Hillsborough County, Florida

Solid Waste Energy Recovery Facility — Application for Power Plant Site Certification

Volume I — Application

Submitted By
The Hillsborough County
Board of County Commissioners

August, 1984

Prepared by

Camp Dresser & McKee Inc.

It will be the responsibility of the Contractor to discharge wastewater to the County's adjacent wastewater treatment plant in accordance with County pretreatment standards, which have not been completed.

Solid Waste Disposal. Figure 2.14 shows the location of existing and proposed solid waste management facilities within the County. Currently, all of the solid waste generated in Hillsborough County, including that generated by the three cities, is disposed of at the County's Hillsborough Heights landfill. The monthly solid waste quantities received at the Hillsborough Heights Sanitary Landfill from May 1981 to April 1983 are shown in Table 2.21. Approximately 2,000 tons per day (six days per week) of solid waste are disposed of at this site, of which about 750 tons per day (six days per week) is delivered by the City of Tampa. Due to capacity limitations and legal restrictions, the Hillsborough Heights landfill is under state administrative order to close by October 31, 1984. The County has commenced construction on the new Southeast County Sanitary Landfill which will be in operation by November 1, 1984. The Southeast County Sanitary Landfill will be used initially for all solid waste disposal, and then as both a residue and emergency backup disposal site for the resource recovery facility, as well as for the disposal of solid waste which cannot be processed.

A 1,000 ton per day (rated capacity) solid waste resource recovery facility to serve the City of Tampa is presently under construction at McKay Bay in Tampa with operation scheduled for May 1986. The Southeast County Sanitary Landfill will be utilized by the City for the disposal of non-processible solid waste and for residue and emergency backup.

The solid waste collection system in the County consists of both city and private refuse collection, and solid waste transfer stations. The County franchises private collection services for the unincorporated areas of the County. There are five franchise districts. Each franchise is for a period of five years and requires each hauler to provide twice-weekly collection to all persons requesting service. For this service, each hauler is permitted to charge fees not to exceed those established annually by the County. The County owns and operates two solid waste transfer stations, the South County transfer station and the Northwest transfer station.

provide an efficient, environmentally-sound, long-range solution to the County's solid waste disposal problems. The facility will be part of a comprehensive County Solid Waste Disposal and Resource Recovery System which will include two transfer stations and the Southeast County Landfill. The wastewater treatment plant will treat wastewater that the County currently pays the City of Tampa to treat. The subregional wastewater facility is also expected to treat flows from several potential industrial concerns, including the proposed resource recovery facility. This plant will help to alleviate the area's sewage treatment problems and, at the same time, supply all of the cooling water needs of the proposed resource recovery facility. The layout of these facilities is presented in Figure 2.5 of Section 2.1.2.

Since the WWTP will be a discretely functioning, albeit interrelated, feature on the site, the components and processes of the WWTP are discussed in a separate section added to the end of this chapter (see Section 3.10).

Hillsborough County is currently seeking proposals fom qualified firms and organizations for the design, construction, startup, acceptance testing, operation and maintenance of a solid waste resource recovery facility to serve the unincorporated areas of the County. The Board of County Commissioners has officially stated that the County will own the project. The contractor will provide a full-service arrangement, including design, construction, acceptance testing, and 20 years of continuous operation, for a "mass-burn" type resource recovery facility with a continuous design rated capacity of 1,200 tons per day using three combustion/steam generation units each with a continuous design rated capacity of 400 tons per day. Additionally, the layout of the project will allow the addition of a fourth combustion/steam generation unit. Initial project construction will include a tipping area and refuse storage pit sized to handle 1,600 tons per day (continuous design rated capacity) and the stack shall have four (4) flues. The project will have one steam turbine-generator which shall generate electricity (about 450 Kwh/ton) to be delivered for sale to Tampa Electric Company (TECO). Power lines from the project's electrical switchyard will connect TECO's powerline right-of-way which abuts the western boundary of the project site. Revenues from energy sales will be shared by the County and Contractor over the life of the operating contract.

Since the proposed facility will utilize mass-burn technology, there will be no preprocessing of wastes at the facility prior to combustion (except for some limited size reduction of oversized items). A schematic diagram of a typical resource recovery facility is presented in Figure 3.1. MSW will be truck-delivered to the facility and ash residue removed by the same mode of transport. Under a 1600 tpd configuration, four 400 tpd units would be used in the facility. MSW would be dumped into the refuse bunker directly from transfer trailers and packer trucks inside the building. All waste will be stored inside the building, so no waste will be visible from the outside. Two overhead cranes will mix the MSW in the bunker and load the charging hoppers as required.

Oversized items would be separated from the other refuse by the overhead crane. A rotor shear (shredder) may be utilized to reduce the size of material. After size reduction, this material would be charged into the furnace.

Each boiler will be equipped with an electrostatic precipitator (ESP) for particulate air emission control. An electrostatic precipitator is a pollution control device that removes small particles from exhaust gases. The gases pass through a strong electric field where the particles are charged and attracted to the opposite electrically charged collecting plates. The dust is then removed mechanically from these plates. The efficiency of the ESP has been established as achieving an emission limitation for particulate matter of 0.025 gr/dscf corrected to 12% CO_2. (A complete analysis, demonstrating the ESP as LAER for particulate matter and BACT for the other criteria pollutants is contained in Appendix 10.1.5 (see Volume III-Air Quality)). The flue gas will be drawn through the ESPs by an induced draft fan which would be located between the stack and the ESPs.

Bottom ash from the furnace and flyash from the precipitator will be mixed prior to removal from the facility. Ash resulting from the combustion of MSW will comprise 10 percent of the volume and 25 percent of the weight of the MSW processed by the facility. The ash will be quenched with water to about 30 percent moisture prior to transport to a landfill.

As noted above, while the proposed facility will have a maximum design rated capacity of 1600 tpd, its initial design rated capacity will be about 1200 tpd (comprised of three 400 tpd units). Each boiler unit operates independently from the others. It will, therefore, be possible to routinely shut down one unit for periods of maintenance and inspection.

3.2 SITE LAYOUT

3.2.1 Layout

The general site development plan (Figure 2.5), shows the conceptual building layout and plant perimeter on the site. All structures will be set back a minimum of 100 feet from all property lines and adjacent roadways. Although the resource recovery facility and wastewater treatment plant will remain separate with individual fencing and parking, the overall facility design and layout will be coordinated (i.e. roadways, fences, retention basins, buffers, signs, etc).

The wastewater treatment plant has been layed out to effectively utilize the existing sloping land within the plant hydraulic profile to minimize pumping. Shallow groundwater restricts construction below grade. Therefore, some portions of the facility which would normally be below grade will be constructed above grade.

The natural site drainage is to the west. Site grading will respect existing drainage patterns where possible. However, substantial site grading will be required to construct a resource recovery facility with multiple level vehicle access. Maximum side slopes for site fill will be

3 x 1600 = 4800 TONS

The facility shall include a totally enclosed tipping floor with twelve tipping bays each sixteen feet in width. Back up barriers will be provided at each tipping bay to prevent vehicles from entering the solid waste storage area. The storage of the delivered solid waste shall be in a completely enclosed storage pit with the floor elevation below the tipping floor. The pit shall be sized for a minimum storage capacity of three days of solid waste; i.e. 4,800 tons of solid waste at a density of 450 pounds per cubic yard. The storage and handling area will be under negative air pressure and shall supply the combustion air during facility operation which will minimize odors outside of the refuse storage area and refuse unloading building.

A solid waste size reduction system consisting of a rotary shear will be provided to reduce the size of the bulky waste which could block the charging hopper to the combustion/steam generating units.

Two overhead solid waste handling cranes will be installed to charge the combustion units and the rotary shear, and maintain the solid waste storage area. The cranes will be of the travelling bridge type, employing a polyp type grapple. Each crane will be capable of meeting the solid waste handling requirements of the entire facility.

3.4 AIR EMISSIONS AND CONTROLS

3.4.1 Air Emissions Types and Sources

As noted previously, the proposed energy recovery facility is a new facility to be located in Hillsborough County. At ultimate size, the facility as planned would contain four boilers each with a rated capacity of 400 tpd of MSW for a total of 1600 tpd. The flue from each of the boilers will be encased in a single stack. The refuse bunker and the residue storage area will be enclosed and under negative pressure as combustion air will be taken from these areas. There will be no on-site storage of either refuse or residue except within these controlled areas. Loading and unloading of trucks will take place within these bunkers. Trucks entering and leaving the site will be covered and travel on paved

Hillsborough County, Florida

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Volume II — Appendices

Submitted By
The Hillsborough County
Board of County Commissioners

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DESCRIPTION OF THE PROJECT

Background Information

Hillsborough County is currently seeking proposals from qualified firms and organizations for the design, construction, startup, acceptance testing, operation and maintenance of a solid waste resource recovery and electrical generating facility to serve the unincorporated areas of the County. The Board of County Commissioners has officially stated that the County will own the project. The contractor will provide a full-service arrangement, including design, construction, acceptance testing, and 20 years of continuous operation, for a "mass-burn" type resource recovery facility with a continuous design rated capacity of 1,200 tons per day using three combustion/steam generation units each with a continuous design rated capacity of 400 tons per day. Additionally, the layout of the project will be such as to allow the addition of a fourth combustion/steam generation unit. Initial projection construction shall include a tipping area and refuse storage pit sized to handle 1,600 tons per day (continuous design rated capacity) and the stack shall have four (4) flues. The project will have one steam turbine-generator which shall generate electricity to be delivered for sale to Tampa Electric Company (TECO). Power lines from the project's electrical switchyard will connect TECO's powerline right-of-way which abuts the western boundary of the project site. Revenues from energy sales will be shared by the County and Contractor over the life of the operating contract.

The project will be located on a site (Faulkenburg Road Site) that has been selected by the County. The County has purchased the property from Seaboard System Railroad. At public hearings, after hearing presentations from both the County staff and the public, the Board of County Commissioners approved an amendment to the Land Use Plan Element of the Horizon 2000 Plan which designated the site as the location of Public/Semi-Public facilities and changed the site zoning from Restricted Industry District to Community Unit District.

Process Description

Since the proposed facility will utilize mass-burn technology, there will be no preprocessing of wastes at the facility prior to combustion (except for some limited size reduction of oversized items). A schematic diagram of a typical resource recovery facility is presented in Figure 1. MSW will be truck-delivered to the facility and ash residue removed by the same mode of transport. MSW would be dumped into the refuse bunker directly from packer trucks inside the building. All waste will be stored inside the building, so no waste will be visible from the outside.

Each boiler will be equipped with an electrostatic precipitator (ESP) for particulate air emission control. An electrostatic precipitator is a pollution control device that removes small particles form exhaust gases. The gases pass through a strong electric field where the particles are attracted to the electrically charged collecting plates. The dust is then removed mechanically from these plates. The efficiency of the ESPs would be established during the federal and state (such as PSD/NSR) air quality permit process. The flue gases will be drawn through the ESPs by an induced draft fan which would be located between the stack and the ESPs.

A wastewater treatment plant is also planned at the site and is at the preliminary design phase. Treatment process trains are currently being developed. The wastewater treatment plant will treat wastewater that the County currently pays the City of Tampa to treat. The subregional facility is also expected to treat flows from several industrial concerns, including the proposed resource recovery facility. This plant will help to alleviate the area's effluent disposal problems and, at the same time, supply all of the cooling water needs (approximately 800,000 gallons per day maximum) of the proposed resource recovery facility. The proposed facility will be capable of providing an effluent treated to high levels to meet the mandated requirements of the Florida Department of Environmental Regulation (FDER).

Project Certification

Florida has adopted legislation, the Florida Electrical Power Plant Siting Act (Florida Statutes, Chapters 403.501 - 403.517), as amended, through Chapter 17-17 of the Florida Administrative Code (FAC) "to provide efficient, centralized review of the needs for increased electrical power generation and the effects of generator-related activities on human health and the environment and ecology of the lands and waters within the state." The Florida Department of Environmental Regulation (FDER) implements this Act.

This Act provides for a certification process which is a "one stop" centralized permitting procedure. Under the Act, the County may elect to obtain each required permit separately, or to file an application for certification which would expedite the review and coordinate the permit application process.

The County is pursuing Site Certification under the Florida Electrical Power Plant Siting Act. The County has submitted a "Plan of Study for Completion of the Application for Certification of Proposed Electrical Power Generating Plant Site" and will file the "Application for Certification" in July 1984.

Once the site is certified by the state, no other state permits will be required for the project. Although the rated continuous design capacity of the project will be 1,200 tons per day (generating about 29 megawatts), site certification is being sought for an ultimate continuous design rated capacity of 1,600 tons per day (generating about 39 megawatts) since it is anticipated that the County may expand the project in the future.

Hillsborough County, Florida

Solid Waste Energy Recovery Facility — Application for Power Plant Site Certification

Volume III — Air Quality

Submitted By
The Hillsborough County
Board of County Commissioners

Rodney Colson, Chairman
Matt Jetton, Vice Chairman
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August, 1984

Prepared by
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the pollution control facilities, when properly maintained and operated, will discharge an effluent that complies with all applicable statutes of the State of Florida and the rules and regulations of the department. It is also agreed that the undersigned will furnish, if authorized by the owner, the applicant a set of instructions for the proper maintenance and operation of the pollution control facilities and, if applicable, pollution sources.

Signed ____________________

Louis Tortora, Jr. PE
Name (Please Type)

Camp Dresser & McKee, Inc.
Company Name (Please Type)

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Mailing Address (Please Type)

Florida Registration No. 32073 Date: 7/24/84 Telephone No. (813)530-9984

SECTION II: GENERAL PROJECT INFORMATION

A. Describe the nature and extent of the project. Refer to pollution control equipment, and expected improvements in source performance as a result of installation. State whether the project will result in full compliance. Attach additional sheet if necessary.

Project is a solid waste energy recovery facility which shall generate electrical power from combustion of municipal refuse. Pollution control device shall be an electrostatic precipitator with an outlet loading of 0.025 grains/dscf corrected to 12% CO_2. Project will be in full compliance with all existing state and federal standards, and the air pollution control device shall meet LAER/BACT for all applicable pollutants.

B. Schedule of project covered in this application (Construction Permit Application Only)

Start of Construction January 1985 Completion of Construction January 1988

C. Costs of pollution control system(s): (Note: Show breakdown of estimated costs only for individual components/units of the project serving pollution control purposes. Information on actual costs shall be furnished with the application for operation permit.)

Electrostatic Precipitators (4) $4,500,000 total

D. Indicate any previous DER permits, orders and notices associated with the emission point, including permit issuance and expiration dates.

Not Applicable

H. Emission Stack Geometry and Flow Characteristics (Provide data for each stack):

Stack Height: ________ ft. Stack Diameter: ________ ft.

Gas Flow Rate: ________ ACFM ________ DSCFM Gas Exit Temperature: ________ °F.

Water Vapor Content: ________ % Velocity: ________ FPS

SECTION IV: INCINERATOR INFORMATION

Type of Waste	Type 0 (Plastics)	Type I (Rubbish)	Type II (Refuse)	Type III (Garbage)	Type IV (Patholog-ical)	Type V (Liq.& Gas By-prod.)	Type VI (Solid By-prod.)
Actual lb/hr Inciner-ated	Vendor supplied information				CALCULATION 6/13/94 BY GPL LBS/HR		
Uncon-trolled (lbs/hr)	Vendor supplied information.				133333 / 4 UNITS	= 33333 x 24 HRS/DAY ÷ 2000 LBS/TON = 400 TONS/DAY/UNIT	

Description of Waste Municipal solid waste

Total Weight Incinerated (lbs/hr) 133,333. Design Capacity (lbs/hr) 133,333. (name plate rating

Approximate Number of Hours of Operation per day ______ day/wk ______ wks/yr. ______

Manufacturer Vendor not selected yet.

Date Constructed ________ Model No. ________

	Volume (ft)^3	Heat Release (BTU/hr)	Fuel Type	Fuel BTU/hr	Temperature (°F)
Primary Chamber	Vendor specific information				
Secondary Chamber					

Stack Height: 220 ft. Stack Diamter: 4 flues, each 5'-9" Diam. Stack Temp. 430^{0}F

Gas Flow Rate: 342,000 ACFM 140,070 @ 50% Ex. Air DSCFM* Velocity: 55 FPS

*If 50 or more tons per day design capacity, submit the emissions rate in grains per standard cubic foot dry gas corrected to 50% excess air. 0.027 gr/dscf @ 50% Ex. Air

Type of pollution control device: [ ] Cyclone [ ] Wet Scrubber [ ] Afterburner

[ ] Other (specify) Electrostatic Precipitator

State of Florida
DEPARTMENT OF ENVIRONMENTAL REGULATION
Application To Operate/Construct Air Pollutant Sources
Supplemental Information

Section V: Supplemental Requirements

1. Total process input rate at design capacity (i.e. name-plate rating) is 1600 TPD, 4 units each at 400 TPD. Residue amount will be 29.000. lb/hr (dry basis) and is derived as follows:

$$\text{Inert Material} = \left(133{,}333\ \frac{\text{wet lb feed}}{\text{hr}}\right)\left(0.7265\ \frac{\text{dry lb}}{\text{wet lb}}\right)\left(0.289\ \frac{\text{lb inert}}{\text{dry lb}}\right) = 28{,}100\ \frac{\text{dry lb inert}}{\text{hr}}$$

$$\text{Unburned Carbon:} = \left(133{,}333.\ \frac{\text{wet lb feed}}{\text{hr}}\right)\left(0.7265\ \frac{\text{dry lb}}{\text{wet lb}}\right)\left(0.3567\ \frac{\text{lb. Carbon}}{\text{dry lb}}\right)(.025) = 900.\ \frac{\text{dry lb carbon}}{\text{hr}}$$

$$29{,}000.\ \frac{\text{dry lb residue}}{\text{hr}}$$

2. Emission estimates are contained in the Prevention of Significant Deterioration (PSD) Permit Application.

3. Emission factors were derived from AP-42 and from data from recent large-scale, mass burn resource recovery facilities. See PSD Permit Applications.

4-8. These items are not available at this time since a system supplier has not been selected. Once these items have been provided by the vendor they will be transmitted to DER for inclusion in this application.

nameplate generating capacity of approximately 29 megawatts, using 1,200 tons per day (tpd) of solid waste as fuel. However, certification for an ultimate site capacity of about 39 megawatts, capable of processing 1,600 tons of solid waste per day, is being sought in anticipation of future solid waste disposal requirements. The energy produced would be used to satisfy internal power demands and the surplus would be sold directly to the Tampa Electric Company (TECO).

Since the proposed facility will utilize mass-burn technology, there will be no complex preprocessing of wastes at the facility prior to combustion. However, identifiable quantities of sludge from wastewater treatment plants, asbestos containing construction waste, or other hazardous waste will not be accepted at the facility. Oversized items would be separated from the incoming refuse by an overhead crane. A roto-shear (shredder) may be utilized to reduce the size of this material. After size reduction, this material would either be landfilled, sold as scrap, or charged into the furnace.

A conceptual schematic diagram of the recovery facility is presented in Figure 3-2. Truck transport will be used to deliver MSW to the facility and to remove ash residue from the facility. Under a 1600 tpd configuration, four 400-tpd units would be used in the facility. MSW would be dumped into the refuse bunker directly from packer trucks inside the building. All waste will be stored inside the building and kept under negative pressure, so no waste will be visible from the outside and odors and fugitive emission will be controlled. The overhead cranes mix MSW in the bunker and load the four charging hoppers as required.

Each boiler will be equipped with an electrostatic precipitator (ESP) for particulate air emission control. An electrostatic precipitator is a pollution control device that removes small particles from exhaust gases. The gases pass through a strong electric field where the particles are charged and attracted to the electrically charged collecting plates. The dust is then removed mechanically from these plates. The efficiency of the ESP has been established as achieving an emission limitation for particulate matter of 0.025 gr/dscf corrected to 12% CO_2. A complete analysis, demonstrating the ESP as LAER for particulate matter and BACT for the other criteria pollutants is contained in Chapter 6.0. The flue gas will be drawn through the ESPs by an induced draft fan which would be located between the stack and the ESPs.

Bottom ash from the furnace and flyash from the precipitator will be mixed prior to removal from the facility. Ash will comprise 10 percent of the volume and 25 percent of the weight of the MSW processed by the facility. The ash will be quenched with water to about 30 percent moisture prior to transport to a landfill.

As noted above, while the proposed facility will have a maximum design rated capacity of 1600 tpd, its initial throughput will be about 1200 tpd (comprised of three 400 tpd units). Each boiler unit operates independently from the others. It would, therefore, be possible to routinely shut down one unit for periods of maintenance and inspection.

3.3 GOOD ENGINEERING PRACTICE STACK HEIGHT EVALUATION

The 1977 Clean Air Act Amendments sought to require that emission limitations used for control of any pollutant were not affected by the stack height which exceeds good engineering practice (GEP), or any other dispersion technique. The GEP stack height was that "height necessary to insure that emissions from the stack do not result in excessive concentrations of any air pollutant in the immediate vicinity of the source as a result of atmospheric downwash, eddies, and wakes which may be created by the source itself, nearby structures, or nearby terrain obstacles." The Act did not seek to restrict the actual height of any stack, only to limit the theoretical stack height used in determining a source's allowable emission rate. This section of the Clean Air Act does not apply to stacks in existence before December 31, 1970.

The EPA proposed regulations to implement Section 123 on January 12, 1979 (44 FR 2608). Based on the responses received during the extended period for public comments, the EPA issued a final rulemaking regarding stack

106.8m. Since the proposed stack height of 67m is less than the maximum GEP stack height, the effects of downwash must be considered in predicting ground level concentrations. For a further discussion regarding the proposed stack height, see Appendix 10.16 "Stack Height Analysis and Recommendations".

3.4 BOILER OPERATING CONDITIONS

The resource recovery facility will consist of four boilers each capable of firing 400 tpd of reference waste (see Section 3.3 of Volume I) at its maximum continuous rating (MCR). This firing rate will be adjusted as the waste quality changes, i.e. changes in the higher heating value (HHV). This is because one of the objectives of plant operation is to maintain the heat load to the boiler by maintaining the heat release on the grate. When the HHV is low (higher moisture and ash fractions, lower combustibles fraction) more waste will be processed, up to 440 tpd per boiler. Likewise, when the HHV is high, less waste will be processed.

A screening analysis was run to assess the potential air quality impact of various operating loads. A total of four different operating load extremes were selected for review. The boiler operating conditions selected for modeling were based on identifying minimum, maximum, and typical load conditions as well as identifying high and low values of the HHV. The boiler conditions associated with each case are listed in Table 3-2.

The maximum load condition with a heating value of 4,000 Btu/lb resulted in the highest pollutant impacts and therefore this condition is used throughout the modeling assessment (see Section 7.1). This provides for a conservative analysis as the facility is expected to operate, over the long-term, at its maximum continuous rating (MCR) of 400 TPD of reference solid waste subject to an availability of 85 percent. A detailed discussion of the modeling methodology and results of the screening analysis are described in Exhibit A.

TABLE 3-2

BOILER OPERATING CONDITIONS

Boiler Exit		Refuse Fired		Flue Exit (from all 4 boilers)		
°F	ACFM*	Heat Content Btu/lb	Rate* (TPD)	Temp. °F(°K)	Flow Rt ACFM	Exit Vel. fps (mps)**
450	87,840	4,000	440	430 (494)	343,600	55.2 (16.82)
475	89,675	4,500	400	455 (508)	351,000	56.4 (17.19)
450	39,925	4,000	200	430 (494)	156,200	25.1 (7.65)
450	79,855	4,000	400	430 (494)	312,400	50.3 (15.32)

* Per boiler (4 boilers total).
** Flue diameter = 5'9" (1.75 m) for an effective diameter of 3.5m.

TABLE 4-1

EMISSION FACTORS FOR FLORIDA RESOURCE RECOVERY FACILITIES
(pounds per ton of MSW)

Hydrocarbons	Hillsborough (proposed)	Pinellas 1 & 2[1]	Pinellas 3[2]	McKay Bay[3]
Particular matter	0.48*	1.6	0.5	0.67*
Sulfur dioxide	2.5	3.0	1.9	4.1
Nitrogen oxides	3.0	---	3.0	7.2
Carbon monoxide	1.8	---	1.5	0.4
Hydrocarbons	0.2	---	0.3	0.2
Lead	0.048	---	0.03	0.074
Mercury	0.0052	---	0.01	0.0996
Beryllium	13.1×10^{-6}	---	1.3×10^{-6}	6.2×10^{-6}
Fluorides	0.06	---	0.1	0.10
Sulfuric acid	7.68×10^{-2}	---	---	---
Hydrogen chloride	4.0	---	4.0	4.51

* Required LAER due to non-attainment area

Source: 1) HDR, 1978
2) HDR, 1983
3) Florida Permit AC 29-47277

~~CALCULATION~~ BY GPL 6/13/94
~~TABLE 4-1~~ STATE PM LIMIT OF .48 LBS/TON
0.48 x 1600 TONS/DAY x 365 DAYS ÷ 2000 LBS/TON
= 140 TPY

TABLE 5-1

SIGNIFICANT EMISSION RATES AND FACILITY POTENTIAL TO EMIT VALUES FOR PSD REGULATED POLLUTANTS

Pollutants	Significant[a] Emission Rates (tons/year)	Potential[b] to Emit (tons/year)
Particulate matter	25	140
Carbon monoxide	100	526
Nitrogen oxides	40	876
Sulfur dioxide	40	730
Ozone (VOCs)	40	58
Lead	0.6	14
Asbestos	0.007	---
Beryllium	0.0004	3.83×10^{-3}
Mercury	0.1	1.52
Vinyl chloride	1.0	---
Fluorides	3	17.5
Sulfuric acid mist	7	22.4
Total reduced sulfur (including H_2S)	10	---
Reduced sulfur (including H_2S)	10	---
Hydrogen sulfide	10	---
Hydrogen chloride	---	1168

SOURCE:

[a]FAC 17.2 Part V Table 500.2.

[b]Emission estimates at 100 percent system capacity for Baseline Control Alternative - ESP 0.025 gr/dscf @ 12 percent CO_2.

6.0 BEST AVAILABLE CONTROL TECHNOLOGY/LOWEST ACHIEVABLE EMISSION RATE ANALYSIS

The evaluation of the emission control technology proposed for a new source is to be contained within the Best Available Control Technology (BACT) and Lowest Achievable Emission Rate (LAER) analyses which are integral portions of the PSD and NSR processes. The BACT analysis is required under the PSD review process, and the LAER analysis is required under New Source Review (NSR) for Non-Attainment Areas, Florida Administrative Code 17-2.510. For purposes of consistency and continuity, both analyses have been incorporated into this section. The BACT/LAER analysis provides the rationale for selecting the control strategy to best satisfy the individual constraints of the area surrounding the site and to minimize the impacts on energy, economic and environmental issues.

A BACT/LAER analysis involves: the review of pollutant applicability, the identification of sensitive concerns, and the selection of control strategy alternatives. These elements are further evaluated using energy, economic and environmental criteria. It is assumed for this analysis that the facility will operate at 100% availability at the maximum firing rate of 110% of the nameplate rating (equal to 1760 TPD). This will provide for worst-case analysis in terms of emissions (both short- and long-term) and their environmental impacts, energy consumption, and economic (operations and maintenance) considerations. Finally, the BACT/LAER decision-making process culminates in a preferred control strategy for minimizing the emission of regulated pollutants from the proposed source within the above constraints. The control option finally selected as LAER for particulate matter is the electrostatic precipitator designed to limit particulate emissions to 0.025 gr/dscf corrected to 12% CO_2, and along with other design specifications is BACT for other regulated pollutants.

Potential sensitive concerns to be included in the BACT/LAER analysis can be addressed on the basis of energy, economic and environmental issues. Relative to energy supply, the project will have a positive effect. The facility is designed to produce steam and electricity during the combustion process. This generation will help satisfy an existing energy demand that would otherwise be supplied by existing fossil-fuel combustion units. Furthermore, no direct energy is recovered from the landfilling of MSW, but fugitive emissions and odor are generated from that disposal method.

The economic impacts analysis of the alternative air pollutant control strategies is based on the following factors: capital cost (debt service), maintenance costs (including supplies and labor), and operations cost (cost of power, chemicals, water, waste disposal). Facility design features that affect air pollutant emissions but which are primarily related to the furnace design and operational parameters (i.e. grate design, excess air level, etc.) are not included in the economic analysis. With this data the total annual cost (economic impact) of each control strategy for each pollutant can be assessed and comparisons made in terms of cost effectiveness.

In general, the positive environmental impacts of the facility would include the reduction of landfilling activities and a resultant reduction in fugitive dust emissions, vehicular emissions (carbon monoxide, hydrocarbons, and nitrogen oxides), odor problems, potential groundwater pollution, and a reduction in the consumption of land resources for landfilling activities. However, the facility would directly impact air quality by releasing atmospheric pollutants as identified in Section 4.0. The level of degradation is assessed on a comparative basis for both the individual control technology considered and the relative impact on the environment.

The environmental impact analysis was performed by calculating incremental ground-level air pollutant impacts of the various control alternatives. The EPA-approved short-term version of the Industrial Source Complex Model (ISCST) model was chosen due to its capability to analyze the aerodynamic affects of the buildings comprising the facility on plume dispersion (downwash). This is required since the proposed stack height is less than the calculated GEP requirements. The modeling methodology and protocol that is followed to calculate facility impacts in Section 7.0 was also used in the BACT/LAER analysis. The stack parameters that were used in the modeling exercise simulated worst-case conditions. That is, recently cleaned boilers operating at maximum load conditions (1760 tpd or 110 percent of the nameplate rating) and firing a waste with a low HHV (4000 BTU/lb). The boiler tubes, being recently cleaned, allow for maximum heat transfer which therefore reduces flue gas temperature; hence, reduces plume rise and pollutant dispersion. This particular condition will occur only briefly. As the units are operated, the boiler tubes become fouled, thereby reducing heat transfer and increasing the flue gas temperature which aids pollutant dispersion. Although worst-case conditions should be used to calculate maximum short-term pollutant concentrations, annual average conditions would be used to calculate maximum long-term concentrations. However, to minimize the computer time involved with the modeling activities, all impacts, both short and long-term were predicted based on worst-case stack gas exit conditions. This would therefore overpredict the long-term concentrations providing a degree of conservatism. Also, this assumption of worst-case conditions holds true even under conditions of changing waste throughput due to variations in waste quality (i.e. HHV). The operating characteristics of the system were discussed earlier in Sections 2 and 4. Worst-case conditions at maximum load corresponds to firing 1760 tpd of solid waste with an HHV of 4,000 BTU/lb and a stack gas exit temperature of 430 deg. F (ESP Case). The modeling data base and options used in the analysis are summarized in Section 7. Source operating data used as input to the model for all control alternatives are listed in Table 6-1. None of the control options studied resulted in pollutant impact projections in violation of the NAAOS or PSD increments (a detailed NAAOS analysis is contained in Section 7.0).

Although BACT determinations are made on a case-by-case basis, EPA pursues a program to disseminate information on control technology determinations. This is done in a nationally consistent manner through the BACT/LAER Clearinghouse (EPA, 1982 and EPA, 1983). The basic purposes of the BACT/LAER Clearinghouse are to: (1) provide state and local agencies with current control technology determinations, (2) summarize recent determinations for sources of similar size and nature, and (3) provide data on the emission limits imposed on new or modified sources.

Source Data

The resource recovery facility will consist of four boilers each capable of firing 400 tons per day (tpd) of reference solid waste. The boilers will typically not be run above 100% of the maximum continuous rate (MCR) but operation at 110% of the MCR caused the greatest air quality impacts and was, therefore, used throughout the air quality analysis (See Section 3.0). The stack parameters and flue gas conditions for the "worst-case" boiler operating condition are presented in Table 7-1. The flue gases from each boiler will be vented to a separate flue; the four flues will be encased in a common stack. Pollutant emission rates quantified in Section 4.0 were used to estimate projected pollutant impacts. Emissions data are based on using an electrostatic precipitator (ESP) designed to meet an outlet particulate loading of 0.025 gr/dscf, corrected to 12% CO_2.

A major consideration in the modeling analysis of an air pollution source is the potential for aerodynamic downwash to occur. Aerodynamic downwash results in enhanced ground-level concentrations caused by pollutants emitted from the stack being caught in air passing over and around building structures. The region of disturbed air flow is known as the cavity zone or turbulent wake. The size of the cavity/wake region depends on the geometry of the facility structures and the relative wind direction. Pollutants emitted from the facility's stack upwind of a building can be entrained into the cavity/wake region, if the stack height is low, relative to the building height, or the momentum of the flue gases is insufficient to escape the turbulent zone. When aerodynamic down wash occurs, the pollutants are rapidly mixed within the cavity/wake region and brought down to ground-level much quicker than without the influence of building downwash.

Based on the dimensions of this facility, the Good Engineering Practice (GEP) stack height is 106.8 m. Because the proposed stack height (67.0 m) is less than GEP, a downwash analysis was performed with the ISC model. As indicated by the modeling results, utilizing a stack height lower than GEP produces acceptable air quality impacts. A discussion of the GEP stack height analysis is contained in Section 3.3 and in Appendix 10.16.

TABLE 7-2

EMISSION RATES FOR THE PROPOSED FACILITY

Pollutant	Emission Rates* #/ton	Emission Rates* g/s
Total Suspended Particulates	0.48	4.46
Sulfur Dioxide	2.5	23.1
Carbon Monoxide	1.8	16.6
Nitrogen Oxides	3.0	27.7
Lead	0.048	0.444
Mercurgy	5.2×10^{-3}	0.048
Sulfuric Acid Mist	7.68×10^{-2}	0.710
Beryllium	1.31×10^{-5}	1.21×10^{-4}
Fluorides	0.06	0.554
Non-Methane Hydrocarbons	0.2	1.85
Total Reduced Sulfur	neg.	neg.
Reduced Sulfur Compounds	neg.	neg.
Vinyl Chloride	neg.	neg.
Asbestos	neg.	neg.
Hydrogen Chloride	4.0	37.9

*Emission rates based on a throughput equal to 110% of design capacity.

STATE OF FLORIDA

DEPARTMENT OF ENVIRONMENTAL REGULATION

TWIN TOWERS OFFICE BUILDING
2600 BLAIR STONE ROAD
TALLAHASSEE, FLORIDA 32301

BOB GRAHAM
GOVERNOR

VICTORIA J. TSCHINKEL
SECRETARY

APPLICATION TO OPERATE/CONSTRUCT AIR POLLUTION SOURCES

SOURCE TYPE: Solid Waste Energy Recovery Facility [X] New[1] [ ] Existing[1]

APPLICATION TYPE: [X] Construction [ ] Operation [ ] Modification

COMPANY NAME: County of Hillsborough, Florida COUNTY: Hillsborough

Identify the specific emission point source(s) addressed in this application (i.e. Lime Kiln No. 4 with Venturi Scrubber; Peaking Unit No. 2, Gas Fired) Solid Waste Energy Recovery Facility w/Electrostatic Precipitator

SOURCE LOCATION: Street Faulkenburg Rd. City Nearest Incorporated City Tampa

UTM: East 03/68/220 M.E. North 30/92/700 M.N.

Latitude 27 ° 57 ' ___ "N Longitude 82 ° 40 ' 22 "W

APPLICANT NAME AND TITLE: Warren N. Smith, Director

APPLICANT ADDRESS: Dept. of Solid Waste, P.O. Box 1110, 925 East Twiggs Street, Tampa Florida 33601

SECTION I: STATEMENTS BY APPLICANT AND ENGINEER

A. APPLICANT

I am the undersigned owner or authorized representative* of Hillsborough County

I certify that the statements made in this application for a construction permit are true, correct and complete to the best of my knowledge and belief. Further, I agree to maintain and operate the pollution control source and pollution control facilities in such a manner as to comply with the provision of Chapter 403, Florida Statutes, and all the rules and regulations of the department and revisions thereof. I also understand that a permit, if granted by the department, will be non-transferable and I will promptly notify the department upon sale or legal transfer of the permitted establishment.

*Attach letter of authorization

Signed: Warren N. Smith

Warren N. Smith, Director, Dept. of Solid Waste
Name and Title (Please Type)

Date: 7-23-84 Telephone No. (813)272-6674

B. PROFESSIONAL ENGINEER REGISTERED IN FLORIDA (where required by Chapter 471, F.S.)

This is to certify that the engineering features of this pollution control project have been designed/examined by me and found to be in conformity with modern engineering principles applicable to the treatment and disposal of pollutants characterized in the permit application. There is reasonable assurance, in my professional judgment, that

[1] See Florida Administrative Code Rule 17-2.100(57) and (104)

DER Form 17-1.202(1)
Effective October 31, 1982

the pollution control facilities, when properly maintained and operated, will discharge an effluent that complies with all applicable statutes of the State of Florida and the rules and regulations of the department. It is also agreed that the undersigned will furnish, if authorized by the owner, the applicant a set of instructions for the proper maintenance and operation of the pollution control facilities and, if applicable, pollution sources.

Signed ______________________

Louis Tortora, Jr. PE
Name (Please Type)

Camp Dresser & McKee, Inc.
Company Name (Please Type)

1321 U.S. 19South, Suite 601,Clearwater, Fl. 33546
Mailing Address (Please Type)

Florida Registration No. 32073 Date: 7/24/84 Telephone No. (813)530-9984

SECTION II: GENERAL PROJECT INFORMATION

A. Describe the nature and extent of the project. Refer to pollution control equipment, and expected improvements in source performance as a result of installation. State whether the project will result in full compliance. Attach additional sheet if necessary.

Project is a solid waste energy recovery facility which shall generate electrical power from combustion of municipal refuse. Pollution control device shall be an electrostatic precipitator with an outlet loading of 0.025 grains/dscf corrected to 12% CO_2. Project will be in full compliance with all existing state and federal standards, and the air pollution control device shall meet LAER/BACT for all applicable pollutants.

B. Schedule of project covered in this application (Construction Permit Application Only)

Start of Construction January 1985 Completion of Construction January 1988

C. Costs of pollution control system(s): (Note: Show breakdown of estimated costs only for individual components/units of the project serving pollution control purposes. Information on actual costs shall be furnished with the application for operation permit.)

Electrostatic Precipitators (4) $4,500,000 total

*Ash Bldg. Dust Suppression Bag House (1) $56,000 total

*Information added 6/12/87

D. Indicate any previous DER permits, orders and notices associated with the emission point, including permit issuance and expiration dates.

Not Applicable

E. Requested permitted equipment operating time: hrs/day 24 ; days/wk 7 ; wks/yr 52 ;

if power plant, hrs/yr ______; if seasonal, describe: ______

F. If this is a new source or major modification, answer the following questions. (Yes or No)

1. Is this source in a non-attainment area for a particular pollutant? Yes

   a. If yes, has "offset" been applied? Will seek offsets

   b. If yes, has "Lowest Achievable Emission Rate" been applied? Yes

   c. If yes, list non-attainment pollutants. Ozone and particulate matter

2. Does best available control technology (BACT) apply to this source? If yes, see Section VI. Yes

3. Does the State "Prevention of Significant Deteriolation" (PSD) requirement apply to this source? If yes, see Sections VI and VII. Yes

4. Do "Standards of Performance for New Stationary Sources" (NSPS) apply to this source? Yes

5. Do "National Emission Standards for Hazardous Air Pollutants" (NESHAP) apply to this source? No

H. Do "Reasonably Available Control Technology" (RACT) requirements apply to this source? No

   a. If yes, for what pollutants? ______

   b. If yes, in addition to the information required in this form, any information requested in Rule 17-2.650 must be submitted.

Attach all supportive information related to any answer of "Yes". Attach any justification for any answer of "No" that might be considered questionable.

SECTION III: AIR POLLUTION SOURCES & CONTROL DEVICES (Other than Incinerators)

A. Raw Materials and Chemicals Used in your Process, if applicable:

Description	Contaminants		Utilization Rate - lbs/hr	Relate to Flow Diagram
	Type	% Wt		

B. Process Rate, if applicable: (See Section V, Item 1)

1. Total Process Input Rate (lbs/hr): ______

2. Product Weight (lbs/hr): ______

C. Airborne Contaminants Emitted: (Information in this table must be submitted for each emission point, use additional sheets as necessary)

Name of Contaminant	Emission[1]		Allowed[2] Emission Rate per Rule 17-2	Allowable[3] Emission lbs/hr	Potential[4] Emission		Relate to Flow Diagram
	Maximum lbs/hr	Actual T/yr			lbs/yr	T/yr	
* TSP	1.63		---	N/A	N/A		---

[1]See Section V, Item 2.

[2]Reference applicable emission standards and units (e.g. Rule 17-2.600(5)(b)2. Table II, E. (1) - 0.1 pounds per million BTU heat input)

[3]Calculated from operating rate and applicable standard.

[4]Emission, if source operated without control (See Section V, Item 3).

* Information added for Ash Bldg. Dust Suppression Bag House 6/12/87

D. Control Devices: (See Section V, Item 4)

Name and Type (Model & Serial No.)	Contaminant	Efficiency	Range of Particles Size Collected (in microns) (If applicable)	Basis for Efficiency (Section V Item 5)
Ash Bldg. Dust Suppressor Bag House	TSP		Not applicable	

E. Fuels

Type (Be Specific)	Consumption*		Maximum Heat Input (MMBTU/hr)
	avg/hr	max./hr	

*Units: Natural Gas--MMCF/hr; Fuel Oils--gallons/hr; Coal, wood, refuse, other--lbs/hr.

Fuel Analysis:

Percent Sulfur: ______________________ Percent Ash: ______________________

Density: ______________________ lbs/gal Typical Percent Nitrogen: ______________________

Heat Capacity: ______________________ BTU/lb ______________________ BTU/gal

Other Fuel Contaminants (which may cause air pollution): ______________________

F. If applicable, indicate the percent of fuel used for space heating.

Annual Average ______________________ Maximum ______________________

G. Indicate liquid or solid wastes generated and method of disposal.

H. Emission Stack Geometry and Flow Characteristics (Provide data for each stack):

Stack Height: ______ ft. Stack Diameter: ______ ft.

Gas Flow Rate: ______ ACFM ______ DSCFM Gas Exit Temperature: ______ °F.

Water Vapor Content: ______ % Velocity: ______ FPS

SECTION IV: INCINERATOR INFORMATION

Type of Waste	Type 0 (Plastics)	Type I (Rubbish)	Type II (Refuse)	Type III (Garbage)	Type IV (Pathological)	Type V (Liq.& Gas By-prod.)	Type VI (Solid By-prod.)
Actual lb/hr Incinerated	Vendor supplied information						
Uncontrolled (lbs/hr)	Vendor supplied information.						

Description of Waste Municipal solid waste

Total Weight Incinerated (lbs/hr) 133,333. Design Capacity (lbs/hr) 133,333. (name plate rating

Approximate Number of Hours of Operation per day ______ day/wk ______ wks/yr. ______

Manufacturer Vendor not selected yet.

Date Constructed ______ Model No. ______

	Volume $(ft)^3$	Heat Release (BTU/hr)	Fuel Type	Fuel BTU/hr	Temperature (°F)
Primary Chamber	Vendor specific information				
Secondary Chamber					

Stack Height: 220 ft. Stack Diamter: 4 flues, each 5'-9" Diam. Stack Temp. 430°F

Gas Flow Rate: 342,000 ACFM 140,070 @ 50% Ex. Air DSCFM* Velocity: 55 FPS

*If 50 or more tons per day design capacity, submit the emissions rate in grains per standard cubic foot dry gas corrected to 50% excess air. 0.027 gr/dscf @ 50% Ex. Air

Type of pollution control device: [ ] Cyclone [ ] Wet Scrubber [ ] Afterburner

[ ] Other (specify) Electrostatic Precipitator

Brief description of operating characteristics of control devices: Electrostatic precipitator collects particulate matter in flue gas stream by producing an electrical charge on the particles and then attracting them to surfaces of opposite polarity.

Ultimate disposal of any effluent other than that emitted from the stack (scrubber water, ash, etc.):

Hillsborough County's co-located wastewater treatment plant will accept the cooling tower blowdown and ash will be disposed of at Hillsborough County's Southeast County Landfill.

NOTE: Items 2, 3, 4, 6, 7, 8, and 10 in Section V must be included where applicable.

SECTION V: SUPPLEMENTAL REQUIREMENTS

Please provide the following supplements where required for this application.

1. Total process input rate and product weight -- show derivation [Rule 17-2.100(127)]

2. To a construction application, attach basis of emission estimate (e.g., design calculations, design drawings, pertinent manufacturer's test data, etc.) and attach proposed methods (e.g., FR Part 60 Methods 1, 2, 3, 4, 5) to show proof of compliance with applicable standards. To an operation application, attach test results or methods used to show proof of compliance. Information provided when applying for an operation permit from a construction permit shall be indicative of the time at which the test was made.

3. Attach basis of potential discharge (e.g., emission factor, that is, AP42 test).

4. With construction permit application, include design details for all air pollution control systems (e.g., for baghouse include cloth to air ratio; for scrubber include cross-section sketch, design pressure drop, etc.)

5. With construction permit application, attach derivation of control device(s) efficiency. Include test or design data. Items 2, 3 and 5 should be consistent: actual emissions = potential (1-efficiency).

6. An 8 1/2" x 11" flow diagram which will, without revealing trade secrets, identify the individual operations and/or processes. Indicate where raw materials enter, where solid and liquid waste exit, where gaseous emissions and/or airborne particles are evolved and where finished products are obtained.

7. An 8 1/2" x 11" plot plan showing the location of the establishment, and points of airborne emissions, in relation to the surrounding area, residences and other permanent structures and roadways (Example: Copy of relevant portion of USGS topographic map).

8. An 8 1/2" x 11" plot plan of facility showing the location of manufacturing processes and outlets for airborne emissions. Relate all flows to the flow diagram.

9. The appropriate application fee in accordance with Rule 17-4.05. The check should be made payable to the Department of Environmental Regulation.

10. With an application for operation permit, attach a Certificate of Completion of Construction indicating that the source was constructed as shown in the construction permit.

SECTION VI: BEST AVAILABLE CONTROL TECHNOLOGY

A. Are standards of performance for new stationary sources pursuant to 40 C.F.R. Part 60 applicable to the source?

[X] Yes [ ] No

Contaminant	Rate or Concentration
Particulate matter	0.08 gr/dscf (grains per dry standard cubic foot) corrected to 12% CO_2

B. Has EPA declared the best available control technology for this class of sources (If yes, attach copy)

[X] Yes [ ] No

Contaminant	Rate or Concentration
Various	See Table 6-2 in the PSD permit application

C. What emission levels do you propose as best available control technology?

Contaminant	Rate or Concentration
Carbon monoxide, nitrogen oxides, sulfur dioxide, lead, beryllium, mercury, fluorides, and sulfuric acid mist	See PSD permit application Section 6.0

D. Describe the existing control and treatment technology (if any).

1. Control Device/System:
2. Operating Principles:
3. Efficiency:*
4. Capital Costs:

*Explain method of determining

5. Useful Life:

6. Operating Costs:

7. Energy:

8. Maintenance Cost:

9. Emissions:

Contaminant	Rate or Concentration

10. Stack Parameters

a. Height: ft.

b. Diameter: ft.

c. Flow Rate: ACFM

d. Temperature: °F.

e. Velocity: FPS

E. Describe the control and treatment technology available (As many types as applicable, use additional pages if necessary).

1.

a. Control Device: electrostatic precipitator (ESP)

b. Operating Principles: Dry collection of charged particles on oppositely charged surfaces.

c. Efficiency:[1] Outlet Loading 0.025 gr/dscf Corr. to 12% CO_2

d. Capital Cost: $4,500,000

e. Useful Life: 20 yrs.

f. Operating Cost: $556,999./yr

g. Energy:[2] 770 KW

h. Maintenance Cost: $90,000/yr

i. Availability of construction materials and process chemicals: Readily available

j. Applicability to manufacturing processes: Not applicable

k. Ability to construct with control device, install in available space, and operate within proposed levels: ESP has by far the longest history of operation within emission standards on solid waste resource recovery facilities (hundreds of units worldwide).

2.

a. Control Device: fabric filter

b. Operating Principles: Dry collection of particles by filtration through fabrics.

c. Efficiency:[1] Outlet loading 0.025 gr/dscf Corr. to 12% CO_2

d. Capital Cost: $3,694.000

e. Useful Life: 20 yrs. complete bag replacement every 2 years.

f. Operating Cost: $859,000./yr

g. Energy:[2] 218 KW

h. Maintenance Cost: $112,000./yr

i. Availability of construction materials and process chemicals: Readily available

[1]Explain method of determining efficiency.
[2]Energy to be reported in units of electrical power - KWH design rate.

j. Applicability to manufacturing processes:

k. Ability to construct with control device, install in available space, and operate within proposed levels: Limited operating experience with fabric filters on solid waste resource recovery facilities (only 3 units on large scale, mass-burn facilities

3.

a. Control Device: Dry Scrubber & ESP Outlet loading 0.025gr/dscf

b. Operating Principles: Alkaline spray neutralizes SO_2 & acic

c. Efficiency:[1] 65% removal eff. for SO_2 & 80% for acid gases

d. Capital Cost: $12,831.000

e. Useful Life: 20 Yr.

f. Operating Cost: $1,387,000/yr.

g. Energy:[2] 1397 KW

h. Maintenance Cost: $336,000/yr

i. Availability of construction materials and process chemicals: Readily available

j. Applicability to manufacturing processes: Not Applicable

k. Ability to construct with control device, install in available space, and operate within proposed levels: Very limited operating experience (only one unit in operation in USA on solid waste service).

4.

a. Control Device: ESP & Wet Scrubber

b. Operating Principles: ESP for dry collection of particulate and alkaline scrubbing for SO_2 & acid gas contr

c. Efficiency:[1] Outlet loading 0.025 gr/dscf 75% removal eff. for SO_2 and 90% for acid gases

d. Capital Costs: $7,810,000.

e. Useful Life: 20 yrs.

f. Operating Cost: $3.310,000/yr

g. Energy:[2]

h. Maintenance Cost: $189,000/yr

i. Availability of construction materials and process chemicals: Expensive corrosion-resistant metals required for quencher and scrubber.

j. Applicability to manufacturing processes: Not Applicable

k. Ability to construct with control device, install in available space, and operate within proposed levels: Very limited operating experience. Problem areas include necessity for stack gas reheat, corrosion of scrubber, and wastewater treatment.

F. Describe the control technology selected:

1. Control Device: ESP

2. Efficiency:[1] Outlet loading controlled to 0.025 gr/dscf corr. to 12% CO_2

3. Capital Cost: $4,500.000

4. Useful Life: 20 yrs.

5. Operating Cost: $556,000/yr

6. Energy:[2] 770 KW

7. Maintenance Cost: $90,000/yr

8. Manufacturer: Not selected yet.

9. Other locations where employed on similar processes: Braintree, MA; Harrisburg, PA; Chicago. NW. IL: Nashville, TN: Norfolk, VA: Saugus, MA: Montreal (Des Carriers), Quebec, and Pinellas County, FL.

a. (1) Company: Not selected yet.

(2) Mailing Address:

(3) City:

(4) State:

[1]Explain method of determining efficiency.
[2]Energy to be reported in units of electrical power - KWH design rate.

2. Instrumentation, Field and Laboratory

a. Was instrumentation EPA referenced or its equivalent? [ ] Yes [ ] No

b. Was instrumentation calibrated in accordance with Department procedures?

[ ] Yes [ ] No [ ] Unknown

B. Meteorological Data Used for Air Quality Modeling

1. 5 Year(s) of data from 1 / 1 / 70 (month day year) to 12 / 3 / 74 (month day year)

2. Surface data obtained from (location) Tampa International Airport

3. Upper air (mixing height) data obtained from (location) Tampa International

4. Stability wind rose (STAR) data obtained from (location) Not Used

C. Computer Models Used

1. Industrial Source Complex (ISC), Short-term. Modified? If yes, attach description.

2. ______ Modified? If yes, attach description.

3. ______ Modified? If yes, attach description.

4. ______ Modified? If yes, attach description.

Attach copies of all final model runs showing input data, receptor locations, and principle output tables.

D. Applicants Maximum Allowable Emission Data

Pollutant	Emission Rate	
TSP	(4.46 Incinerator) (*0.2)	grams/sec
SO^2	(23.1 Incinerator) *(Not applicable)	grams/sec

E. Emission Data Used in Modeling

Attach list of emission sources. Emission data required is source name, description of point source (on NEDS point number), UTM coordinates, stack data, allowable emissions, and normal operating time.

F. Attach all other information supportive to the PSD review.

G. Discuss the social and economic impact of the selected technology versus other applicable technologies (i.e., jobs, payroll, production, taxes, energy, etc.). Include assessment of the environmental impact of the sources.

H. Attach scientific, engineering, and technical material, reports, publications, journals, and other competent relevant information describing the theory and application of the requested best available control technology.

* Information added for Ash Bldg. Dust Suppression Bag House 6/12/87.

State of Florida
DEPARTMENT OF ENVIRONMENTAL REGULATION
Application To Operate/Construct Air Pollutant Sources
Supplemental Information

Section V: Supplemental Requirements

1. Total process input rate at design capacity (i.e. name-plate rating) is 1600 TPD, 4 units each at 400 TPD. Residue amount will be 29.000. lb/hr (dry basis) and is derived as follows:

$$\text{Inert Material} = (133,333 \frac{\text{wet lb feed}}{\text{hr}})(0.7265 \frac{\text{dry lb}}{\text{wet lb}})(0.289 \frac{\text{lb inert}}{\text{dry lb}}) = 28,100 \frac{\text{dry lb inert}}{\text{hr}}$$

$$\text{Unburned Carbon:} = (133,333. \frac{\text{wet lb feed}}{\text{hr}})(0.7265 \frac{\text{dry lb}}{\text{wet lb}})(0.3567 \frac{\text{lb. Carbon}}{\text{dry lb}}$$

$$(.025) = 900. \frac{\text{dry lb carbon}}{\text{hr}}$$

$$29,000. \frac{\text{dry lb residue}}{\text{hr}}$$

2. Emission estimates are contained in the Prevention of Significant Deterioration (PSD) Permit Application.

3. Emission factors were derived from AP-42 and from data from recent large-scale, mass burn resource recovery facilities. See PSD Permit Applications.

4-8. These items are not available at this time since a system supplier has not been selected. Once these items have been provided by the vendor they will be transmitted to DER for inclusion in this application.

(5) Environmental Manager:

(6) Telephone No.:

(7) Emissions:[1]

Contaminant	Rate or Concentration
Various	See Table 6-2 in PSD permit application

(8) Process Rate:[1]

b. (1) Company:

(2) Mailing Address:

(3) City: (4) State:

(5) Environmental Manager:

(6) Telephone No.:

(7) Emissions:[1]

Contaminant	Rate or Concentration

(8) Process Rate:[1]

10. Reason for selection and description of systems: See Section 6.0 of PSD Permit Application

[1]Applicant must provide this information when available. Should this information not be available, applicant must state the reason(s) why.

SECTION VII - PREVENTION OF SIGNIFICANT DETERIORATION

A. Company Monitored Data

1. ________ no. sites ________ TSP ________ ( ) SO^{2*} ________ Wind spd/dir

Period of Monitoring ____/____/____ to ____/____/____
month day year month day year

Other data recorded ____________________

Attach all data or statistical summaries to this application.

Specify bubbler (B) or continuous (C).