp  
                          fibers      electrolysis      ingots

Discuss the sequence of steps in recycling the following materials.

**Glass** is made from soda ash, sand, and lime. It can remain in a disposal site indefinitely and does not break down into its organic components. To be recycled, it must first be sorted by color and crushed into small pieces called *cullet*. The cullet is melted down into a liquid and then molded into glass containers. Other products made from recycled glass bottles are insulations and road-construction materials.

**Aluminum** is made from *bauxite*, an *ore* that must be mined from the ground. It takes a great amount of electricity to produce aluminum. Nature cannot decompose or break it down, so disposal is a problem. When recycled, aluminum is melted and then shaped again into new cans and other items. Making aluminum cans from old aluminum takes only 5 percent as much electricity as making cans from bauxite.

**Tin-plated steel cans** are made of iron ore and tin, both nonrenewable resources. The cans will eventually rust and break down, but throwing them away is a waste of valuable metals. In the recycling process, the cans are put into a huge container with holes in the bottom. This container is immersed in a *caustic* solution which dissolves the tin from off the cans. Then the steel cans are washed and sold as high grade steel. The dissolved tin is then removed from the caustic solution by *electrolysis* and made into *ingots* which are then sold to companies requiring tin.

**Paper** is made from trees. Paper is recycled by first shredding it into small pieces and mixing it with water. This mixture is beaten into a mush-like *pulp* which flows onto a moving screen through which most of the water passes. The wood or paper *fibers* remain. The fibers are pressed through heavy rollers that remove more water and then sent through steam-heated dryers. The result is recycled paper. You can make recycled paper in class (see instructions in K-6 section of guide, Activity 26).

**Plastic** is made of petroleum. It can be recycled either as a mixture of different kinds of plastic or as a single type. Separating plastic by type enables manufacturers to produce higher quality recycled products, or those closer to what could be produced from virgin materials. Polyethylene terephthalate (PET) (soft drink containers) and high density

materials. Polyethylene terephthalate (PET) (soft drink containers) and high density polyethylene (HDPE) (milk containers) are the plastics most commonly used in beverage containers and the types most easily separated. In the recycling process, plastics are melted down and reshaped into the recycled products. Some of the common uses for recycled PET are fiber, structural molding, and containers. HDPE can be recycled into bottles, toys, pipes, crates, and a variety of other products. Products of mixed batch plastic recycling include garbage pails, car stops, manhole covers, park benches, plastic "lumber," and railroad ties.

Used motor oil collected from people who change their own oil (do-it-yourselfers) can be recycled safely and effectively. It can either be cleaned and used as fuel to be burned in asphalt plants or cement kilns, or it can be rerefined and used again as motor oil. The process of rerefining used motor oil is much cheaper and easier than processing virgin oil.

Yard waste, such as grass, leaves, shrubs, and tree clippings, can be collected and composted by individual households or on a community-wide level. The composting process is described in Activity 24. The compost product from large-scale processing can be distributed to the community as fertilizer for landscaping, gardens, or agricultural uses.

In this activity, students research the "life cycle" of a particular type of waste. Break students into groups and assign one of the types of waste listed below to each group. Reproduce and give each student the questionnaire on the following page to help them tell about their particular resource.

**Aluminum Can**

**Plastic Tube**

**Cardboard Box**

**Tin Can**

**Glass Bottle**

Have the groups present their findings to the class. They should make use of drawings, models, or other visual aids and try to make the presentation as informative and entertaining as possible. Older students may wish to make a film or videotape showing the life cycle of their chosen object. These films could be shown to the class or combined in a presentation to the entire school.

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## THE STORY OF THE \_\_\_\_\_

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1. What does it look like?
2. Why does it have a label?
3. What are some of the things it is used for?
4. What is it made of?
5. Where does the manufacturer get the raw materials to make it?
6. Are large amounts of these raw materials available?
7. How many years will it be before these raw materials run out?
8. Does the process of extracting these raw materials from the earth pollute the land, the air, or the water? If so, how?
9. How do manufacturers change the raw materials to make the product?
10. Does the changing of the raw materials pollute the land, the air, or the water? If so, how?
11. Is the item thrown away after it is used?
12. What effect would this item have if it was littered on the ground or in a body of water?
13. What chemicals are released when it is burned? Are they harmful if released into the environment? Can they be filtered and disposed of properly?
14. Does the item break down into earth again if it is buried? If so, how?
15. Does it disintegrate if thrown into a river, lake, or ocean? If so, how?
16. What are some ways in which it could be reused?
17. Can it be recycled? Is it currently recycled? Where?
18. How is it recycled?
19. Can it be safely burned to produce energy from heat?
20. Who pays the real cost for manufacturing this item?  
The manufacturer who makes it?  
The company that uses it?  
The consumer who buys it?
21. Who is responsible for disposing of it? Who pays the cost for disposal?
22. Do you think this item makes a good container? Why or why not?
23. Could we have avoided using this container? How?

**Objective:**

**To investigate a common manufacturing process, its use of resources, and its production of waste.**

**Vocabulary:** post-consumer waste

Visit a papermill or glass manufacturer that produces the products that become our solid waste. Try to find one that uses *post-consumer waste* that has been collected for recycling in the manufacture of its products. Arrange a question and answer session with a representative from such a factory who will talk to students about how recyclable materials contribute to their manufacturing process.

**Objective:**

**To encourage students to design a system to separate recyclables.**

**Vocabulary:** commingled materials recovery facility

Tell students that sometimes recyclables are not separated before they are collected, but must be separated before they can be recycled.

**Q** How might a batch of mixed recyclables be efficiently categorized and separated?

Point students in the right direction by having a short discussion about the various physical properties of paper, tin-plated steel, glass, plastic, and aluminum. For example, steel is magnetic; glass is heavier than plastic and aluminum. Then have students use their imaginations to devise a mechanical system for separating these materials out of the solid waste that comes from a home.

You might want to have a contest to design the best separation process, and have students present their inventions to the class through drawings and explanations. After a “winner” has been chosen, explain to the class that there are actually operations called *materials recovery facilities* (MRFs), which some communities use to separate *commingled* recyclables — a mix of recyclable materials. If you can locate one in your vicinity, arrange a field trip so students can observe the process firsthand.



**Objective:**  
**To involve students in a classroom  
or community-wide recycling effort.**

Have your classroom recycle its wastepaper and/or other recyclable materials. Coordinate with recycling programs in the community so as not to duplicate their efforts. If one exists in your area, arrange a visit, so that students can see firsthand how one is run.

Call local government agencies or look in the Yellow Pages of your telephone directory under *recycling programs*, *waste paper*, or *scrap dealers* to find markets for your paper, aluminum, glass, plastics, tin cans, or other recyclables. (Refer also to the list of State Solid Waste Agencies in the back of this guide.) Be sure to ask exactly what kind of materials the market will accept (for example, for a paper collection: newspapers, magazines, white bond paper, etc.) so that material collected can be properly recycled.

When you have determined what kinds of materials you will collect for recycling, set up collection boxes so that students can separate their classroom waste and possibly bring in recyclables from home. Emphasize the need to remove labels or clean containers to be recycled as required by the market. The brochure, "School Recycling Programs: A Handbook for Educators," available through U.S. EPA (see Resource list at the back of this guide), contains step-by-step "how to" information on setting up and carrying out different kinds of school recycling programs, from a one-time drive to a long-term effort for the entire school system or a community-wide effort.

Have the students record the weekly or monthly results of their program. Record and graph the reduction in solid waste disposed of through old systems and the amount of glass, paper, cans, or other materials recycled.

The program can also be a money maker, especially with certain materials, such as aluminum. Follow and record the fluctuations in the selling price of the recycled materials. Research the reasons behind these changes. Calculate total money earned by your recycling program. You may want to hold a competition between grades for most money earned or greatest quantity of waste recycled. You might also have students keep a running tally of the number of trees they have saved by recycling paper. Every ton of paper recovered for recycling saves 17 trees from being cut down to make new paper.

Encourage the students to tell their parents about recycling and to bring in recyclables from home.



**Objective:**  
**To calculate how much money  
a community could save  
by recycling.**

Besides reducing pollution and saving natural resources and energy, your community can save money by recycling. Using the figures from your school or classroom recycling program, estimate how many tons of solid waste have been recycled. (You might need to start by having students weigh specific quantities of different recyclables, such as a box of plastic bottles and a bag of tin cans, and then multiply by the number of each that have been collected for recycling.)

Use the information on tipping fees in your community to estimate how much money has been saved. (For example, if tipping fees are \$30 per ton and you have recycled 10 tons of materials, you will have saved the community \$300 in disposal and management costs.) Add to this amount, the total that you have earned from selling your recyclables to various markets to estimate your community's potential savings. Remind students, however, that the cost of running a recycling program will reduce the community's savings to some degree.

**Note:** In some areas, the cost of collecting recyclables and a lack of markets could make recycling more expensive than other waste management methods. Recycling still yields net benefits, however, because it saves energy and natural resources, reduces pollution, and conserves landfill space.

Discuss with students ways the community could make more widespread use of recycling (for example, curbside pickups, better publicity, more programs at schools or community centers). Allow them to speculate on how much money their community could save by recycling 25 percent of its solid waste (or more) using the estimate of total waste generated from the Community Profile.



**Objective:**  
**To explore attitudes toward recycling and buying products made from recycled materials.**

Have the students survey at least three different people concerning their attitudes toward recycling to get an idea of the differences of opinion that exist. They should interview their friends, parents, and neighbors on issues such as whether or not they would be willing to source separate their garbage (for example, setting newspapers in stacks apart from other waste), so it could be more easily recycled.

If your class has access to video recorders or film equipment, encourage them to film their interviews for a class screening. The films can stimulate discussion about the reasons behind people's attitudes, and might also inspire a "documentary" for possible presentation to the entire grade level or school.

#### Sample Survey Questions

1. Would you recycle your waste? At home? In the office?
2. Why would you recycle? Why not?
3. What would encourage you to recycle?
4. Which aspect of recycling is most important to you?  
Saving money?  
Reducing pollution?  
Reducing the need for additional combustors or sanitary landfill sites?
5. Are you willing to buy products made from recycled materials?  
Why or why not?

When the interviews are completed, make a chart on the board and tabulate the results. Calculate percentages of responses to certain questions and prepare the material in the form of a newspaper article or fact sheet.

Based on the answers to question 3, you might wish to discuss with students how they could make a recycling program more attractive to the community.

**Objective:****To involve students in the waste management decision-making process.**

Explain to students that decisions about waste management are complex because people have different perspectives on the same problem. Everyone, however, has the opportunity to present his or her viewpoint before a decision is made.

Tell students that they are going to consider an imaginary situation in which a county must decide to change its method of waste management. Hand out the fact sheet on p. 99 that presents three different waste management options. Allow time for students to read and study it. You may want to have them work in small groups to come up with their list of specific issues and concerns. When students have finished, hold the following discussion.

**Q**

What different groups in the community would be affected by the decision?

Elicit from students the following categories of community members (and/or others) and write them on the board:

**Farmingtown Residents**

**Busy City Residents**

**County Real Estate Developers**

**Environmental Activists**

**City Merchants**

**Manufacturers**

**City Political Leaders**

**Waste Haulers**

Discuss with students the concerns of each of these groups and encourage them to hypothesize what option members of each group might favor. Be sure to include in your discussion such factors as:

1. **Proximity.** People who live close to a proposed site may have concerns about noise, odor, pollution, traffic, or spoiling of landscape that a facility may cause. Residents or land owners who may lose their properties to the construction of a facility will be particularly upset.
2. **Economic Impact.** Developers may be concerned that property that they are considering building on will decrease in value because of the facility. Merchants may worry that the nearness of a facility will make an area less attractive to tourists and people who come from neighboring towns to shop. Manufacturers will be interested in ensuring that they can continue to dispose of their waste in the most cost-effective manner possible. To a lesser degree, all County residents will also be affected by rising costs of waste disposal.
3. **Social/Environmental Issues.** Environmental groups will be concerned about the effects of facilities on the surrounding environment, including the loss of parkland or open spaces for wildlife. Community members may also worry about the County's image and desirability, as well as the potential industrial growth that could follow the construction of a major waste management facility. There may also be widespread concern about perceived sanitation problems at a landfill or air pollution resulting from a combustor.
4. **Legal and Political Concerns.** Different government agencies will have a variety of concerns, depending upon their areas of responsibility. For example, one agency may have concerns about air quality, another about health, still another about trade and commerce in the County. There are also guidelines to consider in the construction of facilities, and varying costs involved in building and regulating them. Political decision-makers need to balance the needs and desires of all the groups in the community in order to ensure public support.

Be sure you introduce into the discussion the idea of long-term versus short-term solutions to the waste problem.

When you feel the issues have been covered satisfactorily, ask students to write down the option that they would choose, along with a paragraph defending their choice. Then call on volunteers to present their arguments to the class. Allow for the possibility that some students may try to modify the original options by proposing a combination of management techniques, including source reduction or recycling.

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## FACT SHEET

### Background Information

Approximately 25,000 people live in Pleasant County: 10,000 live in Busy City, 1,200 live in Farmingtown, and 1,300 live outside in surrounding residential and rural areas. The County has always hauled its trash to nearby Fillup County, but the landfill has reached its capacity and is scheduled to close later this year. Pleasant County, therefore, needs to find an alternative for managing its waste. Various proposals for solutions to the problem are presented below:

1. Pleasant County could construct a major sanitary landfill on farmland adjacent to Farmington. This land would need to be purchased from local growers with federal grant money and would probably take care of the County's waste for the next 40 or 50 years. This is the least expensive option to County residents.
2. The County could construct a waste-to-energy combustion plant just outside of Busy City limits. The property to be purchased includes part of a public park that is used for recreation by the city residents. The combustion plant would be more expensive than the landfill but would continue to take care of a majority of the County's trash for the indefinite future. Some of this money would come from a federal grant; the rest would come from increased garbage collection costs. It would also require the exploration of markets for recyclables that could not be burned efficiently or safely. In addition, some additional costs would be necessary to cover hauling of ash to a landfill in Faraway State. This is the second least expensive option.
3. The County could raise garbage collection fees considerably and haul all of its waste to Faraway State. This option could also include a provision that County residents would pay by weight for the amount of garbage they had hauled away each week. Faraway State's landfill has enough capacity to receive Pleasant County's garbage for another 10 to 15 years. This would be the most expensive option for users of the waste hauling service.

A variety of groups in the community—residents, developers, politicians, merchants, people in business and industry, environmental organizations, health organizations, farmers, waste haulers, construction engineers—all have particular concerns that they would like to see addressed by decision-makers. Considering what you have learned about waste management and what you know from your own experience, write down as many of these concerns as you can.



**Objective:**  
To determine the availability of products made from recycled materials in the marketplace.

**Vocabulary:** consumer demand

Have students make a survey of products in a supermarket or department store that are made from recycled materials. Tell them to look for the recycling symbol on boxes and other containers. Review the symbol with them if necessary.

Discuss the results of their survey. Then have students research why there aren't more recycled materials in the marketplace.

**Q** Are there any reasons that consumers or manufacturers may prefer to use new materials instead of recycled ones? (The technology may be expensive; there may be some limitations in the strength or appearance of some recycled materials; there may be a lack of a stable supply of materials.)

**Q** Is there anything we can do to get more recycled products on the market?

Explain that the more we recycle and request products made from recycled materials, the more recycled materials will begin to appear. The key to success in recycling is *consumer demand*. Emphasize that consumers need to use their buying power to choose products made from recycled materials. The more consumer demand there is for products made from recycled materials, the more industry will need to respond to that demand. Suggest to students that they request stores where they shop to carry more products made from recycled materials.

**Q** Are people willing to buy products made from recycled materials if they are competitive in price and quality?

**Q** Why do we all need to buy as many products made from recycled materials as possible whenever they are available?



**Objective:**  
**To conduct a debate on the pros and cons of the returnable versus the no-deposit, no-return bottle.**

**Vocabulary:**      **bottle bill**

Have students imagine that a *bottle bill* — legislation requiring that all beverage containers sold be returnable and a deposit refunded — is being considered in their town. Divide the class into two teams to research and debate the issue of the returnable container (may be glass, aluminum, or plastic) versus the no-deposit, no-return one. Have one side argue in favor of the returnable container, the other, in favor of no-deposit, no-return.

Some issues the teams may want to consider are:

1. The effect the returnable bottle would have on a recycling program. (Pro: Bottle bills have proven effective in increasing beverage container collection and reducing litter; Con: Most of the revenue obtained from recycling by curbside collection programs is from aluminum and other beverage containers. A bottle bill would remove most of this fraction from the available recyclables.)
2. The effect of mandatory returnable bottles on wholesale and retail marketers, and industry. (Pro: Returnable bottle program could create jobs, provide economic incentives; Con: Marketers would need to implement new, possibly costly procedures.)
3. The effectiveness of bottle collection for recycling versus mandatory return in reducing the volume of the waste stream. (Pro: Bottle bills reduce litter and reduce the number of containers entering the waste stream; Con: In some areas with bottle bills, returned bottles are not required to be recycled, and some bottles collected for recycling end up in landfills rather than recycling plants; beverage containers represent a fairly small percentage of the waste stream so a comprehensive recycling program that *included* beverage containers might be more effective than a bottle bill by itself in reducing waste.)



**Objective:**  
**To explore the contributions that business and government can make to the recycling effort.**

Discuss ways that businesses and the government can contribute to the solution of the solid waste problem. For example, many businesses and commercial enterprises recycle their office paper, corrugated cardboard, glass, and aluminum. The U.S. EPA has a program to recycle all of its office paper and newspaper.

**Q** Do businesses in your community recycle their paper?

Perhaps older students can conduct a survey of local merchants and businesses to determine the amount and types of waste they produce and whether they are currently doing any recycling. Supermarkets or chain stores are a good place to start since many of them bale and recycle their cardboard wastes. Restaurants may also recycle some of their wastes. If a nearby federal government building or a private office building has an office paper recycling program, you may want to plan a class trip to see how it works.



**Objective:**  
**To allow students an opportunity to educate the school and community about solid waste management.**

Plan a science fair that will present information to the school and community on how to reduce the amount of waste they generate, as well as how to recycle waste from the home and school. Begin by brainstorming with students about the things that they can do to solve the garbage problem based on what they have learned.

The fair can include many of the demonstrations used throughout this guide on the sources of pollution, making recycled paper, setting up a compost pile, and the recycling processes of different types of materials. It can also include displays of how to prepare and separate materials for recycling and booths on shopping and designing packaging for waste reduction. You may wish to have some students put on skits that deal with themes of source reduction and recycling, such as the waste conscious versus the wasteful way to shop

for food, change oil (12th grade), and prepare a meal. This would also be a good opportunity to perform the skit "Throwaway Three," located at the back of the guide.

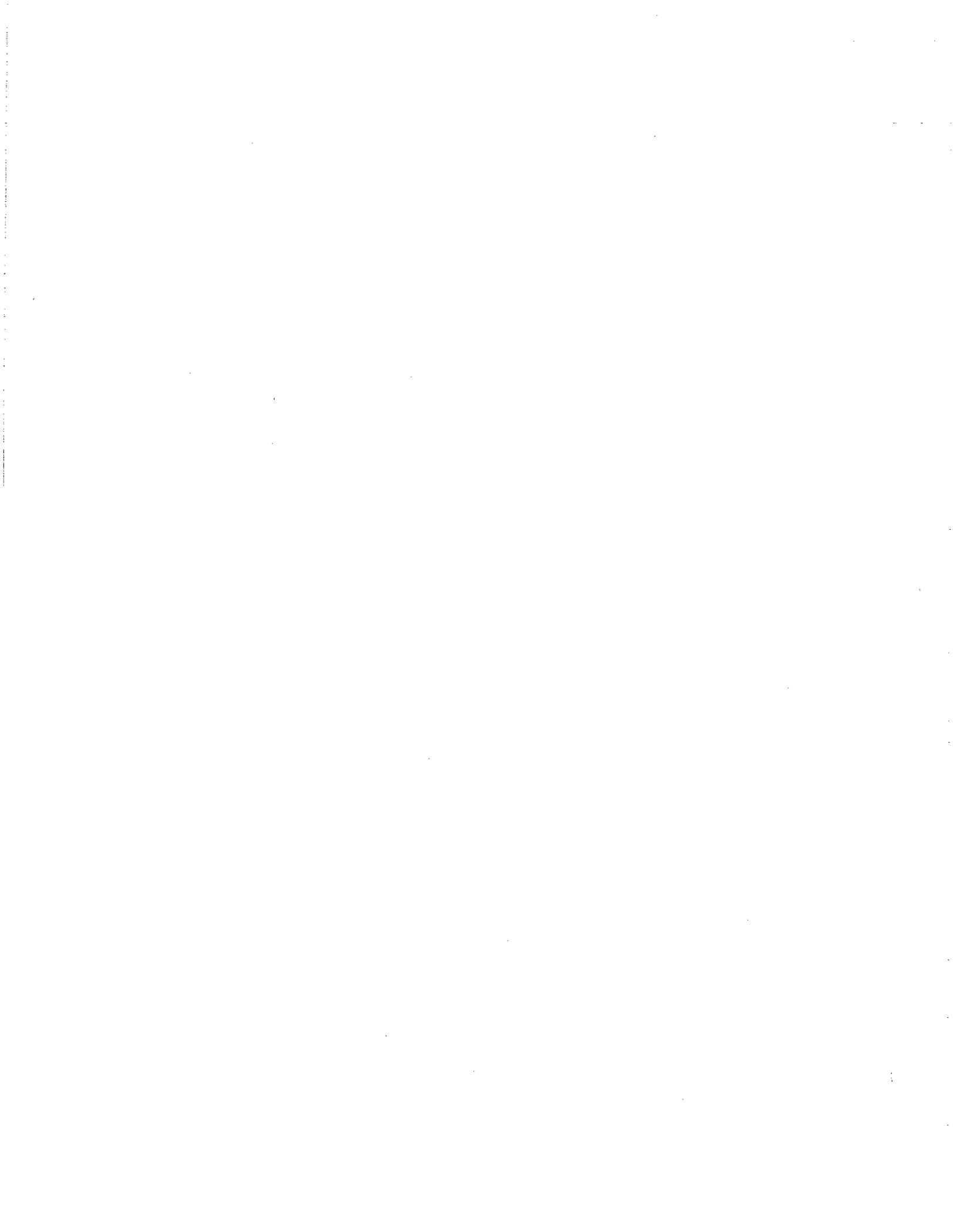
Encourage your students to think of the fair as a learning opportunity for the entire community.

**End of Activities**

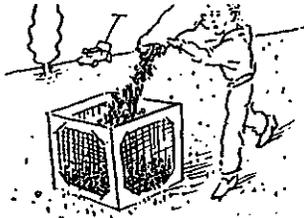


**Appendix IX-C**

**Home Composting Brochure**



# HOW TO Make Compost



## Holding Bins

These portable containers are the simplest way to compost.

**Which wastes?** Non-woody yard wastes are the most appropriate. Avoid composting diseased or infested plants.

**How?** Place the holding bin where it is most convenient. As weeds, grass clippings, leaves and garden debris are collected, they are dropped into the bin. This method will take from 6 months to 2 years to produce compost. Chopping or shredding wastes, alternating high-carbon and high-nitrogen materials, and keeping up good moisture and aeration will all speed the process.

## Turning Bins

This is a series of three or more bins that allows you to make compost in a short time by turning the materials on a regular schedule. Turning bins are most appropriate for gardeners with a large volume of yard waste and the desire to make a high-quality compost. You can also turn your compost with only one bin. Simply remove the bin from around the heap when it's time to turn it, set up the empty bin nearby, and fork the material back into it.

**Which wastes?** Using a wide variety of organic materials will result in a more diverse compost nutrient makeup. If your own kitchen, yard and garden do not generate enough material to fill your bin, ask your neighbors for their clippings and leaves, or start a neighborhood composting project.

## Here are the basics:

Remove grass and sod cover from the area where you will construct your compost pile to allow materials direct contact with soil microorganisms. The following "recipe" for constructing your compost heap is recommended for best results:

**1st layer:** 3"-4" of chopped brush or other coarse material on top of the soil surface allows circulation around the base of the heap.

**2nd layer:** 6"-8" of mixed kitchen scraps, leaves, grass clippings, sawdust, etc. Materials should be "sponge damp."

**3rd layer:** 1" of soil serves as an inoculant by adding microorganisms to the heap.

**4th layer:** 2"-3" of manure provide the nitrogen needed by microorganisms. Sprinkle lime, wood ash, and/or rock phosphate over the layer of manure to reduce the heap's acidity. Add water if the manure is dry.

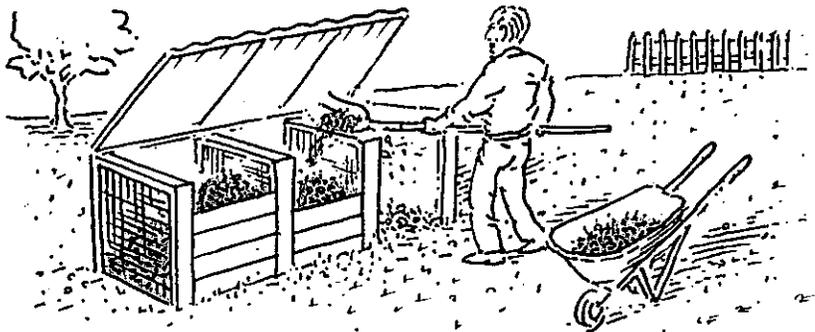
**5th layer:** Repeat steps 1-4 until the bin is almost full. Top off the heap with a 4"-6" layer of straw, and scoop out a "basin" at the top to catch rain water.

A properly made heap will reach temperatures of 140-160°F in four to five days. At this time, you'll notice the pile "settling," a good sign that your heap is working properly.

After 5-6 weeks, fork the materials into a new pile, turning the outside of the old heap into the center of the new pile. Add water if necessary. You shouldn't need to turn your heap a second time. The compost should be ready to use within three to four months. A heap started in late spring can be ready for use in the autumn. Start another heap in autumn for use in the spring.

You can make compost even faster by turning the pile more often. Check the internal temperature regularly; when it decreases substantially (usually after about a week), turn the pile.

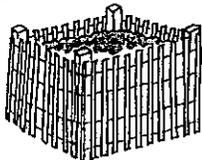
Compost is ready to use when it is dark brown, crumbly, and earthy-smelling. Let it stabilize for a few extra days, and screen it through a 1/2" screen if you want the finest product. Turn your soil, apply 1"-3" layers of compost, and work it in well, up to one pound (a heaping, double handful) per square foot.



## Four Bins to Build

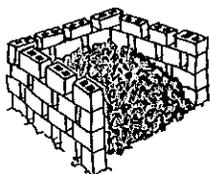
### Snow Fence Bin

Bins made with prefabricated snow fencing are popular because they are simple to make and easy to move and store. To build this bin, buy the appropriate length of prefabricated fencing, and fasten two-by-fours (2X4s) to the bottom to form a square.



### Woven Wire Bin

One easy to make, economical container requires only a length of woven wire fencing. Multiply the diameter you want for the compost heap by 3.2. That's the length of fencing you should buy. Fasten the ends with wire or three or four small chain snaps (available at any hardware store) to make a circle.



### Block or Brick Bin

Compost bins can be made with bricks, cement blocks or rocks. Just lay the blocks without mortar. Leave spaces between each block to permit aeration. Pile them up to form three sides of a square container or a three-bin unit. This bin is sturdy, durable and easily accessible.

### Wooden Bin

Covered wooden bins allow convenient protection from pests and heavy rains. Construct bins with removable fronts or sides so that materials can be easily turned. Old wooden pallets can be used for construction. Wire mesh can be substituted for wooden sides to increase air flow.

Prefabricated compost bins can also be purchased through most gardening catalogues.

## Mulching

Woody yard wastes, leaves and grass clippings can be used as a mulch for weed control and water retention by simply spreading them beneath plants. For woody materials up to 1" in diameter, rent or purchase a chipper/shredder, or cut with hand tools. Tree services, if they are in your neighborhood, often will deliver wood chips free. Chips can also be used for informal garden paths.

All yard wastes will work first as a mulch and then as a soil enrichment as decomposition proceeds. However, grass which has been treated with pesticides should not be used as mulch immediately after mowing. Some of these chemicals take six weeks to break down, so compost treated grass clippings instead of using them as mulch.



The following troubleshooting chart is a guide to more efficient composting.

SYMPTOMS	PROBLEM	SOLUTION
The compost has a bad odor.	Not enough air.	Turn it. Add dry material if the pile is too wet.
The center of the pile is dry.	Not enough water.	Moisten and turn the pile.
The compost is damp & warm only in the middle.	Too small.	Collect more material & mix the old ingredients into a new pile.
The heap is damp and sweet-smelling but still will not heat up.	Lack of nitrogen.	Mix in a nitrogen source like fresh grass clippings, fresh manure, or bloodmeal.

Prepared by Wendy McCown, Wisconsin Department of Natural Resources, Bureau of Solid Waste Management.

For more information, write to us or call (608) 267-7565.



## **Chapter X - Problem Wastes**

### **A. Household Hazardous Waste**

#### **Background**

Household hazardous waste (HHW) is defined as wastes discarded from homes, apartments, motels, and hotels that if generated by an industry would be regulated under Subtitle "C" of the Resource Conservation and Recovery Act as hazardous waste. The waste can either be a listed hazardous waste or hazardous by characteristic: ignitable, corrosive, reactive, or toxic. HHW may pose a threat to sanitation workers or the environment when improperly handled or disposed. Managing this waste in the municipal solid waste stream presents obvious problems. Disposing of this waste in municipal solid waste landfills results in a more toxic leachate. In uncontained landfills leachate has the potential of moving into and contaminating the groundwater. In contained landfills, particularly aggressive chemicals may affect the containment system. HHW discarded with other trash may react or explode in waste compactors, or burn personnel handling these wastes. Improper dumping down the drain may damage septic systems, sewage treatment plants, or drinking water supplies; or it may corrode plumbing or cause treatment plant sludge to be hazardous. Illegal dumping of this waste may directly impact the environment, in particular surface water when dumped into storm sewers.

Household hazardous wastes include: paint thinners, solvents, paints and varnishes, cleaners, cosmetics (nail polish remover), pesticides, fertilizers, bleach, automobile fluids, photo and hobby chemicals, swimming pool chemicals, batteries, wood preservatives, motor oil, air conditioning refrigerants, adhesives, herbicides, fungicides, etc. The benefits of HHW collection programs go beyond the collection and disposal of these potentially dangerous chemicals. The programs can include public education elements that identify HHW, outline proper ways to store the wastes, and suggest alternative products. Collection programs increase the public's awareness of HHW in the home and encourage safer use and proper disposal.

The Solid Waste Management Act of 1991 outlines a program to manage household hazardous waste. The program relies on permanent collection centers for the major population centers, Shelby, Davidson, Knox, and Hamilton Counties. The remainder of the 91 counties in the state will be serviced by mobile collection units. The law requires that each county have at least one collection center by January 1, 1995 for automotive fluids, tires and lead acid batteries.

Liability is often a concern related to the collection of HHW. If the collection event accepts wastes **only** from households, it is exempt from RCRA (Resource Conservation and Recovery Act) Subtitle "C" liability. RCRA Subtitle "C" is the federal law that governs the safe storage, treatment, and disposal of hazardous wastes. The superfund law, or CERCLA

(Comprehensive Environmental Response, Compensation, and Liability Act) is another liability concern. This law allows the federal government to collect cleanup costs for sites that release hazardous constituents from anyone who ever deposited wastes on that site. CERCLA does not contain an exclusion from liability for household waste or an exclusion based on the amount of waste generated. Any waste that qualifies as a hazardous substance under CERCLA is subject to the appropriate liability provisions. Hazardous substances are defined and/or listed under CERCLA. HHW may qualify as a hazardous substance if it contains any substance regulated under CERCLA. If a HHW contains a substance that is covered under CERCLA (whether or not it is a RCRA hazardous waste) potential CERCLA liability exists. It is important to note that potential liability under CERCLA applies regardless of whether the HHW was picked up as part of a community's routine waste collection service and disposed of in a municipal landfill or in a special collection event. The additional safeguards provided by a specific HHW collection and management event may reduce the likelihood of environmental and human health impacts, and therefore may also reduce potential CERCLA liability.

In the State of Tennessee contracted collection program, the Contractor is required to accept legal responsibility for the safety and well being of persons and property on site during the collection event. The contractor is required to carry certain types and amounts of insurance to cover this liability.

### **Goals**

The specific goals for the Region in developing a HHW management program include:

**DISPOSAL.** Provide proper disposal, minimizing the impact on the environment due to potentially dangerous chemicals.

**HOME SAFETY.** Remove chemicals from homes, reducing exposure and potential injury.

**EXPOSURE.** Minimizing the amount of dangerous chemicals in the collection and disposal systems will reduce danger to sanitation workers.

**EDUCATION.** Educate consumers regarding the best methods of management of HHW; alternative product options with less potential hazards; proper storage and use of chemicals; better home management practices such as purchasing only the amount of chemicals needed.

## Implementation

Acknowledging the importance of properly managing HHW, the State of Tennessee has allocated resources to implement special collection programs. The State has contracted with Laidlaw, a mobile collection contractor to manage the collection event. Laidlaw will receive, sort, categorize, and prepare the waste for transporting and disposal in accordance with all applicable regulations. Each county in Tennessee has the responsibility to provide at least one collection center by January 1, 1995. To assist the counties the State has developed the attached "Policy Guide of County Responsibilities Tennessee Household Hazardous Waste Collection Program".

The Solid Waste Management Act requires each county to provide:

a service site for the mobile collection unit to access

advertisement in the newspapers outlining the schedule and details about the collection event

at least one person assigned to the collection site who will assist in the operation

The County Executive needs to schedule the collection event with the Special Waste Section by contacting the section with a proposed date, and location along with the name and address of the County's representative who will be on site (see attached draft letter). The request needs to be submitted at least thirty days prior to the desired collection date. The County can request assistance with advertisement and educational programs from the state as well. The County needs to send to the Section a copy of the proposed ad, expected dates the ad will run, and the names of the papers which the ad will appear ten days prior to the ad appearing. To schedule a collection day, the contact information is:

Don Manning, Manager, Special Waste Section (532-0091)  
Division of Solid Waste Assistance  
14th floor, L & C Tower  
401 Church Street  
Nashville, Tennessee 37243-0455

In order to conduct an effective program a key ingredient is advertising and/or public education. The State will be liable for a set-up fee to the Contractor each time a County is serviced, regardless if participants attend. The potential users must be aware of the availability and the benefits of a program in their community. At a minimum the County needs to advertise in a newspaper of general circulation the date, hours, and location of the collection event. The ad needs to be published once at least two weeks preceding the event and once the week of the event. The ad needs to specify that only 100 pounds of waste will be accepted from each household and list the items excluded (medical and radioactive

wastes, explosives, and dioxins), and note that the program is funded by the state. Effective means of getting the word out include to encourage participation:

posters or handouts, distributed at existing disposal facilities (landfill, transfer station, convenience center), retail outlets, government buildings; consider distributing the information with the collection routes with municipal solid waste pick up;

special lesson units in schools, and/or notice during the school daily announcements; information presented to school age children is very effective means of reaching the entire household;

public service announcements on radio and television, coordination with local news media for press releases or articles of interest in the newspaper;

inserts in utility bills or direct mailings;

meetings with clubs, churches, civic organizations with videotape and audio-slide presentations.

The Public Information and Education Chapter (IX) provides more specific guidelines for an educational program.

### **Site Preparation**

The County is responsible for providing the temporary site for the Collection Event. It is recommended the site be county property. If the site is not County owned, the County needs to provide proper documentation, such as a lease agreement in writing to the State (fifteen days prior to the collection day). Seven to fifteen days prior to the collection event, the County needs to allow the household hazardous waste collection contractor to inspect the site.

The site chosen needs to provide easy access to the State collection Contractor by paved, gravel or well maintained roads. In order to be effective, the site needs to be convenient and close to potential users. The site needs to have access to electricity (grounded 110 electrical outlet), telephones (within fifty feet), water and sanitary facilities. The site can utilize the parking lot of a cooperative retailer, fire or police station, public works facility, etc. At least fifteen parking spaces are needed. A paved surface is necessary to contain spills. A flat area of at least 100 feet by 100 feet is needed. Also, avoidance of areas near surface water, storm water and sewer drains is recommended. The County needs to provide waste containers to manage nonhazardous materials which come in to the site. Management of the solid, nonhazardous waste, will be the responsibility of the County. A roll off dumpster would provide for collection and easy transportation to the landfill for nonhazardous waste. It is the County's responsibility to inspect the waste containers for

questionable waste. This is critical for the County to assure all potentially hazardous waste is removed by the Contractor.

Although Laidlaw will provide the support necessary to conduct the collection program, having certain materials on hand is recommended for the County: tables and chairs, fire extinguisher, signs for traffic control and to identify the site, traffic cones, water hose and shut off valve, duct tape and staple gun, leaflets with general information on the program, pens, camera, paper weights and survey forms. A brief survey form will help determine the effectiveness of the program. A typical form is provided (the State typically provides their own form for distribution).

The operating rules of the facility need to be conspicuously displayed with guidelines for users. The users need to be aware that if a waste is not accepted they, as the generator, are responsible for the proper disposal. Limits on the volume and source of the waste need to be displayed. The State has set a maximum of 100 pounds per household (per automobile). It is imperative that no waste from industries is accepted, only household hazardous waste.

The County needs to provide a site representative, either an employee or a representative of the County. The site representative needs to be a responsible individual capable of assisting in the organization of the collection event, offering support to the Contractor and allocating county resources as needed. The County representative or a suitable back up, must be on site during the operation and clean up of the event. The County representative will inspect the site prior to the Contractor leaving, he will need to document any damages to the site and the removal of all hazardous materials. The County representative will be responsible for coordinating County volunteers and for properly managing the solid waste on site. It is advisable to contact local environmentally conscious groups to request volunteers to assist with the program. Three or four volunteers on site during the day will help with traffic control, survey distribution and to help the Contractor.

### **County Specific Action**

The first household collection day in the State program was Rutherford County on September 23, 1993. Over 400 cars visited the site to utilize the services offered. Overall the day was a success. The advertisement used by Rutherford County is included with this section. At this point, White County needs to move forward to take advantage of the State program. It is the responsibility of the County Executive contact the State to schedule a collection event. The County needs to identify a readily accessible location which meets the criteria for a suitable site prior to contacting the State to schedule a day. The County courthouse, a local merchant with a large parking area, fire station, or other County facility would provide options.

The staffing requirements for the County will primarily involve the individual on site during the collection event. This individual will likely be from the solid waste or public works department, preferably a supervisor or someone of equitable responsible nature. Herd Sullivan, the current landfill supervisor would be a logical coordinator for the White County event due to his daily involvement in the waste management program. It is recommended that the same individual be designated as the event organizer as well. The event organizer would coordinate choosing and preparing the site; setting the schedule with the State; developing and implementing the advertising campaign; working with the State Contractor to evaluate the site and assure the availability of all needed materials; coordinating volunteers; being on site at all times during the event; providing the final inspection and any follow up as needed.

It is estimated the time contribution for the organizer would be 20-30 hours (6-10 hours for advertising, 4-8 hours for coordinating with the State and the Contractor, 8-10 hours the day of the event, and 2 hours follow up). The County Executive would also have an investment of time from 2-6 hours depending on his/her involvement, at least communicating with the State for the initial scheduling of the event.

The overall investment for the County would be:

approximately 20 hours of staff time @ \$25/hour and the County Executives time 5 hours @ \$30/hour (including benefits) \$650

supplies approximately \$200-\$400

utilizing county property (zero for lease or rental)

managing the solid waste collected, \$150- \$550

advertising, \$500 - \$1,000

**TOTAL      \$1,500 - \$2,500**

### **Long Term Program**

The Solid Waste Management Act of 1991 has a five year sunset provision. The State has indicated that they intend to continue the State funded program for another three years. However, the contract is reevaluated annually. Given that, the County needs to take full advantage of the State funded program while it is available. The State program is set up to respond to specific requests from counties. Priority will be given to counties which have not had the services in the past. As available, the State Contractor can revisit counties previously serviced.

Once the State program has been exhausted, the individual counties need to evaluate the options to continue the program with their own resources. The data accumulated from the State program can be used to estimate cost and assist in setting up regional programs. The State contracted service for the Rutherford County collection event was nearly \$20,000, a later event with less participation in Bi-County cost approximately \$10,000.

To take advantage of the economies of scale the White County Solid Waste Region can contact the Development District or surrounding regions and counties directly to discuss options for continuing the services of a Contractor once the State program draws to a conclusion. Due to the high cost of individual programs, it is expensive for single counties to finance household hazardous waste programs. Coordinating with other regions could allow for a more economical option of continuing with the services of a private contractor for a large area. Working with adjacent counties or regions, collection days can be set up annually at alternating counties.

The advertising campaign for the collection days would be disseminated to all participating counties. This allows participants access collection programs in other counties if they could not wait until their home county's scheduled day.

The progress made by the State funded collection events needs to be maintained with a continuing educational program. The information provided to the public regarding the dangers and alternatives of HHW needs to be ongoing. Information such as the attached is a listing of typical HHW with more environmentally friendly alternative products is particularly important in avoiding the generation of household hazardous waste.

The ten year staffing requirements would be covered by the Diversion Manager discussed in Chapter IV. The implementation of the household hazardous waste management program will be under this individual's responsibility since the importance of proper education in this issue is paramount.

### **Implementation Schedule**

The region will take full advantage of the State funded collection program by scheduling a state funded collection event as soon as practical. The County can contact the State periodically to schedule subsequent collection event as soon as the State allows.

The costs associated with the long term program are difficult to estimate at this time due to the lack of specific information on the participation rates for future programs. Once the State funded program has operated the data accumulated can be used to assist in the development of the Region's long term budget for HHW collection and management.

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DATE	SCHEDULED TASK	ESTIMATED COSTS
annually 1994-1996	state funded collection event	\$1,500 - \$2,500
1997-2003	County funded event	\$15,000 - \$30,000

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## B. Waste Tires

### Background

The Solid Waste Management Act of 1991 includes the regulation of waste tire disposal and a program to assist in the proper disposal of waste tires. The law outlines operational requirements for disposal of tires at landfills, as well as directing each county to provide a site to receive and store waste tires. The law reads:

Waste tires may be disposed of in the same manner as other waste except that whole waste tires may not be disposed of in the final lift or within 10 feet of the final grade unless the tires are shredded, chipped or circumferentially sliced. Whole tires or shredded, chipped or circumferentially sliced tires may be stored on site provided that the tire storage area conforms with the following standards:

- I. The storage area shall be surrounded by an 18" high earthen berm to manage run-on and run-off and be sufficient to contain water in the event of a fire, and to provide that:
  - a. All surface run-off is diverted around the site;
  - b. All rain water collected within the berm must be directed to an appropriate release point; and
  - c. All fire control water can be contained until release is approved.
- II. Tire piles shall be restricted to the following dimensions: 200' long, 50' wide and 15' high. Whole tires shall be covered by a material sufficient to shield the tires from precipitation or an effective insect vector and rodent control program shall be established.
- III. A buffer zone of at least 50' wide shall separate tire piles from each other and from active disposal areas.
- IV. In order to reduce the risk of fires:
  - a. The storage areas and the buffer zone shall be kept free of brush and high grass;
  - b. No flammable liquids may be stored nor may equipment with an open flame be utilized in or within 50' of the storage area;
  - c. Communication equipment, capable of immediately notifying the responding fire department, shall be maintained, and;
  - d. A letter assuring response from the responding fire district must be filed with the State and the telephone number of the responding fire district must be posted at the facility. If service is not available specific fire control measures must be specified by letter to the state.
- V. The storage area may not be located:
  - a. On an active disposal area
  - b. On a closed disposal area, unless no remaining area is available and remedial closure is specified in writing to the State
  - c. On an area to be utilized for disposal within one year; and
  - d. In wetlands or the 100 year floodplain.
- VI. Tires or shredded tires may not be stored for more than one year without the written approval of the State. The operator shall maintain records sufficient to establish the date each tire pile within a storage area was begun.

The law calls for a December 31, 1994 ban on disposal of whole tires in landfills. To transition into this ban, the State has funded a private contractor (Southeastern Environmental Technologies of Tennessee) to shred waste tires at no cost to local governments. The mobile tire shredder goes to each county at least twice per year. Counties with a Class I or IV landfill may store waste tires on a permitted facility until they are shredded (up to one year). Other counties can establish a separate waste tire storage site with a state permit.

In order for a county to have its waste tires shredded each site must have an accessible road and work site capable of accommodating a tractor trailer truck and tire shredding equipment weighing approximately 80,000 pounds.

### **Goals**

The specific goals for the Region in developing a waste tire management program include:

provide for environmentally sound disposal of tires

reduce the number of illegal dumps and associated problems with old tires, this includes potential breeding ground for insects, unsightly dumping grounds, and potential for serious fires

alleviate operational problems at landfills due to the behavior of tires in the fill

investigate alternative disposal options, such as recycling or reuse of the tire material subsequent to shredding

### **Current System**

The existing tire management program in White County includes a tire storage area at the existing County Class I landfill. The State tire chipper chips the tires prior to the County disposing of the material in the Class I landfill. To date the State shredder has been to White County once, shredding 1,159 tires. Since the landfill uses landfill employees and the existing landfill for disposal, it is difficult to estimate the operational costs. Once the Class III/IV landfill is permitted, constructed and operational the County can consider disposing of the tires in with the demolition waste.

The State records indicate that 15,195 tires were sold in White County between October 1991 and June 1993. It is difficult to provide a quantitative estimate regarding the extent of illegal dumping problems in the Region. In general, the extent of illegal tire dumping is an issue. Based on the number of tires sold compared to the number of tires shredded, the likelihood of problematic tire dumping is high. Effective advertising/educational programs should reduce the illegal dumping problem.

### Implementation

White County meets the minimum requirements for the regulations, in that they have an existing tire storage area. The Region can move forward in proper tire management by addressing the issue of illegal dumping problems and investigating the feasibility of alternative disposal options. The Region can assign the responsibilities of an ongoing tire management program to the Reduction/Educational Manager discussed in Chapter VI.

To address the problem of illegal dumps the Reduction/Educational Manager needs to coordinate with the sanitation or public works departments of each participating county to establish:

establish an inventory of illegal tire piles

standard clean up protocol

educational programs to attempt to discourage illegal dumping

enforcement program to punish individuals associated with illegal dumping

The issue of developing alternatives to landfilling the tires is a matter of researching potential markets to utilize the materials.

DATE	TASK SCHEDULED	ESTIMATED COSTS
1994-2003	maintain tire storage area	\$1,000 - \$2,000/yr
1994- 2003	Diversion Manager implement educational program, illegal dump investigation	\$ 500 - \$1,000/yr

## **C. Waste Oil**

### **Background**

Due to the common practice of individuals changing their own automobile oil, the potential for environmental impact from improper disposal is high. The EPA estimates that every year, privately owned automobiles and light trucks generate over 300 million gallons of used crankcase oils. The majority of this oil (over 200 million gallons per year) is generated by individual consumers who change their own oil. The EPA estimates only 10% of this is properly collected and sent off for recycling. The remainder is emptied into sewers, dumped directly onto the ground, thrown in the trash or into surface water. The State of Tennessee estimates that over 1,000,000 gallons of used motor oil is generated each year in the state. Of this, up to 60% is estimated ending up eventually in the state's water resources. For instance, the Coast Guard estimates that sewage treatment plants discharge twice as much oil into coastal waters as do tanker accidents (15 million gallons per year versus 7.5 million gallons from accidents).

The facts about used oil include, re-refining used oil takes only about one third the energy of refining crude oil to lubricant quality. If all the used oil improperly disposed of by do-it-yourselfers were recycled, it could produce enough energy to power 360,000 homes each year or 96 million quarts of high quality motor oil. A gallon of used oil can ruin a million gallons of fresh water.

The State of Tennessee recognized the improper management of waste oil as a problem and required the regional solid waste plans to address this issue. The Solid Waste Disposal Act bans the disposal of waste oil in landfills after January 1, 1995 and requires each county to develop an infrastructure for accepting, storing, recycling or safe disposal of these materials by the end of 1994.

### **Goals**

The Region's goals in regards to management of used oil include:

provide an opportunity for the public to properly dispose of their used oil, thereby minimizing environmental impact

maintain and support private entities who offer collection of used oil

educate the population regarding the potential impacts of mismanagement of used oil and environmentally sound disposal options

provide drop off used oil disposal and recycling facility at existing disposal facility to supplement the existing retail facilities

Different collection programs offer various benefits. Curbside collection offers the convenience and high participation rate of the users, however it is very expensive. Collection trucks would need to be retrofitted with used oil collection tanks or racks. Periodic special curbside collection of used oil are more economical to routine curbside collection. This "milk run" alternative requires substantial publicity and coordination with the collection program. This option is still more expensive and potentially problematic than a central drop off facility and is not recommended for the Region.

A central collection station is where do-it-yourselfers can drop off used oil in an appropriate tank or drum. The station needs to be well marked and preferably manned to ensure that it is used for uncontaminated lubricating oil only. Establishing this service at manned convenience centers provides an economical option for collection of used oil. This system can work well in concert with retail facilities. Many service stations, car dealerships and retail stores have collection tanks installed for their own use that their customers.

The used oil needs to be picked up in a timely manner by a responsible used oil hauler and sent to reputable recyclers. The hauler must have valid license and operate in a safe and environmentally sound fashion, maintain regular records of quantities, and deliver the oil to reputable management facilities. Haulers and recyclers are often listed in the Yellow Pages. Contact with existing private programs can provide a list of haulers in the area. The recycling facility should be evaluated prior to contracting. Visiting the site can indicate substandard practices. The recycler should have accurate records of the source of the used oil, routine laboratory checks for contaminated loads, etc. The facility should have containment measures to prevent losses and contain spills. Storage areas should be well maintained with containment in place. The facility needs to be in compliance with all applicable state and federal requirements. Inspection should be up to date and with any violations noted corrected.

An educational program can circulate information regarding the proper management of used oil. The State has information brochures which briefly outline the potential problems and ways to avoid them for individuals wanting to dispose of used oil (attached). Chapter IX, the Educational and Public Information Chapter presents more specific information regarding effective educational programs. In particular used oil program educational efforts should focus on:

- educate the public about the used oil problem, environmental impacts
- encourage more responsible oil management
- notify do-it-yourselfers how to use the program to recycle oil

Used oil programs can be somewhat seasonal, with do-it-yourselfers changing their oil more frequently in the spring and summer. Educational efforts need to concentrate on these times of the year. The typical do-it-yourselfer is between 15 and 45. So a high school age program is particularly effective, along with a program aimed at the general public.

A valuable resource in setting up a used oil recycling program is EPA publication "How to Set Up a Local Program to Recycle Used Oil" (EPA/530-SW-89-039A). This publication provides several examples of brochures, posters, letters, press release, and collection tank design which are included in this chapter.

### **Current System**

Currently the City of Sparta provides a drop off program at their garage. Industrial Oil Company out of Chattanooga provides the pick up service. Typically, private entities provide the service of accepting used oil, such as service stations, auto supply stores, convenience stores, car dealerships, and instant oil changers. The County needs to follow up to identify the public facilities available for managing used motor oil.

### **Implementation**

In order to comply with the requirements of the Solid Waste Management Act, each county needs to provide at least one site by January 1, 1995 to receive and store waste oil. White County has provided this level of service through the City of Sparta. The County needs to move forward with the encouraging proper coordination between government, industry and volunteer organizations working towards a more wide spread implementation. Additionally, the County can consider providing a used oil container at the landfill with a contained tank system with appropriate secondary containment, spill prevention, etc. This will allow interested individuals to utilize a means of proper waste oil disposal. The program would be low cost due to the fact that existing landfill staff could manage the program with minimal investment.

The Region's Diversion Manager can research the existence of private facilities which accept used oil to determine the adequacy of the existing system. The Region can work with the private facilities and encourage their continued involvement. The Region can coordinate with gas stations, supply stores, existing disposal facilities to circulate information. The result of the Region's research can be a listing of private facilities in the county available to potential users.

Key issues to properly implement a used oil collection program include:

ensuring proper financing for the purchase of equipment, collection operations, publicity and staffing requirements;

managing risks, programs must prevent mixing other materials which may be environmentally damaging or cause problems with haulers or recyclers; the oil must never be mixed with gasoline, solvents, pesticides, or other chemicals;

ensure the proper management of the oil once the contracted hauler removes it from the collection site;

effective educational program and advertising to encourage active participation;

accurate record keeping to chart the program's costs, effectiveness, problems, cycles, impact of advertising, etc.

The Region's Diversion Manager can be responsible for the implementation of an effective waste oil management program, since the program relies so heavily on proper education and advertising. The costs of implementing the program can be tied directly to the popularity of the program and the volume of oil received. The cost of administration can be primarily covered by the educational coordinator's time (discussed in the educational section). The cost of collection units range from simple collection barrels to more specifically designed waste oil containers. The haulers can be contracted and negotiated based on the value of the oil to them. White County can have one storage container at the landfill specifically designed for used oil for a cost of \$1,000 to \$3,000 (200 - 400 gallons capacity).

## **D. Lead Acid Batteries**

### **Background**

Lead acid batteries provide power to most motorized vehicles. Because of the toxic properties of lead acid batteries, it is illegal for Tennessee landfills to accept them for disposal. The batteries use a chemical reaction between sulfuric acid and lead to generate electricity. Lead acid batteries can be recycled into useable lead, sulfuric acid and plastic to make new batteries.

### **Goals**

The Region's goals in regards to management of lead acid batteries include:

maintain and support private entities to offer collection of used oil

educate the population regarding the potential impacts of mismanagement of lead acid batteries and environmentally sound disposal options

educate disposal facility operators to ensure no disposal of lead acid batteries at landfills in the Region

### **Current System**

The Region, as every county in Tennessee, is covered by Tennessee law in that every retail store that sells lead acid batteries is required to accept used batteries as trade-ins. In fact, some retailers provide a discount on new batteries with the trade-in of old batteries. Recyclers then buy used batteries from retail stores. The landfill accepts used batteries and segregates them for storage until a scrap dealer hauls them offsite for recycling.

### **Implementation**

The existing system complies with the minimum State requirements for lead acid battery disposal. An important aspect of maximizing the effectiveness of the program is education. The County can work with the retailers to emphasize the disposal options available to consumers. Local environmental groups, the county sanitation departments, earth science programs at schools, etc. need to encourage the recycling, which includes lead acid batteries. The County can include in the general educational program outlined in Chapter IX educational efforts towards assuring the proper disposal of more batteries. The State has information brochures which briefly outline the potential problems and ways to avoid them for individuals wanting to dispose of lead acid batteries (attached). The Region can coordinate with gas stations, supply stores, existing disposal facilities to circulate this information. The Reduction/Educational Manager can be responsible for this program.

## **E. Litter Grant Program**

The State of Tennessee Department of Transportation (Maintenance Division) provides a litter grant program to counties for their use. The system is funded through a tax on the beverages in the state with a fund of \$3.4 million for this year. The money is allocated to the 95 counties based on number of miles in the county and population. The minimum grant is \$20,211 and the maximum is \$295,000. A list of the counties and their grants is included in this section. The counties are reimbursed for money spent on approved programs. The litter grant program is used primarily for road side pick up of litter. Counties use prison labor with the cost of the guard and transportation reimbursed by the litter grant to clean up county roads. The grant can also finance educational programs, if the county fulfills four of the five categories (government, school, business, media or public). The grant program recently started a program to encourage counties to use more of the grant on educational programs. The smallest grant recipients need to spend 5% of the grant on education and the largest recipients 20%. The program increases this percentage over the next three years to a 15% and 35% level.

According to TDOT the 1993-1994 litter grant allocations for White County was \$23,362. The litter grant program is set up as a reimbursement for money spent of clean up or educational programs. This is an excellent opportunity to access funds for educational programs for the various solid waste issues addressed in this Plan. Educational/advertising programs for household hazardous waste, used oil, lead acid batteries, tires, and general recycling programs may be partially financed through this program. Note the TDOT emphasizes the money needs to be related to discouraging litter and approval from TDOT is needed prior to redirecting funds to new educational programs.

The Diversion Manager can submit a listing of potential educational activities to the County Executive along with detailed budgets. The County Executive can accept and fund options at their discretion.

**Appendix X-A**  
**Household Hazardous Waste**

November 1993

Department of Environment and Conservation  
Division of Solid Waste Assistance  
401 Church Street  
Nashville, Tennessee 37243

**Subject: Request for a Household Hazardous Waste Collection Event  
White County Solid Waste Region**

This letter serves to request scheduling of a household hazardous waste collection event in White County. The date desired is \_\_\_\_\_, 1993. The contact person who will serve to coordinate the fulfillment of the county's responsibilities will be \_\_\_\_\_. The contact person can be reached at \_\_\_\_\_, the address is \_\_\_\_\_. The on site representative who will coordinate the county's responsibilities will be \_\_\_\_\_. He/she can be reached at \_\_\_\_\_, the address is \_\_\_\_\_.

The site choice is \_\_\_\_\_ (description and directions). The site is approximately \_\_\_\_\_ (size). The site provides for water, electricity, sanitary facilities, and telephone available within. (If the site is not owned by the county, include the agreement with the land owner). Specifically, the site meets the requirements outlined in the Policy Guide. The telephone numbers for the appropriate emergency agencies are listed below:

FIRE: \_\_\_\_\_

POLICE: \_\_\_\_\_

NEAREST MEDICAL FACILITY: \_\_\_\_\_

Volunteers for this event will be recruited from the:

\_\_\_\_\_

The County intends to advertise for the event starting \_\_\_\_\_ (two weeks prior to the event), with the attached advertisement (include the advertisement).

If you have any questions or objections to the date or location chosen please contact me directly. We would appreciate your prompt attention to this request.

Sincerely,

Mr. Ernest Bennett, White County Executive

# HOUSEHOLD HAZARDOUS WASTE COLLECTION PROGRAM WHITE COUNTY SOLID WASTE MANAGEMENT REGION

DATE: \_\_\_\_\_

To determine the effectiveness of this program and improve future efforts, the user of this household hazardous waste collection service is requested to fill out this brief survey form.

1. How did you hear about this service? \_\_\_\_\_
2. Suggestions for more effective advertizing? \_\_\_\_\_
3. What is the primary reason you decided to utilize this service?
  - \_\_\_ interest in protecting the environment
  - \_\_\_ concern over health risks of having these chemicals in your home
  - \_\_\_ concern over throwing these chemicals in with solid waste and the danger to sanitation workers
  - \_\_\_ just wanted to get rid of the waste
  - \_\_\_ other: \_\_\_\_\_
4. What sort of waste did you bring today? \_\_\_\_\_
5. Approximate volume of waste? \_\_\_\_\_
6. How convenient is this location? \_\_\_\_\_
7. How far do you live from here? \_\_\_\_\_
8. Where do you live(City and County)? \_\_\_\_\_
9. Suggested alternative locations? \_\_\_\_\_
10. Please rate the service received today (1 to 5, 5 being excellent and 1 being unacceptable). \_\_\_\_\_
11. Demographic data:
  - Age group: \_\_\_ <20; \_\_\_ 20-29; \_\_\_ 30-39; \_\_\_ 40-49; \_\_\_ 50-59; \_\_\_ 60+ years old
  - Income: \_\_\_ <15,000; \_\_\_ 15,000-29,999; \_\_\_ 30,000-49,999; \_\_\_ \$50,000+ /year
  - Education: \_\_\_ grade school; \_\_\_ high school; \_\_\_ college; \_\_\_ post graduate
  - Currently a student? \_\_\_ no; \_\_\_ yes
12. The State of Tennessee is funding this program for a limited time. Should local funds finance future programs? Would you be willing to pay for this service in the future?  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
13. Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
14. Name and address (optional) \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

## HAZARDOUS HOUSEHOLD PRODUCTS

Products	Hazardous Ingredients	Hazard Properties	How to Dispose	Precautions and Substitutes
Abrasive cleaners	trisodium phosphate, ammonia, ethanol	corrosive, toxic, irritant	Use completely, rinse container and dispose in trash.	Rub area with half lemon dipped in borax, rinse and dry. Use baking soda instead. Try using soda water to clean stainless steel.
Aerosols	nitrous oxide, propane	toxic, carcinogen, flammable	Use completely, dispose in trash.	Use non-aerosol products.
Air fresheners & deodorizers	formaldehyde	toxic, carcinogen, irritant	Use completely, rinse container and dispose in trash.	Open a window or use an exhaust fan, sprinkle baking soda on odor areas and use in refrigerator.
Ammonia based cleaners	ammonia, ethanol	corrosive, toxic, irritant	Use completely, rinse container and dispose in trash.	Vinegar, salt and water for surfaces, baking soda and water for the bath.
Antifreeze	ethylene glycol	toxic	Dispose at wastewater treatment plant. DO NOT POUR ON GROUND.	
Auto Degreasers	petroleum products	Corrosive, Poisonous, Eye and skin irritant.	Use up according to label instructions or give away.	Choose strong detergent type over solvent type
Auto waxes and polishes	petroleum products	Fumes irritating to eyes. Harmful if swallowed. Eye and skin irritant.	Use up according to label instruction or give away.	Use outside.
Batteries	sulfuric acid, lead	corrosive, toxic	Recycle. trade in or take to reclamation center.	
Batteries: mercury button type	mercury	Swallowing one may be fatal if it leaks.	Throw in trash.	
Bleach cleaners	sodium or potassium hydroxide, hydrogen peroxide, hypochloride	corrosive, toxic	Use completely, rinse container and dispose in trash.	Use powdered bleaches or add borax.
Brake fluid	glycol ether, heavy metals	flammable, toxic	DO NOT DISPOSE. STORE FOR HAZARDOUS WASTE PROGRAM.	

## HAZARDOUS HOUSEHOLD PRODUCTS

Products	Hazardous Ingredients	Hazard Properties	How to Dispose	Precautions and Substitutes
Chlorinated hydrocarbons	DDT, aldrin, endrin, chlordane, heptachlor, lindane	toxic	DO NOT DISPOSE. STORE FOR HAZARDOUS WASTE PROGRAM.	Import predators (ladybugs, ground beetles, mantis).
Disinfectants	diethylene/methylene glycol, sodium hypochlorite, phenols	corrosive, toxic	Use completely, rinse container and dispose in trash.	Half cup borax in 1 gal. water.
Drain cleaners	sodium or potassium hydroxide, sodium hypochlorite, hydrochloric acid, petroleum distillates	corrosive, toxic	DO NOT DISPOSE. STORE FOR HAZARDOUS WASTE PROGRAM.	Mix 1 cup each baking soda, salt and white vinegar, pour in drain, wait 15 minutes, flush with boiling water, use plunger or plumber's snake.
Flea powders, sprays and shampoos	pesticides	Moderately to very poisonous.	Use up or save for hazardous waste collection day.	DO NOT USE DOG PRODUCTS ON CATS. Vacuum house regularly and thoroughly. Launder pet bedding frequently.
Floor or furniture polish	diethylene glycol, petroleum distillates, nitrobenzene	flammable, toxic	DO NOT DISPOSE. STORE FOR HAZARDOUS WASTE PROGRAM.	1 part lemon juice, 2 parts olive or vegetable oil.
Fungicides	captan, folpet, aniazine, zinc, copper compounds	toxic	DO NOT DISPOSE. STORE FOR HAZARDOUS WASTE PROGRAM.	Do not over water; keep area dry and clean.
Furniture strippers	acetone, methyl, ethyl ketone, alcohols, xylene, toluene, methylene chloride	flammable, toxic	DO NOT DISPOSE. STORE FOR HAZARDOUS WASTE PROGRAM.	Sandpaper or heat gun.
Herbicides	2,3-D, glyphosate prometon	toxic	DO NOT DISPOSE. STORE FOR HAZARDOUS WASTE PROGRAM.	Hoe or hand weed, keep grass short.
Lacquer and lacquer thinner	acetone, benzene	Extremely flammable. Very poisonous.	Use up according to label instructions or save for hazardous waste collection day.	Ventilate area very well. Do not use in room with pilot light, open flame, electric motors, spark-generating equipment, etc. DO NOT SMOKE WHILE USING. No substitutes.

## HAZARDOUS HOUSEHOLD PRODUCTS

Products	Hazardous Ingredients	Hazard Properties	How to Dispose	Precautions and Substitutes
Medicine: unneeded or expired	variety of ingredients	Frequently cause child poisonings.	Flush down sink or toilet.	Check content of medicine chest regularly. Old medications may lose their effectiveness, but not necessarily their toxicity. No substitutes.
Mothballs	naphthalene, paradichlorobenzene	toxic	Use fully, rinse container and dispose in trash.	Cedar chips, newspapers, lavender flowers.
Motor oil	hydrocarbons (benzene) heavy metals	flammable, toxic	Recycle wastes; take to reclamation center.	
Nail polish remover	acetone	toxic, flammable	Use up according to label instructions.	
Oven cleaners	potassium or sodium hydroxide ammonia	corrosive, toxic	Use fully, rinse container and dispose in trash.	Use baking soda and water or place a bowl of ammonia in 200 degree oven overnight and clean in the morning.
Paint-enamel or oil	pigments, ethylene, aliphatic, hydrocarbons, mineral spirits	flammable, toxic	DO NOT DISPOSE. STORE FOR HAZARDOUS WASTE PROGRAM.	Latex or water based paint.
Paint-Latex, water based	rosins, glycol ethers, esters, phenyl mercuric acetate	toxic	Pour over newspaper in cardboard box, let air dry then discard in trash.	Limestone based whitewash or casein based paint.
Paint-rust	mineral spirits, glycol ethers, ketone, petroleum	flammable, toxic	Keep in tightly closed jar and allow contaminants to settle. Strain and reuse liquid. Store contaminants for Hazardous Waste Program.	Use water with water based paints.
Paint-stains	mineral spirits, glycol ethers, ketone	flammable, toxic	DO NOT DISPOSE. STORE FOR HAZARDOUS WASTE. PROGRAM	Latex paint or natural earth pigment finishes.
Paint thinner or turpentine	N-butyl alcohol, acetone, methyl isobutyl ketone, petroleum	flammable, toxic	Keep in tightly closed jar and allow contaminants to settle. Strain and reuse liquid. Store contaminants for Hazardous Waste Program.	Use water with water based paints.
Pesticides arsenicals	lead arsenate, calcium arsenate, paris green	toxic	DO NOT DISPOSE. STORE FOR HAZARDOUS WASTE PROGRAM.	Live traps, remove food supply.

## HAZARDOUS HOUSEHOLD PRODUCTS

Products	Hazardous Ingredients	Hazard Properties	How to Dispose	Precautions and Substitutes
Pesticides botanicals	pyrethrine, rotenone, nicotine	toxic	DO NOT DISPOSE. STORE FOR HAZARDOUS WASTE PROGRAM.	Ants: use chili powder to hinder entry.
Pesticides carbamates	carbaryl (sevin) aldicarb (lemik) propoxur (baygon)	toxic	DO NOT DISPOSE. STORE FOR HAZARDOUS WASTE PROGRAM.	Keep garden weed free; use insecticidal soap.
Organo-phosphates	parathion, malathion, diazanon, dichlorvoa, chlorpyritos	toxic	DO NOT DISPOSE. STORE FOR HAZARDOUS WASTE PROGRAM.	Traps or baking soda/powder sugar mix.
Plant insecticide	methoprene, malathion, tetramethrin, carbaryl	toxic	DO NOT DISPOSE. STORE FOR HAZARDOUS WASTE PROGRAM.	Mix bar soap and water or old dishwater, spray on leaves and rinse.
Pool chemicals	muriatic (hydrochloric) acid, sodium hypochlorite (chlorine) algicide	corrosive, toxic	Use full, rinse container and dispose in trash.	Open lid and acid will evaporate.
Rat poison	broditacoum, coumerins (warfarin), strychnine	toxic	DO NOT DISPOSE. STORE FOR HAZARDOUS WASTE PROGRAM.	Live traps; remove food supply.
Rug cleaners	naphthalene, perchloroethylene, oxalic acid diethylene glycol	corrosive, toxic, irritant	DO NOT DISPOSE. STORE FOR HAZARDOUS WASTE PROGRAM.	To deodorize, sprinkle baking soda or cornstarch on dry rug. Vacuum in 30 minutes.
Silver polish	acidified thiourea, sulfuric acid	corrosive, toxic	DO NOT DISPOSE. STORE FOR HAZARDOUS WASTE PROGRAM.	Soak in boiling water with baking soda, salt and piece of aluminum.
Toilet cleaners	muriatic (hydrochloric) of oxalic acid, paradichlorraben zene, calcium hypochlorite	corrosive, toxic, irritant	DO NOT DISPOSE. STORE FOR HAZARDOUS WASTE PROGRAM.	Toilet brush and baking soda or mild detergent.
Transmissionf fluid	hydrocarbons, mineral oils	flammable, toxic	Recycle wastes; bring to reclamation center	
Window cleaner	ammonia	Vapor may be irritating. Slightly poisonous.	Use up according to lable instructions or give away.	Ventilate room. Instead: spray on vinegar, then wipe dry with newsprint.

# Household Hazards

This fact sheet was prepared with the assistance of Clean Water Action. David Zwick, Executive Director of Clean Water Action, is a member of Earth Day 1990's Board of Directors.

## What Is Household Hazardous Waste?

Many common household products contain ingredients that are toxic, corrosive or flammable, making them hazardous when used and disposed of improperly. Such common items as fingernail polish remover, bug spray, shoe polish, cleaning products and paint can threaten a family's health and safety while in the home. When disposed of improperly, household hazardous wastes can contaminate soil, air and water. Hazardous wastes dumped in landfill may seep through the soil into groundwater, which nearly half of all Americans depend on for household use. As a result of improper disposal of household hazardous products, 20 percent of the Environmental Protection Agency's highly contaminated Superfund sites are abandoned city landfills.

Poisoning of children and pets can be an immediate result of improper use and storage of hazardous products. Fire hazards are increased and unsuspecting firefighters may be endangered.



by improperly stored flammables and poisons. Throwing out hazardous wastes with other garbage threatens the health of trash collectors. In some instances, gasoline and other flammables have been carelessly poured into sewers and have caused explosions. In addition to the more obvious problems posed by household hazardous substances, there are long-term effects that are not as well understood. Many studies have shown that common household toxics can lead to cancer and other chronic illnesses.

One of the largest sources of municipal hazardous waste is used motor oil, which becomes a major environmental hazard when poured down storm sewers. Since sewage treatment plants are not designed to deal

with such toxics, the oil is often released directly into streams, rivers or the ocean. There it pollutes water and threatens plant and animal life. Every year, do-it-yourself oil changers improperly dispose of 176 million gallons of oil — an amount equal to 16 Exxon Valdez oil spills. One quart of oil can contaminate 250,000 gallons of drinking water.

## What You Can Do

- Whenever possible, use non-hazardous alternatives to household products (see reverse for suggestions).
- If you must purchase a product that is potentially hazardous, check the label and make sure it will do exactly what you want. Buy only the amount you will use and follow directions carefully. Remember that doubling the dosage does not necessarily double the product's effectiveness.
- Store hazardous products in safe places out of the reach of children.
- Before disposing of a container, use up the entire product or give it to someone who will.
- Do not drain automotive fluids into the sewer. Oil, antifreeze and batteries can be recycled at some gas stations, and transmission fluid and brake fluid should be taken to a special disposal facility.



"With today's climate of rising environmental awareness and activism, promoting change at the individual level makes more sense than ever before. Through our actions, our purchases and our votes, we can change corporate behavior and that of our society as a whole. The roles each one of us chooses to play add up to a better future for our families, our communities and our planet."

- David Zwick, Executive Director, Clean Water Action

- If a hazardous product cannot be used up or recycled, take it to a hazardous waste disposal facility. Check with your local fire department to find out if such a service is available locally.
- Avoid disposable products whenever possible. Plastics and polystyrene (styrofoam) are manufactured using extremely hazardous chemicals, and if they are incinerated release toxics into the air.

## Alternatives

Most household cleaning needs can be met using vinegar, baking soda, borax, ammonia and soap. An effective all-purpose cleaner can be made using the following non-toxic ingredients:

1 gallon hot water  
 2/3 cup baking soda  
 1/4 cup ammonia  
 1/4 cup vinegar

For a stronger solution double all of the above ingredients except for the water.

For non-toxic commercial cleaning products contact:

Shaklee Corporation  
 444 Market Street  
 San Francisco, CA 94111  
 (415) 954-3000

## For More Information

- Clean Water Action  
 317 Pennsylvania Ave., SE  
 Washington, DC 20003  
 (202) 547-1196
- Channing L. Bete Co.  
 200 State Rd.  
 South Deerfield, MA 01373  
 (800) 628-7733

PRODUCT	SAFE ALTERNATIVE	PRODUCT	SAFE ALTERNATIVE
Aerosol sprays	Use lotions, gels or non-aerosol sprays.	Moth balls	Spread out newspapers in closets and place cedar chips around clothes.
Air fresheners	Keep houseplants to purify air. Place baking soda in your refrigerator and in garbage areas. Keep your house well ventilated.	Oven cleaner	Wash after each use with a mixture of baking soda and warm water. To get on burned spills, leave a small dish of ammonia in the oven overnight and scrub again the next day.
Batteries	Use rechargeable batteries.	Paint	Use latex and water-based paints.
Chlorine bleach	Use dry bleach or borax.	Paint remover	Peel off paint with a heat gun or scrape and sand.
Drain opener	To prevent clogging, pour boiling water down drains twice a week and always use the drain strainer. Avoid using drains for disposing of grease. Use a plumbing snake or a plunger to unclog drains.	Pet products	Use products containing de-limonene gas derived from citrus extracts. Insecticidal soaps are biodegradable and non-toxic.
Floor cleaner	Mop floor with a solution of 1 part vinegar to 32 parts water. Use club soda to polish.	Roach spray	Set out a dish of equal parts powdered sugar and baking soda. Spray roaches with soapy water.
Furniture polish	Use a solution of 1 tsp. lemon oil and 1 pint mineral oil. Toothpaste gets rid of water stains and salt helps with grease spots. Crushed raw nuts provide an oily polish.	Rug cleaner	Sprinkle on dry cornstarch and then vacuum. For red wine spills apply salt immediately.
Insecticides	Introduce predator insects, such as lady bugs and praying mantises, to your garden. Make your yard attractive to birds, amphibians, reptiles and bats to help control insects. Apply soapy water to leaves and then rinse well.	Shoe polish	Use polishes that do not contain trichloroethylene, methylene chloride or nitrobenzene. Wear suede or canvas.
Laundry cleaners	Use soap products and boost with washing soda.	Silver cleaner	Soak in warm water with 1 tsp. baking soda, 1 tsp. salt and a small piece of aluminum foil.
Metal polishes	Boil fixtures in a solution of baking soda and salt.	Toilet cleaner	Use a solution of water and baking soda. Remove stubborn rings and lime build-up with white vinegar or pumice stone.
		Window cleaner	Mix 2 tsp. vinegar with 1 qt. water and spray with newspaper.

- Citizens Clearinghouse for Hazardous Waste  
 P.O. Box 926  
 Arlington, VA 22216  
 (703) 276-7070
- Citizens for a Better Environment  
 942 Market St., Suite 505  
 San Francisco, CA 94102  
 (415) 788-0690
- Environmental Hazards Management Institute  
 P.O. Box 932  
 Durham, NH 03824  
 (603) 868-1496

- Greenpeace Action  
 1436 U Street, NW  
 Washington, DC 20009  
 (202) 462-8817
- Household Hazardous Waste Project  
 901 S. National Ave.  
 Box 108  
 Springfield, MO 65804  
 (417) 836-5777
- League of Women Voters  
 8 Winter St.  
 Boston, MA 02108  
 (617) 523-2999
- Local Government Commission  
 909 12th St., Suite 205  
 Sacramento, CA 95814  
 (916) 448-1198
- National Toxics Campaign  
 29 Temple Place, 5th Floor  
 Boston, MA 02111  
 (617) 482-1477
- Seattle Metro  
 821 Second Ave.  
 Seattle, WA 98104  
 (206) 447-5875





STATE OF TENNESSEE  
DEPARTMENT OF ENVIRONMENT AND CONSERVATION  
401 Church Street  
Nashville, Tennessee 37243

August 25, 1993

Ms. Karen Gilbert  
S.C.D.D.  
P.O. Box 1346  
Columbia, TN 38401

Re: Policy Guide on County Responsibilities  
Tennessee Household Hazardous Waste Collection Program

Dear Ms. Gilbert:

The Tennessee Division of Solid Waste Assistance has recently published the referenced policy guide to assist county officials with organizing a Collection Event for Household Hazardous Waste in their counties. The Division would like you, the Solid Waste Coordinator for the Development District, to have a copy for your own information and use. Copies have been sent to each county executive in the 91 counties to be served by this mobile collection service.

If there are any questions, please feel free to contact me at (615) 532-0089.

Sincerely,

A handwritten signature in cursive script that reads "Wade D. Murphy".

Wade D. Murphy, E.I.T.  
Division of Solid Waste Assistance

Enclosures

COUNTY RESPONSIBILITIES  
HOUSEHOLD HAZARDOUS WASTE COLLECTION EVENTS  
IN TENNESSEE

POLICY GUIDE  
AUGUST 1993



TENNESSEE DEPARTMENT OF ENVIRONMENT AND CONSERVATION  
DIVISION OF SOLID WASTE ASSISTANCE

## TABLE OF CONTENTS

### PAGE:

1. Introduction
2. Site Criteria
3. Containers for Nonhazardous Household Waste
4. Advertisement
5. County Site Representative
6. Procedures for Scheduling a Collection Event
8. Volunteers
9. Answers to 13 Commonly Asked Questions

### Attachments

- I. List of Acceptable Materials
- II. List of Materials Specifically Excluded
- III. Sample Newspaper Ad
- IV. Sample Public Service Announcement

#### STATE OF TENNESSEE POLICY OF NON-DISCRIMINATION

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Equal Employment Opportunity/Affirmative/ADA Action inquiries or complaints should be directed to the Tennessee Department of Environment and Conservation, EEO/AA/ADA Coordinator, 401 Church Street, 21st floor, Nashville, TN 37243, (615) 532-0103.

Tennessee Department of Environment and Conservation. Authorization No. 327467. 400 copies. This public document was promulgated at a cost of \$.47 per copy. August 1993
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TENNESSEE MOBILE COLLECTION UNIT PROGRAM  
for  
HOUSEHOLD HAZARDOUS WASTE

HOUSEHOLD HAZARDOUS WASTE

Household hazardous wastes are those wastes discarded from homes or similar sources that are listed by EPA as hazardous or exhibit one or more of these characteristics: ignitability, corrosivity, reactivity, and toxicity.

To help Tennesseans with proper disposal of household hazardous wastes, the Solid Waste Management Act of 1991 (T.C.A. Section 68-211-829) requires the Department of Environment and Conservation to establish a program for mobile collection and disposal of household hazardous waste. The objectives of this program include educating the public on proper disposal practices and assisting counties across the state in providing a means for proper disposal.

Specifically, the state law requires that each county have at least one collection center by January 1, 1995, for collecting used automotive fluids, tires, and lead-acid batteries. It is the objective of the Division of Solid Waste Assistance to assist in the creation of collection centers that will also be able to collect such household items as paint, cleaners, and pesticides.

The Division of Solid Waste Assistance was established to help local governments plan for their solid waste disposal needs and prepare to meet new federal requirements for constructing and operating landfills.

The Special Wastes Section of the Division provides statewide services to assist local governments with the disposal of problem wastes, such as waste tires, waste oil, and household hazardous wastes.

MOBILE COLLECTIONS

Each county in Tennessee will have a responsibility for the household hazardous waste Collection Events. The county, by State law, must provide a service site. It is required to advertise in newspapers the day(s), hours, and location of the mobile collection unit (MCU), as well as the type of household hazardous waste the MCU will receive. The county will assign at least one person to the MCU site who will also assist in its operation.

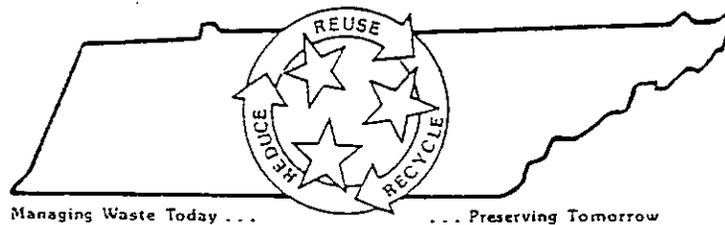
MOBILE COLLECTION PROGRAM  
PAGE 2

A mobile collection contractor will be hired by the State to manage the Collection Event. The contractor will receive, sort, categorize, and prepare the waste for transporting and disposal in accordance with all applicable regulations. The state expects to contract with a private firm for this service by fall, 1993.

Permanent collection sites are planned for the major metropolitan areas of the state, as defined by T.C.A. (Section 68-211-828). The remainder of the state will be serviced by mobile collection units.

The Division of Solid Waste Assistance is available to answer questions concerning site requirements and site selection procedures.

DIVISION OF SOLID WASTE  
ASSISTANCE  
SPECIAL WASTE SECTION  
14TH FLOOR, L & C TOWER  
401 CHURCH STREET  
NASHVILLE, TN 37243-0455  
(615) 532-0091



TENNESSEE'S SOLID WASTE ASSISTANCE PROGRAM

## INTRODUCTION

### Three Responsibilities

As set forth in the Solid Waste Management Act of 1991, county government has three responsibilities to fulfill prior to and during a Household Hazardous Waste Mobile Collection Event. These concern the location, the advertising, and a site representative. To assist county government, the Division of Solid Waste Assistance has defined in this policy guide the minimum criteria for fulfilling these three responsibilities. The policy guide also sets forth the minimum criteria established for scheduling a Collection Event.

### Program Integrity

The criteria herein are deemed appropriate for maintaining integrity of the Household Hazardous Waste Mobile Collection Program. The State of Tennessee will be liable for a set-up fee each time the household hazardous waste contractor services a county regardless of whether participants show up or not. The program can only realize its greatest benefits with the help and active participation of the county governments.

### Criteria Flexibility

These criteria, including the information in all of the attachments, are subject to change based on the needs of the program and the needs of the counties being served. A county may request variances from this policy guide by requesting and justifying a variance in writing to the Manager of the Special Waste Section. The Division reserves the right to refuse household hazardous waste collection service to any county that does not put forth a reasonable effort to meet these criteria.

Manager, Special Waste Section  
Division of Solid Waste Assistance  
14th Floor, L & C Tower  
401 Church Street  
Nashville, TN 37243-0455

### Restrictions

The Contractor is allowed to accept up to one hundred (100) pounds of acceptable household hazardous waste per household (per automobile). NO CONDITIONALLY EXEMPT SMALL QUANTITY GENERATOR OR SMALL QUANTITY GENERATOR WASTE WILL BE ACCEPTED.

### Program Expiration

The Solid Waste Management Act of 1991 has a five year sunset provision. Counties are encouraged to use the State's Mobile Collection Program for Household Hazardous Waste to assist with the design of long-term programs which must be included in their Regional Solid Waste Plans.

## I. Location

### A. Site Criteria

The county will arrange a temporary site for the Collection Event. If the site is not county-owned, then the county will be responsible for all leasing arrangements. The leasing arrangements must be in writing and submitted to the Special Waste Section Manager 15 working days prior to the Collection Event. Seven to fifteen (7-15) days prior to the Collection Event, the county will allow the household hazardous waste collection contractor to inspect the site in order to finalize plans for the Event.

The collection contractor is willing to assist the county in evaluating and selecting sites at no cost. To arrange this assistance, please contact the Special Waste Section at (615) 532-0091 or ask for assistance in the written request for a household hazardous waste collection.

The temporary site should meet the following minimum requirements:

- \* Be accessible by paved, gravel roads, or well maintained roads;
- \* Be located conveniently to the majority of the county residents;
- \* Possess a flat, asphalt or concrete working area of 100 ft X 100 ft minimum;
- \* Accommodate a minimum of 15 parked cars nearby;
- \* Have a clean water source within the working area;
- \* Have toilet facilities (portable or permanent) within approximately 200 feet of the working area;
- \* Have telephone access (portable or permanent) within approximately 50 feet of the working area; and,
- \* Have accessibility to a grounded, 110 electrical outlet.

The county should have a site location in mind when it submits a request in writing to the State for the collection service. The request should identify any of the above criteria that are impossible for the county to meet. Deviations from the above criteria may possibly be arranged. The State reserves the right to disapprove a site that does not meet the above the criteria.

## B. Containers for Nonhazardous Household Waste

The county will provide one or more waste containers for the collection of nonhazardous household waste at each Collection Event and provide for the proper disposal of the non-hazardous wastes. The county may also be required to empty the waste containers, at the county's expense, during the Collection Event hours of operation if necessary.

The county will coordinate with the household hazardous waste collection contractor for the location of these waste containers so as to be convenient to the collection contractor and inaccessible to the general public.

The county will have the right to place any restrictions on the use of the waste containers necessary to protect county interests (i.e., location, use, material sorting).

The State cannot hold the collection contractor responsible for any household hazardous or other waste found in the containers after the collection contractor's departure from the site. During the site clean-up it will be the county's responsibility to inspect the waste containers for questionable waste.

## II. Advertisement

A Collection Event cannot be successful without advertisement. The county will advertise in one or more newspapers of general circulation the date, hours and location of the Collection Event. To qualify as newspapers of general circulation, the newspapers generally have to be published more for their news content rather than their ads and have a paid subscription.

The advertisement should be published once at least two (2) full weeks preceding the event date and preferably the week of the event also. It should also specify that only 100 pounds of waste will be accepted from each household during the event and specifically list the items excluded from the program as well as examples of acceptable items. The items excluded from collection are medical wastes, explosives, radioactive wastes, and dioxins including dioxin precursors. Lastly, the ad should also indicate that the collection and disposal costs will be paid by the State of Tennessee.

The county is advised to send a copy of the proposed ad, the name(s) of the paper(s) in which the ad will appear, and the advertisement date(s) to the Special Waste Section Manager five working days prior to the proposed advertisement date.

A suggested newspaper ad, a generic public service announcement, and a list of materials to be accepted and excluded in the Household Hazardous Waste Mobile Collection Event are attached to this policy.

It is the State's policy to encourage the county to educate its citizens concerning the proper use and disposal of household hazardous waste. The State encourages the county to use available means other than the required newspaper advertisement to communicate the characteristics of household hazardous waste, the consequences of improper disposal, and the ideology of reducing, reusing, and recycling household hazardous waste whenever possible.

The State's household hazardous waste collection contractor and the State are committed to assisting the county with its educational campaign prior to the Collection Event. The contractor and the State have educational materials available for use by the county. The State will coordinate educational and promotional activities with the county and contractor after a formal request for service has been received from the county.

### III. County Site Representative

The site representative may be either a county employee or a person designated to represent the county during the Collection Event. The county will be responsible for paying any wages and expenses incurred by this site representative.

No minimum qualifications have been established for the site representative. However, the site representative should be someone who the county has confidence will safeguard any county property used by the collection contractor (primarily land and waste containers) and will manage problems that may arise during the Collection Event with the county-provided utilities and the nonhazardous waste containers.

A county representative must be on-site during the Collection Event's hours of operation and during the site clean-up. A county representative must also remain during the times the contractor is packaging the materials for shipment in case assistance is needed with site arrangements, utilities, or other problems. If the representative has to leave during the packaging, he should leave a number where he can be reached if needed.

The county should designate a backup representative who can be available to serve as a substitute or to share the responsibility should the Collection Event become lengthy.

The county representative will be asked to return to the site, regardless of the hour, to inspect the site clean-up prior to the contractor's exit from the site. The State will only hold the contractor responsible for any damages that are incurred as a result of the Collection Event operation. The county has the responsibility for documenting any damages to the site.

The representative may make suggestions for improving the site security provided by the contractor in cases where the contractor may leave hazardous materials and/or equipment on site overnight.

Assisting the contractor does not mean providing labor or materials required to fulfill the contractor's obligations. At no time will the county representative be asked to participate in any activity that puts him or her in contact with household hazardous waste.

The county should give the Special Waste Section Manager, in writing, the name of its designated site representative and the backup representative. This notification should also include the home and business addresses and telephone numbers of these representatives.

#### IV. Procedures for Scheduling a Collection Event

The Collection Events will be scheduled on a first-come, first-serve basis. The State reserves the right to make any and all scheduling changes that may be necessary. The procedures for scheduling are as follows:

- A. The County Executive will make a request in writing to the Manager of the Special Waste Section at least 30 days prior to the desired collection date. The letter should include the following:
  1. Request to be serviced by the State's Household Hazardous Waste Contractor.
  2. Indicate the date that the event is desired and at least one alternative date.
  3. Identify a contact person who will serve to coordinate the fulfillment of the county's responsibilities associated with the Collection Event. (This contact person and the site representative may be the same or different persons.)
  4. Identify (name and daytime telephone number) the site representative who will be on site during the day of the Collection Event.
  5. Identify proposed deviations from the minimum site criteria.
  6. Provide telephone numbers for the local law enforcement, emergency response, and nearest medical facilities and the address of the medical facilities.
  7. Provide a list of local environmental and service organizations and their phone numbers who may be able to provide volunteers for the Collection Event.
- B. The Division of Solid Waste Assistance will coordinate a Collection Event date with the contractor and the county contact person.

- C. Fifteen (15) working days or more prior to the Collection Event, the county should send the Special Waste Section Manager a written description of the site proposed for the Collection Event detailing the size, the arrangement and estimated proximity of the required utilities, and the address of and directions to the site. If the Collection Event is held on property not owned by the County, the agreement authorizing use of the site should also be included.
- D. Fifteen (15) working days prior to the Collection Event, the county should send the Special Waste Section Manager a copy of the proposed ad, the name(s) of the paper(s) in which the ad will be published, and the proposed advertisement date(s).

## V. Volunteers

It is the State's policy to encourage but not to require county volunteers for the State's Household Hazardous Waste Collection Program. The household hazardous waste collection contractor will provide the labor necessary to receive, sort, pack, manifest, transport, and dispose of the collected materials. The State requires that this labor force be sufficiently trained to perform these functions and that the contractor be responsible for their personal safety and their insurance coverage. The collection contractor will also be responsible for directing the traffic flow through the site in a manner that facilitates the most efficient collection operation.

There will, however, be areas where volunteers can be used, and the county should make an effort to use the resources of these individuals or groups. These are the areas of surveys, nonhazardous household waste management, and publicity.

The State plans to ask participants in the Collection Event to complete a short survey form about how far the participants traveled, how long the materials have been stored, other items participants would want to see collected, and other such information. Volunteers can be responsible for dispensing and collecting the survey forms.

Since the county will be responsible for managing the nonhazardous household wastes such as cardboard boxes and plastic bags, the county may want to enlist volunteers to help with these wastes especially if they are to be processed for recycling. This will occur only after the contractor has removed the household hazardous wastes from such containers.

Volunteers can also be used to help with publicity for the Collection Event. They can be pass out brochures and post notices of the Collection Event at businesses willing to advertise for the county. They can also be used to make and post signs that direct participants to the Collection Event site.

After the county submits its request in writing to the State to schedule a Collection Event, the State will communicate with the county contact person concerning any interested volunteers.

The hazardous waste collection contractor will assist in coordinating volunteers and insuring their safety on site, as well as assist the county in contacting and recruiting organizations that can provide volunteer support. To initiate this assistance, the county should provide a list of local environmental and service organizations and their phone numbers to the Special Waste Section Manager along with the initial request for a Collection Event.

At no time will volunteers be asked to participate in any activity that puts them in contact with the household hazardous waste.

ANSWERS TO 13 COMMONLY ASKED QUESTIONS  
TENNESSEE HOUSEHOLD HAZARDOUS WASTE PROGRAM  
AUGUST 1993

1. What are the state's criteria for site selection?

In general, a county may use any location, owned or leased, within its borders that meets certain minimum criteria. The criteria concern proximity to necessary utilities and population centers. For further information, a copy of the policy is available upon request. It is entitled, "County Responsibilities, HHW Collection Events in Tennessee, 7/93". A copy may be obtained by calling the Special Waste Section at (615) 532-0091.

2. Can the county collect household hazardous waste at several locations within the county such as convenience centers and then bring the collected wastes to the collection site on the day of the Collection Event?

Even though it might encourage more participation, this action is not allowed because of the potential liability and added responsibility to the county. In order to remain legal, a county collecting household hazardous wastes at various locations would have to personally interview each participant and refuse paints, solvents, petroleum products, pesticides, cleaners, etc., from businesses. (Products that exhibit hazardous characteristics discarded by any business ARE regulated by Tennessee's Hazardous Waste Regulations.) The consequences of not properly screening could result in violation of state and federal transportation and handling regulations which could result in fines and other penalties. Additionally, a collection site always has the potential for becoming a superfund site if the household hazardous waste is spilled or burned. The county would be responsible for the clean-up costs and complying with all clean-up regulations. The county staff would also have the responsibility of interviewing participants for details about waste in unlabeled containers and giving these details to the State's contractor for identification purposes. Lastly, the county would be responsible for the disposal of any waste the State's contractor is unwilling to accept from the county.

3. How can households be made to drive across the county to participate in the Event?

Obviously a household cannot be made to participate or to save household hazardous wastes for collection. In fact, data generated by other states' programs show that the participation rate in a household hazardous waste collection may be low in spite of good availability. However, the availability and Collection Event itself begin an education process within the county on proper management of household hazardous waste. It is hoped that this education will prove beneficial to counties when counties develop their own programs for solid waste management and solid waste reduction as a part of their regional solid waste planning as well as provide an outlet for those items currently stored in garages and basements. It will be possible for the county to hold the Collection Event in a different location from one year to the next.

4. How often can Collection Events be scheduled?

Collection Events are scheduled on a first-come, first-served basis. The State intends to make this service available to all Tennessee counties covered under this program even though funds are limited. Due to financial and other constraints, when scheduling Collection Events, priority will be given to those counties who have not yet held a Collection Event. Counties which have held at least one Collection may be delayed in scheduling additional Events since the Contractor may be previously scheduled to attend other county Collection Events. There is no established minimum or maximum number of events that may be scheduled for any county. However, the State will not schedule more than one Event in a county during a Collection Event day. In other words, a county may not choose locations to hold simultaneous Events for a one day Collection Event. Furthermore, under no circumstances does the State recommend to counties that they collect and store household hazardous waste at any location within the county awaiting the next scheduled Collection Event by the State's Contractor.

5. Will unknown materials be accepted?

As far as the homeowner is concerned, unknown and unlabeled materials may be brought to the collection event. Homeowners should come prepared to share as much information possible about unlabeled materials to assist the contractor with proper identification. With such cooperation from citizens, there are few materials the contractor's chemists cannot identify. Any material that cannot be identified in the presence of the participant will be returned to the participant. (The contractor cannot properly transport or dispose of unidentified material.)

6. Will farm pesticides be accepted?

It is the intent that all households may participate, including farms. A farm household, like other households, is limited to bringing 100 pounds of total waste to the collection event. This total may include pesticides used on the farm provided that they are not subject to regulation by Tennessee's Hazardous Waste Management Regulations. In Tennessee, household hazardous waste is exempt from regulation, and the collection contractor is not allowed to commingle regulated waste with household hazardous waste. The collection contractor is responsible for determining whether a pesticide is regulated or not, and can advise a farmer on how to properly dispose of a pesticides that are regulated.

7. Will the county be responsible for any remaining household hazardous waste?

The contractor is required by his contract with the State to properly package and dispose of every household hazardous waste item accepted during the collection event. The contractor has the responsibility to reject any waste he is unable to legally dispose of while it is still in the possession of the owner. The contractor will be expected to accept all materials except those household wastes specifically excluded by contract and business generated wastes. The contractor will not be responsible for the removal and disposal of any non-hazardous household waste (ordinary solid waste).

8. What will the contractor do with the collected wastes?

The contractor disposes of the collected household hazardous wastes at privately-owned facilities that have licenses and permits to dispose of hazardous waste. These facilities may include incinerators, chemical waste landfills, or recycling processors. The contractor will be allowed to choose the facilities he uses. The State will only reimburse the hazardous waste contractor for waste disposed of by licensed and permitted disposal facilities.

9. Will the wastes be disposed of in my county?

All wastes are to be disposed of at privately owned facilities licensed and permitted for hazardous waste disposal. The contractor will have to ship the wastes to such facilities, even out of state if necessary, in order to comply with this requirement. There is no obligation on the county's part to provide the collection contractor with a licensed and permitted disposal facility within the county's borders.

10. Will there be records that document where the contractor disposed of the wastes?

The contractor is obligated by the terms of his contract to submit to the State certificates of disposal from licensed and permitted disposal facilities in order to receive payment for the services rendered. These certificates are required 30 days from the date of the collection event. The State will compare the quantities of wastes disposed with the quantities of wastes manifested for shipment during the collection event.

11. Will the contractor provide insurance for the collection event?

The contractor is required by his contract with the State to accept all legal responsibility for the safety and well-being of all persons and property on site during the collection event. The contractor is required to carry certain types and amounts of insurance necessary to cover this liability, and has the right to restrict any of the work areas from the general public.

12. How is this collection program funded?

The household hazardous waste mobile collection unit program is funded from the Solid Waste Management Fund. This fund was established by the Solid Waste Management Act of 1991. The fund is financed by the \$1.00 predisposal fee collected on the retail sale of new automotive tires in Tennessee, and an \$0.85 surcharge per ton on waste being dumped in Tennessee landfills. In addition to the household hazardous waste collection program, the monies from the Solid Waste Management Fund are used to fund all other programs established by the Solid Waste Management Act of 1991. These include a grant program for county recycling equipment, grants for landfill scales and tire storage sites, and for the waste tire shredding program.

13. How was the contractor selected?

The contractor was selected through a proposal evaluation process. Each contractor was required to submit a proposal on a specified time and date for evaluation purposes. A Request for Proposal (RFP) was mailed to 64 companies in the hazardous waste industry 42 days prior to the required proposal submission date. The RFP defined the requirements of the program and specified the information required in the proposal. The potential household hazardous waste contractors were required to discuss their experience in household hazardous waste collection, their company organization, the technical aspects of their proposed service to Tennessee, and the cost to the State for the service. Each of these sections were evaluated by a separate group of Department employees and the results of these sections were summed to a total. A contract was awarded to the contractor receiving the most points from the evaluation.

ATTACHMENT # I

LIST OF ACCEPTABLE MATERIALS

HOUSEHOLD HAZARDOUS WASTE MOBILE COLLECTION AND DISPOSAL PROGRAM

I. Household Cleaners

- a. Drain Openers
- b. Oven Cleaners
- c. Wood and Metal Cleaners and Polishes
- d. Toilet Bowl Cleaners
- e. Disinfectants

II. Automotive Products

- a. Oil and Fuel Additives
- b. Grease and Rust Solvents
- c. Carburetor and Fuel Injector Cleaners
- d. Air Conditioning Refrigerants
- e. Starter Fluids
- f. Body Putty
- g. Anti-Freeze/Coolant
- h. Waste Oil

III. Home Maintenance and Improvement Products

- a. Paint Thinners
- b. Paint Strippers and Removers
- c. Adhesives
- d. Paint

IV. Lawn and Garden Products

- a. Herbicides
- b. Pesticides/Rodenticides
- c. Fungicides/Wood Preservatives

V. Miscellaneous

- a. Batteries
- b. Fingernail Polish Remover
- c. Pool Chemicals
- d. Photo Processing Chemicals
- e. Medicines/Drugs
- f. Reactives (aerosols/compressed gas)

ATTACHMENT #II

LIST OF MATERIALS SPECIFICALLY EXCLUDED

FROM THE HOUSEHOLD HAZARDOUS WASTE MOBILE COLLECTION AND DISPOSAL PROGRAM

- I. Medical Waste (as defined by Tennessee Rule 1200-1-7-.01(2))
- II. Explosives or Ordnance (e.g., ammunition, DOT Class A, B, or C explosives)
- III. Highly Radioactive Compounds (e.g., plutonium, uranium)
- IV. Dioxin Precursors (e.g., 2,4,5-TP)

Attachment # III

HOUSEHOLD HAZARDOUS WASTE  
COLLECTION EVENT

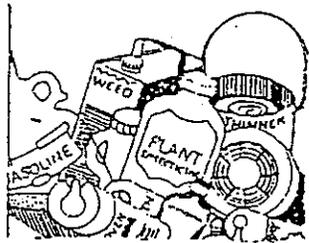
Tennessee Department of  
Environment and Conservation and  
\_\_\_\_\_ County will conduct a  
Household Hazardous Waste Collection  
Event at the following time and  
place:

\_\_\_\_\_  
(day and date)

\_\_\_\_\_  
(location)

\_\_\_\_\_  
(time)

\_\_\_\_\_  
(map to site)



Hazardous waste may be found in every household in our county. This is your opportunity to properly and safely dispose of items such as solvents, cleaners, pesticides, automotive fluids, paints, and aerosols. There is a limit of one hundred pounds per household. The collection program is free to all households in \_\_\_\_\_ County.

FOR MORE INFORMATION CALL:

\_\_\_\_\_  
(name)

\_\_\_\_\_  
(telephone number)

NO MEDICAL WASTE, EXPLOSIVES OR  
ORDNANCE, RADIOACTIVE COMPOUNDS,  
OR DIOXINS WILL BE ACCEPTED.

PUBLIC SERVICE ANNOUNCEMENTS

ASK YOURSELF, ARE THERE ANY HAZARDOUS MATERIALS IN YOUR HOME? THE ANSWER IS PROBABLY "YES". EVERY DAY PRODUCTS LIKE USED MOTOR OIL, PAINTS, AND BUG KILLERS ALL MAY POLLUTE OUR DRINKING WATER IF NOT DISPOSED OF PROPERLY. TENNESSEE DEPARTMENT OF ENVIRONMENT AND CONSERVATION AND \_\_\_\_\_ COUNTY'S HOUSEHOLD HAZARDOUS WASTE COLLECTION EVENT TO BE HELD ON \_\_\_\_\_ AT \_\_\_\_\_ WILL PROVIDE YOU WITH AN OPPORTUNITY TO PROPERLY MANAGE AND DISPOSE OF YOUR HOUSEHOLD HAZARDOUS WASTE. FOR MORE INFORMATION ON WHAT WASTE WILL AND WILL NOT BE ACCEPTED, CALL \_\_\_\_\_ AT \_\_\_\_\_

SAMPLE

**Appendix X-B**

**Waste Oil**

# ESTIMATE OF DISPOSITION OF DIY USED OIL IN 1981

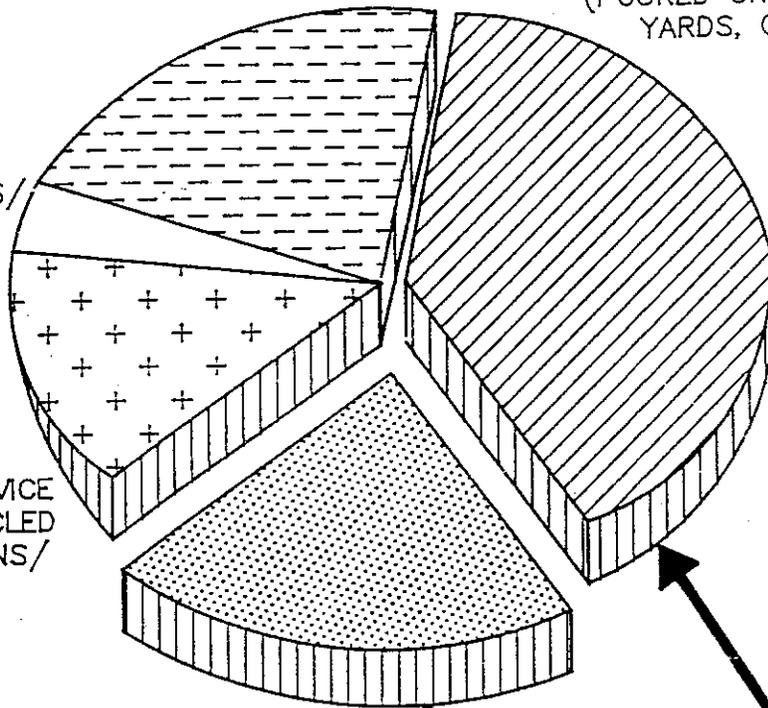
21% MISCELLANEOUS (42 MILLION GALLONS/YEAR)  
(USED ON MACHINERY, STORED, USED AS A  
PESTICIDE, USED TO TREAT WOOD, ETC.)

40% DISPOSAL (80 MILLION GALLONS/YEAR)  
(POURED ON ROADS, DRIVEWAYS,  
YARDS, OR INTO SEWERS)

4% BURNED  
(8 MILLION GALLONS/  
YEAR)

14% TAKEN TO SERVICE  
STATIONS OR RECYCLED  
(28 MILLION GALLONS/  
YEAR)

21%  
PUT IN TRASH OR GARBAGE TO  
BE COLLECTED  
(42 MILLION GALLONS/YEAR)



"DO-IT-YOURSELFERS"  
MISMANAGE AT LEAST 61% OF  
THE OIL THEY HANDLE.  
(NOTE: SOME MISCELLANEOUS  
USES CAN ALSO CONSTITUTE  
MISMANAGEMENT.)



Waste Oil Handlers in Tennessee

A-1 Shipley's Waste Oil  
2843 Harrison Pike  
Chattanooga, TN 37406  
(615) 622-7039

Able Energy Company, Inc.  
1245 Channel Avenue  
Memphis, Tennessee 38113  
(901) 942-1523

CTC Industrial Services  
1827 Latham St.  
Memphis, TN 38106  
(901) 942-1212

Earth Industrial Waste  
Management  
3536 Fite Rd.  
Memphis, TN 38127  
(901) 358-5695

Enterprise Oil  
728 Owl Hollow Rd.  
Knoxville, TN 37923  
(615) 690-9751

Enterprise Waste Oil  
White Wing Rd.  
Lenoir City, TN 37771  
(615) 986-7972

Ferguson Harbor Service  
340 Rockland Rd.  
Hendersonville, TN 37075  
(615) 822-3295

Goins Waste Oil Company  
1606 E. 48th Street  
Chattanooga, TN 37407  
(615) 867-2216

H & H Oil Recovery Company  
Flatwoods Church Rd.  
Camden, TN 38320  
(901) 584-2043

Hurley's LP Gas  
1228 Arden Lane  
Morristown, TN 37813  
(615) 586-2392

ILWD, Inc.  
P. O. Box 983  
Kingsport, TN 37662  
(615) 246-5206

Jack Goins Waste Oil  
801 15th St. NE  
Cleveland, TN 37311  
(615) 476-7492

Necessary Oil Company  
497 Island Rd.  
Bristol, VA 24201  
(703) 669-4831  
(process plant in TN)

North American Environmental  
Corp.  
2100 Board St.  
Chattanooga, TN 37408  
(615) 756-8116

Oil Service Company  
202 Hill st.  
P.O. Box 1203  
Columba, TN 38401  
(615) 481-4999

OSCO, Inc.  
618 Grassmere Park Drive  
Suite 17  
Nashville, TN 37211

Petroleum Recycling Corp.  
2708 Crosslane Rd.  
Knoxville, TN 37919  
(615) 693-7627

Petroleum Refining Company  
119 Morrison St.  
Gallatin, TN 37066  
(615) 451-1806

Petroleum Refining Company  
Crosslane Rd.  
Karns, TN 37921  
(615) 693-7627

Page 2

Waste Oil Handlers in Tennessee

Resource Recycling  
Technologies, Inc.  
1000 Market St.  
Portland, TN 37418  
(615) 325-9818

Robert Sun Company  
240 Great Circle Rd.  
Nashville, TN 37228  
(615) 251-0680

Systech Liquids Treatment, Corp.  
1640 Antioch Pike  
Nashville, TN 37013  
(615) 833-2059

United Oil and Chemical, Inc.  
1015 Southern Rd.  
Memphis, TN  
(901) 521-0810

Volunteer Waste Oil Company  
716 Currey Rd.  
Nashville, TN 37217  
(615) 366-7435

# Used Oil and Filters: The Continuing Saga

According to Tom Tiesler, director of Solid Waste Management for Tennessee's Department of Environment and Conservation, generators have three options in disposing of used oil filters in this state.

## Option 1: Recycle



You can recycle the oil and the metal from the filters. Used oil filters are exempt from hazardous waste regulations if both the metal and the used oil from the filters are recycled. To qualify for a scrap metal recycling exemption, you must remove free flowing oil from the filters by draining and crushing or by filter disassembly prior to shipping to a metal recycler. The actual processing of filters (draining, crushing, and transporting) is not subject to hazardous waste regulations. This means you can process the filters or have someone else handle them off-site.

If you choose to disassemble your oil filters, the individual parts all have statewide special waste approval only if the filter element is mechanically compressed to remove all free-flowing oil and that oil is collected for recycling.

After the filter's drained, you then certify that it's filter element and gaskets are non-hazardous and that you've removed all free-flowing oil. The state will accept this certification without a Toxic Characteristic Leaching Procedure (TCLP) test. The state is waiving TCLP for filters handled as prescribed above because published studies show that this processing method yields material which consistently passes the TCLP.



## Option 2: Recycle... and then some

Since the state is waiving TCLP for drained and crushed filters, you can also recycle the oil but dispose of the filter material in a landfill. TDEC says that after crushing, the filter material retains only about one ounce of oil. That drained filter material can therefore go in the landfill without fear of it oozing out all over the place. Of course you must properly recycle the free-flowing oil that you harvest during crushing. Several vendors exist in Tennessee who will handle your filters and used oil. TDEC doesn't care if processing's done on or off-site.



## Option 3: Dispose of as Hazardous Waste

If you don't want to crush and drain your filters, then you have to handle them as a hazardous waste. Special waste approval will NOT be granted for undrained and uncrushed filters. Nobody wants those yucky, oil-filled things in the landfill. And any oil which you drain from an unrecycled and uncrushed filter must be likewise recycled or disposed of as a hazardous waste if it's not recycled.

If this creates more questions for you than it answers, contact Garey Mabry at the Division of Solid Waste Management—615-741-3424.



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THE UNIVERSITY OF TENNESSEE  
CENTER FOR INDUSTRIAL SERVICES

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Suite 606  
226 Capitol Boulevard Building  
Nashville, Tennessee 37219-1804  
(615) 242-2456  
FAX (615) 741-6644

DRUM RECYCLERS AND DRUM HANDLING EQUIPMENT VENDORS

The following companies may be able to recycle or dispose of used empty drums. This is not meant to be a complete listing, nor is it an endorsement of any of these companies.

Tri-State Steel Drum Company, Inc.  
Graysville Road  
Graysville, GA  
404-891-9726

Nashville Barrel and Drum, Inc.  
1607 Mallory Lane  
Brentwood, TN  
615-377-6801

Cowley Container Corporation  
1715 Pecan  
P. O. Box 5716  
Nashville, TN 37208  
615-242-9127

B J Fox and Son  
62 Hart  
Nashville, TN  
615-256-3512

Allied Drum Service, Inc  
401 Colorado Ave  
Louisville, KY  
502-637-5428

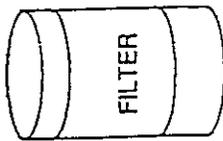
O'Bryan Barrel Company, Inc.  
Evansville, IN  
812-479-6741

Jehl Cooperage Company  
4 Virginia Avenue East  
Memphis, TN  
901-775-3500

Memphis Drum Service  
3299 Tulane Rd  
Memphis, TN  
901-396-6484

W & R Drum Company  
1501 Latham  
Memphis, TN  
901-948-6364

## About Oil Filters:



If you change your oil filter, drain the old one by punching an air hole in the top and drain a minimum of 12 hours.

Dispose of the oil filter only after it is properly drained.

Check to see if there is a filter crushing and recycling program in your community.

*NOTE: Commercial handlers of used oil and oil filters may be subject to more stringent requirements than those specified for do-it-yourselfers.*

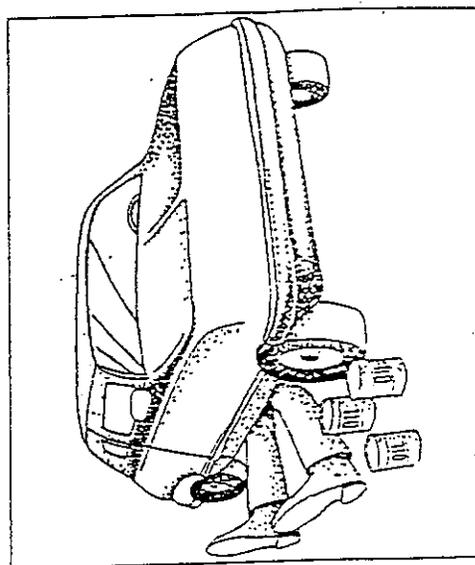
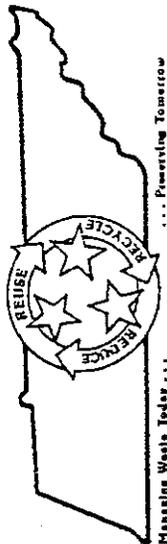
The information contained in this pamphlet is based on current state laws and best management practices. Recommendations may change over time as new laws and information are developed. Contact the Division of Solid Waste Assistance if you have any questions.

Division of Solid Waste Assistance  
Special Wastes Section  
14th Floor, L & C Tower  
401 Church Street  
Nashville, TN 37243-0455  
(615) 532-0091

What Tennessee  
Do-It-Yourselfers  
Should Know  
About  
Disposing of

## USED MOTOR OIL

### TENNESSEE WASTEWISE



Printed on recycled-content paper



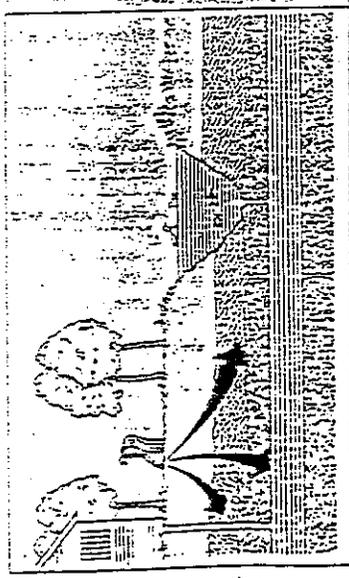
Tennessee Department of Environment and Conservation. Authorization No. 327421, 2,000 copies. This public document was promulgated at a cost of \$.09 per copy. January 1993.

**Get the Facts:**

Tennessee's do-it-yourselfers (DIYers) generate more than 1,000,000 gallons of used motor oil each year.

If it is not disposed of properly, waste motor oil can interfere with the operation of sewer systems and can easily get into our groundwater and streams.

In fact, it is estimated that up to 60 percent of the used motor oil generated by Tennessee's do-it-yourselfers may end up in the our streams and lakes.



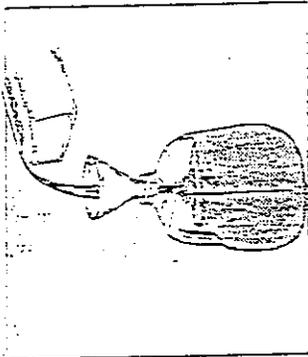
*Used with permission of Project ROSE (Recycled Oil Saves Energy)*

**The Law**

The Tennessee Water Quality Control Act of 1977, enacted to prevent water pollution, makes it unlawful (except under the conditions of a valid permit) for any person to place any waste (including oil) in any location where it is likely to move into any public or private ground or surface water. The maximum penalty is \$10,000 per each day of occurrence [T.C.A. Section 69-3-108 (b)].

**Proper Disposal of Used Oil:**

Put your used oil in a clean plastic container with a tight lid.



*Used with permission from Project ROSE (Recycled Oil Saves Energy)*

Don't mix it with anything else: paint, gasoline, solvents, antifreeze, etc.

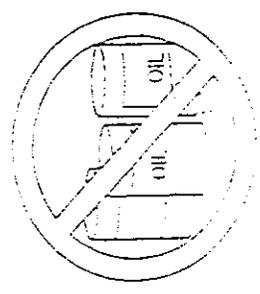


Take your used oil to a service station or other location that collects used oil for recycling.

**Possible Collection Centers:**

- Automotive Service Stations
- Auto Supply Stores
- Convenience Stores
- Car Dealerships
- Instant Oil Changers
- Recycling Drop-Off Centers
- Contact your county or city Public Works or Sanitation Department for other possible collection centers.

**Things NOT To Do With Used Oil:**



- Never pour used oil down a drain.
- Never pour used oil into a storm sewer.
- Never toss used oil on the driveway, street or ground.
- Never dispose of oil in lakes, streams or wetlands.
- Never spread oil to suppress dust or kill weeds.
- Never burn oil outdoors.
- Never mix oil with other substances.

**Remember:**

Oil drained from your automobile is a valuable resource when properly recycled.

- Recycling used oil can conserve our nation's natural resources.
- Used oil can be re-refined and purified into a high-quality motor oil.
- Recycling used oil can save consumers money.
- Improper disposal of used oil can contaminate the soil as well as surface and ground water.

# Appendix B

## Sample Brochure

### WHAT HAPPENS THEN?

- Used oil can be re-refined into a good-quality lubrication oil. Oil never wears out, it just gets dirty. It takes 42 gallons of crude oil to produce 2 1/2 quarts of new lubricating oil. But just one gallon of used oil can be re-refined into the same high quality 2 1/2 quarts of lubricating oil.
- Used oil can be reprocessed into a fuel oil. One gallon of used oil reprocessed for fuel contains about 140,000 BTUs of energy and can be burned very efficiently.
- Recycling used oil could reduce national petroleum imports by 25.5 million barrels of oil per year, and save much of the energy to process it. (University of Alabama/Alabama Energy Division, 1986.)

Washington State law declares that it is the policy of the state to collect and recycle used oil (Chapter 19.114, RCW). Additionally, it is unlawful to spill oil into the ground water or surface waterways of the state (Chapter 90.48, RCW).



Printed on 100% Recycled Paper

### RECYCLE USED OIL

- Prevent Water Pollution
- Protect Public Health
- Reuse Limited Resources

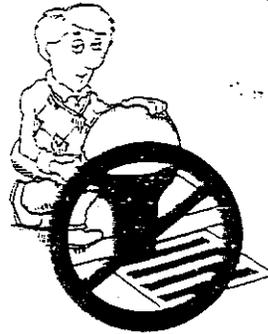


Illustrations by Tim Schlender

For information:  
Call toll-free 1-800-RECYCLE

WASHINGTON STATE DEPARTMENT  
OF ECOLOGY  
Litter Control & Recycling Program  
Olympia, WA 98504

# GO RECYCLE!



**THE USED OIL  
PROBLEM**  
What Can You Do?

Waste oil has the most negative environmental impact of all automotive products because it's insoluble, persistent, and contains toxic chemicals and heavy metals. Oil sticks to everything from beach sand to bird feathers. It floats on and pollutes our waterways. It is slow to degrade and evaporates. A small amount seriously contaminates large quantities of drinking water.

### HOW BIG IS THE USED OIL PROBLEM?

- More than 4.5 million gallons of used oil are discarded every year in Washington State.
  - More than 2 million gallons of used motor oil (enough to fill a medium sized tanker) ends up in Puget Sound. Much of it is dumped into storm drains that empty into streams and lakes that lead the Sound.
  - Used oil is the largest single source of oil pollution (over 40 percent) in our nation's waterways. Most is dumped by do-it-yourselfers.
- In 1960, service stations performed 90 percent of the automotive oil changes. Today do-it-yourselfers change about 60 percent of the automotive oil. Most used oil changed by do-it-yourselfers is dumped down a storm drain, poured on the ground, or sent off to a landfill in the garbage.



### WHAT ARE THE EFFECTS?

Dumping of used oil in storm drains and on the ground pollutes waterways, Puget Sound, and underground water supplies.

- Used oil contains toxic chemicals, carcinogenic hydrocarbons and heavy metals (lead, zinc, arsenic, chromium, cadmium) which are harmful to the environment and public health.
- One pint of oil can produce a slick of approximately one acre on surface water. Fish, waterfowl, insects and aquatic life are threatened by used oil in waterways. Floating plankton and algae is basic food sources are killed on contact with oil. Very small amounts of oil raised over shellfish beds can contaminate the flavor of clams and oysters. Less than 300 parts per million can ruin the taste of fish.
- Used oil placed in the garbage seeps through the landfill to contribute to leachate and contamination of groundwater supplies. One quart of oil will foul the taste of 250,000 gallons of water.
- Used oil should not be applied to roads for a dust suppressant, as new oil sometimes is. Over 90 percent leaves the road surface as dust particles or is rained into the state's waterways with rain runoff, according to an EPA study. Used oil carries a load of heavy metals and toxics.
- Burning unprocessed used oil can pollute the air we breathe with elements potentially harmful to human health.



### WHAT CAN YOU DO? RECYCLE!

RECYCLE used oil from cars, boats, motorcycles, and lawnmowers.

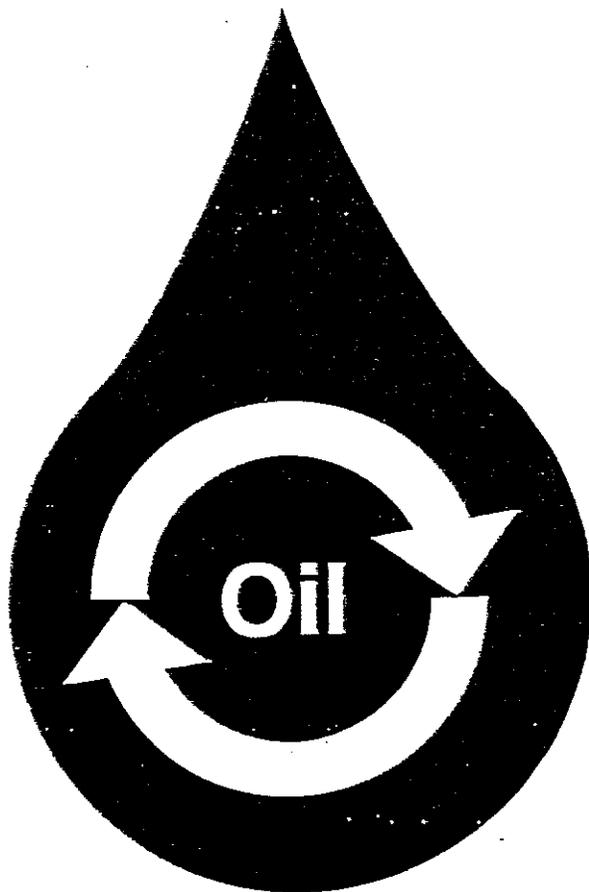
#### HOW?

- Take it in a clean, sealed container (i.e. milk jug) to the nearest participating recycling center or service station accepting uncontaminated used oil. For locations, call the Department of Ecology toll-free recycling hotline, 1-800-RECYCLE.

Current market fluctuations have eliminated many of the financial incentives of the used oil recycling program, and the service station owners may have to pay to have oil removed from their tanks. However, most participating stations have chosen to remain in the program. Used oil should never be mixed with antifreeze, engine degreasers, gasoline, paint thinner, solvents, cooking oil, etc., since these contaminants interfere with the reprocessing or re-refining process and are very expensive to remove.



**RECYCLE  
USED OIL  
HERE**



## Sample Letter to Encourage Participation

(Date)

(Name)  
(Address)

Dear \_\_\_\_\_:

Can we count on you to help our program to recover a potential source of energy, while at the same time eliminating an environmental hazard?

We are in the process of establishing a public service used oil recycling program that we feel would benefit our community and the nation. We would appreciate your advice and assistance in its development.

Used oil is a neglected but valuable energy resource. It can be recycled and put back to work as a lubricant or fuel. If used oil is not recycled and is discarded improperly, it can present a serious hazard to our environment. Throughout our community and nation, used oil is being wasted in surprisingly large amounts. (The Environmental Protection Agency and the Department of Energy estimate that the amount of oil mishandled annually in the U.S. by do-it-yourselfers exceeds 180 million gallons.)

Part of the reason for this waste is that automobile owners who change their own oil do not have proper disposal facilities for their drainings. As a result, used oil ends up in garbage or trash cans, storm sewers, or vacant lots. Eventually, it reaches and pollutes our streams and rivers. A combined effort to end this pollution by saving and re-using oil, thus conserving energy, will benefit all.

Our theme: PROTECT OUR ENVIRONMENT—CONSERVE ENERGY RESOURCES

Our slogan: RECYCLE USED OIL

A key feature of our program will be the establishment of a network of convenient used oil collection centers in our community. We hope to enlist the voluntary participation of civic-minded service station managers and business persons who are equipped and would be willing to handle used oil. Collection facilities might also be set up on public properties such as municipal garages, fire stations, or the area landfill or transfer station. Each collection point can be identified by a sign or poster. The discarded oil can then be sold to a recycler, who will ultimately reprocess it and prepare it for future marketing.

We will publicize the program and the collection centers through literature (brochures, etc.) and the media.

Your interest in, and active support of, our endeavor can help to make this much-needed public service a success. We would welcome your endorsement of our effort. Would you, or someone you designate, meet with us to share additional ideas and discuss approaches aimed at creating an effective program?

We welcome a response at your earliest convenience. You may call us at (phone) or write us at the following address: (list). Thank you for giving the program your consideration.

Sincerely,

(Name)  
(Title)  
(Organization)

Sample Kickoff Press Release

FROM:

DATE:

FOR RELEASE ON: \_\_\_\_\_

USED OIL RECYCLING PROGRAM  
BEGINS IN (COMMUNITY, CITY, STATE)

(Date) marks the kickoff of (community) used oil recycling program.

"We only wish that every community in the nation could be kicking off its own recycling program today also," said (Name, Title) of (Organization).

The program, initiated on (date) by (identify and give desired specifics), will be the first effort of its kind staged in (community). "The objectives are many. Of utmost importance will be our desire to impress upon the do-it-yourself oil changers of (community) the importance of keeping their oil drainings out of storm drains, garbage and trash receptacles, empty lots and the ground water," said (name). (Name) also cited the need to educate new do-it-yourselfers about how to collect and recycle oil in an environmentally sound manner.

(Community's) desire to aid in doing its share to combat the harm done to the environment by improper disposal was yet another reason. Last, but by far not least, (name) said "we want to take a giant step for energy conservation through re-use of this valuable energy resource."

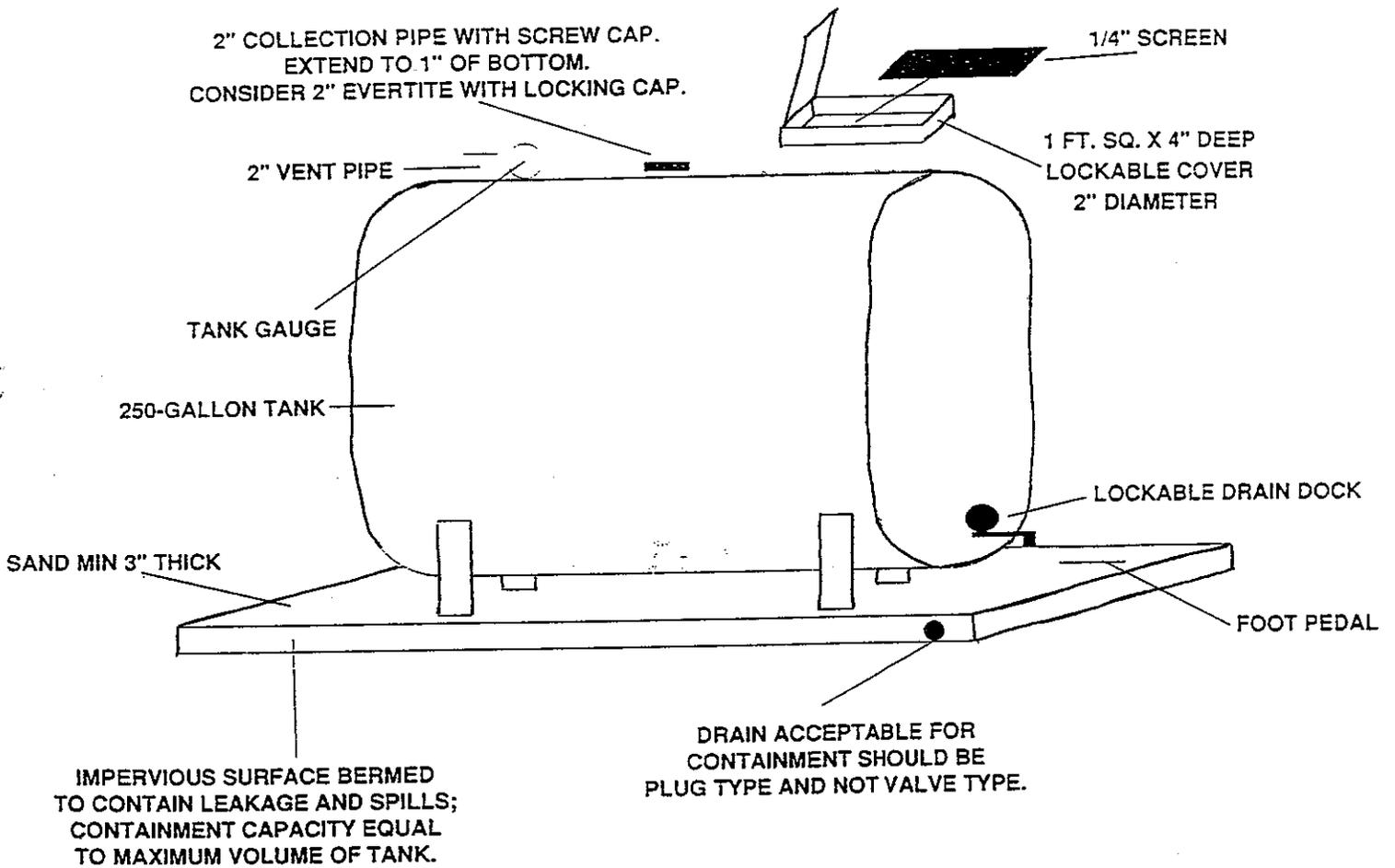
The U.S. Environmental Protection Agency and the Department of Energy estimate that in excess of 180 million gallons of used oil are mishandled annually by do-it-yourselfers.

The (community) program has established a network of collection centers for used oil. Service stations (and any other establishments participating) have agreed to serve as used oil collection centers. One of the incentives is that the collection centers will be able to sell the used oil to recycling conglomerates and use the proceeds as they wish (use statement only if applicable). The collection points will be identified by posters and their locations will be publicized areawide. (Name) said, "For our residents, the rest is easy. All they need is a suitable container and a cooperative frame of mind." (Organization) will have brochures, pamphlets and other informational materials to place in circulation. The (organization) has received endorsements from a number of (civic groups, organizations, etc.) and officials in the area, including: (list)

(Name of person) anticipates excellent cooperation and participation on the part of collectors and community residents. Anyone interested in obtaining more information or helping with this campaign should contact (name) at (address) or call (phone number).

Appendix D

# SAMPLE OIL COLLECTION TANK DESIGN



**Appendix X-C**  
**Lead Acid Batteries**

**REMEMBER:**

— Don't Trash

— Don't Burn

— DO Recycle!

Lead-Acid Batteries.

The information contained in this pamphlet is based on current state laws and best management practices. Recommendations may change over time as new laws and information are developed. Contact the Division of Solid Waste Assistance if you have any questions.

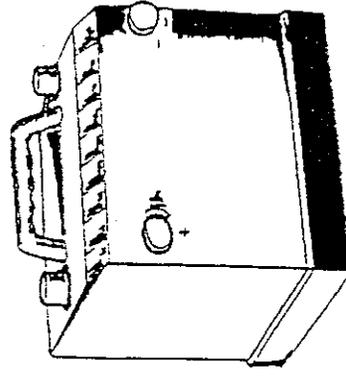
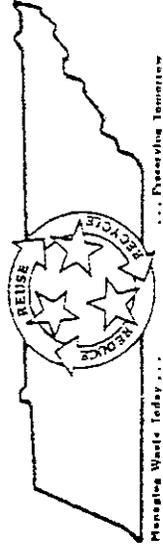
Division of Solid Waste Assistance  
Special Wastes Section  
14th Floor, L & C Tower  
401 Church Street  
Nashville, TN 37243-0455  
(615) 532-0091

**PROPER DISPOSAL**

**OF**

**LEAD-ACID  
BATTERIES**

**TENNESSEE WASTEWISE**



Tennessee Department of Environment and Conservation, Authorization No. 327420, 2,000 copies. This public document was promulgated at a cost of \$.09 per copy, January 1993.

## Appendix C

### Sample Letter to Prospective Collection Center Operators

(Date)

(Name)  
(Address)

Dear \_\_\_\_\_:

We would appreciate your help in a community used oil recycling project designed to conserve energy and protect our environment.

We are planning a broad-scale program aimed at capturing used oil from do-it-yourself oil changers. The residents of our town will be encouraged to participate. They will be informed of the energy potential and the value of recycled oil—that it need not be wasted but can be reprocessed and used again.

As you know, many of our citizens change their own oil and would be willing to cooperate with us in this endeavor, but they need a convenient place at which to deposit their drainings. We are in the process of setting up used oil collection centers at which do-it-yourselfers can deposit their used oil. This oil will then be picked up by reputable used oil collectors to be reprocessed and prepared for use once again.

Would you consider extending your service by establishing a collection center for our project? You would be assisting many people who are now disposing of their drained oil in ways that harm our environment and waste a valuable energy resource. The used oil brought to the collection center would be yours to sell. While rendering a significant service, you would also be playing an important role in a community project that benefits you, the car owner, and the nation.

It is our belief that such a program can and will be successful if we work at it TOGETHER. Sponsors of the program include: (names).

We hope that you will join us and will place a "Recycle Used Oil Here" sign at your station.

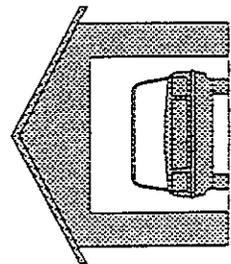
Please let us know at your earliest convenience if we can count on you. Write us at the following address: \_\_\_\_\_ or call \_\_\_\_\_ (phone).

Thank you for giving the program your consideration.

Sincerely,

(Name)  
(Title)  
(Organization)

**Lead-Acid Batteries** provide electricity to the electrical systems of most motorized vehicles. There are millions of these batteries in use today. Lead-acid batteries are used by such things as:



Automobiles,  
Motorcycles,  
Trucks, Tractors,  
Boats, Jet Skis,  
Riding Lawn-  
mowers, Off-Road  
Vehicles

The electricity produced by these batteries is generated by a chemical reaction between sulfuric acid and lead.

***Never throw your battery in the trash.***

While today's landfills are constructed and operated to protect the environment, the best protection is to keep harmful substances out of them.

Because of the toxic properties of lead-acid batteries, it is illegal for Tennessee landfills or incinerators to accept lead-acid batteries for disposal.

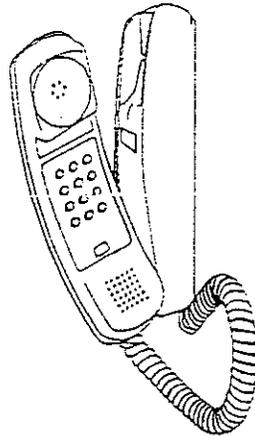
## Always Recycle Your Old Batteries

Lead-acid batteries can be recycled. The components in a battery do not wear out, they just get dirty. Battery recyclers convert spent batteries into useable lead, sulfuric acid and plastic.

### Where Can I Recycle?



Every retail store that sells lead-acid batteries in Tennessee is required by Tennessee law to accept used batteries as "trade-ins." Recyclers then buy used batteries from retail stores.



Call your local auto parts store, service station or discount department store.

Many battery retailers will even accept used lead-acid batteries even when you are not actually purchasing a battery. Just ask!

**Appendix X-D**

**Litter Grant**

1993-1994  
LITTER GRANT ALLOCATIONS

ANDERSON	\$38,290
BEDFORD	\$29,001
BENTON	\$21,435
BLED SOE	\$20,211
BLOUNT	\$49,378
BRADLEY	\$42,971
CAMPBELL	\$28,524
CANNON	\$20,211
CARROLL	\$30,111
CARTER	\$32,387
CHEATHAM	\$23,293
CHESTER	\$20,211
CLAIBORNE	\$26,124
CLAY	\$20,211
COCKE	\$27,357
COFFEE	\$32,332
CROCKETT	\$20,211
CUMBERLAND	\$30,841
DAVIDSON	\$193,053
DECATUR	\$20,211
DEKALB	\$20,211
DICKSON	\$32,590
DYER	\$29,702
FAYETTE	\$27,993
FENTRESS	\$20,211
FRANKLIN	\$29,637
GIBSON	\$39,192
GILES	\$30,724
GRAINGER	\$20,616
GREENE	\$46,049
GRUNDY	\$20,211
HAMBLEN	\$30,007
HAMILTON	\$122,457
HANCOCK	\$20,211
HARDEMAN	\$26,855
HARDIN	\$26,935
HAWKINS	\$25,032
HAYWOOD	\$22,992
HENDERSON	\$27,169
HENRY	\$30,720
HICKMAN	\$26,260
HOUSTON	\$20,211
HUMPHREYS	\$22,991
JACKSON	\$20,211
JEFFERSON	\$29,729
JOHNSON	\$20,211
KNOX	\$144,080
LAKE	\$20,211

LAUDERDALE	\$23,911
LAWRENCE	\$35,127
LEWIS	\$20,211
LINCOLN	\$30,102
LOUDON	\$24,903
MCMINN	\$35,592
MCNAIRY	\$28,007
MACON	\$21,372
MADISON	\$46,087
MARION	\$22,039
MARSHALL	\$23,664
MAURY	\$40,604
MEIGS	\$20,211
MONROE	\$32,297
MONTGOMERY	\$52,500
MOORE	\$20,211
MORGAN	\$20,211
OBION	\$30,943
OVERTON	\$23,092
PERRY	\$20,211
PICKETT	\$20,211
POLK	\$20,871
PUTNAM	\$36,520
RHEA	\$22,167
ROANE	\$33,926
ROBERTSON	\$34,052
RUTHERFORD	\$62,607
SCOTT	\$20,211
SEQUATCHIE	\$20,211
SEVIER	\$39,515
SHELBY	\$295,270
SMITH	\$20,211
STEWART	\$20,211
SULLIVAN	\$71,130
SUMNER	\$57,849
TIPTON	\$29,952
TROUSDALE	\$20,211
UNICOI	\$20,211
UNION	\$20,211
VAN BUREN	\$20,211
WARREN	\$29,448
WASHINGTON	\$50,914
WAYNE	\$24,745
WEAKLEY	\$33,637
WHITE	\$23,362
WILLIAMSON	\$47,513
WILSON	\$44,073
<b>TOTAL</b>	<b>\$3,400,000</b>

## **Chapter XI - Implementation: Schedule, Staffing and Funding**

### **A. System Definition**

In order to meet the requirements of "The Solid Waste Management Act of 1991" White County needs to implement or upgrade the following components to provide an integrated solid waste management system to meet its solid waste demands in the next ten years:

#### **Waste Reduction (Chapter IV)**

White County must reduce or divert 6,496 tons beginning in 1995 being disposed of at the landfill by construction a Class III/IV landfill, expanding the current yard waste composting program in the City of Sparta, implement educational programs at all county schools, providing white goods and scrap metal collection and through recycling.

#### **Collection and Transportation (Chapter V)**

White County is required to provide two convenience centers to meet the minimum level of service. Recommendations are to locate one on State Highway 111N at the County Highway Department Garage and the other a few miles south of Sparta.

#### **Recycling (Chapter VI)**

Recycling programs that need to be implemented to insure the 25 percent reduction is obtained include: provide drop-off containers at the proposed convenience centers for newspaper, aluminum cans, corrugated cardboard and glass; provide recycle bins at county schools for white paper and corrugated cardboard; expand recycling at commercial business and industries as practical; provide curbside collection for newspaper in the City of Sparta.

#### **Disposal (Chapter VIII)**

White County current landfill has approximately 20 years of capacity remaining. White County will continue to dispose of solid waste in its current cell until October 1996. In January 1996 the County will contract for construction of a new cell to conform with Subtitle "D" requirements and continue operating a Class I landfill. The County has evaluated disposal at a private landfill and in January 1996 could decide to contract for private disposal as opposed to continued operations of its own landfill.

## **Education (Chapter IX)**

**Institute education programs for fifth and eleventh grade students as per curriculum provided. Also education programs will be established for area industries, civic groups, offices and ministerial alliances.**

## **Problem Waste (Chapter X)**

**Provide once a year collection through 1995 using the state collection program for household hazardous waste (HHW) and provide a permanent drop of site in the county in 1996.**

**B.****Implementation Schedule**

<u>Activity</u>	<u>Date</u>
Solid Waste Plan Submitted	June 1994
Begin Operation of Class III/IV Landfill	Summer 1994
Begin White Good/Scrap Metal Collection	Summer 1994
Apply for Convenience Center Grant	Fall 1994
Solid Waste Plan Approved	October 1994
Hire Diversion Manager	October 1994
Begin Phase One Drop-off Recycling Program	January 1995
Funding in Place for Two Convenience Centers	Summer 1995
Begin Phase Two Drop-off Recycling Program	June 1995
Begin School Recycling and Education Program	August 1995
Begin Sparta Curbside (if needed)	November 1995
Construction of Two Convenience Centers	Fall 1995
All Planned Programs Associated With Diversion Operating at 100%	December 1995
25% Diversion Goal Met	January 1, 1996

**C. Staffing and Training Requirements**

White County's current solid waste staff includes the following positions:

<u>Position</u>	<u>Number</u>	<u>Certification Req'd</u>
Solid Waste Manager	1	X
Equipment Operator @ Landfill	2	
Truck Driver for Collection	2	
Attendant @ Landfill	1	
Maintenance @ Landfill	2	
Attendant for Collection	2	X

**Additional Staff Required**

<u>Position</u>	<u>Number</u>	<u>Date Filled</u>
Diversion Manager <sup>1</sup>	1	Filled
Convenience Center Attendants	2	Fall 1994

<sup>1</sup> The Diversion Manager position will be handled by the current Solid Waste Manager.

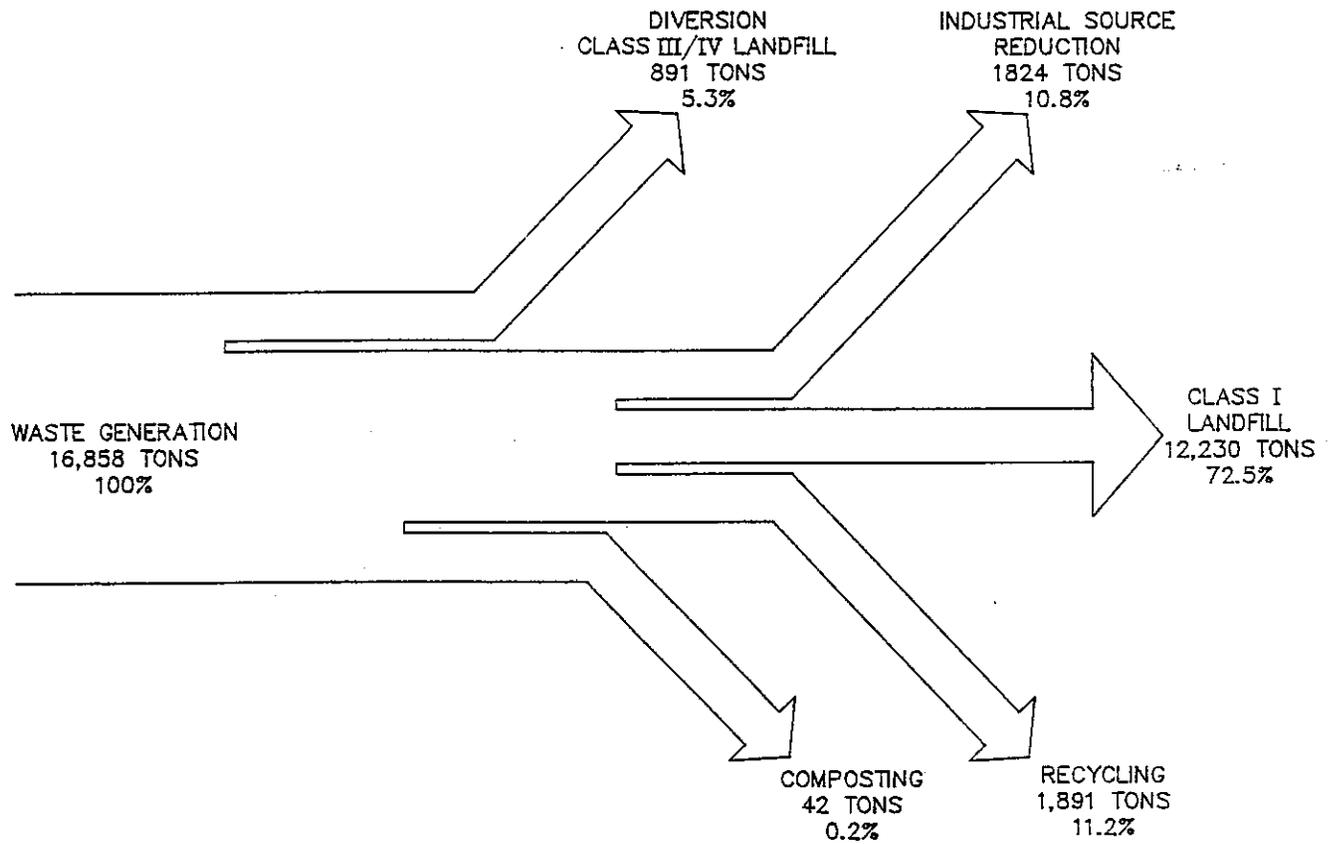
D. Budget

WHITE COUNTY

COST ESTIMATE FOR INTEGRATED SOLID WASTE MANAGEMENT SYSTEM

	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Waste Reduction	4,019	54,214	56,925	59,771	62,760	65,898	69,193	72,653	76,286	80,100
Collection & Transportation	165,178	169,800	184,410	193,009	202,037	219,139	229,475	240,326	251,720	251,244
Recycling	5,000	5,250	5,513	5,789	6,078	6,382	6,701	7,036	7,388	7,757
Disposal	248,122	260,528	494,031	529,027	544,455	570,423	588,291	606,291	631,790	651,480
Education	1,700	1,700	1,700	1,700	1,700	1,700	1,700	1,700	1,700	1,700
Problem Waste	2,000	2,000	2,500	15,000	15,000	20,000	20,000	25,000	25,000	30,000
Total	426,019	493,492	745,079	804,296	832,030	883,542	915,360	953,006	993,884	1,022,281

THE FOLLOWING FLOW DIAGRAM INDICATES  
DIVERSION IN 1995 FOR WHITE COUNTY:



FLOW DIAGRAM FOR WHITE COUNTY





## **Chapter XII - Allocation of Implementation Responsibilities: Plan Adoption and Submission**

The White County Solid Waste Planning Board has developed this regional plan and formally adopted as indicated in the minutes. The Board presented the plan to the White County Commission and was adopted by resolution. Although implementation will be by the planning board, the county commission is responsible for funding. This plan was also submitted to the White County and the City of Sparta Planning Commission for review and comment. The resolution and minutes of the commission meeting review of this plan are included at the end of this chapter.



## **Chapter XIII - Flow Control and Permit Application Review**

### **A. Flow Control**

Since White County is planning as a single county region and proposes to collect, transport and dispose of solid waste within the county, flow control is not recommended. If, in the future, White County joined with another region or decided to dispose of waste at a privately owned or out-of-county facility, flow control would need to be considered to be able to meet the 25 percent diversion requirement of the "Solid Waste Management Act of 1991."

A report on flow control prepared by Mr. John Williams, an environmental attorney in private practice, located in Nashville, is located in the appendix. This report defines flow control and gives opinions on whether flow control can be enforced.

### **B. Permit Application Review**

The following is the proposed permit review process with estimated time periods:

#### **1. Basis for Review**

The review of any application for landfill approval with the White County Solid Waste Planning Region will be based upon compliance with the intent of the plan as written, approved, and adopted. The primary questions which must be answered will be as follows:

- a. Will the additional landfill volume be needed for the Region to maintain environmentally acceptable and cost-effective Class I disposal volume for the waste generated within the region?
- b. Will the location of the new landfill or extension within the region provide for more cost-effective disposal of Class I waste without sacrificing environmental acceptability?
- c. Is the location of the facility suitable for a landfill to serve the White County Region? In other words, landfills which are located at the outer edges of the region (away from major White County Region population centers) and designed to serve out-of-region waste will be considered to be not suitably located to serve the region.

- d. Will the cost impacts for providing infrastructure (roads, water, etc.) for bringing out-of-region waste into the county exceed the cost savings provided by the additional landfill facility?

## 2. Application and Review Procedure

- a. A copy of the Part I Solid Waste Disposal Facility Permit Application shall be submitted to the Chairman of the White County Solid Waste Planning Board prior to submittal of said document to the Division of Solid Waste Management. In addition to the DSWM Part I Application, this submittal shall include the following information:
  - i. Estimated Total Volume of the Facility in Tons of Waste
  - ii. Estimated Daily Tonnage of the Facility
  - iii. Proposed Service Area of the Facility
  - iv. Map showing the location of the site suitable for advertisement.
  - v. Map showing current zoning of the site with a description of any special permits or re-zonings required and the status of same.
- b. The Chairman of the Planning Board will then place an advertisement in the local newspapers of the county in which the disposal facility is proposed as well as in the newspapers of any counties which have a portion of their land mass within 5 miles of the proposed facility. This advertisement will include the following information:
  - i. Date, time, and location of public hearing (must be at least 28 days after advertisement runs).
  - ii. Road address and location relative to incorporated or unincorporated municipalities.
  - iii. Map showing the location of the site.
  - iv. Dates of public comment period.
  - v. Address for mailing of public comments.
- c. The Chairman of the Planning Board will send copies of the application to each member of the Planning Board as well as to the design consultant for the board.
- d. The Chairman of the Planning Board will call a special meeting of the board which will act as the public hearing.

- e. The public hearing will be in presentation format. The applicant will present a 15 minute discussion of the proposed project. This will be followed by a fifteen minute report from the design consultant for the solid waste planning board, this will be followed by the public comment period. Comments will be limited to 5 minutes in duration.
- f. At the end of the public hearing, the Planning Board will schedule another special meeting to be a minimum of two weeks and a maximum of four weeks after the public hearing.
- g. At the second special meeting the Planning Board will discuss the issue and then will vote and render a decision to the owner. The vote will be decided by simple majority. In the event of a tie vote, any abstentions will be re-polled for a vote. In the event that the vote remains tied, the option with the fewest votes will be dropped and the other two options will be re-voted. In the event that the vote remains tied at this point, a new special meeting will be called within two weeks and the application will be voted on again. IN the event that the outcome remains a tie, the application will be automatically tabled until the Part II Permit Application is available. One of three votes will be possible:
  - i. Reject the application;
  - ii. Do not reject the application;
  - iii. Table the application until a Part II Permit Application is available.
- h. In the event that the Planning Board votes to table the application until the Part II Permit Application is available, the Board will have the option of foregoing the public hearing at that point.
- i. Also in the event that the Planning Board votes to table the application until the Part II Permit Application is available, the Board will be required to render an opinion within eight weeks after the Part II Permit Application is submitted. In the event of a tie, the abstentions will be re-polled. In the event there remains a tie vote, a second special meeting will be called within two weeks for a re-vote. In the event of a tie at that point, the vote will automatically be considered to be "Do not reject the application". The two options for a vote at this point will be:
  - i. Reject the application;
  - ii. Do not reject the application.

## FLOW CONTROL

The term "flow control" refers to the power of a state or local government to direct the flow of municipal solid waste to a particular processing or disposal facility or facilities. Flow control is not a new concept. Several states have enacted statutes (or have allowed local governments to enact ordinances) requiring that the solid waste collected in a particular jurisdiction be taken to a particular landfill, incinerator, processing facility, or transfer station.

If the solid waste facility is publicly owned and financed through bonds, the revenue received from tipping fees is generally used to pay the principal and interest on the bonds. Therefore, the facility must receive sufficient waste to generate revenue adequate for that purpose. The tipping fee revenue may also be used to pay for recycling and composting programs and other components of an integrated solid waste management program.

Many states (including Tennessee) have enacted solid waste management acts which set waste reduction goals. Flow control is considered an essential tool to enable a local government to meet the waste reduction goal because it allows the local government to direct waste to recycling and composting facilities.

Opponents of flow control contend that it undermines competition and may result in inefficiencies in the solid waste management system.

This memorandum discusses the legal authority by which a municipal solid waste region in Tennessee may exercise flow control power and the legal issues related to that exercise of flow control power.

## I. Solid Waste Management Act of 1991

For most municipal solid waste regions in Tennessee, the Solid Waste Management Act of 1991 will be the legal basis for enacting flow control. The only exception is counties with municipal solid waste incinerators (Davidson and Sumner), which may also utilize the Energy Production Facilities law (T.C.A. §7-54-103(d)) as a legal basis for imposing flow control.

The Solid Waste Management Act is Public Chapter 451 of the Public Acts of 1991. Most of the act is codified at T.C.A. §§68-211-801 et seq.

Pursuant to T.C.A. §68-211-814(b)(1)(A), a municipal solid waste region may "regulate the flow of collected municipal solid waste generated within the region." Such regulation may occur only after the region's 10-year plan has been approved by the State Planning Office.

If a region decides to implement flow control, the mechanics for doing so are set forth in T.C.A. §68-211-814(b)(1)(A). First, the region's board must conduct a public hearing. Then the board must adopt a resolution stating that it is implementing flow control. Then each county and municipality in the region must adopt an ordinance implementing flow control. The resolution and ordinances should specify the facility or facilities to which the flow of municipal solid waste is being directed.

Before a region's board may adopt a flow control resolution, the region must demonstrate to the State Planning Office that the region has considered the utilization of any municipal solid waste management facility in existence within the region on July 1, 1991, which meets Subtitle D regulations. If the region decides not to use an existing facility, the region must show that its decision not to use the facility is based upon three findings:

- 1) the facility is environmentally unsound or inadequate to meet the region's 10-year capacity assurance plan;
- 2) the costs for using the facility are inconsistent with (i.e., higher than) comparable facilities in Tennessee, or the facility is operating in a manner which is inconsistent with the plan; and
- 3) the waste subject to flow control will be sent to a facility or facilities which meet all state and federal regulations.

T.C.A. §68-211-814(b)(1)(C) allows an "aggrieved person" to appeal the region's decision to implement flow control to any chancery court within the region.

A region's flow control power extends only to solid waste. A region may not restrict the flow of "recovered materials" (i.e., those materials which have been removed from the solid waste stream for sale, use, reuse, or recycling). T.C.A. §68-211-814(b)(5).

Another part of Public Chapter 451 of the Public Acts of 1991 was the Solid Waste Authority Act of 1991, which contains flow control provisions applicable to a solid waste authority. If any local government(s) within a municipal solid waste region choose(s) to establish a solid waste authority, T.C.A. §68-211-906(b) gives that Authority the power "to exercise exclusive jurisdiction and exclusive right to control the collection of solid waste within its boundaries, and to control the disposition of solid waste collected within its boundaries." The governing body of each county and municipality which formed the Authority must concur in the exercise of flow control power by the Authority.

Under §68-211-906(b), then, a Solid Waste Authority is given the power to control the collection and disposal of municipal solid waste within its boundaries. By contrast, a region may regulate only the flow of collected municipal solid waste generated within the region. This means that a

region may regulate the place of disposal of the waste, but not the collection itself.

T.C.A. §68-211-907 contains additional flow control language for solid waste authorities, supplemental to that of §68-211-906(b). §68-211-907 provides that a Solid Waste Authority may "regulate the flow of all municipal solid waste within the county or counties constituting the authority" and may "require the disposal of any transported waste at a specific solid waste disposal facility."

Violation of any ordinance or resolution enacted by any local government which has formed an Authority is a Class A misdemeanor, and each day of continued violation is a separate offense. Any court of competent jurisdiction is empowered to enjoin violations of an ordinance enacted by a local government which has formed an Authority. T.C.A. §68-211-918.

An Authority's decision to exercise flow control power is appealable to any chancery court in the county or counties which have formed the Authority. T.C.A. §68-211-814(b)(1)(C).

No Solid Waste Authority may be formed unless each county governing body in the municipal solid waste region has approved its creation. T.C.A. §68-211-903(a). However, an Authority may be formed prior to the State Planning Office's approval of a region's 10-year plan.

Once an Authority has been formed, there is nothing in the Solid Waste Authority Act of 1991 which expressly forbids the Authority from exercising flow control power before the region's plan has been approved by the State Planning Office. The use of the words "region or solid waste authority" in T.C.A. §68-211-814(b)(1)(A) could be interpreted to forbid the Authority from exercising flow control power before the region's plan has been approved. This is an ambiguous point in the statute.

Another ambiguity is whether an Authority must justify its decision not to use an existing municipal solid waste management facility within the region served by the Authority (as a region's board is required to do). The use of the

words "region or authority" in T.C.A. §68-211-814(b)(1)(A) suggests that an Authority must do so. However, no comparable language is found in T.C.A. §68-211-906(b) or §68-211-907, and those sections do not adopt by reference the requirements of §68-211-814(b)(1)(A).

## II. Court Cases Involving Challenges to Flow Control

Just as flow control is not a new concept, neither is the litigation over flow control. In 1896 the Board of Supervisors of the City of San Francisco granted by ordinance to a particular company the exclusive right to collect and incinerate the city's garbage. The ordinance made it unlawful for any person to take the city's garbage anywhere except to the grantee's incinerator. A competitor challenged the constitutionality of the ordinance. In California Reduction Co. v. Sanitary Reduction Works, 199 U.S. 306 (1905), the U.S. Supreme Court upheld the ordinance as a valid exercise of the city's police power. The Court rejected the argument that the ordinance deprived people of their property without due process of law in violation of the Fourteenth Amendment. The Court found that the ordinance was enacted as a means to protect the public health.

In recent years the primary legal challenge to flow control laws has been under the Commerce Clause of the United States Constitution. Article I, Section 8, Clause 3 of the Constitution provides: "The Congress shall have Power ... To regulate Commerce ... among the several States." This Clause gives Congress the power to enact laws regulating interstate commerce. It has also been interpreted to limit the power of states to erect barriers to interstate trade. This latter doctrine is known as the "dormant Commerce Clause" doctrine.

In the last 12 years, several federal courts have evaluated the constitutionality of state and local laws

in light of the dormant Commerce Clause doctrine. The courts are evenly divided between those which have upheld flow control laws and those which have invalidated flow control laws.

These cases have one common element: they all involve the transportation of solid waste from one state to another state. The plaintiff is generally a hauler who collects waste in one state and transports it to a landfill or incinerator in another state. The enactment of a flow control ordinance has the effect of preventing the hauler from taking the waste to the out-of-state disposal facility.

Two federal circuit courts of appeals (the First and the Eighth) have ruled that the flow control ordinance places an unconstitutional burden on interstate commerce. Two other circuit courts of appeals (the Third and the Sixth) have ruled that the flow control ordinance does not discriminate against interstate commerce and is therefore constitutional.

Because of this split of authority in the federal courts, the U.S. Supreme Court has agreed to hear an appeal involving a flow control ordinance enacted by the Town of Clarkston, New York. The Supreme Court's decision will likely be rendered sometime in 1994.

Because Tennessee is located within the jurisdiction of the Sixth Circuit Court of Appeals, the decisions of that court are binding on federal courts in Tennessee. In Hybud Equipment Corp. v. Akron, 654 F.2d 1187 (6th Cir. 1981), remanded on another issue, 455 U.S. 931 (1982), the Sixth Circuit upheld the constitutionality of a flow control ordinance adopted by the city council in Akron, Ohio. That decision is the law in Tennessee until the Supreme Court renders its decision in the Clarkston case.

Appendix A to this memorandum contains a discussion of each reported federal court decision on flow control, as well as a discussion of the case pending before the U.S. Supreme Court.

### III. Likely Effect of the Supreme Court Decision on Tennessee

If the Supreme Court upholds the Town of Clarkston's flow ordinance, the constitutionality of flow control ordinances under Tennessee law will be absolutely clear.

If the Supreme Court invalidates the Town of Clarkston's flow control ordinance, the Court's decision will be a problem only in municipal solid waste regions where waste is being transported to a landfill or incinerator in another state. If such a region adopted a flow control resolution, it might impose an unconstitutional burden on interstate commerce in waste. However, in those regions where no hauler is transporting waste across state lines, the Court's decision will likely have no impact. A flow control ordinance will be held invalid only if it places a significant burden on interstate commerce. The courts are unanimous in holding that a flow control law is a valid exercise of the state's police power and its power to protect the public health and safety, so long as no significant burden is placed on interstate commerce.

### IV. Possible Congressional Action on Flow Control

Flow control is a widely discussed subject throughout the country. The U.S. Environmental Protection Agency recently conducted three public meetings to gather information for a report on flow control which will be submitted to Congress in September 1994.

Under the Commerce Clause, Congress has the power to regulate commerce "among the several States." This means that Congress could pass a federal statute expressly allowing state and local governments to enact flow control laws. The EPA study may include a recommendation as to the need for federal legislation. Two bills have already been

introduced in Congress this year to allow the use of flow control by state and local governments.

Congress will not likely act until the Supreme Court has decided the Town of Clarkston case. If the Town loses that case, there will be strong pressure from state and local governments to enact federal legislation.

Prepared by:

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Nashville, Tn. 37212  
Telephone: 615-385-4389

## APPENDIX A

### I. Cases Upholding Flow Control Laws

Because Tennessee is one of four states within the jurisdiction of the Sixth Circuit Court of Appeals, the decisions of that court are binding on federal district courts in Tennessee. In Hybud Equipment Corp. v. Akron, 654 F.2d 1187 (6th Cir. 1981), remanded on another issue, 455 U.S. 931 (1982), the Sixth Circuit Court of Appeals upheld the constitutionality of an Akron, Ohio flow control ordinance requiring that all solid waste collected in the city be taken to an incinerator owned and financed by the city. The ordinance adversely affected the plaintiffs in three ways:

- 1) the income of landfills which previously received the waste was reduced;
- 2) there was no longer any competition among disposal sites, which meant the tipping fee at the incinerator was artificially high; and
- 3) collectors could no longer recover and sell recyclables from the waste they collected.

The court rejected the plaintiffs' Due Process and Commerce Clause arguments, finding that the ordinance was a valid exercise of the police power and not a protective measure which discriminated against or otherwise burdened interstate commerce.

The most frequently cited decision upholding a flow control ordinance against a Commerce Clause challenge is J. Filiberto Sanitation, Inc. v. New Jersey Department of Environmental Protection, 857 F.2d 913 (3rd Cir. 1988). In that case a New Jersey county adopted a rule requiring that solid waste collected in that county be deposited at a county-owned transfer station which charged tipping fees to the haulers who brought waste there. Plaintiff (a hauler of solid waste) objected to the rule because the tipping fee

at the transfer station was \$100 a ton, whereas the tipping fee at a nearby Pennsylvania landfill was about \$50 a ton. Ironically, the waste taken to the transfer station was eventually taken to that same Pennsylvania landfill. The operation of the transfer station was paid for by the tipping fees charged to the haulers who were required to bring waste there.

The Third Circuit Court of Appeals defined the issue in Filiberto as "whether the challenged regulation confers an advantage upon in-state economic interests -- either directly or through imposition of a burden upon out-of-state interests -- vis-a-vis out-of-state competitors." 857 F.2d at 919. The court concluded that the plaintiff failed to establish that the ordinance was "protectionist in purpose."

The court found in Filiberto that the flow control rule serves several purposes:

- 1) to assure that all trash produced in the county is properly disposed of;
- 2) to reduce truck traffic on county roads;
- 3) to give the county an accurate gauge for planning purposes of the amount of waste generated;
- 4) to allow the county to enter long-term and short-term contracts for final disposal of waste generated in the county;
- 5) to assure that all haulers have a practical outlet for trash as the distance to landfills grows longer; and
- 6) to allow trash to be compacted for long-distance transport.

The court also found that the burden of the rule fell equally on in-state as well as out-of-state haulers operating in this county, and that the transfer station was not in competition with out-of-state landfills because the transfer station was a customer of the out-of-state landfills. The court held that "the Rule was, both in purpose and in effect, a proper exercise of the state's authority to protect the welfare of its citizenry which

placed no cognizable burden on interstate commerce." 857 F.2d at 923.

Another decision upholding a flow control statute is Harvey & Harvey v. Delaware Solid Waste Authority, 600 F. Supp. 1369 (D. Del. 1985), in which a federal district court upheld a statute requiring all waste originating in Delaware to be disposed of at public facilities in Delaware. The statute stopped the interstate transportation of waste from Delaware to out-of-state landfills and placed an economic burden on transporters who had to pay more to dispose of the waste at Delaware disposal facilities, but the court nevertheless concluded that the statute did not violate the Commerce Clause because it did not "impose a significant economic burden on out-of-state economic interests." 600 F. Supp. at 1380.

## II. Cases Invalidating Flow Control Laws

Two recent federal appellate court decisions reveal a different approach to Commerce Clause analysis of flow control regulations. In Stephen D. DeVito, Jr. Trucking, Inc. v. Rhode Island Solid Waste Management Corp., 770 F. Supp. 775 (D. R.I.), aff'd, 947 F.2d 1004 (1st Cir. 1991), the court preliminarily enjoined enforcement of a resolution adopted by the Rhode Island Solid Waste Management Corporation (RISWMC) (a public corporation created by state statute) requiring that all waste collected in Rhode Island be disposed of at the state's publicly owned Central Landfill (CLF). Because the tipping fee at the CLF was so high, the plaintiff trucking company preferred to haul waste collected in Rhode Island to waste-to-energy facilities in Massachusetts and Maine, where the tipping fees were considerably lower. The court found that this flow control rule would put the plaintiff out of business. The court concluded that "the proscriptions of the Commerce Clause apply to restrictions on transporting items out of a state as well as into a state."

770 F. Supp. at 780. The court said this rule is "an essentially protectionist measure" and its "immediate purpose and effect are to increase RISWMC's revenues by preventing commercially generated waste from being transported out of Rhode Island for disposal and requiring instead that it be deposited at the CLF." 770 F. Supp. at 781. RISWMC would gain a direct benefit from this rule at the expense of out-of-state facilities and interstate commerce in waste, which is totally eliminated. After analyzing the purposes of the rule, the court held that "RISWMC has failed to establish that a total ban on interstate commerce is necessary to achieve this long term goal and that it cannot be accomplished by some less intrusive alternative." 770 F. Supp. at 785.

A similar result was reached in Waste Systems Corp. v. County of Martin, 985 F.2d 1381 (8th Cir. 1993). In that case, two Minnesota counties built an \$8 million composting facility and then enacted flow control ordinances requiring that all the compostable waste collected in those counties (about 40% of the total waste stream) be taken to the composting facility. Prior to the enactment of the flow control ordinances, about 2/3 of this waste had been going to an Iowa landfill. The county-guaranteed bonds issued to finance the composting facility were to be paid primarily from the tipping fees collected at the facility.

The Eighth Circuit Court of Appeals found that the ordinances discriminate against interstate commerce and that the burden they place on interstate commerce is "not incidental." 985 F.2d at 1387. The tipping fee at the Iowa landfill was \$30 a ton, whereas the tipping fee at the composting facility was \$72 a ton. The court found that the ordinances are "economic protectionist measures" because they "insulate the [composting facility] from competition with cheaper out-of-state alternatives." 985 F.2d at 1387-1388. The court recognized that the purpose behind the composting facility included legitimate environmental concerns, but found that "the purpose behind the Ordinances is solely economic." 985 F.2d at 1389.

In Waste Recycling, Inc. v. Southeast Alabama Solid Waste Disposal Authority, 814 F. Supp. 1566 (M.D. Ala. 1993), the plaintiff companies collect solid waste in southeastern Alabama and transport it for disposal at a landfill in northern Florida. The defendant is a public nonprofit Alabama corporation which plans to build a regional solid waste disposal facility and three transfer stations to serve a four-county area in Alabama. Three Alabama cities have signed "user contracts" with the defendant, requiring each city to adopt a flow control ordinance directing that all waste collected in each city be delivered only to the Authority's facilities. The cities adopted these ordinances.

The court held that these ordinances "impermissibly interfere with and discriminate against interstate trade" and that "the intended effect of the ordinances is pure economic protectionism." 814 F. Supp. at 1577. "By expressly limiting the disposal of waste to the Authority's facility, the ordinances have at the same time prohibited disposal outside the state of Alabama." 814 F. Supp. at 1578. One of the three ordinances allowed waste to be taken out-of-state, but imposed additional recordkeeping requirements on such waste shipments. The court found this to be impermissible discrimination against interstate commerce because the same recordkeeping requirements were not imposed on waste disposed of at the Authority's facilities.

The court rejected the defendant's argument that the ordinances "support the legitimate public purpose of ensuring a steady waste stream by creating an infrastructure of public facilities for the transportation and disposal of waste." 814 F. Supp. at 1581. The court suggested that the Authority finance its facilities through any one of several alternative means (other than tipping fees): direct bank loans, county financing, charging competitive rates, private investors, property taxes, or utility bill assessments.

The court invalidated all three flow control ordinances because they violate the Commerce Clause by "insulating [the] four-county region from the rough and tumble of interstate commerce and the economic competition that comes with it." 814 F. Supp. at 1583.

### III. Case Pending Before the Supreme Court

C & A Carbone, Inc. v. Town of Clarkston, 182 A.D.2d 213, 587 N.Y.S.2d 681 (1992), cert. granted, 61 U.S.L.W. 3783 (U.S. May 25, 1993) (No. 92-1402)

C & A Carbone, Inc. and Recycling Products of Rockland, Inc. are interrelated corporations which receive and process solid waste at a facility located within the Town of Clarkston, New York. At that facility, the waste is sorted into two portions: waste which is recyclable and waste which is not recyclable. The waste which is not recyclable is shipped to disposal facilities outside the state of New York.

This privately owned facility received a permit from the New York Department of Environmental Conservation in 1987, authorizing it to operate as a transfer station. C & A charges a tipping fee of \$70 per ton to process waste at its facility. Its permit was valid for five years.

The Town of Clarkston closed its municipal landfill in 1989, but decided to open a transfer station on the closed landfill site and contracted with Clarkston Recycling Center, Inc. to build and operate the transfer station. Under its contract with Clarkston Recycling, the Town must deliver to the transfer station a specified tonnage of waste annually or pay a penalty to Clarkston Recycling. Under an ordinance adopted by the Town, Clarkston Recycling is allowed to charge haulers a tipping fee of \$81 per ton for processing the waste. The New York Department of Environmental Conservation issued a permit for this transfer station, valid for five years.

The Town amended its zoning code to provide that the Town shall have only one designated transfer station. The Town also enacted Local Laws 1990, No. 9, which provides that all solid waste generated within the Town must be delivered to the Town's transfer station. This ordinance also makes it unlawful to import waste from outside the Town and dump it on any property within the Town other than the Town's transfer station. In effect, then, Local Law No. 9 mandates that all solid waste

processed or otherwise handled within the Town of Clarkston (regardless of the point of origin of the waste) be processed or handled at the Town's transfer station.

Despite the passage of Local Law No. 9, C & A continued to receive and process solid waste at its transfer station. The waste processed at C & A's transfer station had been generated both within and outside the Town, including some waste from New Jersey. Vehicles leaving the C & A transfer station were headed to locations in Illinois, Indiana, West Virginia, and Florida.

The Town sought injunctive relief against C & A in the Supreme Court for Rockland County. (In New York, the trial court for a county is called the Supreme Court.) The Town alleged that C & A's actions were depriving the Town of thousands of dollars daily in uncollected revenues. The Supreme Court for Rockland County granted the Town's motion for summary judgment and enjoined C & A from operating its business in violation of the Town's ordinances.

On appeal, the Appellate Division of the New York Supreme Court held that the regulation of solid waste collection and disposal is "a function traditionally entrusted to State and local governments," is "fundamentally related to the public health and welfare," and is within the scope of the Town's police power. 587 N.Y.S.2d at 685. The Appellate Division also rejected C & A's Commerce Clause challenge to Local Law No. 9 (the "flow control" ordinance).

While recognizing that garbage is an article of commerce and that neither states nor municipalities may erect barriers to the free flow of commerce, the court stated that "the Commerce Clause protects the interstate market, not particular interstate firms." 587 N.Y.S.2d at 686. The court said the Town's ordinance "imposes no special fees, taxes, prohibitions, or duties on those transporting out-of-state articles of commerce. Rather, the local law applies evenhandedly to all solid waste processed within the Town, regardless of point of origin."

Id.

The court noted the \$11 difference in the tipping

fee charged at the two transfer stations, but found that the higher fee charged at the Town's transfer station could have "nothing more than an incidental effect on interstate commerce." Therefore, the court concluded that this effect was not "impermissibly burdensome..., particularly when the 'burden' is weighed against the legitimate and significant public concerns underlying the local law." 587 N.Y.S.2d at 687. The Appellate Division upheld the lower court's grant of summary judgment in favor of the Town.

The New York Court of Appeals (New York's highest court) denied leave to appeal. Town of Clarkston v. C & A Carbone, Inc., 591 N.Y.S.2d 138 (N.Y. Ct. App. Oct. 27, 1992).

On May 25, 1993, the U. S. Supreme Court granted certiorari and will hear arguments in the case this fall. C & A Carbone, Inc. v. Town of Clarkston, 61 U.S.L.W. 3783 (U.S. May 25, 1993). In its petition for certiorari, C & A Carbone argued that the Town's flow-control ordinance ensured a captive supply of waste for the Town's transfer station, forced waste haulers to subsidize the Town's facility, and prevented waste haulers from selecting a more competitive facility in the interstate market. 24 ER 186 (May 28, 1993).

The issue upon which the Supreme Court based its grant of certiorari is stated as follows:

"Does a local law requiring the disposal of all trash, regardless of origin, at a designated local facility, and prohibiting the export of such trash out of state, constitute a burden on and discrimination against interstate commerce in violation of the Commerce Clause?"

## DISINCENTIVES TO OUT-OF-REGION WASTE

Under the Solid Waste Management Act of 1991, a municipal solid waste region has two options to discourage the delivery of waste generated outside the region to a landfill located within the region.

### I. Restrictions on Access

T.C.A. §68-211-814(b)(1)(B) allows a region to "restrict access" to a landfill located within the region "by excluding waste originating with persons or entities outside the region" in order to effectuate the region's 10-year plan. However, §68-211-814(b)(1)(B) contains a "grandfather" clause which provides that a landfill may continue to accept "waste from a specific source outside the region" if the landfill received waste from that source prior to July 1, 1991. The words "specific source" are not defined in the statute, although the legislative history indicates that the word "source" refers to a county or municipality.

There is also an exception to the grandfather clause. It does not apply if a landfill's acceptance of waste generated outside the region would "significantly impair" the region's ability to effectuate its 10-year plan.

If a solid waste authority is formed by one or more counties in a municipal solid waste region, the Authority may "restrict access to its solid waste disposal facilities by excluding waste originating with persons or entities outside the region." T.C.A. §68-211-907. However, an Authority may exercise this power only to the extent that the region's plan permits the Authority to do so. §68-211-907 does not contain the grandfather clause found in §68-211-814(b)(1)(B), but the use of the word "its" in §68-211-907 suggests that, under §68-211-907, an Authority is allowed to restrict access to its own solid waste

disposal facilities, but is not allowed to restrict access to those facilities which are owned by others. An Authority's power to restrict access to facilities owned by others depends upon §68-211-814(b)(1)(B), which contains the grandfather clause previously discussed.

Is there any question about the constitutionality of these provisions of the Solid Waste Management Act of 1991? Ironically, the answer is: only with respect to out-of-state waste.

In Fort Gratiot Sanitary Landfill, Inc. v. Michigan Department of Natural Resources, 112 S. Ct. 2019 (1992), the U.S. Supreme Court held that solid waste is an article of commerce and that neither a state nor a political subdivision of the state (e.g., a solid waste region) may impose a substantial burden on interstate commerce by excluding solid waste coming to a landfill from another state. The constitutional basis for this decision is the Commerce Clause of the U.S. Constitution, which provides: "The Congress shall have Power ... To regulate Commerce ... among the several States." The Commerce Clause gives Congress the power to enact laws regulating interstate commerce and has been interpreted to limit the power of states to erect barriers to interstate trade. The latter doctrine is known as the "dormant Commerce Clause" doctrine.

By its very terms, however, the Commerce Clause applies only to interstate commerce. It does not apply to intrastate commerce (i.e., articles moving in commerce within a state).

Therefore, while a region could not constitutionally rely upon T.C.A. §68-211-814(b)(1)(B) as a basis for excluding waste originating in another state, there is no reason to believe that a court would invalidate T.C.A. §68-211-814(b)(1)(B) as a proper basis for excluding waste moving from one solid waste region in Tennessee to another region.

It is also possible that Congress will enact federal legislation overruling the Supreme Court's decision in the Fort Gratiot case and expressly allowing state and local governments to enact laws erecting barriers to out-of-state waste. Such legislation would clarify the legal uncertainties which exist in this area. Several bills have been introduced in Congress this year to accomplish this goal.

## II. Local Surcharge

T.C.A. §68-211-835(f)(1)(A) allows a county, municipality, or solid waste authority to impose a local "surcharge on each ton of municipal solid waste" received at a private landfill located within the county, municipality, or solid waste authority. There is no upper limit or "cap" on the amount of the local surcharge which may be imposed. However, the revenues generated by the local surcharge must be used by the county, municipality, or solid waste authority "for solid waste collection or disposal purposes." The local surcharge is sometimes referred to as a "host fee."

Where the region chooses to allow out-of-region waste to go to a landfill within the region or where the grandfather clause allows delivery of waste to a landfill from a specific source, the county hosting the landfill may desire to impose a local surcharge to fund its own solid waste management program in whole or in part. A local surcharge would also discourage the delivery of large quantities of out-of-region waste to a landfill located within the region if the surcharge were high enough.

**Part III**  
**Appendices**

**Appendix A**

**Legal Documentation And Organization Of Region**

RESOLUTION CREATING WHITE COUNTY'S  
MUNICIPAL SOLID WASTE REGION BOARD  
(8/)-01-93

WHEREAS, pursuant to TCA 68-211-813(B)(1), A Municipal Solid Waste Region Board is hereby established to administer the activities of this Region; and

BE IT FURTHER RESOLVED, that this Municipal Solid Waste Region Board shall be composed of 7 members; and

BE IT FURTHER RESOLVED, that pursuant to TCA 68-211-813(b)(1) 5 Board members shall be appointed by the County Executive and approved by this Board of County Commissioners and, due to the fact that Sparta collects or provides disposal services through its own initiative or by contract, the City of Sparta shall have a Board member appointed by the Mayor of Sparta and approved by the City of Sparta. Due to the fact that Doyle collects or provides disposal services through its own initiative or by contract, the City of Doyle shall have a Board member appointed by the Mayor of Doyle and approved by the City of Doyle.

BE IT FURTHER RESOLVED, That members of the Board of the Municipal Solid Waste Region shall serve a Six (6) year term except 1 members appointed by the County Executive shall have a two (2) year term, that 2 members appointed by the County Executive shall have a four (4) year term that 2 members appointed by the County Executive shall have a six (6) year term, that 1 member appointed by the Mayor of Sparta shall have a two (2) year term, and that one (1) member appointed by the Mayor of Doyle shall have a two (2) year term.

White County	
Eric Eaton	2 year term
Margaret Cope	4 year term
Ord Crouch	4 year term
Herd Sullivan	6 year term
David Wayne Copeland	6 year term

BE IT FURTHER RESOLVED, that this Municipal Solid Waste Region Board shall have all powers and duties as granted it by TCA 68-211-813 and in addition, in the performance of its duty to produce a municipal solid waste region plan, it shall be empowered to utilize existing White County governmental firms, and/or governmental, quasi-governmental, and public entities and agencies and to utilize White County's services, facilities and records in completing this task; and

BE IT FURTHER RESOLVED, that at the Municipal Solid Waste Region Board's initial organization meeting it shall select from its members a chair, vice-chair, and secretary and shall cause the establishment of a municipal solid waste advisory committee whose membership shall be chosen by the Board and whose duties are to assist and advise the Board; and

BE IT FURTHER RESOLVED, that the Municipal Solid Waste Region Board, in furtherance of its duty to produce a municipal solid waste region plan, is authorized to apply for and receive funds from the State of Tennessee, the federal government, White County, Sparta, Doyle and donations and grants from private corporations and foundations; and

BE IT FURTHER RESOLVED, that White County shall receive, disburse and act as the fiscal agent for the administration of the funds of the Municipal Solid Waste Region and the Region's Board; and

BE IT FURTHER RESOLVED, that upon the passage of this Resolution the County Clerk of White County shall transmit a copy of this Resolution to the Tennessee State Planning Office.

Motion made by Terry Howard and seconded by Tim Mackie that the above resolution be adopted.

On roll call, the vote was recorded as follows:

AYES 13  
NAYS 1

The above resolution was passed on the 18th day of January, 1993.

Robert Verble  
Robert Verble, Chairman  
County Legislative Body

ATTEST:

Connie Jolley  
Connie Jolley, County Clerk

Approved the 18th day of January, 1993.

Ernest Bennett, Jr.

RESOLUTION FOR A SINGLE-COUNTY MUNICIPAL SOLID WASTE REGION

RESOLUTION NO. 63-11-92

A RESOLUTION  
CREATING WHITE COUNTY'S MUNICIPAL SOLID WASTE PLANNING REGION

WHEREAS, The adoption of the Subtitle D landfill regulations by the United States Environmental Protection Agency and companion regulations adopted by the Tennessee Solid Waste Control Board will impact on both the cost and method of disposal of municipal solid waste; and

WHEREAS, at the urging and support of a coalition of local government, environmental, commercial, and industrial leaders, the 97th Tennessee General Assembly enacted T.C.A. 68-211-801 et seq. titles "Solid Waste Management Act of 1991"; and

WHEREAS, with the view that better planning for solid waste will help control the additional costs that will be imposed by the new landfill regulations, help protect the environment, provide an improved solid waste management system, better utilize our natural resources, and promote the education of the citizens of Tennessee in the areas of solid waste management including the need for and desirability of reduction and minimization of solid waste, local governments in Tennessee supported and worked for the passage of the Act; and

WHEREAS, one of the stated public policies of this Act is to institute and maintain a comprehensive, integrated, statewide program for solid waste management; and

WHEREAS, as per T.C.A. 68-211-811, the nine development districts in the State of Tennessee have completed a district needs assessment which are inventories of the solid waste systems in Tennessee; and

WHEREAS, White County's Board of County Commissioners has given consideration to the needs assessment prepared by the Upper Cumberland Development District; and

WHEREAS, T.C.A. 68-211-813, requires that counties in the State of Tennessee form municipal solid waste regions no later than December 12, 1992; and

WHEREAS, the Act's stated preference is the formation of multi-county regions with counties having the option of forming single or multi-county municipal solid waste regions; and

WHEREAS, the State of Tennessee will provide grant monies of varying amounts to single county, two county, and three or more county municipal solid waste regions to assist these regions in developing their municipal solid waste region plans; and

WHEREAS, the primary and prevailing purpose of the municipal solid waste regions are the preparation of municipal solid waste regional plans which among other requirements must identify how each region will reduce its solid waste disposal per capita by twenty-five percent (25%) by December 31, 1995, and a planned capacity assurance of its disposal for a ten (10) year period; and

WHEREAS, the development of a municipal solid waste regional plan that results in the most cost effective and efficient management of municipal solid waste is in the best interest of the citizens of White County.

NOW, THEREFORE BE IT RESOLVED, by the Board of County Commissioners of White County, Tennessee, acting pursuant to T.C.A. 68-211-801 et seq., that there is hereby established a Municipal Solid Waste Region for and by White County, Tennessee; and

BE IT FURTHER RESOLVED, that pursuant to T.C.A. 68-211-813(a)(2), that the Board of County Commissioners of White County, Tennessee finds and determines that White County shall be and shall constitute a single county municipal solid waste region due to the following:

White County recognizes the advantages of multi-county solid waste planning. We are reviewing the information contained in the District Needs Assessment which was released September 30, 1992. It will take several weeks to adequately review the data. Therefore, at this time, we feel that it is in the best interest of the citizens of White County that White County become a single county municipal solid waste region. White County will continue to plan and cooperate with its neighbors in any way necessary to provide the most efficient and cost effective solid waste management system for its citizens.

BE IT FURTHER RESOLVED, that pursuant to T.C.A. 68-211-813(b)(1), a Municipal Solid Waste Region Board is hereby established to administer the activities of this Region; and

BE IT FURTHER RESOLVED, that this Municipal Solid Waste Region Board shall be composed of seven (7) members; and

BE IT FURTHER RESOLVED, that pursuant to T.C.A. 68-211-813(b)(1) five (5) Board members shall be appointed by the County Executive and approved by this Board of County Commissioners and, due to the fact that Sparta collects or provides disposal services through its own initiative or by contract, Sparta shall have a Board member appointed by the Mayor of Sparta and approved by the City Council (Board of Alderman) of Sparta, and due to the fact that Doyle collects or provides disposal services through its own initiative or by contract, Doyle shall have a Board member appointed by the Mayor of Doyle and approved by the City Council (Board of Alderman) of Doyle.

BE IT FURTHER RESOLVED, that members of the Board of the Municipal Solid Waste Region shall serve a six (6) year term except that one (1) member appointed by the County Executive shall have a two (2) year term, that two (2) members appointed by the County Executive shall have a four (4) year term, that two (2) members appointed by the County Executive shall have a six (6) year term, that one (1) member appointed by the Mayor of Sparta shall have a two year term; and that one member appointed by the Mayor of Doyle shall have a two year term; and

BE IT FURTHER RESOLVED, that this Municipal Solid Waste Region Board shall have all powers and duties as granted it by T.C.A. 68-211-813 et seq. and in addition, in the performance of its duty to produce a municipal solid waste region plan, it shall be empowered to utilize existing White County governmental personnel, to employ or contract with persons, private consulting firms, and/or governmental, quasi-governmental, and public entities and agencies and to utilize White County's services, facilities and records in completing this task; and

BE IT FURTHER RESOLVED, that at the Municipal Solid Waste Region Board's initial organizational meeting it shall select from its members a chair, vice-chair, and secretary and shall cause the establishment of a municipal solid waste advisory committee whose membership shall be chosen by the Board and whose duties are to assist and advise the Board; and

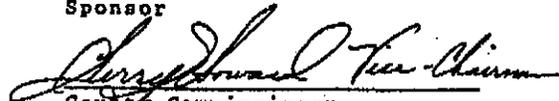
BE IT FURTHER RESOLVED, that the Municipal Solid Waste Region Board, in the furtherance of its duty to produce a municipal solid waste region plan, is authorized to apply for and receive funds from the State of Tennessee, the federal government, White County, Sparta, Doyle, and to apply for and receive donations and grants from private corporations and foundations; and

BE IT FURTHER RESOLVED, that, White County shall receive, disburse, and act as the fiscal agent for the administration of the funds of the Municipal Solid Waste Region and the Region's Board; and

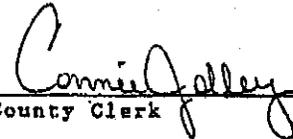
BE IT FURTHER RESOLVED, that upon the passage of this Resolution and at no later date than December 31, 1992, the County Clerk of White County shall transmit a copy of this Resolution to the Tennessee State Planning Office.

RESOLVED BY THE BOARD OF COUNTY COMMISSIONERS OF White COUNTY, TENNESSEE, this 16th day of November, 1992, the welfare of the citizens of White County requiring it.

Sponsor

  
County Commissioner

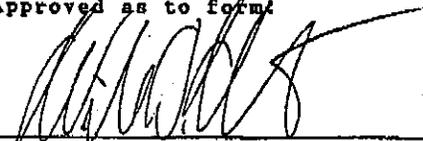
Attest:

  
County Clerk

Approved:

  
County Executive

Approved as to form:

  
County Attorney

The White County Regional Solid Waste Planning Board met at 6:00 pm on April 21, 1994, in the second floor conference room of the White County Courthouse. Present were: David Copeland, Dorsie Poole, Herd Sullivan, Ord Crouch, Charles Humphrey and Margaret Cope. Also present were Advisory Board members Terry Howard and Jim Payne. Also, Enoch Jarrell, Draper Aden and Ernest Bennett, County Executive. Chairman Copeland called the meeting to order. Minutes of the previous meeting were presented and on motion by Crouch, second by Sullivan, were approved as submitted.

Sullivan stated that he had verified with the state and shredded tires can be placed in a Class III/IV landfill.

Howard brought up the question of "skids". It was agreed that we do need a ruling from the state as to whether they are allowed to be placed in a Class III/IV landfill.

Discussion was held on the completed plan. Copeland asked Jarrell to clarify Chapter IV, Pg 10 "cost per ton for school recycling". Jarrell responded that the high cost was due to low volume and transportation cost to take the material to Nashville. Suggestion was made to check into the Overton County recycling center.

The issue of flow control was discussed.

Poole asked how the \$ 500,000 shortfall shown in information provided at the last meeting would correlate with Chapter VIII, Pg 10. Jarrell stated that there were some equipment costs included in the shortfall which does not appear on page 10. He will check his notes and specify.

Motion by Humphrey, second by Poole, to accept the plan as is and pass it on to the county commission for approval. Motion was unanimously approved.

The plan will be submitted to the county commission on May 16th at 7:00 pm. A public hearing will be held just prior to this at 6:00 pm. Bennett will handle public notices for same.

The next scheduled board meeting will be September 15th at 6:00 PM.

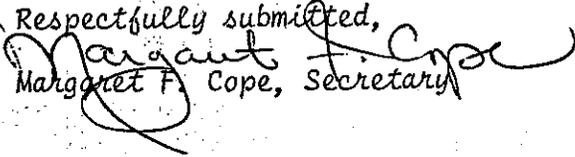
Poole expressed the feeling of the entire board as he told Enoch Jarrell how much we had enjoyed working with him and that we felt that he had done a good job.

Motion by Poole, second by Humphrey, none opposed, to put this in the form of a letter to Draper Aden.

Jarrell asked the board if they would authorize payment of the \$ 1000 which had been reserved from the grant for printing and travel to be paid to Draper Aden, since it had not been used and DA had done much of the printing. No vote was taken, but feeling of the board was that these funds would be needed to implement the educational phase of the plan.

Motion by Humphrey, second by Crouch, none opposed, to adjourn.

Respectfully submitted,

  
Margaret F. Cope, Secretary

The White County Regional Solid Waste Planning Board met at 6:00 P.M. on March 29, 1994 with all members present except Secretary Margaret Cope. Minutes of the previous meeting held on February 22, 1994 were handed out for perusal. Ord Crouch made a motion, seconded by Charles Humphrey that the minutes be approved as read. The motion passed unanimously.

A review of corrections to the current draft of the plan was held, with some items being discussed at length. Collection, transportation and disposal costs are to be obtained from Keith Ryder on current landfill costs in order to finalize the projected budgets. It was noted that site development, water testing (four wells) and a Karst study were included in the 1994-5 figures. Rolloff trucks, convenience centers and Subtitle D development are in the 1995-6 figures.

There was a short discussion of 1996-7 residual costs. Charles Humphrey asked about depreciation costs being included up front. Enoch Jarrell noted that previously there have been times when the budget took big hits for capital equipment items, and a system of depreciation will take care of this situation. He further noted that the figures here are for cash flow purposes only.

Some costs in the recycling program have been removed. The major item is *Postponed* curbside newspaper pickup in Sparta. It was suggested that white goods and scrap metal recycling programs could be implemented this year without too much difficulty. After a short discussion it was decided that the new Class III/IV Landfill could not accept tires. Tires will be shredded, and, hopefully, recycled for paving or other uses.

In finalization of the draft it was decided to put the position of Diversion Director on hold (not recommend that one be hired), change Chapter VIII so that Table 11 comes prior to Table 10 (for clarity), and elucidate our position on relief for the 25% diversion goal.

About \$500,000 in shortfall money was noted at the point when current contracts for foreign waste end and heavy site developmental costs occur. There was some discussion on this fact, and several options would be available to handle the situation.

Ord Crouch made a motion to adjourn, seconded by Charles Humphrey. The motion carried unanimously.

Respectfully Submitted,  
Margaret Cope, Secretary

*D.C. Poole*

by D.C. Poole

The White County Regional Solid Waste Planning Board met in called session on February 22, 1994, at 6:00 pm, in the second floor conference room of the White County Courthouse. Board members present were: Dorsie Poole, Ord Crouch, Herd Sullivan, Eric Eaton and Margaret Cope. Advisory Board members present were: Terry Howard and Larry Bailey, County Commissioners, and Wallace Austin, Sparta-White County Chamber of Commerce Executive Director. Also present were: Enoch Jarrell and Gary Lide, Draper Aden; Ernest Bennett, White County Executive and Ken Shepherd, UCDD.

Vice-Chairman Poole called the meeting to order. Minutes of the previous meeting were presented. On motion by Sullivan, second by Crouch, none opposed, the minutes were approved as submitted.

Poole turned the meeting over to Jarrell and Lide to respond to the questions posed at the last meeting. Chapters 4 and 6 have been reworked according to the new guidelines for the 25% waste reduction. Jarrell presented corrected copies of these chapters to each board member. Both chapters were reviewed and discussed.

Lide presented copies of the response which he received from the state in reply to his letter asking about the 25% reduction. (copy attached)

The grant for the construction of convenience centers was discussed. It was decided that White County should not apply for the grant until summer 1995. The funds will be available whenever application is made. If we apply now we would have to complete now and begin manning them as required by regulations.

A copy of a letter was presented with info on landfills to call to verify Subtitle D landfill costs. (copy attached) Jarrell and Lide stated that if accurate landfill cost figures were available, they would incorporate into our plan and build on those for disposal. Lide requested board approval to work directly with Keith Ryder, Herd Sullivan and Ernest Bennett to obtain those cost figures. Discussion was favorable. Eaton stated that this board should review the results before presenting to the county court.

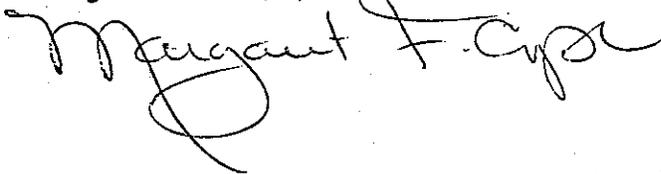
A reminder was given that a public hearing should be held before presenting to the court.

The next meeting date is being left open to allow Draper Aden, Ryder, Bennett and Sullivan to schedule a work session.

Motion by Crouch, second by Eaton, none opposed, to adjourn.

Respectfully submitted,

Margaret F. Cope, Secretary



The White County Regional Solid Waste Planning Board met in regular session on February 3, 1994, at 6:00 pm, in the second floor conference room of the White County Courthouse. Board members present were: David Copeland, Dorsie Poole, Herd Sullivan and Margaret Cope.

Also present were: Ernest Bennett, White County Executive; Enoch Jarrell, Draper Aden; Denise Anderson, Expositor; Gerald Wallace, Mayor of Doyle; Terry Howard, White County Commissioner; and Mary Poole.

Chairman Copeland called the meeting to order. The minutes of the previous meeting were presented and on motion by Poole, second by Cope, were accepted as presented.

Copeland called for any old business:

Bennett stated that he had just received package for the grant to build a convenience center and would get completed and filed.

A bill for work completed thru 12/31/93 by Draper Aden was presented. After some discussion, motion by Sullivan, second by Cope, none opposed, to authorize payment of said bill. (Copy attached)

Sullivan responded to Eaton's question from the previous meeting re: Chapter 4, Page 7. Sullivan states that he has reviewed the numbers and does not totally agree, with all, but realizes that no one is able to accurately project these figures.

Terry Howard asked who would make recommendations as to where the two convenience centers to be built would be located. A lengthy discussion followed. No decision was made.

Copeland deferred to Poole for questions re: the revised plan dated January, 1994. Poole, having read the revision in its' entirety, stated that he did have some problems with the contents:

There is a lack of continuity.

Pg 6-5 What is budget for? (Recycling)

Pg 5-6 What is budget for? (Waste Collection)

Pg 4-8 What is budget for? (Waste Reduction)

Poole suggested that all tables be labeled.

Pg 5-1 needs proofreading and grammar corrected.

There is no cost reduction in the plan.

Pg 9-17 was questioned. Jarrell replied that this is an example of what a home compost demo facility would cost IF we decided to build one, but it is not included in the plan costs

Pg 4-7 Synopsis of Plan Average diverted cost per ton questioned. Annual diversion cost questioned.

PG 6-1 and Pg 4-7 The Recycling and Waste Reduction figures questioned. There is a discrepancy.

Bennett asked Jarrell if Draper Aden had told Cannon County that White County would charge them \$ 60.00 per ton in 1996 for their waste disposal. Bennett stated that he had been advised by an official from Cannon County that this was the case, at least, this is what Cannon County understood. After an explanation and discussion, Jarrell offered to write a letter rescinding the statement.

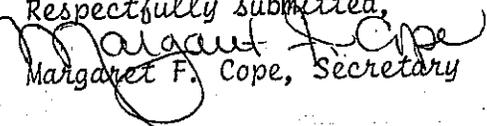
Jarrell stated that he will request a variance on the 1989 disposal figures, due to a change in the way the 25% reduction must be calculated now. A handout was given on the new guidelines, dated December, 1993. (copy attached) Howard reminded Jarrell to be sure he included in the data the fact that several of our industries have already reduced their waste by various methods. We do not want this reduction to penalize White County.

Copeland asked if we could take our present disposal costs and build on these, to arrive at a more realistic \$ figure. Jarrell replied that he was under an obligation to be sure that the costs were realistic and he felt that they were. He does not want to understate, but he will look at again and make adjustments, if possible.

The next meeting is tentatively scheduled for February 17th, at 6:00 pm.

Motion by Sullivan, second by Cope, none opposed, to adjourn.

Respectfully submitted,

  
Margaret F. Cope, Secretary

/mfc

The White County Regional Solid Waste Planning Board met in regular session on December 2, 1993, at 6:00 pm, in the second floor conference room of the White County Courthouse. Present were board members Dorsie Poole, Ord Crouch, Eric Eaton, Charles Humphrey, Herd Sullivan and Margaret Cope. Also present were: Enoch Jarrell, Draper Aden; Ernest Bennett, County Executive; Larry Bailey, Wallace Austin, Mary Poole, Terry Howard, Richard Michie, WMCA; and Denise Anderson, Expositor.

Vice-Chairman Poole called the meeting to order. The minutes of the previous meeting were presented and on motion by Humphrey, second by Eaton, were accepted as written.

Poole asked Jarrell to present the replies to the rate ranges we had requested. Jarrell stated that Waste Management did not respond. A copy of the response from BFI and Sanfill were presented to the group. (copy attached)

Jarrell presented a handout PROPOSED LANDFILL COST ESTIMATE STUDY. (copy attached)

There was a general discussion of the completed information presented at the last meeting. The accuracy of several figures was questioned. It was agreed that the figures in section III-8 are good and should be used for the remainder of the yellow book. Specific items were requested to be corrected and additional information requested: (1) section 4 should be corrected; (2) a copy of the Industrial Survey was requested; (3) information on cost to stay in the landfill business until 1996, then farm out disposal, with contingencies to remain in landfill business; (4) details of how \$ 533,000 capital costs were calculated and a downward revision of that cost. The main concern is that there be consistency with the data presented.

It was noted that the handout from the previous meeting had pages missing: Chapter 9, Appendix 3.

Jarrell will make the requested corrections and will mail to board members along with the additional information requested.

General consensus that we do not need to meet again in December, but do need the corrected material ASAP.

Motion by Humphrey, second by Crouch, none opposed, to meet again January 6, 1994 at 6:00.

Motion by Humphrey, second by Crouch, none opposed, to adjourn.

Respectfully submitted,

Margaret F. Cope, Secretary

The White County Regional Solid Waste Planning Board met in regular session on October 21, 1993, in the second floor conference room of the White County Courthouse. Board members in attendance were: David Copeland, Dorsie Poole, Ord Crouch, Charles Humphrey, Eric Eaton, Herd Sullivan and Margaret Cope. Advisory Board Members Larry Bailey and Terry Howard were also present. Draper Aden was represented by Enoch Jarrell.

Chairman David Copeland called the meeting to order. The minutes of the previous meeting were presented and on motion by Humphrey, second by Eaton, were accepted.

Copeland presented a bill from Draper Aden for \$ 6,300.00, which is 45% of the total amount of the contract. After some discussion there was a motion by Cope, second by Poole, to authorize payment. Motion passed with no opposition.

Jarrell asked for questions regarding previous information provided. Humphrey asked if turning the landfill over to the public sector had been addressed. Jarrell replied that it had been but that he did not believe it would be cose effective to do so. Discussion followed regarding turning the county landfill over to a private company, also single county region vs multi county region costs.

Humphrey expressed concern that we are not on our scheduled time table for completion of the plan. Jarrell affirmed that we will be completed on time (original schedule).

General discussion followed concerning the boards' concern about the lack of correct date which has been made available. Jarrell promised to have corrections made and the yellow book completed by Thursday, November 4th.

It was the feeling of the board that we need to hear from a private company and would ask Ernest Bennett to contact BFI to meet with the board next month.

Jarrell presented handouts on PUBLIC INFORMATION AND EDUCATION. Copy attached.

Motion by Humphrey, second by Eaton, none opposed, to adjourn.

Respectfully submitted,

  
Margaret F. Cope, Secretary

The White County Regional Solid Waste Planning Board met on September 30, 1993, at 7:00 pm, in the second floor courtroom of the White County Courthouse. Board members in attendance were: David Copeland, Dorsie Poole, Ord Crouch, Eric Eaton, Hurd Sullivan and Margaret Cope. Charles Humphrey was absent. Also present were: Wallace Austin, Advisory Board member; Ernest Bennett, County Executive; Gary Lide and Enoch Jarrell, Draper Aden; and Ken Shepherd, UCDD. Terry Howard and Larry Bailey, Advisory Board members and County Court members were present for the latter portion of the meeting. Chairman David Copeland called the meeting to order. Minutes of the previous meeting were presented. After correction of those in attendance to read "David Copeland" instead of "David Bradley" the minutes were accepted. Motion by Crouch, second by Poole.

A letter had been received from the state requesting a copy of the sub-agreement. It had been sent 9/30. Lide stated that it was his fault had not been done already. Due to the state not having this information, a motion for payment to Draper Aden will be held until the next meeting.

Lide presented a handout "DECISION MAKING INFO". (Copy attached)

Poole questioned the percentage for leaves and yardwaste on "Quantities of Waste Landfilled" from handout of previous meeting. Those figures have been revised to 2% leaves and 5% yard waste.

Poole questioned how the unmanaged waste figures would affect projected costs and reduction figures? Lide responded that it would affect both and should be accounted for separately, if possible. The 1989 (base year) figures seemed very low. Lide will be applying for a variance.

Poole asked if we could have a revision of the "Waste Stream Characteristics" before the anticipated presentation to the County Commission. Lide responded that he would have by two weeks. The presentation should take place in November.

Motion by Copeland, second by Crouch, to have the next meeting on October 21st.

Motion by Cope, second by Eaton, to adjourn.

The White County Regional Solid Waste Planning Board met in regular session on September 16, 1993, at 7:00 PM, in the second floor conference room of the White County Courthouse. Board members in attendance were: David Bradley, Dorsie Poole, Herd Sullivan, Charles Humphrey and Margaret Cope. Ord Crouch and Eric Eaton were absent. Advisory board members present were: Wallace Austin, Ronnie Foster and Terry Howard. Others present were: Gary Lide and Enoch Jarrell, Draper Aden; Ernest Bennett, White County Executive and Robert Verble, County Commissioner.

Chairman Copeland called the meeting to order. Minutes of the previous meeting were presented and on motion by Humphrey, second by Sullivan, were unanimously approved.

Chairman Copeland presented two bills which had been received from Draper Aden. Lide addressed the amount. There has been a cost sharing of front end requirements among seven regions they are working with on similar plans. It is itemized in a letter to Chairman Copeland, bearing today's date and included in this meeting's handout.

Lide presented the handout.

Copeland questioned whether we should meet in two weeks. Lide agreed. There is a lot to be done during the next two months. Motion by Sullivan, second by Humphrey, none opposed, to meet again in two weeks, on September 30th.

Humphrey asked if we were still on our target deadline. Lide responded that we were.

A general discussion followed.

Cope asked where we would be should the county commission not accept the plan that is presented. Lide responded that the \$ 14,500 contract was in place until he has an "approved" plan.

Poole asked about the "bottle bill". Lide suggested that it would need to be state wide or would have a negative impact on local businesses. Wallace Austin agreed. It would be very detrimental to our sales tax revenue.

Humphrey questioned about aluminum cans. No answer was given.

On motion by Humphrey, second by Poole, meeting adjourned.

Respectfully submitted,

  
Margaret F. Cope  
Secretary

The White County Regional Solid Waste Planning Board met in regular session on August 19, 1993, at 7:00 pm, in the second floor conference room of the White County Courthouse. Board members in attendance were: David Copeland, Dorsie Poole, Herd Sullivan, Ord Crouch, Charles Humphrey and Margaret Cope. Eric Eaton was absent. Advisory Board members in attendance were: Wallace Austin, Terry Howard and Larry Bailey. Also present were: Ernest Bennett, White County Executive; Denise Anderson, Sparta Expositor; and Enoch E. Jarrell, Jr., Environmental Engineer with Draper Aden.

Chairman David Copeland called the meeting to order.

Minutes of the previous meeting were presented, and on motion by Humphrey, second by Crouch, were accepted as written.

Jarrell announced that Gary Lide had been in a wreck and had asked him to represent Draper Aden at the meeting.

Copeland questioned Jarrell about a bill received for services to this point which was \$ 4,000.00. Jarrell responded that he did not know but would find out.

Jarrell reviewed the handout from the previous month. General discussion followed.

Jarrell asked when this board expected the plan to be completed. Copeland replied October '93. Jarrell then asked if the target date had not been moved forward since the state had moved the deadline to July, 1994. Copeland stated that Lide had agreed to adhere to the original schedule for plan completion.

Humphrey asked if we had changed engineers in mid-stream. Jarrell assured him, "No". He (Jarrell) is assisting Lide but Lide was remaining as engineer in charge of this project.

Jarrell further commented that Draper Aden had hired an additional four employees during the past month.

Jarrell presented Chapter Three for board review. Some discussion followed. There was concern about the validity of some of the data in Chapter Three, as well as in Chapter One and Two.

Jarrell recommended that the bill discussed earlier be held until the next meeting when Lide could be present. Humphrey stated that we just wanted the payment schedule and expectations clearly understood by all parties.

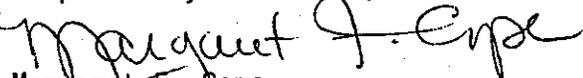
Copeland suggested that we may need to meet again before the regularly scheduled September meeting. General agreement.

Jarrell will confer with Lide, then contact Bennett to set up the next meeting.

Jarrell presented handout "Waste Diversion".

On motion by Humphrey, second by Crouch, meeting adjourned.

Respectfully submitted,

  
Margaret F. Cope  
Secretary

The White County Regional Solid Waste Planning Board met in regular session on July 29, 1993, at 7:00 pm, in the second floor meeting room of the White County Courthouse. The meeting date had been postponed for two weeks due to conflicting schedules of several board members. Board members in attendance were: David Copeland, Dorsie Poole, Herd Sullivan, Ord Crouch and Margaret Cope. Eric Eaton and Charles Humphrey were absent. Also present were: Ernest Bennett, County Executive; Gary Lide, Draper Aiden; Denise Anderson, Expositor; Charlotte Bennett; Advisory Board Members: Larry Bailey, County Commissioner and Jim Payne, Alderman.

Chairman David Copeland called the meeting to order. Copies of the minutes of both the May 27th regular meeting and the June 22nd public meeting were presented. Minutes were approved as written on motion by Crouch, second by Sullivan, none opposed.

Gary Lide presented a progress report. (attached) He stated that he would be presenting much info during the next two months. He will begin making recommendations as we get more into the process.

Copeland asked about education required by the Act. Lide stated that there would be grants and awards from the state to pay for the education.. The regulation is vague as to exactly what is required.

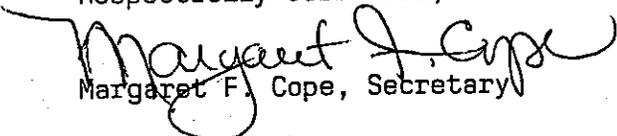
Cope asked if the proposed Advisory Board members had been properly notified. There seemed to be some confusion as to who should have done so. Copeland stated that he would personally contact each one.

- \* Bennett presented the contract to Copeland. It is to be left in the County Executive's office with a copy to be placed in the minutes.

On motion by Crouch, second by Cope, meeting adjourned.

- \* "contract" refers to contract between the Board and the consulting firm of Draper Aden Assoc.

Respectfully submitted,

  
Margaret F. Cope, Secretary

Ernest Bennett, Jr  
County Executive of White County  
Room 205 Courthouse  
Sparta, Tn 38583

ATTENTION: ENOCH E. JARRELL, JR

These are the Advisory Committee Members and Address.

Terry Howard  
Rt 1 Box 118 D  
Walling, Tn 38587

Larry Bailey  
Rt 1 Box 639  
Sparta, Tn 38583

Jim Payne  
123 Pearson Ave  
Sparta, Tn 38583

Wallace Austin  
Chamber of Commerce  
Bockman Way  
Sparta, Tn 38583

Brooke Martin  
401 Sewell Dr  
Sparta, Tn 38583

Ronnie Foster  
306 Hill View Dr  
Sparta, Tn 38583

**Appendix B**

**Documentation for Adjustments to the Base Year**



STATE OF TENNESSEE  
DEPARTMENT OF ENVIRONMENT AND CONSERVATION  
401 Church Street  
Nashville, Tennessee 37243

July 5, 1994

Mr. David Copeland, Chairperson  
White County Solid Waste Planning Board  
c/o Ernest Bennett  
White County Courthouse, Room 205  
Sparta, TN 38583

Dear Mr. Copeland:

We have received and reviewed your request for a base year adjustment of White county's annual per capita disposal rate from 0.42 tons (the rate calculated format he 1989 U.T. survey) to 0.80 tons. It appears that you have a valid concern for correction of your base year data. Therefore, White County's base year data is approved to reflect an adjusted annual per capita disposal rate of 0.80 tons.

Should you require any further assistance on this or other matters, please do not hesitate to contact us.

Sincerely,

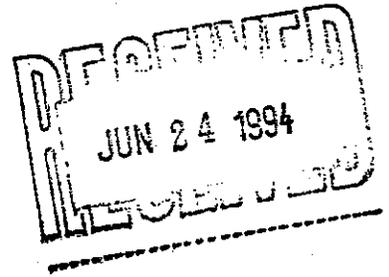
Paul Evan Davis  
Director  
Division of Solid Waste Assistance

PED:GHD:dhm

**WHITE COUNTY SOLID WASTE PLANNING BOARD**

David Copeland, Chairman

June 2, 1994



Mr. Paul E. Davis, Director  
Tennessee Department of Environment and Conservation  
Division of Solid Waste Assistance  
14th Floor - L & C Tower  
401 Church Street  
Nashville, Tn 37243

Re: Base Year Variance Request  
White County  
DAA # 30010

Dear Mr. Davis:

The White County Planning Board is requesting a variance to the base year for waste generation within the county. The 1991 University of Tennessee (UT) study indicated a waste flow of 8795 tons for the 1989 base year. The White County Landfill did not have scales at that time and the waste flow was estimated based on cubic yards. Scales were installed in April 1993 and in June 1993 were on line to accurately measure the waste flow generated within the county as well as out-of-county waste received as required by the Division of Solid Waste Management.

As indicated on the attached scale data tabulation for the period of July 1993 to May 1994, the waste flow is calculated at 16,200 tons. This is a significant difference from the 1990 UT study of 8795 tons. Therefore, we are requesting the base year waste flow be revised to 16,200 tons per year. The population projection of 20,266 in 1993 from the Needs Assessment will be used to calculate the waste generation. This equates to 0.80 tons per person per year which will be used in calculating the 25% diversion goal.

If you have any questions concerning this request or need any additional information please contact me or Mr. Enoch Jarrell with Draper Aden Associates, the consultant helping us preparing the plan.

Sincerely,

  
David Copeland, Chairman

**WHITE COUNTY LANDFILL WASTE FLOW**  
Scale Data at Landfill (tons)

	July 1993	Aug 1993	Sept 1993	Oct 1993	Nov 1993	Dec 1993	Jan 1994	Feb 1994	Mar 1994	Apr 1994	May 1994	Total
White County	514	534	523	520	607	577	511	618	722	737	717	6,580
White County Public	69	15	17	23	10	8	6	8	36	46	14	252
Jackson County	168	42	126	144	93	107	81	119	153	108	87	1,228
Cannon Co./ Woodbury	287	318	284	270	276	283	223	272	351	345	324	3,233
Sparta	511	608	557	504	422	444	380	413	456	489	480	5,264
Gainesboro	86	70	78	61	61	79	58	76	80	65	67	781
Doyle	3	4	3	4	3	5	3	3	4	4	4	40
White County Commercial	224	241	233	209	248	271	271	272	291	283	230	2,773
<b>Total Disposed at Landfill</b>	<b>1,862</b>	<b>1,832</b>	<b>1,821</b>	<b>1,735</b>	<b>1,720</b>	<b>1,774</b>	<b>1,533</b>	<b>1,781</b>	<b>2,093</b>	<b>2,077</b>	<b>1,923</b>	<b>20,151</b>
<b>Total Generated within White County</b>	<b>1,321</b>	<b>1,402</b>	<b>1,333</b>	<b>1,260</b>	<b>1,290</b>	<b>1,305</b>	<b>1,171</b>	<b>1,314</b>	<b>1,509</b>	<b>1,559</b>	<b>1,445</b>	<b>14,909</b>

The above data is for an 11 month period.  
 Dividing 14,909 by 11 months gives a monthly average of 1350 tons.  
 Multiplying this by 12 gives a yearly waste flow generated in White County of 16,200 tons.

## **Appendix C**

### **Public Participation Activities**

**PUBLIC NOTICE OF**  
**THE WHITE COUNTY SOLID WASTE REGIONAL PLAN**  
**PUBLIC MEETING**

The White County Solid Waste Planning Region is conducting a Public Hearing to present and receive comment on the draft Solid Waste Management Plan. The hearing is scheduled for May 16, 1994 at 6:00 pm at the White County Courthouse.

The Solid Waste Management Plan is being prepared pursuant to the State of Tennessee Solid Waste Management Act. The Act requires counties to prepare a ten year plan to address the following issues:

- Current Solid Waste Management System
- Growth Trends and Waste Projections
- Waste Reduction/ Recycling/ Waste Processing
- Collection and Transportation
- Disposal Capacity
- Public information and Education
- Problem Wastes

An Executive Summary of the Solid Waste Management Plan is available from County Executive's Office at the Courthouse - Room 205. Additionally, a copy of the draft Solid Waste Management Plan is on file at the County Executive's office for viewing.

**PUBLIC HEARING**

**WHITE COUNTY MUNICIPAL SOLID WASTE PLANNING BOARD**

**May 16, 1994**

The White County Solid Waste Planning Board held a Public Hearing on May 16, 1994 to present the Solid Waste Plan and answer any questions about the plan. Copies of the plan were available at the White County Courthouse for review. Notice of the hearing was published in *The Expositor*, the local newspaper.

A list of those present is on the following page. Items discussed were as follows:

Current Solid Waste Management System  
Growth Trends and Waste Projections  
Waste Reduction/ Recycling/ Waste Processing  
Collection and Transportation  
Disposal Capacity  
Public information and Education  
Problem Wastes

There were no formal questions and general discussion about collection and disposal followed.

MAY 16, 1994

6 PM

WHITE COUNTY COURTHOUSE

WHITE COUNTY PUBLIC HEARING ON  
REGIONAL SOLID WASTE MANAGEMENT PLAN

	NAME	STREET ADDRESS
1.	[Signature]	Rt. # 1 Box 36 Sparta, TN, 38588
2.	Ken Shepherd	UCDD, COCKEVILLE, TN.
3.	Margaret J. Cope	Rt 11 Box 385, Sparta TN
4.	Daniel W. Copeland	RR #3 Bx 241 Sparta TN 38583
5.	J. E. Cook	P.O. 38, Doyle, TN, 38559
6.	Archie Jault	Draper Allen Associates
7.	Mary Kay Trumbull	Rt # 10 Box 176 - Sparta TN
8.	Richard Lane	322 Mt View DR Sparta TN
9.	Mary W. Page	P.O. Box 38 Doyle TN
10.	[Signature]	Rt. 1 Box 1181 Waddy, TN, 38587
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**Appendix D**  
**Exports and Imports**

White County Executive

Ernest D. Bennett, Jr.

Room 205 Courthouse

Sparta, Tennessee 38583

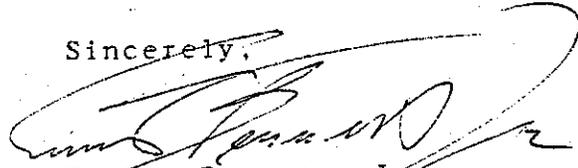
June 2, 1994

Draper Aden Associates  
Consulting Engineers  
Enoch E. Jarrell, Jr. P.E.  
2214 MetroCenter Boulevard, Suite 100  
Nashville, In 37228

To Whom It May Concern:

White County is presently accepting Solid Waste from Cannon County and the City of Woodbury, Tennessee and have every intention to continue accepting their solid waste in the future.

Sincerely,



Ernest Bennett, Jr.  
White County Executive

**Appendix E**

**Review by Appropriate Municipal or Regional Planning Commission**

**WHITE COUNTY SOLID WASTE PLANNING BOARD**  
David Copeland, Chairman

June 16, 1994

Mr. Clifford Tempelton  
White County Planning Commission  
Rt 4  
Sparta, TN 38583

Re: White County Solid Waste Plan

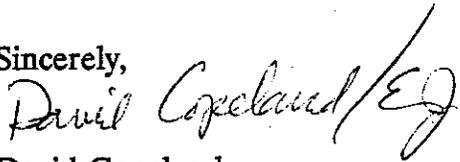
Dear Mr. Tempelton:

This letter is to notify you that a copy of the White County Solid Waste Plan is available for your review at the County Executive's office. The Solid Waste Management Act of 1991 requires counties in Tennessee to develop a 10 year plan for the management of solid waste. This plan was prepared by the White County Solid Waste Planning Board established by White County. This plan has been approved by the White County Commission.

The Tennessee Regional (TCA 13-3-101 et seq) and Municipal (TCA 13-4-101 et seq) planning statutes emphasize that planning documents which may affect the future of an area be available to relevant local planning commissions for review. The law does not require planning commissions to approve solid waste plans nor does it require planning commissions to comment on the plans.

If you have any questions please contact me or Mr. Enoch Jarrell with Draper Aden Associates, our engineering consultant, at 259-3996.

Sincerely,



David Copeland  
Chairman

cc: Mr. Enoch Jarrell

**WHITE COUNTY SOLID WASTE PLANNING BOARD**  
David Copeland, Chairman

June 16, 1994

Mr. George Elrod  
Sparta Planning Commission  
320 Hillview Drive  
Sparta, TN 38583

Re: White County Solid Waste Plan

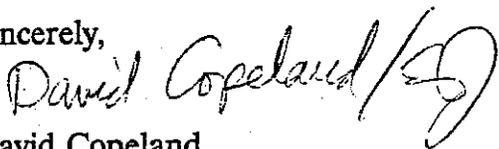
Dear Mr. Elrod:

This letter is to notify you that a copy of the White County Solid Waste Plan is available for your review at the County Executive's office. The Solid Waste Management Act of 1991 requires counties in Tennessee to develop a 10 year plan for the management of solid waste. This plan was prepared by the White County Solid Waste Planning Board established by White County. This plan has been approved by the White County Commission.

The Tennessee Regional (TCA 13-3-101 et seq) and Municipal (TCA 13-4-101 et seq) planning statutes emphasize that planning documents which may affect the future of an area be available to relevant local planning commissions for review. The law does not require planning commissions to approve solid waste plans nor does it require planning commissions to comment on the plans.

If you have any questions please contact me or Mr. Enoch Jarrell with Draper Aden Associates, our engineering consultant, at 259-3996.

Sincerely,



David Copeland  
Chairman

cc: Mr. Enoch Jarrell