2 Solid Waste Management

PLANNING FOR RESOURCE RECOVERY

The Florida Department of Environmental Protection recognized in the late 1970s that coupled with dealing with a high water table and sandy soils, landfills could not continue to be the sole method of disposal for a state that was growing so rapidly. A Resource Recovery Council was organized in 1979, and was mandated by law to study the feasibility of resource recovery and to recommend those counties which should be required to plan for and engage in resource recovery. Pinellas was one of the 19 counties recommended to comply with a Solid Waste and Resource Recovery Plan of Chapter 403.701, Florida Statutes (F.S.).

Chapter 62-7, F.A.C., sets out the rules for Chapter 403.702, F.S. In order to comply, the Board of County Commissioners and the Pinellas Planning Council (PPC) in 1980 adopted the Solid Waste and Resource Recovery Element of the Pinellas County General Plan, which was countywide in scope. The Solid Waste and Resource Recovery Element also complied with the 1975 Local Government Comprehensive Planning Act (LGCPA) requirements. The County's Solid Waste and Resource Recovery Plan must be updated periodically and this solid waste element fulfilled these requirements. The Solid Waste Element also complied with the planning requirements of the Solid Waste Management Act of 1988; the act which superseded the planning requirements found in Chapter 62-7, F.A.C.

The planning authority for solid waste management and resource recovery in Pinellas County is obtained through the following legal statutes and administrative codes.

Florida Statute

Chapter 163, "Intergovernmental Programs", Part II Growth Policy; County and Municipal Planning; Land Development Regulation, 163.3164; Local Government Comprehensive Planning and Land Development Regulation Act"

Chapter 403.702, Part IV, "Resource Recovery and Management"

Florida Administrative Code

Chapter 9J-5, "Minimum Criteria for Review of Local Government Comprehensive Plans and Plan Amendments, Evaluation and Appraisal Reports, Land Development Regulations, and Determination of Compliance"

Chapter 62, "Department of Environmental Protection":

Chapter 62-7, "Resource Recovery and Management"

Chapter 62-701, "Solid Waste Management Facilities"

Chapter 62-702, “Solid Waste Combustor Ash Management”

Chapter 62-709, “Criteria for the Protection and Use of Compost Made from Solid Waste”

Chapter 62-716, “Solid Waste Grant Program” This Chapter was amended to effectively eliminate recycling and educational grants, and waste tire grants to large counties.

Selection of Contractor

In response to the request for proposal issued in 1976 by the Board of County Commissioners to qualified firms, ten proposals from six companies were received. These offered different technologies, as well as both public and private financing. Reviews and evaluations of each proposal were made from the economic, technological, and environmental standpoints. In 1978, the Board of County Commissioners selected Universal Oil Products (UOP) as the contractor to design, construct, and manage the Pinellas County-owned resource recovery system and authorized contract negotiations to begin. UOP was a subsidiary of Signal Environmental Systems, Inc. In 1980, 18 months after negotiations began a 20-year management agreement was signed with UOP. In 1983, Signal RESCO acquired UOP and in the fall of 1987, the company's name was changed to Wheelabrator Environmental Systems. The contract with Wheelabrator Environmental Systems was extended four years in 2000, and terminates in May 2007. The County selected Veolia Pinellas, Inc. as the new contractor in January 2007. The new contract will be effective for 17 years and is coterminous with the agreement with Progress Energy Florida, Inc. to purchase the power generated by the Waste-to-Energy Plant until 2024.

As an incentive to operate and manage the facility in an efficient manner, the contractor is paid a per ton operator's fee. This amount is adjusted annually by the Consumer Price Index. Revenues from the sale of electricity and recovered materials are also shared with the contractor as an incentive for improved performance. Performance standards also must be met by both parties. The contractor must be able to process 950,000 tons per year, or about 17,885 tons per week, and to guarantee 85 percent availability. In other words, the plant will be down no more than 15 percent of the year, including scheduled and non-scheduled maintenance or a penalty is paid. The County's guarantee is that a minimum of 950,000 tons per year will be delivered to the waste-to-energy plant. If the County does not deliver the guaranteed tonnage, they pay a shortfall.

Prior to 2024 when the Power Purchase Agreement with Progress Energy expires, the County will have to negotiate new contracts for the Waste-to Energy Plant operation and for the purchase of power generated by the plant.

In 1980, $160,000,000 in tax exempt industrial revenue bonds were authorized by the Board of County Commissioners. The Board took several steps to ensure that the bonds had an "A" rating and, therefore, a better interest rate. The Board pledged to increase disposal or tipping fees in sufficient amounts to ensure the bond holders that their payments would be protected; and second, the Board would back the County-owned resource recovery system revenues by a covenant of non-ad valorem taxes.

Energy Agreements

Also, in 1980, two agreements were signed with (then) Florida Power Corporation (FPC), now, Progress Energy Florida, Inc. Under the terms of the Electrical Power Purchase Agreement, Progress Energy Florida, Inc. would "take or pay" for all the excess electricity which the plant produces. Electrical energy is generated by using steam produced by the burning process which then powers the turbines. Payment is based on the incremental value of the fuel, as set by the replacement price of such fuel if it had been produced by Progress Energy Florida, Inc. or the purchase price if it had been bought from another company. The payment can fluctuate hourly depending on the price of fuel. This agreement also provides for capacity payments to the County based on avoided costs to Progress Energy for constructing additional capacity. The horizon for the agreements to purchase the electricity generated by the County's Waste-to-Energy Plant is 2024. Prior to 2024, the County and Progress Energy Florida, Inc. will renegotiate the sale of the electricity.

The National Energy Act of 1978 created the Public Utilities Regulatory Policies Act (PURPA). This Act requires utility companies to purchase energy generated by a small power producer that produces less than 80 megawatts and generates energy from biomass, solid waste, or other renewable resources. The Federal Energy Regulatory Commission (FERC) rule on the rates utilities pay and compiles lists of utilities that are required to purchase co-generated electricity. Florida adopted legislation regarding PURPA (Chapter 25-17, F.A.C.) and regulates rates through the Public Service Commission. Pinellas County's contract with Progress Energy Florida, Inc. precedes FERC and its associated regulations.

Expansion

The Pinellas County waste-to-energy plant's boilers were placed in commercial operation on May 3, 1983. Later that same year, a second bond issue for $83,375,000 was authorized by the Board of County Commissioners to expand the plant. The expansion added a third boiler and a second stack and second electric turbine generator, which increased the capacity from 2,100 to 3,150 tons per day. The third boiler and second stack were tested and accepted in September 1986. The first steam turbine generator produces 50 megawatts and the second one, 25 megawatts of electricity. The rated capacity of the total facility is 75 megawatts. Approximately 15 percent of the energy is used internally, and the remainder is sold to Progress Energy Florida, Inc. The milestones in the Pinellas County Resource Recovery Program are listed in Table 2.

Enterprise System

The waste-to-energy facility is an enterprise system, therefore no tax support is involved. The approved operating budget for fiscal year 2005-2006 was $50,617,920. Sources of revenue include tipping fees, electricity sold, capacity payments, materials recovered, and interest income. In Table 1 are the actual percentages for the operations revenue for the 2004-2005 and 2005-2006 fiscal years. The tipping fees charged at the plant are based upon weight and this is the main source of revenue as indicated in Table 1 below, although over time the capacity payment will increase and are expected to eventually equal or exceed tipping fee revenue.

TABLE 1
REVENUE PROJECTIONS

Revenue Source	FY 2005-2006	FY 2006-2007
User (Tipping) Fees	49%	50%
Electrical Capacity	32%	32%
Electrical Sales	14%	13%
Recovered Materials	1%	1%
Investment Income	4%	4%

Source: Pinellas County Utilities, Solid Waste Operations, 2007

Shared Facilities and Proportional Capacity

Rule 9J-5.011(1)(c), FAC requires for shared facilities that "each local government shall indicate the proportional capacity of the system allocated to serve its jurisdiction." While the Pinellas County waste-to-energy system is a shared facility, it is not necessary to break out the proportional capacity for each of the 24 municipalities and the unincorporated areas because of existing interlocal agreements between Pinellas County and each of the 24 local municipalities to dispose of all municipal refuse at the waste-to-energy plant. Proportional capacity could be broken out for each municipality, but it would only be an exercise in statistics. Assigning a proportional capacity to each of its 24 municipalities would not change the fact that the County is ultimately responsible for the disposal of all municipal solid waste.

The amount of solid waste generated will be inventoried in each of the solid waste elements prepared by the jurisdictions in Pinellas County. The weight of each refuse truck is catalogued in a computer and each jurisdiction is billed according to that weight if they have their own refuse trucks. If they contract, they are billed by a private collection firm. The proportional use of the plant by each jurisdiction will be in each individual plan, except for the unincorporated areas. Because they are serviced by private collection vehicles, it would be difficult to identify the refuse trucks that pick up solely in the unincorporated areas of the County. It would not be accurate to subtract the total yearly tonnage from that of the cities, because there are many commercial accounts that also use the waste-to-energy facility.

TABLE 2
MILESTONES IN THE PINELLAS COUNTY RESOURCES RECOVERY

1975	Special Act, "The Pinellas County Solid Waste Disposal and Resource Recovery Act" (Chapter 75-487, Laws of Florida) approved by Legislature.
1976	Project feasibility report completed by consultants and site was selected.
1977	Request for Qualifications issued to industry. Ten proposals from 6 companies were received.
1978	Proposal evaluation report released.
1979	Board of County Commissioners selected UOP, Inc., as the top-ranked firm and contract negotiations commenced. The County brought suit in Circuit Court to test validity of the Special Act. Federal Prevention of Significant Deterioration (PSD) permit approved. Electrical Power Plant Siting certification received from the State.
1980	Electrical sales agreement with Florida Power Corporation. Final construction and management agreements signed with UOP, Inc. First bond issue authorized in June ($160 million) and construction commenced in August. Solid Waste and Resource Recovery Element adopted August 20, 1980 by the Board of County Commissioners.
1983	Commercial operations began in May. Second bond issue authorized ($83.375 million) and construction and management agreements for plant extension negotiated in December. Toytown Landfill closed.
1984	Electrical Power Plant Siting certification and PSD permit received for Unit 3.
1984-86	Construction, start-up and testing of Unit 3. Addition of third boiler completed in September 1986
1987	Special emissions testing program for dioxins and furans in February. Health Risk Assessment issued in July.
1988	Feasibility study for north County resource recovery facility begun.
1989	Entered into an amended and restated Electrical Power Purchase Agreement with Florida Power Corporation to commit and make available sixty megawatts of Facility Capacity beginning January 1, 1995.
1990	Issued the 1990A and 1990B Resource Recovery Refunding Revenue Bonds in the amounts of $129.360 million and $33.490 million, respectively.
1993	Exercised option to change the committed capacity to Florida Power Corporation. Set the committed capacity at 55.75 megawatts.
1994	Committed capacity to Florida Power Corporation adjusted to 54.75 megawatts (per year), based on a 12-month rolling average capacity.
1996	Issued $83.250 million of Resource Recovery Revenue Bonds, Series 1996, to provide funds to finance a portion of the cost to retrofit the Resource Recovery Facility to meet the new federal and state pollution control requirements. Cash defeased $31.940 million of the 1990A Resource Recovery Refunding Revenue Bonds.
2000	Air Pollution Control Retrofit completed and tested to verify compliance with new federal and state pollution control requirements.
2004	Capital Replacement Project completed to improve operational efficiency and extend the anticipated life of the facility (included boiler tube replacement, cooling tower modifications, tipping floor expansion, and upgrades to plant automated control systems).
2006	Defeased last remaining Resource Recovery Revenue Bond in October
2007	New 17-year operating contract awarded Veolia ES Pinellas, Inc., including approximately $90 million in capital projects in January.

Source: Pinellas County Utilities, Solid Waste Operations, 2007

SOLID WASTE COLLECTION SYSTEMS

The Board of County Commissioners, through interlocal agreements, is responsible for the disposal of municipal solid waste in Pinellas County, but the collection of solid waste is the responsibility of the individual municipalities. In most areas of unincorporated Pinellas County, which will be discussed later, residents make their own arrangements for solid waste collection with private contractors. However, the Lealman area located in unincorporated County approved a Municipal Services Benefit Unit (MSBU) to pay for franchise collection for uniform trash collection services beginning in January 2007. Other areas in the unincorporated County may request formation of a similar MSBU for franchise trash collection based on the success of this initial program.

Collection Arrangements

Two types of solid waste collection arrangements are found in Pinellas County: municipal and private collection. Ten municipalities operate municipal collection services. Franchise agreements with private collection companies are used by fourteen other municipalities (see Table 3). Waste Services and Waste Management of Pinellas are the two largest private collection services operating in the County. A combination of municipal and private collection can also be found in some municipalities, with separate service for residential, commercial and/or recycling collection.

Municipal residential collection countywide is typically twice a week. Some cities with municipal garbage collection also provide separate collection services for curbside recycling, yard waste (grass clippings and tree trimmings), and bulky waste (large items like old furniture). Other cities provide drop off centers for these other services as an alternative (and sometimes in addition) to curbside collection. These services are discussed in more detail in the Waste Reduction and Recycling section. Table 11 and Figure 11 provide summaries of services provided by each municipality.

Commercial accounts are also handled differently by each municipality. They include facilities like factories, schools, government offices, shopping centers, malls, hospitals and businesses. Some cities allow certain commercial entities to contract for private collection. Each municipality collects, either by municipal or franchised service, the refuse from the schools within its boundaries, while schools in the unincorporated areas of the County have a contract for private collection. The same is true of government buildings and parks. Those within city limits are serviced by municipal collection and the remainder is under contract for private collection.

TABLE 3
REFUSE COLLECTION SYSTEMS WITHIN PINELLAS COUNTY

Jurisdiction	Municipal	Private Contractor
Belleair	X	
Belleair Beach		X
Belleair Bluffs		X
Belleair Shore		X
Clearwater	X*	
Dunedin	X	
Gulfport	X	
Indian Rocks Beach	X	
Indian Shores		X
Kenneth City		X
Largo	X	
Madeira Beach	X	
North Redington Beach		X
Oldsmar		X
Pinellas Park		X
Redington Beach		X
Redington Shores		X
Safety Harbor		X
St. Petersburg	X*	
St. Pete Beach		X
Seminole		X
South Pasadena		X
Tarpon Springs		X
Treasure Island**	X	X
Unincorporated Area***		X

Source: Pinellas County Utilities, Solid Waste Operations, 2007
* Automated residential refuse collection system
** Treasure Island collection through a municipal garbage collection contract
*** Service provided by various private companies. Some areas do not have franchise agreements with private companies

Unincorporated Area

The areas of the County that are under the jurisdiction of the Board of County Commissioners must independently arrange for solid waste collection. It is important to note that the unincorporated area is not regulated and franchise agreements have not been instituted up to this point, except for the recently established Lealman MSBU where franchise collection began in January 2007. The existing private collection system seems to be functioning adequately through the free enterprise system. However, given the competitive rate being provided in the Lealman MSBU and increasing rates being charged by the private haulers operating in the unincorporated areas, it is anticipated that further requests for the County to expand franchise collection may be received in the future. Enclaves, unincorporated areas surrounded by a municipality, are also serviced by private collection. Cities may provide water and sewer service to enclaves, and some provide solid waste collection.

There are 27 public schools located in the unincorporated areas of Pinellas County. The Pinellas County School Board has an annual bid process for these schools with a second year option renewal. In addition, Pinellas County schools are participating in a paper recycling program provided by the Pinellas Partners in Recycling. Additional details are provided in the Waste Reduction and Recycling section.

County-owned facilities and parks that are within the unincorporated area are on a three-year contract for private collection which can be extended for two additional 12-month periods. The other County-owned facilities that are serviced by private collection are the St. Petersburg-Clearwater International Airport, the Criminal Courts facility on 49th Street, three wastewater treatment plants, the Cooperative Extension Service building, and more than 20 other buildings.

The County parks that are located in unincorporated areas are:

Boca Ciega Millennium Park
John Chesnut, Sr. Park (formerly Brooker Creek)
Lake Seminole Park (Park Boulevard)
Ridgecrest Park (Ulmerton)
Wall Springs Park
Walsingham Park
War Veterans Memorial Park

The exception in the unincorporated County park system where solid waste collection is concerned is Fort DeSoto Park, located south of St. Petersburg. Here, the only County-owned refuse truck is operated for the collection of garbage at the park and campground areas. It delivers the refuse directly to the County's Solid Waste disposal facility.

Transfer Stations

Currently, only one city within Pinellas County owns and operates a refuse transfer stations. The City of Clearwater operates a compactor-type station located on the east side of the City of Clearwater, east of Old Coachman Road and west of U.S. 19. The station began operations in 1981 and is designed to receive between 400 to 500 tons of solid waste per day. Scales are provided to weigh all incoming vehicles.

Transfer stations can reduce haul costs; thus, crews in smaller vehicles can be back on a route more quickly. Refuse vehicles come off their route and empty into semi-trailers which compact the contents. One trailer holds about three loads of compacted trash from collection vehicles.

Because of the considerable distance between some cities and the County solid waste disposal facility, adding transfer stations was recommended by the 1980 Solid Waste and Resource Recovery Element. The County purchase of the Clearwater and Gulfport transfer stations and the construction of additional ones were studied. However, the City of Gulfport transfer station became a moot point when the City razed the transfer station and began direct solid waste hauling to the Waste-to-Energy Plant. Transfer stations are expensive to establish so a careful cost-benefit analysis was undertaken. While the Clearwater station does operate

economically, having the County take over its operation and establish additional transfer stations was not economical and would have increased the tipping fee at the waste-to-energy facility. It is difficult to justify the expenditures of funds for a transfer station if cost savings are not readily apparent. Cost savings may not occur until several years after implementation. Growth within the northern areas of Pinellas County may improve the cost-benefit, making transfer stations an attractive alternative. The construction and use of such a transfer station is being evaluated at the request of the Solid Waste Technical Management Committee.

Charitable Organizations

The Technical Management Committee has approved certain criteria under which charitable organizations may be granted a waiver of disposal fees. In 2006 there were 13 charitable organizations that were approved for no charge solid waste disposal, with a combined waiver allowance of just over 9,000 tons. Disposal costs for these organizations are subsidized by all other rate payers. A list of eligible organizations is annually reviewed by the Solid Waste Technical Management Committee. The actual list of organizations who receive this service and the amount (tonnage) of their waiver may be amended. The yearly exemption that may be granted by the Technical Management Committee is based on established criteria including registration of the organization with the State of Florida in accordance with Chapter 212.08 and the federal government in accordance with Internal Revenue Code Section 501(C)(3); existence and documented results of their ongoing recycling program, and a commitment with documentation that no waste from outside of Pinellas County will be disposed at the resource recovery facility.

The re-approval of charitable organizations to receive a waiver on tipping fee charges for a subsequent year depends on their recycling efficiency. They are required to submit a report listing total tonnage taken in and recycled tonnage. Recycling efficiency measures the amount of material recycled, i.e., for every five tons taken in, four were recycled.

MUNICIPAL SOLID WASTE DISPOSAL FACILITY

Pinellas County owns and operates a 705-acre permitted solid waste disposal facility, located at 3095 114th Avenue North, St. Petersburg, which includes the waste-to-energy plant and sanitary landfill, as well as yard waste processing and a household electronics and chemical collection center (HEC_3). The majority of municipal solid waste disposed in Pinellas County is processed by the waste-to-energy plant. The sanitary landfill is used for waste-to-energy ash, non-combustible waste, oversized items, and as a backup for times when incoming waste exceeds the waste-to-energy plant's capacity or when the plant is down for maintenance. Additional solid waste disposal capacity is provided by private construction and demolition (C&D) debris landfills within and outside of Pinellas County's boundaries.

Waste-to-Energy Plant

The Pinellas County waste-to-energy plant is a technological state-of-the-art facility. The Pinellas County facility is a mass-burn plant with waterwall furnaces; one of the three basic types of direct combustion systems by which solid waste is burned to generate steam for use as an energy source. The mass burn method consists of the incineration of unprocessed solid waste at about 1,800 degrees F. on a grate system in a waterwall furnace. Boilers recover the

heat of combustion to generate steam. The steam is used to drive turbines and generate electricity.

The use of mass burn waterwall furnace incineration for steam generation has been used successfully in Europe for almost 60 years and in the United States since 1970. As of 2006, there are 12 waste-to-energy facilities in operation in the State of Florida. The large capacity mass burn technology is the most proven of energy recovery systems. The large capacity plants are most suitable for highly urbanized areas where there is a high volume, steady generation of waste. The solid waste is used as boiler fuel to produce super-heated steam to generate electric power for sale to a utility company. The combustion residue is usually processed to recover ferrous metals, aluminum, and heavy non-ferrous metals which are sold and recycled and ash which is used onsite.

While incineration is an option for reducing the refuse to be disposed, it is a very sophisticated engineering system and a complicated planning process.

Overview of Pinellas County Waste-to-Energy Facility

The Pinellas County waste-to-energy facility occupies about 15 acres within the Bridgeway Acres Landfill site. The site layout is shown in Figure 8. Its location is at 110th Avenue North and 28th Street North.

The plant contains the following features:

Three 1,050-ton per day Martin steam-generating units for burning unsegregated municipal solid waste as received;

Fully-enclosed tipping floor and storage pit for receiving the solid waste, and overhead cranes for charging combustion units;

Materials recovery and loading equipment;
One 50- and one 25-megawatt turbine generator, auxiliaries, and switchgear;

Water-cooled steam condensing system including a bypass condensor to permit solid waste disposal operations during the infrequent periods when the turbine generators are not available;

Access roads, ramps, and mobile equipment;

Buildings of modern architectural design which meet all current building codes and requirements; and

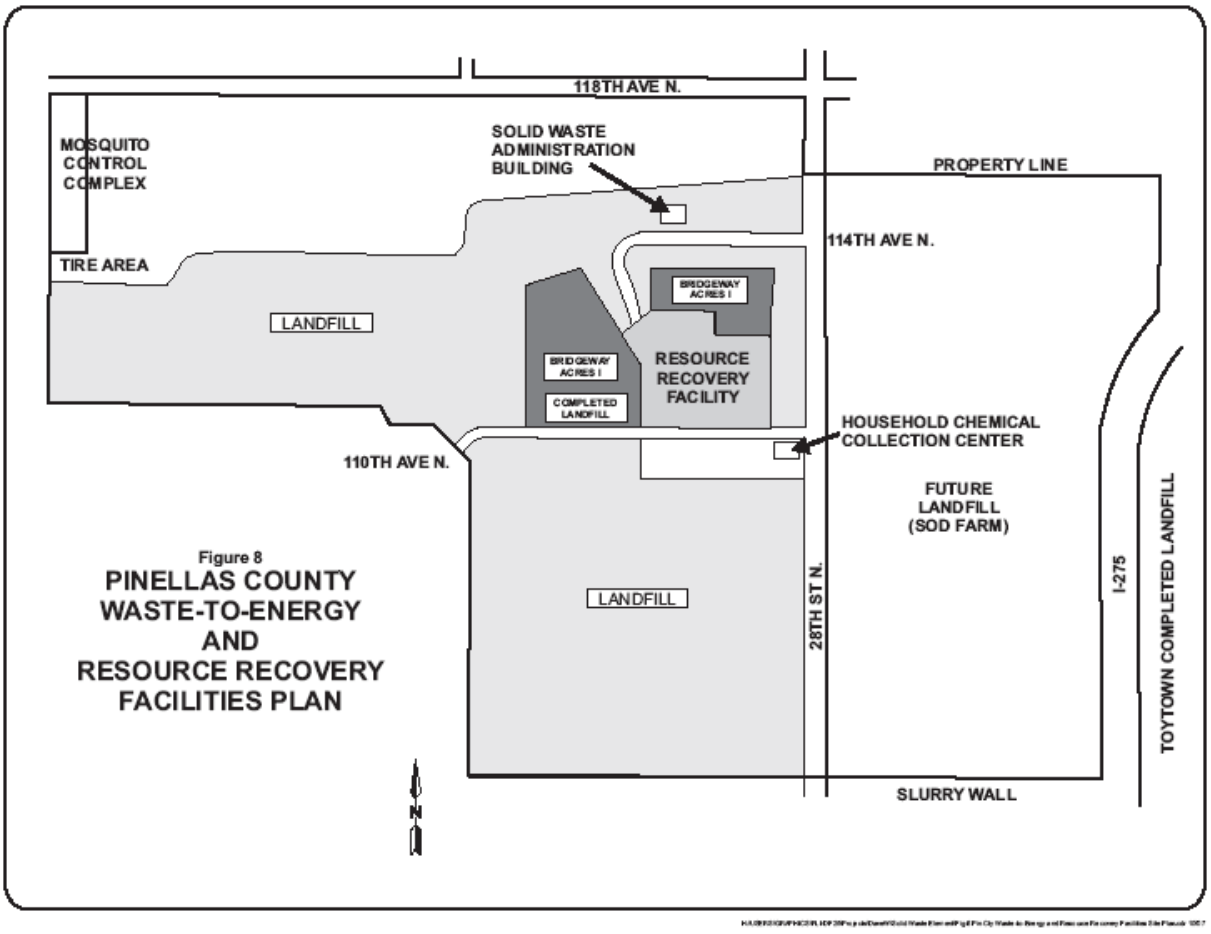
Air pollution control equipment meeting all current applicable regulations.

Vehicle Route

Collection and transfer vehicles enter the solid waste disposal facility from 28th Street North at 114th Avenue North. There is a mini-refuse area provided where any private citizen, or vehicles which must be unloaded manually, can place solid waste in roll-off containers which, in turn, are hauled over the scales and into the tipping floor. The mini-refuse area was constructed to eliminate potential hazards resulting from having private automobiles maneuvering in the same area as the large vehicles using the facility. Four electronic truck scales are provided to weigh incoming refuse vehicles. A computer account for each regular customer is stored in the scale-house computer. The account has a truck number, jurisdiction or other source, tare weight, and other pertinent information. The empty weight of the vehicle is in the database and is tied to the truck's identification number. The trucks are reweighed on an outbound scale at least every six months.

Upon arrival at the scale, scale operators type the vehicle number into the computer and in a few seconds, the truck is weighed and a ticket is printed showing the truck number, source, time, gross tare and net weight, date and time. This ticket is given to the driver. Simultaneously, the same information is recorded in the computer. Between 800 and 1,000 trucks per day are weighed at the facility. Bills are done internally and sent out on a monthly basis. Each private refuse hauler may establish an escrow account which consists of two months' worth of charges. Another alternative is to present a letter with a line of credit equal to two months of billing. A history of tipping fees since the plant opened in 1983 is found in Table 4. The scale-house operators direct the incoming load of refuse to the waste-to-energy facility, mini-refuse area, landfill or yard-waste processing area. The scale-house operates from 6 a.m. - 6 p.m. Monday through Friday and 7 a.m. - 5 p.m. on Saturday, including holidays, with the exception of Thanksgiving, Christmas, and New Years Day. The facility is closed on Sunday.

FIGURE 8:
FACILITY SITE PLAN



The Combustion Process

Figure 9 is a cross-section view of the Pinellas County waste-to-energy system. Trucks are directed to the enclosed receiving area where they discharge the solid waste at one of 12 tipping bays into the refuse fuel pit. The capacity of the storage pit is approximately 7,000 tons of solid waste. This is adequate space to store two days of incoming refuse. Additional storage is available through stacking waste.

Three 8-cubic yard, "orange peel-type" overhead cranes lift the material from the refuse fuel pit to the feed hopper of the boiler. The crane operator can mix the solid waste to provide the best possible fuel mixture in the boiler. Non-processible material (5 to 10 percent of the waste stream) that is inadvertently delivered to the pit will be removed by the crane operator at this stage and stored in metal dumpsters for later transfer to the landfill or the metals recovery contractor.

The feed hopper opens into a feed chute which maintains a uniform refuse feed rate in direct proportion to steam generation requirements. The solid waste is automatically fed onto the combustion grates. The grates operate with reverse reciprocating action. The grate area is

inclined at a 26-degree angle producing a downward movement of the refuse during combustion. At the same time, the grates are moving upward providing a tumbling action which results in a uniform burnout of better than 95 percent of all combustible matter.

Undergrate compartments control the distribution of high pressure combustion air up through the grates providing thorough burnout of the refuse. An ash discharge is located at the end of and below the grate area. As the residue reaches the end of the grate, it is dumped into the ash discharger where it is cooled with nonpotable water. The residue, after cooling, is in almost dry condition with moisture content less than 20 percent. The residue is hydraulically discharged on a conveyor belt where it is transported to the materials separation area.

The combustion chamber temperature is about 1,800 degrees F. The hot gases rise and travel through the waterwall boilers. The furnace boilers are constructed of tubular walls filled with water which forms steam when heated by the combustion gases. Portions of the waterwalls are covered with refractory material to prevent the corrosion of the boiler tubular walls. The burning process takes about 45 minutes. The steam generated is collected, piped and used to drive the turbine generators for energy recovery. The combustion gases, after passing through the boiler, are cooled to approximately 450 degrees F.; they then pass into the spray dry absorbers (SDA), shown as scrubbers on the diagram. Chemicals are injected into the gas stream to enhance acid gas and particulate removal. The gas then flows through a series of fabric filters to remove any remaining particulate matter, before being released through the stack. The combination of the SDA and fabric filters allows the waste to energy plant to remove better than 99% of all particulate matter and maintain emissions well below regulatory and permit requirements.

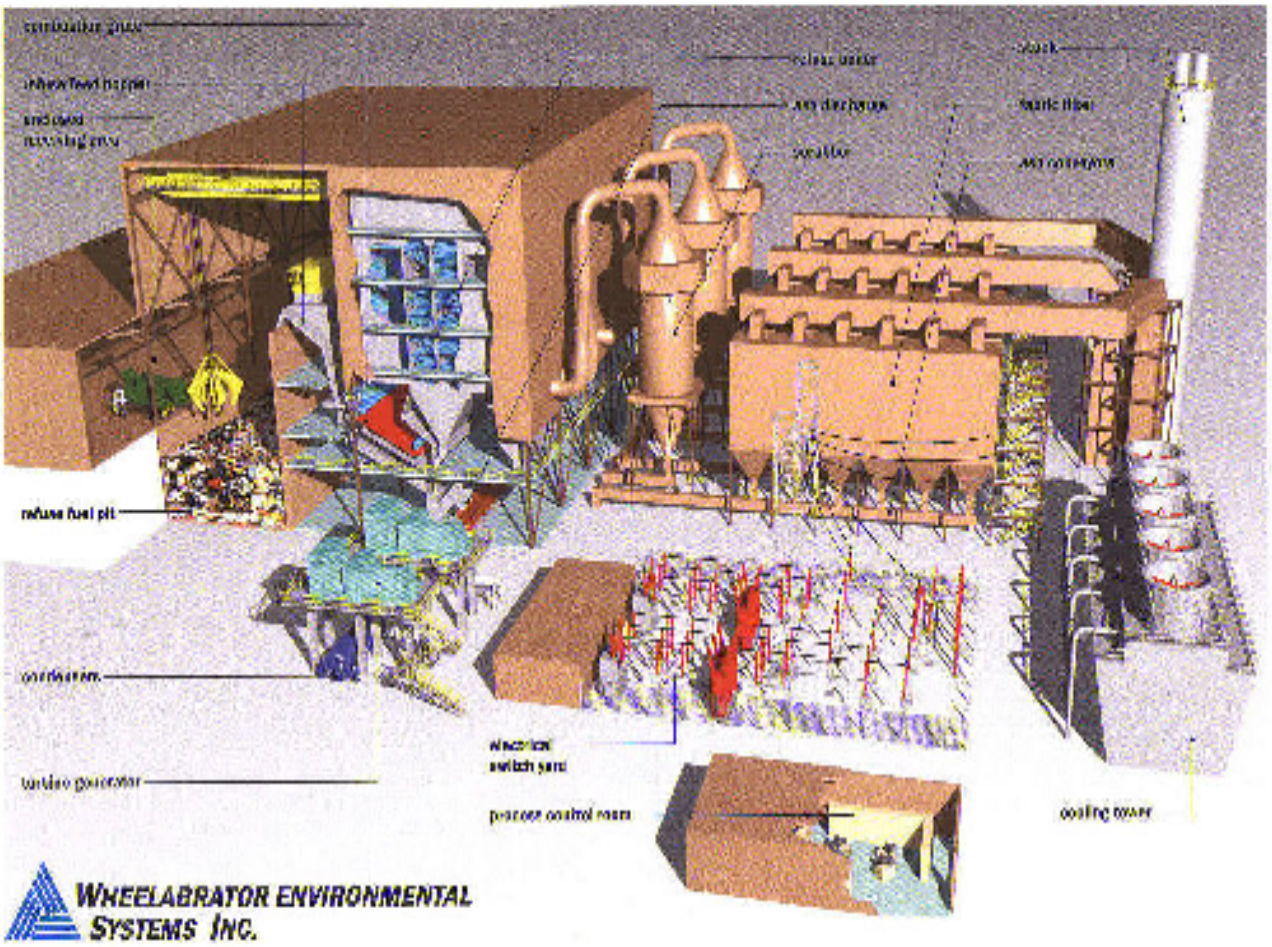
TABLE 4
RATES AND CHARGES FOR USERS OF PINELLAS COUNTY SOLID WASTE FACILITIES ($/TON)

FACILITY USER	FISCAL YEAR							
	1983	1984	1985	1986	1987	1988	1990-2004	2005-2007
Class I (Garbage)	19.00	24.00	28.50	37.50	37.50	37.50	37.50	37.50
Class III (Trash)	12.50	15.00	17.50	20.00	25.00	37.50	37.50	37.50
Construction and Demolition Debris	5.00	5.00	10.00	15.00	37.50	37.50	37.50	37.50
Tires	20.00	20.00	25.00	40.00	40.00	40.00	37.50	37.50
Grease	12.00	20.00	25.00	35.00	35.00	37.50	37.50	Not accepted
Yard Waste							15.00	37.50
Automobiles (each per load)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00
Trucks (each per load)							Varied from $7-$15 based on vehicle size	10.00
Approved Charitable Organizations	NO CHARGE							

Source: Pinellas County Utilities, Solid Waste Operations, 2007

[NOTE: disposal rates for 2006 and 2007 remain same as 2005]

FIGURE 9: FACILITY SECTION VIEW
Waste-to-Energy Plant Diagrams



Energy Recovery

The generation of energy is the most significant resource recovery of the Pinellas County waste-to-energy system. The steam, which is produced at 600 pounds per square inch and 750 degrees F., drives the turbine generators which will generate electricity to be sold to Progress Energy Florida, Inc. via a 230 kilovolt tie-line in the distribution grid. Approximately 430 kilowatts are produced per ton of solid waste processed.

In 2005, the waste-to-energy facility generated 509,769 megawatts. Energy production and revenues received are listed in Table 5. The table indicates a drop in electrical production in 1994 due to downtime for turbine maintenance that is necessary every five years. The total residential, commercial and industrial megawatt hours consumed within Pinellas County in 1995 according to Progress Energy Florida, Inc. and the Tampa Electric Company were

10,187,363 (Kennedy, FPC 08/96; Mahoney, TECO, 10/97). Therefore, the megawatts generated by the waste-to-energy system amounted to about 3.3 percent of the electrical power consumed by Pinellas County.

Materials Recovery

The materials that are recovered in the Pinellas County system consist of ferrous metals, aluminum, heavy non-ferrous metals, aggregate material, white goods and combustion residue. Materials recovery primarily occurs after combustion.

The residue from the burning process falls into a water-quenched ash removal system from which the cooled ash is transferred to a vibratory conveyor serving all three combustion trains. The ash is then transported across a grizzly scalper designed to separate out materials in excess of ten inches. The remaining materials are then transferred with belt conveyors to a materials recovery system which further screens and separates ferrous and non-ferrous metals. The remaining non-metallic materials are then further screened and sized to produce an aggregate for use as a soil substitute for landfill cover. During 2005, approximately 33,000 tons of metal were recovered and sold. One-third of this metal was recovered from out-of-county ash processed at our facility. The remaining metal (approximately 21,000 tons) was about three percent of the County's total recycled tonnage.

Operation Management

The Pinellas County waste-to-energy facility had a 20-year contract to be operated, maintained and managed by Wheelabrator of Pinellas, Inc. (formerly Pinellas RESCO or Signal RESCO) under the administration of the Pinellas County Department of Solid Waste Operations. In 2000, the contract was extended until 2007. A new 17-year contract was awarded in January 2007. The following are the major operations management factors:

1. The waste-to-energy facility, including materials recovery and power generation functions, is operated, maintained and managed by a contract operator. The facility is operated 24 hours a day, seven days a week.

2. Trucks entering the resource recovery facility first pass through the County's scalehouse where all weighing and record-keeping is done by County personnel to provide a basis for billing.

3. At the time of weighing, the Scalehouse Services Specialist determines the type of waste carried by each truck, and directs it to the proper location. Depending on the type of refuse and truck, trucks are directed to:
    a. landfill (Class I or Class III)
    b. waste-to-energy facility
    c. Citizens Hand Unload disposal area
    d. yard waste area

TABLE 5
ENERGY PRODUCTION AND REVENUES RECEIVED

YEAR	KILOWATTS HOURS GENERATED	ELECTRIC REVENUE RECEIVED*	ANNUAL AVERAGE PRICE PER KILOWATT HOUR (¢)
1983**	204,966,000	$8,488,855	4.14
1984	240,737,000	$9,051,592	3.76
1985	288,679,000	$10,534,224	3.65
1986	303,990,000	$7,131,873	2.35
1987	400,843,000	$10,207,979	2.55
1988	391,741,000	$8,762,145	2.24
1989	378,426,000	$11,073,625	2.93
1990	380,871,000	$11,819,886	3.10
1991	321,022,000	$9,407,952	2.93
1992	358,532,000	$10,641,669	2.97
1993	368,378,000	$9,231,829	2.51
1994	341,658,000	$7,375,788	2.16
1995	336,084,000	$6,268,931	1.87
1996	337,288,000	$6,578,092	1.95
1997	309,230,000	$5,483,494	1.77
1998	331,492,000	$5,556,402	1.68
1999	342,683,000	$5,647,781	1.65
2000	360,547,000	$6,717,656	1.86
2001	348,969,000	$7,139,017	2.05
2002	370,401,000	$7,553,718	2.04
2003	409,778,000	$8,617,726	2.10
2004	465,553,000	$10,393,186	2.23
2005	439,136,000	$9,773,988	2.23
2006	414,614,000	$10,127,908	2.44

Source: Pinellas County Utilities, Solid Waste Operations, 2007
* Does not include capacity payments received.
** Partial year operating results (April - December)

4. Dump trucks containing residential and commercial solid waste dump directly onto the tipping floor of the waste-to-energy facility. Trucks containing special collections of oversize bulky waste are directed to unload in the landfill. Hazardous, toxic wastes or liquid are not accepted at the facility. Hazardous wastes are monitored at three different points and random screening is also done. The only material accepted from the wastewater treatment process is grit and sand.

5. Refuse delivery trucks enter the tipping floor area through one of eight roll-up type doors. The loader operator or traffic control operator direct each truck into a specific bay, and continuously monitor traffic flow.

6. Facility operation is highly automated. Only the operation of the refuse cranes and part of the materials recovery system are not automated. The crane operator has three important functions: (a) charging the furnaces; (b) clearing the tipping area of the pit; and (c) mixing wastes with extreme variations in composition.

7. Plant personnel monitor the operation and take action as necessary to ensure smooth operation. The operation of the units is monitored and controlled from a modern control room. In the control room, an operator monitors temperature, pressure and flow instruments which continually control and record the performance of the boiler and combustion air systems. There, the operator can adjust the firing conditions to result in changes in refuse disposal and steaming rate. He can monitor and adjust the chemical feed to the spray day absorbers (SDA) to improve operational efficiency of each unit, as well as steam delivery and condensate return. In like manner, the operator can also adjust the hydraulic oil systems required to drive the stoker, feeder rams, ash discharger, etc.

8. From log sheets of refuse deliveries, residue production, and combustion operating conditions, an operating summary describing refuse through-put, steam generation and refuse composition is prepared.

9. Each employee must be alert to potential environmental and safety problems and the actions to be taken to eliminate them. The plant engineer is responsible for training employees to operate and maintain the waste-to-energy facility at a high level of environmental and safety performance.

10. The personnel requirements are for about 65 people including administrative, operations, and maintenance personnel.

11. Proper maintenance of all systems is given high priority. The facility is designed to allow for normal preventive maintenance as needed and emergency maintenance as required. The service contract acknowledges that maintenance downtime is required.

12. The primary responsibility for the marketing and sales of recovered materials rests with the contractor. The manager of the facility arranges for the transportation of materials.

Plant operations are monitored through a series of reports and logs which are maintained by the plant supervisors. All operators of County-owned solid waste management facilities, including the waste-to-energy facility, are required to complete approved training courses. In accordance with the Management Agreement for the Facility, the County, as the owner of the plant, employs an Independent Consulting Engineer to conduct routine inspections of the facility. The inspection is to determine whether the plant operator is satisfactorily performing its obligations in good faith with respect to maintenance, repair, safety and efficient operation of the facility and within the requirements of all federal, state and local regulations. The

Independent Consulting Engineer for Pinellas County is directed to perform the inspections and other duties for the County in accordance with the Management Agreements.

Design Capacity

The waste-to-energy plant was initially designed to handle 2,100 tons of solid waste per day. When the facility was expanded to include a third boiler, the plant's capacity was increased to 3,150 tons per day, which would equal 1,149,750 tons per year. However, the existing contract guarantees that the operator will burn 950,000 tons per year at the plant. Downtime for routine maintenance has to be scheduled. The facility combusted 890,907 tons during the calendar year 2005. Of the tons of solid waste coming to the County facility in 2005, approximately 80 percent of the waste was combusted or recycled and only 20 percent went directly to the County landfill. Table 6 below shows the actual tons processed from 1986 to 2005. As total disposal tonnage increases, the percent of waste going to the landfill will also increase. Significant capital projects were performed during the period from 1997-1999 (Air Pollution Control Retrofit) and from 2001 through 2003 (Capital Replacement Project). During these years, the annual contract guarantee for tonnage was reduced to account for the increased boiler downtime associated with the capital projects.

Air Quality

The Federal Clean Air Act requires a permit for resource recovery facilities because they are a stationary source of airborne pollution. The U.S. Environmental Protection Agency (EPA) has delegated the Florida Department of Environmental Protection (DEP) the authority to issue air pollution permits for resource recovery plants. If a new facility will be in, or impact an area of non-attainment, the potential air quality impacts of the project are evaluated and an air quality monitoring program and utilization of best available control technology are required. The location of the air monitoring stations is listed in Figure 10.

Pinellas County shares the same airshed with Hillsborough County. Formerly a marginal non-attainment area for ozone per federal air quality regulations and standards, the Tampa Bay airshed has since been redesignated as “attainment/maintenance.”

As part of the power plant siting permit for the waste-to-energy facility, DEP required two air monitoring stations nearby. They automatically read and register sulfur dioxide levels in the air 24-hours a day. One air monitoring station is east of the waste-to-energy plant near Derby Lane and there is another one to the west of the plant.

TABLE 6
WASTE-TO-ENERGY PLANT PERFORMANCE 1986-2006 (Tons/Year)

CALENDAR YEAR	INCINERATED	LANDFILLED	TOTAL
1986	752,266	244,109	999,539
1987	934,722	230,167	1,165,564
1988	885,466	225,721	1,111,187
1989	867,648	170,034	1,037,842
1990	843,619	128,780	972,578
1991	773,375	101,683	875,373
1992	831,076	36,114	867,947
1993	860,960	62,050	923,217
1994	828,175	57,287	885,647
1995	818,757	75,029	893,988
1996	821,254	72,555	893,804
1997	759,099	124,644	883,742
1998	766,519	165,698	932,217
1999	788,898	180,120	969,018
2000	740,280	165,020	1,005,301
2001	781,055	241,632	1,022,687
2002	821,264	222,822	1,044,086
2003	879,239	202,559	1,081,798
2004	950,884	179,547	1,130,431
2005	890,907	254,254	1,145,161
2006	906,489	314,566	1,221,055

Source: Pinellas County Utilities, Solid Waste Operations, 2007.

Compliance with regulatory standards by the waste-to-energy plant is maintained by spray dry absorbers and fabric filters. This combination of treatment is a proven, widely applied technology that removes chemicals and particulate pollutants from the gas stream.

In February 1987, the County contracted with an independent laboratory to perform special tests not required by permits to evaluate emissions of dioxins, furans, and other pollutants. Over a two week period, stack emissions were sampled. This was a joint effort of the Florida Department of Environmental Protection, Pinellas County, the California Air Resources Board, and Signal Environmental Systems (now Wheelabrator). The test results were used to conduct dispersion models and risk assessments.

The section of the report entitled "Health Risk Assessment for the Pinellas County Resource Recovery Facility" concludes the following:

> Cancer risk to a "maximum exposed individual" is 1.2 chances per million for all emissions, not just dioxins and furans. ("a maximum exposed individual" means a person who has been exposed to facility emissions for 70 years, continuously for 24

hours per day, 365 days per year; one who has consumed locally produced food; and who has avoided competing risks.)

Risk from resource recovery is insignificant.

Because the data was calculated to determine maximum risk, the actual health risks will be lower than what is listed in the report. The results of the testing program showed that the Pinellas County Waste-to-Energy facility has emissions of dioxins and furans that are among the lowest measured at any plant in North America. The results indicate that the solid waste facility was designed and is being operated in such a way that emissions are minimized.

The Clean Air Act was amended in 1990 changing the requirements for Municipal Solid Waste Combustors (MSWC). In 1995, guidelines were adopted which set limits on lead, sulfur dioxide, hydrogen chloride, and nitrogen oxides emissions and established a two-tiered schedule for compliance with these emissions standards. Pursuant to this air quality legislation, the emissions control devices at the resource recovery facility were retrofitted. These improvements completely enclosed the post-incineration functions of the facility to reduce loss of particulate matter and to add additional emission control devices to further minimize gaseous emissions. This retrofit was completed in the year 2000 at a total cost of approximately $92 million.

LANDFILLS

The Florida Department of Environmental Protection has classified sanitary landfills into two categories, Class I and III landfills. Pinellas County has one active Class I landfill and no active Class III landfills. However, a separate Class III disposal area is included in the Bridgeway Acres Class I landfill area. Materials that can be disposed of at a Class III landfill include yard trash, construction and demolition debris and other similar inert materials. Everything else must be disposed of in a Class I landfill that is lined. There are also several transfer stations in Pinellas County where waste is collected and consolidated prior to transfer to either the Pinellas County Class I landfill or to Class III or Construction and Demolitions Debris landfills located outside of Pinellas County for disposal. The location of solid waste disposal sites and transfer stations in Pinellas County are shown in Figure 11. Also shown are the private and municipal brush sites in the County; the County's brush site is located at the Class I landfill. The landfill is described below.

Bridgeway Acres Sanitary Landfill

Sanitary landfills are expensive operations because of strict regulations. In Florida, landfill regulations are particularly concerned with the possibility of groundwater contamination. Bridgeway Acres is the only Class I sanitary landfill in Pinellas County.

FIGURE 10:
LOCATION OF AIR MONITORING STATIONS

The site of the County's Bridgeway Acres Sanitary Landfill has a natural layer of clay that is 10 to 20 feet below the surface, and is 20 to 50 feet thick. Along the outer perimeter of the landfill, a trench was excavated down to the natural clay layer and it was filled with bentonite clay slurry to form a barrier to block the lateral movement of groundwater. The slurry is a mixture of sodium bentonite plus water and natural soil. Bentonite is a natural clay mineral that swells with the absorption of water, making it an ideal sealing agent which creates an impervious liner. The slurry wall functions to keep all leachate generated by landfill operations within the slurry wall and site, thereby protecting surrounding groundwater resources. A series of monitor wells are located around the perimeter of the landfill and are used to monitor water quality outside of the site. These wells are also used to monitor water elevations. As further protection of surrounding water resources, the water table inside of the slurry wall is maintained at an elevation lower than the water table outside of the slurry wall. Any movement of water through the slurry wall would therefore be moving towards the inside of the site, rather than allowing any movement of water from the site outside of the slurry wall.

A berm was constructed around the perimeter of the disposal area to screen the landfill from its neighbors while landfill operations are occurring at or close to grade. Additionally, the landfill contractor is responsible for monitoring and cleaning up litter for a one mile radius around the disposal facility, with further distances required on primary roads leading to the facility. Other methods that are used to minimize impacts of the facility on our surrounding neighbors include immediately covering any waste with a strong odor, using litter fences in the disposal areas to minimize the potential for blowing debris, and monitoring for gas and odor around the perimeter of the disposal facility.

The County contracts the operation of the Bridgeway Acres Sanitary Landfill. It is a 5-year contract for the operation of the sanitary landfill and other general civil work within the project site. Non-processible or non-burnable solid waste such as large tree trunks, some construction debris, and excess material from the waste-to-energy plant are buried there. Ash from the waste-to-energy plant is used as cover on the landfill, fill for facility roads, and as a general soil substitute.

The landfill has a stormwater control system. The stormwater control system is regulated by the National Pollutant Discharge Elimination System (NPDES). This program is mandated in the Federal Clean Water Act and is delegated to the Florida Department of Environmental Protection. Pinellas County holds a NPDES permit, which regulates the discharge of pollutants into the County’s drainage system and surface waters. The NPDES permit allows off-site discharge of stormwater should runoff exceed storage volume.

The stormwater control system fulfills all the DEP regulations located in Chapter 62-701, 62-3, 62-4, F.A.C. The slurry wall which was constructed confines all the stormwater to the 705 acres. In addition to the slurry wall at Bridgeway Acres, a system of drains, ditches, culverts and pumps carry rainwater to a retention pond in the northwest corner of the property. Storage capacity in the retention pond is provided by pumping its contents to a treatment facility then to the waste-to-energy plant where it is used in the cooling towers. There is a pumping station so that the pond will be able to accept the runoff during a heavy rainfall. About 1,800,000 gallons of water are needed each day at the plant and as much as 1,400,000 gallons are treated stormwater. The remainder is treated wastewater provided by the cities of Largo and St. Petersburg.

Figure 8 shows the location of Bridgeway Acres relative to the waste-to-energy plant. It also shows the location of what is called the Sod Farm, a 211-acre tract east of Bridgeway Acres which was purchased by the County from St. Petersburg to expand the landfill area.

The Bridgeway Acres Landfill, including the sod farm area, has approximately 538 acres of remaining permitted capacity. This amounts to approximately 20,793,283 cubic yards of landfill space which is expected to last at least thirty (30) years. In 2005, Pinellas County submitted a modification to increase the height of the landfill, which would extend the disposable life expectancy of the landfill by an additional 30 years. It is important to note that this is the last Class I landfill in Pinellas County. The highly urbanized nature of Pinellas County and the applicability of state groundwater regulations in the northern portion of the County make new landfills prohibitive.

Illegal Dumping

The Pinellas County Department of Environmental Management responds to complaints received about illegal dumping; in other words, violations of the trash and debris ordinance. Environmental specialists investigate the complaints once they are in writing. They also pursue cases where illegal excavation has taken place. The sanitary landfill ordinance (Section 106, Pinellas County Code) is applicable countywide, while the trash and debris ordinance (Section 58-301, Pinellas County Code) pertains only to unincorporated areas of Pinellas County.

Separate ordinances have also been written for abandoned vehicles and abandoned appliances. Violators of any of these ordinances are served with a notice of violation and can be charged up to a maximum of $500 per day, but the first violation is $30.

SMALL INCINERATORS

Several facilities in Pinellas County operate various incinerators for medical waste (also known as Hospital/Medical/Infectious Waste) and pathological waste (human and animal). The waste-to-energy plant does not accept pathological or untreated biomedical wastes. Some medical wastes are shipped to facilities outside of Pinellas County. There are two medical waste facilities permitted in Pinellas County. They are Bayfront Medical Center (1,500 lbs./hour) and Medico Environmental Services, Inc. Incinerators are permitted and regulated under the following rules:

Hospital/Medical/Infectious Waste	62-296.401(4), F.A.C. and 40 CFR 60, Subpart C
Animal Crematories (biomedical waste)	62-296.401(6), F.A.C.
Human Crematories	62-296.401(5), F.A.C.
General Incinerators (Industrial)	62-296.401(1), F.A.C.

The Florida Department of Health regulates the handling and transportation of medical waste under Rule 10D-104, F.A.C.

FIGURE 11:
LOCATION OF SOLID WASTE AND RECYCLING FACILITIES

The Air Quality Division of the Pinellas County Department of Environmental Management inspects all incinerators with a Florida Department of Environmental Protection (DEP) air construction or operating permit. DEP operating permits are typically issued for five years. Table 7 is a list of permitted incinerators in the County. Incinerators are classified as follows:

Type 0 - Trash, a mixture of highly combustible waste such as paper, cardboard, wood.
Type 1 - Rubbish, a mixture of combustible waste such as paper, cardboard cartons, wood scrap, foliage and combustible floor sweepings, from domestic, commercial and industrial activities.
Type 2 - Refuse, consisting of an approximately even mixture of rubbish and garbage by weight.
Type 3 - Garbage, consisting of animal and vegetable wastes from restaurants, cafeterias, hotels, hospitals, markets, and like installations.
Type 4 - Human and animal remains, consisting of carcasses, organs, and solid organic wastes from hospitals, laboratories, abattoirs, animal pounds, and similar sources.

There are 17 facilities with a total of 28 sources within Pinellas County as shown on Table 7.

TABLE 7
INCINERATORS IN PINELLAS COUNTY

FACILITY NAME	POINT SOURCE	DEP PERMIT #	PROCESS RATE (LBS/HOUR)
Anderson-McQueen Funeral Home	Incinerator, Human	1030282 001	150
Anderson-McQueen Funeral Home	Incinerator, Human	1030282 002	150
Anderson-McQueen Funeral Home	Incinerator, Animal	1030282 003	150
Reflection Pet Urns, Inc.	Incinerator, Animal	1030136 001	75
Reflection Pet Urns, Inc.	Incinerator, Animal	1030136 002	75
Pinellas County Animal Services	Incinerator, Animal	1030018 003	250
Pinellas Memorial Pet Cemetery	Incinerator, Animal	1030129 001	75
Pinellas Memorial Pet Cemetery	Incinerator, Animal	1030129 002	75
SPCA of Pinellas County	Incinerator, Animal	1030020 001	150
Cemetery Management, Inc.	Incinerator, Human	1030017 005	150
Cemetery Management, Inc.	Incinerator, Human	1030017 006	150
Curlew Hills Memory	Incinerator, Human	1030096 002	150
Director's Services	Incinerator, Human	1030035 001	200
Director's Services	Incinerator, Human	1030035 002	150
Director's Services	Incinerator, Human	1030035 003	150
National Cremation Society	Incinerator, Human	AO52-213450	200
Parklawn Memorial	Incinerator, Human	AO52-205941	150
E. James Reese, Inc.	Incinerator, Human	1030131 001	200
Gee & Sorensen Funeral Home and Cremation Services*	Incinerator, Human	1030516 001	200
Gee & Sorensen Funeral Home and Cremation Services*	Incinerator, Human	1030516 002	200
Palm State Crematory Services, LLC	Incinerator, Human	1030473 001	200
Palm State Crematory Services, LLC	Incinerator, Human	1030473 002	200
Premiere Transport and Crematory Services, Inc.	Incinerator, Human	1030075 003	200
Premiere Transport and Crematory Services, Inc.	Incinerator, Human	1030075 004	200
Bayfront Medical Center	Incinerator, Medical	1030095 002	1500
SCI Funeral Services of FL, Inc.	Incinerator, Human	1030047 003	200
Medico Environmental Services	Incinerator, Medical	1030210 001	2350
SCI Funeral Services of FL, Inc.	Incinerator, Human	1030047 004	200
Suncoast Crematory	Incinerator, Human	1030217 001	150
Veterans Funeral Care	Incinerator, Human	1030512 001	200

Source: Pinellas County Utilities, Solid Waste Operations, 2007

ARTIFICIAL REEF CONSTRUCTION PROGRAM

Pinellas County has one of the most ambitious artificial reef construction programs in the state of Florida. The Department of Solid Waste Operations, through the recycling of selected construction and demolition debris, is able to create productive underwater habitats and save valuable landfill disposal space.

There are 13 Department of Environmental Protection permitted artificial reef sites off the coast of Pinellas County in the Gulf of Mexico (see Figure 12 for locations). On these locations, specially trained divers and personnel construct high profile pyramid shaped structures to attract fish species while also providing substrate for marine communities. The Department of Solid Waste Operations is researching the sizing, shape and spacing of these reef "units" to improve their overall effectiveness underwater.

Pinellas County has also constructed a number of inshore mitigation reefs. Although anglers and divers find our inshore reefs inviting for recreational purposes, Pinellas County Utilities designed these reefs as part of an environmentally sensitive coastal enhancement program. Marine biologists and engineers hope these reefs will replace hardbottom habitats impacted by beach restoration projects. The inshore reefs, found anywhere from 100 to 900 yards offshore, all have a height of approximately three to five feet. Swimmers and small boats have easy access to any of these reefs, where they will find many different species of fish. When finished, the project will include 29 inshore reefs.

The artificial reef construction program, started in the mid 1970s, has evolved into one of the most progressive reef construction programs in the nation. Each of the 13 reefs is gradually built up until they reach a 2,000-yard by 500-yard size. Among the materials used in building the reefs are concrete culverts, beams, bridge pilings, steel barges, and other large construction items. If a contractor delivers the material to the artificial reef staging area at Sand Key County Park, they are not charged a tipping fee. However, they do pay tipping fees if materials are delivered to the solid waste disposal facility and have to be transported to Sand Key Park or landfilled. Tires were used for reef building in the past, but this is no longer permitted by the FDEP.

Many of the reef sites were selected by a professor at St. Petersburg College, Dr. Hayward Mathews, and by Dr. Greg Smith of the Florida Department of Natural Resources (now the Department of Environmental Protection), both of whom are reef specialists and divers. The materials that are placed at the reefs quickly cover with algae and barnacles. Fish are attracted within weeks. Soft corals attach themselves after six to nine months, and after 12 months the hard corals like brain and star corals can be found. The reefs are almost unrecognizable from natural rock outcroppings after four to six years. Not only have the reefs begun to attract fishermen because of the variety of fish, but these spots have also become popular with recreational scuba divers.

FIGURE 12:
ARTIFICIAL REEF LOCATION

SOLID WASTE GENERATION

The universally accepted unit of measure for solid waste generation is pounds per capita per day. Solid waste planning is partially based on the per capita generation concept. "Per capita generation rate is defined as a unit of solid waste which is theoretically generated by one person (capita) during a specified time period, usually one day" (Florida Solid Waste Management Plan, 1981). Per capita generation can be influenced by many variables, such as: population, urbanization, affluence, and use of synthetic materials. For instance, if there is a rise in median income, there will typically be a rise in the amount of refuse. If there is growth in commercial and industrial activity, the solid waste generation rate tends to rise. The amount of solid waste generated per capita also seems to be correlated with age, specifically increasing for age groups on either end of the age spectrum. For instance, if there are more children under the age of 10 or more people over 80, the solid waste generation rate tends to increase, presumably because of the use of prepackaged and convenience products by those age groups.

A ton per person per year is generally accepted as a rule of thumb for residential generation. One ton per year equates to 5.48 lbs. per capita per day and this does not include commercial and industrial generation. However, this number is also influenced by the level of recycling. If the level of recycling is high, a significant portion of the generation rate may not need disposal. It is for this reason that Pinellas County takes into account the recycling rate and is primarily concerned with the per capita generation rate of waste to be disposed (landfilled or incinerated). Pinellas County defines the level of service for solid waste in terms of tons of waste to be disposed per capita per year, including residential and commercial waste.

Table 8 shows waste disposal figures for 1987 through 2006, along with the total population (resident plus seasonal and tourist) for those years, and the generation rates for waste to be disposed. Variations in the generation of solid waste are annual, as well as daily and seasonal. Generally, there appear to be two peak periods during any given year. The first peak generally occurs during March at the start of the growing season and during the height of the tourist season. The second, smaller peak typically occurs during the early summer months, probably resulting from increased yard waste from summer vegetation growth, heavy rain and to a lesser extent, the summer tourists.

As shown in Table 8, the change in the pounds per capita per day and total waste disposed at the County facility since 1987 can be accounted for by recycling efforts, the artificial reef program, and the removal of the flow control. One of the chapters in the analysis section will deal with solid waste generation projections and levels of service. Some of the past decrease has been offset by changes in consumer packaging and purchasing habits, and elimination of curbside yard waste collection in some communities.

TABLE 8
SOLID WASTE GENERATION, 1987-2006

YEAR	TOTAL POPULATION	TOTAL WASTE DISPOSED (tons)	TOTAL POUNDS PER CAPITA PER DAY	TONS DISPOSED PER CAPITA PER YEAR
1987	859,577	1,164,889	7.43	1.36
1988	866,929	1,111,238	7.02	1.28
1989	880,592	1,037,693	6.46	1.18
1990	890,967	972,578	5.98	1.09
1991	898,837	875,373	5.34	0.97
1992	903,470	867,947	5.26	0.96
1993	902,991	923,217	5.60	1.02
1994	917,727	885,647	5.29	0.97
1995	923,932	893,988	5.30	0.97
1996	931,187	893,809	5.26	0.96
1997	935,638	883,742	5.18	0.94
1998	941,641	932,217	5.42	0.99
1999	947,160	969,018	5.60	1.02
2000	964,070	1,005,301	5.71	1.04
2001	972,008	1,022,687	5.76	1.05
2002	977,019	1,044,086	5.86	1.07
2003	1,017,422	1,081,798	5.83	1.06
2004	1,021,477	1,130,431	6.06	1.11
2005	1,113,907	1,145,161	5.63	1.03
2006	1,118,353	1,221,055	5.99	1.09

Source: Pinellas County Utilities, Solid Waste Operations and Pinellas County Planning Department, 2006.
1996-1999 used 2000 seasonal population.
2003 - Methodology changed for calculating seasonal population.

TRANSPORTATION

Pinellas County, being a highly urbanized County, has a well developed public road network for the collection and transportation of solid waste to disposal sites. There are approximately 2,427 lane miles of major road systems. This figure breaks down into approximately 1,024 miles of state roads, 957 miles of County roads and 599 miles of other roads. Figure 13 indicates the major roads. Many of these are hampered with high traffic volumes; however, solid waste transport adds very little proportionately to the overall traffic volume in the County. The proximity to Interstate 275 and other major roads make the solid waste disposal facility very accessible.

The Pinellas County Metropolitan Planning Organization (MPO) has developed the County's 2025 Long-Range Transportation Plan as well as its five-year implementation programs. The MPO's 2025 Long-Range Transportation Plan is designed to address traffic congestion problems on the major roadways. The MPO also completed a Goods Movement Study in 1996 which includes the transport of hazardous materials. Subsequently, in 2004 the MPO adopted a Truck Route Plan.

HAZARDOUS WASTE MANAGEMENT

The disposal of hazardous waste is a complex and sensitive problem that has few solutions. Hazardous waste disposal in Florida is administered by the Department of Environmental Protection (DEP). Small amounts of hazardous waste may find their way into residential garbage, the sewer system, or storm drains from small quantity generators and households. Large generators of hazardous waste can contract with transfer companies, who transport the waste to permitted sites out of state but it is very expensive. Conditionally-exempt small quantity generators are those businesses that generate less than 220 pounds per month (about one half drum). Such businesses are not required to obtain an EPA Hazardous Waste Generator Identification number, but they are required by federal law to document that the wastes were sent to a licensed disposal facility.

The Pinellas County waste-to-energy plant does not accept hazardous wastes. Employees have been trained to help identify hazardous waste in the garbage. There are three different monitoring points. Random screening is also done to help prevent hazardous waste from being disposed of in the landfill.

Hazardous wastes are currently being produced by large and small quantity waste generators within Pinellas County. Table 9 shows the approximate volumes of hazardous waste generated within Pinellas County in 1984. The categorical break-down by waste type generally defines which particular generators are producing what amounts of hazardous wastes requiring further management. Waste oils, greases, lubricants and spent solvents are the waste types with the largest quantities produced annually.

FIGURE 13:
ROAD NETWORK

Federal Legislation

The issue of hazardous waste management was first addressed in 1976 in a comprehensive manner by Congress when the Resource Conservation and Recovery Act (RCRA) was passed to establish a regulatory program controlling hazardous waste from “cradle to grave” to protect public health, safety and welfare. A major feature of this legislation is to require that states develop and carry out their own hazardous waste programs.

RCRA defines hazardous waste as materials that exhibit ignitable, corrosive, reactive and/or toxic properties. The terms hazardous and toxic are not interchangeable. A hazardous waste is defined as "waste materials which by their nature are inherently dangerous to handle or dispose of, such as old explosives, radioactive materials, some chemicals, and some biological wastes; usually produced in industrial operations" (Hazardous Materials, Hazardous Waste, ICMA, 1987). About 350 chemical compounds were found by the EPA to have one or more of these properties, but more than 2,400 materials have been identified as hazardous by the U.S. Department of Transportation (DOT).

The varying regulations from one federal agency to another are increasingly complex. Generators, shippers, carriers, and disposers have to comply with regulations under RCRA, under DOT's Hazardous Materials Transportation Act, as well as EPA's Clean Water Act. In addition, there is the Toxic Substances Control Act; the Clean Air Act; the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA or “Superfund”); the Pollution Prevention Act of 1990; and the Occupational Safety and Health Act. The most significant recent changes in the regulatory environment have been in the implementation of increased restrictions on disposing of hazardous waste in specially-permitted landfills. These restrictions are being implemented in stages as technology becomes available to provide new and preferable alternatives for the disposal of hazardous waste rather than using landfills.

Florida Legislation

The category of hazardous waste materials, which includes “hazardous waste,” continues to be defined by Chapter 403.703(23), Florida Statutes as:

> “. . . solid waste, or a combination of solid wastes, which, because of its quantity, concentration or physical, chemical, characteristics, may cause, or significantly contribute to, an increase in mortality or an increase in serious irreversible or incapacitating reversible illness or may pose a substantial present or potential hazard to human health or the environment when improperly transported, disposed of, stored, treated or otherwise managed.”

The Florida Resource Recovery and Management Act (Sec. 403.7, Florida Statutes) was amended in 1980 to adopt the hazardous waste guidelines of the U.S. Environmental Protection Agency and to direct the Florida Department of Environmental Protection to develop and implement a hazardous waste management program for the state. Several key elements of the amendment include:

Federal definition of hazardous waste;

Manifest system to monitor hazardous waste from generation to disposal;
Annual inventory of large generators of hazardous waste;

Permit requirements to regulate treatment, storage, and disposal of hazardous waste;

A trust fund to clean up hazardous waste spills and uncontrolled sites;

Procedures to select sites for hazardous waste management facilities; and

Fines and penalties for violators of the law.

During 1988, the State proposed a state-operated hazardous waste treatment facility in the Panhandle. The new hazardous waste legislation required DEP to develop, by March 1, 1991, a statewide local hazardous waste management plan. The law also provided grant programs through DEP for the establishment of local and regional hazardous waste collection centers. There is still no permitted hazardous waste landfill in Florida.

The State of Florida passed the Pollution Prevention Act of 1991 as companion legislation to the federal program. Though the policy of the State is that pollution prevention is necessary for all materials and waste management activities, the State shall initially concentrate upon preventing pollution caused by toxic and hazardous wastes.

To carry out the Florida Legislature's intent to preserve surface water and groundwater quality throughout the State, rules were devised to regulate above ground and underground storage tanks. Deadlines are imposed for the retrofit and replacement of pollutant storage tank systems. Specifically, Chapter 62-761, Florida Administrative Code (F.A.C.) regulates Underground Storage Tank (UST) systems, and Chapter 62-762, F.A.C. regulates Above Ground Storage Tank (AST) systems. These rules were instituted in 1990 and 1991 to set strict criteria for tank retrofits and tank replacements. The new rules stipulated that any new installation would be required to be totally double walled or secondarily contained. The following, from the Pinellas County Public Health Unit, are the approximate number of active "regulated" tanks located at nearly 950 facilities throughout Pinellas County, and the deadlines to comply with the retrofit and replacement rules.

ASTs and USTs that have met all retrofits:	500
ASTs to meet 12/31/1999 retrofit deadline:	100
USTs to meet 12/31/1998 replacement deadline:	500
USTs to meet 12/31/2009 replacement deadline*:	1,600
Total Tanks	2,700

* Note: all USTs that have to be replaced by December 31, 2009 must first meet a piping, overfill, and dispenser liner retrofit deadline of no later than December 31, 1998.

Pinellas County Programs

It is the policy of the County to minimize the generation of hazardous waste. County departments are encouraged to identify non-hazardous or less hazardous materials for use in the work processes. With the lead of the County's General Services Department, a County hazardous waste management program has been implemented and procedures have been developed for dealing with hazardous waste. These procedures provide for the acquisition of material safety data sheets, proper labeling, employee training, job safety analysis, monitoring contractors, and identification and disposal of hazardous waste materials. This program complies with the provisional requirements of OSHA 29 CFR 1910.1200, et. seq.

The County formerly participated in the state's Amnesty Days program, whereby twice per year Pinellas County residents could bring hazardous household chemicals to a mobile facility for disposal at no charge. In 1993, a permanent, state-of-the-art Household Electronics and Chemical Collection Center (HEC_3) was opened next to the County's waste-to-energy facility. This facility was built in 1992 at a cost of approximately $313,000, including a $100,000 grant from the Florida Department of Environmental Protection. Construction of a new state-of-art center is scheduled in 2007 to meet the needs of the increased volumes and updated operations of this highly popular program. Ongoing funding for HEC_3 is provided by system revenues. In 1999/2000, electronics were added to the list of items to bring into the HEC_3 due to the toxicity of the metals in the CRT's and circuit boards. County citizens can now bring items such as fertilizers, fungicides, pesticides, household chemicals and cleansers, paints, solvents, automotive fluids, pool chemicals, electronics, fluorescent and mercury containing materials and household batteries for disposal at no charge. Collection of Household Electronics and Chemicals through this program for fiscal year 2005/2006 was over 1.8 million pounds. The popularity of this program with our citizens is demonstrated by the continuing increase in pounds collected as shown on Figure 14.

This on-going program also includes a public information component geared toward homeowners and emphasizing pollution prevention by using alternatives to hazardous materials, reducing the amounts used and the proper disposal of hazardous waste. Periodically, the chemical waste is transported by a licensed transporter from HEC_3 to a licensed disposal facility. The HEC_3 is open on Monday, Tuesday, Thursday, and Friday, plus the third Saturday of each month. . It is anticipated that the hours will be extended to match the operating hours of the rest of the Solid Waste Operations facilities upon construction of the new facility. The County also sponsors a Swap Shop at the HEC_3 where citizens may take certain useable products for no charge. The household chemicals that are collected are required to be recycled, if possible, by the contractor.

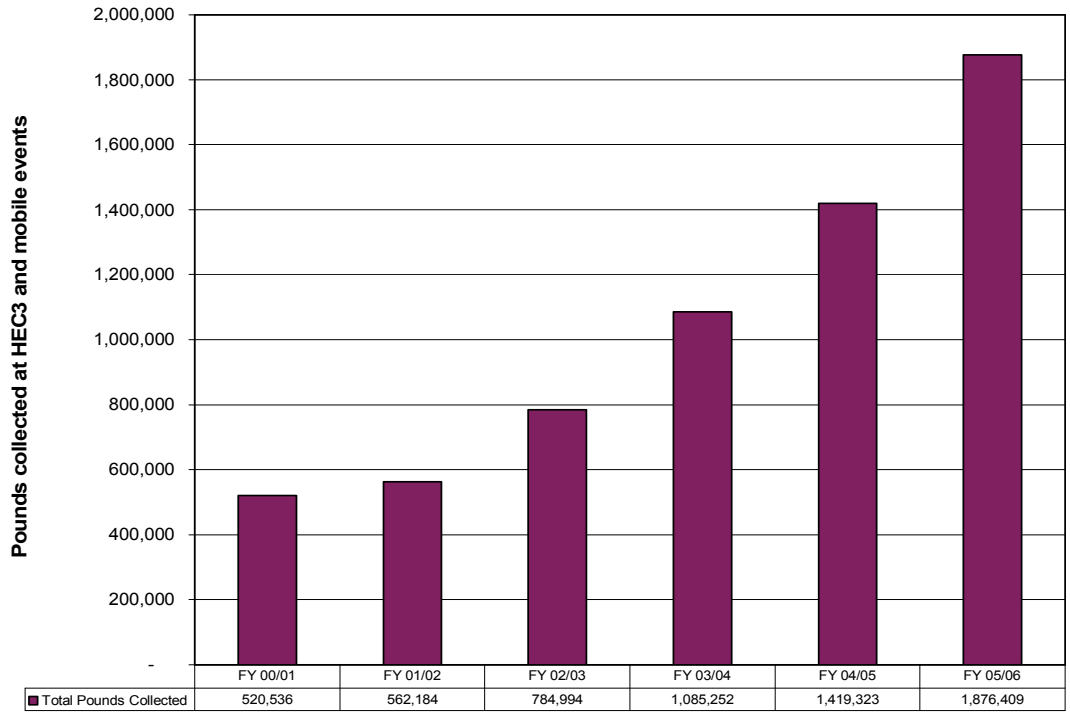
The County also coordinates with local municipalities, the School board and national corporations (e.g., Home Depot) to offer local "mobile" collection events, whereby household hazardous waste is collected at a specified site within a local municipality at various rotating sites throughout the County and transported by the County's contractor to appropriate disposal or recycling facilities. Over 20 of these one day events are held each year and have expanded the outreach of the program.

Additionally as a complement to the mobile collection program, the Haz-to-Go program was implemented in 2006. A specially designed vehicle for conducting small one-day events for collecting household chemicals and electronics and transporting the material back to the permanent facility was purchased. The Haz-to-Go vehicle services homeowner and neighborhood associations, mobile home parks and collection events through major employers. Haz-to-Go events are currently held on Wednesdays and Saturdays, by appointment.

On a quarterly basis, businesses classified as Conditionally-Exempt Small Quantity Generators (CESQG) may bring their hazardous waste to the HEC_3 for disposal for a fee, which is paid directly to the contractor at the County's agreed upon contract price. CESQG businesses are also allowed to bring their waste to the mobile collections and the contractors will accept the material at the agreed upon fee.

Rather than administering a costly inspection program with limited effectiveness for non-residential small quantity hazardous waste generators, Pinellas County developed a proactive program. The Pollution Prevention Program (P2) was established in an effort to reduce the volume of hazardous waste produced in Pinellas County. Specifically, P2 was developed to minimize the amount of liquid, solid, and gaseous pollution, as well as energy and water consumption, within Pinellas County. Based upon the premise that preventing waste and pollution today can help reduce the costs and risks of operating a business, P2 provides counsel and technical assistance to any individual or company conducting business within Pinellas County about pollution prevention (see "Recycling and Waste Reduction" in Pinellas County).

FIGURE 14
PINELLAS COUNTY UTILITIES, SOLID WASTE OPERATIONS
CHEMICALS AND ELECTORNICS COLLECTIONS
THROUGH HEC3 PROGRAMS



Source: Pinellas County Utilities, Solid Waste Operations, 2006

Pollution prevention is any activity that reduces or eliminates waste at its source. Pollution prevention measures include the use of new technologies, substitute products, conservation practices, efficiency enhancements and recycling. The Pollution Prevention Program is staffed by Environmental Management Specialists from the County's Environmental Management Department who work with local businesses and individuals to help identify practical and effective pollution prevention strategies. In addition, the Air Quality Division provides industry specific fact sheets and resource lists, waste audit and assessment training, and access to a library of technical information. Pollution prevention measures such as Best Management Practices and selective use of technology can improve the economic effectiveness of a business while at the same time protecting the business from potential liability and preparing it to meet any future environmental regulations. In this way, both the business and the environment benefit.

Hazardous Waste Assessment

The 1983 legislative amendment which enacted the Amnesty Days program also included the Water Quality Assurance Act. This Act requires counties to conduct a hazardous waste assessment. In response to this mandate, Pinellas County and the Tampa Bay Regional Planning Council, in conjunction with Environmental Science and Engineering, Inc., developed the County Government Hazardous Waste Management Assessment for Pinellas County. In

late 1983 and early 1984, questionnaires were mailed to 5,700 businesses and government offices in the County.

There was a 63.6 percent response rate and, of these, 25.5 percent said they generated hazardous wastes. It is estimated that 137.3 million pounds per year of hazardous waste will be produced in the Tampa Bay area in the year 2000. Approximately 87.4 million pounds of hazardous waste were projected to be produced in Pinellas County by the year 2000. Waste oils, greases, and lubricants; photographic wastes; plating rinses, and spent solvents are the wastes projected to contribute the largest quantities. The types of waste and the amounts generated are listed in Table 9. From the survey responses, it was estimated that 60.0 million pounds of hazardous waste were produced each year in Pinellas County and that 72 percent of this was recycled, reused or treated. With these numbers in mind, the study recommended that a transfer/temporary storage facility was needed in Pinellas County and a section addressed the selection of an area for this type of facility. In 1986, a private facility that handles hazardous waste did locate in Pinellas Park, and received a permit as a hazardous waste transfer station. Material from the transfer stations goes to approved hazardous waste treatment or disposal sites.

Right-to-Know Laws

Employers are required, under the 1985 Florida Right-to-Know Law, to advise employees of any chemicals and hazardous materials in the workplace. This law also requires companies to inform the local fire departments of these hazardous materials and where they are located in the facility.

In 1987, the federal government passed the Emergency Planning and Community Right-to-Know Law, which requires that all hazardous waste users submit to the state a list of hazardous materials they have on hand. The Florida Department of Community Affairs is the state agency which implements the law, but there is no money to enforce it. Federal law requires that training be required before employees are permitted to handle or clean up hazardous materials.

The Emergency Operations Communications (EOC) Center, in the basement of the Pinellas County Annex in downtown Clearwater, houses a database containing data from companies which use hazardous materials, plus additional information which fire officials gather during routine safety inspections. This centralized system helps fire department hazardous materials response teams be more effective.

In addition, the Local Emergency Planning Committee (LEPC), coordinated by the Tampa Bay Regional Planning Council (TBRPC), is the repository for the District VIII SARA Title III information. Pinellas County supports the LEPC in their efforts to maintain this information.

TABLE 9
ESTIMATED HAZARDOUS WASTE
PRODUCED ANNUALLY IN PINELLAS COUNTY

WASTE TYPE	WASTE AMOUNT (LBS)	WASTE RECYCLED, REUSED OR TREATED (LBS)	WASTE REQUIRING FURTHER TREATMENT (LBS)
Waste Oils, Greases or Lubricants	7,054,528	5,373,565	1,680,963
Spent Solvents	4,300,297	2,926,926	1,373,335
Distillation Bottoms	105,910	22,349	83,561
Dry Cleaning Filter Residues	28,480	3,720	24,760
Waste Pesticide	43,589	12,705	30,884
Pesticide Rinse	73,355	3,922	69,434
Pesticide Containers	41,811	34,356	7,454
Toxaphene Solutions/Sludges (Dipping)	622	199	423
Other Solutions or Sludges (Dipping)	6,262	3,320	2,942
Heavy Metals (Solid)	139,259	73,582	65,677
Plating rinse	1,000,932	67,567	933,364
Sludges	270,578	205,465	65,113
Ignitable Wastes	185,015	84,060	100,954
Reactive Wastes/Cyanides	31,417	25,732	5,685
Reactive Wastes/Acids - Caustics	357,865	285,334	72,531
Spent Plating Waste	228,379	200,966	27,413
Waste ammonia	387,709	17,911	20,797
Photographic Wastes	840,426	28,535	811,891
Waste Paints w/Solvents	229,057	46,432	182,624
Other Paints	85,160	54,145	31,015
Lead Acid Batteries	243,909	145,495	98,414
Wood Preservatives	1,483	241	1,242
Waste Explosives	346	129	217
Waste Formaldehyde	42,877	8,721	34,156
Waste Ink	185,122	25,697	159,425
TOTAL	15,353,387	9,651,112	5,884,276

Source: Pinellas County, Tampa Bay Regional Planning Council, and Environmental Science and Engineering, Inc. Survey, 1983-1984

Household Hazardous Waste

Household hazardous waste is legally exempt from the requirements of RCRA. The Florida Department of Environmental Protection estimates that the average Florida family generates about five and one half gallons of hazardous waste per year from bleach to motor oil to furniture polish, pesticides, paint, paint thinner and many others.

Information on how to handle any hazardous chemicals that are found in the home is provided to homeowners by Pinellas County. Brochures and pamphlets are available at the Pinellas County Department of Solid Waste Operations and from the Florida Department of Environmental Protection. Disposal of household hazardous waste can be done at the County-operated Household Electronic and Chemical Collection Center (HEC_3). In 1999/2000, electronics were added to the list of items to bring into the HEC_3 due to the toxicity of the metals in the CRT's and circuit boards. County citizens can now bring items such as fertilizers, fungicides, pesticides, household chemicals and cleansers, paints, solvents, automotive fluids, pool chemicals, electronics, fluorescent bulbs and other mercury containing materials and household batteries for disposal at no charge. For the disposal of motor oil, facilities are available and promoted by Pinellas County Solid Waste Operations.

The Florida Department of Environmental Protection disseminates pamphlets and booklets on the subject, including: "Hazardous Wastes from Homes;" "Making the Switch: Alternatives to Using Toxic Chemicals in the Home;" "Florida's Handbook for Small Quantity Generators of Hazardous Waste;" and "Know Your Chemicals: Alternatives and Precautions."

Solid Waste Requirements for Asbestos

Compliance with asbestos disposal is regulated under the special waste handling procedures of 62-701.520(4), F.A.C. Class I and III landfills can accept asbestos waste from sources which are covered under the National Emission Standards for Hazardous Air Pollutants (NESHAP), 40 CFR Part 61, Subpart M. The disposal requirements for asbestos waste from NESHAP sources are covered under EPA's standard for active asbestos waste disposal sites, 40 CFR Part 61.154, which are incorporated in the State's rule by reference. The waste disposal requirements under 40 CFR Part 61.154 do not refer to non-NESHAP sources, such as Category I and II asbestos-containing material. In general, 40 CFR Part 61.154 and F.A.C. 62-701.520(4) contain guidelines for the following:

1. Making prior arrangements with the landfill operator regarding quantities of asbestos-containing material (ACM) and scheduled date of arrival;

2. Disposal of asbestos-containing material waste in designated areas and maintaining records of the location, depth, area and volume on a diagram of the disposal area until closure;

3. Asbestos warning signs and the requirement for no visible emissions to the outside air; and

4. Maintaining waste shipment records and providing copies of the waste shipment records to the waste generators within a specified time frame.

HAZARDOUS WASTE AND KNOWN POLLUTION PROBLEMS

In 9J-5.013(1)(b), it states that "for each of the above natural resources (rivers, bays, lakes, wetlands, air, floodplains, soil, fisheries, wildlife, marine habitats and vegetative communities), ... known pollution problems including hazardous wastes and the potential for conservation, use or protection shall be identified." This next section deals with known pollution problems involving hazardous waste in rivers, lakes, and soils and that are the subjects of specific federal, state, and/or local action.

Stauffer Chemical Plant

A phosphorus processing plant for over 30 years, the Stauffer Chemical Plant was located north of Tarpon Springs near the Pinellas-Pasco County border. Field investigations had discovered that approximately 900 barrels of phosphorus remained buried on the site after the plant closed in 1981. Monitoring wells had additionally detected chromium, lead, cadmium, and fluoride in the soil and groundwater, but the main concern was the 900 barrels of phosphorus.

Among the recommendations in the Site Investigation Report were: 1) a more extensive investigation to determine the extent of soil, groundwater, and surface water contamination; 2) an extensive air monitoring program to better define potential contaminant transport; 3) radiological analyses to better define the source of the contamination; and 4) tissue analyses on selected sessile marine organisms in the Anclote River.

At this time, the final site remedial investigation which addressed the recommendations of the initial site investigation report has been completed. A remedial action plan is now being prepared. A monitoring group of local citizens has been formed to gauge the progress and results of the clean-up efforts.

Soil Contamination

Soil contamination, particularly by petroleum-related incidents, is a problem throughout Florida and can occur because of leaking storage facilities and isolated spillage accidents. This contamination is a hazard to the quality of surface waters and groundwater.

According to the Florida Department of Environmental Protection, there have been 1,515 incidents of petroleum contamination in Pinellas County as of December 17, 1995. Of the 1,515 incidents, 161 are in the Initial Remediation Action phase, whereby the soil is either treated or removed, or the contaminant is recovered, or an alternative process is applied. There are 612 incidents that are in the stage of Contamination Assessment, which is the determination of the vertical or horizontal extent of contamination in the soil and groundwater. Remedial Action Plans have either been approved or are in progress for 187 incidents. There are 479 incidents where the site rehabilitation has been completed or where no further action is warranted. The cost of doing the Initial Remedial Actions, the Contamination Assessments, and the Remedial Action Plans for approximately 75 percent of the sites is either paid directly by the State of Florida or by State reimbursement to the responsible party.

These clean-up funds come from a trust fund that receives $0.02 per gallon of gas at the pump. The remaining sites are paid for by other means because the sites were not eligible for State-assisted clean-up funds. There are no local clean-up programs to assist in the cost of contamination clean-up in Pinellas County.

Department of Energy (General Electric Plant)

A federally-owned weapons plant operated under contract by General Electric was investigated by the Department of Energy because of problems affecting the safety of residents and employees at other plants around the Country. The weapons plant produced triggering mechanisms for nuclear weapons. Among the hazardous and radioactive materials used in the manufacturing process were tritium, deuterium, krypton and plutonium. The plant ceased operations in 1990 and the property is now owned by Pinellas County.

Corrective actions have taken place at specific contaminated sites located with the 100-acre complex:

1) At the "eastern sites": Remedial action was first conducted in the summer of 1988. Pump and treat activity is still proceeding at the eastern sites.

2) At the "4.5-Acre Site": Contaminated soil, 303 tons of waste, and 83 barrels were removed in 1985.

3) At the "Western Pond": This area was of lesser concern. Contamination problems are under control.

4) At the "Spray Irrigation Site": Contamination was of a lesser concern. The situation is under control.

5) At the "Diesel Fuel Spill Site": This site was of lesser concern. Contamination problems have been remediated.

WASTE REDUCTION AND RECYCLING

Solid waste management professionals recognize the importance of waste reduction and recycling in the integrated solid waste management hierarchy which places priority on waste reduction, reuse, and recycling, followed by waste-to-energy and sanitary landfills.

According to the U.S. Environmental Protection Agency (EPA), "recycling, including composting, diverted 79 million tons of material away from landfills and incinerators in 2005, up from 34 million tons in 1990. By 2002, almost 9,000 curbside collection programs served roughly half of the American population. Curbside programs, along with drop-off and buy-back centers, resulted in a diversion of about 32 percent of the nation's solid waste in 2005" (US EPA, Office of Solid Waste and Emergency Response, URL: http://www.epa.gov/epaoswer/non-hw/muncpl/reduce.htm, 12/14/2006).

A variety of factors can impact the success of waste reduction and recycling programs. Ideally, source-reduction through producer responsibility (industry) and environmentally preferable purchasing (consumers) would minimize waste and maximize recycling through policies that affect product design and behavioral norms. The "zero waste" movement epitomizes this ideal (Grass Roots Recycling Network, Zero Waste, http://www.grrn.org/zerowaste/index.html, 12/14/2006). However, municipal solid waste managers do not usually have this level of policy control, and therefore, they must be able to analyze and respond to the waste stream in its current and near-term situation.

Planning for waste reduction and recycling requires characterization of the waste stream (waste composition analyses) and its sources (generators), plus identification of viable collection mechanisms and markets for recyclable materials. Systematic analysis of these factors is necessary to determine the most appropriate materials to be included in municipal recycling programs. For example, if paper constitutes a significant portion of the commercial waste stream and markets for recovered paper are readily available, it would be wise to identify the most cost-effective means to recover (collect) paper from the commercial waste stream.

Public education is equally important for the implementation of successful waste reduction and recycling programs. In order to participate, citizens must be aware of, and feel they have a stake in, these programs. Furthermore, consistent evaluation of participation and recovery of targeted materials is necessary to determine whether programs are providing significant waste reduction and recycling, or if a different approach is warranted.

Recycling in Florida

On October 1, 1988, the Solid Waste Management Act (Chapter 88-130, Laws of Florida) containing a large recycling component went into effect. A statewide goal to reduce the waste stream 30 percent by 1994 was the cornerstone of the legislation. All counties were held responsible for achieving the 30 percent goal. Counties were also required to submit annual recycling reports documenting progress toward the goal. A majority of the newspaper, glass, plastic bottles, aluminum and steel cans were to be recycled. This legislation also imposed an "advance disposal fee" (container-deposit law) for containers not meeting a 50 percent recycling rate. This fee was in effect for two years until the advance disposal fee requirement was removed, despite not having achieved the targeted recycling rate.

State-funded recycling grants began in 1988, peaked in 1992, and then steadily declined until the "Recycling and Education" grants were eliminated in 2001 for counties with populations over 100,000, and "Waste Tire" grants were eliminated in 2004. State funding is still available in the form of competitive "Innovative Recycling" grants for specific projects. In response to these changes, Pinellas County started providing limited reimbursements to its cities in 2005. Pinellas County's municipal recycling reimbursements are intended to help maintain local recycling programs and thereby reduce waste that must be combusted or landfilled at the County's disposal facility.

Waste Reduction and Recycling in Pinellas County

As with garbage, collection of recyclables from residents is the responsibility of each municipal jurisdiction, with Pinellas County responsible for the unincorporated area. Table 11 summarizes recycling services available in the County and cities, and a map of recycling centers is provided in Figure 11. In theory, all residents (as well as commercial establishments) have access to recycling through numerous drop-off centers located throughout the county. However, surveys indicate that 87% of residents that have curbside recycling available to them participate in this service while only 50% of residents without curbside recycling use drop-off centers (2005 Pinellas County Recycling Awareness Survey, Executive Summary, page 4).

Commercial recycling services are available through a mixture of municipal and private services. 46% of respondents surveyed indicated that they have a recycling program at work (2005 Pinellas County Recycling Awareness Survey, Executive Summary, p. 9). Limited commercial recycling collection is provided by a few cities on a case-by-case basis. Recycling drop off centers provided by the County and cities (Table 11) are open to businesses as well as residents. Businesses can also make arrangements with private recycling companies, but experience indicates that only businesses generating large consistent volumes of high-value recyclables (usually paper fibers) find service with private recyclers to be feasible. Pinellas Partners in Recycling, detailed below, is currently attempting to assist small businesses wishing to recycle.

TABLE 10
MUNICIPAL SOLID WASTE COLLECTED AND RECYCLED 1988-2005

YEAR	TOTAL TONS GENERATED	TOTAL TONS RECYCLED	PERCENT RECYCLED
1988	1,111,473	260,770	23.5%
1989	1,305,658	289,656	22.2%
1990	1,511,764	383,141	25.3%
1991	1,482,060	445,484	30.0%
1992	1,620,097	506,673	31.3%
1993	2,093,733	810,317	38.7%
1994	1,708,460	812,333	42%*
1995	1,749,761	855,975	48.9%
1996	1,641,672	747,863	45.6%
1997	1,709,257	825,515	48.3%
1998	1,757,732	825,515	47.0%
1999	1,657,824	688,806	41.5%
2000	1,437,395	432,094	30.1%
2001	1,526,501	503,814	33.0%
2002	1,801,903	757,817	42.1%
2003	1,606,473	524,675	32.7%
2004	1,943,415	585,562	30.0%
2005	2,051,765	630,337	31.0%

Source: Pinellas County Utilities, Solid Waste Operations, 2007
*adjusted rates.

Solid Waste Technical Management Committee and Recycling Subcommittee

Background As a result of the 1988 Solid Waste Management Act, Pinellas County began developing a recycling plan in September of 1988. The first step was the creation of a Recycling Task Force made up of County employees with representatives from the County Administrator's Office, Public Works, Solid Waste Management, Environmental Management, Public Service and Information, Planning and Cooperative Extension.

The second step was setting up a Recycling Subcommittee that would report to the Solid Waste Technical Management Committee (TMC). The purpose of this subcommittee is to coordinate recycling education so that all citizens will receive the same message about solid waste management practices, the importance of waste reduction and recycling, “how to” recycle, what to do in the home and at work, where to take the recyclable materials and the importance of buying recycled products. The Recycling Subcommittee membership includes local government, private sector and non-profit representatives. An interlocal agreement was drafted and sent out to the 24 municipalities requesting that each city develop a recycling program and participate with the County in a coordinated approach, including the application for a state solid waste recycling and education grant. The Department of Solid Waste Operations coordinated the recycling and education grant which was submitted to the

Department of Environmental Protection (DEP) annually. This has been discontinued since recycling grants offered by DEP to larger populated counties were suspended.

On April 5, 2005, Pinellas County Board of County Commissioners passed Resolution 05-59 creating the Pinellas County Recycling Reimbursement Grant Program. This program offers funding, on a reimbursement basis, to municipalities within Pinellas County for the purpose of supporting and expanding their recycling activities. Initially, this grant consisted of $350,000 allocated on a per-capita basis. The amount was increased to $500,000 in fiscal year 2006-2007.

Work groups have been established under the Recycling Subcommittee to address specific needs. Work groups that are currently active include the following:

1. Executive Committee: comprised of city and county government representatives, its primary role is to coordinate municipal recycling reimbursements and to address other issues affecting city and county services

2. School Assistance: led by the School Board's representative, it coordinates school recycling initiatives, include the School Paper Recycling Program

3. Business Assistance: led by a representative from the private sector, it addresses the challenges of improving commercial recycling and waste reduction throughout the county

4. Organics and Yard Waste Reduction: led by a representative from Pinellas County's Cooperative Extension Service, it focuses on compost education, yard waste reduction techniques, and promoting the use of recycled mulch

5. Litter and Pollution Prevention: led by a representative from Keep Pinellas Beautiful, it addresses litter and pollution prevention needs

6. Public Outreach: led by a representative from Pinellas County Utilities, it coordinates waste reduction and recycling program information that is presented to the public through various media outlets, including the distribution of an annual recycling directory and the maintenance of an online guide to proper waste disposal and recycling.

The TMC reviews the waste reduction and recycling contributions of local charitable organizations and recommends limited allowances for disposal fee waivers each fiscal year. Only non-profit organizations that are registered 501(c)3 corporations and demonstrate the processing of materials for reuse are eligible for free disposal allowances for non-reusable, non-recyclable residue from materials collected within Pinellas County. Utilities' staff processes applications and performs site inspections to confirm reuse and recycling operations. The cost of this disposal waiver (approximately $350,000 in 2006) is absorbed by all other users of the County's disposal facility.

The TMC and Recycling Subcommittee both function as forums to discuss countywide solid waste issues and to coordinate programs that maintain the viability of the county's disposal capacity; however, all decisions (including finances and contracts) are ultimately the

responsibility of the Board of Pinellas County Commissioners and its designees. Currently, as directed by the Board, the Utilities Departments' recycling activities consist primarily of countywide public education, plus maintenance of recycling drop-off centers in the unincorporated area, the Household Electronics & Chemical Collection Center and mobile collections, and a yard waste recycling operation whose final products are mulch and firewood. Solid Waste Operations also coordinates a recycling program for county offices. This program currently includes office paper, rechargeable batteries, printer cartridges, and cell phones.

Public Education

The County's Communications Department handles inquiries about county services in coordination with other county departments. Press releases are sent from this office, and they also arrange speakers for group presentations. In addition to the Communications Department, the Utilities Department coordinates more specific outreach and education efforts through Conservations Resources and Solid Waste Operations. A summary of the current programs follows below:

Web Site – Conservation Resources maintains the Utilities Department's web site, which contains information about all existing programs, as well as downloadable versions of all publications produced by the department. In 2006, an A-Z "Get Rid of It" guide was added to the site. The guide was designed to provide answers to citizens' solid waste questions (including recycling, hazardous waste, and disposal information) and allows users to submit comments or questions. The Utilities web site can be found at www.pinellascounty.org/utilities.

Annual Recycling Directory – Each year, Solid Waste Operations and Conservation Resources review and update all information about municipal and county recycling programs. This information is published each January and distributed as a newspaper insert in the St. Petersburg Times. Additional copies are distributed during facility tours, presentations, and events and through County Connection Centers, libraries, and other avenues. The directory is also available online.

Brochures – Reef Guides, Yard Waste Reduction, Household Electronics and Chemical Collection Centers, Motor Oil Recycling, Cutting Waste at Work, and various other brochures are produced by Conservation Resources and distributed through numerous county outlets.

Video – Conservation Resources and Solid Waste Operations updated "Let's Make Trash Extinct" with a new video produced in 2006 titled "No Such Place as Away". The new video is a virtual tour of the county's integrated solid waste management system and includes footage and commentary on waste reduction, reuse, recycling, waste-to-energy, and sanitary landfills.

Curriculum Development – The Utilities website has a "Just for Teachers" section that includes educational resources about water conservation and waste reduction. Conservation Resources currently produces a "Recycling Activity Book" that references the Florida Sunshine Standards. Solid Waste Operations is planning to develop additional educational resources for K-12 teachers and students.

Facility Tours and Presentations – Free facility tours and presentations are provided to the public, primarily by three Solid Waste Operations staff. As an additional incentive, Solid Waste

Operations began providing free transportation for schools in 2006. Free tours of the City of Clearwater's recycling center are also available.

Events – Solid Waste Operations coordinates a number of public outreach events with the Pinellas Partners in Recycling. Annually recurring events sponsored by Solid Waste Operations include the "Recycle Regatta" in which participants build and race recycled boats, and "Pinellas Recycles Day" at which the Pinellas Partners in Recycling answer citizens' questions and run a recycled-art activity called "Create-A-Critter". Solid Waste Operations uses event recycling trailers called "Recyclin' Roadies" and temporary recycling bins to collect plastic bottles, aluminum cans, and paper fibers from these events. The trailers, bins, and staff are also available to provide recycling services for other events.

Other County Departments involved with Waste Reduction and Recycling – In addition to the public education elements listed above, three other county departments work closely with Pinellas Partners in Recycling. The Department of Environmental Management operates Pollution Prevention, Clean Marina, and educational programs through Weedon Island and Brooker Creek Preserves. These programs all have waste reduction components. Secondly, Pinellas County's Cooperative Extension Service provides educational workshops that promote waste reduction, including "Compost Happens" and "Rain Barrel Magic". Solid Waste Operations provides compost bins to the Extension Service to accompany education about yard waste reduction. In 2006, the Extension Service coordinated an effort to inventory the county's "green" practices, which resulted in the first "Green Local Government" designation by the Florida Green Building Coalition. Furthermore, Extension Service has hired a "Sustainability Coordinator" to help the county continue to improve its environmental impact. Waste reduction and recycling are important components of this effort. The Pinellas County Communications Department also supports the public education and outreach efforts of the Utilities Department by disseminating literature and referring tour and presentation requests that they receive through the County's Speakers Bureau.

Waste Reduction Plan

Analysis of waste reduction and recycling programs is conducted via annual reports to the state, as well as monitoring internal measures, and through studies performed by consultants. Thus, we are able to evaluate program success, compare ourselves with other similar programs, and make adjustments and plans for future waste reduction efforts. A summary of tools for program analysis and planning are listed below:

Annual Municipal Solid Waste Report – Required by the Florida Department of Environmental Protection, this report details the generation, recycling, and disposal of all Municipal Solid Waste from Pinellas County. As of 2005, Pinellas County has a 31% recycling rate.

Recycling Awareness Survey – Performed by a consultant annually, this telephone survey measures citizens' awareness and their reported participation in recycling programs. Results of this survey in 2005 indicate an 87% participation rate for residents with curbside recycling and a 50% participation rate for residents with access to drop-off centers only. Reasons for not using drop-off recycling centers are led by "inconvenient/too much trouble" (52%) and "don't have a drop off center nearby/too far" (22%). Respondents suggested education (50%), making curbside recycling available to everyone (41%), and providing incentives for people to

recycle (14%) as the top factors that would increase recycling in Pinellas County (2005 Pinellas County Recycling Awareness Survey, Executive Summary, page 10).

Municipal Recycling Reports – Cities are supposed to report tons of recycled materials collected through their municipal programs, but some are not able to get this information from their contractors. County staff measures the performance of recycling drop off centers in unincorporated areas, the county's yard waste to mulch process, the Household Electronics & Chemical Collection Center and mobile collections, and the reef construction program.

Commissioned Studies – Consultants perform various analyses of Solid Waste Operations' current and potential programs. Current studies include waste composition, waste reduction options, curbside recycling, litter, and beach recycling.

TABLE 11
RECYCLING IN PINELLAS COUNTY JURISDICTIONS MATERIALS AND TYPE OF PROGRAM

JURISDICTION	COLLECTION PROGRAM		MATERIALS COLLECTED								
	CURBSIDE PICKUP	COLLECTION CENTER	NEWSPAPER	CARDBOARD	MIXED PAPER	ALUMINUM	STEEL	PLASTIC	GLASS	YARD TRASH	MULCH
Belleair	X	X	X	X	X	X	X	X			
Belleair Beach	X		X			X	X	X	X		
Belleair Bluffs	X		X			X	X	X	X		
Belleair Shore	X		X			X	X	X	X		
Clearwater	X	X	X	X	X	X	X	X			X
Dunedin	X	X	X	X	X	X	X	X	X	X	X
Gulfport	X		X			X		X		X	X
Indian Rocks Beach	X	X	X			X		X		X	X
Indian Shores	X	X				X		X	X		
Kenneth City	X	X	X		X	X		X	X		
Largo	X	X	X	X	X	X		X	X	X	X
Madeira Beach	X	X	X	X		X	X	X		X	X
North Redington Beach	X		X			X	X	X	X		
Oldsmar	X		X		X	X	X	X	X		
Pinellas Park	X		X			X	X	X	X	X	X
Redington Beach	X		X		X	X	X	X	X		
Redington Shores		X	X			X		X		X	
Safety Harbor	X	X	X	X		X	X	X	X	X	X
St. Petersburg		X	X	X	X	X		X	X	X	X
St. Pete Beach	X		X			X	X	X	X		X
Seminole	X										
South Pasadena	X	X	X			X		X	X		
Tarpon Springs	X	X	X	X		X	X	X	X	X	X
Treasure Island	X	X	X	X		X	X	X	X		X
Unincorporated Pinellas		X	X	X	X	X		X			X

Source: Pinellas County Utilities, Solid Waste Operations, 2007

LAND USE AND ZONING

Pinellas County's land use development trend has been similar to the other coastal areas of Florida. Initially slow to develop due to its inaccessibility, Pinellas grew rapidly following the arrival of the Orange Belt Railroad in 1887. Since that time, the County's consistent growth has been interrupted only briefly: During World War I, following the collapse of the Boom period of the 1920s, during the Great Depression, and during World War II.

Pinellas County is the most urbanized county in the state; in 2006 only 9,014 acres or 5.6% percent of Pinellas County's land available for development were vacant. Of the remaining vacant land, nearly 4,900 acres (54.3%) are designated for residential uses, approximately 2,000 acres (21.6%) are designated for industrial uses, about 1,000 acres (11.7%) are designated for commercial uses, nearly 465 acres (5.2%) are designated for residential/office/retail-type uses, and about 646 acres (7.2%) are designated as Institutional, Public/Semi-public, and Recreation/Open Space land uses.

The countywide land use designations, as shown on the Countywide Future Land Use Map, for the waste-to-energy facility and the adjacent Bridgeway Acres Landfill are Industrial General and Industrial Limited. However, portions of the property fall within the jurisdictions of St. Petersburg, Pinellas Park and the County. The portion that is within the unincorporated area is zoned M1 (light manufacturing and industrial). The property within Pinellas Park's jurisdiction is zoned IH (Industrial Heavy), and the property that is within the jurisdiction of St. Petersburg is IP (Industrial Parkway). All these designations are compatible with the land use designations. Additional information relating to land use can be found in the Future Land Use Element.

In 2005, the City of St. Petersburg submitted a zoning change request to allow mixed use development including industrial, commercial and residential at the property located immediately south of the solid waste facility, on the east side of 28th Street, south of 102nd Avenue. The proposed zoning change would have allowed for residential development immediately adjacent to the solid waste facility. While there is already residential development within 500 feet of the disposal facility, the County was concerned with allowing more residential development close to the site due to the potential for increased pressure to limit landfilling. This has happened at a number of landfills in the State of Florida. Due to the importance of the solid waste facility to the County, and the lack of any viable location to develop a new disposal site within the County, the Board approved a land use code amendment that prohibited residential development within 2000 feet of the landfill. The code did include the ability for the Board to approve variances to this setback.

FINANCIAL MANAGEMENT

The Department of Solid Waste Operations is a self-supporting enterprise. The other County programs that operate as enterprise funds are the St. Petersburg-Clearwater Airport and the other divisions within the Utilities Department.

The Pinellas County waste-to-energy facility was built with the sale of $160 million in industrial revenue bonds in 1980 and an additional $83,375,000 in bonds which were sold in 1983 for an expansion to the plant. In 1996, $83,500,000 in bonds were issued for construction of the air pollution control retrofit project. Gross revenues for the operation of the waste-to-energy complex are from:

1) user or tipping fees for the disposal of solid waste;
2) revenues from capacity payments and the sale of electric power to Progress Energy Florida, Inc.;
3) revenues from the sale of recovered materials (mainly ferrous metals and aluminum); and
4) investment income.

In fiscal year 1996-97, the amount budgeted for debt service was $24,808,070, out of a total operation and management budget estimate of $55,262,520. The rest of the budget included outlays for operating expenses, capital costs and transfers. In October 2006, the last remaining bond was paid off.

DISASTER PLAN

Pinellas County has a Comprehensive Emergency Management Plan (CEMP) which is adopted by the Board of County Commissioners. The CEMP includes policies, procedures and guidelines to prepare for, respond to, recover from and mitigate future impacts of all hazards and disasters that could affect the County. This includes, but is not limited to, natural disasters like storms, hurricanes, floods, fires or other catastrophes resulting in damage, hardship or suffering. Depending on the severity of a disaster, municipal, county, state, and federal authorities would participate in disaster preparation, response, recovery and mitigation activities. The Director of Emergency Management is the County coordinator of disaster operations.

Pinellas County adheres to the “Pinellas County Debris Management Plan” to respond to a natural or man-made debris generating event. This plan identifies agencies and activities that are involved in debris operations to ensure a coordinated response to achieve removal, storage, and final disposition of debris. Within this Plan, Standard Operating Guidelines (SOG) provide the organizational structure, guidance, and standardized guidelines for field operations in the clearance, removal and disposal of debris. These SOG apply to all Pinellas County departments and agencies. Further, the SOG are designed to assist Pinellas County staff in coordinating with municipal and private sector debris removal and disposal operations to maximize cleanup efficiencies. Contracts for debris collection, removal and disposal developed in support of this plan include provisions that allow municipalities to “piggyback” on the County contract at the same rates, with coordination of cleanup efforts being handled by a committee of the participating entities.

Post-disaster debris clearance and removal in the unincorporated areas is to be coordinated by the Pinellas County Utilities, Solid Waste Operations with the assistance of the Department of Public Works. The Pinellas County Utilities provides assistance, as necessary, to municipalities. Debris removal operations after a disaster are the responsibility of the

municipality involved, if it is within their capability. Assistance can be provided to these departments by coordinating with the Pinellas County Emergency Operations Center. All debris, especially perishable items, will initially be transported to temporary waste storage and processing sites and eventually to the waste-to-energy facility or out of Pinellas County for disposal. Temporary waste storage and processing sites are identified throughout the County, and each year the availability and readiness of these sites is assessed and the listing is updated accordingly. Emergency sites for burning debris may also be authorized and selected by the County in coordination with state agencies, fire departments, and local municipalities. Assistance may also be provided, if needed, by state and federal agencies.

The Pinellas County Department of Solid Waste Operations developed a Hurricane Disaster Preparedness Plan in 1994 and it is updated annually. This plan establishes procedures and assigns responsibilities for securing the facility prior to an emergency, for assessment of damages, and restoration of normal operations as soon as possible after the disaster.