SULPHUR RIVER BASIN AUTHORITY

Sulphur River Basin Area Non-Hazardous Solid Waste Management Plan for Protection of Water Resources 1990 - 2010

FINAL REPORT

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EXECUTIVE SUMMARY

This Plan was undertaken in response to the need to protect present and future water supplies in the Sulphur River Basin. Its purpose is to prevent water pollution from improper waste disposal by developing a non-hazardous waste management plan for 10 counties which lie wholly or partially within the Basin: Bowie, Cass, Delta, Franklin, Hopkins, Hunt, Lamar, Morris, Red River and Titus. The planning period is from 1990 to the year 2010. This work is funded by the Texas Water Development Board, through a grant to the Sulphur River Basin Authority, and by participating local governments and industries.

The report is presented in five chapters, outlined as follows:

INTRODUCTION

This chapter contains background information on the Sulphur River Basin Authority and the need to protect water supplies through proper solid waste and sludge management. Recent regulatory and legislative activities at the federal and state levels that make solid waste management planning very timely are briefly outlined. Thirteen specific tasks to be completed during the present study are outlined in the scope.

EXISTING CONDITIONS

Population figures are presented for 1980 and 1987 (the latest available figures). Figures are presented for the following areas: the entire 10-county planning area, the Sulphur River Basin area, each of the 56 cities in the planning area, and for each of the 10 counties including the whole county, the unincorporated area only, and the 1980 census divisions. Population and housing densities are presented by county and by census divisions within each county. The population of the 6,630 square-mile planning

area was 316,850 in 1987, an increase of 9.6 percent since 1980. The basin-only population was estimated at 161,330, up 7.7 percent from 1980. Sixty-one percent of the population lives in cities, but there are only six cities with more than 10,000 residents. Thus the planning area is primarily rural.

The Sulphur River Basin is an excellent surface water resource for the State of Texas, with potential for development of additional water supplies. Surface water quality is generally good in the basin, according to Texas Water Commission data for the six designated stream segments in the area. Existing water quality problems in the Sulphur/South Sulphur River and Days Creek segments are being addressed by improvements in sewage treatment plants. The general characteristics of Wright Patman Lake and Cooper Lake (under construction) are presented, as well as the characteristics of the six aquifers contributing to the groundwater supply in the Basin. Groundwater supplies are limited in further development potential and are of marginal quality.

The amount of solid waste generated in the planning area is estimated to be 206,000 tons per year, of which 133,000 tons are generated in cities and 73,000 tons in unincorporated areas. This is mixed residential, commercial, and industrial waste. Separate estimates could not be made for industrial waste, but this is taken into account by using a higher per capita generation rate for larger cities. Information regarding some 300 manufacturers in the area is presented.

There are 148 permitted dischargers in the planning area, which produce an estimated 15,600 tons per year of water and wastewater treatment plant sludge. Current sludge disposal practices rely heavily on land application or landfilling at treatment plant sites.

There are currently 34 permitted landfills in the 10-county planning area, but only 24 of these are active. The 24 active landfills have a combined area of approximately 907 acres and have expected closure dates that vary from 1990 to 2030. Pending federal regulations are expected to drastically change this picture within the next year. Only five landfills are expected to remain open once the regulations are finalized. Of these, three are in Hunt County, and one each in Lamar and Titus Counties. Their combined acreage would be 1,064 acres assuming planned expansions are approved. Under this scenario, 81 percent of the landfill area would be under private ownership, with 19 percent operated by public entities. This is a significant change from the present ratio, which is about 50 percent private and 50 percent public. About 52 percent of the study area is geologically suitable for landfilling.

Available information indicates that collection services are provided more frequently by private operations than by local governments. About 10 percent of the cities and probably much of the unincorporated areas offer no organized collection.

There is some on-site disposal of solid waste in the region which is a potential water quality concern. This may be as much as 40 percent of the amount generated in rural areas. Septic tank use is common in rural areas for on-site sewage disposal. The number of septic tanks in the planning area is estimated to be about 33,000, which produce an estimated seven million gallons per year of septage requiring off-site disposal. Some illegal disposal of septage is thought to occur in the area and is a current water quality concern.

FUTURE NEEDS

Population projections are presented for the 1990-2010 planning period. An increase of 25 percent to 421,465 is expected for the planning area during the 20-year period. Projected population and housing densities are also given by county and census

division within each county. Population distribution within each county was assumed to be similar to that based on the 1980 census since more recent data were not available, but this should be verified after the 1990 census is published.

Solid waste projections have been made for the area and by county based on the population projections and an assumed per capita generation rate based on size of communities. The projected solid waste produced in the area will be 286,000 tons per year by 2010; however if the EPA's National Waste Reduction Goal of 25 percent by the year 1992 could be met, this amount would be reduced to 215,000 tons per year. Assuming all solid waste is landfilled, 437 acres of landfill would be used by the year 2010 with current generation rates; 338 acres would be required if the EPA reduction goal were met. While both figures are well below the 1069 acres available in the region, the landfills are concentrated in the western portion of the planning area. This indicates that a system of transfer stations will be necessary, with possible construction of at least one new landfill to service the eastern part of the region.

The predicted future siting and operating criteria for landfills (Subtitle D Requirements) are outlined in detail. These requirements, expected to be adopted in 1990, will make landfilling a much more difficult and expensive solid waste disposal option than it is now.

Wastewater treatment plants and new landfills under the stringent regulations will cause even less water quality problems than in the past. Thus, the main concern regarding future water quality in the region is illegal dumping of wastes. The impact of illegal dumping is impossible to predict, but local governments can minimize it by strong enforcement and public education programs.

ALTERNATIVES

The Texas Legislature has outlined a preferred hierarchy of management techniques for solid waste. It is:

1. Minimization of waste production
2. Reuse or recycling of waste
3. Treatment for energy or other resource recovery
4. Land disposal as the least preferred option

These management methods are discussed in detail.

Current available practices for the disposal of water and wastewater treatment plant sludge are presented. These include management practices for beneficial reuse of this material. Pending regulations affecting programs for sewage sludge reuse are also briefly discussed.

An analysis of collection and transportation options for solid waste management is presented.

Several permits may be required for solid waste facilities. These are summarized for different types of facilities. The Texas Department of Health has primary responsibility for permitting solid waste disposal or processing sites, but depending on the type of facility, permits may be required from the Texas Air Control Board, the Texas Water Commission, or local agencies.

Management alternatives for solid waste programs are discussed. Analysis is made of the pros and cons of public ownership and operation, public ownership with private operation, private ownership with public operation, private ownership and operation,

and multijurisdictional approaches.

Financing alternatives for solid waste management projects are presented including the following: general obligation bonds, revenue bonds, industrial development bonds, leveraged leasing, current revenue financing, bank loans, and lease agreements.

Generalized cost criteria are presented, including analysis of transportation/collection costs, intermediate processing (transfer station) costs, and ultimate disposal costs. The total costs are related to residential fees, so that if the total cost for collection, transportation, processing, and disposal can be defined, this can readily be translated to a per-household cost.

Finally, six alternative regional solid waste management plans are outlined. Each alternative divides the region into subareas and identifies which landfills would service them and what transfer stations would be needed for collection and transport. All the alternatives would require a system of regional landfills served by transfer stations. For each alternative, the landfill acreage required and currently available is presented by subarea.

RECOMMENDATIONS

The recommended regional plan is based on dividing the planning area and solid waste disposal requirements into three subareas for initial development and four subareas for long-range development. Each subarea is served by a landfill and one or more transfer stations. Initially, the three subareas will be served by existing landfills in Hunt, Lamar, and Titus Counties, and the fourth subarea will be created when a new regional landfill is developed in Bowie County. All solid waste will be compacted prior to ultimate disposal at the landfill, either at the appropriate transfer station for its service area or by a compactor station located adjacent to the landfill for

the direct haul service areas. Facility site development costs are based on 2010 solid waste generation requirements for the appropriate service area and the initial collection, equipment, and transfer operation costs are based on 1990 solid waste disposal requirements. A landfill tipping fee based on a modern landfill capable of meeting all of the proposed Subtitle D requirements was utilized in the costing analysis. Projected costs per ton were equated to monthly residential charges based on typical household solid waste generation quantities. Cost per ton ranged from $52.10 to $140.90 for initial development which equated to a monthly residential charge of $7.50 to $20.10.

It is recommended that the management of the solid waste disposal in the Sulphur River Basin be a combination of different entities.

Overall regulation is the responsibility of the Texas Department of Health (TDH) through their Regions 5 and 7. Region 5, located in Arlington, is responsible for Hunt County. Region 7, located in Tyler, is responsible for the other nine counties. The Sulphur River Basin Authority should work in conjunction with TDH to insure that the water quality is protected.

Municipal solid waste collection is the responsibility of the city in incorporated areas and of the county in rural areas for counties with population greater that 30,000. Cities and counties should provide for collection within their jurisdiction either with their own forces or by arrangement with private entities. Several counties in the study area have populations less than 30,000. However, all of these counties should consider providing solid waste collection for all residents.

Transfer stations can be owned and operated by the local government, by a regional entity, or by private enterprise but the ultimate responsibility belongs to the local

government. Each city and county should insure that a transfer facility is available for its constituents either by furnishing the service or by contract.

Both the public and private sectors are already involved in the management of landfills in the region. Operations should continue and cities and counties in the area should make long-term contracts with the landfill operator to insure disposal space in the future.

The landfill southwest of Mount Pleasant is presently owned and operated by the City of Mount Pleasant. Ownership and operation can be continued by the City, or it could be transferred to a regional entity such as the Sulphur River Basin Authority (SRBA), or some other special purpose entity for ownership/operation. Action will need to be initiated to increase the load limits of the bridges and upgrade the roads leading to the site to allow heavy transfer truck traffic an easier access.

Planning for the proposed landfill in Bowie County should be initiated as soon as possible. The evaluation of a specific landfill site is beyond the scope of this study. Because of the regional service provided by the proposed new landfill, it is important that planning for the facility be accomplished by a regional entity.

It is recommended that local governments adopt regulations and educate the public to promote the proper disposal of waste.

All water and wastewater treatment plant operators should be encouraged to find a beneficial use for the sludge. The cost for hauling waste sludges to municipal landfills will be the responsibility of the operator and should not be considered in this study.

Regulations should be adopted by all counties and cities to insure that septic tanks are properly installed and maintained. County sanitarians should be given the ability and authority to enforce the standards. Waste water treatment plants should be required to provide for and accept septic tank waste for disposal. Septic tank waste haulers should be held accountable for their loads.

Local regulations should be adopted and enforced to discourage illegal dumping. Law enforcement officials should issue citations and collect fines for offenders. Existing illegal dump sites will need to be cleaned up and disposed of in a permitted landfill.

Local governments should adopt programs to encourage waste minimization. Some examples include prohibiting grass clippings from landfills by regulation, encouraging composting of yard wastes, encouraging citizens to buy products in recyclable containers and those that create less waste.

Paper, aluminum, ferrous metal, plastic, and glass can all be recycled. Composting is also an attractive alternate method of recycling because up to 80 percent of the municipal waste stream consists of organic material. All of the above can be implemented at the local level either voluntarily or by legislation.

There is no energy recovery program that makes economical sense for the Sulphur River Basin area in the near future. However, local and regional governments should continuously update technology and cost information because technologies are improving and the cost of landfilling is increasing.

CHAPTER I

INTRODUCTION

BACKGROUND

The Sulphur River Basin Authority was established by the Texas Legislature in August 1985 to provide for conservation and development of the State's natural resources within the Sulphur River Watershed. A list of the present members of the Sulphur River Basin Authority Board of Directors is included as Table I-1. The Sulphur River Basin is one of the few areas in Texas where major amounts of potential surface water supply still remain to be developed. Previous studies indicate that, with adequate reservoir storage, the basin may be able to provide as much as 1.4 million acre-feet per year of dependable yield. Less than one fourth of that potential supply will have been developed when construction of the U.S. Army Corps of Engineers' Cooper Reservoir project is completed in 1991. The Texas Water Plan outlines a program of reservoir construction to meet all in-basin water requirements and to provide approximately 485,000 acre-feet per year for export to other basins through the year 2030.

The protection of the quality of these valuable water resources in a "water-short" state such as Texas is of utmost importance. Accordingly, the Texas Water Development Board (TWDB) determined that the development and implementation of a non-hazardous waste management program was necessary to adequately manage watershed runoff and to protect the quality of existing and potential surface water and groundwater supplies in the Sulphur River Basin. On December 15, 1988, the Sulphur River Basin Authority submitted a successful application to the TWDB for planning grant assistance to prepare a non-hazardous waste management program to protect the water resources of the Sulphur River Basin. Fifty percent of the cost is borne by participating local governments and industries listed in Table I-2.

TABLE I-1

SULPHUR RIVER BASIN AUTHORITY
BOARD OF DIRECTORS

DISTRICT 1: Bowie, Red River Counties	President Mr. C.B. Wheeler P.O. Box 1838 500 Texarkana National Bank Building Texarkana, Texas 75501 214-792-2848 Vice President Mr. William O. Morriss 518 Pine Texarkana, Texas 75501
DISTRICT 2: Cass, Franklin, Morris, Titus, Hunt Counties	Secretary/Treasurer Ms. Vatra Solomon P.O. Box 1218 Mt. Pleasant, Texas 75455 214-572-1887 512-463-0101 (Austin, Texas) Mrs. Lanny R. Ramsey P.O. Box 382 Mt. Vernon, Texas 75457 214-537-4567
DISTRICT 3: Delta, Hopkins, Lamar Counties	Mr. David Baucom 1308 Azalea Lane Sulphur Springs, Texas 75482 214-885-4256 (Home) 214-885-9537 (Office) Mr. Curtis Fendley 554 Church Street Paris, Texas 75460 214-784-5353 (Home) 214-784-0836 (Office)

TABLE I-2

CONTRIBUTIONS AND PLEDGES
TO
SULPHUR RIVER BASIN AUTHORITY
NON-HAZARDOUS SOLID WASTE MANAGEMENT PLAN

Contributions	Pledges
Bowie County	Titus County
Red River County	Bloomburg
Franklin County	Wake Village
Hopkins County	Omaha
Morris County	Deport
Hunt County	
Queen City	
Hughes Springs	
Daingerfield	
New Boston	
Paris	
Detroit	
Avery	
Bogata	
Clarksville	
International Paper	
DeKalb	
Maud	
Nash	
Avinger	
Lone Star	
Commerce	
Sulphur Springs	
Mt. Pleasant	
Red River Army Depot	
Leary	
Texarkana	
Naples	
Hooks	
Mt. Vernon	

Table I-3 contains a list of members of the steering committee from representative sections of the region. They provided helpful insight and direction in the development of the recommendations from a regional perspective.

In recent years, much legislation at both the federal and state levels has been adopted to address the increasing solid waste problems. As a nation, America generates more than 160 million tons of solid waste per year and the garbage deluge could reach 193 million tons a year by 2000. Almost 80 percent of this amount is landfilled, yet landfill capacity is decreasing, as evidenced by a recent situation which involved a New York "gar-barge" that sailed the East and Gulf coasts searching in vain for a dump site; the problem is fast approaching a critical stage. In February 1988, the U.S. Environmental Protection Agency (USEPA) created the Municipal Solid Waste Task Force to define the solid waste problem, identify potential solutions and develop a framework to address these problems in coordination with States, industry, and others. The Task Force adopted a preferred hierarchy for attacking the solid waste problem. It includes, in order of preference, reduction of waste at the source, recycling, incineration, and lastly landfilling. It recommended a waste reduction target of 25 percent through minimization and recycling programs.

The USEPA will soon finalize new regulations affecting solid waste landfilling. These rules, which have strict technical requirements designed to protect land and water resources and human health, will probably result in the closure of many existing landfills and will cause the cost of waste disposal to rise sharply.

Texas has placed increasing emphasis on solid waste management in recent years. A Comprehensive Municipal Solid Waste Management, Resource Recovery and Conservation Act was adopted in 1983 but was not funded for six years. In 1987, the State Legislature mandated the following priority for solid waste management, to be considered in planning to the maximum extent feasible: 1) Minimization of waste production;

TABLE I-3

STEERING COMMITTEE MEMBERS

Honorable Jamie Rawls, Mayor
City of Queen City
P.O. Box 301
Queen City, Texas 75572
214-796-7986

Mr. Van James, City Manager
City of Mount Pleasant
P.O. Box 231
Mount Pleasant, Texas
214-572-3412

Mr. Roger Powell, Planner
City of Sulphur Springs
125 South Davis
Sulphur Springs, Texas 75482
214-885-7541

Mr. Charles R. Wilcox, P.E.
Environmental Engineer
Red River Army Depot
Texarkana, Texas 75507
214-334-2111

Mr. Anthony Bethel,
Registered Sanitarian
Paris/Lamar County Health Dept.
740 Sixth SW
Paris, Texas 75460
214-785-4561

Ms. Elaine Wray,
Regional Development Specialist
Ark-Tex Council of Governments
P.O. Box 5703
911 U.S. Hwy 59
Centre West, Bldg. A
Texarkana, Texas 75505
214-832-8636

Mr. Stuart Daniels, Asst. Director
Texarkana Chamber of Commerce
819 State Line Avenue
Texarkana, Texas 75501
214-792-7191

Mr. Bill Dean, Executive Director
NE Texas Municipal Utility Division
P.O. Box 955
Hughes Springs, Texas 75656
214-639-7538

Mr. Dwight Moss, Ad Hoc Member
Manager, Technical Services
International Paper
P.O. Box 870
Texarkana, Texas 75504
214-796-7101

2) Reuse or recycling of waste; 3) Treatment for energy or other resource recovery; and 4) Land disposal as the least preferred option. This is very similar to the USEPA recommendations.

In 1988, Texas formed a Task Force on Waste Management Policy to develop specific recommendations to address the solid waste dilemma at the state level. Some of the Task Force's recommendations have already been passed into law, including a small fee per ton of waste disposed which will boost dramatically the enforcement and planning budget of the Solid Waste Division of the Texas Department of Health. When available, funds from this fee will be used to assist in the development of regional and local solid waste management plans and to establish a state office of waste minimization and recycling to provide technical assistance to local governments to develop programs. Counties of over 30,000 population and all cities are required to ensure solid waste services to citizens throughout their jurisdictions.

The severity and complexity of the solid waste problem requires the complementary use of the four waste management practices of waste minimization, recycling, energy or other resource recovery, and landfilling; thus the term "integrated waste management" is used to describe this approach. To be most effective, an integrated waste management system should ensure that all participants--governments, industry, groups and associations, and individuals--play active roles. Using such an approach, a system can be designed for each locality to meet its needs, taking into account local demographics and waste stream characteristics. Proper planning ensures that each waste treatment or disposal method complements rather than competes with other methods.

PURPOSE

In accordance with the December 2, 1988, notice which appeared in the Texas Register, the purpose of this project is to develop a regional plan to manage non-hazardous waste in all or parts of Bowie, Cass, Morris, Titus, Red River, Franklin, Hopkins, Delta, Lamar, and Hunt Counties comprising the Sulphur River Basin. Figure I-1 shows the Sulphur River Basin and 10 counties which comprise the solid waste management planning area. The plan will document service needs for mixed solid and recyclable wastes, water and wastewater plant sludges, and septic tank waste; identify feasible collection, transfer and hauling, and disposal alternatives, including alternatives for reducing waste generation and resource recovery; establish facility design criteria, preliminary locations for facility alternatives, and service frequency; develop capital and operating cost estimates by implementation phase for feasible alternatives; and assess financing and management arrangements to provide non-hazardous waste management service. Planning shall be primarily for incorporated and unincorporated communities and rural areas but may include non-hazardous waste streams from industrial operations. The planning period for the project shall extend from 1990 through the year 2010.

SCOPE

The scope of the project is to develop a non-hazardous waste management plan which will identify specific measures, including disposal operations, that must be implemented to prevent pollution of the basin's water resources by improper disposal of waste. The plan will address disposal of solid waste (refuse), water and wastewater treatment plant sludge, and septic tank waste. The scope of the project includes the following discernable tasks in accordance with TWDB Contract No. 9-483-721 between the TWDB and the Sulphur River Basin Authority:

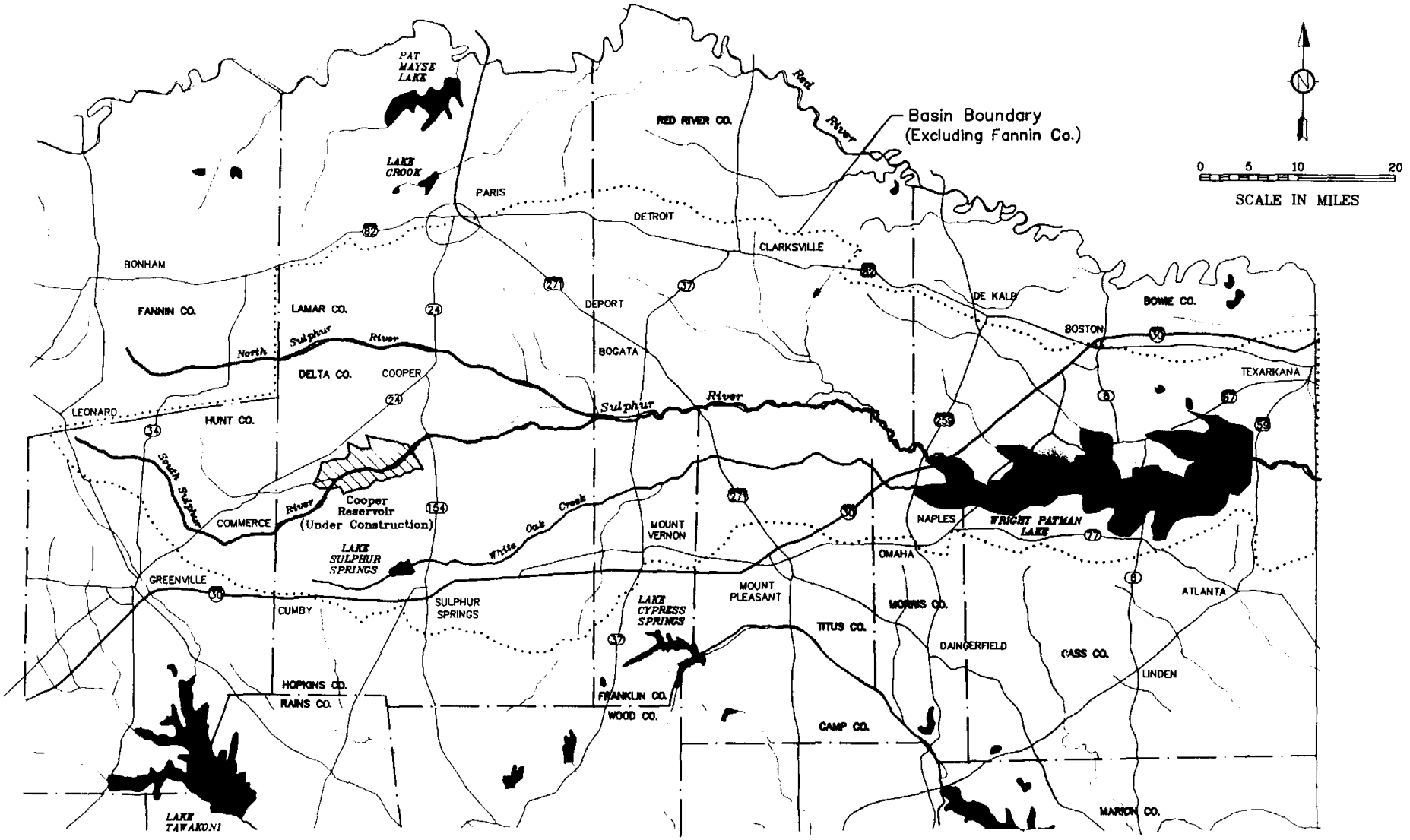


FIGURE I-1
PROJECT PLANNING AREA

- **Examine Population and Demographic Patterns** - Develop population projections for counties within the Sulphur River Basin, excluding Fannin County, and for the cities within these counties. Information from the TWDB, cities, counties, the Ark-Tex Council of Governments, and the North Central Texas Council of Governments will be utilized for this task.

- **Determine Current and Future Waste Characteristics** - Identify the current and future waste generation rates and characteristics applicable to the study area. The sources of the waste, whether from residential, commercial or industrial generators, will be determined. These will be used to project future (to the year 2010) waste characteristics.

- **Establish Criteria for Landfill Disposal** - Establish criteria for landfill siting, design, and operation. The criteria will be based on current and pending regulations. Special emphasis will be placed on protecting the quality of surface water and groundwater supplies.

- **Evaluate Existing Facilities** - Identify and evaluate existing water and wastewater treatment plants, and their sludge disposal practices in the study area. An assessment of on-site sewage disposal facilities will also be performed. Special emphasis will be placed on the determination of the potential hazards to surface water and groundwater supplies.

- **Evaluate Future Non-hazardous Waste Disposal Alternatives** - Efforts will focus on landfill disposal of non-hazardous waste, but consideration will be given to resource recovery as a possible alternative to provide for long-term disposal. Special emphasis will be placed on the protection of future surface and groundwater in the project area.

- **Evaluate Future Sludge Disposal Alternatives** - Efforts will focus on landfill disposal of sludge, but consideration will be given to resource recovery as a possible alternative to provide for long-term disposal. Special emphasis will be placed on the protection of future surface and groundwater in the project area.

- **Evaluate Transportation Needs** - Evaluate the cost of transporting waste from the waste generation centers to disposal sites. The evaluation will consider transfer stations as well as transportation requirements.

- **Develop Cost Estimates** - Develop the probable costs associated with the transport and disposal of waste in the Sulphur River Basin Solid Waste Management Planning Area.

- **Identify Permit Requirements** - Identify the permits required to implement the individual waste disposal sites but not to include any permit applications.

- **Select Disposal Alternatives** - Select the most cost-effective waste transport and disposal alternatives.

- **Evaluate Management Alternatives** - Identify and evaluate both private and public entities that could implement and operate the waste disposal system(s) and assess current local regulation of existing landfills as well as on-site sewage disposal facilities and identify entities to enforce regulations as required.

- **Project Communication/Coordination** - Provide for project communication/ coordination with the incorporated cities, the counties, the Authority, and the TWDB to promote adequate communication to enhance the quality of the project to insure it properly addresses local needs.

- **Prepare Report** - Prepare a report presenting the findings and recommendations of this project.

The Solid Waste Management Planning Area considered in this study includes all of the 10 counties listed above as opposed to the Sulphur Basin only. This is because much information is available by county and also because future local plans will encompass each county as a whole. Using the drainage basin divide to describe the planning area would not accomplish the goals of the waste management plan.

CHAPTER II

EXISTING CONDITIONS

POPULATION

Summary

This section presents population figures for 1980 and 1987, including the percent change in population during the seven-year period. Figures are presented for the following areas: the entire 10-county planning area, the Sulphur River Basin area, each of the 56 cities in the planning area, and each of the 10 counties including the whole county, the unincorporated area only, and the 1980 county census divisions. Population densities are presented by county and by census divisions within each county.

Area Population and Economy

The population of the 10-county planning area, which includes 6,630 square miles, was 291,286 in 1980 and was estimated to be 316,851 in 1987. Of this number, about 149,800 were living within the Sulphur River Basin in 1980, increasing to about 161,330 in 1987. The largest city in the basin is Texarkana, with a 1980 population of 31,262 in the Texas portion of the city, which grew to 33,000 in 1987. Existing condition populations presented in this section are based on 1987 population estimates published by the Ark-Tex Council of Governments (for nine counties) and the North Central Texas Council of Governments (for Hunt County only).

The economy of the area is based primarily on agriculture, agribusiness, and to a lesser extent on manufacturing, government employment, and tourism. Hopkins County is one of the leading dairy counties in Texas. Mineral activities in the basin are principally confined to oil, gas, lignite, and clay production.

Cities

There are 56 incorporated cities in the 10-county area with a combined 1987 estimated population of 193,717, or 61 percent of the planning area total. Of these, approximately 15 percent reside in 38 communities of fewer than 2,000 people, 21 percent reside in 12 communities between 2,000 and 10,000 population, and 64 percent live in six cities of greater than 10,000 population. Of the 56 communities, only seven have populations of more than 5,000.

Table II-1 shows Existing Condition City Populations, including the 1987 estimates as well as the 1980 Census data. It also gives the percent change in population from 1980 to 1987 for each city in the planning area. Cities are listed alphabetically by county. The average population change from 1980 to 1987 was an increase of 9.6 percent; it varied from a decrease of 11.7 percent for Omaha in Morris County to an increase of 65.9 percent for Reno in Lamar County. The population shown for Texarkana is for the Texas portion only.

Counties

The 10-county area population was estimated at 316,851 in 1987, an increase of 8.8 percent from 291,286 in 1980. Table II-2 shows the 1980 and 1987 populations of each county as well as the percent change from 1980 to 1987. This information is also broken down for the unincorporated and incorporated areas of each county.

Estimated 1987 population and housing densities per square mile are shown in Table II-3 for each county and for county divisions used in the 1980 census. These county divisions are mapped in Figure II-1. The county-wide population densities vary from a low of 15 persons per square mile for Red River County to a high of 89 persons per square mile for Bowie County. The county division densities vary from a low of

TABLE II-1

EXISTING CONDITION CITY POPULATIONS

Entity	1980 Census	1987 Estimate	1980-87 Percent Change
Bowie County			
DeKalb	2,217	2,163	-2.4
Hooks	2,507	2,617	+4.4
Leary	253	257	+1.6
Maud	1,059	1,100	+3.9
Nash	2,022	2,507	+2.4
New Boston	4,628	4,817	+4.1
Texarkana	31,262	33,000	+5.6
Wake Village	3,865	4,413	+14.2
Cass County			
Atlanta	6,272	6,352	+1.3
Avinger	671	664	-1.0
Bloomburg	419	404	-3.6
Domino	249	234	-6.0
Douglassville	228	212	-7.0
Hughes Springs	2,196	2,281	+3.9
Linden	2,443	2,439	-0.2
Marietta	169	162	-4.1
Queen City	1,748	1,831	+4.7
Delta County			
Cooper	2,338	2,315	-1.0
Pecan Gap	250	243	-2.8
Franklin County			
Mount Vernon	2,025	2,117	+4.5
Winnsboro	862	1,028	+19.3
Hopkins County			
Como	554	613	+10.6
Cumby	647	690	+6.6
Sulphur Springs	12,804	14,461	+12.9
Tira	249	281	+12.9
Hunt County			
Caddo Mills	1,060	1,302	+22.8
Campbell	549	643	+17.1
Celeste	716	869	+21.4
Commerce	8,136	10,033	+23.3
Greenville	22,161	27,750	+25.2
Lone Oak	467	529	+13.3
Neylandville	168	217	+29.2
Quinlan	1,002	1,240	+23.8
West Tawakoni	840	1,016	+21.0
Wolfe City	1,594	1,914	+20.1

TABLE II-1

EXISTING CONDITION CITY POPULATIONS
(continued)

Entity	1980 Census	1987 Estimate	1980-87 Percent Change
Lamar County			
Blossom	1,487	1,688	+13.5
Deport (part)	724	720	-0.6
Paris	25,498	27,105	+6.3
Reno	1,059	1,757	+65.9
Roxton	735	754	+2.6
Sun Valley	76	89	+17.1
Toco	164	191	+16.5
Morris County			
Daingerfield	3,030	2,934	-3.2
Lone Star	2,036	1,972	-3.1
Naples	1,908	1,714	-10.2
Omaha	960	848	-11.7
Red River County			
Annona	471	457	-3.0
Avery	520	482	-7.3
Bogata	1,508	1,569	+4.0
Clarksville	4,917	4,783	-2.7
Deport (part)	41	39	-4.9
Detroit	805	771	-4.2
Titus County			
Miller's Cove	61	67	+9.8
Monticello	43	48	+11.6
Mount Pleasant	11,003	11,908	+8.2
Talco	751	758	+0.9
Winfield	349	349	0.0
Fifty-six City Total/Average	176,776	193,717	+9.6

TABLE II-2

EXISTING CONDITION POPULATIONS

COUNTY UNINCORPORATED/INCORPORATED AREAS

	1980 Census	1987 Estimate	1980-87 Percent Change
Bowie County	75,301	79,137	+5.1
City Population	47,813	50,874	+6.4
Unincorporated Areas	27,488	28,263	+2.8
Cass County	29,430	30,294	+2.9
City Population	14,395	14,579	+1.3
Unincorporated Areas	15,035	15,715	+4.5
Delta County	4,839	4,857	+0.4
City Population	2,588	2,588	0
Unincorporated Areas	2,251	2,299	+2.1
Franklin County	6,893	7,648	+11.0
City Population	2,887	3,145	+8.9
Unincorporated Areas	4,006	4,503	+12.4
Hopkins County	25,247	28,588	+13.2
City Population	14,254	16,045	+12.6
Unincorporated Areas	10,993	12,543	+14.1
Hunt County	55,248	68,829	+24.6
City Population	36,693	45,513	+24.0
Unincorporated Areas	18,555	23,316	+25.7
Lamar County	42,156	45,272	+7.4
City Population	29,743	32,304	+8.6
Unincorporated Areas	12,413	12,968	+4.5
Morris County	14,629	13,609	-7.0
City Population	7,934	7,468	-6.2
Unincorporated Areas	6,695	6,141	-9.0
Red River County	16,101	15,488	-3.8
City Population	8,262	8,101	-2.0
Unincorporated Areas	7,839	7,387	-6.1

TABLE II-2

EXISTING CONDITION POPULATIONS
COUNTY UNINCORPORATED/INCORPORATED AREAS
(continued)

	1980 Census	1987 Estimate	1980-87 Percent Change
Titus County	21,442	23,129	+7.9
City Population	12,207	13,130	+7.6
Unincorporated Areas	9,235	9,999	+8.3
Study Area Total	291,286	316,851	+8.8
Study Area City Population	176,776	193,717	+9.6
Study Area Unincorporated Areas	114,510	123,134	+7.5

TABLE II-3

COUNTY AND CENSUS DIVISION POPULATION DENSITIES

1987 ESTIMATES

County Census Divisions	Persons Per Square Mile	Estimated Houses Per Square Mile
Bowie County	89	37
Dalby Springs-Simms	13	5
DeKalb	26	12
Hooks	42	18
Maud-Elliot Creek	39	16
New Boston	84	34
Texarkana	410	169
Cass County	32	14
Atlanta	67	28
Bivins-McLeod	16	7
Hughes Springs-Avinger	37	16
Linden	23	10
Marietta-Douglassville	13	6
Delta County	18	8
Cooper	34	16
Pecan Gap	7	3
Franklin County	26	12
Mount Vernon	25	11
Winnsboro	31	14
Hopkins County	36	16
Cumby	19	8
North Hopkins-Sulphur Bluff	10	4
Pickton-Pine Forest	24	10
Seymour	21	8
Sulphur Springs	111	50

TABLE II-3

COUNTY AND CENSUS DIVISION POPULATION DENSITIES

1987 ESTIMATES
(continued)

County Census Divisions	Persons Per Square Mile	Estimated Houses Per Square Mile
Hunt County	83	35
Caddo Mills	43	17
Celeste	23	10
Commerce	142	63
Greenville	162	68
Lone Oak	26	11
Quinlan	67	29
Wolfe City	43	19
Lamar County	51	22
Biardstown	10	4
Blossom	30	12
Deport	25	11
Howland	13	5
Paris	283	127
Powderly	24	9
Roxton	16	8
Sumner	14	5
Morris County	52	21
Daingerfield	77	30
Naples	32	14
Red River County	15	7
Annona-Avery	10	5
Bogata	16	7
Clarksville	41	18
Detroit	12	5
Manchester	4	2
Titus County	55	24
Cookville	25	10
Mount Pleasant	147	63
Talco	16	7
Winfield	30	13

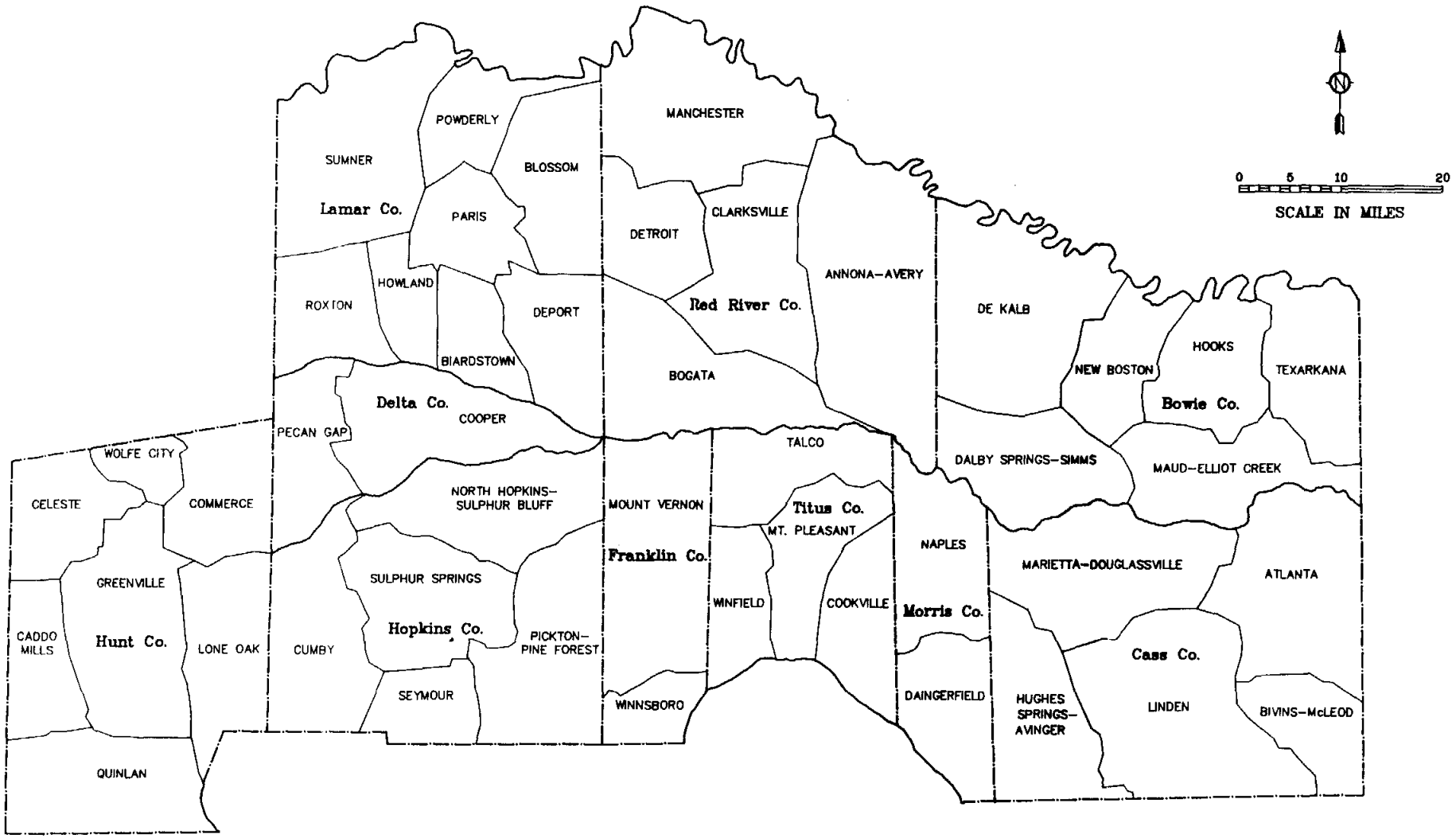


FIGURE II-1
COUNTY CENSUS DIVISIONS

four persons per square mile for the Manchester Division in the northern part of Red River County to a high of 410 persons per square mile in the Texarkana Division of Bowie County.

Basin Area Only

Existing condition populations for the basin area only have also been estimated. Table II-4 gives the basin population by county for 1980 and 1987 and indicates the 1980 through 1987 percent change. The 1984 Texas Water Plan published in November 1984 by the Texas Department of Water Resources indicated the 1980 basin population to be 154,000 including Fannin County. The Fannin County portion of the basin was estimated to include 4,200 persons based on 1980 Census County Subdivision data. This amount was deducted from the total to give the 149,800 basin population for 1980 shown in Table II-4. The Sulphur River Basin drainage area includes about 3,267 square miles or 49.3 percent of the 10-county study area of 6,630 square miles and contains about 50.9 percent of its 1987 estimated population.

WATER QUALITY AND QUANTITY

Summary

The Sulphur River Basin is an excellent surface water resource for the State of Texas, with potential for development of additional water supplies. Surface water quality is generally good in the basin, according to Texas Water Commission data for six designated stream segments in the area. Existing water quality problems in the Sulphur/South Sulphur River and Days Creek segments which are influenced by municipal discharges are being addressed by improvements in sewage treatment plants. The general characteristics of Wright Patman Lake and Cooper Lake (under construction) are

TABLE II-4

EXISTING CONDITION BASIN POPULATION BY COUNTY

County	Sulphur River Basin Portion 1980 Census	1987 Estimate	1980-87 Percent Change
Bowie	54,620	57,370	+5.0
Cass	7,560	7,790	+3.0
Delta	4,840	4,860	+0.4
Franklin	5,080	5,640	+11.0
Hopkins	21,310	24,130	+13.2
Hunt	17,440	21,750	+24.7
Lamar	13,240	14,220	+7.4
Morris	4,390	4,080	-7.1
Red River	12,940	12,450	-3.8
Titus	8,380	9,040	+7.9
Total/Average	149,800	161,330	+7.7

presented, as well as the characteristics of the six aquifers contributing to the groundwater supply in the Basin.

Surface Water

The surface water resources of the planning area are excellent, particularly when compared to other areas of Texas. Due to favorable hydrologic conditions, the Sulphur River Basin is potentially one of the State's major water supply areas. Development of these resources is being carefully considered as a source of supply in some of the long-range water supply planning studies underway for densely populated areas of North Central Texas.

The surface waters of the Sulphur River Basin are generally of good quality. Treated municipal and industrial waste discharges are small, particularly in the western part of the basin where the North Sulphur, Middle Sulphur, and South Sulphur Rivers originate.

The Texas Water Commission has divided the Sulphur River Basin into six segmented reaches totalling 261 stream miles and maintains six routine stream monitoring stations within the basin. Appendix Tables A-1 through A-5 present water quality data for Segments 0301 through 0305, respectively, as excerpted from the Texas Water Quality Inventory. Data are not yet available for Segment 0306 which was recently designated for the upper portion of the South Sulphur River. Figure II-2 shows locations of these stream segments. Water quality standards established by the Texas Water Commission for the Sulphur River Basin are shown in Table II-5.

No significant water quality problems are identified for two segments, the Sulphur River below Wright Patman Lake and the North Sulphur River. In the other four

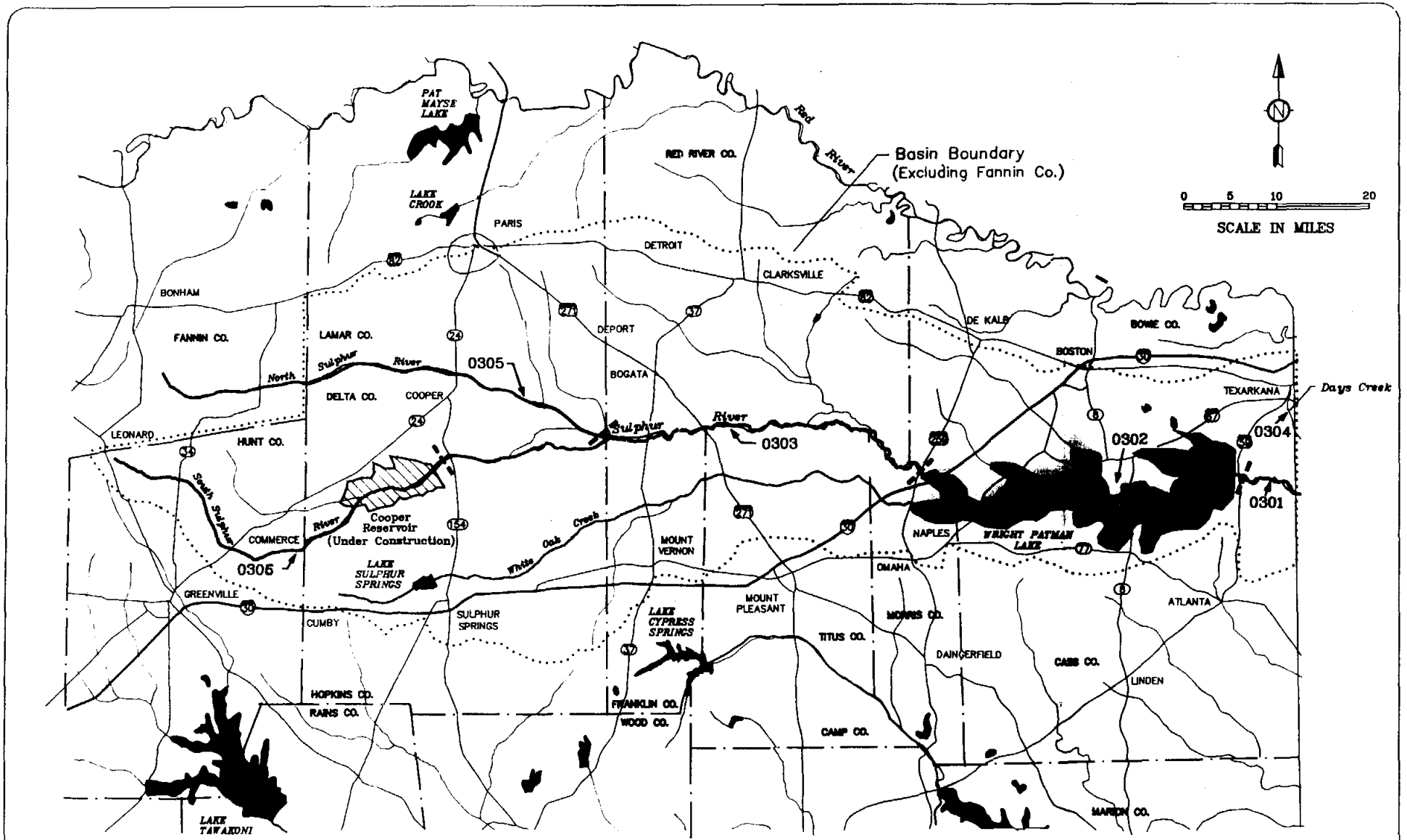


FIGURE II-2
EXISTING SURFACE
WATER RESOURCES

TABLE II-5

SULPHUR RIVER BASIN WATER QUALITY STANDARDS

SULPHUR RIVER BASIN		USES				CRITERIA						
SEGMENT NUMBER	SEGMENT NAME	RECREATION	AQUATIC LIFE	DOMESTIC WATER SUPPLY	OTHER	CHLORIDE (mg/L) Annual average not to exceed	SULFATE (mg/L) Annual average not to exceed	TOTAL DISSOLVED SOLIDS (mg/L) Annual average not to exceed	DISSOLVED OXYGEN (mg/L)	pH RANGE	FECAL COLIFORM (#/100 mL) Thirty-day geometric mean not to exceed	TEMPERATURE (°F) Not to exceed
0301	Sulphur River Below Wright Patman Lake	CR	H			120	100	500	5.0	6.0-8.5	200	90
0302	Wright Patman Lake	CR	H	PS		75	75	400	5.0	6.0-8.5	200	90
0303	Sulphur/South Sulphur River	CR	H			80	180	600	5.0	6.0-8.5	200	93
0304	Days Creek	CR	I			525	75	850	4.0	6.0-8.5	200	90
0305	North Sulphur River	CR	H			190	475	1,320	5.0	6.0-8.5	200	93
0306	Upper South Sulphur River	CR	I			80	180	600	4.0	6.5-8.0	200	93

Source: Revisions to Texas Water Quality Standards, Texas Water Commission, 1988.

Legend: CR - Contact Recreation
H - High Quality Aquatic Habitat
I - Intermediate Quality Aquatic Habitat
PS - Public Water Supply

segments, some violations of state water quality standards have been documented; problems considered significant by the Texas Water Commission are the following:

Wright Patman Lake - occasional low dissolved oxygen and elevated pH.

Sulphur/South Sulphur River - low dissolved oxygen and elevated pH in about 15 percent of samples, and periodic high fecal coliform counts.

Days Creek - frequent low dissolved oxygen and periodic high fecal coliform counts.

The occasional problems in Wright Patman Lake are attributed to overproduction of algae, a common occurrence in Texas lakes. This does not impair the quality of the lake water for public water supply purposes.

The water quality problems in the Sulphur/South Sulphur River and in Days Creek are due to treated sewage effluent, non-point source runoff, and the sluggish nature of the streams. New sewage treatment plants completed by the cities of Commerce and Sulphur Springs are expected to result in improved water quality in the Sulphur/South Sulphur River segment. Advanced sewage treatment facilities for the City of Texarkana have been recently constructed, so water quality in Days Creek is also expected to improve.

The amount of surface water available each year varies with climatic conditions. Average annual runoff for the Sulphur River Basin in Texas during the 1941 to 1970 period varied from approximately 600 acre-feet per square mile in the western part to 1,000 acre-feet per square mile in the eastern most part of the basin. Lowest flows in consecutive years for the 1941 to 1956 period occurred during 1955 and 1956, when average annual runoff was 230 and 162 acre-feet per square mile, respectively.

Runoff rates in the western part of the basin were 146 and 124 acre-feet per square mile in 1955 and 1956, respectively.

Due to channel rectification of the North Sulphur River, floods in this stream differ greatly from those in the South Sulphur River. Floods in the North Sulphur River characteristically rise and fall rapidly, rarely go beyond bank full, and have high flow velocities. The South Sulphur River and its tributaries have small main channels and wide, timbered floodplains. Consequently, floodwaters have lower velocities and extend beyond bankfull levels for long periods of time.

There are currently two major reservoir projects in the basin, as shown on Figure II-2, one existing and the other under construction. They provide for a safe annual water supply yield of about 369,000 acre-feet (329.5 MGD). Wright Patman Lake, whose dam is located on the Sulphur River about eight miles southwest of Texarkana, was completed in 1956. It extends through portions of Bowie, Cass, Morris, Red River, and Titus Counties. The reservoir has 145,300 acre-feet of conservation storage at elevation 220.0 feet MSL with an area of 20,300 acres. There are 2.5 million acre-feet of flood control storage at elevation 259.5 feet MSL with an area of 119,700 acres. At normal level, the reservoir has an average depth of about 12 feet with shoreline length of about 165 miles and is an important recreation resource in the area. The U.S. Army Corps of Engineers has indicated that the annual number of visitors has increased from about 100,000 in 1956 to about 2.5 million in 1986.

The project under construction is Cooper Lake, whose dam is located on the South Sulphur River near Cooper. The impounded reservoir will extend through portions of Delta and Hopkins County and will include 310,000 acre-feet of conservation storage at elevation 440 MSL with an area of 19,305 acres and 131,400 acre-feet of flood control storage at elevation 446.2 MSL with an area of 22,740 acres. The project is scheduled for completion in 1991.

Groundwater

Six aquifers are tapped for water supply throughout the planning area. Their approximate locations are shown in Figure II-3.

The Trinity Group Aquifer occurs in the western part of the Sulphur River Basin. Total thickness ranges to approximately 1,000 feet. Yields of large-capacity wells drawing from the aquifer in adjacent basins average about 430 gallons per minute (gpm). The quality of their water ranges from about 1,000 to 3,000 mg/L total dissolved solids.

The Carrizo-Wilcox Aquifer occurs in the south and eastern parts of the basin. Thickness ranges from about 500 to 900 feet. Yields of large-capacity wells average about 275 gpm, but locally wells produce up to 700 gpm. Groundwater in the aquifer generally contains less than 500 mg/L total dissolved solids.

The Woodbine Aquifer occurs in a small area in the western part of the basin. Total thickness ranges from 400 to 600 feet. Yields of large-capacity wells completed in the aquifer in nearby basins average about 150 gpm with water quality generally exceeding 1,000 mg/L total dissolved solids.

The Blossom Sand Aquifer occurs in a narrow band across the northern edge of the basin. Maximum thickness is about 400 feet. Yields of high-capacity wells range upward to a maximum of about 500 gpm, but the average yield of most wells is much lower. The quality of water in the aquifer ranges from 1,000 to 3,000 mg/L total dissolved solids.

The Nacatoch Sand Aquifer occurs in a narrow band across the western part of the basin. Total thickness ranges from 350 to 500 feet. It produces usable-quality water

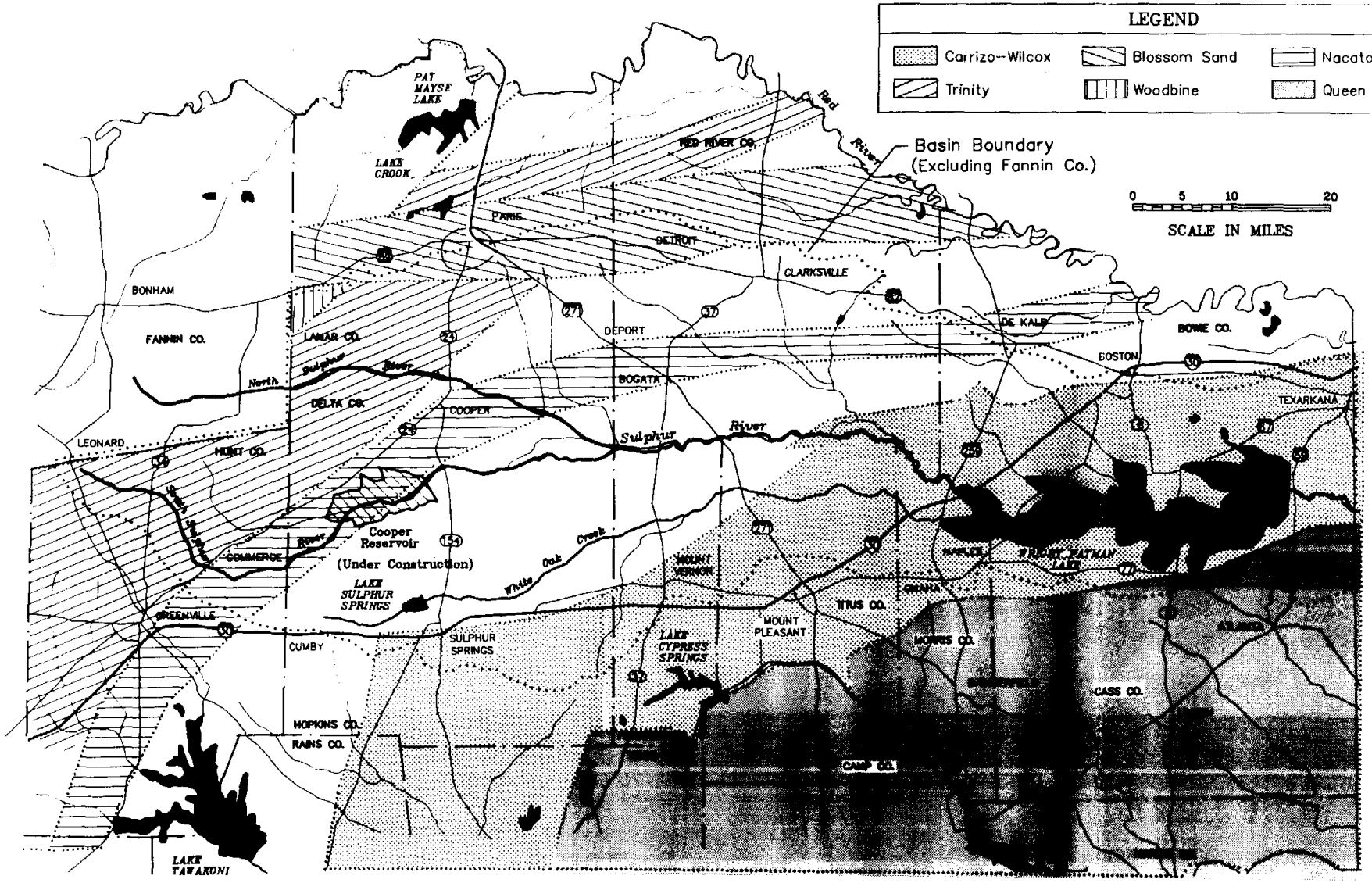


FIGURE II-3
GENERAL LOCATION OF
GROUND WATER AQUIFER

in most places to a depth of about 800 feet. Maximum yields of large-capacity wells reach 500 gpm but average considerably less. The water in the aquifer generally contains less than 1,000 mg/L total dissolved solids, but salinity increases with depth.

The Queen City Aquifer occurs in the southeastern part of the basin. The aquifer ranges to about 500 feet in total thickness. Well yields are generally less than 250 gpm. Water in the aquifer generally contains less than 500 mg/L total dissolved solids; salinity increases with depth.

Water in the Carrizo-Wilcox and Queen City Aquifers in the Sulphur River Basin is generally suitable for most purposes; however, both aquifers produce water with relatively high iron concentrations. Water in the Queen City Aquifer is generally corrosive, as is water in the Carrizo-Wilcox Aquifer. In some locations, the concentration of fluoride in the Woodbine, Nacatoch, and Blossom Aquifers exceeds the Interim Primary Drinking Water Standards promulgated by the Environmental Protection Agency-Texas Department of Health.

Saline-water encroachment is a potential problem within the basin due to local heavy withdrawals of groundwater from the Woodbine, Nacatoch, and Blossom Aquifers. As noted, many wells in the planning area produce water above the 1,000 mg/L total dissolved solids secondary standard cited in the Safe Drinking Water Act. TDH regulations allow the 1,000 mg/L TDS for municipal purposes only if a better quality source is not available. Thus, future water needs should be supplied by surface water development rather than increased groundwater use.

SOLID WASTE GENERATORS

Residential and Commercial

Information was solicited from operating landfills in the area during this study. However, the responses received (contained in Appendix C) were inadequate to provide definitive values for solid waste generation within the planning area. Insufficient data was provided regarding populations served and many of the smaller landfills do not maintain weight records. Also, wastes from some localities are disposed of outside the planning area while some landfills receive waste imported into the region. Therefore, estimates of waste produced are based on population and assumed per capita rates of generation.

Much of the solid waste generated in the 10-county planning area is domestic, originating in urban residential and/or rural areas. As previously stated, there are 56 incorporated cities in the planning area which account for 61 percent of the total area population. Of these, six cities have a population greater than 10,000; 12 have a population between 2,000 and 10,000; and 38 have a population of 2,000 or less. National studies have used a sliding scale of per capita generation rates based on city size to estimate solid waste loading from community populations, as presented in Table II-6. Studies done by the Ark-Tex Council of Governments in 1979 utilized this methodology.

The per capita rate of solid waste generation increases with city size; the generation rate from the largest cities is 20 percent higher than that from the smallest. This is due to greater amounts of commercial waste being generated in larger cities. The smaller communities typically have only such commercial establishments as grocery stores and service stations whereas the larger cities serve the region as trade,

TABLE II-6

ESTIMATED SOLID WASTE UNIT LOADINGS
FOR VARIOUS SIZE CITIES

City Population	Pounds Per Capita Per Day
less than 5,000	3.3
5,000 - 19,999	3.6
20,000 - 99,999	4.1

educational, and health centers and have commercial establishments to support these activities. Some of the difference may also be due to the fact that not all solid waste is disposed of in smaller cities and rural areas, whose residents may practice limited on-site disposal.

These differential generation rates were used to compute the amounts of solid waste produced in the study area during 1987, presented in Table II-7. The estimated solid waste quantities from the cities is about 64 percent of the total. Rural per capita generation was estimated using the rate for the smallest cities. The total amount produced in the study area is 206,000 tons per year, or 3.56 pounds per person per day.

Industrial

Appendix B lists some 300 manufacturers by counties and cities in the 10-county planning area according to the 1988 Edition of the Directory of Texas Manufacturers. Most of them are fairly small and do not significantly impact solid waste projections. In Table II-8, 37 manufacturers with annual sales above $10 million or more, their locations, and products are listed. The major industrial solid waste generators in the planning area are International Paper Company in Cass County, Red River Army Depot and Lone Star Army Ammunition Plant in Bowie County, Campbell Soup and Kimberly-Clark in Lamar County, and Pilgrim's Pride and the Texas Electric Monticello Power Plant in Titus County. Of these only Campbell Soup and Kimberly Clark utilize landfills available to the public. The others operate their own landfills. Hopkins County is one of the leading dairy counties in Texas, but most dairy wastes are disposed of on-site.

Separate projections for industrial solid waste were not developed due to lack of existing solid waste data for various types of generators as well as the generally

TABLE II-7

1987 ESTIMATED SOLID WASTE LOADINGS

City Size Distribution	Number	Population	Computed Lbs Per Day	Tons Per Wk	Tons Per Yr	% Distribution
Less than 5,000	49	63,108	208,000	730	38,000	18
5,000 to 19,999	4	42,754	154,000	540	28,000	14
20,000 to 99,999	3	87,855	360,000	1,300	67,000	33
Subtotal, Cities	56	193,717	722,000	2,570	133,000[1]	65
Other Rural Unincorporated Areas	-	123,134	406,000	1,400	73,000[2]	35
Total, Cities and Unincorporated Areas	-	316,851	1,128,000	3,970	206,000[3]	100

[1]Equivalent to an average of 3.76 pounds per person per day.

[2]Equivalent to 3.25 pounds per person per day per year.

[3]Equivalent to 3.56 pounds per person per day per year.

TABLE II-8

MAJOR MANUFACTURERS IN PLANNING AREA[1]

Location	Manufacturer	Product
Bowie County		
New Boston	International Paper	Lumber
Texarkana	Alumax Mill Products	Aluminum Sheets
Texarkana	Borden, Inc.	Dairy Products
Texarkana	International Paper	Cardboard
Texarkana	Kerr-McGee	Treated Wood
Texarkana	Mid South Bottling	Soft Drinks
Texarkana	NL Baroid	Drilling Supplies
Texarkana	Picoma Industries	Pipe Fittings
Hopkins County		
Como	Warren Petroleum	Liquid Petroleum, Sulphur
Dike	Phillips Petroleum	Liquid Petroleum, Sulphur
Sulphur Springs	Associated Milk Producers	Dairy Products
Sulphur Springs	Borden, Inc.	Dairy Products
Sulphur Springs	A.P. Green Refractories	Brick
Sulphur Springs	Northeast Texas Farmer's Coop.	Livestock Feed
Sulphur Springs	Ocean Spray Cranberries	Fruit Products
Sulphur Springs	Rockwell International	Control Valves
Hunt County		
Commerce	SNE Enterprises	Doors
Commerce	U.S. Brass	Brass Fittings
Greenville	E-Systems Inc.	Computer, Aircraft Parts
Greenville	Fiberite Corp.	Epoxy Resins
Greenville	Henson-Kickernick, Inc.	Clothing
Greenville	Serv-Air Inc	Aircraft Parts
Greenville	Walker-McDonald Co.	Drill Bits
Greenville	Wing Industries	Doors
Lamar County		
Paris	Babcock and Wilcox	Boiler Products
Paris	Campbell Soup	Canned Foods
Paris	Kimberly-Clark	Disposable Diapers
Paris	Merico Inc. Packaging	Cartons
Paris	UARCO Inc.	Business Forms

TABLE II-8

MAJOR MANUFACTURERS IN PLANNING AREA[1]
(continued)

Location	Manufacturer	Product
Morris County		
Daingerfield	Georgia Pacific	Roofing Products
Lone Star	Lone Star Steel	Steel Products
Red River County		
Clarksville	Red Kap Industries	Clothing
Clarksville	Scotch Craft Bldg. Products	Aluminum Doors and Windows
Titus County		
Mount Pleasant	Fluorcarbon Co.	Wire Products
Mount Pleasant	Kwik-Way Corp.	Wood Millwork
Mount Pleasant	Pilgrims Pride	Poultry Products

[1]Based on annual sales of $10 million or more based on information from 1988 Directory of Texas Manufacturers.

rural nature of planning area. Also, generation of solid waste by industries is directly related to their manufacturing production rates, and future production rates depend on economic conditions which are not predictable. Non-hazardous industrial waste is therefore assumed to be accounted for throughout the planning period by the higher per capita generation rates used for larger cities in calculating residential/commercial waste production. Hazardous waste is disposed of separately and does not enter the waste stream considered in this plan.

Water and Wastewater Treatment Plants

Sludge Production

Sludge refers to the solids that are removed from raw water and wastewater (sewage) during treatment. They are defined as municipal solid wastes by the state Solid Waste Disposal Act and must be disposed of properly. Sludge from water treatment plants contains fewer contaminants and is produced in smaller amounts than that from wastewater treatment plants. Information regarding water and wastewater treatment plant sludges for the study area is not readily available, and responses to questionnaires distributed to permitted dischargers during the current study provided only minimal data. (Copies of questionnaire response summaries received are found in Appendix C).

Appendix Table C-1 lists the TWC permitted water and wastewater treatment plants for the study area by county and stream segment and estimates sludge produced based on rates of 0.2 tons/MGD and 1.2 tons/MGD for water and wastewater treatment plants, respectively. The listing includes 148 TWC permitted Waste Control Order dischargers in the 10-county study area. Of these, 50 are municipalities, 22 are other local agency or private plants serving domestic requirements, three are agricultural dischargers, and the remaining 73 are industrial dischargers. Of the 50 permitted

municipal dischargers, 48 are wastewater treatment plants, and two are water treatment plants. The table also includes three municipal water treatment plants which do not operate under a TWC Waste Control Order as point discharges are not made. Estimated sludge production for these three plants are based on data furnished by the current study questionnaire.

Total estimated sludge production is about 15,600 tons per year for the 10-county study area, of which 7,500 tons per year originate in the Sulphur River Basin proper. This compares to 206,000 tons per year of total solid waste produced in the region. Of the 10-county area sludge total, about 13,750 tons per year (88 percent) are from wastewater treatment plants, and about 1,850 tons per year (12 percent) are from water treatment plants. About 5 percent of the wastewater treatment plant sludge is industrial and 95 percent is municipal or domestic. These quantities are estimates only since they are based on "rule of thumb" sludge production rates in the absence of more detailed information for each plant. Actual production rates may vary due to plant size and efficiency of operation as well as characteristics of the wastewater or raw water being treated.

Sludge Disposal

Questionnaires soliciting information on sludge disposal practices were sent to all 148 municipal and industrial water and wastewater permitted dischargers in the study area, but only 46 responses were received. The responses, found in Appendix C, are summarized in Table II-9. Most plants reporting dispose of their sludge on-site by landspreading or landfilling. Of the 46 dischargers responding, only 9 (about 20 percent) stated that they dispose of sludge at off-site landfills. None indicated a management program for reuse of sludge. Table II-9 also includes the permitted plant flow rate (maximum monthly average) and permitted daily average BOD levels for the responding wastewater treatment plants.

TABLE II-9

CURRENT STUDY QUESTIONNAIRE REPORTED
SLUDGE DISPOSAL PRACTICES

Owner	Permit number	Type plant[1]	Plant permit limits		Sludge disposal method
			Flow rate[2] (MGD)	BOD[3] (mg/L)	
Alumax	2742-001	WWTP	0.008	1.3[4]	Private hauler - location not available
Alumax	2742-002	WWTP	0.127	-	Private hauler - location not available
Avery	10733-002	WWTP	0.144	20	On-site landfill
Avinger	10646-001	WWTP	0.12	20	City landfill
Bogata	10065-001	WWTP	0.34	30	Facultative-stabilization ponds
Caddo Mills	10475-001	WWTP	0.15	30	Not available
Campbell Soup	-	WWTP	13.0	-	Land application
Celeste	10146-001	WWTP	0.0795	30	On-site landfill
Commerce	10555-001	WWTP	2.0	10	On-site landfill
Commerce	-	WTP	1.5	-	City landfill
Daingerfield	10499-001	WWTP	0.471	10	Lone Star landfill
DeKalb	10062-002	WWTP	0.35	20	Land application
Deport	10741-001	WWTP	0.183	30	Not available
Detroit	10724-001	WWTP	0.108	20	Land application
Greenville	10485-002	WWTP	4.23	20	North Texas Services landfill
Hughes Springs	10415-001	WWTP	0.49	20	On-site landfill
Hunt County Oil	11721-001	WWTP	0.007	20	Greenville WWTP
Kimberly Clark	2648-001	WWTP	0.325	-	B&B Landfill
Lone Star	12411-001	WWTP	0.44	10	City landfill
Luxury Lodges	10981-001	WWTP	0.065	20	Texarkana WWTP
Maud	10767-001	WWTP	0.08	10	Not available
A.M. Miller	11750-001	WWTP	0.038	20	Winfield WWTP
Mt. Pleasant	10575-002	WWTP	0.40	20	Land application
Mt. Pleasant	10575-001	WWTP	1.50	20	Land application
Mt. Pleasant	-	WTP	12.0	-	City landfill
Mt. Vernon	11122-001	WTP	1.50	-	City landfill
Mt. Vernon	11122-002	WWTP	0.425	20	City landfill
North Texas Comm. College	13070-001	WWTP	0.02	20	Land application
New Boston	10482-001	WWTP	0.60	20	Land application
Paris	10479-001	WTP	18.0	-	Land application
Pecan Gap	10744-001	WWTP	0.04	30	On-site landfill
Pilgrim's Pride	3017-001	WWTP	2.0	-	Land application
Red River Army Depot	2206-001/203	WWTP	3.0	250[4]	On-site landfill
Red River Army Depot	2206-001/203	WWTP	0.35	-	On-site landfill
Reno	12162-001	WWTP	0.261	20	Land application
Roxton	10204-001	WWTP	0.10	20	Land application

[1]WWTP - Wastewater Treatment Plant WTP - Water Treatment Plant
[2]Maximum monthly average
[3]Daily average
[4]Pounds per day

TABLE II-9

CURRENT STUDY QUESTIONNAIRE REPORTED
SLUDGE DISPOSAL PRACTICES
(continued)

Owner	Permit number	Type plant[1]	Plant permit limits		Sludge disposal method
			Flow rate[2] (MGD)	BOD[3] (mg/L)	
Southwestern Electric	01811-0301	WWTP	1.425	-	Daingerfield WWTP
T&N Lone Star	13326-001	WWTP	0.0065	20	Lone Star WWTP
Talco	10869-001	WWTP	0.125	20	On-site landfill
Tenaska	03021-001	WWTP	0.36	-	Not available
Texas Highway Dept.	11987-001	WWTP	0.015	20	Land application
Texas Highway Dept.	12009-002	WWTP	0.0075	20	Land application
Texarkana	-	WTP	22.5	-	City WWTP
Trey Corporation	00378-001	WWTP	0.345	-	Plant closed in 1985
U.S. Government - Camp Maxey	13249-001	WWTP	0.007	30	Stabilization pond
West Tawokoni	11331-001	WWTP	0.30	10	On-site landfill
Winfield	12146-001	WWTP	0.084	20	On-site landfill

[1]WWTP - Wastewater Treatment Plant WTP - Water Treatment Plant
[2]Maximum monthly average
[3]Daily average
[4]Pounds per day

Regulatory authority for sludge management programs is divided between the Texas Department of Health (TDH) and the Texas Water Commission (TWC). Sludge disposed at municipal landfills falls under TDH regulations. TDH also regulates land application programs run by private sludge management companies. TWC regulates any compost production and programs that apply sludge at wastewater treatment plant sites or other land owned or leased by cities.

Various possible methods of sludge disposal are discussed in Chapter IV, Sludge Disposal Alternatives. However, the limited questionnaire response level (less than 35 percent) and data available on sludge disposal methods at existing plants has accordingly provided limited input data required to evaluate sludge disposal alternatives.

SOLID WASTE LANDFILLS

Summary

There are currently 34 permitted landfills in the 10-county planning area, but only 24 of these are active. The 24 active landfills have a combined area of approximately 907 acres and have expected closure dates that vary from 1990 to 2030. Pending federal regulations are expected to drastically change this picture within the next year. Only five landfills are expected to remain open once the regulations are finalized. Of these, three are in Hunt County, and one each in Lamar, Titus, and Morris Counties. Their combined acreage would be 1,069 acres assuming planned expansions are approved. Under this scenario, 81 percent of the landfill area would be under private ownership, with 19 percent operated by public entities. This is a significant change from the present ratio, which is about 50 percent private and 50 percent public.

Current Landfill Status

During the initial studies of the 10-county planning area, some 40 landfill/dump sites were identified. The 1987 Annual Facility Report published by the Texas Department of Health (TDH) on July 25, 1988, indicates 34 permitted solid waste landfills listed in Table II-10. Of the 34 permitted landfills, seven have been closed according to the TDH report. Two more were reported to be closed and one was reported to be inactive in responses received to questionnaires mailed as part of the current study. (Copies of questionnaire response summaries are included in Appendix C).

The TDH Annual Report also indicates remaining landfill area and estimated closure dates. The remaining 24 active permitted landfills in the 10-county planning area have a combined area of approximately 907 acres based on the 1987 Annual Report.

However, approximately 65 percent of this amount is in Hunt County with nearly 30 percent in one large rural landfill operated by Wallace Hefner near Commerce. Two counties, Delta and Hopkins, do not have any permitted landfills available and Red River and Franklin Counties only have 10 acres of remaining permitted landfill area each.

The closure dates for the active landfills vary from 1990 to 2030. It is interesting to note that nine landfills, totaling 50 acres, are scheduled to close prior to 1995, and three more, totaling 91 acres, are scheduled to close prior to 2000, together representing approximately 15 percent of the remaining permitted landfill area.

Figure II-4 is a plot of the available landfill area versus planning year. Of interest is that of the 907 acres remaining in 1987, 445 acres or 49 percent is included in the six landfills owned by private industry, and 462 acres or 51 percent

TABLE II-10

PERMITTED SOLID WASTE LANDFILL
DATA FROM 1987 TDH ANNUAL REPORT

Service area	Permit No.	Operator	Type	Status	Landfill size Total (acres)	Landfill size Remain. (acres)	Closure year
Bowie County							
Texarkana	1022	Western Waste Ind.	5	O	(Transfer station)		
Dekalb	650	City of Dekalb	1	A	15	6	1992
Maud	756	City of Maud	3	A	20	8	1998
Government Depot	1315	Red River Army Depot	5	C	Closed	-	-
Government Depot	1313	Red River Army Depot	1	A	40	5	1989
New Boston	576	City of New Boston	1	A	96	18	2015
Cass County							
Avinger	285	City of Avinger	3	A	2	1	1989
Atlanta	359	City of Atlanta	1	A	10	2	1990
Linden	530	City of Linden	2	A*	50	13	1999
Bloomburg	387	City of Bloomburg	3	A	4	1	1991
County	879	Cass County - Pct. #3	3	A	3	2	1993
County	882	Cass County - McLeod	3	C	Closed	-	-
County	883	Cass County - Pct. #1	3	A	2	1	1993
County	1956	Cass County - Pct. #3	3	A	3	3	1995
Queen City	604	City of Queen City	2	A	36	23	2040
Domino	881	City of Domino	3	A	2	1	2000
Delta County							
Cooper	1014	City of Cooper	2	C	Closed	-	-

Legend:

*Questionnaire response indicates landfill recently closed.

Landfill Type:

1 - Municipal landfill serving a population equivalent of 5000 persons or more.
2 - Municipal landfill serving a population equivalent between 1500 and 5000 persons.
3 - Municipal landfills serving less than a population equivalent of 1500 persons.
4 - Landfill for construction debris, brush disposal.
5 - Separate solid waste processing sites, transfer stations.

Status:

A - Actively receiving waste
C - Closed; not receiving waste
O - Open; not actively receiving waste

TABLE II-10

PERMITTED SOLID WASTE LANDFILL
DATA FROM 1987 TDH ANNUAL REPORT
(continued)

Service area	Permit No.	Operator	Type	Status	Landfill size		Closure year
					Total (acres)	Remain. (acres)	
Franklin County							
Talco	862	City of Talco	3	A*	13	8	2012
Mount Vernon/County	563	City of Mount Vernon	2	A	20	10	2012
County	1423	Kings Country	3	C	Closed	-	-
Hopkins County							
Sulphur Springs	209	City of Sulphur Springs	1	C	Closed	-	-
Hunt County							
Commerce/Greenville	421	City of Commerce	1	A	179	159	2030
Greenville	473	City of Greenville	4	C	Closed	-	-
Greenville	1503	North Texas Services, Inc.	1	A	186	112	2008
Greenville	475	North Texas Service, Inc.	1	A	61	22	1994
Sulphur Springs and Greenville	1195	Wallace Hefner	1	A	328	278	2060
Celeste	1320	City of Celeste	3	A	54	42	2016

Legend:

*Questionnaire response indicates landfill recently closed.

Landfill Type:

1 - Municipal landfill serving a population equivalent of 5000 persons or more.
2 - Municipal landfill serving a population equivalent between 1500 and 5000 persons.
3 - Municipal landfills serving less than a population equivalent of 1500 persons.
4 - Landfill for construction debris, brush disposal.
5 - Separate solid waste processing sites, transfer stations.

Status:

A - Actively receiving waste
C - Closed; not receiving waste
O - Open; not actively receiving waste

TABLE II-10

PERMITTED SOLID WASTE LANDFILL
DATA FROM 1987 TDH ANNUAL REPORT
(continued)

Service area	Permit No.	Operator	Type	Status	Landfill size		Closure year
					Total (acres)	Remain. (acres)	
Lamar County							
County/Paris	1454	B&B Equipment Co.	1	A	129	80	1996
Paris	144	City of Paris	1	C	Closed	-	-
Morris County							
Lone Star/ Daingerfield	316[1]	City of Lone Star	1	A	41	35	2017
Naples	75	Trabage Company	2	A	30	13	2001
Omaha	436	Luther Davlin	NA	A	100	20	2000
Red River County							
Clarksville	743	City of Clarksville	2	A	20	10	1992
Titus County							
Mount Pleasant/ County	797	City of Mount Pleasant	1	A	97	55	2010

Legend:

*Questionnaire response indicates landfill recently closed.

Landfill Type:

1 - Municipal landfill serving a population equivalent of 5000 persons or more.
2 - Municipal landfill serving a population equivalent between 1500 and 5000 persons.
3 - Municipal landfills serving less than a population equivalent of 1500 persons.
4 - Landfill for construction debris, brush disposal.
5 - Separate solid waste processing sites, transfer stations.

Status:

A - Actively receiving waste
C - Closed; not receiving waste
O - Open; not actively receiving waste

[1]Final permit not yet issued.

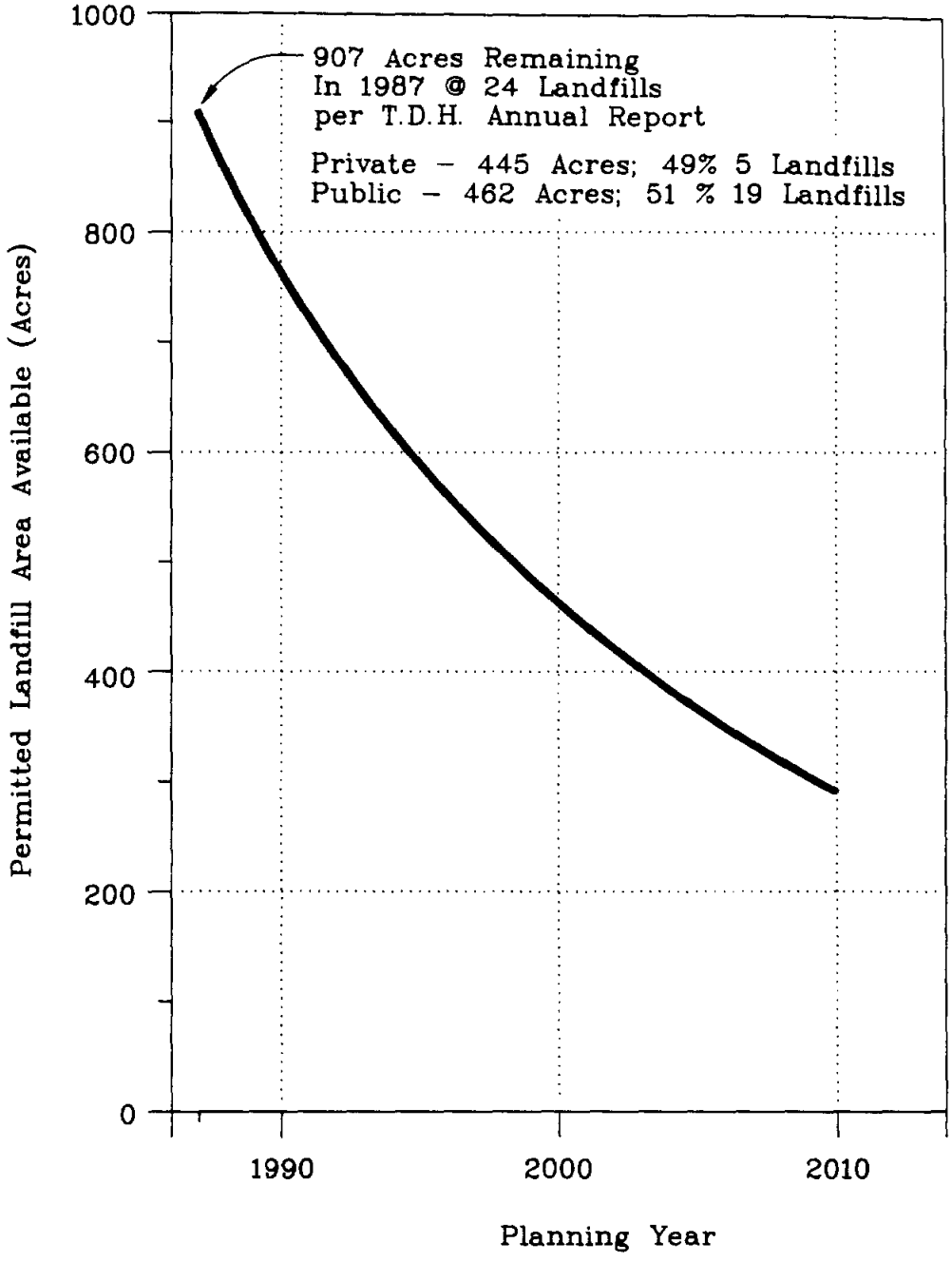


FIGURE II-4
AVAILABLE LANDFILL AREA VS. PLANNING YEAR
1987 T.D.H. DATA

is included in the 18 landfills operated by public entities. Figure II-5 shows the locations of existing active landfills. Service areas based on information furnished by TDH data and current study questionnaires are shown on Table II-10.

There are no known cases of surface water or groundwater pollution from landfills in the study area, but there is a potential risk of undesirable substances leaching from them into surrounding waters. It is expected that the Environmental Protection Agency will finalize new rules for landfills in 1990 (outlined in detail in Chapter III). These rules, designed specifically to prevent water pollution from landfills, will impose much more stringent operation requirements on existing facilities. New sites, and those which continue to operate under the new rules, will therefore pose even less risk to water supplies than they do now. Landfills unable to comply with the new regulations will have to close.

In light of this and other current influences contributing to the tentative nature of landfill life, personnel from the TDH Regions 5 and 7 were contacted to verify and/or update the information included in the 1987 TDH Annual Report. (Of the 24 active landfills included in Table II-10, five are in Hunt County and TDH Region 5 and the remaining 19 are located in TDH Region 7.) According to the updated information received, only five of the 24 landfills would remain in operation after the pending regulations are implemented. Therefore, Table II-11 has been prepared to include estimated solid waste landfill availability based on the updated information. Three of the landfills would be in Hunt County, and one each in Titus County and Lamar County.

Figure II-6 shows estimated available landfill area versus planning year for this updated information. A definite change from public to private ownership is reflected in the estimated 1990 availability of 1,069 acres, of which 862 acres or 81 percent are under private ownership at three landfills, and 207 acres or 19 percent are still

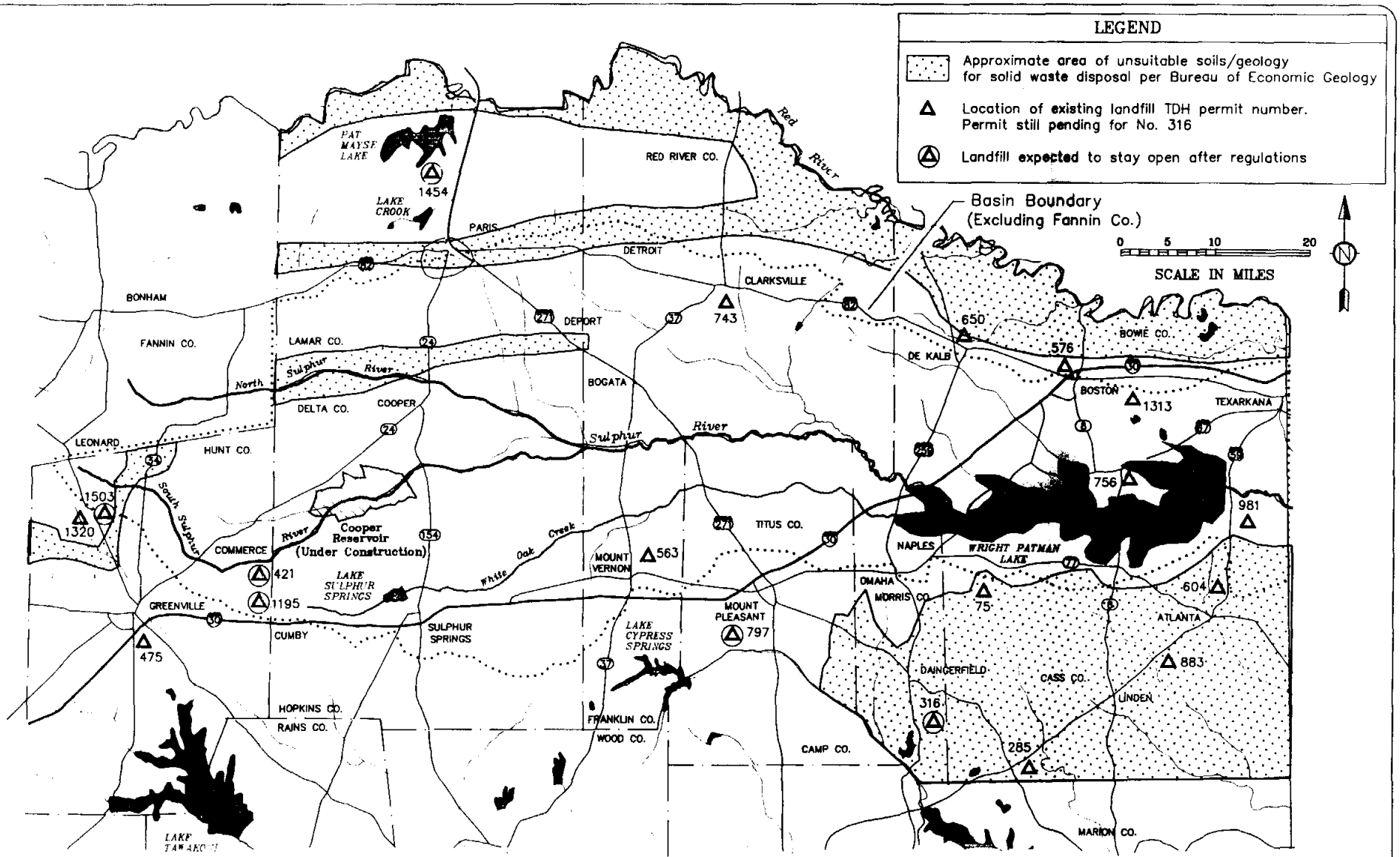


FIGURE II-5
EXISTING ACTIVE LANDFILLS

TABLE II-11

ESTIMATED SOLID WASTE LANDFILL AVAILABILITY
1987 ANNUAL REPORT DATA UPDATED BY
CURRENT INFORMATION FROM TDH

Service area	Permit No.	Operator	Type	Updated Status	Landfill size Total (acres)	Landfill size Remain. (acres)	Closure year	Alter. Map Ref. No.
Bowie County								
Texarkana	1022	Western Waste Ind.	5	0 (Transfer station)				33
Dekalb	650	City of Dekalb	1	Will close				29
Maud	756	City of Maud	3	Will close				30
Government Depot	1315	Red River Army Depot	5	C Closed	-	-		-
Government Depot	1313	Red River Army Depot	1	Closed				-
New Boston	576	City of New Boston	1	Will close				28
Cass County								
Avinger	285	City of Avinger	3	Will close				18
Atlanta	359	City of Atlanta	1	Closed				19
Linden	530	City of Linden	2	Closed				21
Bloomburg	387	City of Bloomburg	3	Closed				20
County	879	Cass County - Pct. #3	3	Will close				23
County	882	Cass County - McLeod	3	C Closed	-	-		25
County	883	Cass County - Pct. #1	3	Will close				-
County	1956	Cass County - Pct. #3	3	Will close, may use as trans. stat.				-
Queen City	604	City of Queen City	2	Will close				22
Domino	881	City of Domino	3	Will close				24
Delta County								
Cooper	1014	City of Cooper	2	C Closed	-	-		8

Legend:

Landfill Type:

1 - Municipal landfill serving a population equivalent of 5000 persons or more.
2 - Municipal landfill serving a population equivalent between 1500 and 5000 persons.
3 - Municipal landfills serving less than a population equivalent of 1500 persons.
4 - Landfill for construction debris, brush disposal.
5 - Separate solid waste processing sites, transfer stations.

Status:

Updated status based on discussions with TDH personnel at Region 5 and 7 offices.

Alternative map reference numbers in last column are used on Figures IV-5 through IV-10.

TABLE II-11

ESTIMATED SOLID WASTE LANDFILL AVAILABILITY
1987 ANNUAL REPORT DATA UPDATED BY
CURRENT INFORMATION FROM TDH
(continued)

Service area	Permit No.	Operator	Type	Updated Status	Landfill size Total (acres)	Landfill size Remain. (acres)	Closure year	Alter. Map Ref. No.
Franklin County								
Talco	862	City of Talco	3	Closed				10
Mount Vernon/County	563	City of Mount Vernon	2	Will close				9
County	1423	Kings Country	3	C	Closed	-	-	-
Hopkins County								
Sulphur Springs	209	City of Sulphur Springs	1	C	Closed	-	-	7
Hunt County								
Commerce/Greenville	421	City of Commerce	1	A	179	159	2030	1
Greenville	473	City of Greenville	4	C	Closed	-	-	-
Greenville	1503	North Texas Services, Inc.	1	A	186	112[a]	2010	-
Greenville	475	North Texas Service, Inc.	1	Will probably close				-
Sulphur Springs and Greenville	1195	Wallace Hefner	1	A	328	250[b]	2060	3
Celeste	1320	City of Celeste	3	Will close				4

Legend:

Landfill Type:

1 - Municipal landfill serving a population equivalent of 5000 persons or more.
2 - Municipal landfill serving a population equivalent between 1500 and 5000 persons.
3 - Municipal landfills serving less than a population equivalent of 1500 persons.
4 - Landfill for construction debris, brush disposal.
5 - Separate solid waste processing sites, transfer stations.

Status:

Updated status based on discussions with TDH personnel at Region 5 and 7 offices.

A - Actively receiving waste

[a]Permit amended in 1988 to increase depth of fill from 15 feet to 24 feet.

[b]Site development plan filed in 1988 indicates site would have about 20-year life. However, landfill operator is currently not in compliance with all TDH requirements.

Alternative map reference numbers in last column are used on Figures IV-5 through IV-10.

TABLE II-11

ESTIMATED SOLID WASTE LANDFILL AVAILABILITY
1987 ANNUAL REPORT DATA UPDATED BY
CURRENT INFORMATION FROM TDH
(continued)

Service area	Permit No.	Operator	Type	Updated Status	Landfill size		Closure year	Alter. Map Ref. No.
					Total (acres)	Remain. (acres)		
Lamar County								
County/Paris	1454	B&B Equipment Co.	1	A	500[c]	500	2010	39
Paris	144	City of Paris	1	C	Closed	-	-	38
Morris County								
Lone Star/ Daingerfield	316[d]	City of Lone Star	1	Will close				14
Naples	75	Trabage Company	2	Will close				16
Omaha	436	Luther Davlin	NA	Closed				15
Red River County								
Clarksville	743	City of Clarksville	2	Will close				34
Titus County								
Mount Pleasant/ County	797	City of Mount Pleasant	1	A	97	48[e]	2010	13

Legend:

Landfill Type:

1 - Municipal landfill serving a population equivalent of 5000 persons or more.
2 - Municipal landfill serving a population equivalent between 1500 and 5000 persons.
3 - Municipal landfills serving less than a population equivalent of 1500 persons.
4 - Landfill for construction debris, brush disposal.
5 - Separate solid waste processing sites, transfer stations.

Status:

Updated status based on discussions with TDH personnel at Region 5 and 7 offices.

A - Actively receiving waste

[c]Permit amended in 1988 to increase from original size of 129 acres to 500 acres. Indicated ultimate plans for site to include total area of 1,100 acres to occupy much of old Camp Maxey Military Reservation in Lamar County.

[d]Final permit not yet issued.

[e]Does not include 46 acres in permit application process.

Alternative map reference numbers in last column are used on Figures IV-5 through IV-10.

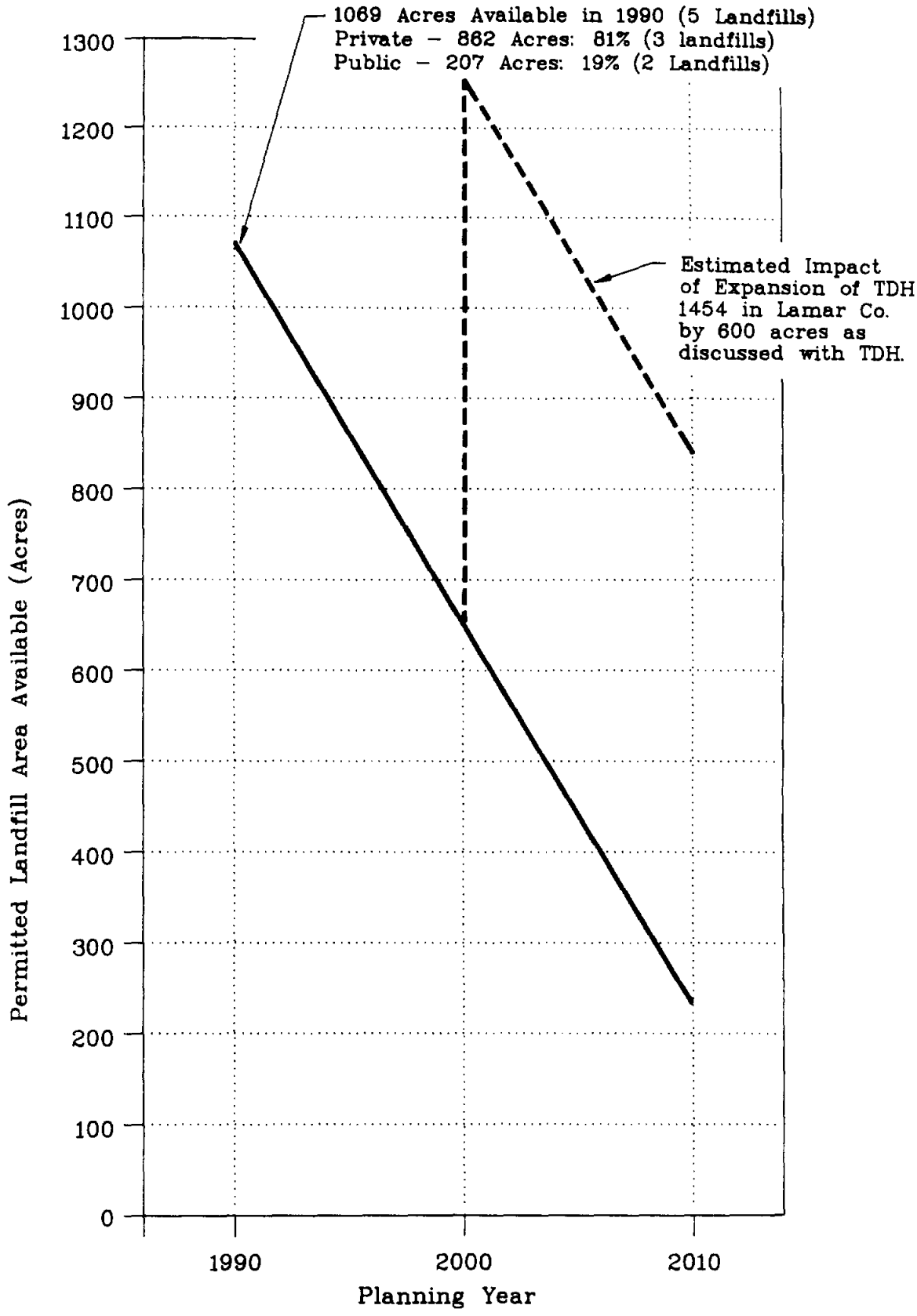


FIGURE II-6
UPDATED AVAILABLE LANDFILL AREA VS. PLANNING YEAR
1989 VERBAL T.D.H. UPDATE

operated by public entities at three landfills. This figure also assumes expansion of the B&B landfill as planned by the current owners. However, continued operation of the Lone Star Municipal Landfill is not definite as it is still operating under a permit application and not an issued permit. Also shown in Figure II-6 is a plot of the landfill area requirements for the solid waste projections developed in Chapter III. Existing landfill area adequacy will be discussed in more detail in Chapter III.

Geologic Suitability of Landfill Sites

Generalized boundaries of approximate locations of suitable soils/geology for solid waste disposal are also indicated on Figure II-5. This information was taken from "Land Resources of Texas" published by the Bureau of Economic Geology (1977). The suitable areas in the planning region generally include mineral land units noted as B-3, B-7, C-1 and C-5 in that document. Exceptions to areas indicated as suitable may occur along stream valleys and other isolated locations but generalized lines do not show this much detail. Likewise, there may be some isolated suitable areas within broadly-outlined non-suitable areas on Figure II-5. The four suitable mineral land units are briefly described below.

Mineral Land Unit	General Material Description	Use for Solid Waste Disposal
B-3	Potential Cement Material	Significant Problem Possible or Likely
B-7	Ceramic Clay and Lignite Coal	Significant Problems Unlikely
C-1	Expansive Clay Mud	Significant Problems Unlikely
C-5	Sand and Mud (Undifferentiated)	Possible Problems

The general use ratings indicated are based on the natural capacity for infiltration of the material. This can be improved by special planning, technology and

construction methods. The suitability of the B-3 material should be examined more closely on a site-specific basis as infiltration capacity is generally shown to be moderate and locally fracture controlled. The infiltration capacity of the other three units is indicated as low or low to moderate.

The Bureau of Economic Geology Publication cited above also gives the aerial extent of land or mineral resource units. The percent coverage for the four suitable mineral land units in the 10 counties in the study area was found to be about 52 percent distributed by county as indicated in Table II-12.

Solid Waste Haulers

According to studies made by the Ark-Tex Council of Governments in 1979, the usual solid waste collection procedure in the study area is vehicle pick-up at the residence or business and transportation direct to a landfill. However, there is much variation among cities regarding provision of service. Some cities run their own collection service and maintain publicly-owned landfills. Other cities are served by private enterprise for either collection or disposal services or both. There may be more than one collection service provider per city, and the landfill operator does not always provide collection. City size has little bearing on whether service provision is public or private.

In 1986, a survey was conducted by the East Texas State University at Texarkana to determine then-current methods of collection, hauling, and disposal of solid waste. Table II-13 summarizes results of that study by county and city responding to their survey. Data from Lamar County is based on the 1979 Ark-Tex Council of Government information since it was not obtained in the ETSU-T survey. Of the 43 cities for which information is available, 32 percent offer public collection service, 58 percent

TABLE II-12

PERCENT COVERAGE OF SUITABLE/UNSUITABLE MINERAL LAND UNITS IN STUDY AREA PER LAND RESOURCES OF TEXAS, BUREAU OF ECONOMIC GEOLOGY, 1977

County	Percent Coverage[1]	
	Suitable	Unsuitable
Bowie	57	43
Cass	13	87
Delta	67	33
Franklin	66	34
Hopkins	76	24
Hunt	43	57
Lamar	66	34
Morris	33	67
Red River	53	47
Titus	61	39
Weighted Average	52	48

[1]Percent coverage based on area of coverage shown for mineral land unit B-3, B-7, C-1, and C-5 in each county divided by total land area of each county.

TABLE II-13

SUMMARY OF SOLID WASTE HAULER
SURVEY INFORMATION

Location	Collector/Hauler Public	Collector/Hauler Private	Disposal at Local City Landfill
Bowie County			
DeKalb	Yes	No	Yes
Hooks	Yes	No	No
Leary	No	Yes	No
Maud	Yes	No	Yes
Nash	No	Yes	No
New Boston	Yes	No	Yes
Texarkana	No	Yes	No
Wake Village	No	Yes	No
Cass County[3]			
Atlanta	Yes	No[1]	Yes
Avinger	No	Yes[2]	Yes
Bloomburg	No	Yes[1]	Yes
Domino	No[4]	[4]	Yes[4]
Douglassville			
Hughes Springs	No	Yes	No
Linden	Yes	No	Yes
Marietta[5]	No	No	No
Queen City	No	Yes	Yes
Delta County			
Cooper	No[4]	Yes[4]	No[4]
Pecan Gap			
Franklin County			
Mount Vernon	Yes	No	Yes
Winnsboro	Yes	No	No
Hopkins County			
Como	[4]	[4]	[4]
Cumby	No	Yes	No
Sulphur Springs	No[4]	Yes[4]	No[4]
Tira			
Hunt County			
Caddo Mills	[4]	[4]	[4]
Campbell	[4]	[4]	[4]
Celeste	Yes	No	Yes
Commerce	No	Yes	Yes
Greenville	No[4]	Yes[4]	No[4]
Lone Oak	[4]	[4]	[4]
Neylandville			
Quinlan	No[4]	Yes[4]	No[4]
West Tawakoni			
Wolfe City	No	Yes	No

TABLE II-13

SUMMARY OF SOLID WASTE HAULER
SURVEY INFORMATION
(continued)

Location	Collector/Hauler Public	Collector/Hauler Private	Disposal at Local City Landfill
Lamar County[6]			
Blossom	No	Yes	No
Deport	Yes	No	No
Paris	No	Yes	No
Reno	No	Yes	No
Roxton	No	Yes	No
Sun Valley	[4]	[4]	[4]
Toco	[4]	[4]	[4]
Morris County			
Daingerfield	Yes	No	No
Lone Star	Yes	No	Yes
Naples	No	Yes	No
Omaha	No	Yes	No
Red River County			
Annona	No	Yes	No
Avery	No	No[1]	Yes
Bogata	No	Yes	No
Clarksville	No	Yes	No
Detroit	No	Yes[7]	No
Titus County[8]			
Miller's Cove	[4]	[4]	[4]
Monticello	[4]	[4]	[4]
Mount Pleasant	Yes	No	Yes
Talco	Yes	No	Yes
Winfield	No	Yes	No

[1] Residents must take their own trash to landfill.
[2] Residents may take their own trash to landfill or have it picked up by private contractors not under city control.
[3] Cass County operates four county landfills for rural area and smaller communities.
[4] Information not available.
[5] Small rural community; has no solid waste program.
[6] B & B Landfill which serves Paris also serves other smaller communities and rural areas of Lamar County.
[7] Residents take trash to central collection point where it is picked up by contractor.
[8] Mount Pleasant landfill available to residents of Titus County.

are served by private haulers, and the remainder have no organized collection - i.e. residents take their own trash to the landfill. Responses to questionnaires received during the current study generally confirmed the ETSU-T survey results.

ON-SITE DISPOSAL

Solid Waste

Due to the rural nature of the study area, some of the domestic solid waste in unincorporated areas is disposed on-site, either by burning or by land disposal. Prior studies have shown that this may be as much as 40 percent of the amount generated. This is true particularly for large landowners, who have available area to dispose of solid waste or may reuse it as part of agriculture or livestock operations. As discussed in Chapter II, there are 38 communities in the study area with a population of 2,000 or less, and some on-site disposal in these areas is also likely.

On-site disposal is a concern. Open burning of trash may cause air quality problems. Improper land disposal may lead to trash being washed into surface waters or onto other property. Controls would be desirable but may be difficult to enforce in rural areas on private property. Public education efforts could help reduce this problem.

Septic Tank Waste

On-site disposal of sewage is used in the more rural portions of the planning area where organized wastewater collection systems are not available. In the septic tank/drain field system, the tank itself serves as a settling basin and removes about 50 percent of the particulate solids. The overflow from the tank into the absorption field is a potential source of nonpoint pollution but if the field is properly sized and installed in adequately draining soils the problem should be minimal. House Bill

No. 1875 gives the TDH supervision and authority over the location, design, construction, installation and proper functioning of on-site sewage disposal systems. The House Bill also permits the TDH to delegate the responsibility to local responsible government entities. However, only three counties in the area have been delegated the authority: Cass, Hunt and Lamar (Table II-14).

Proper operation and maintenance of septic tanks requires that settled solids be removed from the tank as needed. Removal should be done by a registered septic tank cleaning service certified by the Texas Department of Health to remove and transport the septage/sludge to an approved point of disposal, normally a wastewater treatment plant. It then becomes part of the wastewater treatment plant sludge requiring processing or disposal.

The TDH requires that the registered waste transporter file an annual report indicating the amount of septage handled as well as points of collection and disposal. Unfortunately, the response to these requirements has not yet developed to the point of providing meaningful data, and it is felt by some TDH personnel that substantial amounts of septage are disposed of illegally. The TDH recently initiated a program to inform citizens with septic tanks of their responsibility to operate them properly and to use only TDH-registered cleaning services. TDH also publishes required septic tank design criteria; minimal sludge production should result from properly designed and operated systems.

Nationwide, EPA estimates as much as 4 billion gallons per year of septage are produced. The annual amount is about 65 to 70 gallons per person for properly functioning systems according to studies by Kolega and Dewey. Recommendations for frequency of pumping vary from 2 to 5 years.

TABLE II-14

COUNTY SEPTIC TANK/SEWAGE DISPOSAL REGULATIONS

County	Regulations In-Place	County Sanitarian/ Health Officer
Bowie	No	-
Cass	Yes	David Fant (214) 756-7051
Delta	No	-
Franklin	No	-
Hopkins	No	-
Hunt	Yes	Jay Coddle (214) 455-1761
Lamar	Yes	Paris/Lamar County Health Dept. (214) 785-4561
Morris	No	-
Red River	No	-
Titus	No	-

Source: Telecon with Texas Department of Health - Regions 5&7

Does not include any city ordinances.

There are no statistics available regarding numbers of septic tanks in the planning area, so estimates have been made. These estimates assume that 80 percent of the unincorporated area population uses septic tanks, and assumes an average of 3 persons per household each producing 70 gallons of septage per year. The total number for the planning area is estimated to be 32,840. Estimated septic tank numbers by county are listed in Table II-15. The total number of TDH registered septic tank/sludge haulers in the study area is only 21. The number of registered haulers in each county is also shown in Table II-15.

Data on hauling capacity of the septic tank/sludge haulers in the planning area is not available. However, based on the assumption that the 21 registered haulers could each handle an average of approximately 2,000 gallons per day and work about 200 days per year; they could handle about 8.4 million gallons per year. This would be adequate to handle the projected volume of septage estimated to be approximately 6.89 million gallons per year in Table II-15.

TABLE II-15

ESTIMATED NUMBER OF SEPTIC TANK-DRAIN FIELD FACILITIES
FOR COUNTY RURAL POPULATION AND TDH REGISTERED HAULERS

County	1987 Rural Population	Estimated Number of Septic Tank Facilities[1]	Estimated Septage Produced[2] (mg/yr)	Number of Registered Haulers[3]
Bowie	28,263	7,535	1.58	4
Cass	15,715	4,190	0.88	0
Delta	2,299	615	0.13	0
Franklin	4,503	1,200	0.25	0
Hopkins	12,543	3,345	0.70	4
Hunt	23,316	6,220	1.31	6
Lamar	12,968	3,460	0.73	4
Morris	6,141	1,640	0.34	2
Red River	7,387	1,970	0.41	0
Titus	9,999	2,665	0.56	1
Total	123,134	32,840	6.89	21

[1]Assuming that 80% of rural population is served by septic tank facilities and 3 persons per rural household on septic tank facility.

[2]Septage estimated based on 70 gallons per year per capita for estimated rural population served by septic tanks.

[3]Texas Department of Health data as of November 30, 1989.

CHAPTER III

FUTURE NEEDS

POPULATION

This section presents population projections for the 1990-2010 planning period. The projections are based on the Texas Water Development Board - High Series projections and are shown on Figure III-1 for the 10-county planning area. Projected population densities are also given by county and census division within each county. Population distribution within each county was assumed to be similar to that based on the 1980 census since more recent data were not available, but this should be verified when the 1990 census data is available.

Cities

Population projections, given in Table III-1, exist for only 29 of the 56 incorporated cities in the planning area. However, these 29 accounted for 93.5 percent of the 1987 population of the 56 communities. The 1990 projected population of the 29 cities is 181,761 and is estimated to increase by about 25 percent to 226,961 over the 20-year planning period. The minimum percentage increase projected for the 20-year period is 10.8 percent for the City of Cooper in Delta County while the maximum percentage increase is 43 percent for Mount Vernon in Franklin County. Populations of the remaining 27 incorporated communities will probably increase at or below the rate of increase for the county in which they are located.

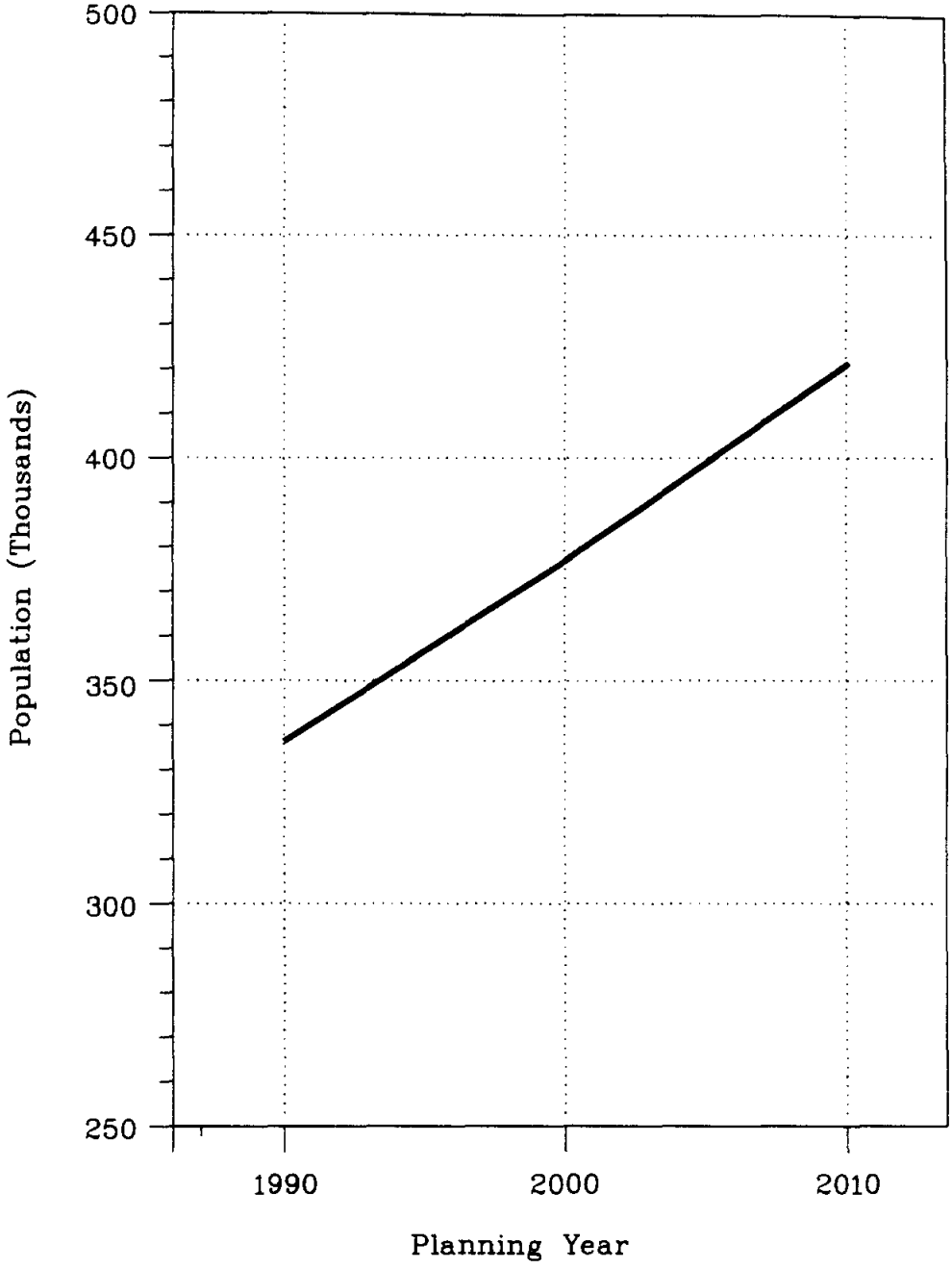


FIGURE III-1
PLANNING AREA PROJECTED POPULATIONS

TABLE III-1

PROJECTED CITY POPULATIONS [1]

Entity	1990	2000	2010	1990-2010 Percent Change
Bowie County				
DeKalb	2,185	2,345	2,610	19.5
Hooks	2,636	2,934	3,266	20.1
Maud	1,236	1,338	1,490	20.6
Nash	2,555	3,037	3,380	32.3
New Boston	5,371	6,347	7,066	31.6
Texarkana	33,960	38,038	42,351	24.7
Wake Village	4,602	5,771	6,424	39.6
Cass County				
Atlanta	6,753	7,904	8,585	27.1
Hughes Springs	2,705	3,012	3,270	20.9
Linden	2,409	2,608	2,833	17.6
Queen City	2,111	2,493	2,707	28.2
Delta County				
Cooper	2,206	2,375	2,445	10.8
Franklin County				
Mount Vernon	2,477	2,998	3,543	43.0
Winnsboro	890	1,020	1,134	27.4
Hopkins County				
Sulphur Springs	15,560	17,307	19,269	23.8
Hunt County				
Caddo Mills	1,498	1,652	1,868	24.7
Commerce	7,369	8,129	9,196	24.8
Greenville	25,688	28,327	32,045	24.7
Quinlan	2,187	2,665	3,013	21.9
Wolfe City	1,710	1,884	2,131	24.6
Lamar County				
Blossom	2,115	2,279	2,581	22.0
Paris	26,738	28,712	32,535	21.7
Reno	1,244	1,339	1,518	22.0
Morris County				
Daingerfield	2,874	3,169	3,710	29.1
Lone Star	2,268	2,737	3,203	41.2
Naples	1,883	2,187	2,559	35.9
Red River County				
Bogata	1,550	1,612	1,755	13.2
Clarksville	4,682	4,869	5,304	13.3
Titus County				
Mount Pleasant	12,299	13,485	15,170	23.3
Twenty-nine City Total/Average	181,761	202,573	226,961	24.9

[1] Limited to cities for which TWDB has prepared projections.

Counties

Projected population data for the 10-county study area developed by the Texas Water Development Board (TWDB) as well as the Texas Department of Commerce and the Texas Department of Health were evaluated during this planning study. Of these, the TWDB - High Series projections developed in September 1988 were adopted for use. They closely agree with other available projections for the planning area. Table III-2 shows projections for 1990, 2000, and 2010 as well as the 1990 to 2010 percent change for each of the 10 counties. The 1990 projected population of 335,827 for the entire study area is expected to increase to 421,415 by the year 2010, about a 25 percent increase. The minimum percentage increase projected is 10.6 percent for Delta County; the maximum is 40 percent for Franklin County. Information broken down by incorporated and unincorporated areas is also presented.

Projected population densities and housing densities for each of the 10 counties for 1990, 2000 and 2010 are given in Table III-3, for the county as a whole and by county divisions used in the 1980 census. The population densities for 1990 range from a low of four persons per square mile in the Manchester Division of Red River County to a high of 428 persons per square mile for the Texarkana Division in Bowie County. The density range for 2010 is from 5 to 533 persons per square mile for the same two divisions.

Basin Area Only

Projected populations for the basin area only have also been estimated. Table III-4 gives the projected basin population by county for 1990, 2000, and 2010 as well as the 1990 to 2010 percent change for each of the 10 counties or portions of the counties which are in the river basin area.

TABLE III-2

PROJECTED POPULATIONS -
COUNTY UNINCORPORATED/INCORPORATED AREAS

	1990	2000	2010
Bowie County	82,689	92,230	102,852
City Population[1]	52,545	59,810	66,587
Unincorporated Areas[2]	30,144	32,420	36,265
Cass County	32,293	36,406	39,634
City Population[1]	13,978	16,017	17,395
Unincorporated Areas[2]	18,315	20,309	22,239
Delta County	4,765	5,119	5,269
City Population[1]	2,206	2,375	2,445
Unincorporated Areas[2]	2,559	2,744	2,824
Franklin County	8,268	9,763	11,529
City Population[1]	3,367	4,018	4,677
Unincorporated Areas[2]	4,901	5,745	6,852
Hopkins County	31,203	36,135	40,010
City Population[1]	15,560	17,307	19,269
Unincorporated Areas[2]	15,643	18,828	20,741
Hunt County	74,301	83,459	92,236
City Population[1]	38,452	42,657	48,253
Unincorporated Areas[2]	35,849	40,802	43,983
Lamar County	46,551	54,179	60,941
City Population[1]	30,097	32,330	36,634
Unincorporated Areas[2]	16,454	21,849	24,307
Morris County	15,351	18,022	21,149
City Population[1]	7,025	8,093	9,472
Unincorporated Areas[2]	8,326	9,929	11,677
Red River County	15,407	16,025	17,457
City Population[1]	6,232	6,481	7,059
Unincorporated Areas[2]	9,175	9,544	10,398

TABLE III-2

PROJECTED POPULATIONS -
COUNTY UNINCORPORATED/INCORPORATED AREAS
(Continued)

	1990	2000	2010
Titus County	24,999	26,990	30,388
City Population[1]	12,299	13,485	15,170
Unincorporated Areas[2]	12,700	13,505	15,218
Study Area Total	335,827	378,328	421,465
Study Area City Population[1]	181,761	202,573	226,961
Study Area Unincorporated Areas[2]	154,066	174,755	194,504

[1]Only includes cities for which TWDB projections were made.

[2]Includes population of small communities for which individual population projections were not made. In 1987, the small communities accounted for about 6.5% of the city population.

TABLE III-3

COUNTY AND CENSUS DIVISION PROJECTED POPULATION DENSITIES

County Census Divisions	Persons and Est. Number of Houses Per Square Mile					
	1990		2000		2010	
	Pers.	Houses	Pers.	Houses	Pers.	Houses
Bowie County	93	39	104	44	115	48
Dalby Springs-Simms	14	5	16	6	17	6
DeKalb	27	12	30	13	34	15
Hooks	43	18	48	20	54	23
Maud-Elliot Creek	40	16	45	18	50	20
New Boston	88	36	98	40	110	45
Texarkana	428	176	478	197	533	219
Cass County	34	15	39	17	42	19
Atlanta	72	30	81	34	88	37
Bivins-McLeod	17	7	19	8	21	9
Hughes Springs-Avinger	39	17	44	19	48	21
Linden	25	11	28	12	31	14
Marietta Douglassville	14	6	16	7	17	7
Delta County	17	8	19	9	19	9
Cooper	34	16	36	17	37	17
Pecan Gap	7	3	8	3	8	3
Franklin County	28	13	33	15	39	18
Mount Vernon	27	12	32	14	37	16
Winnsboro	34	15	40	18	47	21
Hopkins County	39	17	46	20	50	22
Cumby	20	8	24	10	26	10
North Hopkins-Sulphur Bluff	10	4	12	5	13	5
Pickton-Pine Forest	26	11	30	13	33	14
Seymour	22	8	26	9	29	11
Sulphur Springs	121	55	140	64	155	70

TABLE III-3

COUNTY AND CENSUS DIVISION PROJECTED POPULATION DENSITIES
(Continued)

County Census Divisions	Persons and Est. Number of Houses Per Square Mile					
	1990		2000		2010	
	Pers.	Houses	Pers.	Houses	Pers.	Houses
Hunt County	90	38	101	43	112	47
Caddo Mills	47	19	52	21	58	23
Celeste	25	11	28	12	31	14
Commerce	153	68	159	71	190	84
Greenville	175	73	197	82	217	91
Lone Oak	28	12	31	13	35	15
Quinlan	72	31	81	35	90	39
Wolfe City	46	20	52	23	58	25
Lamar County	52	22	61	26	68	29
Biardstown	11	4	12	4	14	5
Blossom	31	12	36	14	41	16
Deport	25	11	30	13	33	15
Howland	14	5	16	6	18	6
Paris	291	131	338	152	381	172
Powderly	24	9	28	9	32	12
Roxton	16	8	19	10	21	11
Sumner	14	5	16	6	18	6
Morris County	59	24	69	28	81	33
Daingerfield	87	34	102	40	120	47
Naples	36	16	42	19	50	22
Red River County	15	7	15	7	17	8
Annona-Avery	10	5	11	6	12	6
Bogata	15	7	16	7	17	8
Clarksville	41	18	42	18	46	20
Detroit	12	5	12	5	13	5
Manchester	4	2	4	2	5	2
Titus County	60	26	65	28	73	32
Cookville	27	11	29	12	33	13
Mount Pleasant	159	68	172	74	194	83
Talco	18	8	19	8	22	10
Winfield	33	14	35	15	40	17

TABLE III-4

PROJECTED SULPHUR RIVER BASIN POPULATION BY COUNTY

County	Sulphur River Basin Portion 1990	2000	2010	1990-2010 Percent Change
Bowie	59,950	66,870	74,570	24.3
Cass	8,300	9,360	10,190	22.8
Delta	4,765	5,119	5,269	10.6
Franklin	6,100	7,210	8,510	39.5
Hopkins	26,340	30,500	33,770	28.2
Hunt	23,480	26,370	29,150	24.1
Lamar	14,620	17,010	19,140	30.9
Morris	4,610	5,410	6,340	37.5
Red River	12,390	12,880	14,040	13.3
Titus	9,770	10,550	11,880	21.6
Total/Average	170,325	191,279	212,859	25.0

PROJECTED SOLID WASTE

Source

Projected solid waste estimates have been developed for the 10-county planning area based on Texas Water Development Board - High Series population projections and assumed rates of per capita generation. Much of the population in the planning area presently lives in rural settings; about 48 percent live in unincorporated areas or communities below 2,000 population. As discussed in Chapter II, these areas are more likely to practice onsite disposal than more urban areas. The percentage of urban versus rural residents in the planning area is not expected to change significantly over the next 20 years.

Characteristics

The solid waste generated in much of the study area is primarily residential. About 80 percent of the geographical planning area is rural (unincorporated areas or communities below 2,000 population). The remaining 20 percent includes about 52 percent of the population who live in 18 cities. These urban areas produce some commercial and industrial as well as residential wastes. The typical composition of municipal solid waste by category according to EPA studies is as shown below:

Solid Waste Classification	Percentage
Paper and paper goods, including cardboard	41.0
Yard wastes	17.9
Food wastes	7.9
Wood, rubber, textiles, and leather	8.1
Plastics	6.5
Metal	8.7
Glass	8.2
Miscellaneous inorganic wastes	1.6

The general characteristics of waste in the study area are not expected to change significantly over the 20-year planning period.

Quantities

Total annual solid waste estimates range from 160 to 230 million tons for the U.S., depending on how the waste stream is defined. This equals between 3.6 and 5.2 pounds per person per day (PPD). Various per capita solid waste generation rates were evaluated to select the appropriate rate for making solid waste projections for the planning area.

According to recent estimates by the Texas Department of Health, Texans generate about 18 million tons per year or about 5 ppd. Prior studies in northeast Texas have used rates varying from 3.3 to 4.1 ppd. In Chapter II, the average generation rate was estimated at 3.56 ppd for the study area (Table II-7) with higher rates in cities greater than 20,000 and lower rates in small cities and rural areas. This is less than the estimated Texas average, which would be expected since there are no major urban/industrial areas in the study area. (Only six cities, Texarkana, Sulphur Springs, Greenville, Paris, Mount Pleasant and Commerce, have populations greater than 10,000, and none is over 35,000).

Figure III-2 depicts projected estimates of solid waste for the 10-county area using the estimated existing generation rates. It also shows the effect of the USEPA published National Waste Reduction Goal of 25 percent by 1992. If this goal is reached by waste minimization and recycling efforts, the waste generation rate for the planning area would average about 3 ppd.

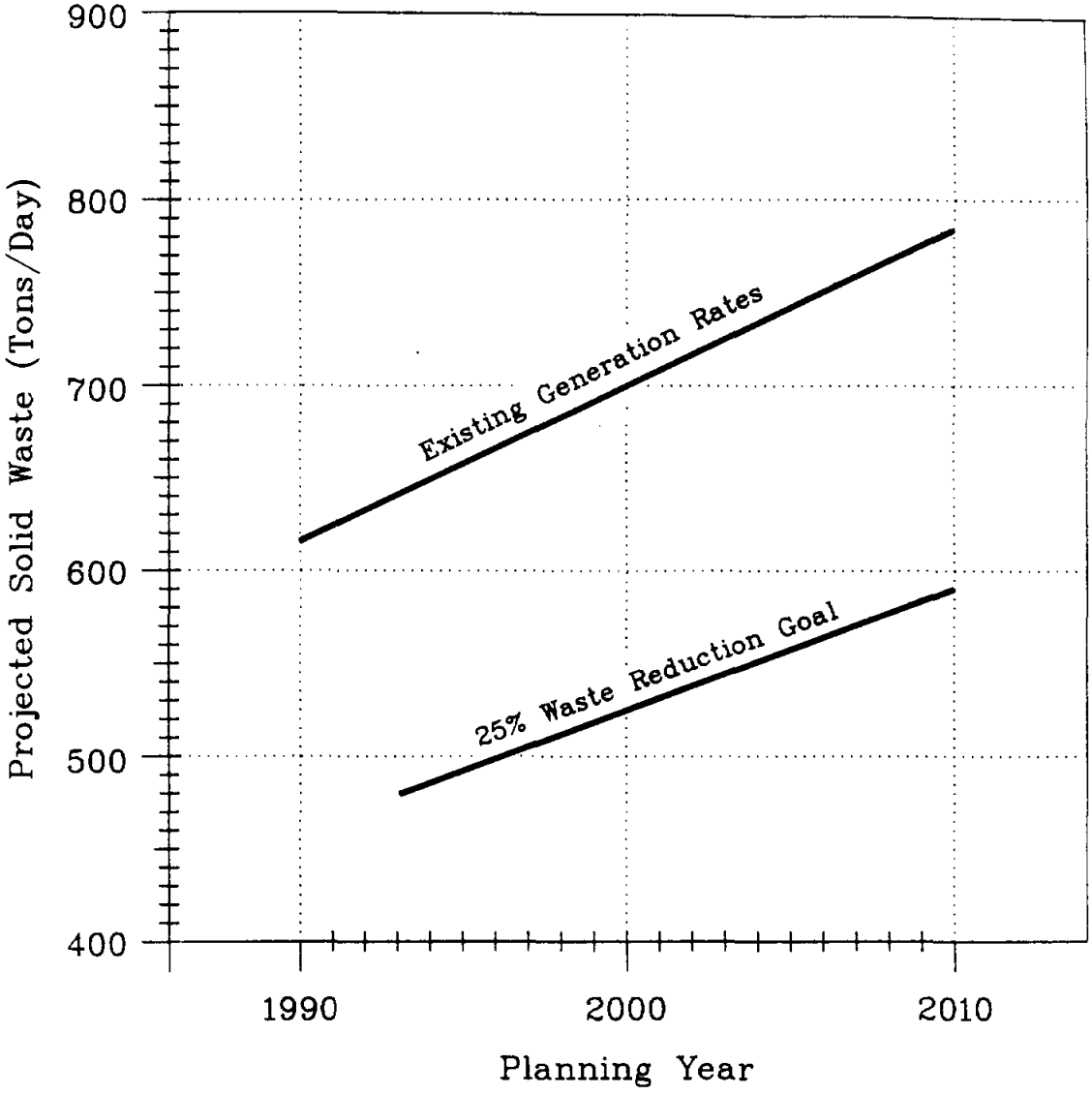


FIGURE III-2
PLANNING AREA SOLID WASTE PROJECTIONS

PREDICTED FUTURE LANDFILL REQUIREMENTS

Subtitle D Criteria for Landfills

In 1984, the U.S. Congress added Hazardous and Solid Waste Amendments (HSWA) to the Resource Conservation and Recovery Act of 1976 (RCRA). This legislation required the U.S. Environmental Protection Agency (EPA) to review its regulations and revise them as necessary to ensure that all municipal solid waste landfills be sited, designed, and operated so as to protect human health and the environment. At a minimum, the revisions should require groundwater monitoring to detect contamination and provide for corrective action as necessary.

EPA has developed revised proposed criteria for landfills, published in the August 30, 1988 Federal Register as "Solid Waste Disposal Facility Criteria", 40 CFR Parts 257 and 258, or Subtitle D Criteria. These require new performance standards for publicly and privately-owned municipal solid waste landfills, including location restrictions, facility design and operating criteria, and requirements for groundwater monitoring, corrective action, financial assurance, and closure and post-closure procedures.

The criteria have not yet been promulgated in final form. EPA's current published schedule is to adopt final rules by the end of February 1990 with an effective date of 18 months thereafter--about September 1, 1991. It is expected that the Texas Department of Health will implement a permit and enforcement program that will conform to the regulations which EPA adopts.

HSWA gave EPA the authority to regulate municipal solid waste management in any state that does not implement an adequate permitting and enforcement program. Since HSWA also contains a provision that any citizen may institute a suit in Federal court against any landfill operator who is in violation of a federal regulation, EPA does

not intend to establish a formal enforcement program. EPA's goal is to write regulations in such a manner so that the average citizen can readily tell if an operator is in violation. Any suit filed against a site operator will also include the state for failure to enforce the regulations, and this provision essentially requires that the state adopt the federal regulations.

The proposed criteria are much more stringent and complicated than current standards and will significantly increase the cost of waste disposal. They will necessitate careful evaluation by local governments to decide if it is in their best interest to remain in the solid waste disposal business or contract to another local government or to private enterprise. Timely decisions and arrangements should be made to provide any necessary replacement site that meets the new standards. If a replacement site is not available by the effective date, existing landfill operations will be required to comply with the new regulations.

Following is a summary of the criteria expected to be adopted:

I. Operating Criteria

1. Daily cover will be required on all sites.

2. Explosive gases control will be required.

3. Open burning will be prohibited.

4. 24-hour access control will be required on all sites.

5. Drainage control will be required to consist of run-on control systems to prevent flow into active portions of the landfill during

a 25-year storm and run-off control system to collect and control the volume of a 24-hour, 25-year storm.

6. No discharge of water from a landfill will be permitted unless it is in accordance with the Clean Water Act.

7. Liquids, including vacuum truck wastes, will not be allowed to be accepted at a landfill.

8. A program must be implemented to detect and prevent the disposal at the facility of regulated hazardous waste and PCBs.

II. Closure and Post-closure Criteria

1. All sites will have to submit a closure and post-closure plan for approval. New sites have to have these plans at the time of permit application.

2. The post-closure maintenance period will last a minimum of 30 years.

3. Financial assurance for proper closure and post-closure maintenance will have to be provided for the life of the landfill and the post-closure period. Only Federal and State-owned facilities would be exempt. The amount of financial assurance will be based on a detailed, annually-revised cost estimate as to what it would cost for a third party to effect proper closure or post-closure remedial action.

III. Design Criteria

1. As originally proposed, new landfills and new units (trenches or cells) within existing landfills would be designed against an allowable groundwater carcinogenic risk level and might be required to have liners and leachate collection systems. The allowable risk level would apply to the site boundary and would be based on a lifetime cancer risk level (due to continuous lifetime exposure) within a range from $1x10^{-4}$ to $1x10^{-7}$ (one case of cancer per 10,000 persons exposed to one case per 10,000,000 persons exposed). However, EPA has subsequently abandoned this approach and will adopt one of the other alternative design proposals or a combination thereof.

2. Completed sections of an existing landfill would not have to be retrofitted for liners and leachate collections systems, but would have to have a proper final cover and cover maintenance.

IV. Groundwater Monitoring Criteria

1. All new sites will be required to monitor the groundwater. The sampling requirements will be intense and will continue through the 30-year post-closure maintenance period.

2. Previously filled areas within existing landfills will be exempt from groundwater monitoring requirements only if the permittee can demonstrate that there is no potential for migration of hazardous constituents to the uppermost aquifer during the active life of the landfill and the post-closure care period.

The proposed criteria will probably accomplish what RCRA had envisioned in 1976--regionalization of solid waste management services. The RCRA concept was to require regional and local solid waste management plans that would provide for a minimum number of strategically-located landfills to receive waste from a large service area. Once this was done, the waste stream could be characterized and a combination of materials recovery and energy recovery systems could be established to maximize revenue and bury the smallest amount of waste possible. The increased cost of operating a landfill under the proposed rules should provide adequate incentives to regionalize, recycle as much as possible, establish waste-to-energy facilities, and bury the smallest amount of waste possible in order to conserve landfill capacity.

The imminent high-tech mode of solid waste management will require professionally-trained landfill managers, adequate operator certification, and proper management of equipment. Many of the presently existing landfills may have to be closed and replaced by regional landfills which can serve areas now being served by as many as 10 or more small landfills. As discussed in Chapter II, three-fourths of the currently active landfills in the study area are likely to close. Most of the smaller landfills utilize open burning which will be prohibited by the proposed criteria. It is estimated that the more expensive high-tech landfill operations may need a minimum service area equivalent population of 50,000 to make their operation feasible.

Projected Needs for Landfill Space

Table III-5 includes projected population data, solid waste quantities, and landfill requirements by county based on disposal of all solid waste by landfilling in the study area. The projected solid waste and landfill requirements data are presented for two scenarios: the first data set assumes that the EPA waste reduction goal of 25 percent by 1992 will not be met, and the second data set assumes that the EPA

TABLE III-5

SULPHUR RIVER BASIN REGIONAL SOLID WASTE PLANNING
COUNTY PROJECTIONS/LANDFILL REQUIREMENTS

County	Projected Population 1990	2000	2010	Solid Waste Projections w/o EPA Reduction Goal 1990	2000	2010	20-Year Landfill Req.	Solid Waste Projections w/EPA Reduction Goal 1990	2000	2010	20-Year Landfill Req.
	---(1000 persons)----			---(1000 tons/year)----			----Acre-----	---(1000 tons/year)----			----Acre-----
Bowie	82.7	92.2	102.9	58	65	73	111	58	49	55	86
Cass	32.3	36.4	39.6	20	23	25	39	20	17	19	30
Delta	4.8	5.1	5.3	3	3	3	5	3	2	2	4
Franklin	8.3	9.8	11.5	5	6	7	10	5	5	5	8
Hopkins	31.2	36.1	40.0	20	25	28	42	20	19	21	32
Hunt	74.3	83.5	92.2	51	58	64	99	51	44	48	76
Lamar	46.6	54.2	60.9	33	38	43	65	33	29	32	50
Morris	15.4	18.0	21.1	10	11	13	19	10	8	10	15
Red River	15.4	16.0	17.5	9	10	11	17	9	8	8	13
Titus	25.0	27.0	30.4	16	17	19	29	16	13	14	23
TOTALS	336.0	378.3	421.4	225	256	286	437	225	192	215	338

waste reduction goal will be met. The adequacy of existing landfills to meet these requirements is discussed in Chapter IV, Regional Plan Alternatives.

The projected landfill requirements are based on a disposal rate of 800 pounds of solid waste per cubic yard of landfill and an average landfill depth of 20 feet for a resultant landfill loading of about 12,900 tons per acre and a five percent contingency.

Primary factors to consider in siting new landfills include access/transportation requirements, soils, geology, topography, and land use/availability. Other factors to consider include proximity to airports and other developed areas, wetlands or flood-prone areas, streams, and reservoirs; availability of adequate soils for required lining and cover operations; groundwater conditions; surface drainage patterns; and climatic conditions. Public participation during the siting process should be encouraged to minimize the "NIMBY" (not in my back yard) syndrome and to keep the public properly informed. Public acceptance of a given site can likely be the most important siting factor, and it can even reduce subsequent permitting requirements.

PREDICTED WATER QUALITY AND QUANTITY

Surface Water

As indicated above, the surface water resource potential of the Sulphur River Basin of Texas is substantial. The latest version of the Texas Water Plan (1984) includes an analysis of water supply and demand in the Sulphur River Basin through 2030. It concludes that, in 2030, the predicted basin demand can be supplied by 193,200 acre-feet per year of in-basin surface water, 40,400 acre-feet per year of imported surface water and 5,300 acre-feet per year of in-basin ground water.

Development of Cooper Reservoir, George Parkhouse Reservoir, and the first stage of the Marvin Nichols Reservoir would allow 485,000 acre-feet per year to be exported from the Sulphur Basin for use in areas of heavy need further west. Table III-6 is taken from the 1984 Texas Water Plan. It illustrates the surface water development potential, indicates the in-basin water supply requirements and shows projected exports to other basins as well as developed surface water yield in reserve for future need for the period 2000 through 2030. It can be seen that the potential water supply yield by 2030 is approximately six times that required to meet projected net in-basin needs. Figure III-3 shows these future reservoirs as well as existing surface water development.

This valuable resource must be protected. State water quality standards must be met in accordance with the General Policy Statement of the Texas Water Commission, i.e., "to maintain the quality of water in the State consistent with public health and enjoyment, propagation and protection of terrestrial and aquatic life, operation of existing industries, and economic development of the State." As discussed in Chapter II, the existing quality of waters in the Sulphur River Basin is generally good. This quality must be preserved.

A major statewide concern regarding solid waste disposal is the illegal dumping of all kinds of waste. This can have a negative effect on surface water quality, since trash is frequently dumped in gullies or near streams. When rainwaters cause local flooding, refuse, or materials from it that dissolve into the water, can wash into surface water supplies. Since many landfills are expected to close and the cost of trash disposal is expected to rise, an increase in illegal dumping may well occur. Local governments need to be aware of this possibility in order to address it in their solid waste management plans. Enforcement of state law and local ordinances prohibiting such dumping can be increased. Public education efforts to convince citizens to dispose of their waste responsibly and the convenient availability of

TABLE III-6

COMPARISON OF POTENTIAL SURFACE WATER SUPPLY
AND PROJECTED FUTURE REQUIREMENTS

- AMOUNTS IN 1,000 AC-FT/YR -

	1990	2000	2010	2030
a. Projected in-basin water requirements	129.7	166.3	206.6	238.9
b. Requirements met from ground-water	5.2	5.4	5.5	5.3
c. Available usable return flow	26.4	32.0	39.1	47.4
d. Estimated imports from other basins	23.3	28.0	33.7	40.4
e. Net in-basin requirements for surface reservoir yield (a-b-c-d)	74.8	100.9	128.3	145.8
f. Projected surface yield developed	320.6	446.6	584.5	875.3
g. Excess surface yield over in-basin requirements (f-e)	245.8	345.7	456.2	729.5
h. Projected exports to other basins	72.6	115.2	232.4	485.0
i. Developed surface water yield in reserve for future need (g-h)	173.2	230.5	223.8	244.5

Note: Source of this table is the 1984 Texas Water Plan, and the data should be updated when the 1990 Texas Water Plan is available.

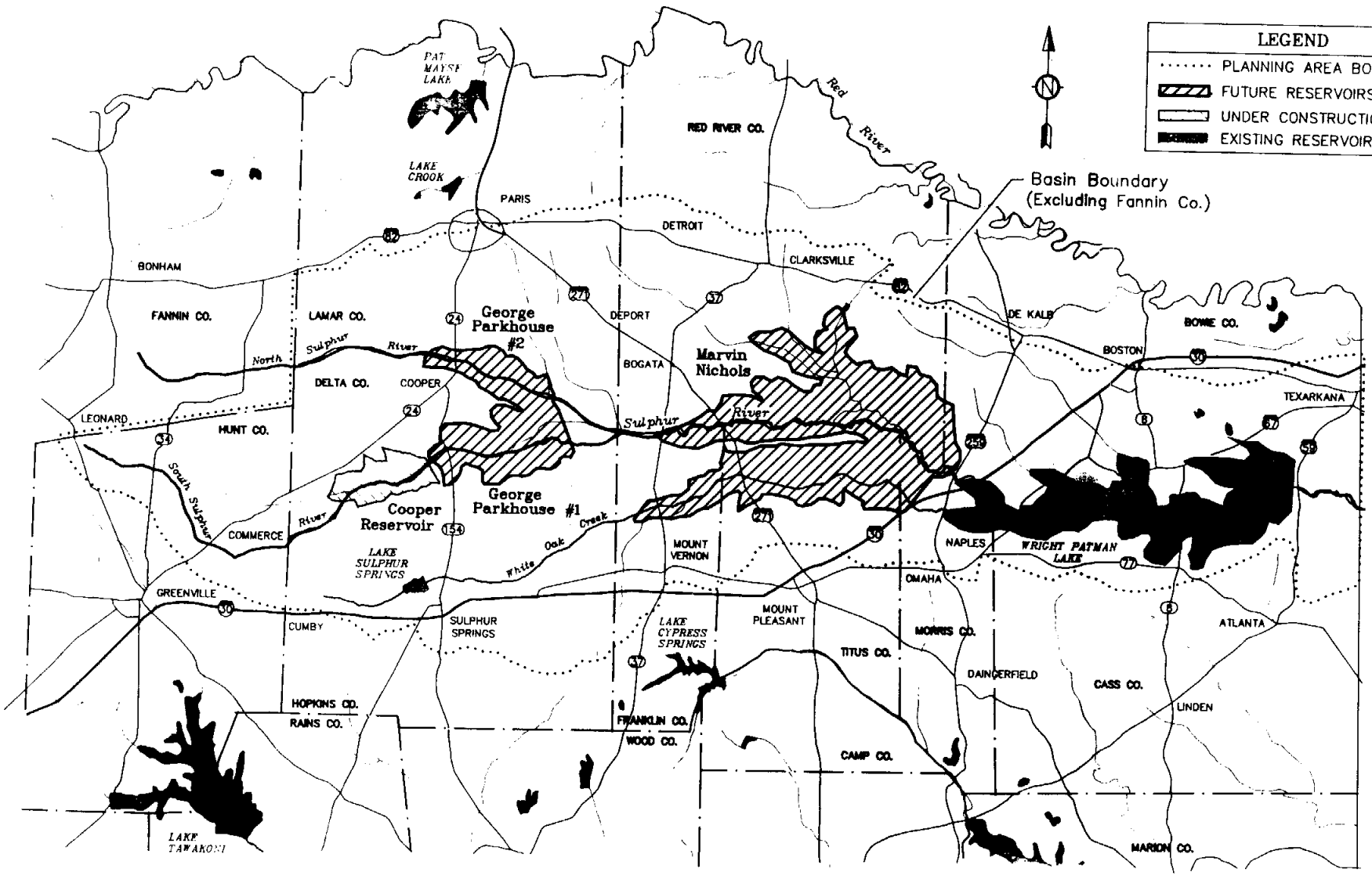


FIGURE III-3
FUTURE SURFACE
WATER RESOURCES

collection services to all citizens will probably have the greatest impact on this situation in the long run. The Texas Department of Health is expected to strengthen its enforcement activities against illegal dumpers with some of the new funds recently allocated to it by the Legislature. This should enhance the protection of surface water quality.

Groundwater

There is only a small dependable groundwater supply in the Sulphur River Basin. According to the 1984 Texas Water Plan, a range of about 5,200 to 5,500 acre feet per year is available - less than 5 percent of the water supply requirements of the basin. As indicated in Chapter II, the quality of the groundwater pumped from the available aquifers in the Sulphur River Basin is marginal. However, the importance of a small well to a remote rural area which does not have an organized surface water supply system is significant, and the protection of groundwater supplies is particularly important in these areas.

The new Subtitle D landfill criteria are designed specifically for groundwater protection. Any new landfill, or those that continue to operate (and therefore comply with the new standards), should not pose any threat to groundwater quality. However, the concerns outlined above regarding illegal dumping of waste apply also to groundwater since hazardous substances can leach from improper dumps to pollute aquifers. Therefore, any activities to control illegal dumping will benefit both surface and groundwater supplies.

CHAPTER IV

ALTERNATIVES

NON-HAZARDOUS WASTE DISPOSAL ALTERNATIVES

Hierarchy of Preferred Solid Waste Management Methods

The United States is rapidly approaching a crisis in solid waste management; indeed in some areas, the crisis has already arrived. The specter of the garbage barge from Islip, New York, wandering from state to state in search of a disposal site is still with us. Careful planning is needed now to avoid similar situations, even here in Texas. Our state has long enjoyed very low waste disposal costs because of an abundance of inexpensive land, but this will soon change. At various locations in the nation, groundwater has been polluted by toxic materials leaking from municipal landfills, which has led to the enactment of federal regulations requiring advanced technology to be applied in landfill operation, naturally increasing costs. Landfill space in many areas is running out, and public opposition to siting new facilities has become almost universal.

In response to these trends, in 1987 the Texas Legislature established a state policy on preferred methods for solid waste management. Preference is given, to the maximum extent economically and technologically feasible, to the following:

1. Minimization of waste production
2. Reuse or recycling of waste
3. Treatment for energy or other resource recovery
4. Land disposal as the least preferred option

In 1989, the Texas Legislature passed Senate Bill 1519 which mandates development of state, regional and local solid waste management plans, subject to the availability of 50/50 state matching funds. The Bill took effect on September 1, 1989. These plans, if they are to be approved by the Texas Department of Health, must follow the existing guidelines, including addressing the preferred hierarchy for solid waste management outlined above. These methods are discussed below.

Waste Minimization

Waste minimization is defined as a reduction of the amount of material that enters the waste stream by changing the way products are designed or consumed. The challenge is how to get people to throw away less trash. This differs from recycling or incineration with energy recovery which are methods to recover resources from the waste stream; the goal of waste minimization is to produce less waste in the first place.

There are four basic approaches to achieve this goal: (1) reuse the product, (2) increase the durability of the product, (3) reduce the amount of material used in the product, and 4) decrease the consumption of the product.

Product Reuse

A good example of this is the use of cloth diapers for infants instead of disposable diapers. A newborn may use as many as 70 to 80 diapers per week, a two-year-old will need about 35. Collectively nationwide, the use of disposable diapers accounts for about 3 million tons of waste per year. By comparison cloth diapers can be reused up to 200 times, washed either at home or by a diaper service, and old cloth diapers may have years of use left as cleaning rags before they are finally thrown away.

Increased Product Durability

One product that has changed in recent years is automobile tires. The bias and bias-belted tires commonly used before 1973 had an expected life of 15,000 to 20,000 miles. They have now been largely replaced by the use of radial tires, which have an average life of 40,000 miles, thus cutting in half the number of waste tires produced per vehicle. Consumers can choose many other products that will last longer over alternatives that may be cheaper initially, but will have to be replaced sooner.

Reduced Material Used in Product

This applies primarily to packaging, for example of foodstuffs. Packaging accounts for more than 30 percent of the total waste stream. An individual shopper can choose larger packages which have more product inside per unit of packaging material; two 8-ounce sized cans contain 40 percent more metal than one 16-ounce sized can. Frozen juice concentrate in a small can will generate less waste than ready-to-serve juice in large cans or bottles. Avoidance of bulky packaging materials such as styrofoam can also help to reduce waste. Many packages could be modified by the manufacturer to be less productive of waste.

Decreased Consumption

This means buying less products that eventually are discarded. Suggestions are to borrow, rather than buy, such items as books and magazines and to rent things like tools that are used infrequently.

Government initiatives to reduce waste fall into three categories: (1) regulations, (2) economic incentives, and (3) voluntary programs.

Regulations

Regulation of the manufacture and sale or disposal of consumer products can result in reduction of waste. While more easily implemented on the state or federal level, some local governments around the country have enacted regulations. For example, Suffolk County, N.Y. and Berkeley, Calif. prohibit the sale of bulky polystyrene packaging used at fast food restaurants.

Economic Incentives

These encourage manufacturers and consumers to reduce the amount of waste produced because it pays them to do so. Examples are deposits on reusable containers and differential fees charged to homes or businesses based on the amount of trash left for collection. Nine states have passed "bottle bills" requiring a deposit on beverage containers to increase recycling and reduce litter, but this is not feasible to implement on a local government level. Differential fees, however, can be charged by local governments. This is currently being done in Seattle, Washington, and is being considered by other municipalities as a way to encourage waste reduction.

Voluntary Programs

Public education to change people's waste generation habits is probably the best tool available to local governments and agencies to help minimize waste. Seattle, Washington sends a brochure to residents with a checklist asking them to look at the products they buy regarding their recyclability, wasteful packaging, and efficiency. Plano, Texas has a successful voluntary program requesting residents to compost their grass clippings rather than bagging them for disposal in summer. Tarrant County has recently initiated a "Don't Bag It" program to encourage composting of grass clippings by homeowners and minimize the amount of grass clippings going to landfills.

Regulations restricting choices of individuals and related rules restricting sale or use of certain products may not be easily accepted particularly in more rural areas such as the study area. A differential collection fee would greatly increase the paperwork required to administer solid waste services and might also have a negative effect on the environment. Some residents might be tempted to illegally dispose of their waste if it would save them money in collection fees.

Public education to promote voluntary minimization and recycling will probably be much more successful. The public can be informed through brochures in water or utility bills, articles in local newspapers, and even radio or TV public service announcements. Local governments could ask for cooperation from school districts in teaching the need to conserve resources and minimize waste (a curriculum, "Waste-in-Place" is available through the Keep America Beautiful program).

Recycling and Reuse

Approximately 11 percent of the waste generated today in America is recycled. Most experts agree that about 25 percent of waste could be recycled with a well-managed system. This would reduce the amount of refuse needing disposal by 22 million tons per year nationwide. The U.S. Environmental Protection Agency has recommended a 25 percent target for recycling. Congress is currently considering amendment of solid waste legislation to make this into law. In Texas, recycling rates are below the national average.

There are three steps in the recycling process: separation of reusable items from other trash, either at the source (home or business) or, less frequently, at a central recycling facility; processing of the items so that they can be substituted for virgin items at manufacturing plants; and returning them to commerce.

A variety of materials is successfully recycled today. A striking example is aluminum cans, of which over 50 percent are recycled. Since recycled aluminum requires 95 percent less energy than use of aluminum ore in the processing of cans, the market for recycled aluminum is very strong.

Over 30 percent of all paper and cardboard used in the United States is recycled. Much of the paper is reused in building materials for new houses, and a large portion is shipped overseas, so the market fluctuates with the world economy. The type of paper affects its usefulness for recycling. Paper with long fibers, such as cardboard, can be processed into other types of paper. Newsprint can also be reused. Glossy paper, such as magazines use, has very short fibers and is essentially useless for recycling purposes. Currently the market for cardboard is strong, but that for newsprint is flat.

About 25 percent of glass produced is made from recycled glass containers. According to the industry, this number would be 70 percent if the recycled containers were available. Glass has the advantage of being recyclable indefinitely, but it also requires careful quality control in the collection process. Glass must be sorted by color, and contaminants such as aluminum or plastic caps, stones or ceramics must be avoided. Currently the price for glass is about 5 percent that of aluminum by weight.

Plastics have received much attention in recent years. Although they account for only about 7 percent of the total weight of waste produced, the amount produced is growing rapidly. They are also of interest because so many plastics break down very slowly - they may last for hundreds, or even thousands, of years in landfills virtually unchanged. While there is much interest and industry-sponsored research underway, plastics recycling is still in the fledgling stage. Currently less than 1 percent of plastics used are recycled.

Other materials commonly recycled are yard wastes, which can be composted for sale to local gardeners; tires, 27 percent of which are recapped or shredded to use in other products such as asphalt; iron and steel; and used motor oil, two-thirds of which is recycled.

There are four basic patterns of recycling:

1. Drop-off centers. This is the most common type of recycling system. Individuals separate recyclables at home and take them to drop-off centers. These centers are sometimes run as "theme parks" to promote good public relations.

2. Curbside collection. In these systems, homeowners separate recyclables into different containers provided by the city or collection service and place them out on regular collection days. The City of Austin has such a program, which is voluntary. This type of system is normally more convenient to the user. In some areas, notably New Jersey, participation in curbside recycling is mandatory.

3. Material Recovery Facilities. These facilities separate recyclables which are picked up from households mixed in one container.

4. Centralized recovery. Trash is brought to the central facility where it is picked over and recyclables removed.

Communities considering a recycling program face a number of problems. Curbside collection of recyclables is quite expensive. Such programs are unlikely to pay for themselves in revenues from materials sold because they are labor intensive (Austin

paid $120 per ton in 1987 to collect and recycle wastes). However, some costs are avoided by conserving existing landfill space.

The driving force behind the success of voluntary recycling programs is usually the cost of landfill disposal and the availability of landfills. Accordingly, the more successful programs are being implemented in areas which have these problems. One successful program is in Bergen County, New Jersey, where the population density is approximately 3500 persons per square mile and the only available landfill is out-of-state and costs about $100 per ton. Also, recent state legislation has mandated specified recycling goals for the citizens of New Jersey.

The characteristics of Bergen County are somewhat different from those in the study area. The highest county population density in the study area is Bowie County which is less than 100 persons per square mile. The City of Texarkana which is the most densely populated section of the study area, has a population density of less than 500 persons per square mile. Also, there are still several landfills available in the study area at a fairly economical cost when compared to Bergen County.

Voluntary recycling programs should, however, be implemented in the study area before their waste disposal problems become as severe as those being experienced in New Jersey. There are currently some recycling programs being implemented in Texas in the more densely populated areas where availability and cost of landfill disposal is more restrictive. Therefore, until the waste disposal problems in the study area become more restrictive , the potential for voluntary recycling in the largely rural study area will probably be minimal, except for possibly in more densely populated sections.

Mandatory programs, such as New Jersey's which requires 25 percent recycling, may be successful in enforcing source separation and collection. The states of Washington, Florida and California have also passed legislation requiring that recycling plans and

programs be adopted. In all recycling programs, the marketability of the products is a very important consideration. Flooding of the market for newsprint has occurred because of these mandatory collection systems, reducing prices and also making it difficult even to find an alternative to landfilling in some cases. A problem experienced in Austin is the theft of aluminum cans left out for recycling. Since this is the best-paying material, the loss to the system is significant.

Theme park type collection centers are successful in increasing recycling in their areas because they make it fun for families or groups (Scouts, schools, etc.) to take things to be dropped off. They also accept more than one type of material. Such centers are usually sponsored by cities and/or industry and have a distinctive theme such as the Wild West theme in the City of Waco's recycling center.

There are many recycling programs in Texas. Many cities have organizations (for example, "Clean Greenville" in Hunt County) which are affiliated with Keep Texas Beautiful (KTB). These organizations may promote recycling as well as general beautification efforts. KTB can offer assistance to groups interested in developing recycling programs. The Governor's Office recently sent out a request for proposals to local governments and other agencies offering grants of up to $20,000 to establish or expand recycling programs. A copy of this request is found in Appendix E.

The current market for recyclables in the study area is minimal. This is partially due to the minimal supply of recyclable items because local area governments have not concentrated on recycling because the study area is rural and landfill space has generally been available. This present market condition has been generally verified by the Texas Recycling Association who indicated they did not have any registered recyclers in the study area. They are emerging markets in the Dallas-Fort Worth area and in Oklahoma.

When the acceptance and perceptive need for recycling by the study area citizens increases to create a supply of recyclables, markets will likely develop to respond to this supply. Future planning studies at the local level should then conduct more intensive local surveys to determine local markets, but current conditions do not warrant this level of evaluation. Appendix E includes a listing of contacts for future reference.

Composting

Aerobic composting (bacterial break-down of organic material) can be a large-scale method of recycling. Separation and composting of yard wastes produces a high-quality organic material which may be sold or given away for horticultural use or applied on city-owned landscapes and parks. This can reduce waste volumes by as much as 20 percent depending on the season.

The yard waste composting process is as follows: Yard waste is brought to a holding area, debagged, ground/chipped, then placed in windrows for active composting. Some materials may be chipped and sold as is. After composting is complete (usually several weeks at least, depending on temperature and moisture) the material is cured and screened. Undercomposed material goes back to the windrows - the rest is stored for distribution.

Technologies also exist for composting of mixed municipal solid waste, including yard waste and sludge. This process is more complex: At the receiving end of the plant, items such as glass, plastics, and aluminum are manually removed for recycling or landfilling. A magnetic sorter removes ferrous metals. The remaining wet material is pulped and added to a digestion chamber, with or without the addition of sludge. From there, the product is packaged for distribution.

Even if the composted mixed waste is not used for horticultural purposes, composting still has the benefit of reducing waste volumes by about 80 percent, thus conserving landfill space.

Incineration With Energy Recovery

Incineration of garbage is a method of disposal once used widely but phased out in preference to sanitary landfilling or burial of trash. Incineration is once again being addressed as a preferable disposal method, but with a difference: stringent air pollution control devices are used, and frequently energy from the burning process is recovered for beneficial use. The major advantage of incineration is that it conserves landfill space - the ash resulting from incineration takes up only about one-tenth of the space that the original refuse would have.

A typical comparison rate of waste to energy is 4,500 BTU's per pound of mixed solid waste. Thus, the planning area could theoretically produce 1,854 billion BTUs per year if all solid waste were disposed by energy recovery incineration. This would be equivalent to about 62,000 kilowatts.

It has been fashionable in Texas to shrug off new incineration efforts as not cost-effective for a number of years - and with good reason. Landfilling costs here frequently are under $10/ton, compared to $100/ton or more in the northeast. But the picture is rapidly changing. Existing landfill space is running out in many locations, and it is politically much more difficult than formerly to site new landfills because of local resident opposition. The forthcoming federal regulations will seriously tighten the technological requirements for siting and operating new and existing landfills, causing many to close. This will drive up the cost of land disposal, making incineration a much more attractive alternative.

Incineration of garbage with recovery of energy has a long track record of success in Europe. More recently, within the last 10 to 20 years, European methods have been adapted in the U.S. in areas that have felt the squeeze in landfill availability. In 1989, there were 135 incineration facilities in 36 states, processing 13 percent of the nation's municipal solid waste; 89 percent of these facilities recover energy. By 1992, an additional 93 facilities now under construction will bring the total to 27 percent of the nation's waste being incinerated, according to the U.S. Environmental Protection Agency.

There are three basic types of waste-to-energy plants operating in the United States today. They are:

1. **Mass Burn.** This type accounts for about 75 percent of plants in operation. Municipal solid waste is burned as it arrives, without processing. Boilers use the heat produced to make industrial steam or electricity. Most plants have two or more burners and process up to 3,000 tons per day of solid waste. The volume of garbage is reduced to as little as 10 percent of the original volume. There are no large mass burn facilities in Texas.

2. **Modular Combustion Units.** These are also usually mass burn units, but with smaller capacities of 25 to 300 tons per day. The boilers are factory-built and shipped to the site rather than constructed on the spot as with larger facilities. They are most suitable for smaller communities. Four Texas communities have such plants.

3. **Refuse-Derived Fuel (RDF).** In this type of plant, waste is processed before burning. Typically recyclable glass and metals and non-combustibles are removed, then the remainder of the waste is shredded. This allows a more uniform fuel to be produced which may be burned on-site or shipped elsewhere,

often after being compacted into pellets. There are no plants of this type in Texas.

In all of these kinds of facility the principle is the same: trash is burned, reducing its volume to as little as 10 percent of the original. Air pollution is a potential concern, but combustion temperatures are very high - 1,800 to 2,000°F, which destroys most complex chemical compounds. Air emissions are further controlled by using the best available control technologies to capture over 95 percent of the remaining gases and fly ash. Such technologies include acid gas scrubbers, electrostatic precipitators, and fabric filters.

A landfill is still required for disposal of the resulting ash and for disposal of unburnable items (such as refrigerators). The ash can have high concentrations of toxic materials, but the new landfill regulations will be sufficient to protect groundwater and surface water from contamination by ash or other materials deposited in them.

Waste-to-Energy Experiences in Texas

There are currently six incineration with energy recovery facilities in Texas. Two are small plants owned by the Texas Department of Corrections. The four plants owned and operated by cities are described below. All are of the modular mass burn type.

City of Carthage (population 6,500), Panola County. This 40-ton facility is jointly owned by the City and the County, with operation by the City of Carthage. It has been a successful solution to solid waste management since it began operating in 1986. The initial investment of $1.6 million was partly paid by a one-half million dollar Community Development Block Grant from the state, and the rest was paid by the City

(2/3) and the County (1/3). The key to the success of the operation was a contract before construction with a local industry (now Tyson Foods) to purchase the steam produced. The facility is also permitted to burn medical wastes which are being brought in from outside the county and are expected to significantly increase revenues. Another reason for this City's success is local residents' acceptance of the facility, which is viewed as an industry with employment opportunities. The current cost per ton for disposal of municipal waste is about $25, according to Solid Waste Superintendent Bob Milhauser. Mr. Milhauser can be reached at (214) 693-3868.

City of Center (population approximately 6,000), Shelby County. This City-owned 40-ton facility is almost identical to the one in Carthage, with a similar story of success. The plant was built in 1986 and sells steam to Holly Farms (now a branch of Tyson Foods). As in Carthage, local residents see the facility as an economic boost to the City. The plant currently operates at less than capacity so its cost per ton of disposal is probably slightly higher than that of Carthage. Some special non-hazardous wastes, such as out-of-date pharmaceutical products are disposed of here, and the City plans to begin accepting medical waste soon. The fees paid for medical waste disposal are high (over $100/ton) and are expected to lower the cost of disposal per ton of municipal waste significantly. This information was received from Center City Manager Jeff Ellington, who can be reached at (409) 598-4693.

City of Cleburne (population 22,800), Johnson County. This 115-ton, $5.5 million facility has been in operation since 1986. Two major problems are the lack of a commercial/industrial buyer for the energy produced and less waste than anticipated being brought to the site. It costs the City about $110 per ton of waste disposed to maintain and operate the facility. For more information, contact Don Dietrich, Public Works Director, at (817) 641-3321.

City of Waxahachie (population 18,150), Ellis County. The City's 50-ton facility has been operating since 1982. It is running at near capacity, but there are no plans for its expansion. Operation costs are currently about $40 per ton. The City has had difficulty in finding buyers for the steam produced. They had a customer when the plant was built, but when costs of natural gas fell considerably, it no longer made economic sense for the City to produce steam from waste, and by mutual agreement, the contract was terminated. The plant is currently operated as an incinerator only, without production of energy, although this could be resumed at any time. The main advantage to the City is the 90-95 percent reduction in volume of waste. A major source of revenue is the incineration of "international waste" primarily waste from meals served on flights landing at DFW International Airport, which is required to be burned. The City is interested in finding other special waste customers but is limited in the amount it can accept to 2.5 tons per day. Costs to the City for incineration have been considerably more than landfilling would have been over the past seven years, but this economic picture may change over the next few years as landfilling costs are expected to rise. Sonny Wilson, Director of Environmental Health, can be reached at (214) 937-7330, ext. 250.

Incineration with energy recovery could be a viable option for future solid waste management in the study area. Currently, the cost of incinerating is higher than the cost of landfilling. However, if the price tag for landfilling rises to as high as $67 per ton as predicted by the year 2000, landfill costs may exceed those for incineration (currently $25 and $40 per ton in the Texas cities of Carthage and Waxahachie). It is important to keep in mind that an incineration facility would still need some landfill space to dispose of ash.

If an incineration plant is seriously considered, there are some lessons to be learned from the Texas experience. It is clear that careful planning is the key to success. No facility should be built without a prior contract with a local purchaser of steam.

Good estimates of the amounts of solid waste that will be delivered to the plant are necessary, and contracts for delivery may be advisable prior to construction. The method of financing construction should be considered; if tax-exempt bonds are used, the Tax Reform Act of 1986 may result in a limit being placed on the amount of capacity allowed to be committed by contract for the disposal of outside waste (as little as 10 percent according to Center City Manager Jeff Ellington).

Sanitary Landfilling

Land disposal is the least preferred option for solid waste management, but it is currently the most common and least expensive. The proposed Subtitle D requirements for modern landfills will have a dramatic impact on the operation of many municipal landfills by making land disposal more costly, although much safer for the environment. The increased cost of landfilling will probably make other solid waste management options more economically attractive.

The elements of a modern landfill are schematically portrayed on Figure IV-1. Efficient landfill operation plans shall include the following:

- Adequate control of incoming solid waste including quality and quantity of material to meet requirements of TDH-approved Site/Development Operating Plan.

- Proper placement of solid waste in approved landfill cell area and adequate compaction of material and placement and compaction of daily cover in accordance with Site Operating Plan and Soil Management Plan.

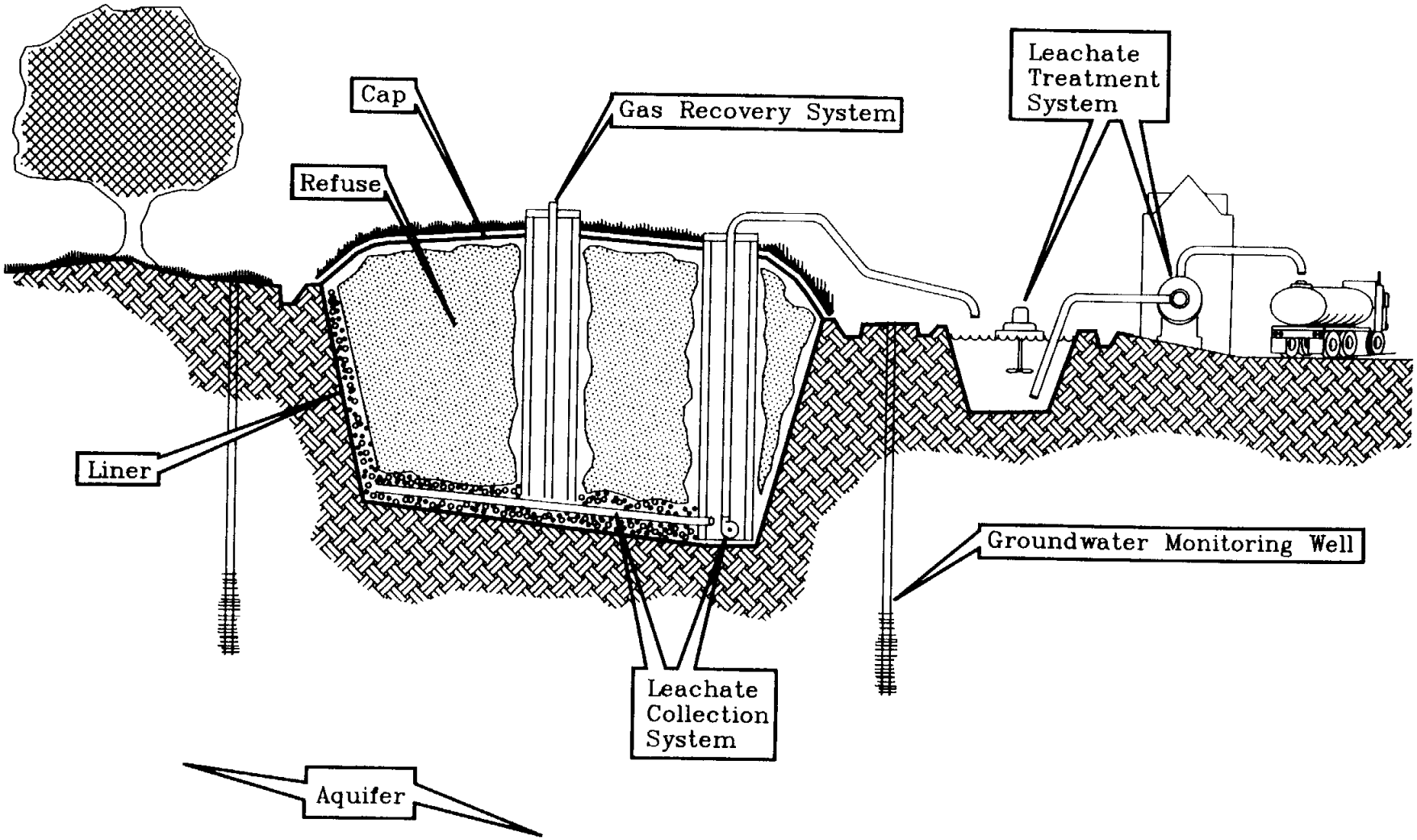


FIGURE IV-1
ELEMENTS OF A MODERN LANDFILL

- Earthwork operations as required to efficiently handle solid waste material and maintain surface of landfill to adequately control surface drainage and prevent runoff from becoming contaminated in active landfill areas.

- Proper operation and maintenance of landfill lining, leachate collection, and groundwater monitoring systems in accordance with TDH-approved Site Operating Plan.

- Closure of landfill in accordance with TDH-approved Site Development/Operation Plan when landfill capacity has been exhausted. Post-closure care of area in accordance with TDH approved plan.

The National Solid Waste Management Association (NSWMA) has recently estimated that the initial costs of a modern landfill of 100 acres and a 20-year operating life could cost as much as $87,000,000 or about $70 per ton. However, characteristics of the planning area, including its rural nature and land availability for possible landfills, environmental setting, and public acceptance, could possibly make landfill siting and operation less difficult and costly than for a typical installation as studied by the NSWMA.

SLUDGE DISPOSAL ALTERNATIVES

Sludges from water and wastewater (sewage) treatment plants must be disposed of properly. Over the last 20 years, as the U.S. has built more treatment plants, the rate of sludge production has doubled. An estimated 7 million or more dry tons of sludge are currently produced each year. The estimated sludge production in the study area is 15,600 tons per year, 88 percent of which comes from sewage treatment.

It has recently been estimated by EPA that sewage sludge is currently reused or disposed of by the following eight methods, distributed as follows nationwide:

	Percent
Municipal Landfills	41
Incineration	21.4
Land Application	15.6
Distributing and Marketing	9.1
Ocean Disposal	5.5
Pile, Stacks, Mounds	2.6
Monofills	1.3
Other	3.5

Sludge disposal practices in the study area, described in Chapter II, appear to depend heavily on landspreading or on-site landfilling; only about 20 percent of the plants dispose of sludge at municipal landfills.

Sludges are disposed of by several methods in Texas, including landfilling, incineration, and landspreading. Recently, increased attention has been given to managing sludge as a reusable resource rather than a waste. Wastewater treatment plants often sell or give away dried sludge for soil conditioning and enrichment. Sludges are currently applied to farmland in much of Texas; roughly 63,000 acres were registered in 1989 with the TDH as application sites. Composts are produced in many of Texas' urban areas for use on golf courses, parks, highway medians, and landscapes. One sludge management program in Gladewater, Upshur County, just outside of the study area, involves mixing sludges from a brewery and local wastewater treatment plants with sawdust to produce composted potting soils. Land application of sludge as part of a program to reclaim lignite mined areas in Titus County could be considered.

Most successful sludge management programs are associated with larger plants serving areas of more concentrated population than are generally found in the study area. The Bowie County-Texarkana area has the greatest population concentration in the region and produces about 33 percent of the estimated amount of sludge generated in the 10-county study area. Other significant population centers are Sulphur Springs in Hopkins County, Greenville and Commerce in Hunt County, Paris in Lamar County, and Mount Pleasant in Titus County which collectively generate about 45 percent of the total estimated sludge produced. These areas should consider developing programs for beneficial reuse of sludge. The treatment plant permit holders have the responsibility for developing these programs.

Proposed new regulations by EPA include more strict requirements for some 27 sewage sludge contaminants for five different types of disposal/reuse options. These options are incineration, non-agricultural land application, agricultural land application, distribution and marketing as fertilizers/composts, and monofills or surface impoundments. The latter regulations will set limits for the 27 contaminants based on an acceptable level of risk to adequately protect human health and the environment. The proposed risk-based regulations were published in the February 6, 1989, issue of the Federal Register and the schedule for subsequent activities to adopt these regulations in late 1991 is as follows:

Date	Event
August 7, 1989	Public comment period ended
December 1989	Release of results from National Sewage Sludge Survey (NSSS)
February 1990	Public comment period for NSSS ends
July 1990	Revised draft limits proposed
October 1991	Final regulation adopted

The proposed EPA regulations will not affect codisposal with solid waste at municipal landfills. This is addressed by the new Subtitle D Landfill Regulations discussed elsewhere in this report. It has been stated that the new Subtitle D regulations are essentially "containment regulations" as far as sludge is concerned, and the proposed "sludge regulations" noted above are "pathway exposure regulations."

TRANSPORTATION

Because of the sparse population density of much of the study area and the expected distance between disposal sites, transportation activities and costs will have a significant impact on the area. Transportation refers to the movement of waste products from the point of generation to the point of disposal. The point of generation is the homes and businesses as well as the commercial centers and industrial sites, while the point of disposal is currently the local landfill but in the future it may also be incinerators or resource recovery plants. Transportation includes the collection of the waste from the homes, the temporary storage and handling of the waste at a transfer station, and the transport of the waste to a disposal site.

These discussions are organized to describe specific transportation needs for the area as a result of plan implementation. The first area of discussion will be mixed solid waste from residential customers. Because of the specialized nature of commercial and industrial solid waste, it is normally transported separately from the residential waste and will be discussed separately. Transportation needs for sludges from water and wastewater treatment plants is also unique and therefore is discussed separately. A discussion of the transportation of septic tank wastes is also presented. Finally, the discussions cover the special transportation needs when technologies such as source separation and resource recovery are used.

Collection of the mixed solid waste from the residential generator can be accomplished by having the generator place the mixed solid waste in a container that is located in a specific location and that is picked up on a specified schedule. The container may be a garbage can, a plastic bag, a metal dumpster, a roll-off container, or other as appropriate for the type of waste and the quantity expected to be generated. Residential mixed solid waste is usually placed in a garbage can or plastic bag at the curb or in the alley for pickup. Schedules for pickup vary with the type and quantity of waste but are often once or twice per week on specified days.

Collection vehicles vary from pick-up trucks to sophisticated single purpose vehicles for lifting, emptying and compacting the material. Single purpose collection vehicles for urban areas are generally categorized as front loading, rear loading, or side loading types. Each have their advocates and each has its advantages and disadvantages which require that the user carefully evaluate each to determine the best in the particular use situation. The only exception would be in the front loading type because this type is used almost exclusively for commercial collection. Capacities of these units vary from 6 cubic yards to 40 cubic yards although most units appear to be in the 20 cubic yard size. With a payload of approximately 3,600 pounds, the small 6 cubic yard units can serve an equivalent population of approximately 1200 people if there is a twice per week pickup schedule. For collection of waste from sparsely populated areas, it will be necessary to use multipurpose vehicles such as pickup trucks that do not have any capabilities of compacting the material. These vehicles are not dedicated to solid waste collection by their owners. It should be noted at this point that some landfills will not receive waste that has not been compacted, therefore it is expected that pickup trucks will deliver their load to a transfer or compaction station for compaction.

There are five main categories of point of generation storage containers: standard, lightweight, 20- to 32-gallon metal or plastic cans; paper or plastic bags; and

containers designed for mechanized collection which eliminate the manual loading of waste into the vehicle. The heavy weight of 55-gallon drums makes them a potential injury source for workers so their use should be prohibited.

In many areas, especially in rural areas, the most commonly used storage container is the rigid galvanized metal or plastic can. These containers are acceptable when they are lightweight, not rusted or cracked, kept reasonably clean, and have tight fitting lids. Containers outside the 20- to 32-gallon range are usually not acceptable. The use of many smaller cans at each stop increases the handling time required to load the refuse into the truck while the use of larger or heavier cans increases the weight the workers must lift.

The use of paper and plastic bags as residential storage containers has increased considerably in the past few years. Plastic bags are used more frequently than paper bags because they cost less. Bags are easier to handle and carry, no lids have to be removed or replaced, no time or effort is required to dislodge the contents, no set-back motion is required, and there is less weight to be lifted. The result is faster, more efficient, and less costly service. Bags offer benefits to the homeowner also. When additional storage volume is needed, it is relatively easy to use additional bags. The bags are disposable so containers do not line the street after collection. Bags can eliminate odors and the cleaning of dirty containers. Collection is quieter because noise from handling of conventional containers is eliminated and because trucks remain on the street a shorter length of time. Because the bags are closed, spillage of waste is reduced. The disadvantages to the use of bags are the cost; bags are susceptible to animal attacks especially in rural areas; and bags are not suitable for such items as branches, cardboard boxes, heavy objects, or objects with sharp or pointed edges.

Mechanized collection from bulk containers has long been regarded as an efficient and acceptable way of servicing apartment buildings and commercial establishments. Some residential solid waste systems also use clustered storage and mechanized pickup by which more than one residence can be serviced per stop. The use of four family groupings has found more acceptance than two family groupings. People also tend to oppose even temporary storage of other people's waste on their property, so if there are proper storage areas and sufficient access space, and an economic analysis shows a cost savings could be achieved, mechanized collection of multi-family groups should be considered.

The single most important factor in determining the cost of collection service is the frequency of collection. The minimum acceptable frequency of collection, for health and aesthetic reasons, for residential waste containing food wastes is once per week. Most urban areas provide collection service twice per week although some densely populated areas of New York provide daily collection. The more frequent service is required because of the dense population and seriously restricted storage space. The increase in collection cost will not double due to twice per week collection but it will increase the cost by as much as 30 percent.

The collection methods used in urban areas of the study area have little applicability to the rural areas of the area because of the much greater distance between stops of the collection vehicles. The three methods available to the rural areas are (1) direct haul by the resident to the disposal site, (2) the use of centrally located bulk containers, and (3) house-to-house collection as used in the urban areas. Direct haul of the wastes by the resident to a transfer station or landfill creates some problems when the residents consider the distance too great. These residents will then create roadside litter due to improper disposal.

In a bulk storage container system, a number of containers, enough to serve the needs of the rural population, are strategically located along highways or roads easily traversed by a collection vehicle. The individual resident is required to transport his waste to the bulk containers which are serviced by collection vehicles; the collected wastes are then transported to a transfer station or to the sanitary landfill. The two types of bulk containers are small containers with 3 to 8 cubic yard capacity each (the same units used by commercial sites and apartment houses) and serviced by emptying into a collection vehicle. The other bulk container system uses large open boxes with a capacity of approximately 20 to 40 cubic yards. These large boxes are not emptied but are replaced by empty boxes and the full boxes are taken directly to the transfer station or landfill. An EPA study has estimated that the average number of persons served per cubic yard of bulk container space is 10 for once a week collection, but varied from 4 to 17 depending upon local conditions. To determine the number of containers that can be emptied into a collection truck, the following estimates can be used. For loose solid waste, a density in the container of 75 to 150 pounds per cubic yard can be expected. A density in the collection vehicle of 450 to 1,000 pounds per cubic yard of compacted waste can be expected. Data on the density that can be achieved by any specific type of collection truck can be obtained from manufacturer's specifications for that equipment.

Site locations should be chosen according to common sense criteria. For example, containers should be located so that they will be on the way for users going to town, church or school. Containers should be conveniently located and the maximum distance of a container from any user should not be over 3 to 5 miles. If containers are placed near existing landfills, they are more apt to be successful because of the strength of habit of the users. The site must be large enough to allow collection vehicles to safely empty the container. In order to provide all-weather access, the site should be paved, preferably with concrete because of the heavy loading associated with collector trucks. The site should also be fenced with chain-link fabric for

collection of windblown debris as well as for security. It is expected that the site will be open continuously with no supervision. As with any unattended site, vandalism may occur and unsanitary conditions may develop unless the sites are properly maintained. Users of the system must carry their own waste to the containers, which may be a hardship for those without means of transportation. To work well, this kind of service must supply a substantial number of containers at accessible sites. The amount of waste picked up at each site may be unpredictable and cause scheduling problems, at least until new sites or more containers are supplied. Also, if this kind of rural service is used near municipalities, the containers may be used by town residents if there is inadequate town service.

If a house-to-house system (sometimes called a "mail-box" system in rural areas) is used, the collection vehicle follows the rural mail delivery routes, and all of the garbage containers are placed on one side of the road. This minimizes collection crew size and collection time. The advantages of this type of system are that it collects the highest percentage of generated waste of any system, it permits a high level of scheduled service to the rural resident, and it provides a system for which user charges can be established. The disadvantages are that litter problems can occur if containers are upset or bags are torn. It will also be the most costly system for isolated areas.

The term "transfer station" typically refers to a structure that is used to collect and compact waste before it is transported to the disposal site. In this study, however, it will be used to refer to structures and places where waste can be delivered and may be compacted before transportation. Some of the rural areas of the planning area may need to use open-top trailers for collection of waste. The volume collected may not justify the use of a compactor, so the material would be transported from this site to another site where compaction would occur. Transfer stations handling less than 50 tons per day usually use a stationary compactor that discharges

into a roll-off trailer. These roll-off containers are often in the 40-cubic yard capacity and they have a payload of 8 to 10 tons. Because they cannot handle large objects, it is often necessary to locate an additional open top roll-off container at these sites for these bulky items. For stations that have a capacity of 100 tons per day or more, the stationary compactor is used with trailers either in a push-pit or self-contained trailer arrangement. These trailers often have payloads of 17 to 18 tons. For larger capacity transfer stations (1,000 tons per day and over), open-top trailers and wheel or tracked loading vehicles operate in multi-storied structures with tipping floors and pits.

Most of the transfer stations expected to be used in the planning area will be of the small capacity type and each will need to be evaluated individually to determine their design requirements. All of the sites should be designed to provide adequate space to allow functions such as source separation and recycling to occur at these sites in the future.

The transfer trailers for hauling the material from the transfer station to the landfill vary in size, materials, compaction capabilities and unloading methods. The trailers have advertised capacities of from 30 to 150 cubic yards but most are in the 65 to 75 cubic yard size. The typical trailer dimensions are 8'-6" wide, 13'-6" high and 40 feet long although the length and height are varied to achieve the desired capacity. The trailers can be made of steel but often they are made of aluminum which, because of its lighter weight, allows the use of higher payloads. Some of the units use a hydraulic ram to move the compacted waste out of the trailer at the landfill while other designs use a "walking" or "live" floor on the trailer to discharge the material. A "walking" or "live" floor uses hydraulically operated slats that move alternately and this movement causes the material to be discharged. This design requires the use of a stationary compactor at the transfer station however. Another design does not use a ram but relies on a lift mechanism at the landfill to

raise the whole trailer to discharge the material out the end. This design also requires a stationary compactor at the transfer station.

One of the design criteria that is critical in transporting waste is the axle weight of the trailers and the loading on bridges along the route of the transfer trailers. Whenever possible, landfills and transfer stations should be located near major roads or highways, but if this is not possible, the roads and bridges leading to them should be rebuilt for the heavy loading expected.

Since sludges contain as much as 70 percent moisture, their weight will have a major impact on the cost of transportation. Currently the generators of these sludges are responsible for their transportation to the disposal site.

Special transportation needs are found in cases where source separation, recycling and resource recovery are in effect. When source separation is required, there are several waste streams rather than one. These waste streams must not only be separated by the individual but they must also be kept separate by the transporters. The most popular system at this point is the use of separate containers (often referred to as "igloos") for the different materials of aluminum, ferrous metals, and glass. Newspapers are also collected but in a different type of container. This system requires the residents to bring the recyclables to this location and is therefore a voluntary program. In mandatory programs, curbside pickup of the different waste streams is practiced. Often, the frequency of collection may vary for each waste category. For instance, newspapers and aluminum cans could be collected monthly while the other wastes could be collected weekly. Either special collection trucks with separate compartments are used for this purpose, or multiple trucks are used with each truck picking up a separate waste material.

Commercial and large scale generators currently utilize special procedures for the collection of their wastes. Many times this waste is mixed with residential waste at a transfer station or at the landfill. In this way, the commercial users are paying a cost directly related to the volume of waste that they generate. Commercial and industrial containers are normally in a fixed location that is convenient for both the user and the hauler. Front loading type collection vehicles are used almost exclusively for commercial collection because it allows the driver of the collection vehicle to lift and empty a large steel container without assistance.

PERMITS REQUIRED

A number of state, federal, and possibly local permits are required before any solid waste facility can begin construction and operation. Environmental regulatory permits pertaining to water (both source and discharge), air emissions and solid waste may be required. A typical mass-burn, energy recovery incineration facility, for example, may require up to six environmental permits, excluding possible local permit requirements. The six federal and state environmental permits could include the following:

Agency	General Type of Permit
USEPA	Air/Water (PSD/NPDES)
USFAA	Aviation Obstruction
USCOE	Wetland Construction
TACB	Permit to Contruct/Operate
TWC	WCO or Non-Discharge
TDH	Type V

While the implementation of incineration technologies involves one of the more complex permitting procedures, it should be noted that state agencies encourage such

alternative waste disposal methods and have been prompt in responding to permit applications.

State regulatory agencies potentially involved in solid waste management facility implementation include the Texas Department of Health (TDH), which must approve all municipal solid waste disposal and handling facilities in the state; the Texas Air Control Board (TACB); and the Texas Water Commission (TWC). Recent state legislation has exempted permit applications for landfills from detailed TACB review. On the federal level, standards established by the Environmental Protection Agency (EPA) must also be met for certain activities.

The Facilities Evaluation Branch of TDH evaluates permit applications for the operation and maintenance of sites used for storage, processing and disposal of solid waste. This permitting authority is granted by the State Solid Waste Disposal Act. The procedure and criteria for facility permitting are contained in the department's "Municipal Solid Waste Management Regulations." The application process requires submission of general information and engineering and technical data concerning the facility for which a permit is requested. TDH engineers and geologists evaluate the environmental suitability of the proposed site. Proper notice is given and a public hearing process is followed in accord with the regulations and the State Administrative Procedure and Texas Register Act. After the hearing process and the submission of complete testimony and evaluation to the Commissioner of Health, a decision on whether to permit a facility is rendered by the Commissioner.

The TDH permit application procedure, from time of application submittal to issuance of permit, could require 210 days or more for opposed permit applications or as little as 120 days for unopposed permit applications. Permit application submittal and review prior to the Public Hearing varies from 60 to 90 days and processing required

subsequent to the Public Hearing ranges from 60 days for unopposed permit applications to 120 days or more for opposed permit applications.

Appendix "D" contains TDH permit application forms and other documents required in the registration and permitting required for construction and operation of solid waste management sites and/or facilities, as excerpted from the "Municipal Solid Waste Management Regulations." These will be updated as required to provide for the requirements of the recent legislation cited above.

Specific permit requirements that have been identified for various types of facilities are listed in Table IV-1.

Recent legislation passed in Texas which will affect solid waste management and permitting is summarized as follows.

Senate Bill 1519 mandates regional and local solid waste management plans and establishes a new solid waste disposal fee system. However, the plans will not be mandatory until sufficient funds collected from the fees are accumulated and made available by the TDH to provide 50/50 matching grants to regional planning agencies (COGs) and local governments. The first grants could be made in May or June 1990. TDH will issue rules for submitting grant applications. In the meantime, COGs and local governments may have to develop interim informal plans that do not require TDH approval in order to meet immediate needs for regionalization of solid waste systems. The formal, more-detailed, plans can be done after grants are available. Grants cannot be made to cover expenses incurred for development of the interim plans.

Beginning January 1, 1990, TDH will charge each landfill operator a fee of 50 cents per ton or 17 cents per compacted cubic yard or 10 cents per uncompacted cubic yard of waste that is landfilled. The fee for land application of sludge or similar wastes

TABLE IV-1
PERMIT REQUIREMENTS

Type of Facility	Permit Required	Responsible Agency[1]
Municipal Landfills - Types I-IV	1. Permit/Registration to Operate a Municipal Solid Waste Site	Texas Department of Health T.A. Outlaw (512) 458-7271
Transfer Stations	1. Permit/Registration to Operate a Municipal Solid Waste Site	Texas Department of Health T.A. Outlaw (512) 458-7271
Incinerators	1. Permit/Registration to Operate a Municipal Solid Waste Site 2. Control of Air Pollution by Permits for New Construction or Modification	Texas Department of Health T.A. Outlaw (512) 458-7271 Texas Air Control Board Permits Div. (512) 451-5711
Experimental Site	1. Permit/Registration to Operate a Municipal Solid Waste Site	Texas Department of Health T.A. Outlaw (512) 458-7271
Land Application Site	1. Permit/Registration to Operate a Municipal Solid Waste Site	Texas Department of Health T.A. Outlaw (512) 458-7271
Recycling Center	1. Permit/Registration to Operate a Municipal Solid Waste Site	Texas Department of Health T.A. Outlaw (512) 458-7271
Sludge Management	1. Notification of Sludge Management Activities	Texas Department of Health T.A. Outlaw (512) 458-7271
Transporters of Sludge and Similar Wastes	1. Registration Form for Transporters of Sludge and Similar Wastes	Texas Department of Health T.A. Outlaw (512) 458-7271

[1]Regional Offices of Texas Department of Health are located at Arlington for Region 5 which includes Hunt County at (817) 460-3032 and at Tyler for Region 7 which includes remainder of study area at (214) 595-3585.

Note: May not include all necessary permits for transportation/collection vehicles.

and for waste received at an incinerator or a shredding and composting facility shall be one-half of the fee for landfilled waste. No fee will be charged for waste received at transfer stations. Of the fees collected by TDH, approximately half will be used to fund the permitting and enforcement program. The balance will be used to: 1) provide 50/50 matching grants for planning, 2) provide technical assistance to local governments, 3) establish a solid waste resource center and an office of waste minimization and recycling, 4) conduct a statewide public awareness program, 5) provide supplementary funding to local governments for enforcement of the Solid Waste Disposal Act and Litter Abatement Act, 6) create a state municipal solid waste superfund, and 7) conduct other programs that the Board of Health may consider appropriate.

State Bill 1517 exempts recycling or waste separation facilities from permitting requirements if they are established in conjunction with a permitted municipal solid waste management facility. The bill also authorizes TDH to exempt from permit requirements transfer stations that serve populations of less than 5,000. All these facilities, however, must be registered with TDH in accordance with rules to be adopted.

Senate Bill 1516 requires that a person storing more than 500 used or scrap tires register the storage site with TDH. Used or scrap tires may be disposed only in facilities permitted by TDH for that purpose. A person may not store more than 500 used or scrap tires or dispose of any quantity of used or scrap tires unless they are shredded, split or quartered. TDH may grant exceptions under certain circumstances. Anyone who transports used or scrap tires must maintain records and use a manifest to assure that the tires are taken to registered storage sites or permitted disposal sites.

MANAGEMENT ALTERNATIVES

A number of management alternatives are available for solid waste projects. These include various combinations of public and private participation: public ownership and operation; public ownership and private operation; private ownership and public operation; private ownership and operation; and multijurisdictional approaches, which include public authorities, non-profit public corporations, multi-community cooperatives, special districts, and intergovernmental agreements. Other alternatives might include joint public/private ownership agreements with actual operations provided by either. Each project must be evaluated individually to assess the best administrative arrangements.

Public authorities should consider all administrative options in order to evaluate technological risks and the degree of management expertise required for a given project, as well as availability and cost of capital. Public/private administrative options are authorized by the Texas County Solid Waste Control Act, which allows the sale or lease of all or part of publicly funded waste disposal facilities to private parties, and also empowers local governments to enter into agreements with any person for the operation of all or any part of the solid waste disposal system. However, since solid waste flow control measures are tied to publicly owned or operated facilities, it is doubtful that local governments could require the use of one privately owned and operated solid waste disposal facility to the exclusion of all others.

In order to implement an solid waste management facility successfully, three factors must be satisfied: the project sponsor must have a real interest in the success of the project; the sponsor must be able to finance the project; and the sponsor must have control of the solid waste stream. A single, committed coordinator should accept

responsibility for developing and implementing a project, since implementation time typically ranges from 3 to 7 years.

Public Ownership and Operation

Public ownership and public operation is the traditional method used by local governments to procure public buildings and public works. This method gives local government full control of the project, but it also places the responsibility of implementation, including initial performance, on the local administrative agency.

There are a number of advantages to public ownership and public operation. Under this type of ownership, the project may be able to obtain low-interest financing rates and/or government grants for capital-intensive systems. Such systems are tax free. A publicly owned and operated facility can be operated either by an established city department or by a public authority which is financially self-supporting and administered separately from other agencies of city government.

Disadvantages depend in part upon the type of disposal technology being employed. The sponsoring public agency may have difficulty financing a long-term, capital intensive project and may not have the necessary personnel to operate a technologically sophisticated facility. If there are recoverable energy and material by-products of the process, publicly owned and operated facilities may lack marketing expertise. As always in the public sector, restrictive budget policies may affect equipment replacement, maintenance, and operation.

A variation of this administrative option is the use of a turnkey contract. Under a turnkey contract, a system contractor agrees to design, install or construct, and test the facility, turning it over to the public authority for operation once it performs

as guaranteed. The public authority can assume responsibility for operation of the facility, or may choose private operation alternatives.

Public Ownership and Private Operation

A publicly owned facility could be privately operated either by an independent service contractor or by the system contractor who built the facility. The operator may be paid a management fee based on a percentage of the annual operating and maintenance costs. While the management contract reduces public sector involvement in daily plant operation, it does not diminish overall public responsibility for the project.

A major benefit of public ownership with private operation is the availability of sufficient expertise in technical, management, and marketing applications for technologically sophisticated waste disposal activities. Public ownership also provides the usual tax and financing advantages to the project.

The public agency must be assured of proper maintenance and operation, retention of control over management policy, and the specific requirements for performance under the contract. Such control necessitates considerable and continual participation on the part of the public agency to ensure safe and effective management.

Private Ownership and Public Operation

Private ownership and public operation is often referred to as a leveraged lease. A public entity can lease a facility from private investors who help the jurisdiction finance the facility in exchange for formal ownership and the tax advantages such ownership brings. The private sector adds management and technical expertise important to the implementation of the project and ensures that the community will not bear the entire risk.

Success of such an option is dependent upon the public sector's assuming responsibility for proper operation and for employing skilled management and technical personnel. Success may also be limited by restrictive budget policies of the public sector affecting equipment replacement, maintenance and operation.

Private Ownership and Operation

Private ownership and operation represents a full service approach to implementing a disposal project. Under such an approach a system contractor has full responsibility for financing, design, implementation, continued operation, and ownership of the facility. The full-service contractor offers the public a solid waste disposal service in return for a public guarantee of delivered tonnages for an established charge. A full-service contractor is essentially offering a service instead of just a facility, and the public sector shares certain inherent risks in such a project with the private sector. The advantage is that the contractor has to operate the system.

Disadvantages include the difficulty a privately owned facility would have in obtaining long-term contracts to assure an adequate and consistent waste flow, and the public difficulty in ensuring stable disposal charges. The public sector may have limited or no control over disposal fees and may be constrained from signing long-term contracts. Further, private ownership and operation places the public sector at a disadvantage as responsibility for disposal activities will no longer be under full control of the public sector. It is a concern that the private operator may base decisions on financial gain and fail to address community needs sufficiently.

Multijurisdictional Approaches

Many communities are looking toward multijurisdictional and regional approaches to solid waste management in order to accomplish together what they cannot alone.

Multijurisdictional approaches include public authorities, non-profit public corporations, multi-community cooperatives, special districts, joint power authorities and other approaches based upon intergovernmental agreements.

A multijurisdictional approach offers potential advantages for large and small municipalities: there are often environmental, financial, and aesthetic advantages to having one large, properly run facility serving an area, rather than numerous small facilities, each serving a small community. Another form of cooperative venture could involve sharing of facilities where, for example, one jurisdiction owns an incinerator and another contributes landfill space.

An intergovernmental entity created for management of solid waste can solicit and accept funding from State, Federal, and other sources; it can allocate costs fairly among local jurisdictions; it can plan comprehensively for waste processing and disposal; it can ensure an adequate supply of solid waste; and it can make a systems approach to resource recovery more feasible. Multijurisdictional approaches can be used to take advantage of economies of scale and to avoid costly duplication of services.

A multijurisdictional approach places responsibility for implementation and performance fully upon the public sector. Such responsibility can be a disadvantage, as the public sector must provide the necessary technical, management, and operating expertise. Furthermore, multijurisdictional approaches require coordinated and cooperative agreements with participating governments to ensure a consistent and adequate waste flow and to guarantee project financial support. Finally, restrictive budget policies of the public sector can impair equipment replacement, maintenance, and operation, thereby negatively impacting the overall provision of service.

FINANCING ALTERNATIVES

There are several financing alternatives for solid waste management projects. The selected management alternative for a given project may influence the type of financing available. Public sector capital financing for solid waste disposal facilities and equipment is generally drawn from either borrowed funds or current revenues. Public borrowing is accomplished through issuance of general obligation bonds and municipal revenue bonds. Private sector participation shifts all or part of the capital raising burden from the public sector. Private sector financing of solid waste management facilities is usually accomplished through industrial revenue bonds and leveraged leasing. The choice of financial options is usually controlled by factors such as magnitude of the project to be undertaken, financial status of the issuing public entity, voter attitudes, legal constraints on debt limits or long-term contracts, and who is to assume project and financial risks.

Solid waste management projects generally have not been favorably received by the investment community. They are perceived as capital intensive, new, and risky, even though certain technologies have been widely applied for years in Europe, Japan, and elsewhere. In the United States, alternative disposal technologies are an emerging industry for which operating performance and economic data have not been clearly established.

The financing of alternative ventures poses considerable risk to municipalities as well as to private-sector organizations involved in long-term construction and operating contracts. Investors are generally not risk takers, desiring security and liquidity in their investments. In view of the perceived risks associated with alternative disposal technologies, many investors seek opportunities elsewhere, even though alternative ventures can offer substantial tax advantages in many cases.

The discussion which follows examines different types of financing typically considered in solid waste disposal projects, summarizing critical elements and characteristics of each.

General Obligation Bonds

The issuance of general obligation bonds is the simplest, lowest interest financing approach for any solid waste disposal activity. Such bonds are long-term tax-exempt obligations secured by the full faith and credit of a political jurisdiction which has the ability to levy taxes. They are available to small and medium sized communities, municipal utility districts, water control and improvement districts, and other taxing jurisdictions. General obligation bond financing may not be available to communities with limited remaining debt capacity, several competing demands for capital, or a poor credit rating. In any issue, the credit rating of the municipality determines the salability and price of the bonds. General obligation bonds are the least expensive method of financing, but their issuance can be complex and time consuming, so most communities are reluctant to commit general obligation bond financing to solid waste projects. Issuance may be simplified if solid waste disposal projects are grouped together with other projects in a general obligation bond package. Limitations in using general obligation bond debt are chiefly political or institutional. A municipality is normally required by law to secure voter approval, as the public sector takes all risk of facility ownership and operation.

Revenue Bonds

Municipal revenue bonds are secured, not by the taxing power of the issuer, but by anticipated revenues from project-user charges, such as tipping fees, and from the sale of energy and recovered materials. Revenue bonds are long-term obligations, typically issued by a public entity authorized to issue such debt instruments. Voter

approval is not usually required for a revenue bond issue, and municipal debt or taxing limitations do not apply since the bonds are not backed by the taxing power of a municipality.

Since revenue bonds are not secured by the taxing power of a municipality, they come under very close scrutiny by the investment community. Investors require a convincing determination of the economic feasibility of the project. Any revenue bond issuance must prove to an investor that there is ample reason to believe that project revenues will always be stable and sufficient to pay debt service.

Projects financed with revenue bonds must have control of the waste stream and long-term contracts which will ensure sufficient waste quantities and therefore, revenues to the project. Such projects may require a "put or pay" solid waste disposal agreement, a "take or pay" energy or material purchase contract, a guarantee of facility performance, and various types of insurance.

In some instances, municipalities have also pledged tax revenues as additional security for a revenue bond issuance. This is referred to as a "double-barreled" revenue bond. While the issuing entity still relies on project revenues to pay debt service, the project is secondarily guaranteed by the full faith and credit of the municipality, and allows the bonds to be considered general obligation bonds and sell at a lower interest rate. However, such secondary security may not be an available option due to legal barriers.

Industrial Development Bonds

Industrial development bonds are issued through an agency acting on behalf of one or more municipalities and a private industry or other community entity. They are similar to municipal revenue bonds, except that the credit of a private firm is

substituted for that of a municipality. Industrial development bonds permit the issuance of tax-exempt debt on behalf of a private owner for a public purpose. While voter approval is not required, a public hearing and approval by elected officials or a legislative body is required.

Industrial development bond financing combined with private equity usually permits a private firm or joint venture to gain the benefits of lower cost, tax exempt financing, as well as other tax benefits including investment tax credits, energy tax credits, and interest or rental deductions. As a result, a municipality may achieve lower costs for disposal of solid waste, as the private contractor can agree to pass along a portion of the tax savings in the form of a reduced tipping fee.

Industrial development bonds are closely scrutinized by the investment community and require several security features to be marketable. In the case of an uninsured financial disaster, financial responsibility must be assured. The bonds may be structured as guaranteed corporate debt, as pure revenue bonds, or as a combination of revenue bonds with corporate guarantee. Financing structure must provide convincing evidence that the corporation's financial substance is sufficient to make debt service payments. The investment community will further base its support of the project upon availability of sufficient solid waste and a secured long-term energy market (in the case of energy recovery projects).

Recently approved Federal tax provisions will probably cause a diminished interest in future financing of solid waste disposal facilities with industrial development bonds. Solid waste projects must now compete with a multitude of other high-visibility projects. Additionally, Federal private-sector tax credits are reduced as solid waste facilities financed with industrial revenue bonds will have to use straight line depreciation rather than accelerated depreciation allowances approved in the past.

Leveraged Leasing

Leveraged leasing is a complex method of financing based on benefits that accrue to a city if a financial intermediary, corporate or individual, is interposed between a long-term source of capital and the public sector. Tax benefits associated with the acquisition and ownership of a solid waste disposal facility are transferred from the public sector to the private sector. Such tax benefits, combined with the availability of tax-exempt debt financing, serve to attract private capital into solid waste disposal projects.

Leveraged leasing differs from traditional leasing in that both private and public sectors provide capital to the project; private contributions usually total 20 to 30 percent of the cost of the asset, and the public sector contributes the remaining portion through a typical borrowing method. Including private investors in a leveraged leasing option can lower the amount of bonded indebtedness of the public sector and reduce tipping fees by passing on a portion of the tax savings realized.

The investment community, however, demands proof of a soundly developed, conservatively structured financing package. Lenders providing the debt portion of the financing will look primarily to the ability of the public sector to make timely "rental" payments, and to the collateral value of the project.

Recently approved tax bill provisions limit public-private service control agreements for solid waste disposal facilities. The test of whether tax benefits may be taken now depends upon who assumes various project risks. The goal of the new provisions is to limit the practice of governments "selling" public property to private firms for tax reasons while retaining significant project risks.

Current Revenue Financing

Current revenue financing is the least complex financing alternative available to the public sector. It is simply "pay-as-you-go" financing and is dependent upon the ability to generate surplus capital. There are usually no legal constraints, and voter approval is generally not required. However, current revenue financing is often limited to small-scale facility and equipment purchases, and is generally not available for major capital expenditures often associated with solid waste disposal projects.

Bank Loans

Municipalities can use bank loans to meet small-scale capital requirements for short to medium term funding at low cost. Bank loans are a source of funds available on short notice, generally not requiring voter approval. They also represent a financing option for political jurisdictions lacking taxing powers.

Bank loans can carry relatively low interest rates, and there are essentially no set debt limitations. The financial community requires no technical or economic analysis of the project prior to approval. The loans, however, are not useful for capital intensive projects. The loans are of a short to medium term length, and may limit the maximum amount available for a particular project.

Lease Agreements

The public sector may gain access to solid waste disposal facilities and equipment without major capital outlays through a lease agreement. In lease agreements, the lessor purchases and holds title to the asset and the lessee pays rent for the use of it during the lease term, usually not more than five years. The lessee will generally

not own the asset at the completion of the lease period. Stipulations in the lease agreement may allow for the purchase of the equipment at "fair market value" at the end of the lease. Once made available to the public sector, a lease agreement requires a short lead time to enact. Lease agreements, however, can be limited by state restrictions on multi-year contracts between the public and private sectors.

COST CRITERIA

Evaluation of solid waste management activities must include adequate determination of economic impacts even though economics may receive less attention than environmental concerns on the part of regulatory agencies. The public is much more sensitive to economic impacts than may be apparent from current publicity, and this, in turn, can influence environmental quality. For example, the high cost of solid waste services can lead to increased illegal dumping and environmental degradation.

Selection of the most cost-effective alternative should be based on costs which can be adequately defined. A consistent methodology should be applied to alternatives in order to truly compare costs. Also, a clear distinction should be drawn between collection/transportation costs and processing/disposal costs. Each phase of the solid waste management process has its own set of expenses for such items as administration, maintenance, overhead, personnel, etc. Current expenses for disposal activities must be identified if alternative technologies are to be accurately compared with existing practices.

The economic comparison of alternatives should include both long- and short-term costs. These vary widely, as they are based upon individual local circumstances. It is clear, however, that in the future increasingly stringent requirements (see Subtitle D Criteria for Landfills, Chapter III) will make long-term landfilling costs

much more comparable to the long-term costs of alternative technologies such as incineration with energy recovery.

Primary components for cost evaluation of a typical landfill disposal system are: (1) Collection/primary haul, (2) Intermediate processing/secondary haul, and (3) Ultimate disposal.

Collection/Primary Haul

The collection/primary haul costs are those incurred by transporting waste from a Waste Generation District to an intermediate facility, such as a transfer station, or directly to an ultimate disposal facility such as a landfill. This haul is assumed to be made with a fully-loaded collection vehicle.

Computation of primary haul costs requires the following information: travel distance in miles from the loading point to the facility, travel time in minutes from the loading point to the facility, collection vehicle capacity in cubic yards, the compaction factor of the collection vehicle in pounds per cubic yard (i.e., how many pounds a cubic yard of waste weighs in the collection vehicle), the cost in dollars per hour for labor and overhead to operate the vehicle, and the cost in dollars per mile for acquiring and operating the vehicle.

For primary hauling, a 20-cubic-yard packer vehicle with a 350 pounds per cubic yard compaction factor is often used for residential waste. A 25-cubic-yard packer vehicle with a 350 pounds per cubic yard compaction factor is a typical commercial haul vehicle.

Typical unit costs for primary and secondary hauling operations are as follows:

Residential Collection/Primary Haul
Vehicle = $1.45/mile or $0.40/ton-mile
Labor = $20.50/hour

Commercial Collection/Primary Haul
Vehicle = $1.65/mile or $0.40/ton-mile
Labor = $11.50/hour

Intermediate Processing/Secondary Haul

Intermediate processing generally refers to a transfer station, where waste is consolidated from several collection vehicles (or from several trips of the same vehicle), for more efficient transfer to the landfill in larger vehicles. Frequently, waste is further compacted at the transfer station. The costs of a transfer station depend on its size and type. There is a wide variety of equipment available, but some typical operations are described below.

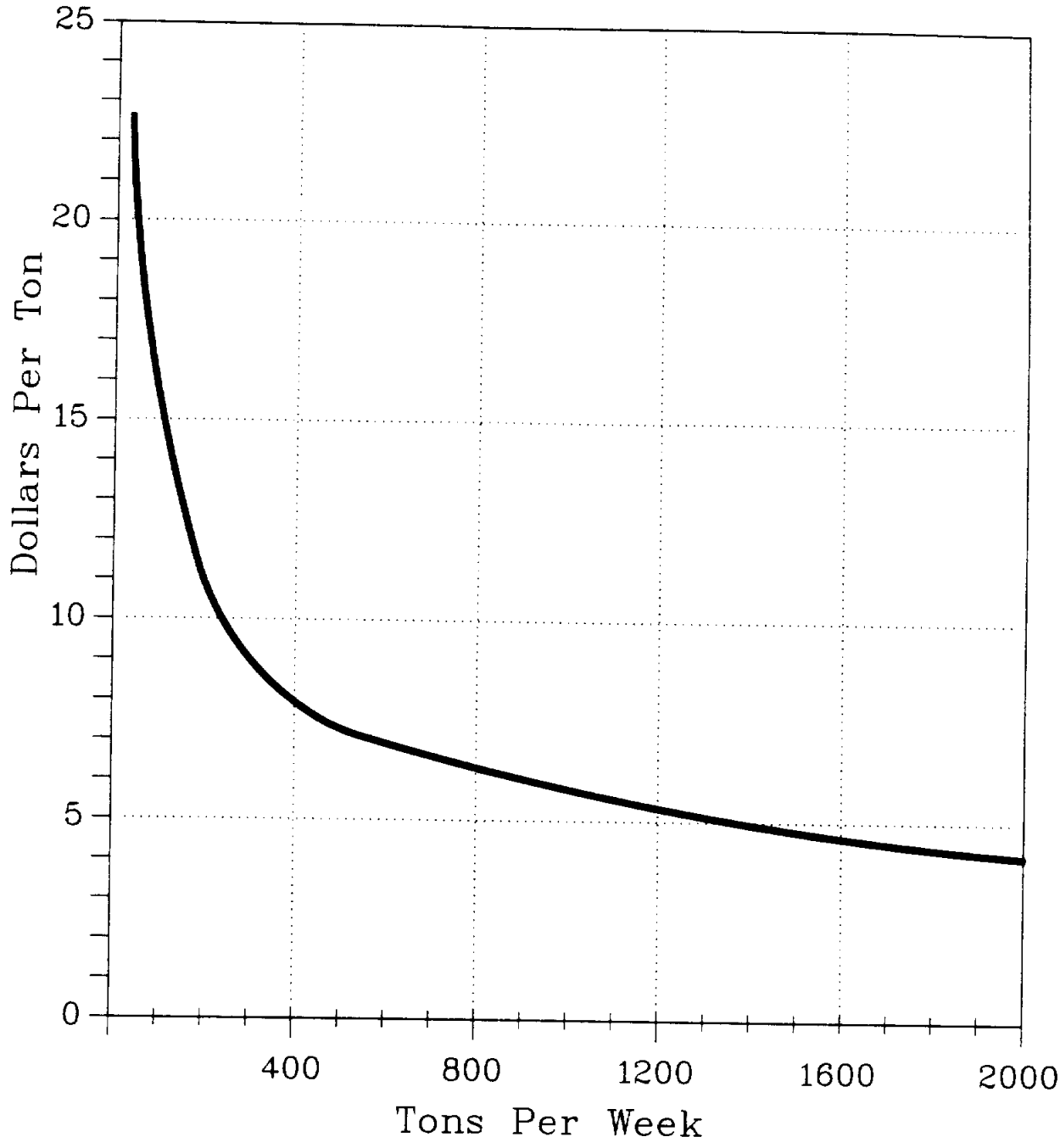
Very small stations (those handling less than 100 tons of waste per week) usually use roll-off containers which sit in place until filled by collection vehicles. They are then hauled to the ultimate disposal site, emptied, and returned to the transfer station site. Some of these containers compact the waste, but are more expensive than those that do not. Medium sized transfer stations (100 to 1,000 tons per week) accept waste from collection vehicles and load it into open-top or closed vehicles, sometimes compacting it upon loading with a hydraulic ram. Larger stations (over 1,000 tons per week) may have a tipping floor where waste is dumped and stored temporarily. It is then moved by bulldozers into a pit from which is loaded by hydraulic rams into closed trailers for hauling.

The secondary haul costs are those of transporting waste from an intermediate facility to an ultimate disposal facility. This haul is assumed to be made by a fully loaded transfer vehicle. A 65 to 75 cubic yard transfer vehicle with a compaction factor of about 600 pounds per cubic yard is normally used.

Estimates for transfer stations take into account the capital costs of the facility and equipment, operating costs, labor costs, and overhead and management costs. Figure IV-2 is a generalized cost curve in dollars per ton of solid waste processed for various sizes of transfer stations. These generalized figures should only be used for developing comparative costs as they could be affected by additional costs for permitting, legal, engineering, administration, accounting, or other site-specific requirements. These cost curves were developed in 1974 and updated to 1989 for inflation. Evaluation of current cost data indicates that these generalized costs should be adequate for planning purposes.

A recent series of articles on waste transfer in the Waste Age magazine included an article in the May 1989 issue entitled "How Much Will Transfer Cost?" A case study was presented for a 600 tons per day transfer station (3,300 tons per week based on 5-1/2 days per week operation). Its annual capital equipment and site costs were $2.41 per ton and the station operation and maintenance costs were $2.17 per ton for a total of $4.58 per ton.

Smaller transfer stations will generally have a higher unit operating costs. An example of costs for a smaller station, a 200-ton-per-week transfer station in the Dallas-Fort Worth area was evaluated. Since this transfer station was constructed in 1982, capital costs were updated for inflation to 1989. The annual capital equipment and site development costs are $7.10 per ton; station operation and maintenance costs are $5.05 per ton, giving a total unit cost for this station of $12.15 per ton of waste processed.



Note: Unit costs can vary significantly due to distance to disposal site and required round trip travel time which controls transfer fleet size and operation costs. Truck transfer operation costs can be as much as 70% of the total tranfer unit cost.

FIGURE IV-2
TRANSFER STATIONS–
GENERALIZED UNIT COSTS VS. SIZE

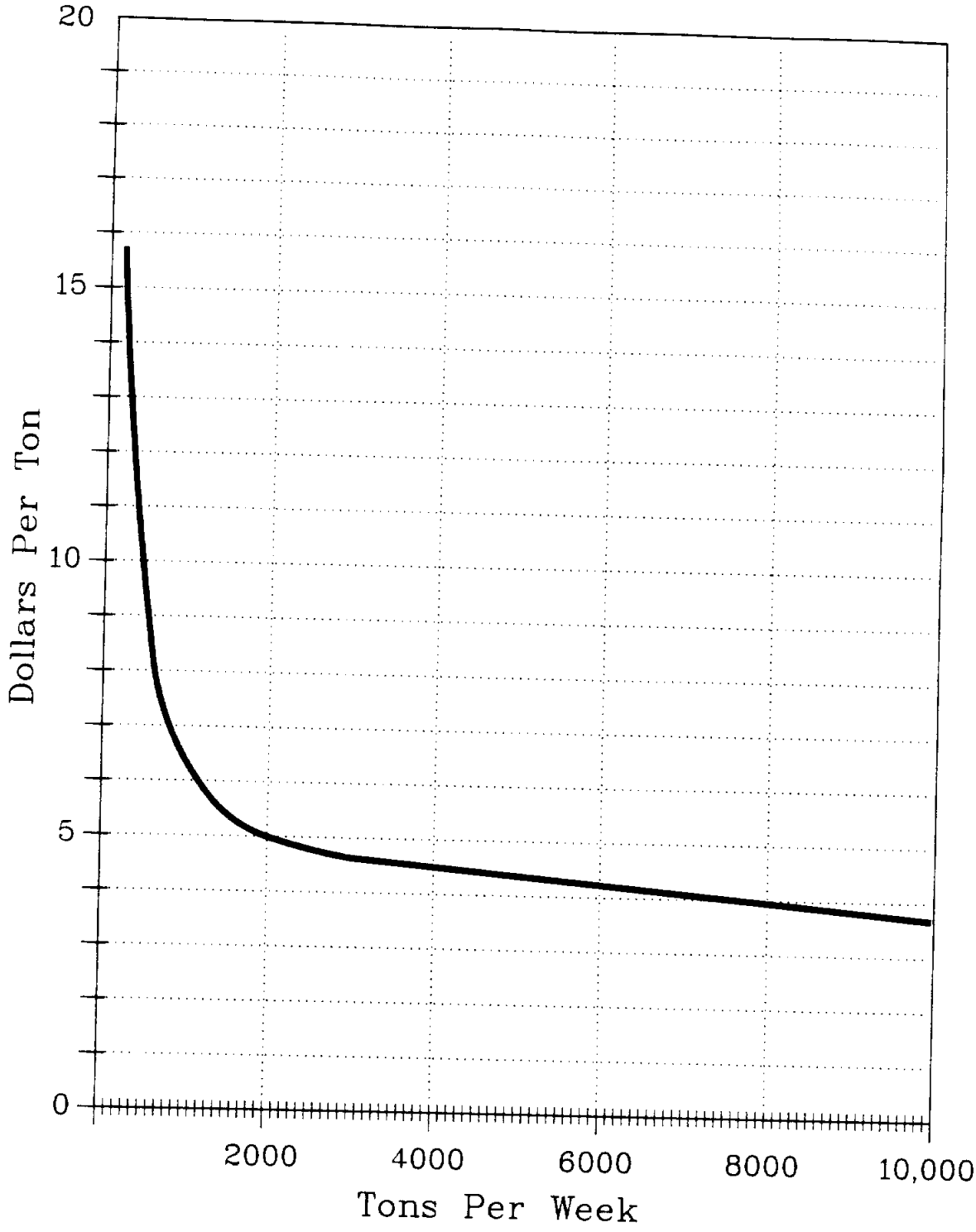
Truck transfer operation costs for the 600 tons per day transfer station evaluated in the Waste Age article required 17 truck/trailer transfer trucks and were determined to be $11.58 per ton.

Ultimate Disposal

By far, the most common method for ultimate disposal of waste is in a sanitary landfill. Generalized costs of landfilling were developed and are discussed below.

The factors to be considered in defining the general costs of landfilling include equipment requirements, labor requirements to operate the equipment, initial site development costs, and management and overhead costs. Figure IV-3 is a generalized cost curve in dollars per ton of solid waste disposed for various sizes of landfills. These generalized costs should only be used for planning and developing comparative costs. They could be affected by additional costs for permitting, legal, engineering, administration, accounting, or other site-specific requirements. Also, the economic impact of the new Subtitle D regulations will likely be significant.

Landfill tipping fees vary widely in the Dallas-Fort Worth area according to data published by the North Central Texas Council of Governments. Most landfills do not have scales and charge by load or type of vehicle. Calculations based on available data indicate that these tipping fees range from $5.00 to $20.00 per ton. Minimal information is available on tipping fees charged by landfills in the planning area. In its 1975 Regional Solid Waste Study, the Ark-Tex Council of Governments reported that costs for operating a landfill range from $1.25 to $5.00 per ton for landfills handling less than 160 tons per day, and from $0.75 to $2.00 per ton for landfills handling more than 300 tons per day. This is equivalent to current costs of about



Note: These generalized unit costs are based on current costs for existing facilities with some contingency added. However, the economic impact of the new subtitle D requirement could be significant depending on specific site requirements. NSWMA estimates that costs could be as much as $50–$70 dollars per ton for a new modern landfill.

FIGURE IV-3
SANITARY LANDFILLS–
GENERALIZED UNIT COSTS VS. SIZE

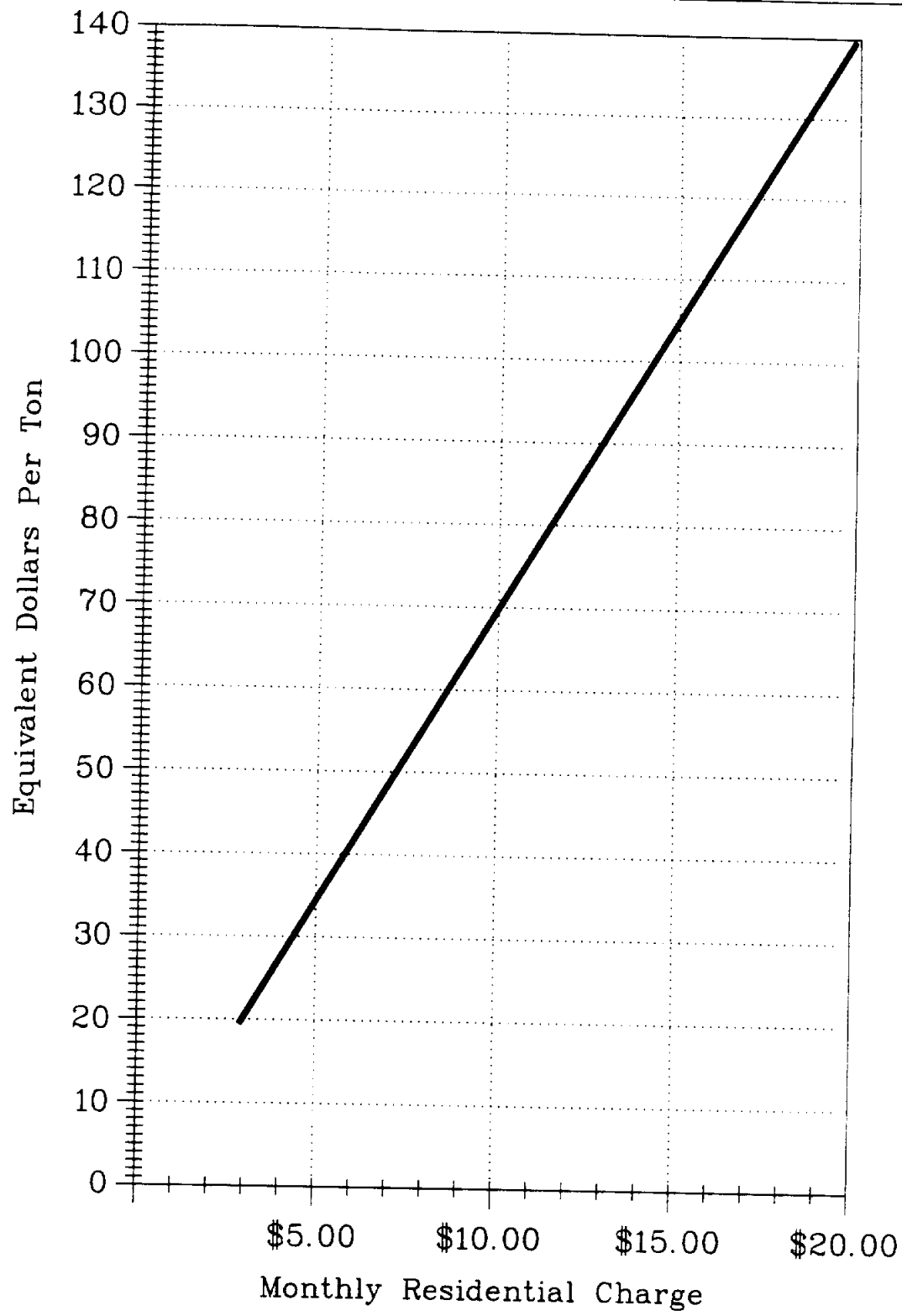
$3.00 to $12.00 per ton for the smaller landfills and $1.80 to $4.80 for the larger landfills. These costs are in close agreement with those shown on Figure IV-4 but do not reflect requirements of the new Subtitle D regulations.

The National Solid Waste Management Association in a recent publication entitled "Landfill Capacity in the Year 2000," estimated that the initial costs of a modern 100-acre landfill with a 20-year life which could meet all the new requirements would be $65,950,950 for a single liner and $86,950,950 for a double liner installation. This would equate to $51.10 and $67.37 per ton, respectively, based on a landfill disposal rate of 800 lb/cubic yard and landfill depth of 20 feet.

Figure IV-4 relates the disposal costs in dollars per ton to a monthly residential charge in order to relate economic impacts to residential rates. The solid waste generated in a typical residence is based on assumed averages of 2.5 persons per household, each producing solid waste at a rate of 3.76 pounds per person per day or about 1.72 tons per year (3,430 lbs.). For example, a residential charge of $5.00 per month or $60.00 per year for 1.72 tons per year would be equivalent to about $34.90 per ton available for total solid waste management costs, including collection, transportation, and ultimate disposal.

REGIONAL PLAN ALTERNATIVES

The 10-county planning region includes some 6,630 square miles and is about 175 miles long from the western side of Hunt County on the west to the Arkansas State Line on the east. It has a maximum width of about 95 miles from the Red River (Oklahoma State Line) on the north to the southern boundary of Franklin County near the center of the planning region.



Note: Solid waste generation based on assumed typical residence at 2.5 persons at 3.76 lbs/person/day or 3,430 lbs per year to relate monthly and annual charge to annual dollars per ton.

FIGURE IV-4
MONTHLY RESIDENTIAL CHARGE
VS. EQUIVALENT DOLLARS PER TON

Based on the location of existing landfills and population centers, various possible subdivisions of the region were evaluated. Six different alternatives are shown on Figures IV-5 through IV-10. For each alternative, summary tables including projected population, solid waste quantities, and landfill requirements were developed by subarea (Tables IV-2 through IV-7). This information is presented for two scenarios: the first data set assumes that the EPA waste reduction goal of 25 percent by 1992 will not be met, and the second data set assumes that it will be met.

The projected solid waste quantities are based on a generation rate of four pounds per person per day without the EPA reduction goal and three pounds per person per day with the reduction goal. The projected landfill requirements are based on a disposal rate of 800 pounds of solid waste per cubic yard of landfill and an average landfill depth of 20 feet for a resultant landfill loading of about 12,900 tons per acre.

The projected landfill availability for each regional subarea based on evaluation of current conditions, as well as the projected landfill requirements, are shown for each alternative indicated in Figures IV-5 through IV-10. A proposed plan of development of transfer stations and/or landfills is also shown for each alternative. Reference numbers on the figures for possible landfills and transfer stations refer back to Table II-11 (page II-38) where they are listed as Alternative Map Reference Numbers.

The projected 437 acres needed to dispose of waste until the year 2010 is only about 40 percent of the 1,069 acres available in the planning area. However, over 90 percent of this space is in four landfills in the western portion of the planning area, thus transfer stations and transportation of waste to these facilities would be needed. There are currently only three transfer stations in the region at Sulphur Springs, Paris, and Texarkana. The solid waste from the Texas portion of Texarkana which currently goes to a landfill in Miller County, Arkansas is included in these

projections since the Arkansas landfill may close or may stop accepting out-of-state waste. Also, the landfill acreage needed takes into account only solid waste generated in the planning area. It could be increased by waste received from generators outside the area.

Alternative No. 1 divides the planning area into three subareas (Figure IV-5). Subarea 1A is Hunt County and would utilize three existing landfills within its borders. Subarea 1B would include Lamar, Red River, Delta, Hopkins, Franklin, and Titus Counties and would be served by the B&B Landfill in north central Lamar County. Transfer stations near Mount Pleasant, Mount Vernon, Sulphur Springs, Cooper, Clarksville, and Paris would be constructed to assist collection and transport to the B&B Landfill. Subarea 1C would include Bowie, Cass, and Morris Counties and would send waste to a proposed new landfill in Bowie County. Transfer stations near Queen City, Lone Star, and Texarkana would be needed. Solid waste quantities and landfill requirements for this alternative are included in Table IV-2.

Alternative No. 2 divides the planning area into four subareas (Figure IV-6). Subarea 2A includes Hunt, Hopkins, and Delta Counties and would use the three existing landfills in Hunt County as shown. Transfer stations near Sulphur Springs and Cooper would be utilized in collecting and transporting solid waste from various parts of subarea 2A. Subarea 2B includes Lamar and Red River Counties and would be served by the B&B Landfill in north central Lamar County. Transfer stations near Clarksville and Paris would be constructed. Subarea 2C would include Franklin, Titus, and Morris County and would utilize the Mount Pleasant Landfill. One transfer station at Lone Star would be necessary. Subarea 2D includes Bowie and Cass Counties and would send waste to a proposed new landfill in Bowie County, with transfer stations near Queen City, Avinger, and Texarkana. Table IV-3 summarizes solid waste quantities and landfill requirements for this alternative.

Alternative No. 3 divides the planning area into four subareas (Figure IV-7). Subarea 3A includes Hunt, Hopkins, and Delta Counties and would be served by the three existing landfills in Hunt County and two transfer stations near Sulphur Springs and Cooper. Subarea 3B includes Red River and Lamar Counties and would utilize the B&B Landfill in North Central Lamar County. Transfer stations near Clarksville and Paris would be required. Subarea 3C includes Bowie County and would send waste to a proposed new landfill there. A transfer station at Texarkana would be used. Subarea 3D would include Franklin, Titus, Morris, and Cass Counties and would be served by the Mount Pleasant Landfill, with transfer stations near Queen City and Lone Star. A summary of solid waste quantities and landfill requirements for this alternative is found in Table IV-4.

Alternative No. 4 subdivides the planning area into six subareas (Figure IV-8). Subarea 4A is Hunt County and would use the three existing landfills there. Subarea 4B includes Lamar and Red River Counties and would utilize the B&B Landfill in north central Lamar County, with transfer stations at Clarksville and Paris. Subarea 4C, including Delta and Hopkins Counties, would use a landfill near Sulphur Springs and one transfer station near Cooper. Subarea 4D would include Franklin and Titus County and would send waste to the landfill near Mount Pleasant. Subarea 4E would be Bowie County and would use a proposed new landfill there with one transfer station near Texarkana. Subarea 4F would include Morris and Cass Counties served by the Lone Star Landfill and a transfer station at Queen City. A summary of solid waste quantities and landfill requirements for this alternative is found in Table IV-5.

Alternative No. 5 divides the planning area into four subareas (Figure IV-9). Subarea 5A would be Hunt County and would utilize the three existing landfills there. Subarea 5B includes Lamar, Delta, and Hopkins Counties and would be served by the B&B Landfill in north central Lamar County, with transfer stations near Sulphur Springs, Cooper, and Paris. Subarea 5C includes Red River, Franklin, Titus, and Morris Counties and

would send waste to the Mount Pleasant Landfill. Transfer stations near Clarksville and Lone Star would be needed. Subarea 5D would include Bowie and Cass Counties and would be served by a proposed new landfill in Bowie County with transfer stations near Queen City and Texarkana. Solid waste quantities and landfill requirements for this alternative are summarized in Table IV-6.

Alternative No. 6 would divide the planning area into three subareas (Figure IV-10). Subarea 6A would include Hunt, Delta and Hopkins Counties and would utilize the three existing landfills in Hunt County, with transfer stations near Sulphur Springs and Cooper. Subarea 6B would include Lamar and Red River Counties which would send waste to the B&B Landfill in north central Lamar County, using transfer stations near Clarksville and Paris. Subarea 6C, including Bowie, Franklin, Titus, Morris, and Cass Counties, would be served by the Mount Pleasant Landfill and transfer stations near Texarkana, DeKalb, Queen City, Avinger and Lone Star. Table IV-7 summarizes solid waste quantities and landfill requirements for this alternative.

TABLE IV-2

SULPHUR RIVER BASIN REGIONAL SOLID WASTE PLANNING
ALTERNATIVE NO. 1

Subarea	Projected Population 1990	2000	2010	Solid Waste Projections w/o EPA Reduction Goal 1990	2000	2010	20-Year Landfill Req.	Solid Waste Projections w/EPA Reduction Goal 1990	2000	2010	20-Year Landfill Req.
	---(1000 persons)----			---(1000 tons/year)----			----Acre-----	---(1000 tons/year)----			----Acre-----
1A	74.3	83.5	92.2	51	58	64	99	51	44	48	76
1B	131.3	148.2	165.6	86	99	111	169	86	74	83	130
1C	130.4	146.6	163.6	88	99	111	170	88	74	83	131
TOTALS	336.0	378.3	421.4	225	256	286	437	225	192	215	338

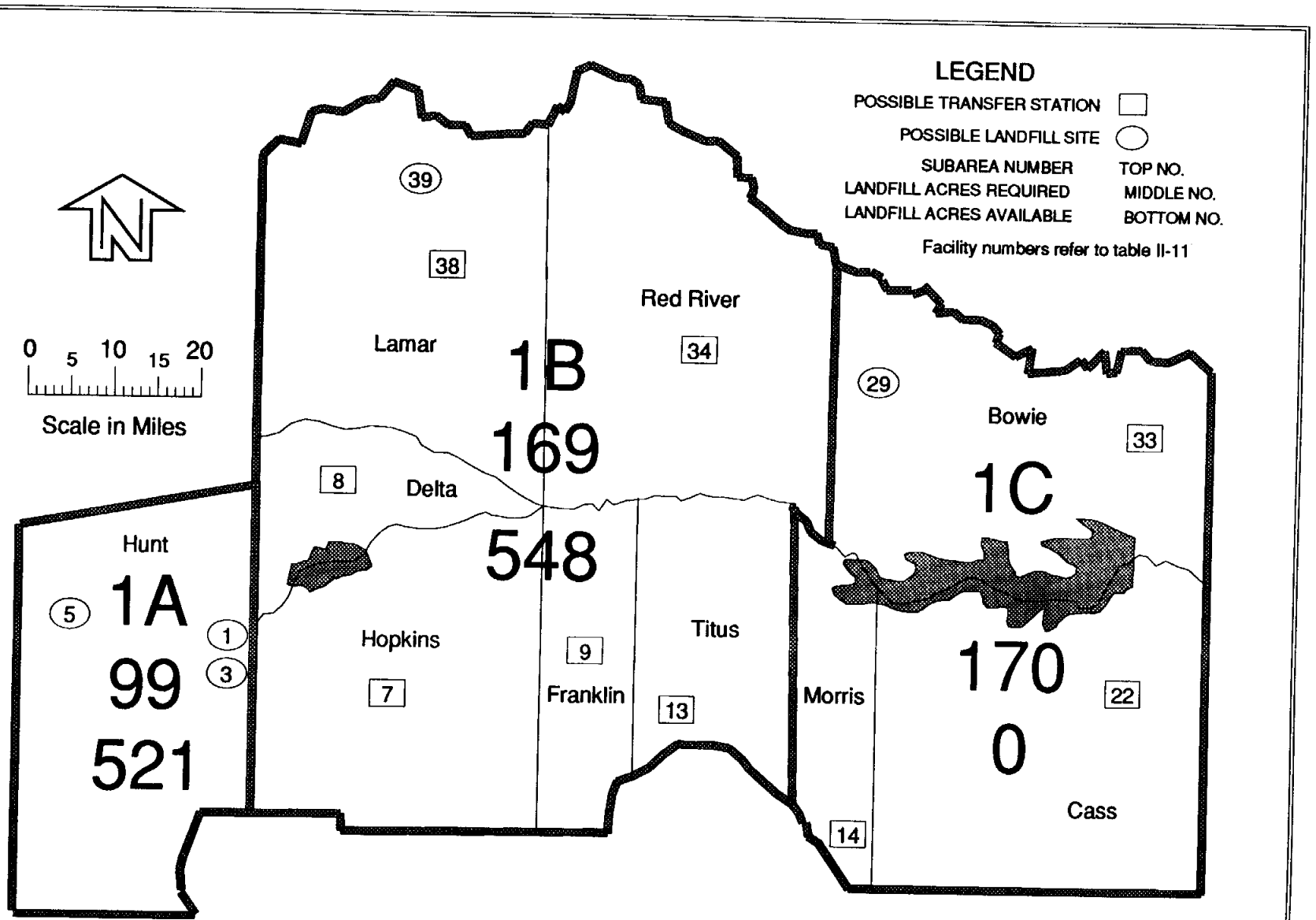


FIGURE IV-5
Regional Solid Waste Management Plan Layout
Alternative No. 1

TABLE IV-3

SULPHUR RIVER BASIN REGIONAL SOLID WASTE PLANNING
ALTERNATIVE NO. 2

Subarea	Projected Population 1990	2000	2010 ---(1000 persons)----	Solid Waste Projections w/o EPA Reduction Goal 1990	2000	2010 ---(1000 tons/year)----	20-Year Landfill Req. ----Acre-----	Solid Waste Projections w/EPA Reduction Goal 1990	2000	2010 ---(1000 tons/year)----	20-Year Landfill Req. ----Acre-----
2A	110.3	124.7	137.5	74	86	95	146	81	68	75	115
2B	62.0	70.2	78.4	42	48	54	82	45	38	43	65
2C	48.7	54.8	63.0	31	34	39	59	36	30	34	51
2D	115.0	128.6	142.5	78	88	98	150	84	70	78	120
TOTALS	336.0	378.3	421.4	225	256	286	437	245	207	231	352

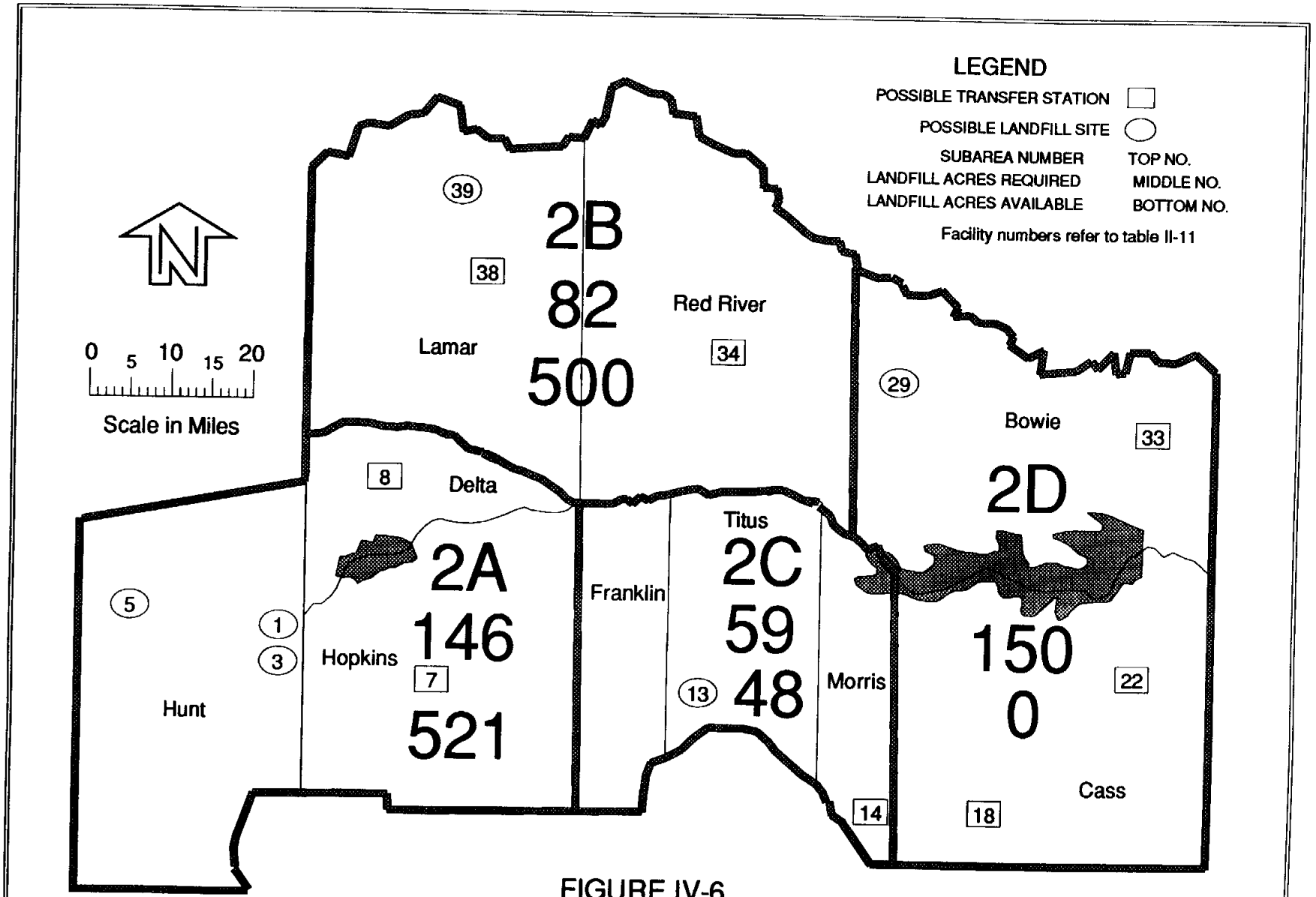


FIGURE IV-6
Regional Solid Waste Management Plan Layout
Alternative No. 2

TABLE IV-4

SULPHUR RIVER BASIN REGIONAL SOLID WASTE PLANNING
ALTERNATIVE NO. 3

Subarea	Projected Population 1990	2000	2010	Solid Waste Projections w/o EPA Reduction Goal 1990	2000	2010	20-Year Landfill Req.	Solid Waste Projections w/EPA Reduction Goal 1990	2000	2010	20-Year Landfill Req.
	---(1000 persons)----			---(1000 tons/year)----			----Acre-----	---(1000 tons/year)----			----Acre-----
3A	118.6	134.5	149.0	79	92	102	156	87	74	82	125
3B	62.0	70.2	78.4	42	48	54	82	45	38	43	65
3C	82.7	92.2	102.9	58	65	73	111	60	50	56	86
3D	72.7	81.4	91.1	46	51	57	88	53	45	50	76
TOTALS	336.0	378.3	421.4	225	256	286	437	245	207	231	352

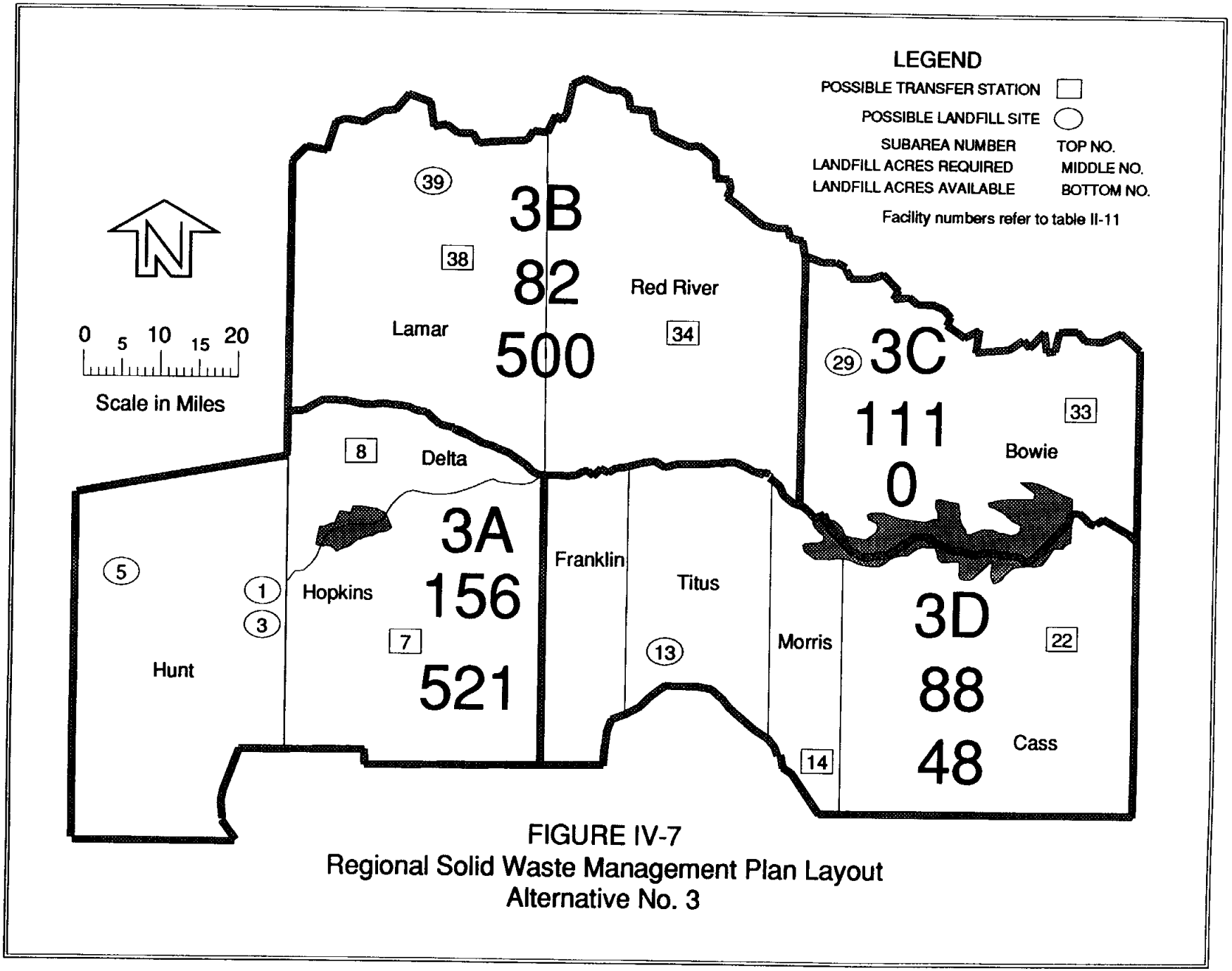


FIGURE IV-7
Regional Solid Waste Management Plan Layout
Alternative No. 3

TABLE IV-5

SULPHUR RIVER BASIN REGIONAL SOLID WASTE PLANNING
ALTERNATIVE NO. 4

Subarea	Projected Population 1990	2000	2010	Solid Waste Projections w/o EPA Reduction Goal 1990	2000	2010	20-Year Landfill Req.	Solid Waste Projections w/EPA Reduction Goal 1990	2000	2010	20-Year Landfill Req.
	---(1000 persons)----			---(1000 tons/year)----			----Acre-----	---(1000 tons/year)----			----Acre-----
4A	74.3	83.5	92.2	51	58	64	99	54	46	50	77
4B	62.0	70.2	78.4	42	48	54	82	45	38	43	65
4C	36.0	41.2	45.3	23	28	31	47	26	23	25	38
4D	33.3	36.8	41.9	21	23	26	40	24	20	23	35
4E	82.7	92.2	102.9	58	65	73	111	60	50	56	86
4F	47.7	54.4	60.7	30	34	38	58	35	30	33	50
TOTALS	336.0	378.3	421.4	225	256	286	437	245	207	231	352

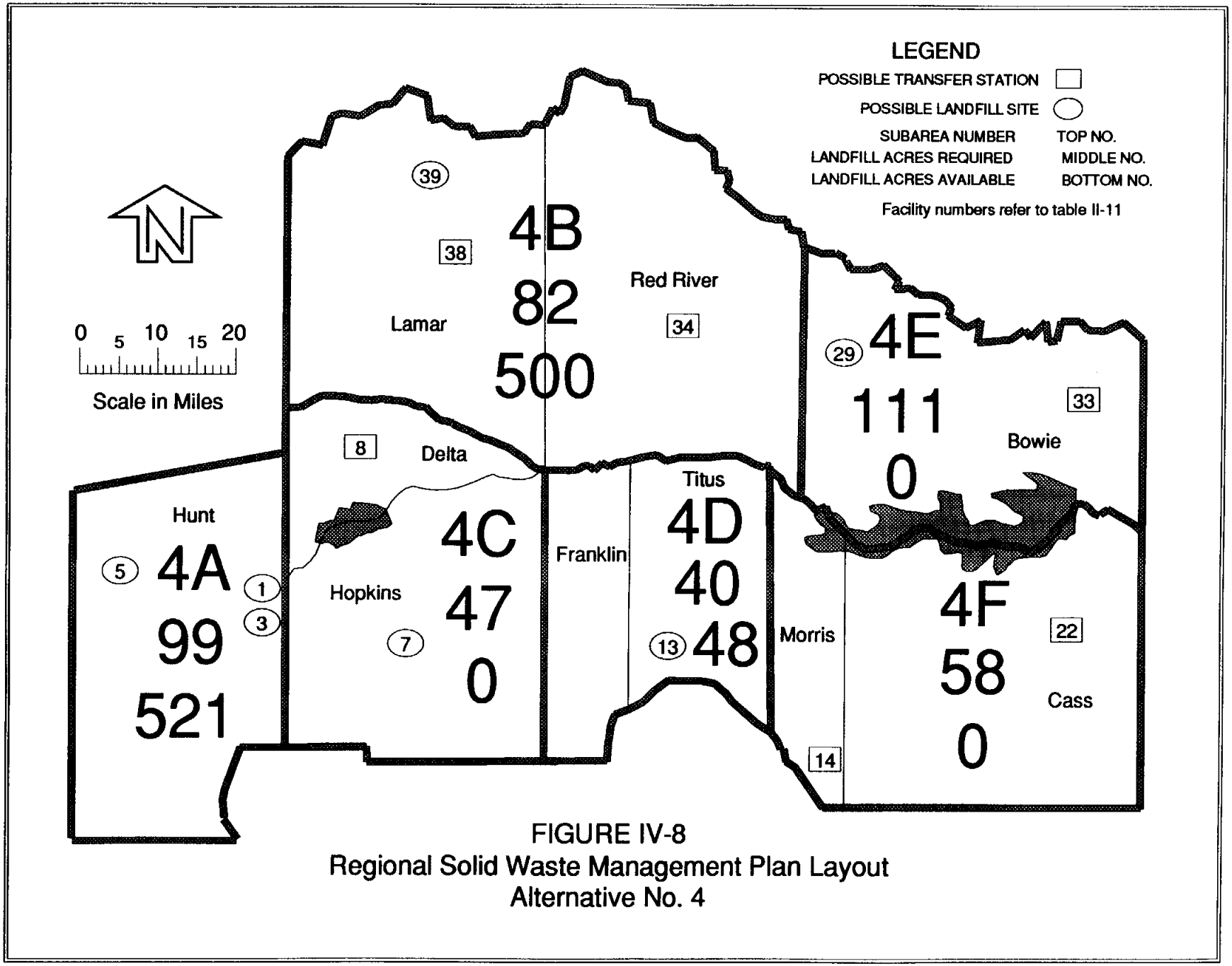


FIGURE IV-8
Regional Solid Waste Management Plan Layout
Alternative No. 4

TABLE IV-6

SULPHUR RIVER BASIN REGIONAL SOLID WASTE PLANNING
ALTERNATIVE NO. 5

Subarea	Projected Population 1990	2000	2010	Solid Waste Projections w/o EPA Reduction Goal 1990	2000	2010	20-Year Landfill Req.	Solid Waste Projections w/EPA Reduction Goal 1990	2000	2010	20-Year Landfill Req.
	---(1000 persons)----			---(1000 tons/year)----			----Acre-----	---(1000 tons/year)----			----Acre-----
5A	74.3	83.5	92.2	51	58	64	99	54	46	50	77
5B	82.6	95.4	106.2	56	66	74	112	60	52	58	88
5C	64.1	70.8	80.5	40	44	50	76	47	39	44	67
5D	115.0	128.6	142.5	78	88	98	150	84	70	78	120
TOTALS	336.0	378.3	421.4	225	256	286	437	245	207	231	352

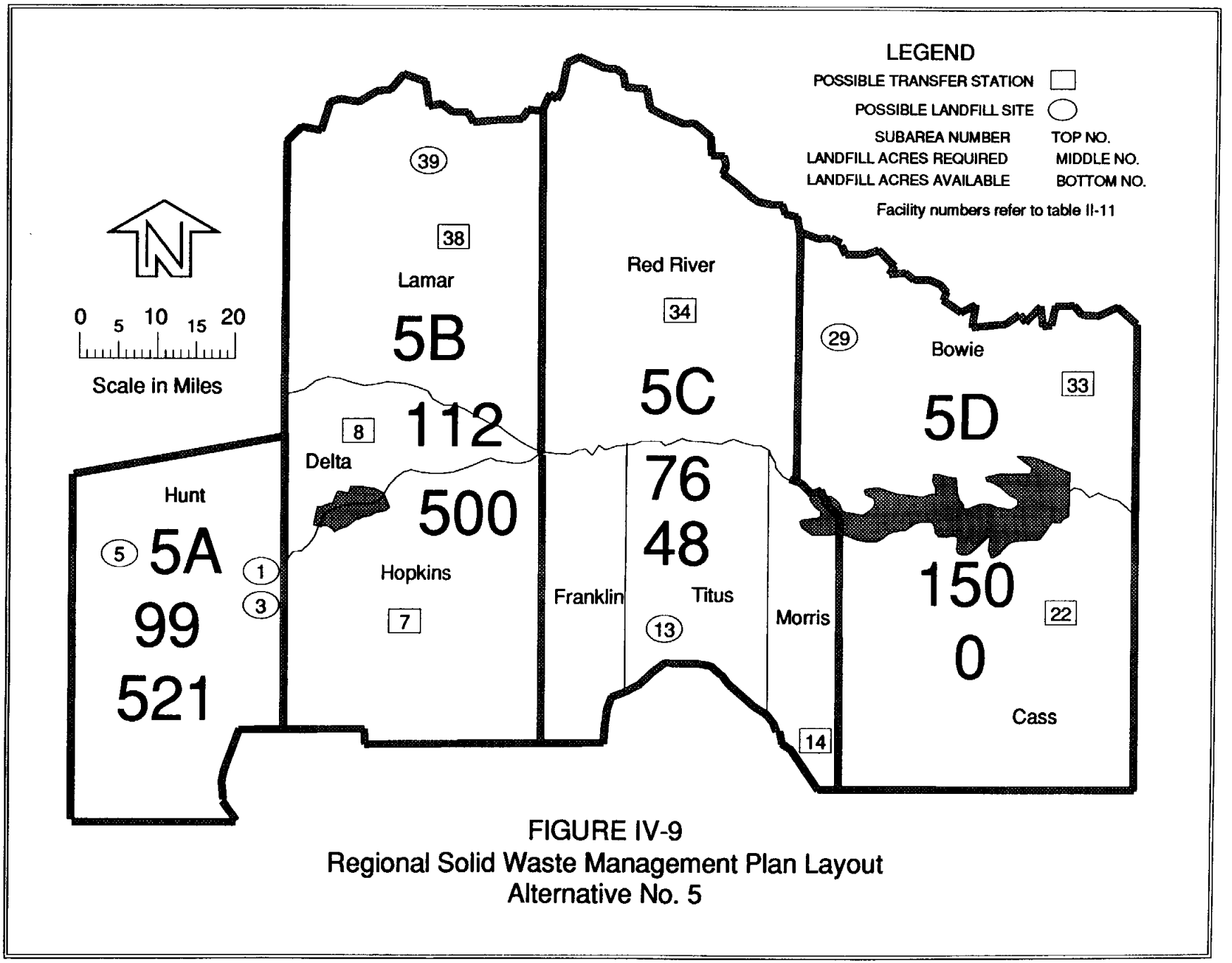


FIGURE IV-9
Regional Solid Waste Management Plan Layout
Alternative No. 5

TABLE IV-7

SULPHUR RIVER BASIN REGIONAL SOLID WASTE PLANNING
ALTERNATIVE NO. 6

Subarea	Projected Population 1990	2000	2010	Solid Waste Projections w/o EPA Reduction Goal: Solid Waste Projections 1990	2000	2010	20-Year Landfill Req.	Solid Waste Projections w/EPA Reduction Goal: Solid Waste Projections 1990	2000	2010	20-Year Landfill Req.
	---(1000 persons)----			---(1000 tons/year)----			----Acre-----	---(1000 tons/year)----			----Acre-----
6A	118.6	134.5	149.0	79	92	102	156	87	74	82	125
6B	62.0	70.2	78.4	42	48	54	82	45	38	43	65
6C	155.4	173.6	194.0	104	116	130	199	113	95	106	162
TOTALS	336.0	378.3	421.4	225	256	286	437	245	207	231	352

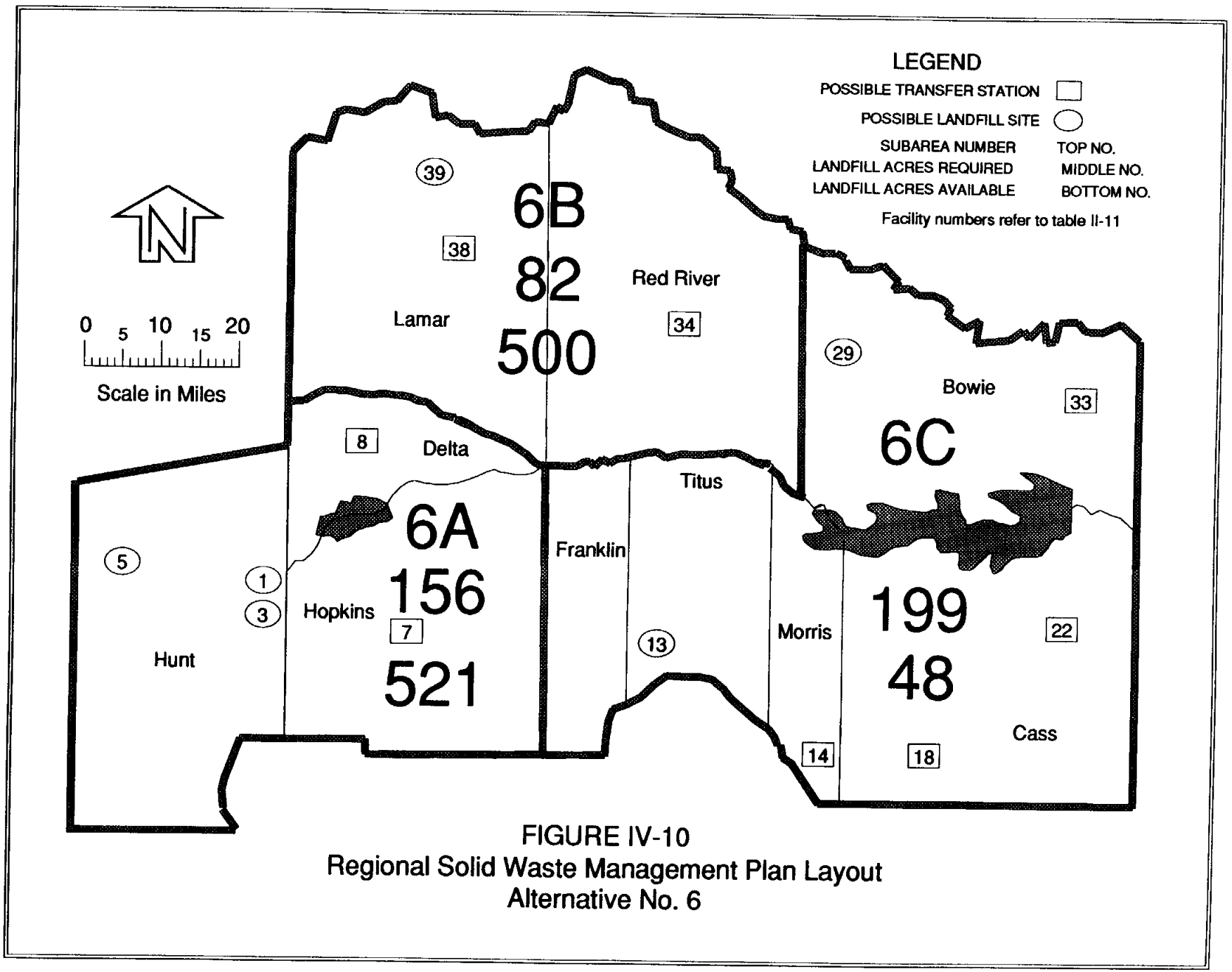


FIGURE IV-10
Regional Solid Waste Management Plan Layout
Alternative No. 6

CHAPTER V

RECOMMENDATIONS

RECOMMENDED ALTERNATIVE

The regional solid waste management alternatives, described in Chapter IV, have been reviewed with emphasis on existing conditions as well as the capability to best serve the needs of the river basin area in the future. Alternative No. 2 is recommended as the best long-range alternative. However, since Alternative No. 2 requires a landfill in Bowie County and since there is no public landfill presently located in Bowie County that is suitable to serve as a regional landfill, it is proposed that Alternative No. 6 be implemented initially.

There is no energy recovery program that makes economical sense for the Sulphur River Basin area in the near future. However, local and regional governments should continuously update technology and cost information because technologies are improving and the cost of landfilling is increasing. At some point in the future, incineration, Refuse Derived Fuel (RDF), or methane recovery may be an attractive alternative. Nothing in this plan would preclude implementation of an energy recovery program in the future. Regardless of the program, landfills will still be required for a portion of the waste stream that cannot be eliminated or recycled in any other way.

Subregional Facilities

Alternative No. 6 divides the 10-county region into the following subareas:

Subarea A - Hunt, Hopkins, and Delta Counties.
Subarea B - Lamar and Red River Counties.
Subarea C - Titus, Franklin, Morris, Bowie, and Cass Counties.
Subarea D (Future) - Bowie and Cass Counties.

Subarea A would be served be served by three landfills which are presently operating. One is located south of the City of Commerce. It is operated by the City and is presently serving the City of Commerce. The other two are privately operated and presently serve the Cities of Greenville and Sulphur Springs. They should continue to serve as regional solid waste disposal sites. However, if disposal of solid waste at these sites becomes uneconomical or if the sites are not operated in a manner that complies with all environmental regulations, including Subtitle D regulations, a public entity should develop a regional solid waste disposal site. The City of Sulphur Springs is presently operating a transfer station. Other transfer stations would be needed in Delta County near Cooper and adjacent to the landfills to receive solid waste from non-compacting collection trucks. Other areas which may consider transfer stations include Quinlan, Caddo Mills, Celeste, and Wolfe City in Hunt County and Pickton, Seymour, Cumby, and Sulphur Bluff in Hopkins County.

Subarea B would be served by the landfill located north of Paris and presently being operated by the B&B Equipment Company. It appears that the B&B Equipment Company landfill, which currently serves as a regional solid waste disposal site, should serve as the regional site for Subarea B. However, if disposal of solid waste at this site becomes uneconomical or the site is not operated in a manner that complies with all environmental regulations including Subtitle D regulations, a public entity should develop a solid waste disposal site. The City of Paris is presently operating a transfer station. Other transfer stations would be needed near Clarksville and adjacent to the landfill to receive solid waste from non-compacting collection trucks. It is understood that the county commissioners are presently planning to construct four transfer stations in various locations in Lamar County. Other areas which may consider transfer stations include Bogata, and Annona/Avery.

Subarea C would be served by the landfill located southwest of Mount Pleasant presently being operated by the City. Additional land will be needed at the present site to expand the landfill to meet regional needs for 20 years. Transfer stations would be required at Mount Vernon, Lone Star, Linden, Atlanta, Texarkana, New Boston, and adjacent to the landfill to receive solid waste from non-compacting collection trucks. Other areas which may consider transfer stations include Marietta/ Douglassville, DeKalb, Hooks, Maud, Winnsboro, Naples, and Hughes Springs.

Subarea D (Future) would be served by a new landfill located in Bowie County. The same transfer stations suggested for Cass and Bowie Counties in Subarea C would continue to function. When the new landfill becomes operational, municipal wastes would be transferred to the new landfill and the Mount Pleasant landfill service area would be reduced to Franklin, Titus, and Morris Counties.

Solid Waste Loadings

In order to evaluate the distribution of solid waste within the county planning unit in more detail and to determine design loadings to transfer stations, solid waste quantities were evaluated on the basis of census subdivisions. Figure V-1 shows the 2010 projected solid waste loading in tons per week for each census subdivision.

The recommended plan assumes that only compacted solid waste will be accepted at regional landfills. This is currently the practice at private landfills in Lamar County and Hunt County. Compactor stations will be set up adjacent to each of these landfills to receive solid waste from non-compacting collection trucks for compaction prior to being placed in the landfill. Table V-1 lists the transfer and compactor stations and the solid waste loading for 1990 and 2010 for the initial development. Table V-2 lists the same information for the long range development. Figures V-2 and V-3 show the phased development of the recommended regional plan.

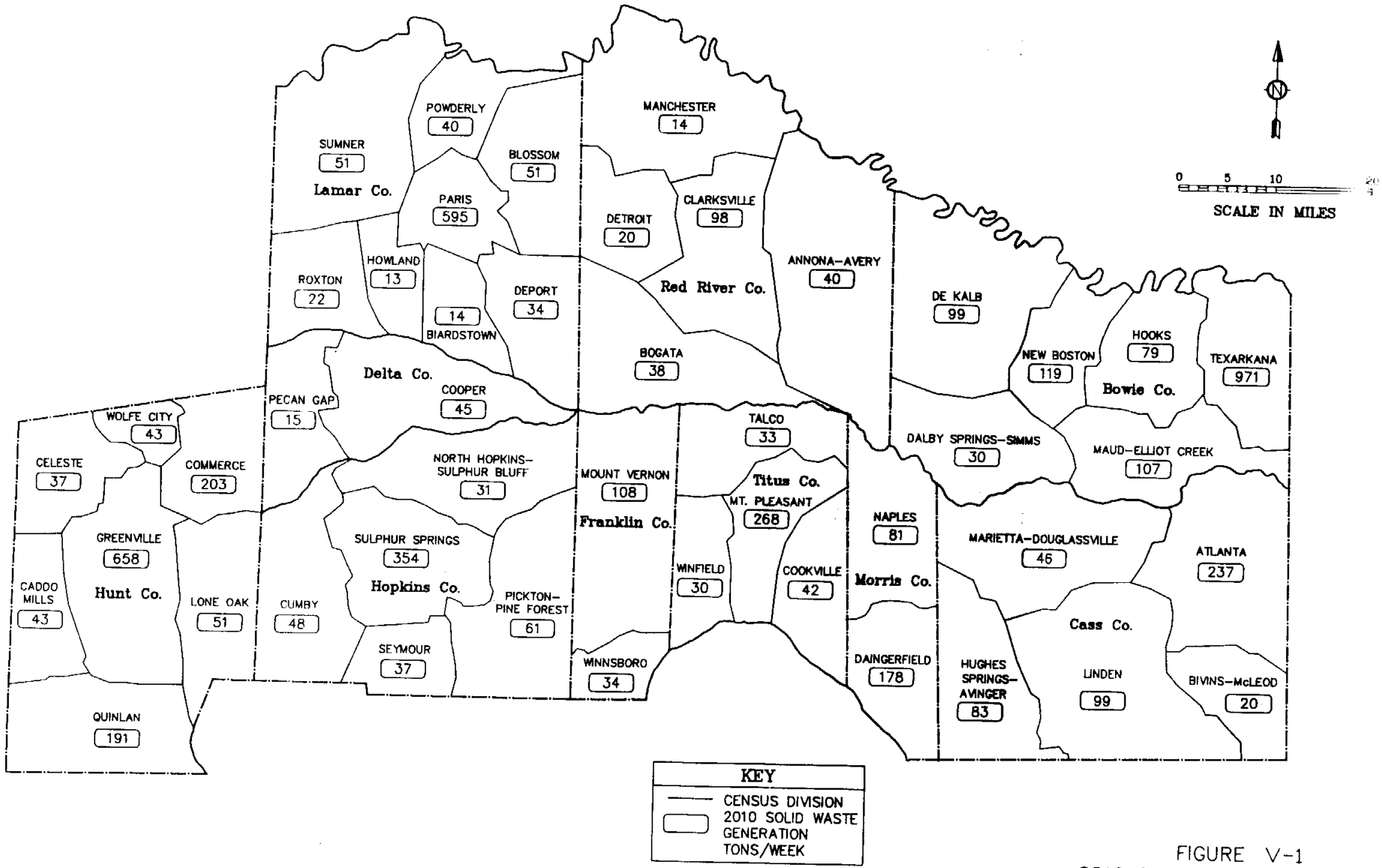


FIGURE V-1
2010 SOLID WASTE LOADINGS
COUNTY CENSUS DIVISION

TABLE V-1

RECOMMENDED ALTERNATE FACILITIES - INITIAL

TRANSFER/COMPACTOR STATIONS

Index No.	County	Location	Service Area Solid Waste Generation in Tons 1990 (Max. Day)	1990 (Yearly)	2010 (Max. Day)	2010 (Yearly)
33	Bowie	Texarkana	235	40,600	290	50,500
28	Bowie	New Boston (Initially, transfer station)	100	17,500	130	22,600
22	Cass	Queen City	65	10,900	80	13,400
17	Cass	North of Linden	55	9,400	70	11,900
8	Delta	Cooper	20	2,900	20	3,100
14	Morris	Lone Star	40	6,700	55	9,300
13	Titus	Compactor at Landfill	120	20,300	150	25,400
9	Franklin	Mount Vernon	20	3,700	30	5,600
34	Red River	Clarksville	55	9,200	65	10,900
38	Lamar	Paris	155	26,900	205	35,300
39	Lamar	Compactor at Landfill	35	5,700	45	7,400
7	Hopkins	Sulphur Springs	115	19,800	160	27,600
3	Hunt	Compactors at Landfills	300	51,400	370	63,800

TABLE V-2

RECOMMENDED ALTERNATE FACILITIES - LONG RANGE

TRANSFER/COMPACTOR STATIONS

Index No.	County	Location	Service Area Solid Waste Generation in Tons 1990 (Max. Day)	1990 (Yearly)	2010 (Max. Day)	2010 (Yearly)
33	Bowie	Texarkana	235	40,600	290	50,500
28	Bowie	New Boston (Initially, transfer station)	100	17,500	130	22,600
22	Cass	Queen City	65	10,900	80	13,400
17	Cass	North of Linden	55	9,400	70	11,900
8	Delta	Cooper	20	2,900	20	3,100
14	Morris	Lone Star	40	6,700	55	9,300
13	Titus	Compactor at Landfill	120	20,300	150	25,400
9	Franklin	Mount Vernon	20	3,700	30	5,600
34	Red River	Clarksville	55	9,200	65	10,900
38	Lamar	Paris	155	26,900	205	35,300
39	Lamar	Compactor at Landfill	35	5,700	45	7,400
7	Hopkins	Sulphur Springs	115	19,800	160	27,600
3	Hunt	Compactors at Landfills	300	51,400	370	63,800

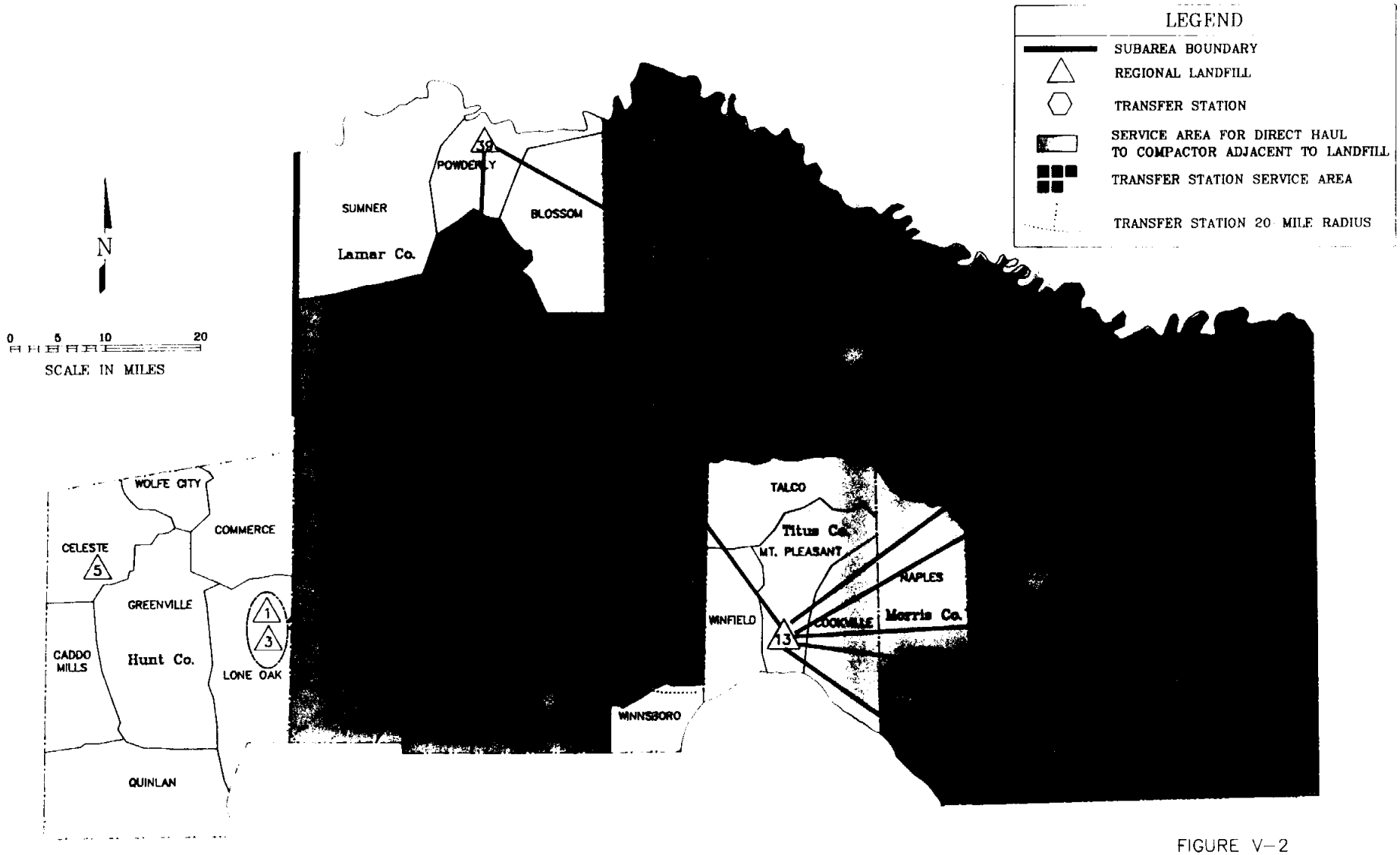


FIGURE V-2
SCHEMATIC OF
RECOMMENDED REGIONAL
SOLID WASTE MANAGEMENT PLAN
(INITIAL)

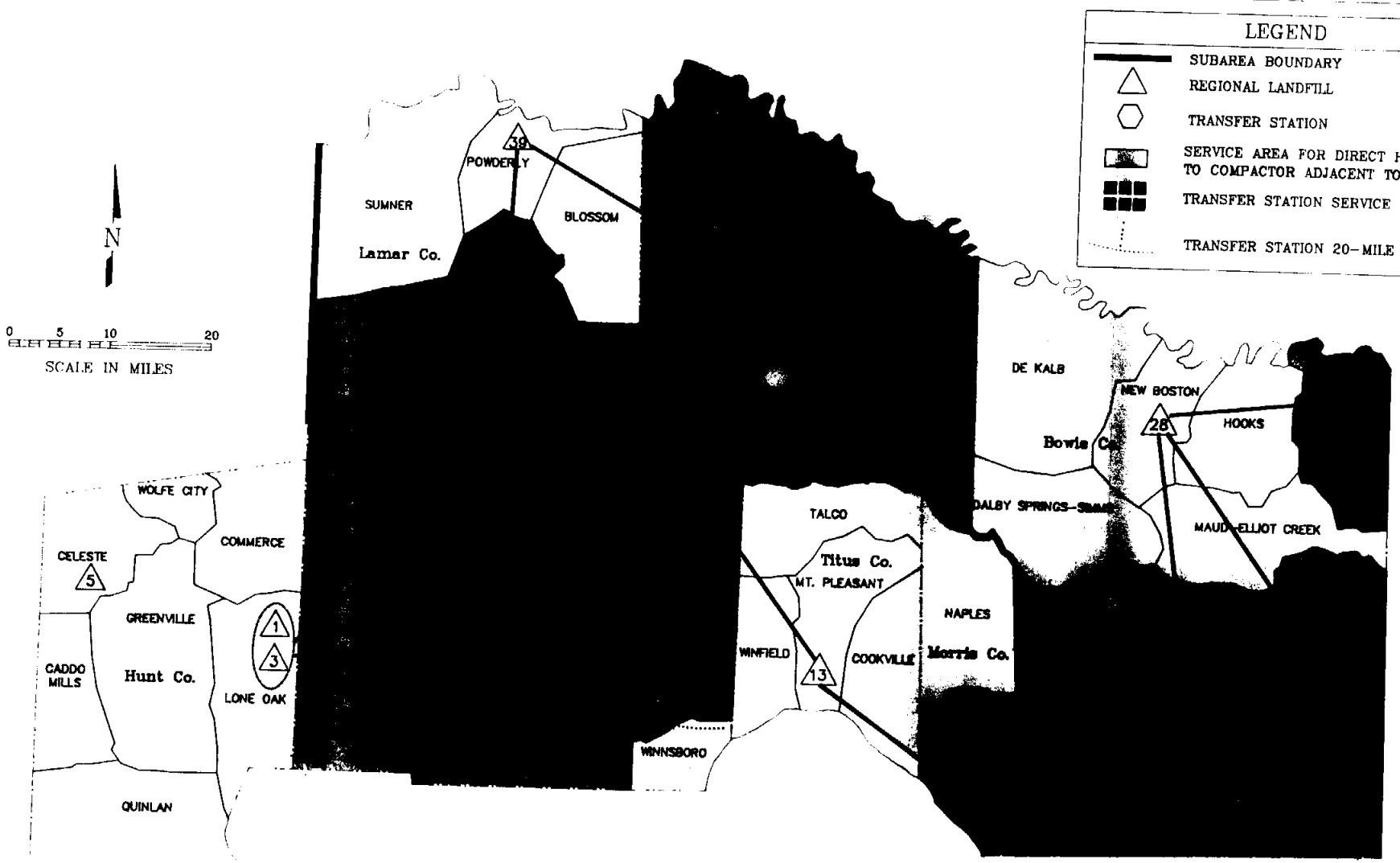


FIGURE V-3
SCHEMATIC OF
RECOMMENDED REGIONAL
SOLID WASTE MANAGEMENT PLAN
(LONG RANGE)

Costs

A cost analysis was conducted to determine estimated costs of the collection, transfer, and landfill disposal costs for the recommended regional plan. Table V-3 summarizes the results of this cost analysis for the initial development, and Table V-4 summarizes the costs for the long-range plan of development. The equivalent monthly residential charge varies from a low of $7.50 in Lamar County to a high of $20.10 in Delta County for the initial development.

The transfer cost analysis utilizes facility site development costs and related annual costs based on 2010 solid waste generation requirements but equipment and annual operating costs based on the initial 1990 solid waste generation requirements. Transfer costs consist of site costs, station operation and maintenance costs, and truck transfer operation costs. Annual site costs for buildings, site work, engineering, and administration, as well as utilities, insurance, property and building and site maintenance, were determined for each transfer station. Annual transfer station operation and maintenance costs include equipment costs, fuel, maintenance, utilities, and personnel. Truck transfer operation costs include vehicle costs, fuel, tires, maintenance, licenses, and insurance and personnel costs.

The size of the truck transfer fleet and personnel is a function of distance between the transfer station and disposal site (landfill) and resulting transfer cycle times. The site costs and the station operation and maintenance costs account for about 30 percent of the transfer station costs. The truck capital and operation and maintenance costs make up the other 70 percent. Each transfer station was considered to be operated by a single entity, and therefore, it was assumed that each would require its own transfer equipment. However, because some of the transfer stations are small and require only one or two trips per day, it would be more cost effective

TABLE V-3

CONCEPTUAL COST OF RECOMMENDED REGIONAL SOLID WASTE MANAGEMENT PLAN - INITIAL

Service Area		Disposal Site	Transfer Station	Estimated Annual Costs			Cost Per Ton			Equivalent Monthly Residential Charge*
County	Census Division			Collect.	Trans.	Total	Coll. Trans*	Landfill	Total*	
Bowie	Dekalb; New Boston; Hooks; Dalby-Springs Simms; Maud Elliott Cr.	13	28	$ 582,000	$513,000	$1,095,000	$ 62.60	$25.00	$ 87.60	$12.50
Bowie	Texarkana	13	33	$ 435,000	$832,000	$1,267,000	$ 31.20	$25.00	$ 56.20	$ 8.00
Titus/ Morris/ Franklin	Talco; Mt. Pleasant; Cookville Winfield; Naples; Winnsboro	13	DHC	$ 522,000	$396,000	$ 918,000	$ 45.20	$25.00	$ 70.20	$10.00
Franklin	Mt. Vernon	13	9	$ 140,000	$200,000	$ 340,000	$ 91.90	$25.00	$ 116.90	$16.70
Morris	Daingerfield	13	14	$ 123,000	$248,000	$ 371,000	$ 55.40	$25.00	$ 80.40	$11.50
Cass	Marietta Douglassville; Linden; Hughes-Springs-Avinger	13	17	$ 387,000	$299,000	$ 686,000	$ 73.00	$25.00	$ 98.00	$14.00
Cass	Atlanta; Bivins-McLeod	13	22	$ 245,000	$308,000	$ 552,000	$ 50.60	$25.00	$ 75.60	$10.80
Lamar	Sumner, Powderly; Blossum	39	DHC	$ 289,000	$235,000	$ 524,000	$ 91.90	$25.00	$116.90	$16.70
Lamar	Paris; Roxton; Howland; Biardstown; Deport	39	38	$ 301,000	$427,000	$ 728,000	$ 27.10	$25.00	$ 52.10	$ 7.50
Red River	Manchester; Detroit; Clarksville; Annona-Avery; Bogata	39	34	$ 498,000	$294,000	$ 792,000	$ 86.10	$25.00	$111.10	$15.90
Hunt	Celeste; Wolfe City; Commerce; Caddo Mills; Lone Oak; Quinlan, Greenville	1/3	DHC	$1,362,000	$591,000	$1,953,000	$ 38.10	$25.00	$ 63.10	$ 9.00
Delta	Pecan Gap; Cooper	1/3	8	$ 134,000	$202,000	$ 336,000	$115.90	$25.00	$140.90	$20.10
Hopkins	Cumby; Seymour; Sulphur Springs; North Hopkins Sulphur Bluff; Pickton-Pine Forest	1/3	7	$ 568,000	$408,000	$ 976,000	$ 49.30	$25.00	$ 74.30	$10.60

DHC - Direct haul to compactor transfer station adjacent to landfill.

*Rounded to nearest $0.10.

TABLE V-4

CONCEPTUAL COST OF RECOMMENDED REGIONAL SOLID WASTE MANAGEMENT PLAN - LONG RANGE

Service Area		Disposal Site	Transfer Station	Estimated annual costs			Cost Per Ton			Equivalent Monthly Residential Charge*
County	Census Division			Collect.	Trans.	Total	Coll. Trans*	Landfill	Total*	
Bowie	Dekalb; New Boston; Hooks; Dalby-Springs Simms; Maud Elliott Cr.	28	DHC	$ 630,000	$387,000	$1,017,000	$50.60	$25.00	$ 75.60	$10.80
Bowie	Texarkana	28	33	$ 478,000	$569,000	$1,047,000	$23.00	$25.00	$ 48.00	$ 6.90
Cass	Marietta Douglassville; Linden; Hughes-Springs-Avinger	28	17	$ 406,000	$296,000	$ 702,000	$65.60	$25.00	$ 90.60	$12.90
Cass	Atlanta; Bivins-McLeod	28	22	$ 261,000	$299,000	$ 560,000	$45.90	$25.00	$ 70.90	$10.10
Titus/ Morris/ Franklin	Talco; Mt. Pleasant; Cookville Winfield; Naples; Winnsboro	13	DHC	$ 554,000	$396,000	$ 950,000	$41.50	$25.00	$ 66.50	$ 9.50
Franklin	Mt. Vernon	13	9	$ 150,000	$200,000	$ 350,000	$74.50	$25.00	$ 99.50	$14.20
Morris	Daingerfield	13	14	$ 135,000	$248,000	$ 383,000	$47.90	$25.00	$ 72.90	$10.40
Lamar	Sumner, Powderly; Blossum	39	DHC	$ 304,000	$235,000	$ 539,000	$81.70	$25.00	$106.70	$15.20
Lamar	Paris; Roxton; Howland; Biardstown; Deport	39	38	$ 390,000	$427,000	$ 817,000	$26.30	$25.00	$ 51.30	$ 7.30
Red River	Manchester; Detroit; Clarksville; Annona-Avery; Bogata	39	34	$ 503,000	$294,000	$ 797,000	$78.90	$25.00	$103.90	$14.80
Hunt	Celest; Wolfe City; Commerce; Caddo Mills; Lone Oak; Quinlan, Greenville	1/3	DHC	$1,490,000	$591,000	$2,081,000	$49.80	$25.00	$ 74.80	$10.70
Delta	Pecan Gap; Cooper	1/3	8	$ 137,000	$202,000	$ 339,000	$113.00	$25.00	$138.00	$19.70
Hopkins	Cumby; Seymour; Sulphur Springs; North Hopkins Sulphur Bluff; Pickton-Pine Forest	1/3	7	$ 632,000	$408,000	$1,040,000	$43.90	$25.00	$ 68.90	$ 9.80

DHC - Direct haul to compactor transfer station adjacent to landfill.

*Rounded to nearest $0.10.

to contract the hauling or combine several transfer stations into one management group.

The various service area collection costs are based on a typical 7,000 pound capacity collection vehicle. Labor costs are based on an assumed mixture of 75 percent residential and 25 percent commercial pickup. Annual costs for vehicle capital, fuel, tires, and maintenance are based on estimated average haul distances and unit costs for ton-mile.

Current landfill costs of $5 to $10 per ton are not adequate to cover the proposed Subtitle D requirements. Costs estimated by the National Solid Waste Management Association (NSWMA) for a modern landfill range from $50 to $70 per ton. Specific Subtitle D requirements and costs will depend to some extent on individual site characteristics, the definition of which is beyond the scope of this study, and how the Texas Department of Health implements the new regulations. Therefore, an average cost of $25.00 per ton for operation of all of the regional landfills has been assumed. It should be noted that because some of the landfills are already operating, some equity exists that would lower the estimate used. Also, costs for permitting and land development could significantly raise the unit cost for new landfills. Costs could also be increased if problems are observed during groundwater monitoring studies which require special remediations.

MANAGEMENT OPTIONS

It is recommended that the management of the solid waste disposal in the Sulphur River Basin be a combination of different entities.

Regulation

Overall regulation is the responsibility of the Texas Department of Health (TDH) through their Regions 5 and 7. Region 5, located in Arlington, is responsible for Hunt County. Region 7, located in Tyler, is responsible for the other nine counties. The Sulphur River Basin Authority should work in conjunction with TDH to insure that the water quality is protected. Landfills not in compliance with existing regulations must be brought into compliance. As new regulations are promulgated to conform to the new Subtitle D Regulations, all landfill operators must change their operation to insure compliance.

Municipal Solid Waste Collection

Municipal Solid Waste Collection is the responsibility of the city in incorporated areas and of the county in rural areas for counties with population greater that 30,000. Cities and counties should provide for collection within their jurisdiction either with their own forces or by arrangement with private entities. It is recommended that existing collection systems remain in effect and be extended as required to meet the requirements. Six of the counties currently have populations less than 30,000. However, these counties should also consider providing for solid waste collection services for all residents.

Transfer Station Management

Transfer stations can be owned and operated by the local government, by a regional entity, or by private enterprise, but the ultimate responsibility belongs to the local government. Each city and county should insure that a transfer facility is available for its constituents either by furnishing the service or by contract. Where the

population density is sparse, it would be beneficial for several transfer stations to share transportation equipment either by joint ownership or by contract.

Landfill Management

Both the public and private sectors are already involved in the management of landfills in Subarea 6A. The City of Commerce is operating the city landfill south of Commerce, and Wallace Hefner is operating a private landfill south of Commerce. Both operations should continue. Cities and counties in Subarea 6A should execute long-term contracts with either a regional solid waste entity or directly with the landfill operators to insure disposal space in the future. If the existing operators are not interested in long-term contractual commitments to continue to operate the landfills, discussions should be held regarding the possibility of a regional entity assuming responsibility for operating the landfill. If the existing operators are interested in continuing to operate the landfill, there could be benefits for individual cities and counties to contract with a regional solid waste entity that would contract with the existing operators for solid waste disposal.

The landfill in Subarea 6B (north of Paris) is presently owned and operated by B&B Equipment Company. No change in operation is anticipated. Cities and counties in Subarea 6B should execute long-term contracts with either a regional solid waste entity or directly with the landfill operator to insure disposal space in the future. If the existing operators are not interested in long-term contractual commitments to continue to operate the landfills, discussions should be held regarding the possibility of a regional entity assuming responsibility for operating the landfill. If the existing operators are interested in continuing to operate the landfill, there could be benefits for individual cities and counties to contract with a regional solid waste entity that would contract with the existing operators for solid waste disposal.

The landfill in Subarea 6C (southwest of Mount Pleasant) is presently owned and operated by the City of Mount Pleasant. Ownership and operation can be continued by the city, or it could be transferred to a regional entity such as the Sulphur River Basin Authority (SRBA) or some other special purpose entity for ownership/operation. Action will need to be initiated to increase the load limits of the bridges and upgrade roads leading to the site to allow for heavy transfer truck traffic. Steps should be taken to purchase additional adjacent land to expand the present site. Cities and counties in Subarea 6C and 6D should execute contracts with the landfill operator to insure disposal space in the future. If the existing operators are not interested in long-term contractual commitments to continue to operate the landfills, discussions should be held regarding the possibility of a regional entity assuming responsibility for operating the landfill. If the existing operators are interested in continuing to operate the landfill, there could be benefits for individual cities and counties to contract with a regional solid waste entity that would contract with the existing operators for solid waste disposal.

Planning of the proposed landfill in Subarea 6D should be initiated as soon as possible. Because of the regional service provided by the proposed new landfill, it is important that planning for the facility be accomplished by a regional entity such as SRBA or some other special purpose entity. Funding for the planning, permitting, and design of the landfill should be furnished by the entities proposed to use the facility.

ADDITIONAL LOCAL GOVERNMENT ACTIONS

It is recommended that local governments adopt regulations and educate the public to promote the proper disposal of waste. Some of the potential actions include the following:

Water and Wastewater Sludges

It is the responsibility of the water and wastewater treatment plant permit holders to properly dispose of their sludge. They should be encouraged to find a beneficial use for the sludge. The cost for hauling waste sludges to municipal landfills will be the responsibility of the operator and was not be considered in this study.

Septic Tanks

Regulations should be adopted by all cities and counties to insure that septic tanks are properly installed and maintained. Only three counties currently have such regulations. County sanitarians should be given the ability and authority to enforce the standards. Wastewater treatment plants should be required to provide for and accept septic tank waste for disposal in order to help control illegal dumping. All septic tank waste haulers should be properly registered. There are currently only 21 registered haulers in the study area. Haulers should also be held accountable for their loads and shall comply with all TDH reporting requirements. Septage should not be deposited in transfer stations or landfills.

Illegal Dumping

Local regulations should be adopted and enforced to discourage illegal dumping. Existing state and local regulations should be enforced to the maximum. Law enforcement officials should issue citations and collect fines from offenders. Existing illegal dump sites will need to be cleaned up and disposed of properly in a permitted landfill. The cost of initial cleanup will probably be borne by the county. Future cleanup can be funded by fines if the regulations are vigorously enforced.

Waste Minimization Programs

Local governments should adopt programs to encourage waste minimization. Some examples include prohibiting grass clippings from landfills by regulation, encouraging composting of yard wastes, and encouraging citizens to buy products in recyclable containers and those that create less waste.

Reuse and Recycling Programs

Paper, aluminum, ferrous metal, plastic, and glass can all be recycled. Composting is also an attractive alternate method of recycling because up to 80 percent of the municipal waste stream consists of organic material. All of the above can be implemented at the local level either voluntarily or by legislation. Mandated programs are generally more effective, but they also cost more. Each local government should implement a program to maximize recycling within their jurisdiction. Citizen groups should be encouraged to implement voluntary programs and to assist in educating the public on the need to conserve landfill space.

Public Education

It is imperative that the public be made aware of the pending solid waste regulations and the effect that they will have on the local community.

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APPENDIX A

WATER QUALITY DATA

Water quality data for Segments 0301 through 0305, Sulphur River Basin, is given in Tables A-1 through A-5 which follow. This data was developed by the Texas Water Commission and published in the 9th Edition (1988) of the State of Texas Water Quality Inventory. An explanation of Intensive Survey Code Letters is as follows:

A	Algal Growth Potential
B	Bacteriological
C	Chemical (nutrients, BOD, solids)
D.	Dye Studies (time of travel)
F	Field (DO, pH, conductivity, water temperature)
I	Invertebrates (benthic)
L	Tidal Data
M	Macrophytes (vascular aquatic plants)
N	Nekton (fish, shellfish)
O	Benthal Respiration
P	Plankton or Periphyton (drifting or attached microscopic plants)
Q	Flow
R	Reaeration
S	Metals or Pesticides in Sediment
T	Metals or Pesticides in Animal Tissue
W	Metals or Pesticides in Water
X	Stream Widths

TABLE A-1

WATER QUALITY DATA FOR
SEGMENT 0301 OF THE SULPHUR RIVER BASIN

NAME: Sulphur River Below Wright Patman Lake

DESCRIPTION: From the Arkansas State Line in Bowie/Cass County to Wright Patman Lake Dam in Bowie/Cass County

SEGMENT CLASSIFICATION: Effluent Limited

LENGTH: 19 miles (31 kilometers)

DESIGNATED WATER USES: Contact Recreation
High Quality Aquatic Habitat

MONITORING STATIONS: 0301.0100

INTENSIVE SURVEYS: None

PERMITTED FACILITIES (FINAL):

Domestic	2 outfalls	0.26 MGD	44.0 lb/d BOD
Industrial	4 outfalls	0.10 MGD	0.0 lb/d BOD
Total	6 outfalls	0.36 MGD	44.0 lb/d BOD

KNOWN WATER QUALITY PROBLEMS/WATER QUALITY STANDARD COMPARISON:

No significant water quality problems were observed during this monitoring period.

POTENTIAL WATER QUALITY PROBLEMS:

Phosphorus levels are periodically elevated and chlorophyll *a* and fecal coliform levels are rarely elevated.

TABLE A-1

WATER QUALITY DATA FOR
SEGMENT 0301 OF THE SULPHUR RIVER BASIN
(continued)

WATER QUALITY STATUS:

The following table presents water quality data for Segment 0301 from October 1, 1983 through September 30, 1987. Total dissolved solids were estimated by multiplying specific conductance by a factor of 0.5.

Parameter	Criterion	Number of Samples	Minimum	Maximum	Mean	Number of Values Outside Criteria	Mean Values Outside Criteria
Dissolved Oxygen (mg/L)	5.0	16	5.3	13.1	8.7	0	0
Temperature (F)	90.0	16	41.9	88.2	67.6	0	0
pH	6.0-8.5	15	6.6	8.5	7.5	0	0
Chloride (mg/L)	120	17	3	97	20	0	0
Sulfate (mg/L)	100	17	6	35	16	0	0
TDS (mg/L)	500	17	82	272	121	0	0
Fecal Coliforms (#/100 mL)	200	15	2	210	11	1	210

TABLE A-2

WATER QUALITY DATA FOR
SEGMENT 0302 OF THE SULPHUR RIVER BASIN

NAME: Wright Patman Lake

DESCRIPTION: From Wright Patman Lake Dam in Bowie/Cass County to a point 1.5 kilometers (0.9 mile) downstream of Bassett Creek in Bowie/Cass County, up to the normal pool elevation of 220.5 feet (impounds the Sulphur River)

SEGMENT CLASSIFICATION: Water Quality Limited

LENGTH: 45 miles (73 kilometers)

DESIGNATED WATER USES: Contact Recreation
High Quality Aquatic Habitat
Public Water Supply

MONITORING STATIONS: 0302.0100, 0302.0200

INTENSIVE SURVEYS: 28 Jan 1975 Q,F,C,S,P,B,A IMS-17 (Twidwell: Mar 1976)

PERMITTED FACILITIES (FINAL):

Domestic	6 outfalls	1.15 MGD	182.2 lb/d BOD
Industrial	4 outfalls	2.45 MGD	262.5 lb/d BOD
Total	10 outfalls	3.60 MGD	444.7 lb/d BOD

KNOWN WATER QUALITY PROBLEMS/WATER QUALITY STANDARD COMPARISON:

Low dissolved oxygen levels and elevated pH occur occasionally, probably due to algal photosynthesis and respiration.

POTENTIAL WATER QUALITY PROBLEMS:

Segment 0303, which enters the upper end of the Lake, periodically has elevated levels of phosphorus. This nutrient can increase the productiviey of the upper portion of the lake and the potential exists for increased algal growth and lower dissolved oxygen levels.

TABLE A-2

WATER QUALITY DATA FOR
SEGMENT 0302 OF THE SULPHUR RIVER BASIN
(continued)

WATER QUALITY STATUS:

The following table presents water quality data for Segment 0302 from October 1, 1983 through September 30, 1987. Total dissolved solids were estimated by multiplying specific conductance by a factor of 0.5.

Parameter	Criterion	Number of Samples	Minimum	Maximum	Mean	Number of Values Outside Criteria	Mean Values Outside Criteria
Dissolved Oxygen (mg/L)	5.0	11	3.2	11.6	6.4	2	4.0
Temperature (F)	90.0	11	72.5	88.3	82.0	0	0
pH	6.0-8.5	11	6.9	9.3	7.7	2	9.0
Chloride (mg/L)	75	7	4	10	6	0	0
Sulfate (mg/L)	75	7	7	29	14	0	0
TDS (mg/L)	400	11	94	135	109	0	0
Fecal Coliforms (#/100 mL)	200	6	2	46	5	0	0

TABLE A-3

WATER QUALITY DATA FOR
SEGMENT 0303 OF THE SULPHUR RIVER BASIN

NAME: Sulphur/South Sulphur River

DESCRIPTION: From a point 1.5 kilometers (0.9 mile) downstream of Bassett Creek in Bowie/Cass County to SH 78 in Fannin County

SEGMENT CLASSIFICATION: Water Quality Limited

LENGTH: 188 miles (302 kilometers)

DESIGNATED WATER USES: Contact Recreation
High Quality Aquatic Habitat

MONITORING STATIONS: 0303.0100

INTENSIVE SURVEYS:

26 Aug 1974	Q,F,C,S,P,I,B	IMS-18	(Twidwell: Mar 1976)
17 Jul 1979	Q,X,D,F,C,R,O,B	IS-9	(Respess: May 1980) South Sulphur River
22 May 1979	Q,X,D,F,C,O,B	IS-10	(Respess: Apr 1980) Rock Creek
13 Aug 1984	Q,X,D,F,C,B,	IS-86-06	(Ottmers: Jun 1986)

PERMITTED FACILITIES (FINAL):

Domestic	18 outfalls	10.53 MGD	771.7 lb/d BOD
Industrial	4 outfalls	0.06 MGD	0.2 lb/d BOD
Total	22 outfalls	10.59 MGD	771.9 lb/d BOD

KNOWN WATER QUALITY PROBLEMS/WATER QUALITY STANDARD COMPARISON:

Fourteen and fifteen percent of the dissolved oxygen and pH measurements did not meet their respective criterions during this monitoring period.

POTENTIAL WATER QUALITY PROBLEMS:

Dissolved oxygen levels greater than 125% saturation and elevated chlorophyll a levels occasionally appear caused by algal photosynthesis. Elevated levels of phosphorus occur approximately half the time, and appear to stimulate algal production. Fecal coliform and chloride levels are periodically elevated and high sulfate levels have been observed.

TABLE A-3

WATER QUALITY DATA FOR
SEGMENT 0303 OF THE SULPHUR RIVER BASIN
(continued)

RELATIVE SIGNIFICANCE OF POINT AND NONPOINT SOURCE POLLUTANTS:

Treated sewage appears to be the most significant contribution to the dissolved oxygen deficits and elevated levels of fecal coliforms and phosphorus found in this segment. The water quality condition of the segment is further aggravated by the sluggish nature of the stream. A study done by the Ark-Tex Council of Governments in 1984 did not identify any problem areas in the segment related to non-point source pollutants.

CONTROL PROGRAMS:

A. Existing: The cities of Commerce and Sulphur Springs have completed construction of new 10/15 mg/L (BOD_5/TSS) sewage treatment plants. An intensive survey was conducted in 1984 to evaluate the effect of the improved wastewater treatment on the water quality of the segment and to provide information to update the waste load evaluation.

B. Programs still to be implemented: An updated waste load evaluation is in preparation.

FACTORS NEEDING CLARIFICATION WITH RESPECT TO CAUSE/EFFECT RELATIONSHIPS:

To be determined following reassessment of the waste load evaluation.

KNOWN RELATIONSHIPS TO OTHER ENVIRONMENTAL PROBLEMS:

A use attainability report has been approved for Segment 0303 which recommends the segment be divided based on physical, chemical and biological characteristics.

TABLE A-3

WATER QUALITY DATA FOR
SEGMENT 0303 OF THE SULPHUR RIVER BASIN
(continued)

WATER QUALITY STATUS:

The following table presents water quality data for Segment 0303 from October 1, 1983 through September 30, 1987. Total dissolved solids were estimated by multiplying specific conductance by a factor of 0.5.

Parameter	Criterion	Number of Samples	Minimum	Maximum	Mean	Number of Values Outside Criteria	Mean Values Outside Criteria
Dissolved Oxygen (mg/L)	5.0	71	2.4	14.6	7.5	10	3.9
Temperature (F)	93.0	71	43.2	90.5	78.2	0	0
pH	6.0-8.5	71	6.3	9.4	7.7	11	9.0
Chloride (mg/L)	60	31	1	74	37	7	63
Sulfate (mg/L)	150	31	9	158	66	1	158
TDS (mg/L)	600	86	68	538	329	0	0
Fecal Coliforms (#/100 mL)	200	16	5	780	67	5	605

TABLE A-4

WATER QUALITY DATA FOR
SEGMENT 0304 OF THE SULPHUR RIVER BASIN

NAME: Days Creek

DESCRIPTION: From the Arkansas State Line in Bowie County to the confluence of Swampoodle Creek and Nix Creek in Bowie County

SEGMENT CLASSIFICATION: Water Quality Limited

LENGTH: 5 miles (8 kilometers)

DESIGNATED WATER USES: Contact Recreation
Intermediate Quality Aquatic Habitat

MONITORING STATIONS: 0304.0100

INTENSIVE SURVEYS: 02 Dec 1980 Q,X,D,F,C IS-33 (Respess: May 1982)

PERMITTED FACILITIES (FINAL):

Domestic	4 outfalls	21.60 MGD	2601.0 lb/d BOD
Industrial	5 outfalls	0.17 MGD	1.3 lb/d BOD
Total	9 outfalls	21.77 MGD	2602.3 lb/d BOD

KNOWN WATER QUALITY PROBLEMS/WATER QUALITY STANDARD COMPARISON:

Frequent violations of the dissolved oxygen criterion have been observed in this segment. This segment is presently not meeting the fishable/swimmable criteria due to depressed dissolved oxygen levels and elevated levels of fecal coliform bacteria (Table 4).

POTENTIAL WATER QUALITY PROBLEMS:

Nutrient levels (ammonia nitrogen and phosphorus) are persistently high. Advanced eutrophication is evident in the lower portion of the segment. Fecal coliform levels are periodically high.

RELATIVE SIGNIFICANCE OF POINT AND NONPOINT SOURCE POLLUTANTS:

The point source discharge of treated sewage appears to be the most significant contribution to the dissolved oxygen deficits and elevated levels of nutrients and fecal coliforms.

TABLE A-4

WATER QUALITY DATA FOR
SEGMENT 0304 OF THE SULPHUR RIVER BASIN
(continued)

CONTROL PROGRAMS:

A. Existing: A waste load evaluation has been developed for Days Creek. It recommends advanced waste treatment for both of the City of Texarkana's domestic wastewater treatment facilities. A use attainability analysis for Days Creek determined that naturally depressed dissolved oxygen levels occur and a high quality aquatic life category is not appropriate. The dissolved oxygen criterion was changed to 4.0 mg/L and an "intermediate" aquatic life use was deemed appropriate for the segment. Other existing uses and criteria remained as they were.

B. Programs still to be implemented: Verification of the expected water quality improvements in Days Creek should be done following completion of the new treatment facilities.

FACTORS NEEDING CLARIFICATION WITH RESPECT TO CAUSE/EFFECT RELATIONSHIPS:

The impact of nonpoint source pollutants from the urban drainage area of Days Creek was evaluated in a study by the Ark-Tex Council of Governments. No nonpoint source problems were identified.

KNOWN RELATIONSHIPS TO OTHER ENVIRONMENTAL PROBLEMS:

None identified.

WATER QUALITY STATUS:

The following table presents water quality data for Segment 0304 from October 1, 1983 through September 30, 1987. Total dissolved solids were estimated by multiplying specific conductance by a factor of 0.5.

Parameter	Criterion	Number of Samples	Minimum	Maximum	Mean	Number of Values Outside Criteria	Mean Values Outside Criteria
Dissolved Oxygen (mg/L)	4.0	15	.4	9.6	3.6	10	1.1
Temperature (F)	90.0	15	43.7	84.6	66.7	0	0
pH	6.0-8.5	14	6.1	7.4	6.9	0	0
Chloride (mg/L)	525	15	21	260	83	0	0
Sulfate (mg/L)	75	15	6	43	27	0	0
TDS (mg/L)	850	15	92	447	272	0	0
Fecal Coliforms (#/100 mL)	2000	13	20	31933	1111	5	11238

TABLE A-5

WATER QUALITY DATA FOR SEGMENT 0305 OF THE SULPHUR RIVER BASIN

NAME: North Sulphur River

DESCRIPTION: From the confluence with the South Sulphur River in Lamar County to a point 6.7 kilometers (4.2 miles) upstream of FM 68 in Fannin County

SEGMENT CLASSIFICATION: Effluent Limited

LENGTH: 48 miles (78 kilometers)

DESIGNATED WATER USES: Contact Recreation
High Quality Aquatic Habitat

MONITORING STATIONS: 0305.0300

INTENSIVE SURVEYS: 26 Aug 1974 Q,F,C,S,P,I,B IMS-18 (Twidwell: Mar 1976)

PERMITTED FACILITIES (FINAL):

Domestic	2 outfalls	0.12 MGD	22.0 lb/d BOD
Industrial	2 outfalls	0.19 MGD	24.3 lb/d BOD
Total	4 outfalls	0.31 MGD	46.3 lb/d BOD

KNOWN WATER QUALITY PROBLEMS/WATER QUALITY STANDARD COMPARISON:

There are no significant water quality problems in this segment.

POTENTIAL WATER QUALITY PROBLEMS:

None anticipated. An insufficient number of fecal coliform samples have been collected to adequately determine standards compliance. Nitrogen and phosphorus levels have been elevated but only a limited number of samples have been analyzed.

TABLE A-5

WATER QUALITY DATA FOR
SEGMENT 0305 OF THE SULPHUR RIVER BASIN
(continued)

WATER QUALITY STATUS:

The following table presents water quality data for Segment 0305 from October 1, 1983 through September 30, 1987. Total dissolved solids were estimated by multiplying specific conductance by a factor of 0.5.

Parameter	Criterion	Number of Samples	Minimum	Maximum	Mean	Number of Values Outside Criteria	Mean Values Outside Criteria
Dissolved Oxygen (mg/L)	5.0	7	6.2	9.5	8.3	0	0
Temperature (F)	93.0	7	56.7	97.3	79.1	1	97.3
pH	6.0-8.5	6	7.1	8.5	7.9	0	0
Chloride (mg/L)	190	7	15	281	154	1	281
Sulfate (mg/L)	475	7	60	1000	340	1	1000
TDS (mg/L)	1320	9	256	1120	710	0	0
Fecal Coliforms (#/100 mL)	200	3	26	1640	222	2	652

APPENDIX B

LIST OF MANUFACTURERS

Manufacturers in the planning area, per the 1988 Directory of Texas Manufacture are indicated in Table B-1. Standard Industrial Classification (SIC) Major Group Descriptions, as well as SIC numbers listed in Table B-1 and corresponding industry as excerpted from the publication precedes Table B-1.

Standard Industrial Classification
Major Group Descriptions

Major Group 13. Oil and Gas Extraction. This major group includes establishments engaged in producing liquid hydrocarbons from oil and gas field gases —natural gasoline and liquefied petroleum gases, and cycle condensate and derived liquids. Sulfur recovered from hydrocarbons is classified in Industry 2819. Establishments engaged in petroleum refining and in the production of lubricating oils and greases are classified in Major Group 29.

Major Group 14. Mining of Nonmetallic Minerals. This major group includes establishments engaged in mining sulfur. Refined sulfur and sulfur recovered from hydrocarbons are classified in Industry 2819. Sulfur ground or otherwise treated is classified in Industry 3295.

Major Group 20. Food and Kindred Products. This major group includes establishments processing or manufacturing foods and beverages for human consumption and certain related products such as ice, chewing gum, prepared feeds for animals and fowls, and vegetable and animal fats and oils.

Major Group 21. Tobacco Products. This major group includes establishments engaged in manufacturing cigars, smoking and chewing tobacco, and snuff and in stemming and redrying tobacco.

Major Group 22. Textile Mill Products. This major group includes establishments engaged in performing any of the following operations, regardless of the type of fiber used: (1) preparation of fiber and subsequent manufacturing of yarn, thread, braids, twine, and cordage; (2) manufacturing broad-woven fabric, narrow-woven fabric, knit fabric, and carpets and rugs from yarn; (3) dyeing and finishing fiber, yarn, and knit apparel; (4) coating, waterproofing, or otherwise treating fabric; (5) the integrated manufacture of knit apparel and other finished articles from yarn; and (6) the manufacture of felt goods, lace goods, nonwoven fabrics, and miscellaneous textiles.

Major Group 23. Apparel and Other Finished Products Made from Fabrics and Similar Materials. This major group, known as the cutting-up and needle trades, includes establishments producing clothing and other fabricated products by cutting and sewing purchased woven or knit fabrics. All types of textiles are utilized, as well as leather, rubberized fabrics, plastics, and furs.

Major Group 24. Lumber and Wood Products, except Furniture. This major group includes logging camps engaged in cutting timber and pulpwood; merchant sawmills, veneer mills, lath mills, shingle mills, cooperage stock mills, planing mills, and plywood mills engaged in producing lumber and wood basic materials; and establishments engaged in manufacturing finished articles made entirely or mainly of wood or wood substitutes. Certain types of establishments producing wood products are classified elsewhere. For example, furniture, and office and store fixtures are classified in Major Group 25; musical instruments, toys and playground equipment, and caskets and coffins are classified in Major Group 39.

Major Group 25. Furniture and Fixtures. This major group includes establishments engaged in manufacturing household, office, public building and restaurant furniture, and office and store fixtures. Establishments primarily engaged in the production of millwork are classified in Industry 2431; wood kitchen cabinets in Industry 2434; cut stone and concrete furniture in Major Group 32; laboratory and hospital furniture in Major Group 38; beauty and barber shop furniture in Major Group 39.

Major Group 26. Paper and Allied Products. This major group includes the manufacture of pulps primarily from wood and from rags and other fibers; the conversion of these pulps into any kind of paper or paperboard; and the manufacture of paper and paperboard into converted paper products such as coated paper, paper bags, paper boxes, and envelopes. Certain

types of converted paper products are classified elsewhere, such as abrasive paper in Industry 3291, carbon paper in Industry 3955, and photosensitized and blueprint paper in Industry 3861.

Major Group 27. Printing and Allied Industries. This major group includes establishments engaged in printing by one or more of the common processes such as letterpress, lithography, gravure, or screen; and those performing services for the printing trades such as bookbinding, typesetting, engraving, photoengraving, and electrotyping. This group also includes publishers.

Major Group 28. Chemical and Allied Products. This major group includes establishments producing basic chemicals and establishments manufacturing products by predominantly chemical processes. Establishments classified in this major group manufacture three general classes of products: (1) basic chemicals such as acids, alkalies, salts, and organic chemicals; (2) chemical products to be used in further manufacture such as synthetic fibers, plastics resins, dry colors, and pigments; and (3) finished chemical products to be used for ultimate consumption, such as drugs, cosmetics, and soaps; or to be used as materials or supplies in other industries, such as paints, fertilizers, and explosives. Establishments primarily engaged in manufacturing nonferrous metals and high percentage ferroalloys are classified in Major Group 33, baking powder, other leavening compounds, and starches in Major Group 20, artists' colors in Major Group 39, and silicon carbide in Industry 3291.

Major Group 29. Petroleum Refining and Related Industries. This major group includes establishments refining crude petroleum, manufacturing paving and roofing materials, and compounding lubricating oils and greases from purchased materials. Establishments engaged in producing coke and by-products are classified in Major Group 33.

Major Group 30. Rubber and Miscellaneous Plastics Products. This major group includes establishments manufacturing from natural or synthetic rubber products such as tires, rubber footwear, mechanical rubber goods, and rubber sundries. The manufacture of garments made from rubberized fabrics is classified in Major Group 23, and the manufacture of synthetic rubber is classified in Industry 2822. This major group also includes establishments engaged in molding primary plastics for the trade, and in manufacturing miscellaneous finished plastics and fiberglass products. The manufacture of plastics resins is classified in Major Group 28.

Major Group 31. Leather and Leather Products. This major group includes establishments engaged in tanning, currying, and finishing hides and skins, and establishments manufacturing finished leather and artificial leather products and some similar products such as luggage, handbags, and key cases made of any material other than precious metal.

Major Group 32. Stone, Clay, Shell, Glass, and Concrete Products. This major group includes establishments engaged in manufacturing flat glass and other glass products, cement, structural clay products, pottery, concrete and gypsum products, cut stone products, abrasive and asbestos products, etc., from materials taken principally from the earth in the form of stone, clay, and sand. This group also includes establishments engaged in crushing, grinding, pulverizing, and otherwise preparing certain earths, rocks, minerals, or slag, and the mining of industrial sands for sale for industrial uses. Shell has been added because of its extensive use in Texas.

Major Group 33. Primary Metal Industries. This major group includes establishments engaged in the smelting and refining of ferrous and nonferrous metals from ore, pig, or scrap; in the rolling, drawing, and alloying of ferrous and nonferrous metals; in the manufacture of castings and other basic products of ferrous and nonferrous metals; and in the manufacture of nails, spikes, and insulated wire and cable. This major group also includes the production of coke. Establishments engaged in manufacturing metal forgings or stampings are classified in Major Group 34.

Major Group 34. Fabricated Metal Products, except Machinery and Transportation Equipment. This major group includes establishments engaged in fabricating ferrous and nonferrous metal products such as metal cans, tinware, hand tools, cutlery, general hardware, nonelectric heating apparatus, fabricated structural metal products, metal forgings, metal stampings, ordnance (except vehicles and guided missiles), fabricated wire products, and a variety of miscella-

neous metal products and metal finishing. Certain important segments of the metal fabricating industries are classified in other major groups such as machinery in Major Groups 35 and 36, transportation equipment, guided missiles and space vehicles in Major Group 37, professional, scientific, and controlling instruments, and watches and clocks in Major Group 38, and jewelry and silverware in Major Group 39. The production of ferrous and nonferrous metals and their alloys is classified in Major Group 33.

Major Group 35. Machinery, including Selected Electrical and Electronic Machinery. This major group includes establishments engaged in manufacturing machinery and equipment, other than electrical equipment (Major Group 36) and transportation equipment (Major Group 37). Machines powered by built-in or detachable motors ordinarily are included in this major group, with the exception of electrical household appliances (Major Group 36). Portable tools, both electric and pneumatic powered, are included in this major group, but hand tools are classified in Major Group 34.

Major Group 36. Electrical and Electronic Machinery, Equipment, and Supplies. This major group includes establishments engaged in manufacturing machinery, apparatus, and supplies for the generation, storage, transmission, transformation, and utilization of electrical energy. The manufacture of electrical household appliances is included in this group, but industrial machinery and equipment powered by built-in or detachable electric motors are classified in Major Group 35. General purpose electronic computing equipment is classified in Industry 3573. Electronic computing equipment for industrial process control and analysis is classified in Industry 3823. Establishments engaged in manufacturing instruments for indicating, measuring, and recording electrical quantities are classified in Industry 3825.

Major Group 37. Transportation Equipment. This major group includes establishments engaged in manufacturing equipment for transportation of passengers and cargo by land, air, and water. Important products produced by establishments classified in this major group include motor vehicles, aircraft, guided missiles and space vehicles, ships, boats, railroad equipment, and miscellaneous transportation equipment. Establishments engaged in manufacturing mobile homes are classified in Industry 2451.

Major Group 38. Measuring, Analyzing, and Controlling Instruments; Photographic, Medical, and Optical Goods; Watches and Clocks. This major group includes establishments engaged in manufacturing instruments (including professional and scientific) for measuring, testing, analyzing, and controlling, and their associated sensors and accessories; optical instruments and lenses; surveying and drafting instruments; surgical, medical, and dental instruments, equipment, and supplies; ophthalmic goods; photographic equipment and supplies; watches and clocks.

Major Group 39. Miscellaneous Manufacturing Industries. This major group includes establishments engaged in manufacturing products not classified in any other major group. Industries in this group fall into the following categories: jewelry, silverware and plated ware; musical instruments; toys, sporting and athletic goods; pens and other office and artists' materials; buttons, costume novelties, and miscellaneous notions; brooms and brushes; caskets; linoleum; and other miscellaneous manufacturing industries.

13 OIL & GAS EXTRACTION
132 Natural Gas Liquids
1321 Natural gas & liquefied petroleum gases produced from oil & gas field gases

14 MINING OF NONMETALLIC MINERALS
147 Chemical & Fertilizer Mineral Mining
1477 Mined native sulfur

20 FOOD & KINDRED PRODUCTS
201 Meat Products
2011 Meat packing (slaughtering) plants
2013 Sausages & other prepared meat products (not made in slaughtering plants)
2016 Poultry & small game slaughtering, dressing, & packing plants
2017 Processed poultry products from purchased carcasses & processed eggs
202 Dairy Products
2021 Creamery butter
2022 Natural & processed cheese, except cottage cheese
2023 Condensed & evaporated milk, dry milk products, & nondairy-base cream substitutes
2024 Ice cream & frozen desserts
2026 Fluid milk & related products, including cottage cheese
203 Canned & Preserved Fruits & Vegetables
2032 Canned specialties
2033 Canned fruits, vegetables, preserves, jams, & jellies
2034 Dried & dehydrated fruits, vegetables, & soup mixes
2035 Pickled fruits & vegetables, vegetable sauces & seasonings, & salad dressings
2037 Frozen fruits, fruit juices, & vegetables
2038 Frozen specialties
204 Grain Mill Products
2041 Flour & other grain mill products
2043 Cereal breakfast foods & related preparations
2044 Rice milling
2045 Blended & prepared flour made from purchased flour
2046 Wet corn milling, including crude & refined corn oil
2047 Dog, cat, & other pet food
2048 Prepared feeds & feed ingredients for animals & fowls, nec
205 Bakery Products
2051 Bread & other bakery products, except cookies, crackers, & pretzels
2052 Cookies, crackers, & pretzels
206 Sugar & Confectionery Products
2061 Cane sugar, except refining only
2062 Cane sugar refining
2063 Beet sugar
2065 Candy & other confectionery products, except solid chocolate bars
2066 Chocolate & cocoa products, except nonsolid chocolate candy
2067 Chewing gum
207 Fats & Oils
2074 Cottonseed oil mills
2075 Soybean oil mills
2076 Vegetable oil mills, except corn, cottonseed, & soybean
2077 Animal & marine fats & oils
2079 Shortening, table oils, margarine, & other edible fats & oils, nec
208 Beverages
2082 Malt beverages
2083 Malt
2084 Wines, brandy, & brandy spirits
2085 Distilled, rectified, & blended liquors
2086 Bottled & canned soft drinks & carbonated waters
2087 Flavoring extracts & flavoring syrups, nec
209 Miscellaneous Food Preparations & Kindred Products
2091 Canned & cured fish & seafoods
2092 Fresh or frozen packaged fish & seafoods
2095 Roasted & concentrated coffee
2097 Manufactured ice, except dry ice
2098 Macaroni, spaghetti, vermicelli, & noodles
2099 Food preparations, nec

21 TOBACCO PRODUCTS
211 Cigarettes
2111 Cigarettes
212 Cigars
2121 Cigars
213 Chewing & Smoking Tobacco & Snuff
2131 Chewing & smoking tobacco & snuff
214 Tobacco Stemming & Redrying
2141 Tobacco stemming & redrying

22 TEXTILE MILL PRODUCTS
221 Broad-Woven Fabric Mills, Cotton
2211 Cotton broad-woven fabric mills
222 Broad-Woven Fabric Mills, Man-Made Fiber & Silk
2221 Man-made fiber & silk broad-woven fabric mills
223 Broad-Woven Fabric Mills, Wool
2231 Wool broad-woven fabric mills, including dyeing & finishing
224 Narrow Fabrics & Other Smallwares Mills: Cotton, Wool, Silk & Man-Made Fiber
2241 Narrow fabrics & other smallwares mills
225 Knitting Mills
2251 Women's full length & knee length hosiery
2252 Hosiery, except women's full length & knee length
2253 Knit outerwear mills
2254 Knit underwear mills
2257 Circular knit fabric mills
2258 Warp (flat) knit fabric mills
2259 Knitting mills, nec
226 Dyeing & Finishing Textiles, Except Wool Fabrics & Knit Goods
2261 Finishers of broad-woven fabrics of cotton
2262 Finishers of broad-woven fabrics of man-made fiber & silk
2269 Finishers of textiles, nec
227 Floor Covering Mills
2271 Woven carpets & rugs
2272 Tufted carpets & rugs
2279 Carpets & rugs, nec
228 Yarn & Thread Mills
2281 Yarn spinning mills: cotton, man-made fibers, & silk
2282 Yarn texturizing, throwing, twisting, & winding mills: cotton, man-made fibers, & silk
2283 Yarn mills, wool (including carpet & rug yarn)
2284 Thread mills
229 Miscellaneous Textile Goods
2291 Felt goods of any fiber, except woven felts & hats
2292 Lace goods
2293 Paddings & upholstery filling
2294 Processed waste & recovered fibers & flock
2295 Coated fabrics, not rubberized
2296 Tire cord & fabric
2297 Nonwoven fabrics
2298 Cordage & twine
2299 Textile goods, nec

23 APPAREL & OTHER FINISHED PRODUCTS MADE FROM FABRICS & SIMILAR MATERIALS
231 Men's, Youths', & Boys' Suits, Coats, & Overcoats
2311 Tailored suits, coats, & overcoats
232 Men's, Youths', & Boys' Furnishings, Work Clothing, & Allied Garments
2321 Shirts (except work shirts) & nightwear
2322 Underwear not made in knitting mills
2323 Neckwear not made in knitting mills
2327 Separate trousers, except work pants & jeans
2328 Work clothing & jeans
2329 Clothing, nec
233 Women's, Misses, & Juniors Outerwear
2331 Blouses, waists, & shirts
2335 Dresses
2337 Tailored suits, pant suits, skirts, & coats
2339 Outerwear, nec
234 Women's, Misses, Children's, & Infants' Undergarments
2341 Underwear & nightwear not made in knitting mills
2342 Brassieres, girdles, & allied garments, except surgical & orthopedic appliances
235 Hats, Caps, & Millinery
2351 Millinery
2352 Hats & caps, except millinery
236 Girls', Children's, & Infants' Outerwear
2361 Dresses, blouses, waists, & shirts not made in knitting mills
2363 Coats & suits not made in knitting mills
2369 Outerwear, nec
237 Fur Goods
2371 Fur goods
238 Miscellaneous Apparel & Accessories
2381 Dress & work gloves, except knit & all-leather
2384 Robes & dressing gowns
2385 Raincoats & other waterproof outer garments
2386 Leather & sheep-lined clothing
2387 Apparel belts made of any material
2389 Apparel & accessories, nec
239 Miscellaneous Fabricated Textile Products
2391 Curtains & draperies, except lace curtains made on lace machines
2392 House furnishings, except curtains & draperies
2393 Textile bags, except laundry, garment storage, & sleeping bags, & luggage
2394 Canvas & related products
2395 Pleating, decorative & novelty stitching, & tucking for the trade
2396 Automotive trimmings, apparel findings, & related products, including printing on fabric articles
2397 Schiffli machine embroideries
2399 Fabricated textile products, nec

24 LUMBER & WOOD PRODUCTS, EXCEPT FURNITURE
241 Logging Camps & Logging Contractors
2411 Logging camps & logging contractors
242 Sawmills & Planing Mills
2421 Sawmills & planing mills, general
2426 Hardwood dimension & flooring mills
2429 Special product sawmills, nec
243 Millwork, Veneer, Plywood, & Structural Wood Members
2431 Millwork
2434 Wooden kitchen cabinets & bathroom vanities
2435 Hardwood veneer & plywood
2436 Softwood veneer & plywood
2439 Structural wood members, nec
244 Wooden Containers
2441 Nailed & lock-corner wooden boxes & shook
2448 Wooden pallets & skids
2449 Wooden containers, nec
245 Wooden Buildings & Mobile Homes
2451 Mobile homes, mobile classrooms, & mobile buildings for commercial use
2452 Prefabricated wooden buildings & components
249 Miscellaneous Wood Products
2491 Wood preserving
2492 Particle board
2499 Wooden products, nec

25 FURNITURE & FIXTURES
251 Household Furniture
2511 Wooden household furniture, except upholstered
2512 Wooden household furniture, upholstered
2514 Metal household furniture
2515 Mattresses, bedsprings, & dual-purpose sleep furniture
2517 Wooden television, radio, phonograph, & sewing machine cabinets
2519 Household furniture, nec
252 Office Furniture
2521 Wooden office furniture
2522 Metal office furniture

253 Public Building & Related Furniture
- 2531 Public building & related furniture, including seats for automobiles & public conveyances

254 Partitions, Shelving, Lockers, & Office & Store Fixtures
- 2541 Wooden partitions, shelving, lockers, & office & store fixtures
- 2542 Metal partitions, shelving, lockers, & office & store fixtures

259 Miscellaneous Furniture & Fixtures
- 2591 Drapery hardware & window blinds & shades
- 2599 Furniture & fixtures, nec

26 PAPER & ALLIED PRODUCTS

261 Pulp Mills
- 2611 Pulp mills

262 Paper Mills, Except Building Paper Mills
- 2621 Paper mills, except building paper mills

263 Paperboard Mills
- 2631 Paperboard mills

264 Converted Paper & Paperboard Products, Except Containers & Boxes
- 2641 Paper coating & glazing
- 2642 Envelopes
- 2643 Bags, except textile bags
- 2645 Die-cut paper & paperboard & cardboard
- 2646 Pressed & molded pulp goods
- 2647 Sanitary paper products
- 2648 Stationery, tablets, & related products
- 2649 Converted paper & paperboard products, nec

265 Paperboard Containers & Boxes
- 2651 Folding paperboard boxes
- 2652 Setup paperboard boxes
- 2653 Corrugated & solid fiber boxes & related products made from purchased paperboard of fiber stock
- 2654 Sanitary food containers
- 2655 Fiber cans, tubes, drums, & similar products

266 Building Paper & Building Board Mills, Except Hardboard
- 2661 Building paper & building board mills, except hardboard

27 PRINTING & ALLIED INDUSTRIES

271 Newspapers, Publishing & Printing
- 2711 Newspapers, publishing & printing

272 Periodicals, Publishing & Printing
- 2721 Periodicals, publishing & printing

273 Books
- 2731 Books, publishing & printing
- 2732 Book printing

274 Miscellaneous Publishing & Printing
- 2741 Miscellaneous publishing & printing

275 Commercial Printing
- 2751 Commercial printing, letterpress & screen
- 2752 Commercial printing, lithographic
- 2753 Engraving & plate printing
- 2754 Commercial printing, gravure

276 Manifold Business Forms
- 2761 Manifold business forms

277 Greeting Card Publishing & Printing
- 2771 Greeting card publishing & printing

278 Blankbooks, Loose-Leaf Binders, & Bookbinding & Related Work
- 2782 Blankbooks, loose-leaf binders & devices, & paper ruling
- 2789 Bookbinding & related work

279 Service Industries for the Printing Trade
- 2791 Typesetting
- 2793 Photoengraving
- 2794 Electrotyping & stereotyping
- 2795 Lithographic platemaking & related services

28 CHEMICALS & ALLIED PRODUCTS

281 Industrial Inorganic Chemicals
- 2812 Alkalies & chlorine
- 2813 Industrial gases
- 2816 Inorganic pigments
- 2819 Industrial inorganic chemicals, nec

282 Plastics Materials & Synthetic Resins, Synthetic Rubber, Synthetic & Other Man-Made Fibers, Except Glass
- 2821 Plastics materials, synthetic resins, & nonvulcanizable elastomers
- 2822 Synthetic rubber (vulcanizable elastomers)
- 2823 Cellulosic man-made fibers
- 2824 Synthetic organic fibers, except cellulosic

283 Drugs
- 2831 Biological products
- 2833 Medicinal chemicals & botanical products, bulk
- 2834 Pharmaceutical preparations

284 Soap, Detergents, & Cleaning Preparations, Perfumes, Cosmetics, & Other Toilet Preparations
- 2841 Soap & other detergents, except specialty cleaners
- 2842 Specialty cleaning, polishing, & sanitation preparations
- 2843 Surface active agents, finishing agents, sulfonated oils & assistants
- 2844 Perfumes, cosmetics, & other toilet preparations

285 Paints, Varnishes, Lacquers, Enamels, & Allied Products
- 2851 Paints, varnishes, lacquers, enamels, & allied products

286 Industrial Organic Chemicals
- 2861 Gum & wood chemicals
- 2865 Cyclic (coal tar) crudes, cyclic intermediates, dyes, & organic pigments (lakes & toners)
- 2869 Industrial organic chemicals, nec

287 Agricultural Chemicals (Formulations)
- 2873 Nitrogenous fertilizers & natural organic fertilizers, except compost
- 2874 Phosphatic fertilizers
- 2875 Fertilizers, mixing only
- 2879 Pesticides & agricultural chemicals, nec

289 Miscellaneous Chemical Products
- 2891 Adhesives & sealants
- 2892 Explosives
- 2893 Printing ink
- 2895 Carbon black
- 2899 Chemicals & chemical preparations, nec

29 PETROLEUM REFINING & RELATED INDUSTRIES

291 Petroleum Refining
- 2911 Petroleum refining

295 Paving & Roofing Materials
- 2951 Paving mixtures & blocks
- 2952 Asphalt felts & coatings

299 Miscellaneous Products of Petroleum & Coal
- 2992 Lubricating oils & greases not made in petroleum refineries
- 2999 Products of petroleum & coal, nec

30 RUBBER & MISCELLANEOUS PLASTICS PRODUCTS

301 Tires & Inner Tubes
- 3011 Tires & inner tubes

302 Rubber & Plastics Footwear
- 3021 Rubber & plastics footwear

303 Reclaimed Rubber
- 3031 Reclaimed rubber

304 Rubber & Plastics Hose & Belting
- 3041 Rubber & plastics hose & belting

306 Fabricated Rubber Products, Nec
- 3069 Fabricated rubber products, nec

307 Miscellaneous Plastics Products, Nec
- 3079 Miscellaneous plastics products, nec

31 LEATHER & LEATHER PRODUCTS

311 Leather Tanning & Finishing
- 3111 Leather tanning & finishing

313 Boot & Shoe Cut Stock & Findings
- 3131 Boot & shoe cut stock & findings

314 Footwear, Except Rubber
- 3142 House slippers
- 3143 Men's footwear, except slippers, athletic & rubber footwear
- 3144 Women's footwear, except slippers, athletic & rubber footwear
- 3149 Footwear, except rubber, nec

315 Leather Gloves & Mittens
- 3151 Leather gloves & mittens

316 Luggage
- 3161 Luggage

317 Handbags & Other Personal Leather Goods
- 3171 Women's handbags & purses
- 3172 Personal leather goods, except women's handbags & purses

319 Leather Goods, Nec
- 3199 Leather goods, nec

32 STONE, CLAY, SHELL, GLASS, & CONCRETE PRODUCTS

320 Shell
- 3201 Oyster & clam shell, ground or otherwise treated

321 Flat Glass
- 3211 Flat glass

322 Glass & Glassware, Pressed Or Blown
- 3221 Glass containers
- 3229 Pressed & blown glass & glassware, nec

323 Glass Products, Made of Purchased Glass
- 3231 Glass products, made of purchased glass

324 Cement, Hydraulic
- 3241 Hydraulic cement, including portland, natural, masonry, & pozzolan

325 Structural Clay Products
- 3251 Brick & structural clay tile
- 3253 Ceramic wall & floor tile
- 3255 Clay refractories
- 3259 Structural clay products, nec

326 Pottery & Related Products
- 3261 Vitreous china plumbing fixtures & china & earthenware fittings & bathroom accessories
- 3262 Vitreous china table & kitchen articles
- 3263 Fine earthenware (whiteware) table & kitchen articles
- 3264 Porcelain electrical supplies
- 3269 Pottery products, nec

327 Concrete, Gypsum, & Plaster Products
- 3271 Concrete block & brick
- 3272 Precast concrete products, except block & brick
- 3273 Ready-mixed concrete
- 3274 Lime
- 3275 Gypsum products

328 Cut Stone & Stone Products
- 3281 Cut stone & stone products

329 Abrasive, Asbestos, & Miscellaneous Nonmetallic Mineral Products
- 3291 Abrasive products
- 3292 Asbestos products
- 3293 Gaskets, packing, & sealing devices made of leather, metal, asbestos, & plastics
- 3295 Minerals & earths, ground or otherwise treated
- 3296 Mineral wool
- 3297 Nonclay refractories
- 3299 Nonmetallic mineral products, nec

33 PRIMARY METAL INDUSTRIES

331 Blast Furnaces, Steelworks, & Rolling & Finishing Mills
- 3312 Blast furnaces (including coke ovens), steelworks, & rolling mills
- 3313 Electrometallurgical products
- 3315 Steel wiredrawing & steel nails & spikes
- 3316 Cold-rolled steel sheet, strip, & bars
- 3317 Steel pipe & tubes not made in steelworks or rolling mills

332 Iron & Steel Foundries
- 3321 Gray iron foundries
- 3322 Malleable iron foundries
- 3324 Steel investment foundries
- 3325 Steel foundries, nec

333 Primary Smelting & Refining of Nonferrous Metals
- 3331 Copper
- 3332 Lead
- 3333 Zinc
- 3334 Aluminum primary production
- 3339 Nonferrous metals, nec

334 Secondary Smelting & Refining of Nonferrous Metals
- 3341 Secondary smelting & refining of nonferrous metals

335 Rolling, Drawing, & Extruding of Nonferrous Metals
- 3351 Copper
- 3353 Aluminum sheet, plate, & foil
- 3354 Aluminum extruded products
- 3355 Aluminum rolling & drawing, nec
- 3356 Rolling, drawing, & extruding of nonferrous metals, except copper & aluminum
- 3357 Drawing & insulating of nonferrous wire

336 Nonferrous Foundries (Castings)
- 3361 Aluminum castings
- 3362 Brass, bronze, copper, copper-base alloy castings
- 3369 Nonferrous castings, nec

339 Miscellaneous Primary Metal Products
- 3398 Metal heat treating
- 3399 Primary metal products, nec

34 FABRICATED METAL PRODUCTS, EXCEPT MACHINERY & TRANSPORTATION EQUIPMENT

341 Metal Cans & Shipping Containers
- 3411 Metal cans
- 3412 Metal shipping barrels, drums, kegs, & pails

342 Cutlery, Hand Tools, & General Hardware
- 3421 Cutlery
- 3423 Hand & edge tools, except machine tools & hand saws
- 3425 Hand saws & saw blades
- 3429 Hardware, nec

343 Heating Equipment (Except Electric & Warm Air) & Plumbing Fixtures
- 3431 Enameled iron & metal sanitary ware
- 3432 Plumbing fixture fittings & trim (brass goods)
- 3433 Heating equipment, except electric & warm air furnaces

344 Fabricated Structural Metal Products
- 3441 Fabricated structural metal products
- 3442 Metal doors, sash, frames, molding, & trim
- 3443 Fabricated platework (boiler shops)
- 3444 Sheet metal work
- 3446 Architectural & ornamental metalwork
- 3448 Prefabricated metal buildings & components
- 3449 Miscellaneous metalwork

345 Screw Machine Products, & Bolts, Nuts, Screws, Rivets, & Washers
- 3451 Screw machine products produced on a job or order basis
- 3452 Bolts, nuts, screws, rivets, washers, & special industrial fasteners

346 Metal Forgings & Stampings
- 3462 Iron & steel forgings
- 3463 Nonferrous forgings
- 3465 Automotive stampings
- 3466 Crowns & closures
- 3469 Metal stampings, nec

347 Coating, Engraving, & Allied Services
- 3471 Electroplating, plating, polishing, anodizing, & coloring metals & formed products for the trade
- 3479 Coating, engraving, & allied services, nec

348 Ordnance & Accessories, Except Vehicles & Guided Missiles
- 3482 Small arms ammunition (30 mm. & below)
- 3483 Ammunition, except for small arms, nec
- 3484 Small arms (30 mm. & below)
- 3489 Ordnance & accessories, nec

349 Miscellaneous Fabricated Metal Products
- 3493 Steel springs, except wire
- 3494 Valves & pipe fittings, except plumbers' brass goods
- 3495 Wire springs
- 3496 Miscellaneous fabricated wire products made from purchased wire
- 3497 Metal foil & leaf, except plain aluminum foil
- 3498 Fabricated pipe & fabricated pipe fittings made from purchased pipe
- 3499 Fabricated metal products, nec

35 MACHINERY, INCLUDING SELECTED ELECTRICAL & ELECTRONIC MACHINERY

351 Engines & Turbines
- 3511 Steam engines; steam, gas, & hydraulic turbines & turbine generator set units
- 3519 Internal combustion engines, nec

352 Farm & Garden Machinery & Equipment
- 3523 Farm machinery & equipment
- 3524 Garden tractors & lawn & garden equipment

353 Construction, Mining, & Materials Handling Machinery & Equipment
- 3531 Construction machinery & equipment
- 3532 Mining machinery & equipment, except oil field machinery & equipment
- 3533 Oil field machinery & equipment, except pumps
- 3534 Elevators & moving stairways
- 3535 Conveyors & conveying equipment
- 3536 Hoists, industrial cranes, & monorail systems
- 3537 Industrial trucks, tractors, trailers, & stackers

354 Metalworking Machinery & Equipment
- 3541 Machine tools, metal-cutting types
- 3542 Machine tools, metal-forming types
- 3544 Special dies & tools, die sets, jigs & fixtures, & industrial molds
- 3545 Machine tool accessories & measuring devices
- 3546 Power driven hand tools
- 3547 Rolling mill machinery & equipment
- 3549 Metalworking machinery, nec

355 Special Industry Machinery, Except Metalworking Machinery
- 3551 Food products machinery
- 3552 Textile machinery
- 3553 Woodworking machinery
- 3554 Paper industries machinery
- 3555 Printing trades machinery & equipment
- 3559 Special industry machinery, nec

356 General Industrial Machinery & Equipment
- 3561 Pumps & pumping equipment, except measuring & dispensing pumps for gasoline stations & air & gas compressors
- 3562 Ball & roller bearings
- 3563 Air & gas compressors; vacuum pumps, except laboratory
- 3564 Blowers & exhaust & ventilation fans
- 3565 Industrial patterns
- 3566 Speed changers, industrial high speed drives, & gears
- 3567 Industrial process furnaces & ovens
- 3568 Mechanical power transmission equipment, nec
- 3569 General industrial machinery & equipment, nec

357 Office, Computing, & Accounting Machines
- 3572 Typewriters & parts
- 3573 Electronic computing equipment
- 3574 Calculating & accounting machines, except electronic computing equipment
- 3576 Scales & balances, except laboratory
- 3579 Office machines, nec

358 Refrigeration & Service Industry Machinery
- 3581 Automatic merchandising machines
- 3582 Commercial laundry, dry cleaning, & pressing machines
- 3585 Air-conditioning & warm air heating equipment; commercial & industrial refrigeration equipment
- 3586 Measuring & dispensing pumps
- 3589 Service industry machines, nec

359 Miscellaneous Machinery, Except Electrical
- 3592 Carburetors, pistons, piston rings, & valves
- 3599 Machinery, except electrical, nec, & machine shops

36 ELECTRICAL & ELECTRONIC MACHINERY, EQUIPMENT, & SUPPLIES

361 Electric Transmission & Distribution Equipment
- 3612 Power, distribution, & specialty transformers
- 3613 Switch gear & switchboard apparatus

362 Electrical Industrial Apparatus
- 3621 Motors & generators
- 3622 Industrial controls
- 3623 Welding apparatus, electric
- 3624 Carbon & graphite products
- 3629 Electrical industrial apparatus, nec

363 Household Appliances
- 3631 Household cooking equipment, including both electric & nonelectric types
- 3632 Household refrigerators & home & farm freezers
- 3633 Household laundry equipment
- 3634 Electric housewares & fans
- 3635 Household vacuum cleaners, parts, & attachments
- 3636 Sewing machines, domestic & industrial
- 3639 Household appliances, nec

364 Electric Lighting & Wiring Equipment
- 3641 Electric lamps (bulbs, tubes, & related light sources)
- 3643 Current-carrying wiring devices, including lightning rods
- 3644 Noncurrent-carrying wiring devices
- 3645 Residential electric lighting fixtures
- 3646 Commercial, industrial, & institutional electric lighting fixtures
- 3647 Vehicular lighting equipment
- 3648 Lighting equipment, nec

365 Radio & Television Receiving Equipment, Except Communication Types
- 3651 Radio & television receiving sets (except communication types); electronic equipment for home entertainment
- 3652 Phonograph records & prerecorded magnetic tapes

366 Communication Equipment
- 3661 Telephone & telegraph apparatus
- 3662 Radio & television transmitting, signaling, & detection equipment & apparatus

367 Electronic Components & Accessories
- 3671 Radio & television receiving-type electron tubes, except cathode ray
- 3672 Cathode ray television picture tubes
- 3673 Transmitting, industrial, & special purpose electron tubes (except X-ray)
- 3674 Semiconductors & related devices
- 3675 Electronic capacitors
- 3676 Resistors for electronic applications
- 3677 Electronic coils, transformers, & other inductors
- 3678 Connectors for electronic applications
- 3679 Electronic components, nec

369 Miscellaneous Electrical Machinery, Equipment & Supplies
- 3691 Storage batteries
- 3692 Primary batteries, dry & wet
- 3693 Radiographic, fluoroscopic, therapeutic, & other X-ray apparatus & tubes; electromedical apparatus
- 3694 Electrical equipment for internal combustion engines
- 3699 Electrical machinery, equipment, & supplies, nec

37 TRANSPORTATION EQUIPMENT

371 Motor Vehicles & Motor Vehicle Equipment
- 3711 Motor vehicles (complete) & passenger car bodies
- 3713 Truck & bus bodies
- 3714 Motor vehicle parts & accessories, nec
- 3715 Truck trailers & detachable cargo containers for sale separately
- 3716 Self-contained motor homes & chassis

372 Aircraft & Parts
- 3721 Aircraft (complete)
- 3724 Aircraft engines & engine parts
- 3728 Aircraft parts & auxiliary equipment, nec

373 Shipbuilding, Boat Building, & Repairing
- 3731 Shipbuilding & repairing
- 3732 Boat building & repairing

374 Railroad Equipment
- 3743 Railroad equipment

375 Motorcycles, Bicycles, & Parts
- 3751 Motorcycles, bicycles, & parts

376 Guided Missiles & Space Vehicles & Parts
- 3761 Guided missiles & space vehicles (complete)
- 3764 Guided missile & space vehicle propulsion units & propulsion unit parts
- 3769 Guided missile & space vehicle parts & auxiliary equipment, nec

379 Miscellaneous Transportation Equipment
- 3792 Travel trailers, campers, & pickup covers
- 3795 Tanks & tank components
- 3799 Transportation equipment, nec

38 MEASURING, ANALYZING, & CONTROLLING INSTRUMENTS; PHOTOGRAPHIC, MEDICAL, & OPTICAL GOODS; WATCHES & CLOCKS

381 Engineering, Laboratory, Scientific, & Research Instruments & Associated Equipment
- 3811 Engineering, laboratory, scientific, & research instruments & associated equipment

382 Measuring & Controlling Instruments
- 3822 Automatic controls for regulating residential & commercial environments & appliances
- 3823 Industrial instruments for measurement, display, & control of process variables & related products
- 3824 Totalizing fluid meters & counting devices
- 3825 Instruments for measuring & testing of electricity & electrical signals
- 3829 Measuring & controlling devices, nec

383 Optical Instruments & Lenses
- 3832 Optical instruments & lenses

384 Surgical, Medical, & Dental Instruments & Supplies
- 3841 Surgical & medical instruments & apparatus (except surgical appliances, electromedical, & X-ray apparatus)
- 3842 Orthopedic, prosthetic, & surgical appliances & supplies
- 3843 Dental equipment & supplies

385 Ophthalmic Goods
- 3851 Ophthalmic goods

386 Photographic Equipment & Supplies
- 3861 Photographic equipment & supplies

387 Watches, Clocks, Clockwork-Operated Devices, & Parts
- 3873 Watches, clocks, clockwork-operated devices, & parts

39 MISCELLANEOUS MANUFACTURING INDUSTRIES

391 Jewelry, Silverware, & Plated Ware
- 3911 Jewelry made of precious metal
- 3914 Silverware, plated ware, & stainless steel ware
- 3915 Jewelers' findings & materials & lapidary work

393 Musical Instruments
- 3931 Musical instruments, parts, & accessories

394 Toys & Amusement, Sporting, & Athletic Goods
- 3942 Dolls & stuffed toy animals
- 3944 Games, toys, & children's vehicles, except dolls & bicycles
- 3949 Sporting & athletic goods, nec

395 Pens, Pencils, & Other Office & Artists' Materials
- 3951 Pens, mechanical pencils, & parts
- 3952 Lead pencils, crayons, & artists' materials
- 3953 Marking devices
- 3955 Carbon paper & inked ribbons

396 Costume Jewelry, Costume Novelties, Buttons, & Miscellaneous Notions, Except Precious Metal
- 3961 Costume jewelry & costume novelties, except precious metal
- 3962 Feathers, plumes, & artificial trees & flowers, except glass
- 3963 Buttons
- 3964 Needles, pins, hooks & eyes, & similar notions

399 Miscellaneous Manufacturing Industries
- 3991 Brooms & brushes
- 3993 Signs & advertising displays, except printed
- 3995 Burial caskets & cases, except concrete
- 3996 Linoleum, asphalted-felt-base & other hard surface floor coverings, nec
- 3999 Manufacturing industries, nec

TABLE B-1

LIST OF MANUFACTURERS IN PLANNING AREA
PER 1988 DIRECTORY OF TEXAS MANUFACTURERS

Service Area	Manufacturer	SIC Code	Product
Bowie County			
DeKalb	The DeKalb News	2711/2752	Newspaper/printing
	Phillips Cecil Lumber Mill Inc.	2421	Lumber
	Red River Fertilizer Company	2875	Fertilizers
Nash	Myers Power Sprayer Company	3523	Agriculture, chemical sprayers
	Texana Tank Car and Manufacturers	3743	Railroad tank cars
	Wilson's Plastic-Pak Inc.	3079	Packaging
New Boston	Citizens Tribune	2711/2752	Newspaper
	International Paper Company	2421	Lumber
	New Boston Printers	2711/2752	Newspaper/printing
Texarkana	Alaska Printing	2751	Printing
	Alumax Mill Products	3353	Aluminum sheets
	Artex Fishing Tackle Co.	3949	Fishing tackle
	Borden Inc.	2026/2037/2486	Dairy products
	Carpenter Steel Fabrication	3441/3444/3446	Structural steel
	Celotex Corporation	3079	Insulation
	Coca-Cola Bottling Company	2086	Soft drinks
	Comdial Teleservices	3661	Telephone/electronics
	Commercial Box and Lumber	2439/2441/2448	Fabrication of wood structures
	Commercial Manufacturing Co.	3479	Metal painting
	Cooper Tire and Rubber	3011	Tires
	D&W Packing Company	2011	Packaged beef
	Davis Roof Truss Mfg. Co.	2426/2439	Roof trusses
	Day and Zimmerman	3483	Ammunition, assembling
	Delaware Rainbo Leasing Corp.	2035	Pickles
	Diamond Spear Co.	2891	Automotive supplies
	Dyke Industries	2431/2439	Door units/roof trusses
	Emerson Laboratories	2834	Pharmaceuticals
	Ericsson Cable	3357	Insulated wire
	Firmin Printing and Ofc. Equip.	2751/2752/2761	Printing/forms
	Flat Gard Inc.	2891	Tire sealants
	Four States Portable Building	2852/3448	Wooden/aluminum buildings

TABLE B-1

LIST OF MANUFACTURERS IN PLANNING AREA
PER 1988 DIRECTORY OF TEXAS MANUFACTURERS
(continued)

Service area	Manufacturer	SIC Code	Product
Texarkana (continued)	Gifford-Hill and Company	3295	Filter/blasting sand
	Gifford-Hill and Company	3273	Concrete
	Green Sign Company	3993	Signs
	Hartshon's Inc.	3299	Marble
	Humco Laboratories	2834/2842/2844	Pharmaceuticals, etc.
	Ideal Awning and Sign Co.	3444/3448/3993	Awnings/signs
	International Paper	2611/2631	Cardboard
	Johnson Controls	3079	Plastics containers
	Kelly Instrument Machine Inc.	3533/3823	Oil, gas metering equipment
	Kennedy Sand and Gravel	3273/3295	Concrete/aggregate
	Kerr-McGee Chemical	2491	Treated wood
	Kwik Copy	2752	Printing
	Larkotex Company	3841/3842	Medical supplies
	Lato Products Company	3442	Metal window screen
	Ledwell and Son Enterprises	3713/3715	Truck bodies
	LeGrand and Sons Welding	2514/3429/3441 3446/3448	Welding, metal fab.
	Malone Concrete	3272	Concrete products
	Mayo Manufacturing Corporation	2515	Furniture
	MDW Enterprises	2421/2426/2431 2499	Miscellaneous wood products
	Mid South Bottling	2086	Soft drinks
	Mineral Fibers Co.	2891	Bonding cement
	Nelson Office Supply	2751	Printing
	Newcourt, Inc.	3432	Roll-up doors
	NL Baroid	2899	Drilling supplies
	Parks Metal Fabricators	3444/3499/3525/ 3537/3549	Sheet metal fabricators
	Picoma Industries	3498	Pipe fittings
	Precision Metal Industries	3471/3599	Chrome plating/metal work
	Quality Service Railcar	3743	Railroad cars
	Ragland Office Equipment	2751	Printing
	Razorback Ready-Mix	3277	Concrete
	Rebel Publishing Co.	2721/2731	Magazines, books

TABLE B-1

LIST OF MANUFACTURERS IN PLANNING AREA
PER 1988 DIRECTORY OF TEXAS MANUFACTURERS
(continued)

Service area	Manufacturer	SIC Code	Product
Texarkana (continued)	Rockwell International	3429/3494/3824	Water meters, fittings
	Rubyes Interior Decorating	2391	Draperies
	Schnipper Meat Co.	2013/2017	Meat processing
	Sico Machine and Supply Co.	3599	Machine shop
	Smart Printing, Inc.	2751/2752/2761	Printing, forms
	Southern Ice, Co.	2097	Ice
	Southwest Printers and Publishers	2751	Printing
	Star Paper Tube, Inc.	2655	Paper cores
	Tennison Brothers	3444	Sheet metal
	Texarkana Concrete Products	3271	Concrete products
	Texarkana Gazette	2711	Newspaper
	Texarkana Plating Co.	3471/3479	Plating/printing
	Texarkana Venetian Blind	2499/2591	Birdhouses/blinds
	Thatcher Concrete Yard	3272	Concrete products
	Tola Asphalt Pavers	2951	Asphalt concrete
	Tri State Iron and Metal Co.	3341	Aluminum products
	Venture Outdoor Advertising	3993	Billboards
	Ward-Davis, Inc.	2448/2499	Wood boxes
	Whatley Sign and Advertising	3993	Signs
	Wright Brothers, Inc.	3444	Sheet metal work
Wake Village	Apache Steel	3441	Structural steel fabricating
Cass County			
Atlanta	Anthony Forest Products	2421/2439	Lumber
	Bobs Printing	2752	Printing
	Citizens Journal	2711	Newspaper
	Clement Sand and Gravel	3273	Concrete
	Enercon Industries	3231/3442	Glass, windows
	Guard-Line, Inc.	2381/3151/3842	Fabrics, sewing
	Henson-Kickernick, Inc.	2341/2342	Clothing
	Mono-Chem, Inc.	2851/2899	Solvents, additives
	Times-Atlanta	2711	Newspaper
	Tyco Structures	2452	Wood prefab. str.

TABLE B-1

LIST OF MANUFACTURERS IN PLANNING AREA
PER 1988 DIRECTORY OF TEXAS MANUFACTURERS
(continued)

Service area	Manufacturer	SIC Code	Product
Bivens	Breckenridge Gasoline	1321	Liquid petroleum
Douglassville	Shell Offshore, Inc.	1321/2819	Liquid petroleum
Hughes Springs	Bower Steel	3498	Pipe threading
	Design Factory	2499/2751/3993	Wooden signs
	Hughes Springs Frozen Food	2011	Meat processing
	North American Tractor	3523	Farm machinery
	Texas Pipe Coupling and Threading	3498	Pipe threading
	Texas Pipe Coupling and Threading	3494	Pipe couplings
	Varleys Inc.	2511/2521	Furniture
Linden	Cass County Printing	2732/2751/2752	Books, printing
	Cass County Sun	2711	Newspaper
	Cass County Treating	2491	Treated lumber
	Custom Marble Specialties	3299	Cultured marble
	Mathis and Mathis Mining and Exploration	3295	Iron carbonate
Queen City	Cass County Concrete	3272	Concrete products
Delta County			
Cooper	Cooper Marble and Granite Works	3281	Monuments
	Cooper Review	2711	Newspaper
	Laramy Meat Co.	2011	Meat processing
	Mobile Supply and Mfg.	3643/3714	Wire, trailer parts
	Pedco Industries	3694	Automotive parts
Franklin County			
Mount Vernon	Four Corners Publishing	2711/2751/2752	Printing
	Kinder Mfg. Corp.	2392/2511/2512/2515/2531	Upholstery
	McAllister Mfg. Co.	2339	Fabric sewing

TABLE B-1

LIST OF MANUFACTURERS IN PLANNING AREA
PER 1988 DIRECTORY OF TEXAS MANUFACTURERS
(continued)

Service area	Manufacturer	SIC Code	Product
Scroggins	Texaco Producing	1321/2819	Liquid petroleum
Winnsboro	Abbott Concrete Works	3272	Concrete products
	Air Born Inc.	3678	Electronic comp.
	Huskey Inc.	3361/3369/3469/3599/3714	Aluminum/auto products
	Junes Printing and Office Supplies	2751/2752/2761	Printing, forms
	Kendon Co.	3999	Furnishing accessories
	Lunge Inc.	3269/3961/3993	Pottery, jewelry
	LDC Associates	2653	Corrugated boxes
	Pinson Tool Co.	3079/3559	Plastic, oil field products
	Tri State Building System Inc.	3441/3448	Strl. steel building fab.
	Westbrook Ready Mix	3273	Concrete
	Westland Oil Development	1321	Liquid petroleum
	E.G. Wilson Mfg. Inc.	2339	Clothing
	Winnsboro Mfg. Co.	2331/2337/2339	Clothing
	Winnsboro News	2711/2752	Newspaper, printing
Hopkins County			
Como	Crystal Feed Mills	2048/2875	Feed, fertilizer
	Warren Petroleum	1321/2819	Liquid petroleum, sulphur
Cumby	Black Jack Pottery	3269	Pottery
Dike	Phillips Petroleum	1321/2812	Liquid petroleum, sulphur
Miller Grove	Watts Sawmill	2421/2448	Lumber
Sulphur Springs	American Creamery Inc.	2023/2024	Dairy products
	Associated Milk Producers	2021/2023/2026	Dairy products
	Bell Concrete Products Inc.	3272/3273	Concrete products
	Borden Inc.	2033	Dairy products
	Burney Valve Co.	3494	Rebuilt valves
	Cannon Craft Co.	2431	Doors
	Coca Cola Bottling Co.	2086	Soft drinks
	Daily News Telegram	2711	Newspaper
	A.P. Green Refractories	3255	Brick

TABLE B-1

LIST OF MANUFACTURERS IN PLANNING AREA
PER 1988 DIRECTORY OF TEXAS MANUFACTURERS
(continued)

Service area	Manufacturer	SIC Code	Product
Sulphur Springs (continued)	Hargrove Machine and Welding	3446/3451/3551/3599	Metal products
	J.B. Weld Co.	2899	Welding supplies
	Munves Fashions Inc.	2335	Clothing
	Northeast Texas Farmers Corp.	2048	Livestock feed
	Ocean Spray Cranberries Inc.	2033/2086	Fruit products
	Plastic Fabricators Co. Inc.	3079	Plastic/fiberglass
	Pratt Packing Co. Inc.	2011	Meat processing
	Rockwell International Corp.	3494	Control valves
	Runge Industries Inc.	3728	Aircraft parts
	Southland Corp.	2023/2026/2033/2086	Food products
	Sulta Mfg. Co.	3441/3443/3499/3559/3589	Metal products
	Bob Waggoner Co.	3451	Machinery
	Westbrook Ready Mix Concrete Inc.	3273	Concrete
	Wingo Feed Mill Inc.	2048	Livestock feed
	Winzen International Inc.	3079	Plastic film
Hunt County			
Celeste	Terra International Inc.	2875	Fertilizer
Commerce	Champion Home Builders Co.	2451	Mobile Homes
	Commerce Journal	2711/2741	Newspaper
	Latson's Print Shop	2751/2752	Printing
	Quality Concrete Products	3271/3272	Concrete products
	Sherwood Medical Co.	3841	Medical supplies
	SNE Enterprises	2431	Doors
	Southernaire Mfg. Co.	3792	Truck supplies
	Sparkman Printing Co.	2751	Printing
	U.S. Brass	3494/3498	Brass fittings
	Wood Designs Inc.	2521	Office furniture

TABLE B-1

LIST OF MANUFACTURERS IN PLANNING AREA
PER 1988 DIRECTORY OF TEXAS MANUFACTURERS
(continued)

Service area	Manufacturer	SIC Code	Product
Greenville	A-1 Energy Systems Inc.	3433	Heating equipment
	Bonus Crop Fertilizer	2875	Fertilizer
	Coca Cola Bottling	2086	Soft drinks
	Billy Cook Leather Co.	3199	Leather products
	Crown Door Corp.	2431	Doors
	E-Systems Inc.	3573/3662/3721/3811	Computer, aircraft parts
	El Dorado Chemical	2875	Fertilizer
	ESCO Mfg. Co.	3612/3613/3622/3825	Electrical products
	Fiberite Corp.	2821	Epoxy resins
	Greenville Printing	2751/2752/2789/2791	Printing
	Greenville Transformer Co.	3612	Elec. Trans.
	Hefner Sheet Metal and Roofing	3444	Sheet metal products
	Henson-Kickernick Inc.	2341/2342	Clothing
	Herald-Banner Publishing	2711/2752	Newspaper
	Hunt County Shopper	2741	Newspaper
	International Cassette Corp.	3652	Recording products
	Lake Printing Co.	2751	Printing
	Lance Inc.	2052	Food products
	Lattimore Materials Co.	3273	Concrete
	Mary of Puddin Hill Inc.	2051/2065	Food products
	W.A. McKenzie Asphalt Co.	2951	Paving materials
	Northeast Texas Farmers Coop.	2048	Livestock feed
	PARC Inc.	2099	Bakery products
	Pine Mountain Corp.	2411/2421/2499	Fireplace wood
	Rock Tenn Co.	2651	Cardboard
	S&M Mfg. Co.	3573	Computer parts
	Serv-Air Inc.	3721	Aircraft parts
	Shirey Co. Inc.	2341/2369	Clothing
	Strombergs Statuary	3272	Concrete products
	Texoma Advertising Co.	3993	Signage
	Trico Industries	3533	Sucker rods
	Walker-McDonald Co.	3532/3533	Drilling bits
	Ward Body Co.	2531/3714	Bus body parts
	Ward Mfg. Co.	2531	Furniture
	Western Frame and Molding	2499	Picture frames
	Wing Industries Inc.	2431	Doors

TABLE B-1

LIST OF MANUFACTURERS IN PLANNING AREA
PER 1988 DIRECTORY OF TEXAS MANUFACTURERS
(continued)

Service area	Manufacturer	SIC Code	Product
Quinlan	Vintage Wood Work Inc.	2431/2452/2499/ 2511/2541	Wood trim
Wolfe City	Andy's Mill and Cabinet	2431	Wood millwork
	Ennis-Texas Tag	2649/2751/2761/ 3993	Labels/forms
	Greenville Printing	2751	Printing
	Hennington Publishing Co.	2731/2751/2752/ 2789	Publications
	Ne-Tex Co-op Oil Mill	2074/2075	Livestock feed
Lamar County			
Blossom	Anderson Candy Co.	2065	Candy
Deport	Deport Cabinet and Counter Tops	2434/2511/2521/ 2541	Cabinets
	Thunder Prairie Publishing	2751/2752/2761	Printing
Paris	ADM Feed Corp.	2048	Livestock feed
	AGPRO Inc.	3431/3446/3523	Farm equipment
	American Plant Food Inc.	2875	Fertilizer
	Babcock and Wilcox Co.	3443	Boiler products
	Big Tex Feed Co.	2048	Livestock feed
	Campbell Soup	2013/2032/2019	Canned foods
	Cannon Printing	2751	Printing
	Central Mfg. Co.	2077	Bone meal
	Coston and Sun Inc.	3273	Concrete
	E-Z Printing	2752	Printing
	Kimberly-Clark Corp.	2647	Disposable diapers
	Kwik Kopy	2752/2782	Printing
	Lamar County Echo	2711	Newspaper
	Lattimore Concrete	3273	Concrete
	Lukeni General Industries	2899/3229	Construction materials
	Merico Inc.	2051	Bakery
	Merico Inc. Packaging	2651	Cartons
	Nafe Concrete Products	3272	Concrete products
	North American Philips Lighting	3699	Electrical products
	Oliver Rubber Co.	3011	Rubber products
	Oyler Sign Co.	3993	Signage

TABLE B-1

LIST OF MANUFACTURERS IN PLANNING AREA
PER 1988 DIRECTORY OF TEXAS MANUFACTURERS
(continued)

Service area	Manufacturer	SIC Code	Product
Paris (continued)	Paris Coca-Cola/Dr. Pepper Bottling	2086	Soft Drinks
	Paris News	2711/2752	Printing
	Paris Quickprint	2752	Printing
	Red River Publishing	2741	Newspaper
	Rodgers Wade Mfg. Co.	2434/2531	Cabinets
	Sesame Products Inc.	2099	Food processing
	Seven Up/Royal Crown Bottling	2086	Soft drinks
	Superior Technology Co.	3444/3644	Sheet metal work
	Swaim Printing Co.	2751/2752/2789	Printing
	T&K Inc.	3599/3728	Aircraft parts
	Tex/Oko Outdoor Advertising	3993	Signage
	UARCO Inc.	2761	Forms
	Valley Feed Mill, Inc.	2048	Livestock feeds
	Vassarette	2341/2342/2384	Clothing
	Wall Concrete Pipe Co. Inc.	3272	Concrete products
	Welch Art Co.	2431/2499	Furnishings
	Wintermute Ind. Inc.	3999	Furnishings
	Winzen International Inc.	3721	Research balloons
Morris County			
Cason	Gifford-Hill Inc.	3295	Cement
Dainger-field	The Bee	2711/2752	Newspaper
	Cox's Relish Co.	2033/2035/2045/2099	Food products
	Georgia Pacific Corp.	2952/3079	Roofing products
	Malouf Co.	2335/2339/2361/2369	Clothing
	Semanco Services Inc.	3643	Electrical products
Lone Star	A&A Coating Co.	3479	Pipe coatings
	A&F Machine Shop	3441/3443/3599	Steel fab.
	Gifford Hill Inc.	3295	Slag.
	Lone Star Steel	3312	Steel products
	Reilly Tar and Chemical Co.	2865/2891/2952	Coal tar products
	Scot Industries Co.	3471/3599	Chrome plating/milling

TABLE B-1

LIST OF MANUFACTURERS IN PLANNING AREA
PER 1988 DIRECTORY OF TEXAS MANUFACTURERS
(continued)

Service area	Manufacturer	SIC Code	Product
Naples	B&L Trophy	3079/3479/3499/3993	Engraving/nameplates
	Naples Monitor	2711	Newspaper
	The Printer	2751/2752	Printing
	Tex Goober Inc.	2065/2099	Peanut products
Red River County			
Annona	Annona Mfg. Co.	2431	Wood millwork
	Eubanks Agri. Co.	2875	Fertilizer
	Flour Power Inc.	2499	Wood flour
Bagwell	Buzbee Lumber Co.	2429/2431/2653	Wood products
Bogota	Henderson Concrete and Supply	3273	Concrete
Clarksville	Clarksville Times	2752/2791	Printing
	Fowler Post Co.	2491	Treated posts
	HCPI	3842	Safety products
	K&B Steel	3429	Steel products
	Magnolia Brush Mfgs.	3991	Industrial brushes
	Martin Sprocket and Gear	3568	Machine parts
	Master Molders Inc.	3732	Boats
	Maverick Mfg. Co.	3079/3469/3544	Industrial plastics
	Mellow-Tone Mfg.	3714	Automotive parts
	Mitchell Lumber Co.	2421	Lumber products
	Mulberry Lumber Co.	2421/2448	Lumber products
	Philips Industries Inc.	3442	Aluminum doors and windows
	Red Kap Industries	2328	Clothing
	Red River Custom Trailers	3779	Boat Trailers
	Sailor Mfg. Inc.	2431/3442	Doors
	Scotch Craft Building Products	3442	Aluminum doors and windows
Detroit	Detroit Lumber	2421/2439	Lumber products

TABLE B-1

LIST OF MANUFACTURERS IN PLANNING AREA
PER 1988 DIRECTORY OF TEXAS MANUFACTURERS
(continued)

Service area	Manufacturer	SIC Code	Product
Titus County			
Mount Pleasant	Cypress Lumber Co.	2421/2426	Wood products
	Dunn and Gearhart Ever Ready Concrete	3273	Concrete
	Fashion Portable Building Co.	2452/3448	Portable buildings
	Jack Firmin Office Equipment	2732/2752/2761	Printing
	Fluorocarbon Co.	3496	Wire products
	Glover Feed Mills	2048	Livestock feed
	International Chemicals Inc.	3295	Sulphur
	Kwik-Way Corp.	2431	Wood millwork
	Mastercraft Industries Inc.	2499	Furnishings
	Mount Pleasant Daily Tribune	2711/2752	Newspaper
	Mount Pleasant Meat Processing	2011	Meat processing
	Northeast Machine and Tool	3599	Machine shop
	Pilgrim's Pride Corp.	2016/2017	Poultry products
	Pilgrim's Pride Corp.	2077	Poultry byproducts
	Pilgrim's Pride Corp.	2017	Poultry products
	Priefert Mfg. Co.	3523	Farm equipment
	Print shop	2732/2751/2752	Printing
	H.E. Spann Co.	2951/3273	Asphalt, concrete
	Star Memorial Co.	3281	Monuments
	Stovall Fab. and Machine and Equip.	3441/3444/3599/ 3713/3715	Misc. sheet metal
	Texas Emulsions Inc.	2951	Asphalt

APPENDIX C

QUESTIONNAIRE RESPONSE SUMMARIES
ESTIMATED SLUDGE PRODUCTION

REGIONAL WATER AND WASTEWATER MANAGEMENT PLAN
SULPHUR RIVER BASIN AUTHORITY OF TEXAS
SOLID WASTE LANDFILLS

Name of Owner: Hefner, Wallace
Address: Route 1, Box 305B
Campbell, Texas 75422
Telephone Number: 214/866-7832
Location: 2.5 miles north of FM 1568/FM 499 intersection on east side of FM 1568

County: Hunt
Permit Number: TDH-01195
Permit Type: 1
Facility Name: Maloy Landfill

Permitted Acres: 327
Customers Served: City of Greenville; City of Sulphur Springs

Estimated Service Population:
Estimated Quantity Received: cubic yards/month
Estimated Composition of Waste Received: Paper %; Glass %; Aluminum %; Other metals %; Plastics %; Other %
Resource Recovery Operations:
Approximate Annual Cost of Operation:

REMARKS:

REGIONAL WATER AND WASTEWATER MANAGEMENT PLAN
SULPHUR RIVER BASIN AUTHORITY OF TEXAS
SOLID WASTE LANDFILLS

Name of Owner: City of DeKalb
Address: 110 S.E. South Front
DeKalb, TX 75559
Telephone Number: 214/667-2410
Site Location:

County:
Permit Number: TDH-00650
Permit Type: 1
Facility Name: City Landfill

Permitted Acres:
Customers Served: City of DeKalb

Estimated Service Population: 2260
Estimated Quantity Received: 144 cubic yards/week (43 tons/week)
Estimated Composition of Waste Received: Paper %; Glass %; Aluminum %; Other metals %; Plastics %; Other %
Resource Recovery Operations: None
Approximate Annual Cost of Operation: $38,000

REMARKS:
(1) No batteries or tires accepted.
(2) Fee structure: $2.50 per pickup truck
$5.00 per trailer
$10.00 per bobtail truck

REGIONAL WATER AND WASTEWATER MANAGEMENT PLAN
SULPHUR RIVER BASIN AUTHORITY OF TEXAS
SOLID WASTE LANDFILLS

Name of Owner: City of Maud
Address : P.O. Box 437
Maud, TX 75567
Telephone Number: 214/585-2294
Site Location:

County:
Permit Number: TDH-00756
Permit Type: 1
Facility Name:
City Landfill

Permitted Acres:
Customers Served: City of Maud

Estimated Service Population: 1100
Estimated Quantity Received: 9 tons/week
Estimated Composition of Waste Received: Paper 50 %; Glass 20 %; Aluminum 5 %; Other metals %; Plastics 20 %; Other 5 %
Resource Recovery Operations: None
Approximate Annual Cost of Operation: $38,000

REMARKS:
(1) No batteries or tires accepted.
(2) Rate structure: Outside City limits $50.00 per year
Household Pickup $4.50 per month
Commercial Pickup $5.65 per month
Schools/Commercial $100 per year

REGIONAL WATER AND WASTEWATER MANAGEMENT PLAN
SULPHUR RIVER BASIN AUTHORITY OF TEXAS
SOLID WASTE LANDFILLS

Name of Owner: City of Lone Star
Address : P.O. Box 218
Lone Star, Texas 75668-0218
Telephone Number: 214/656-2311
Site Location:

County: Morris
Permit Number: 316
Permit Type:
Facility Name:

Permitted Acres:
Customers Served: Omaha, Daingerfield, Hughes Springs, Ore City, Lone Star

Estimated Service Population: 11,200
Estimated Quantity Received: 6,098.7 tons/year
Estimated Composition of Waste Received: Paper %; Glass %; Aluminum %; Other metals %; Plastics %; Other %
Resource Recovery Operations: None
Approximate Annual Cost of Operation: $45,000

REMARKS:
(1) Haulers who use the landfill: Western Waste Ind., Waste Management of N. America, Tri- City Disposal, Laidlaw Waste Systems

REGIONAL WATER AND WASTEWATER MANAGEMENT PLAN
SULPHUR RIVER BASIN AUTHORITY OF TEXAS
SOLID WASTE LANDFILLS

Name of Owner: City of Commerce
Address: 1119 Alamo St.
Commerce, TX 75428
Telephone Number: 214/886-2105
Location: 3 miles east of SH 50 on FM 1568

County: Hunt
Permit Number: TDH-00421
Permit Type: 1
Facility Name:
City Landfill

Permitted Acres: 179
Customers Served: City of Commerce, City of Greenville

Estimated Service Population:
Estimated Quantity Received: cubic yards\week
Estimated Composition of Waste Received: Paper %; Glass %; Aluminum %; Other metals %; Plastics %; Other %
Resource Recovery Operations:
Approximate Annual Cost of Operation:

REMARKS: Water treatment plant sludge is disposed at this site.

REGIONAL WATER AND WASTEWATER MANAGEMENT PLAN
SULPHUR RIVER BASIN AUTHORITY OF TEXAS
SOLID WASTE LANDFILLS

Name of Owner: City of Bloomburg
Address: P.O. Box 198
Bloomburg, TX 75556
Telephone Number: 214/886-2105
Site Location:

County: Cass
Permit Number: TDH-00387
Permit Type: 1
Facility Name:
City Landfill

Permitted Acres:
Customers Served: City of Bloomburg

Estimated Service Population: 135
Estimated Quantity Received: 8 cubic yards\week
Estimated Composition of Waste Received: Paper 50 %; Glass 10 %; Aluminum 10%; Other metals 10%; Plastics 10 %; Other 10 %
Resource Recovery Operations:
Approximate Annual Cost of Operation: $3,200

REMARKS:
(1) No batteries, tires, or white goods accepted.
(2) Rate structure: $20.00 per year per customer

Name of Owner:City of Mount Vernon
Address :P.O. Box 597
Mount Vernon, TX 75457
Telephone Number: 214/537-2252
Site Location:2 miles northeast of Mount Vernon

County: Franklin
Permit Number: P00563
Permit Type: 2
Facility Name:
City Landfill

Permitted Acres:
Customers Served: City of Mount Vernon

Estimated Service Population:2525
Estimated Quantity Received: 200 cubic yards\week
Estimated Composition of Waste Received:Paper 65 %;Glass 10 %;Aluminum 5 %;
Other metals 5 %;Plastics 5 %;Other 10 %
Resource Recovery Operations:None
Approximate Annual Cost of Operation: $43,920

REMARKS: Both water treatment plant sludge and wastewater treatment plant sludge are disposed at this site.

REGIONAL WATER AND WASTEWATER MANAGEMENT PLAN
SULPHUR RIVER BASIN AUTHORITY OF TEXAS
SOLID WASTE LANDFILLS

Name of Owner:City of Mount Pleasant
Address :P.O. Box 231
Mount Pleasant, Texas 75455
Telephone Number: 214/572-3412
Site Location:

County: Titus
Permit Number: P00797
Permit Type:
Facility Name:
City Landfill

Permitted Acres:
Customers Served: All of Titus County

Estimated Service Population: 21,051
Estimated Quantity Received: 10,347.6 cubic yards/month
Estimated Composition of Waste Received:Paper %;Glass %;Aluminum %;
Other metals %;Plastics %;Other %
Resource Recovery Operations: Metals are sold for scrap
Approximate Annual Cost of Operation: $594,640

REMARKS:
(1) No batteries, tires, or concrete accepted
(2) Both water and wastewater treatment plant sludges are disposed here
(3) Rate structure: $2.00 per car
$5.00 per pickup truck
$10.00 per small trailer or dump truck(5 C.Y.)
$20.00 per large trailer or dump truck(10 C.Y.)
$40.00 per garbage truck

REGIONAL WATER AND WASTEWATER MANAGEMENT PLAN
SULPHUR RIVER BASIN AUTHORITY OF TEXAS
SOLID WASTE LANDFILLS

Name of Owner: City of Queen City
Address: P.O. Box 301
Queen City, Texas 75572
Telephone Number: 214/796-7986
Site Location:

County: Cass
Permit Number: P00604
Permit Type:
Facility Name:
City Landfill

Permitted Acres:
Customers Served: City of Queen City

Estimated Service Population: 1750
Estimated Quantity Received: 10 tons/week
Estimated Composition of Waste Received: Paper 75 %; Glass 10%; Aluminum %; Other metals %; Plastics 10 %; Other 5 %
Resource Recovery Operations: None
Approximate Annual Cost of Operation: $20,000

REMARKS:

REGIONAL WATER AND WASTEWATER MANAGEMENT PLAN
SULPHUR RIVER BASIN AUTHORITY OF TEXAS
SOLID WASTE LANDFILLS

Name of Owner: City of New Boston
Address: P.O. Box 5
New Boston, Texas 75570
Telephone Number: 214/628-3231
Site Location:

County: Bowie
Permit Number: 10482-01
Permit Type:
Facility Name:

Permitted Acres:
Customers Served: City of New Boston

Estimated Service Population: 7268
Estimated Quantity Received: 140 tons/week
Estimated Composition of Waste Received: Paper 30 %; Glass 10%; Aluminum 10%; Other metals 10 %; Plastics 10 %; Other 30 %
Resource Recovery Operations: None
Approximate Annual Cost of Operation: $54,000

REMARKS:
(1) No batteries or tires accepted.
(2) Rate structure: $3.00 per car
$5.00 per pickup truck or small truck
$10.00 per large trailer or small truck
$15.00 per large truck

REGIONAL WATER AND WASTEWATER MANAGEMENT PLAN
SULPHUR RIVER BASIN AUTHORITY OF TEXAS
WATER TREATMENT PLANTS

Name of Owner: City of Commerce
Address : 1119 Alamo
Commerce, Texas 75428
Telephone Number: 214/886-2105
Site Location:

County: Hunt
Permit Number:
nonr
Facility Name:

Stream segment: 0303
Plant size: 1.5 MGD
Current average production: 0.7 MGD
Estimated Service Population: 8,136
Estimated Sludge produced: 30 - 35 tons/yr
Sludge dewatering method: lagoons
Ultimate sludge disposal method: City landfill

Approximate Annual Cost of Sludge Disposal:

REMARKS:
(1)

REGIONAL WATER AND WASTEWATER MANAGEMENT PLAN
SULPHUR RIVER BASIN AUTHORITY OF TEXAS
SOLID WASTE LANDFILLS

Name of Owner: Red River Army Depot
Address :
Texarkana, Texas 75507-5000
Telephone Number: 214/334-2503
Site Location:

County: Bowie
Permit Number: TDH-01313
Permit Type:
Facility Name:

Permitted Acres:
Customers Served: Red River Army Depot and Lone Star Army Ammunition Plant

Estimated Service Population: 7000
Estimated Quantity Received: 7,800 cubic yards/month
Estimated Composition of Waste Received: Paper 56.1%; Glass 0 %; Aluminum 0 %; Other metals 0 %; Plastics 4.5%; Other 39.4%
Resource Recovery Operations: Metals sold as scrap; wood used for boiler fuel
Approximate Annual Cost of Operation: $167,000

REMARKS:
(1) No batteries or hazardous waste accepted.
(2) Both water and wastewater treatment sludges are disposed here
(3) Landfill use is restricted to only RRAD and LSAAP.

REGIONAL WATER AND WASTEWATER MANAGEMENT PLAN
SULPHUR RIVER BASIN AUTHORITY OF TEXAS
WATER TREATMENT PLANTS

Name of Owner:City of Mount Vernon Address :P.O. Box 597 Mount Vernon, Texas 75457 Telephone Number: 214/537-2252 Site Location:	County: Franklin Permit Number: 11122-001 Facility Name:

Stream segment: 0303
Plant size: 1.5 MGD
Current average production: 1.2 MGD
Estimated Service Population: 3,000
Estimated Sludge produced: 60 cubic yards/yr
Sludge dewatering method: lagoons
Ultimate sludge disposal method: City landfill

Approximate Annual Cost of Sludge Disposal: $2000

REMARKS:
(1)

REGIONAL WATER AND WASTEWATER MANAGEMENT PLAN
SULPHUR RIVER BASIN AUTHORITY OF TEXAS
WATER TREATMENT PLANTS

Name of Owner:City of Mount Pleasant Address :P.O. Box 231 Mount Pleasant, Texas 75455 Telephone Number: 214/572-3412 Site Location: North of I30 Mount Pleasant, Texas 75455	County: Titus Permit Number: none Facility Name:

Stream segment: 0304
Plant size: 12 MGD
Current average production: 5.5 MGD
Estimated Service Population: 7,180
Estimated Sludge produced: no response
Sludge dewatering method: no rsponse
Ultimate sludge disposal method: At city landfill

Approximate Annual Cost of Sludge Disposal:

REMARKS:
(1)

REGIONAL WATER AND WASTEWATER MANAGEMENT PLAN
SULPHUR RIVER BASIN AUTHORITY OF TEXAS
WATER TREATMENT PLANTS

Name of Owner:City of Texarkana Address :P.O. Box 1967 Texarkana, Texas 75504 Telephone Number: 214/794-3571 Site Location: 2700 New Boston Rd. Texarkana, Texas 75501	County: Bowie Permit Number: none Facility Name: Wright Patman Water Treatment Plant

Stream segment: 0304
Plant size: 22.5 MGD
Current average production: 8.2 MGD
Estimated Service Population: 47,541
Estimated Sludge produced: 58 tons/month
Sludge dewatering method: none
Ultimate sludge disposal method: At Wastewater treatment plant

Approximate Annual Cost of Sludge Disposal:

REMARKS:
(1)

REGIONAL WATER AND WASTEWATER MANAGEMENT PLAN
SULPHUR RIVER BASIN AUTHORITY OF TEXAS
WATER TREATMENT PLANTS

Name of Owner:City of Paris Address :P.O. Box 9037 Paris, Texas 75461-9037 Telephone Number: 214/785-7511 Site Location:	County: Lamar Permit Number: 10479-001 Facility Name:

Stream segment: 0202
Plant size: 18 MGD
Current average production: 12 MGD
Estimated Service Population: 50,000
Estimated Sludge produced: 348,000 gal/day of 1% solids
Sludge dewatering method:
Ultimate sludge disposal method: Land application by spray irrigation

Approximate Annual Cost of Sludge Disposal:

REMARKS:
(1)

REGIONAL WATER AND WASTEWATER MANAGEMENT PLAN
SULPHUR RIVER BASIN AUTHORITY OF TEXAS
WASTEWATER TREATMENT PLANTS

Name of Owner: Albert M. Miller
Address: P.O. Box 168
Winfield, Texas 75493
Telephone Number: 214/524-2111
Site Location:
Miller's Cove

County: Titus
Permit Number:
11750-001
Facility Name:
Wastewater Treatment
Plant

Stream segment: 0408
Permitted flow rate: 0.038 MGD
Current flow rate: 0.013 MGD
Estimated Service Population: 60
Estimated Sludge produced: 33 ton/yr
Sludge dewatering method: sludge drying beds
Ultimate sludge disposal method: Winfield wastewater plant

Approximate Annual Cost of Sludge Disposal: $200

REMARKS:
(1)

REGIONAL WATER AND WASTEWATER MANAGEMENT PLAN
SULPHUR RIVER BASIN AUTHORITY OF TEXAS
WASTEWATER TREATMENT PLANTS

Name of Owner: Alumax Mill Products, Inc.
Address: 300 Alumax Dr.
Texarkana, Texas 75501
Telephone Number: 214/832-8471
Site Location:

County: Bowie
Permit Number:
2742-001 & 002
Facility Name:

Stream segment: 0304
Permitted flow rate: 0.008 MGD & 0.127 MGD
Current flow rate: 0.049 MGD
Estimated Service Population: response was N/A
Estimated Sludge produced: 27.03 cubic yards/year
Sludge dewatering method: none
Ultimate sludge disposal method: Haul off-site by Chemical Wsate Mgmt.

Approximate Annual Cost of Sludge Disposal: $1500 / month

REMARKS:
(1)

REGIONAL WATER AND WASTEWATER MANAGEMENT PLAN
SULPHUR RIVER BASIN AUTHORITY OF TEXAS
WASTEWATER TREATMENT PLANTS

Name of Owner: City of Avinger
Address: P.O. Box 367
Avinger, Texas 75630
Telephone Number: 214/562-1001
Site Location:

County: Cass
Permit Number: 10646-001
Facility Name:

Stream segment: 0402
Permitted flow rate: 0.12 MGD
Current flow rate: 0.034 MGD
Estimated Service Population: 652
Estimated Sludge produced: 6 cubic yards/year
Sludge dewatering method: sludge drying beds
Ultimate sludge disposal method: City landfill

Approximate Annual Cost of Sludge Disposal: $20/ cubic yard

REMARKS:
(1)

REGIONAL WATER AND WASTEWATER MANAGEMENT PLAN
SULPHUR RIVER BASIN AUTHORITY OF TEXAS
WASTEWATER TREATMENT PLANTS

Name of Owner: City of Avery
Address: P.O. Box 35
Avery, Texas 75554
Telephone Number: 214/684-3825
Site Location: North end of Ft. Worth St.

County: Red River
Permit Number: 10733-002
Facility Name: Wastewater treatment Plant

Stream segment: 0202
Permitted flow rate: 0.144 MGD
Current flow rate: 0.040 MGD
Estimated Service Population: 520
Estimated Sludge produced: unknown
Sludge dewatering method: sludge drying beds
Ultimate sludge disposal method: land application on-site

Approximate Annual Cost of Sludge Disposal: unkmown

REMARKS:
(1)

Name of Owner: City of Caddo Mills
Address: P.O. Box 490
Caddo Mills, Texas 75005
Telephone Number: 214/527-3116
Site Location:

County: Hunt
Permit Number: 10425-001
Facility Name: Wastewater treatment Plant

Stream segment: 0507
Permitted flow rate: 0.15
Current flow rate: no response
Estimated Service Population: 1100
Estimated Sludge produced: unknown
Sludge dewatering method:
Ultimate sludge disposal method:

Approximate Annual Cost of Sludge Disposal:

REMARKS:
(1) Plant is being expanded and modified

REGIONAL WATER AND WASTEWATER MANAGEMENT PLAN
SULPHUR RIVER BASIN AUTHORITY OF TEXAS
WASTEWATER TREATMENT PLANTS

Name of Owner: City of Bogota
Address: P.O. Box 400
Bogota, Texas 75417
Telephone Number: 214/632-4631
Site Location:

County: Red River
Permit Number: 10065-001
Facility Name: City Wsatewater Treatment Plant

Stream segment: 0303
Permitted flow rate: 0.34 MGD
Current flow rate: 0.151 MGD
Estimated Service Population: 1550
Estimated Sludge produced: None
Sludge dewatering method: None
Ultimate sludge disposal method: Facultative-stabilization ponds

Approximate Annual Cost of Sludge Disposal:

REMARKS:
(1)

REGIONAL WATER AND WASTEWATER MANAGEMENT PLAN
SULPHUR RIVER BASIN AUTHORITY OF TEXAS
WASTEWATER TREATMENT PLANTS

Name of Owner: Adjutant General's Department
Camp Maxey Plant
Address: P.O. Box 5218
Austin, Texas 78763
Telephone Number: 214/ 732-3792
Site Location: Rt 1,Box 59 Powderly,Tx 75473

County: Lamar

Permit Number:
13249-001
Facility Name:
Camp Maxey Plant

Stream segment: 0202
Permitted flow rate: 0.007 MGD
Current flow rate: 0.002 MGD
Estimated Service Population: 15 daily; 200 weekends
Estimated Sludge produced: response = N/A stabilization ponds
Sludge dewatering method:
Ultimate sludge disposal method:

Approximate Annual Cost of Sludge Disposal:

REMARKS:

(1) Point of Contact: Camp Maxey
LTC Dan E. Wisely
UTES #1 Facility Manager

Point of Contact: Austin
Cliff Hall, P.E.
512/465-5071

REGIONAL WATER AND WASTEWATER MANAGEMENT PLAN
SULPHUR RIVER BASIN AUTHORITY OF TEXAS
WASTEWATER TREATMENT PLANTS

Name of Owner: Campbell Soup (Texas) Inc.
Address: P.O. Box 9016
Paris, Texas 75461-9016
Telephone Number: 214/784-3341
Site Location: 500 North Loop 286

County: Lamar
Permit Number:

Facility Name:

Stream segment:
Permitted flow rate: 13.0 MGD
Current flow rate: 4.5 MGD
Estimated Service Population:
Estimated Sludge produced: N/A
Sludge dewatering method:
Ultimate sludge disposal method:

Approximate Annual Cost of Sludge Disposal:

REMARKS:

(1) All wastewater is treated by land application.
(2) Grease is sold and recycled.
(3) Vegetable waste is hauled to the B & B landfill.
(4) General plant wastes are hauled to the B & B landfill.

REGIONAL WATER AND WASTEWATER MANAGEMENT PLAN
SULPHUR RIVER BASIN AUTHORITY OF TEXAS
WASTEWATER TREATMENT PLANTS

Name of Owner:City of Commerce Address :119 Alamo Street Commerce, Texas 75428 Telephone Number: 214/886-2513;886-2105 Site Location: On east side of FM 3218 and on the north side of the Middle Sulphur River	County: Hunt Permit Number: 10555-001 Facility Name: Water Pollution Control Facility

Stream segment: 0303
Permitted flow rate: 2.0 MGD
Current flow rate: 1.0 MGD
Estimated Service Population: 8136
Estimated Sludge produced: 14,285 gal/day
Sludge dewatering method: Sludge drying beds
Ultimate sludge disposal method: Landfill on-site

Approximate Annual Cost of Sludge Disposal: unknown

REMARKS:
(1)

REGIONAL WATER AND WASTEWATER MANAGEMENT PLAN
SULPHUR RIVER BASIN AUTHORITY OF TEXAS
WASTEWATER TREATMENT PLANTS

Name of Owner:City of Celeste Address :P.O. Box 398 Celeste, Texas 75243 Telephone Number: 214/568-4512 Site Location:	County: Hunt Permit Number: 10146-001 Facility Name:

Stream segment: 0507
Permitted flow rate: 0.0795
Current flow rate: .25 MGD
Estimated Service Population: 716
Estimated Sludge produced: 2 tons/year
Sludge dewatering method: sludge drying beds
Ultimate sludge disposal method: on-site landfill

Approximate Annual Cost of Sludge Disposal: $200

REMARKS:
(1)

REGIONAL WATER AND WASTEWATER MANAGEMENT PLAN
SULPHUR RIVER BASIN AUTHORITY OF TEXAS
WASTEWATER TREATMENT PLANTS

Name of Owner: City of DeKalb
Address: 110 S.E. South Front
DeKalb, Texas 75559
Telephone Number: 214/667-2410
Site Location:

County: Bowie
Permit Number: 10062-002
Facility Name: Wastewater treatment Plant

Stream segment: 0302
Permitted flow rate: 0.35 MGD
Current flow rate: 0.236 MGD
Estimated Service Population: 2260
Estimated Sludge produced:
Sludge dewatering method: Sludge drying beds
Ultimate sludge disposal method: Land application

Approximate Annual Cost of Sludge Disposal:

REMARKS:
(1)

REGIONAL WATER AND WASTEWATER MANAGEMENT PLAN
SULPHUR RIVER BASIN AUTHORITY OF TEXAS
WASTEWATER TREATMENT PLANTS

Name of Owner: City of Daingerfield
Address: P.O. Drawer E
Daingerfield, Texas 75638-0843
Telephone Number: 214/645-3906
Site Location:

County: Morris
Permit Number: 10499-001
Facility Name: City Wastewater Treatment Plant

Stream segment: 0404
Permitted flow rate: 0.7 MGD
Current flow rate: 0.35 MGD
Estimated Service Population: 3030
Estimated Sludge produced: 53,856 gal/MGD
Sludge dewatering method: Sludge drying beds
Ultimate sludge disposal method: Landfill at the City of Lone Star landfill

Approximate Annual Cost of Sludge Disposal:

REMARKS:
(1) Operator Todd York

REGIONAL WATER AND WASTEWATER MANAGEMENT PLAN
SULPHUR RIVER BASIN AUTHORITY OF TEXAS
WASTEWATER TREATMENT PLANTS

Name of Owner: City of Detroit
Address : P.O. Box 180
Detroit, Texas 75436
Telephone Number: 214/674-4573
Site Location:

County: Red River
Permit Number:
10724-001
Facility Name:
Wastewater treatment
Plant

Stream segment: 0303
Permitted flow rate: 0.108 MGD
Current flow rate: 0.068 MGD
Estimated Service Population: 600
Estimated Sludge produced: unknown
Sludge dewatering method: sludge drying beds
Ultimate sludge disposal method: land application

Approximate Annual Cost of Sludge Disposal: $85/week

REMARKS:
(1)

REGIONAL WATER AND WASTEWATER MANAGEMENT PLAN
SULPHUR RIVER BASIN AUTHORITY OF TEXAS
WASTEWATER TREATMENT PLANTS

Name of Owner: City of Deport
Address : P.O. Box 354A
Deport, Texas 75435
Telephone Number: 214/652-3875
Site Location:

County: Lamar
Permit Number:
10741-001
Facility Name:
Wastewater treatment
plant

Stream segment: 0303
Permitted flow rate: 0.183 MGD
Current flow rate: 0.085 MGD
Estimated Service Population: 724
Estimated Sludge produced: response was N/A
Sludge dewatering method: response was N/A
Ultimate sludge disposal method:

Approximate Annual Cost of Sludge Disposal: response was N/A

REMARKS:
(1)

REGIONAL WATER AND WASTEWATER MANAGEMENT PLAN
SULPHUR RIVER BASIN AUTHORITY OF TEXAS
WASTEWATER TREATMENT PLANTS

Name of Owner:Hunt County Oil Company Address :P.O. Box 1298 Greenville, Texas 75401 Telephone Number: 214/455-4854 Site Location: I30 & FM 1903	County: Hunt Permit Number: 11721-001 Facility Name: Wastewater treatment plant

Stream segment: 0507
Permitted flow rate: 0.007 MGD
Current flow rate: 0.003 MGD
Estimated Service Population: no response
Estimated Sludge produced: 2300 gallons/month
Sludge dewatering method:
Ultimate sludge disposal method: Haul to Greenville WWTP

Approximate Annual Cost of Sludge Disposal: $200 / month

REMARKS:
(1)

REGIONAL WATER AND WASTEWATER MANAGEMENT PLAN
SULPHUR RIVER BASIN AUTHORITY OF TEXAS
WASTEWATER TREATMENT PLANTS

Name of Owner:City of Greenville Address :P.O. Box 1049 Greenville, Texas 75401 Telephone Number: 214/454-4301 Site Location:	County: Hunt Permit Number: 10485-002 Facility Name:

Stream segment: 0507
Permitted flow rate: 4.23 MGD
Current flow rate: 3.32 MGD
Estimated Service Population: 24,000
Estimated Sludge produced: 700 tons (dry solids)/year = 3000 CY/year
Sludge dewatering method: Belt press
Ultimate sludge disposal method: Off-site landfill @ North Texas Services

Approximate Annual Cost of Sludge Disposal: $100 - 120/ton

REMARKS:
(1) Contact: Bill Erwin, Superintendent of Wastewater Reclamation
214/454-4301

REGIONAL WATER AND WASTEWATER MANAGEMENT PLAN
SULPHUR RIVER BASIN AUTHORITY OF TEXAS
WASTEWATER TREATMENT PLANTS

Name of Owner: Kimberly-Clark Corporation Address: P.O. Box 9000 Paris, Texas 75461-9000 Telephone Number: 214/785-7501 Site Location:	County: Lamar Permit Number: 2648-001 Facility Name: Wastewateer Treatment Plant

Stream segment: 0305
Permitted flow rate: 0.325 MGD
Current flow rate: 0.139 MGD
Estimated Service Population: not applicable
Estimated Sludge produced: 104 tons/month (26 tons/month BDW)
Sludge dewatering method: water extractor
Ultimate sludge disposal method: B & B Landfill - Paris

Approximate Annual Cost of Sludge Disposal: $26,000/yr

REMARKS:
(1) Currently investigating selling sludge
(2) TWC printout says permitted flow is 0.192 MGD

REGIONAL WATER AND WASTEWATER MANAGEMENT PLAN
SULPHUR RIVER BASIN AUTHORITY OF TEXAS
WASTEWATER TREATMENT PLANTS

Name of Owner: City of Hughes Springs Address: P.O. Box 805 Hughes Springs, Texas 75656 Telephone Number: 214/639-7519 Site Location:	County: Cass Permit Number: 10415-001 Facility Name:

Stream segment: 0402
Permitted flow rate: 0.49 MGD
Current flow rate: 0.33 MGD
Estimated Service Population: 2196
Estimated Sludge produced: 10 tons/month (6 cubic yards/month)
Sludge dewatering method: Sludge drying beds
Ultimate sludge disposal method: On-site landfill

Approximate Annual Cost of Sludge Disposal:

REMARKS:
(1)

REGIONAL WATER AND WASTEWATER MANAGEMENT PLAN
SULPHUR RIVER BASIN AUTHORITY OF TEXAS
WASTEWATER TREATMENT PLANTS

Name of Owner: Luxury Lodges of Texas, Inc. Address :P.O. Box 168 Texarkana, Texas 75504 Telephone Number: 214/792-5521 Site Location: Northgate Park 500 West 53rd St. Texarkana 75503	County: Bowie Permit Number: 10981-001 Facility Name:

Stream segment: 0225
Permitted flow rate: 0.065 MGD
Current flow rate: 0.033 MGD
Estimated Service Population: 400
Estimated Sludge produced: 0.002433 gal/MGD
Sludge dewatering method:
Ultimate sludge disposal method: Haul to Texarkana WWTP

Approximate Annual Cost of Sludge Disposal: $300/month

REMARKS:
(1) TWC printout indicates the owner to be S. Feinberg & Dr. C. Yarbrouh

REGIONAL WATER AND WASTEWATER MANAGEMENT PLAN
SULPHUR RIVER BASIN AUTHORITY OF TEXAS
WASTEWATER TREATMENT PLANTS

Name of Owner: City of Lone Star Address :P.O. Box 218 Lone Star, Texas 75668-0218 Telephone Number: 214/656-2311 Site Location:	County: Morris Permit Number: 12411-001 Facility Name:

Stream segment: 0403
Permitted flow rate: 0.44 MGD
Current flow rate: 0.20 MGD
Estimated Service Population: 2036
Estimated Sludge produced: 111 CY/year
Sludge dewatering method: Sludge drying beds
Ultimate sludge disposal method: Off-site landfill @ City Landfill

Approximate Annual Cost of Sludge Disposal: $26 /CY

REMARKS:
(1)

REGIONAL WATER AND WASTEWATER MANAGEMENT PLAN
SULPHUR RIVER BASIN AUTHORITY OF TEXAS
WASTEWATER TREATMENT PLANTS

Name of Owner:City of Mount Pleasant Address :P.O. Box 231 Mount Pleasant, Texas 75455 Telephone Number: 214/572-3412 Site Location:Highway 67 East	County: Titus Permit Number: 10575-002 Facility Name: Northeast Wastewater Treatment Plant

Stream segment: 0404
Permitted flow rate: 0.4 MGD
Current flow rate: 0.37 MGD
Estimated Service Population: 11,003
Estimated Sludge produced: 693 wet tons/month (22,232 cubic yards/month)
Sludge dewatering method: Sludge drying beds
Ultimate sludge disposal method: Land application

Approximate Annual Cost of Sludge Disposal: $50,000

REMARKS:
(1)

REGIONAL WATER AND WASTEWATER MANAGEMENT PLAN
SULPHUR RIVER BASIN AUTHORITY OF TEXAS
WASTEWATER TREATMENT PLANTS

Name of Owner:City of Maud Address :P.O. Box 427 Maud, Texas 75567 Telephone Number: 214/585-2294 Site Location:	County: Bowie Permit Number: 10767-001 Facility Name: Wastewater treatment plant

Stream segment: 0302
Permitted flow rate: 0.08 MGD
Current flow rate: 0.08 MGD
Estimated Service Population: 1059
Estimated Sludge produced:
Sludge dewatering method:
Ultimate sludge disposal method:

Approximate Annual Cost of Sludge Disposal:

REMARKS:
(1) Response was that the plant was designed for 150,000 gpd

REGIONAL WATER AND WASTEWATER MANAGEMENT PLAN
SULPHUR RIVER BASIN AUTHORITY OF TEXAS
WASTEWATER TREATMENT PLANTS

Name of Owner: City of Mount Vernon
Address: P.O. Box 597
Mount Vernon, Texas 75457
Telephone Number: 214/537-2252
Site Location:

County: Franklin
Permit Number: 11122-002
Facility Name: City Wastewater Treatment Plant

Stream segment: 0303
Permitted flow rate: 0.425 MGD
Current flow rate: 0.160 MGD
Estimated Service Population:
Estimated Sludge produced: 18-20 cubic yards/year
Sludge dewatering method: Sludge drying beds
Ultimate sludge disposal method: Landfill at city landfill

Approximate Annual Cost of Sludge Disposal: $1500/year

REMARKS:
(1)

REGIONAL WATER AND WASTEWATER MANAGEMENT PLAN
SULPHUR RIVER BASIN AUTHORITY OF TEXAS
WASTEWATER TREATMENT PLANTS

Name of Owner: City of Mount Pleasant
Address: P.O. Box 231
Mount Pleasant, Texas 75455
Telephone Number: 214/572-3412
Site Location: Highway 49 and Alexander

County: Titus
Permit Number: 10575-001
Facility Name: Southeast Wastewater Treatment Plant

Stream segment: 0404
Permitted flow rate: 1.5 MGD
Current flow rate: 1.23 MGD
Estimated Service Population: 11,003
Estimated Sludge produced: 995 wet tons/month (31,929 cubic yards/month)
Sludge dewatering method: Sludge drying beds
Ultimate sludge disposal method: Land application

Approximate Annual Cost of Sludge Disposal: $50,000

REMARKS:
(1)

REGIONAL WATER AND WASTEWATER MANAGEMENT PLAN
SULPHUR RIVER BASIN AUTHORITY OF TEXAS
WASTEWATER TREATMENT PLANTS

Name of Owner: Northeast Texas Comm. Col. Dist.
Address: P.O. Box 1307
Mt. Pleasant, Texas 75474
Telephone Number: 214/572-1911 X 533
Site Location:

County: Titus
Permit Number: 13070-001
Facility Name:

Stream segment: 0404
Permitted flow rate: 0.020 MGD
Current flow rate: 0.008 MGD
Estimated Service Population: 1500
Estimated Sludge produced: 8 tons/yr
Sludge dewatering method:
Ultimate sludge disposal method: land application

Approximate Annual Cost of Sludge Disposal: $1200/yr

REMARKS:
(1)

REGIONAL WATER AND WASTEWATER MANAGEMENT PLAN
SULPHUR RIVER BASIN AUTHORITY OF TEXAS
WASTEWATER TREATMENT PLANTS

Name of Owner: City of New Boston
Address: P.O. Box 5
New Boston, Texas 75570
Telephone Number: 214/628-3231
Site Location:

County: Bowie
Permit Number: 10482-001
Facility Name: City Wastewater Treatment Plant

Stream segment: 0302
Permitted flow rate: 0.60 MGD
Current flow rate: 0.597 MGD
Estimated Service Population: 7268
Estimated Sludge produced: 63 cubic yards/year
Sludge dewatering method: Sludge drying beds
Ultimate sludge disposal method: Land application

Approximate Annual Cost of Sludge Disposal: $5,000

REMARKS:
(1)

REGIONAL WATER AND WASTEWATER MANAGEMENT PLAN
SULPHUR RIVER BASIN AUTHORITY OF TEXAS
WASTEWATER TREATMENT PLANTS

Name of Owner:City of Pecan Gap Address :P.O. Box 27 Pecan Gap, Texas 75469 Telephone Number: Site Location:	County: Delta Permit Number: 10744-001 Facility Name: Wastewater treatment plant

Stream segment: 0303
Permitted flow rate: 0.04 MGD
Current flow rate: 0.001 MGD
Estimated Service Population: 250
Estimated Sludge produced: 8 tons/year
Sludge dewatering method: sludge drying beds
Ultimate sludge disposal method: landfill on-site

Approximate Annual Cost of Sludge Disposal:

REMARKS:
(1)

REGIONAL WATER AND WASTEWATER MANAGEMENT PLAN
SULPHUR RIVER BASIN AUTHORITY OF TEXAS
WASTEWATER TREATMENT PLANTS

Name of Owner:Pilgrim's Pride Inc. Address :P.O. Box 1268 Mt. Pleasant, Texas 75455 Telephone Number: 214/572- Site Location: Mount Pleasant	County: Titus Permit Number: 3017-001 Facility Name: Mount Pleasant

Stream segment: 0404
Permitted flow rate: 2.0 MGD
Current flow rate: 0.49 MGD
Estimated Service Population: 25,000 pop. equivalent
Estimated Sludge produced: 31.25 tons/month
Sludge dewatering method:
Ultimate sludge disposal method: land application by spraying

Approximate Annual Cost of Sludge Disposal: $3,000/month

REMARKS:
(1) TWC print out indicates this to be permitted for 1.6 MGD

REGIONAL WATER AND WASTEWATER MANAGEMENT PLAN
SULPHUR RIVER BASIN AUTHORITY OF TEXAS
WASTEWATER TREATMENT PLANTS

Name of Owner:City of Roxton Address :P.O. Box 176 Roxton, Texas 75477 Telephone Number: 214/346-3535 Site Location:	County: Lamar Permit Number: 10204-001 Facility Name:

Stream segment: 0305
Permitted flow rate: 0.10 MGD
Current flow rate: 0.04 MGD
Estimated Service Population: 750
Estimated Sludge produced: 15 cubic yards/month
Sludge dewatering method: sludge drying beds
Ultimate sludge disposal method: land application

Approximate Annual Cost of Sludge Disposal: $5/cubic yard

REMARKS:
(1)

REGIONAL WATER AND WASTEWATER MANAGEMENT PLAN
SULPHUR RIVER BASIN AUTHORITY OF TEXAS
WASTEWATER TREATMENT PLANTS

Name of Owner:City of Reno Address :Route 7, Box 142 Paris, Texas 75460 Telephone Number: 214/785-1944 Site Location:	County: Lamar Permit Number: 12162-001 Facility Name:

Stream segment: 0202
Permitted flow rate: 0.261 MGD
Current flow rate:
Estimated Service Population: 1650
Estimated Sludge produced: 40 cubic yard/month
Sludge dewatering method: sludge drying beds
Ultimate sludge disposal method: land application

Approximate Annual Cost of Sludge Disposal: no response

REMARKS:
(1)

REGIONAL WATER AND WASTEWATER MANAGEMENT PLAN
SULPHUR RIVER BASIN AUTHORITY OF TEXAS
WASTEWATER TREATMENT PLANTS

Name of Owner:US Department of the Army Address :Red River Army Depot Commander SDSRR-GE Texarkana, Texas 75507-5000 Telephone Number: 214/334-3559 Site Location:	County: Bowie Permit Number: 2206-001 thru 203 Facility Name: Domestic waste treatment plant

Stream segment: 0302
Permitted flow rate: 3 MGD
Current flow rate: 0.48 MGD
Estimated Service Population: 7,200
Estimated Sludge produced: 350 - 400 CY per year
Sludge dewatering method: sludge drying beds
Ultimate sludge disposal method: landfill on-site

Approximate Annual Cost of Sludge Disposal:

REMARKS:
(1)

REGIONAL WATER AND WASTEWATER MANAGEMENT PLAN
SULPHUR RIVER BASIN AUTHORITY OF TEXAS
WASTEWATER TREATMENT PLANTS

Name of Owner:US Department of the Army Address :Red River Army Depot Commander SDSRR-GE Texarkana, Texas 75507-5000 Telephone Number: 214/334-3559 Site Location:	County: Bowie Permit Number: 2206-001 thru 203 Facility Name: Industrial Wastewater Treatment Plant

Stream segment: 0302
Permitted flow rate: 0.35 MGD
Current flow rate: 0.48 MGD
Estimated Service Population: 5,350
Estimated Sludge produced: 150 - 250 CY per year
Sludge dewatering method: sludge drying beds
Ultimate sludge disposal method: landfill on-site

Approximate Annual Cost of Sludge Disposal:

REMARKS:
(1) A separate treatment process treats electroplating rinsewaters. The sludge from this is hauled off-site for disposal.

REGIONAL WATER AND WASTEWATER MANAGEMENT PLAN
SULPHUR RIVER BASIN AUTHORITY OF TEXAS
WASTEWATER TREATMENT PLANTS

Name of Owner: T & N Lone Star Warehouse Co
Address: P.O. Box 300
Lone Star, Texas 75668
Telephone Number: 214/656-3461
Site Location: On Hiway 250 between Lone Star and Hughes Springs

County: Morris
Permit Number: 13326-001
Facility Name: Wastewater treatment plant

Stream segment: 0404
Permitted flow rate: 0.0065 MGD
Current flow rate: 0.00568 MGD
Estimated Service Population: 140
Estimated Sludge produced: 3,200 gallons/year
Sludge dewatering method:
Ultimate sludge disposal method: Taken to City of Lone Star treatment plant

Approximate Annual Cost of Sludge Disposal: $200.00

REMARKS:
(1) Contact: Jerry B. Traylor

REGIONAL WATER AND WASTEWATER MANAGEMENT PLAN
SULPHUR RIVER BASIN AUTHORITY OF TEXAS
WASTEWATER TREATMENT PLANTS

Name of Owner: Southwestern Electric Power Co
Address: P.O. Box 21106
Shreveport, LA 71156
Telephone Number: 214/856-6638
Site Location: Route 4, Box 221
Pittsburg, Texas 75686

County: Titus
Permit Number: 01811-301
Facility Name: Welsh Power Plant

Stream segment: 0404
Permitted flow rate: 1.425 MGD
Current flow rate: 0.004 MGD
Estimated Service Population: 129
Estimated Sludge produced: 17 gal/0.004 MGD
Sludge dewatering method:
Ultimate sludge disposal method: City of Daingerfield WWTP

Approximate Annual Cost of Sludge Disposal: $514.50/yr

REMARKS:
(1)

REGIONAL WATER AND WASTEWATER MANAGEMENT PLAN
SULPHUR RIVER BASIN AUTHORITY OF TEXAS
WASTEWATER TREATMENT PLANTS

Name of Owner:Tenaska, Inc. Address :407 North 117th Street Omaha, NE 68154 Telephone Number: 214/785-2991:402/691-9514 Site Location: 300 Lake Crook Rd. Paris, Texas 75460	County: Lamar Permit Number: 03021-001 Facility Name: Lamar Co. Cogeneration

Stream segment: 0202
Permitted flow rate: 0.36 MGD
Current flow rate:
Estimated Service Population:
Estimated Sludge produced:
Sludge dewatering method:
Ultimate sludge disposal method:

Approximate Annual Cost of Sludge Disposal:

REMARKS:

(1) This is a cogeneration plant serving Campbell Soup and Texas Utilities Electric Company.

(2) The facility discharges water used for cooling and steam production.

(3) Contact A.J. Fontana (402/691-9514) for more info.

REGIONAL WATER AND WASTEWATER MANAGEMENT PLAN
SULPHUR RIVER BASIN AUTHORITY OF TEXAS
WASTEWATER TREATMENT PLANTS

Name of Owner:City of Talco Address :P.O. Box 365 Talco, Texas 75487 Telephone Number: 214/379-3731 Site Location:	County: Titus Permit Number: 10869-001 Facility Name:

Stream segment: 0303
Permitted flow rate: 0.125 MGD
Current flow rate: 0.075 MGD
Estimated Service Population: 752
Estimated Sludge produced: 8 cubic yards/month
Sludge dewatering method: Sludge drying beds
Ultimate sludge disposal method: Landfill on-site

Approximate Annual Cost of Sludge Disposal: $200

REMARKS:

(1)

REGIONAL WATER AND WASTEWATER MANAGEMENT PLAN
SULPHUR RIVER BASIN AUTHORITY OF TEXAS
WASTEWATER TREATMENT PLANTS

Name of Owner: Texas State Department of Highways and Public Transportation
Address: P.O. Box 1210
Atlanta, Texas 75551-1210
Telephone Number: 214/796-2851
Site Location: IH 30, 1 mi. West FM 990

County: Bowie
Permit Number: 11987-001
Facility Name: Bowie Co. Rest Area

Stream segment: 0302
Permitted flow rate: 0.015 MGD
Current flow rate: 0.004 MGD
Estimated Service Population:
Estimated Sludge produced: no response
Sludge dewatering method: no response
Ultimate sludge disposal method: land application

Approximate Annual Cost of Sludge Disposal:

REMARKS:
(1)

REGIONAL WATER AND WASTEWATER MANAGEMENT PLAN
SULPHUR RIVER BASIN AUTHORITY OF TEXAS
WASTEWATER TREATMENT PLANTS

Name of Owner: Trey Corporation of Vivian
Address: P.O. Drawer 512
Vivian, LA 71082
Telephone Number:
Site Location:

County: Titus
Permit Number: 00378-001
Facility Name:

Stream segment: 0404
Permitted flow rate: 0.345
Current flow rate:
Estimated Service Population:
Estimated Sludge produced:
Sludge dewatering method:
Ultimate sludge disposal method:

Approximate Annual Cost of Sludge Disposal:

REMARKS:
(1) Plant closed in 1985.

REGIONAL WATER AND WASTEWATER MANAGEMENT PLAN
SULPHUR RIVER BASIN AUTHORITY OF TEXAS
WASTEWATER TREATMENT PLANTS

Name of Owner: City of Winfield
Address: P.O. Box 14
Winfield, Texas 75493
Telephone Number: 214/524-3131
Site Location:

County: Titus
Permit Number: 12146-001
Facility Name: Wastewater treatment plant

Stream segment: 0408
Permitted flow rate: 0.084 MGD
Current flow rate: 0.058 MGD
Estimated Service Population: 396
Estimated Sludge produced: 22.44 tons/year
Sludge dewatering method: sludge drying beds
Ultimate sludge disposal method: on-site landfill

Approximate Annual Cost of Sludge Disposal: $400

REMARKS:
(1)

REGIONAL WATER AND WASTEWATER MANAGEMENT PLAN
SULPHUR RIVER BASIN AUTHORITY OF TEXAS
WASTEWATER TREATMENT PLANTS

Name of Owner: Texas State Department of Highways and Public Transportation
Address: P.O. Box 1210
Atlanta, Texas 75551-1210
Telephone Number: 214/796-2851
Site Location: Hwy 59, 7 mi. South of Atlanta

County: Cass
Permit Number: 12009-002
Facility Name: Cass Co. Rest Area

Stream segment: 0407
Permitted flow rate: 0.0075 MGD
Current flow rate: 0.0030 MGD
Estimated Service Population:
Estimated Sludge produced: no response
Sludge dewatering method: no response
Ultimate sludge disposal method: land application

Approximate Annual Cost of Sludge Disposal:

REMARKS:
(1)

REGIONAL WATER AND WASTEWATER MANAGEMENT PLAN
SULPHUR RIVER BASIN AUTHORITY OF TEXAS
WASTEWATER TREATMENT PLANTS

Name of Owner:City of West Tawakoni Address :P.O. Box 354 Quinlan, Texas 75474 Telephone Number: 214/447-2285 Site Location:	County: Hunt Permit Number: 11331-001 Facility Name:

Stream segment: 0507
Permitted flow rate: 0.30 MGD
Current flow rate: 0.14 MGD
Estimated Service Population: 945
Estimated Sludge produced: 1 ton/month
Sludge dewatering method: sludge drying beds
Ultimate sludge disposal method: on-site landfill

Approximate Annual Cost of Sludge Disposal: no response

REMARKS:
(1)

TABLE C-1

ESTIMATED SLUDGE PRODUCTION

SULPHUR RIVER BASIN PLANNING AREA

COUNTY	STR. SEG.	W.C.O. No	NAME	AVG. Q	MX.MO. Q	WWTP/WTP	SLUDGETPY
Bowie	301	2263-003	Army-LS	0.075		Other	0
Bowie	301	2263-002	Army-LS	0.004		Other	0
Bowie	301	2263-001	Army-LS	0.016		Other	0
Bowie	302	2206-002	Army-RR	0.05		Other	0
Bowie	302	2206-001	Army-RR	1.5		Other	0
Bowie	304	2119-001	Coleman	0		Other	0
Bowie	304	10374-007	Texarkana		2	WWTP	584
Bowie	304	10374-005	Texarkana		11.7	WWTP	3416.4
Bowie	302	10482-001	N. Boston		0.6	WWTP	175.2
Bowie	302	10062-002	De Kalb		0.35	WWTP	102.2
Bowie	304	2955-001	Paper Ch.	0.04		Other	0
Bowie	302	2776-002	Intl. Pap	0		Other	0
Bowie	302	2776-001	Intl. Pap	0		Other	0
Bowie	304	2742-002	Alumax	0.127		Other	0
Bowie	304	2742-001	Alumax	0.008		Other	0
Bowie	302	10767-001	Maud		0.08	WWTP	23.36
Bowie	302	10926-002	Redwater		0.06	WWTP	17.52
Bowie	302	10926-001	Redwater		0.04	WWTP	11.68
Bowie	301	11795-001	Moody MHP		0.012	WWTP	3.504
Bowie	302	11987-001	TexHwyDep		0.013	WWTP	3.796
Bowie	201	2206-203	Army-RR	0		Other	0
Bowie	201	2206-103	Army-RR	0.8		Other	0
Bowie	201	2206-003	Army-RR	0.9		Other	0
Bowie	225	10374-008	Texarkana		0.05	WWTP	14.6
Bowie	201	10507-001	Hooks		0.644	WWTP	188.048
Bowie	225	10981-001	Feinberg		0.065	WWTP	18.98
Bowie	225	13392-001	Red Lick		0.013	WWTP	3.796
Bowie	-	-	Texarkana	8.2		WTP	598.6
Cass	301	11225-001	Queen Cty		0.25	WWTP	73
Cass	301	1339-101	Intl. Pap	0		Other	0
Cass	301	1339-001	Intl. Pap	0		Other	0
Cass	406	10338-001	Atlanta		1.1	WWTP	321.2
Cass	407	10429-003	Linden		0.31	WWTP	90.52
Cass	407	10429-002	Linden		0.13	WWTP	37.96
Cass	402	10415-001	Hughes Sp		0.49	WWTP	143.08
Cass	407	12009-001	TexHwyDep		0.0075	WWTP	2.19
Cass	400	11146-001	Bloomburg		0.083	WWTP	24.236
Cass	402	10646-001	Avinger		0.12	WWTP	35.04
Delta	303	10449-001	Cooper		0.37	WWTP	108.04
Delta	303	10744-001	Pecan Gap		0.04	WWTP	11.68

TABLE C-1

ESTIMATED SLUDGE PRODUCTION

SULPHUR RIVER BASIN PLANNING AREA
(continued)

COUNTY	STR.	SEG.	W.C.O. No	NAME	AVG. Q	MX.MO. Q	WWTP/WTP	SLUDGETPY
Franklin	303		11122-002	Mt.Vernon		0.425	WWTP	124.1
Franklin	303		11122-001	Mt.Vernon		1.5	WTP	73
Hopkins	303		2581-101	A.P.Green	0.0012		Other	0
Hopkins	303		2521-001	Hinton			Other	0
Hopkins	303		2581-002	A.P.Green	0		Other	0
Hopkins	303		2581-001	A.P.Green	0		Other	0
Hopkins	303		2872-001	Borden	0.06		Other	0
Hopkins	303		10372-001	SulphurSp		5.4	WWTP	1576.8
Hopkins	303		12275-001	Tex.Util.		0.0026	WWTP	0.7592
Hopkins	512		10773-001	Cumby		0.12	WWTP	35.04
Hopkins	512		11313-001	Como		0.1	WWTP	29.2
Hunt	303		10383-001	Wolfe Cty		0.195	WWTP	56.94
Hunt	303		10555-001	Commerce		2	WWTP	584
Hunt	507		2395-001	Expl. Pl.		0	Other	0
Hunt	507		2837-001	Tex. Term		0	Other	0
Hunt	507		2871-001	Tex.Util.		0	Other	0
Hunt	507		2871-002	Tex.Util.		0	Other	0
Hunt	507		2875-001	Con-Dor		0	Other	0
Hunt	507		2984-001	GrnvleSES		0	Other	0
Hunt	507		2984-101	GrnvleSES	111		Other	0
Hunt	507		10146-001	Celeste		0.0795	WWTP	23.214
Hunt	507		10425-001	Caddo Mls		0.15	WWTP	43.8
Hunt	507		10485-002	Grnville.		4.23	WWTP	1235.16
Hunt	507		10760-001	Lone Oak		0.06	WWTP	17.52
Hunt	507		10907-001	Sabine RA		0.002	WWTP	0.584
Hunt	507		10907-101	Sabine RA		0	WWTP	0
Hunt	507		10946-001	Quinlan		0.175	WWTP	51.1
Hunt	507		11331-001	West Taw.		0.3	WWTP	87.6
Hunt	507		11721-001	HuntCoOil		0.007	WWTP	2.044
Hunt	507		11853-001	Campbell		0.116	WWTP	33.872
Hunt	507		12227-001	Adelphi		0.012	WWTP	3.504
Hunt	507		13220-001	BolesHme.		0.016	WWTP	4.672
Hunt	507		13220-101	BolesHme.		0	WWTP	0
Hunt	507		13310-001	Robins		0.08	WWTP	23.36
Hunt	507		13435-001	Kaden		0.014	WWTP	4.088
Hunt	-	-		Commerce	2.6		WTP	189.8

TABLE C-1

ESTIMATED SLUDGE PRODUCTION

SULPHUR RIVER BASIN PLANNING AREA
(continued)

COUNTY	STR.	SEG.	W.C.O. No	NAME	AVG. Q	MX.MO. Q	WWTP/WTP	SLUDGETPY
Lamar	305		10204-001	Roxton		0.1	WWTP	29.2
Lamar	305		2648-001	Kimb.Clk.	0.192		WWTP	84.096
Lamar	303		11413-101	Wagnon		0	WWTP	0
Lamar	303		11413-001	Wagnon		0.00875	WWTP	2.555
Lamar	305		12305-001	Petty WSC		0.02	WWTP	5.84
Lamar	303		10715-002	Blossom		0.02	WWTP	5.84
Lamar	303		10741-001	DePort		0.183	WWTP	53.436
Lamar	305		0300-001	Bab.&Wil.	0		Other	0
Lamar	202		10479-001	Paris	12		WTP	876
Lamar	202		10479-102	Paris		0	WWTP	0
Lamar	202		10479-002	Paris		7.25	WWTP	2117
Lamar	202		3021-101	Tenaska	0		Other	0
Lamar	202		3021-002	Tenaska	0		Other	0
Lamar	202		3021-001	Tenaska	0.36		Other	0
Lamar	202		11400-001	ParisG&CC		0.0075	WWTP	2.19
Lamar	209		11932-001	N.Lam.ISD		0.0076	WWTP	2.2192
Lamar	202		12162-001	Reno		0.261	WWTP	76.212
Lamar	202		13249-001	CampMaxey		0.007	WWTP	2.044
Lamar	202		1012-001	CampbellS	10		Other	0
Lamar	202		1435-001	Whitener	0.004		Other	0
Morris	403		12411-001	Lone Star		0.44	WWTP	128.48
Morris	404		13326-001	LoneStrWh		0.0065	WWTP	1.898
Morris	404		2938-001	LoneStrLg	0.0032		Other	0
Morris	404		10499-001	Daingrfld		0.471	WWTP	137.532
Morris	404		10239-001	Omaha		0.2	WWTP	58.4
Morris	402		10230-001	Naples		0.13	WWTP	37.96
Morris	404		1464-101	Sw.E.P.Co	0		Other	0
Morris	404		1464-001	Sw.E.P.Co	80		Other	0
Morris	404		1146-001	Barfield	0		Other	0
Morris	404		0348-001	E.Tex.Stl	0.5		WWTP	146
Morris	404		0348-003	E.Tex.Stl	15		Other	0
Morris	404		0348-002	E.Tex.Stl	130		Other	0
Morris	404		0348-005	E.Tex.Stl	0.75		Other	0
Morris	404		0348-004	E.Tex.Stl	100		Other	0
Red River	303		11204-001	T.B.C.ISD		0.0032	WWTP	0.9344
Red River	303		10724-001	Detroit		0.108	WWTP	31.536
Red River	303		10863-001	Annona		0.058	WWTP	16.936
Red River	303		10065-001	Bogata		0.332	WWTP	96.944
Red River	303		10148-001	Clarksvle		0.7	WWTP	204.4

TABLE C-1

ESTIMATED SLUDGE PRODUCTION

SULPHUR RIVER BASIN PLANNING AREA
(continued)

COUNTY	STR.	SEG.	W.C.O. No	NAME	AVG. Q	MX.MO. Q	WWTP/WTP	SLUDGETPY
Red River	303		00945-401	Tex.Util.	0		WWTP	0
Red River	303		00945-301	Tex.Util.	0		Other	0
Red River	303		00945-201	Tex.Util.	0		Other	0
Red River	303		00945-101	Tex.Util.	200		Other	0
Red River	303		00945-001	Tex.Util.	0		Other	0
Red River	202		10733-002	Avery		0.144	WWTP	42.048
Titus	303		10869-001	Talco	0.125		WWTP	36.5
Titus	303		02697-001	Tex.Ut.Mn	0		Other	0
Titus	303		02697-101	Tex.Ut.Mn	0		Other	0
Titus	408		1528-001	Tex.Util.	1.785		Other	0
Titus	408		1528-101	Tex.Util.	0		Other	0
Titus	408		1528-002	Tex.Util.	0		Other	0
Titus	408		1528-401	Tex.Util.	0		Other	0
Titus	408		1528-301	Tex.Util.	0		Other	0
Titus	408		1528-201	Tex.Util.	0		Other	0
Titus	404		0378-001	TreyCorp	0.345		Other	0
Titus	404		13070-001	NETexCmCl	0.02		WWTP	5.84
Titus	408		11750-001	Miller	0.038		WWTP	11.096
Titus	408		12146-001	Winfield	0.084		WWTP	24.528
Titus	404		10575-002	Mt.Plsnt.	0.4		WWTP	116.8
Titus	404		10575-001	Mt.Plsnt.	1.5		WWTP	438
Titus	404		02917-003	Conoco	0		Other	0
Titus	404		3017-001	Pilgrm.Pr	1.6		WWTP	467.2
Titus	404		3019-101	VanDeLaar	0		Other	0
Titus	404		3019-001	VanDeLaar	0		Other	0
Titus	404		2917-002	Conoco	0		Other	0
Titus	404		2917-001	Conoco	0		Other	0
Titus	404		2697-102	Tex.Ut.Mn	0		Other	0
Titus	408		2697-003	Tex.Ut.Mn	0		Other	0
Titus	404		2697-002	Tex.Ut.Mn	0		Other	0
Titus	408		2697-103	Tex.Ut.Mn	0		Other	0
Titus	404		01811-301	Sw.E.P.Co	1.425		Other	0
Titus	404		01811-001	Sw.E.P.Co	0		Other	0
Titus	404		01811-201	Sw.E.P.Co	0		Other	0
Titus	404		01811-101	Sw.E.P.Co	0		Other	0
Titus	-	-		Mt.Plsnt.	1.89		WTP	137.97
					TOTAL EST			15606.42
					BASIN			7514.2

APPENDIX D

TDH PERMIT APPLICATION FORMS/DOCUMENTS

325.901

TEXAS DEPARTMENT OF HEALTH
1100 West 49th Street
Austin, Texas 78756

APPLICATION FOR A PERMIT/REGISTRATION TO OPERATE A MUNICIPAL SOLID WASTE SITE

PART A - GENERAL DATA
SECTION I - ALL SITES

All references to "Regulations" herein refer to the department's "Municipal Solid Waste Management Regulations" dated June 1983. The applicant is encouraged to read the Regulations and should consult with the department to determine if any amendments to the Regulations have been published that would impose additional or different requirements than are specified herein.

This form must be submitted in eleven copies unless otherwise determined by the department for a specific site. Supporting documents shall be submitted in the numbers indicated. Failure to complete all entries and provide all necessary attachments will delay processing the application. Notes 1,2,3, and 4 at the end of Part A should be read before completing Section II or III or proceeding to complete Part B, as applicable. PLEASE TYPE OR PRINT IN BLACK INK.

PERMIT/REGISTRATION APPLICATION NO. _____ (Applicant Leave Blank)

Name of Applicant: _____
(City, County, Individual or Company)

TYPE OF FACILITY (*) _____

Landfill	Processing Site		
_____ Type I	Type V	_____ Experimental Site	Type VI
		_____ Land Application Site	Type VII
_____ Type II	_____ Incinerator	_____ Hazardous Waste Site	Type VIII
_____ Type III	_____ Transfer Station	_____Storage	_____Treatment
_____ Type IV	_____ Trench Burner	_____Disposal	
	_____ Other		

(*) See Subchapter D of the Regulations

Facility is: Existing _____ Proposed _____ (Check One)
(Date Established)

Facility is: _____ feet to the nearest road _____;

_____ miles to nearest airport/airfield _____; _____

feet (miles) to nearest occupied structure.

Name of Applicant _____

Street Address or Location of the Site: (Distance and direction from city, roads, intersections, etc.)

_____

_____

Geographic coordinates: _____

Site is located in: (Fill in appropriate blanks.)

County of _____ City Limits of City of _____

Extraterritorial jurisdiction (ETJ) of City of _____

Nearest town _____
(Applicable only if site is outside the city limits or ETJ of any city)

Application is for amendment or renewal of Permit/Registration No. _____

List any other existing permits or licenses issued by this or any government agency, whether local, state, or federal which pertain to this facility.

_____

_____

_____

SUBMIT ELEVEN COPIES OF AN AREA MAP WITH THE COMPLETED PART "A" WHICH CLEARLY SHOWS:

1. Date and scale of map.
2. Site boundaries.
3. Prevailing wind direction and north arrow.
4. Location of drainage structures, streams, waterways and lakes.
5. Water wells within 500 feet of the site.
   (If there are no wells in the vicinity, please add a note to that effect.)
6. Residences and other significant structures within one (1) mile of the site.
7. Cemeteries within one (1) mile of the site.
8. Designated recreational areas within one (1) mile of the site.
9. Land use (i.e. farm or ranch land, commercial, residential, wooded areas, etc.) within one (1) mile of the site (1/2 mile for processing plants). (Annotate as needed.)

Name of Applicant _____

10. Political boundaries, including municipal extraterritorial jurisdictional limits.

11. Names or designations of main public roadways within one (1) mile of the site. Indicate type of surfacing of roads providing access to the site.

12. Locations and names of all airports within four (4) miles of the site.

13. Drainage and utility easements on or adjacent to the site.

14. Latitudes and longitudes.

For all types of applications other than for Type I and IV sites serving 5,000 or more persons, the map shall be all or a portion of half-scale State Department of Highways and Public Transportation County Map or a United States Geological Survey 7 1/2-Minute Quadrangle Sheet. For applications for Type I and IV sites serving 5,000 or more persons, both types of maps shall be submitted. Equivalent maps may be submitted with any application provided they meet the prior approval of this department.

The facility will serve approximately _____ persons and it is estimated that it will receive an average of approximately _____ tons per day of municipal solid waste. The estimated life of the facility is _____ years. Open burning of solid waste _____ (is) (is not) contemplated.

It is requested that the permit/registration be issued for a site of _____ acres. The name, address, and telephone number of the owner of the site are as follows:

_____

_____

The name, address, and telephone number of the governmental entity or firm responsible for the operation of the facility are as follows:

_____

_____

When the applicant for a permit is not the owner of record of the land or does not have an option to buy the land on which the site is located, there shall be submitted with the application of a statement in the general format provided in Appendix E of the Regulations, signed by the owner of the land acknowledging that he is aware that his land as described in the legal description submitted is to be used for the storage, processing and/or disposal of solid waste and, that the owner recognizes that notwithstanding and without prejudice to any contractual or other obligations between owner and operator, the department may regard owner and operator as jointly and severally responsible to maintain the site after termination of permit.

Name of Applicant _____

NOTE 1: If the applicant is sure of the type classification of the facility and operation for which a permit is desired, he may proceed to complete Part B of the application which pertains to more detailed information and technical data required for evaluation of the particular type of facility and operation. Before proceeding to Part B, the applicant is advised to read Subchapter E of the Regulations for guidance in providing the necessary detail required for each item in Part B. Additionally, the applicant should consult with the department to determine the amount of soil data required for the site. Applicants for Type I and IV sites serving 5,000 or more persons and for Types V and VI will not use Part B, but will provide a technical report in the form of a Site Development Plan as described in Subchapter E of the Regulations.

NOTE 2: If the applicant is not sure of the type classification of the facility and operation for which a permit is desired, only Part A should be completed, signed, and submitted to the department. Upon receipt of Part A, the department will evaluate it and advise the applicant of the appropriate classification for the operation and facility so that unnecessary expenditures for the preparation of Part B can be avoided when a Site Development Plan may be required in lieu of Part B.

NOTE 3: Information required by Section II of this form shall be provided only when the application is for a site registration.

NOTE 4: Information required by Section III of this form shall be provided only when the application is for a hazardous waste permit.

_____
(Signature of Applicant or Authorized Agent)

_____
(Typed or Printed Name and Title)

_____
(Street or P. O. Box)

_____
(City) (State) (Zip Code)

_____
(Area Code) (Telephone)

_____
(Date)

TEXAS DEPARTMENT OF HEALTH
1100 West 49th Street
Austin, Texas 78756

APPLICATION FOR A PERMIT/REGISTRATION TO OPERATE A MUNICIPAL SOLID WASTE SITE

SECTION II

1. For registration of a site to be used for trench burner operations, submit a copy of the Texas Air Control Board permit for the trench burner and all items required by Section I.

2. For registration of a site to be used for land application of sludge, submit the following information and all items required by Section I.

    a. Sewage treatment plants served
    b. Quality of sludge from each source
        (1) Method of stabilization
        (2) Process used to further reduce pathogens
        (3) Recent EP toxicity analysis (hazardous waste determination)
    c. Method of transportation
    d. Land application methods

TEXAS DEPARTMENT OF HEALTH
1100 West 49th Street
Austin, Texas 78756

APPLICATION FOR A PERMIT/REGISTRATION TO OPERATE A MUNICIPAL SOLID WASTE SITE

SECTION III - HAZARDOUS WASTE SITES

This supplementary form shall be submitted with Part A for a hazardous municipal solid waste site permit application.

1. List up to four Standard Industrial Classification (SIC) codes which best reflect the principal products or services provided by the facility (Standard Industrial Classification Manual (District of Columbia: Executive Office of the President - Office of Management and Budget, 1972)). _____

2. Status of owner (Federal)(State)(Private)(Public)(Other, specify). _____

3. Status of operator (Federal)(State)(Private)(Public)(Other, specify). _____

4. Facility located on Indian lands? Yes _____ No _____

5. On the topographic (or other) map submitted, indicate location of each hazardous waste treatment, storage or disposal facility and any drinking water wells and springs within 1/4 mile.

6. Briefly describe the nature of business conducted at the facility (attach supplemental sheet(s) if needed) _____

_____

_____

_____

7. Is this an initial or revised application? Initial _____ Revised _____

8. If an existing facility, submit a scale drawing of the facility (8 1/2" x 11") showing property boundaries, location of all past, present, and future treatment, storage, and disposal areas.

9. If an existing facility, submit photographs of the facility clearly delineating all existing structures; existing treatment, storage, and disposal areas; and sites of future treatment, storage, and disposal areas.

10. Describe the processes (treatment, storage, disposal) (used) (to be used) and the design capacities of each (obtain current process code data from the department).

_____

_____

Name of Applicant _____

11. List the hazardous waste (to be) treated, stored, disposed annually and general description of processes (to be) used for each waste (obtain current listing of hazardous waste from the department). _____

_____

_____

(Attach additional sheets if necessary)

TEXAS DEPARTMENT OF HEALTH
1100 West 49th Street
Austin, Texas 78756

APPLICATION FOR A PERMIT TO OPERATE A MUNICIPAL SOLID WASTE SITE

PART B - TECHNICAL DATA

All references to "Regulations" herein refer to the Department's "Municipal Solid Waste Management Regulations" dated April 1983. The applicant is encouraged to read the Regulations and should consult with the Department to determine if any amendments to the Regulations have been published that would impose additional or different requirements than are specified herein.

Please read notes 1 and 2 at the end of Part A before starting to complete Part B. This form and supporting documents must be submitted in three copies unless otherwise noted. Failure to complete all entries and provide all necessary attachments will delay processing the application. PLEASE TYPE OR PRINT IN BLACK INK.

I. SITE DATA (Complete this section only if Part B is submitted separately from Part A.)

A. Site Location: _____

_____

B. Name of Applicant: _____

Mailing Address: _____ Telephone _____

_____ Zip Code _____

C. Type of Operation:

Type I____/Type II____/Type III____/Type IV____

II. AGENTS FOR THE APPLICANT

Name, address, telephone number and title of persons authorized to act for the applicant. If a registered engineer has been employed to act for the applicant, a letter of appointment, as required by subsection (b)(2) of § 325.74 of this title (relating to Technical Information Required for Landfill Sites Serving 5,000 Persons or More - Site Development Plan) of the Regulations shall be submitted.

_____

_____

_____

Name of Applicant_____

III. LAND USE

A. Describe general land use within a one (1) mile radius of the site: (for example: residential, commercial, industrial, agricultural, etc.)

_____

_____

(Submission of an aerial photograph, though not required, is recommended as it may clarify land use, topography, vegetation, etc., within vicinity of the site.)

B. Will the operation of this solid waste facility conform with existing zoning ordinances? Yes____ No____ If no, give status of any proposed zoning change which will apply to this site.

C. Growth trends of the area within a one (1) mile radius of the site during the preceding five (5) years, if known.

_____

D. Provisions by the applicant for inspection and maintenance of site for a period of five years after closure:

_____

_____

_____

E. Has use of the site after closing been determined? Yes_____ No_____
If yes, specify type of use.

_____

_____

F. List the names of any endangered or threatened species in the site area or vicinity (see subsection (b)(5)(F)(vi) of § 325.74 of this title (relating to Technical Information Required for Landfill Sites Serving 5,000 Persons or More - Site Development Plan)).

_____

_____

Name of Applicant_____

IV. TWO COPIES SHALL BE SUBMITTED (IF NOT ALREADY PROVIDED SEPARATELY WITH PART A) OF A LEGAL DESCRIPTION OF TRACT OR TRACTS OF LAND UPON WHICH THE FACILITY IS LOCATED. The term "Legal Description" means either a metes and bounds description, a plat showing the block and lot number of a recorded subdivision with a reference to the volume and page numbers of the latest conveyance as recorded in the Deed Records of the county in which the tract of land is located, or any other description which would be suitable to effectuate the transfer of title to real property. The legal description should include a copy of the latest conveyance to the owner. Where only a portion of the tract is to be used for the landfill, a metes and bounds description of that portion of land is required.

V. PLANS AND MAPS:

A. Eleven copies shall be submitted of an area map (if not previously submitted separately with Part A) showing all information required by subsection (b)(1) of § 325.72 of this title (relating to General Information Required for All Sites - Permit/Registration Application, Part A).

B. Three copies of a large-scale plan of the site shall be submitted, using as guidance, the design criteria contained in subsection (b)(5) and (6) of § 325.74 of this title (relating to Technical Information Required for Landfill Sites Serving 5,000 Persons or More - Site Development Plan) of the Regulations, and supported by a narrative statement when necessary. The plan should show all of the information required below:

1. Site location. (Show boundaries and dimensions of tract of land on which site is to be developed.)

2. Location of structures, any utility easements, and distance to nearest residences. (Identify pipelines by type and ownership)

3. Streets and roads providing ingress and egress to site.

4. Locations of fences and gates.

5. Provisions to be made for controlling windblown solid waste.

6. Provisions for handling large items.

7. The landfill method proposed, e.g., trench, area fill, or combination.

8. The depth of existing groundwater.

9. The maximum depth of excavation or fill.

10. Manner and sequence of site development as they pertain to disposal activities.

11. The amount of land actually available for landfill.

12. Provisions for wet-weather operations.

Name of Applicant_____

13. Drainage provisions for controlling surface water on or near the site. Show locations of any proposed dikes, berms, or levees to be located along or near streams, rivers, etc.

14. Fire control facilities, e.g., fire hydrants, fire breaks, earth stockpiles, water tanks.

15. If an existing pit is to be used, or if sufficient suitable cover material is not available on site, indicate source and soil characteristics of cover material.

VI. STATEMENT OF APPLICANT

I, _____,

state that I have knowledge of the facts herein set forth and that these facts are true and correct, to the best of my knowledge and belief. I further state that, to the best of my knowledge and belief, the project for which application is made will not in any way violate any law, rule, ordinance, or decree of any duly authorized governmental entity having jurisdiction. I further state that I am the applicant or am authorized to act for the city/county/applicant.

_____
(Signature)

_____
(Title)

_____
(Date)

Name of Applicant _____

VII. NOTARY PUBLIC'S CERTIFICATE

Subscribed and sworn to before me, by the said _____

_____, this _____ day of _____, 19____,

to certify which witness my hand and seal of office.

_____

Notary Public in and for _____
County, Texas.

(seal)

VIII. ENGINEER'S SEAL (NOT REQUIRED UNLESS APPLICANT UTILIZES SERVICES OF AN ENGINEER)

If the application and supporting data for a permit are prepared under the direction of a registered professional engineer authorized to practice in the State of Texas, place the signature and seal of the engineer in the spaces below.

Engineer's Signature _____

_____

Seal

325.903

NOTICE OF APPOINTMENT

Robert Bernstein, M.D.
Commissioner of Health
Texas Department of Health
1100 West 49th Street
Austin, Texas 78756

Dear Doctor Bernstein:

This is to advise you that the officials of _____, Texas, at a regular or called meeting on _____, have duly appointed _____ as consulting and designing engineer for the purpose of submitting engineering reports, planning material, plans and specifications, and for supervision of construction of _____. Mr. _____ is a registered professional engineer in good standing in accordance with State statutes and has had experience in the design and construction of similar facilities at the following locations:

_____

_____

We herewith authorize you to review and comment on such reports, planning material, data, and plans and specifications on this proposed project as he may submit to you.

ATTEST:

_____
Secretary's Signature

_____
Secretary's Typed Name

_____
Official's Signature

_____
Official's Typed Name & Title

_____
Official Mailing Address

DATE: _____

(7/12/83)

(The following is a suggested format for the "Affidavit to the Public" required by 25 TAC § 325.152 (relating to Site Completion and Closure Procedures).

STATE OF TEXAS

AFFIDAVIT TO THE PUBLIC

COUNTY OF _____

Before me, the undersigned authority, on this day personally appeared _____ who, after being by me duly sworn, upon oath states that he is tne record owner of that certain tract or parcel of land lying and being situated in _____ County, Texas, and being more particularly described as follows:

The undersigned further states that from the year _____ to the year _____ there was operated on the aforesaid tract of land a Solid Waste Disposal Site. Specifically, such operation was conducted on that portion of the aforesaid tract described as follows:

Further, the undersigned, _____ was the operator of such Solid Waste Disposal Site.

Notice is hereby provided to any future owner or user of the site to consult with the Texas Department of Health prior to planning or initiating any activity involving the disturbance of the landfill cover or monitoring system.

WITNESS MY/OUR HAND(S) on this the ____ day of _____, 19___.

_____
Owner

_____
Operator

SWORN TO AND SUBSCRIBED before me on this the _____ day of _____, 19 ____.

_____
Notary Public in and for
_____ County, Texas

(5/7/84)

Appendix E -- Form for Property Owner Affidavit.

I, _____(name of owner)_____, the owner of record of the property herein described;

(include legal description of property described in the application)

have all rights and convenants to lease, rent or assign to _____(name of applicant)_____, the property described.

I acknowledge and am aware that _____(name of applicant)_____ plans to file for a permit to operate a solid waste processing, storage and/or a disposal site upon such property.

I acknowledge that the State of Texas may hold the undersigned and _____(name of applicant)_____ either jointly or severally responsible for the operation, maintenance, closure and post-closure care of the site.

I acknowledge my responsibility to file with the county deed records, upon closure of the disposal site, an affidavit to the public advising that the land has been used for disposal of solid waste.

I acknowledge the requirement that the site operator/permittee shall have access to the property described herein for a period of not less than five years, for the purpose of inspection and maintenance as necessary.

WITNESS MY HAND on this the _____ day of _____, 19___.

_____
(Owner)

SWORN TO AND SUBSCRIBED before me on this the _____ day of _____, 19___.

_____
Notary Public in and for
_____ County, Texas

Vacuum Truck Trip Ticket

Name of Transporter _____
(Company Name)

Name of Driver _____ Truck License No. _____
(Print)

Date(s) of Pickup _____ Tank Capacity _____
(gallons)

PART I Generator Information and Certification:

Name of Generator	Pickup Address	Type Waste	Quantity (gallons)	Generator's Signature	Generator's Phone No.

TOTAL: _____

PART II Transporter Certification:

I certify that the information provided above is correct, and that only wastes in PART I of this ticket are contained in this load. I further certify that this load contains no chemical or hazardous waste material. I am aware that falsification of this ticket may result in forfeiture of my transporter's license and/or the privilege of utilizing State permitted disposal facilities.

Truck Driver's Signature _____

PART III Statement of Disposal Site Operator:

Disposal Site Name _____ Permit No. _____

I certify that I have been authorized by the Texas Department of Health to accept the above type wastes and that I have disposed of the above indicated wastes in accordance with the requirements outlined in that authorization.

Site Operator's Name _____
(Print)

_____ / _____
(Signature) (Date)

(TRPTIC)

(7/12/83)

325.907

Texas Department of Health
1100 West 49th Street • Austin, Texas 78756 • (512) 458-7271

NOTIFICATION OF SLUDGE MANAGEMENT ACTIVITIES

This form is to be used by operators of municipal wastewater treatment plants to notify the Texas Department of Health of sludge management activities in accordance with 25 TAC § 325.432 of this title (relating to Notification by Municipal Wastewater Treatment Plant Operators).

TEXAS DEPARTMENT OF HEALTH NOTIFICATION NUMBER _____. (Notifier leave blank)

A. **Treatment Plant Identification:** (Please identify each plant separately)
1. Treatment Plant Name: _____
2. Location: _____
3. TDWR Waste Discharge Permit Number: ☐☐☐☐☐-☐☐☐
4. Authorized Plant Contact:
   a. Name: _____ b. Position: _____
   c. Mailing Address: _____ (Street or P.O. Box) _____ (City) _____ (State) _____ (Zip Code)
   d. Telephone Number: (Area Code) _____ (Number)

B. **Treatment Plant Design and Operation:**
1. Design Capacity of Plant: _____ gallons of wastewater treated per day
2. Average Sludge Generation Rate: _____ dry tons per day
3. Wastewater Treatment Process: _____
4. Sludge Stabilization Process: _____
5. Sludge Dewatering Processes: _____
6. Percent Solids of Sludge Mixture Attained: _____
7. Process to Further Reduce Pathogens (Disinfection): _____

C. **Sludge Analyses:** Please attach copies of the most recent and most complete chemical analyses of plant-generated sludges and any updated, partial analyses of sludges performed subsequent to the last complete chemical analyses. Sampling Dates of Attached Analyses: _____

D. **Sludge Management:**
1. Transporter(s) under contract for removal of plant-generated sludges:
   Name: _____
   Street Address: _____ (Street) _____ (City) _____ (State) _____ (Zip Code)
   Mailing Address: _____ (Street or P.O. Box) _____ (State) _____ (Zip Code)
   Telephone Number: (_____) _____
   TDH Registration Number _____ (to be assigned by TDH)
   (Attach Additional Sheets as needed for Transporter Identification)
2. Sludge Management Practices: (Check and Complete Appropriate Lines Below)
   _____ Land Application for Beneficial Use/ Site Registration Number _____
   _____ Land Disposal to include Land Treatment, Landfilling, and Co-Disposal at a Solid Waste Landfill
   Site Operator: _____ Type of Site: _____
   Permit Number: _____ Site Location: _____
   _____ Marketing or Distribution:
   Brief Description of Controls Utilized for Such Types of Distribution: _____
   _____ Other: (Specify: Include Methods, Site/Facility Locations, Operator, etc.) _____

E. **Responsible Persons:** The above information is true to the best of my knowledge.

(Signature of Facility Operator) (Date) (Typed or Printed Name)

(Title) (Facility Name)

If space provided is not sufficient, attach additional sheets.

Important — Mail *ALL* copies to TDH. The *yellow copy* will be returned with TDH notification number.
White Copy: TDH — *Yellow Copy*: Notifier — *Pink Copy*: Region

NOTE: Copies of this form should be obtained by contacting the Texas Department of Health at (512) 458-7271.

(8/13/84)

REGISTRATION FORM FOR TRANSPORTERS OF SLUDGES AND SIMILAR WASTES

This form is to be used by persons engaged in collecting and/or transporting sludges and similar wastes who are required to register with the Texas Department of Health in accordance with 25 TAC § 325.442 (relating to Registration). Please see reverse of form for instructions and applicability.

(Applicant Leave Blank)

TEXAS DEPARTMENT OF HEALTH REGISTRATION NUMBER: ☐☐☐☐☐☐☐☐

SERVICING UNIT: (Registrant)

Name: _____

Street Address: _____ Mailing Address: _____

_____ _____

_____ _____

City State Zip City State Zip

Telephone Number: (____) ____-____

PARENT COMPANY: (Registrant)

Name: _____

Street Address: _____ Mailing Address: _____

_____ _____

_____ _____

City State Zip City State Zip

Telephone Number: (____) ____-____

ACTIVITY: Check all blocks which identify activities operated.

☐ Storage 01 ☐ Processing 02 ☐ Land Application 04
☐ Land Disposal 03 ☐ Distribution 05

TYPE & APPROXIMATE AMOUNT OF WASTE HANDLED EACH MONTH

Municipal Wastewater Treatment Plant Sludge — _____ Gallons (less than 5% solids)
Municipal Wastewater Treatment Plant Sludge — _____ Tons (greater than 5% solids)

Septic Tank Pumping — _____ Gallons
Grit Trap Waste — _____ Gallons
Grease Trap Waste — _____ Gallons
Tank Bottoms — _____ Gallons
Stripping, Cleaning or Plating Sludge — _____ Gallons
Other (describe and specify units): _____

_____

Are you involved with collecting and transporting hazardous waste? ___Yes ___No

If yes, give EPA identification number: ☐☐☐☐☐☐☐☐☐☐☐☐

GIVE BRIEF DESCRIPTION OF COLLECTION AND/OR TRANSPORTATION ACTIVITY, ORIGIN AND TYPE WASTE INVOLVED AND LOCATION OF ACTIVITY:

LOCAL ORDINANCE: (Provide information, if any, on local ordinances governing your activity.)

REGISTRATION WITH TDWR: Is your activity currently registered with the Texas Department of Water Resources
___Yes ___No

Registration Number, if any: _____

RESPONSIBLE PERSONS:

The above information is true to the best of my knowledge.

Signature: _____ Date: _____

Distribution
White copy TDH
Yellow copy Transporter
Pink copy Region
Gold copy Local Health Department

8/84

NOTE: Copies of this form should be obtained by contacting the Texas Department of Health at (512) 458-7271.

325.909

Bureau of Solid Waste Management
Texas Department of Health
1100 West 49th Street
Austin, Texas 78756-3199
(512) 458-7271

ANNUAL SUMMARY REPORT FORM FOR SLUDGES AND SIMILAR WASTES

This form is to be used by persons who collect and/or transport sludges and similar wastes in accordance with 25 TAC § 325.445 (relating to Disposition Control). Transporters shall submit this report to the bureau no later than March 1st of the year following the end of the calendar year of the reporting period. Please see reverse side of this form for applicability.

TDH REGISTRATION NO. | | | | | | | | |

Reported Year _____

A. TRANSPORTER

Name: _____

Mailing Address: _____
Street or P.O. Box

_____
City State Zip Code

B. TYPE AND AMOUNT OF WASTES DELIVERED TO FACILITIES ANNUALLY

List the facilities which have received the sludges or related wastes from your company (include facility operator's name, address, and telephone number of facility). List the type, unit of measure, and management of waste transported by marking the appropriate code or codes. Use additional sheets if necessary.

Waste Types:

(01) Municipal Wastewater Treatment Plant Sludges
(02) Septic Tank Pumpings
(03) Grit Trap Waste
(04) Grease Trap Waste
(05) Tank Bottoms
(06) Stripping, Cleaning, or Plating Sludges
(07) Water Supply Treatment Plant Sludge
(08) Other (Explain) _____

Unit of Measure Codes: (UNIT)

(01) Dry Tons
(02) Gallons
(03) Cubic Yards
(04) Drums (55 gallon)

Management Codes: (MGMT)

(01) Land Application
(02) Land Treatment
(03) Landfill (Sludge only)
(04) Ocean Disposal
(05) Processing
(06) Storage

TYPE	QUANTITY	UNIT	MGMT	FACILITY OPERATOR, ADDRESS OR PERMIT NO.

(Attach additional sheet if more space is needed.)

C. RESPONSIBLE PERSON

The above information is true to the best of my knowledge.

_____ _____
Signature Date

Remarks:

Distribution: White copy — TDH Yellow copy — retain 6-84

NOTE: Copies of this form should be obtained by contacting the Texas Department of Health at (512) 458-7271.

(8/13/84)

APPENDIX E

COMMUNITY-BASED RECYCLING PROGRAM
RECYCLE MARKET CONTACTS

Governor's Office of Budget and Planning
Request for Proposals

Notice of Invitation

The Energy Management Center (EMC) in the Governor's Office of Budget and Planning invites proposals from local governments, school districts, public and non-profit agencies and institutions of higher education to participate in the Community-Based Recycling Program (CBRP). CBRP will provide up to $20,000 to help local communities establish or expand programs that promote the recycling of glass, metal, paper, plastic or yard wastes. Funds may cover program activities for a maximum of twelve months.

During the program period, and for two years afterward, grantees must submit quarterly reports to the EMC, documenting the types and volumes of materials recycled. Collection and reporting of additional data may be requested by the EMC for program evaluation purposes.

Allowable expenditures include, but are not limited to:

1. Salaries, wages, fringe benefits and local travel (reimbursed at standard state rates) of personnel directly involved in program implementation.
2. Promotional and outreach activities, including the production and distribution of posters, brochures, and public service announcements for radio and television.
3. Purchase or construction of collection boxes and containment fences.
4. Associated costs such as office space, office equipment and supplies, copying, utilities and telephone service.

A minimum 25 percent local match is required. This matching requirement may be cash or in-kind, such as donated office space or staff time.

Restrictions on the Use of Funds

This program is funded with oil overcharge funds appropriated to the Energy Extension Service (EES) by the 71st Texas Legislature. Oil overcharge funds are monetary settlements returned to the states as a result of litigation by the U.S. Department of Energy against certain oil companies for violations of price controls in effect between 1973 and 1981. The courts returned these funds to the states for use in certain energy programs deemed to provide restitution to citizens aggrieved by the overcharges.

Funds are subject to program guidelines of the U.S. Department of Energy's Energy Extension Service (EES) and the U.S. v. Exxon court decision, and may not be used to pay indirect administrative costs. The funds may be used to supplement existing programs, but may not supplant funds already allocated to the programs.

Projects selected will be funded on a cost reimbursement basis. All expenses must be properly documented and permissible under the contract and under federal guidelines, and all are subject to approval by the Governor's office. No advance payments are allowable.

Contact Person

To obtain a copy of the proposal format, or for more information, contact Douglas Key, Energy Management Center, Governor's Office of Budget and Planning, P.O. Box 12428, Austin, Texas 78711, (512) 463-1870.

Due Date

Six copies of the sealed proposals should be sent to:

Ms. Kim Munyon
Energy Management Center
Governor's Office of Budget and Planning
P.O. Box 12428
Austin, Texas 78711

The Energy Management Center is located in room 620 of the Sam Houston State Office Building, 201 East 14th Street, Austin, Texas 78701. Proposals should be sent by certified mail or by courier and must be received no later than 3:00 p.m. on January 5, 1990. Proposals received after that time will not be considered.

Selection Criteria

Proposals must adhere to the format provided by the Energy Management Center. Proposals will be evaluated using the following criteria:

1. Proposer's experience administering community-based programs; (15%)
2. Proposer's plan for marketing and promoting the recycling program; (20%)
3. Degree of community support for the program, evidenced by letters of support from local governments, including school districts, local businesses and business associations, civic and religious organizations, and non-profit environmental groups (other indications of support in addition to such letters also are acceptable); (20%)
4. For new programs, proposer's plan for continuation of the recycling program after the grant has expired; for existing programs, the extent to which the grant will increase the amount of materials recycled after the grant has expired; (15%)
5. Proposer's plan for marketing the materials collected, including identification of potential purchasers, transportation costs, and expected prices for each material to be recycled; (15%) and
6. Reasonableness of the proposed budget and the amount of local match committed. (15%)

Final selection of grantees will be based on the recommendations of a proposal review panel. If two or more proposals are ranked so closely that a decision cannot be made, the review panel may request finalists to provide additional information or to meet with Energy Management Center staff in Austin prior to final selection. However, no respondent will be reimbursed for any costs incurred in the preparation, submission or clarification of a proposal.

Published in the Texas Register on October 13, 1989. (Vol. 14, No. 76)

RECYCLE MARKET CONTACTS

Organization	Market	Telephone
National Solid Waste Management Association	General	(202) 659-4613
Steel Can Recycling Institute	Metal Cans	(800) 876-SCRI
Texas Recycling Association	General	(512) 339-8495
Keep Texas Beautiful	General	(800) 253-2689
Institute of Scrap Recycling Industry	Metals/Plastics	(202) 466-4050
Mid-America Glass Recycling	Glass	(501) 855-4703
Ashbrook-Simon-Hartley	Compost	(713) 449-0322
Cholla Waste Management, Inc.	Compost	(512) 482-0806
Ecological Technologies Inc.	Compost	(800) 634-8370
Gachman Metals Company	Metals	(817) 334-0211