State of Florida
DEPARTMENT OF ENVIRONMENTAL REGULATION

INTEROFFICE MEMORANDUM

For Routing To District Offices
And/Or To Other Than The Addressee

To: Ed Svec Loctn.: TLH
To: _____ Loctn.: _____
To: _____ Loctn.: _____
From: _____ Date: _____
Reply Optional [ ] Reply Required [ ] Info. Only [ ]
Date Due: _____ Date Due: _____

DER

JUN 12 1985

BAQM

TO: Power Plant Siting Review Committee

FROM: Hamilton S. Oven, Jr. HSO

DATE: June 12, 1985

SUBJECT: South Broward County Resource Recovery Project
Sufficiency Responses

Enclosed please find a copy of Broward County's response to the department's initial comments on insufficiency. Please review the responses and evaluate the amended application for its adequacy. I would appreciate your comments by July 1, 1985.

Resource Recovery Office
Room 521, 115 South Andrews Avenue
Fort Lauderdale, Florida 33301
(305) 357-6458

June 10, 1985

State of Florida
Department of Environmental Regulation
Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32301

Attention: Mr. Hamilton Oven, P.E.
Power Plant Siting Section

Re: South Broward County Resource Recovery Project, Inc.
Power Plant Siting Application, PA 85-21;
OGC File No. 85-0367; DOAH Case No. 85-1166

Gentlemen:

Enclosed is our response to your inquiry of April 19, 1985 on the South Broward County Resource Recovery Project, Inc. Power Plant Site Certification Application. Note that each of your questions has been italicized and is followed by our specific response.

Should you have any further questions or comments, please do not hesitate to contact us.

Very truly yours,

Thomas M. Henderson

Thomas M. Henderson
Project Director
Broward County Resource Recovery Office
and
Attorney-in-Fact
South Broward County Resource Recovery Project, Inc.

TMH/bd
Enclosure
cc: Ron Mills
Timothy Smith

SOUTH BROWARD COUNTY RESOURCE RECOVERY PROJECT
POWER PLANT SITING APPLICATION, PA 85-21
OGC FILE NO. 85-0357, DOAH CASE NO. 85-1166

APPLICANT RESPONSES TO FLORIDA DER INQUIRY OF
APRIL 19, 1985

Question 1: The 1:24000 governmental jurisdiction map required by Section 2.2.1 needs to be provided.

Response: Figure 2.2.1.2 (see attached) represents the 1:24000 governmental jurisdiction map required by Section 2.2.1.

Question 2: Address the adequacy of public services and utilities as required by Section 2.2.7., especially with regard to fire fighting facilities in case of explosions and fires at the Resource Recovery Facility (RRF). Likewise address the capacity of water mains, sewer mains, and sewage treatment plants to serve the RRF.

Response: Adequacy of Public Services and Utilities

a) Education - An extensive list of schools is provided in Volume I of the Power Plant Site Certification Application on pages 2-15, 2-16 and 2-17.

b) Transportation - Section 5.9 in Volume I of the Power Plant Site Certification Application discusses the increase in average daily traffic volumes and concludes that there would be an insignificant impact on existing traffic conditions.

c) Medical Facilities - A list of nine medical facilities within a 5 mile radius of the proposed facility is provided in Volume I of the Power Plant Site Certification Application on page 2-8.

d) Fire Fighting Facilities - On-site fire fighting Facilities would consist of the following:

- The Broward County Resource Recovery Office and the City of Fort Lauderdale will jointly install a 12-inch diameter water transmission main to serve the entire 441 site from the Broward County Utility System. Three separate metered water lines would serve the RRF, the compost site and the landfill.

- The RRF vendor will provide the necessary on-site water storage and auxiliary pumps, stand-by power needed to meet fire demands and

insurance requirements. Either the New River or a shallow well system could be utilized as a secondary source of water (if required). Potable and industrial water lines would be isolated with back-flow preventors.

- o The County and the City of Davie are currently discussing the location of a fire station either on or adjacent to the site. The area is currently served by both the County and Davie Fire Departments.

e) Police Protection - The following is a list of Police Departments in Broward County:

Broward County Sheriff's Office/201 SE 6th St., Ft. Lauderdale
Coconut Creek/1071 NW 45 Ave.
Cooper City/9090 SW 50 Pl
/11610 Stonebridge Pky
Coral Springs/106 W. Dania Bch Blvd.
Davie/6591 SW 45 ST.
Deerfield Beach/300 NE 2 St.
Fort Lauderdale/1300 W. Broward Blvd.
Hallandale/100 SW 4 Ct.
Hillsboro Beach/1210 A 1-A Hwy.
Lauderdale-by-the-Sea/4501 Ocean Dr.
Lauderdale Lakes/3461 NW 43 Ave.
Lauderhill/1980 NW 56 Ave.
Lazy Lake/2154 Lazy Lane
Lighthouse Point/3760 NE 22 Ave.
Margate/5790 Margate Blvd.
Miramar/6700 Miramar Pky.
North Lauderdale/1051 SW 80 Ave.
Oakland Park/3650 NE 12 Ave.
Parkland/6500 Parkside Dr.
Pembroke Pines/3150 SW 52 Ave.
Pembroke Pines/9500 W. Pines Blvd.
Plantation/7051 NW 4 St.
Pompano Beach/101 SW 1 Ave.
Sea Ranch Lakes/1 Gatehouse Rd.
Sunrise/1277 Sunset Strip
Tamarac/5811 NW 88 Ave.
Wilton Manors/524 NE 21 Ct.

f) Recreation Facilities - A list of recreation facilities is provided in Volume I of the Power Plant Site Certification Application on pages 2-7, 2-8 and 2-17.

g) Electricity - Will be generated on-site by a condensing turbine generator set. All electrical utility power not used by the plant will be sold to Florida Power and Light. Back up emergency power will be supplied either by Florida Power and Light or diesel generators.

h) Gas - Natural gas will not be used in the RRF.

i) Water Supply Facilities - As stated in d(1) above, a 12-inch diameter water transmission main will serve the Resource Recovery Facility.

j) Sewage Treatment Facilities -

- o Wastewater Forcemain - A new 8-inch diameter wastewater forcemain will serve the Resource Recovery Facility. The line will extend some 6,800 l.f. along Route 441 south, past Griffin Road and then east to the Broward County Utilities System.

- o Hollywood Treatment Plant - The design capacity of the facility is 38 mgd with present influent flow into the plant at 31 mgd. The estimated maximum wastewater volumes from the RRF and residue landfill will be approximately .3 mgd. Thus, the reserve capacity of the Hollywood Treatment Plant will be able to handle the increase in hydraulic flow into the plant from the proposed RRF and landfill.

- o An amendment to the large user agreement to incorporate the Resource Recovery and City of Ft. Lauderdale facilities within the Hollwyood Treatment Plant Service Area is currently being drafted.

k) Solid Waste Disposal - Refuse generated on-site will be processed at the facility. No hazardous material will be generated on-site. Any unprocessable waste (i.e. oversized or bulky waste) that cannot be incinerated will be landfilled directly at the adjacent residue/unprocessable waste landfill.

Question 3: Figure 2.1.3 (see attached) fails to show how ash disposal trucks or maintenance trucks will get from the RRF to the landfill.

Response: Revised Figure 2.1.3 (see attached) shows the truck flow from the Resource Recovery Facility to the landfill.

Question 4: Neither Section 3.3.9 nor Chapter 5 address contingency plans for disposing of raw garbage when boilers are inoperable for long periods of time.

Response: Contingency plans have been formulated to address periods during which raw refuse processing capability is unavailable due to either scheduled or unscheduled downtime at the proposed facility. Basically, the overall contingency plan consists of a three-tiered approach. We wish to note that the processing capacity of the proposed facility has been selected based, in part, on a projected annual availability factor of at least 80 percent. This factor includes scheduled downtime for routine maintenance activities as well as unscheduled downtime for unforeseen circumstances based on operating experience at other similar facilities.

The first tier of the contingency plan is the storage capacity of the receiving pit and multiple, redundant processing units at the proposed facility. A minimum four-day pit capacity represents one of the facility design criteria. While the primary purpose of this requirement is to assure adequate on-site storage of refuse to sustain plant operations over a weekend, the excess pit capacity that will normally be available could be used to store incoming refuse for one to three days when the facility is down for scheduled or unscheduled maintenance. Thus, during such periods refuse delivery to the facility will proceed uninterrupted. At no time during such periods would incoming refuse be delivered or stored outside the enclosed pit area or diverted to the adjacent landfill which will be dedicated to the disposal of residue produced at the proposed facility and waste classified as unprocessable (as defined in the Certification Application) upon delivery to the proposed facility. For those periods when the facility will be off-line for an extended duration subsequent tiers of the contingency plan will come into effect.

As discussed in detail in Appendix 10.11 of the Certification Application, the facility will consist of three independent process lines. Common elements such as waste feed cranes, ash conveyors, and boiler feedwater system will have redundant capabilities. Further, the facility will have a condenser capable of wasting all of the facilities steam if the turbine generator is being serviced or is inoperable. These features will minimize the need to bypass waste to a greater extent than any facility developed in this country to date.

The second tier of the plan involves utilization of available capacity at the second or northern resource recovery facility being proposed by Broward County. This northern facility is an integral component of the overall county solid waste man-

agement plan. Although a Certification Application has not yet been submitted for the northern facility, it has been the subject of implementation planning in concert with the southern facility. Once established, the northern facility would be available to accept solid waste from the southern service area of the county during periods when the southern facility is out-of-service due to scheduled or unscheduled maintenance activities. Although a reserve capacity at the proposed northern facility cannot be guaranteed for this purpose, its availability provides a great deal of flexibility to the overall county solid waste management plan. During those periods when the southern facility is unable to process incoming solid waste and the northern facility is unavailable to process part of or all of the waste stream from the southern service area, the third tier of the contingency plan will be triggered.

The third tier consists of transporting solid waste to either the Central Disposal Landfill site owned and operated by Waste Management, Inc. or a new contingency landfill for disposal. The latter landfill is currently being developed by the county. Consisting of 589 acres, the landfill site is referenced, for planning purposes, as the Broward Correctional Institute (BCI) site. Its location is shown on Figure 1.1.1 of the Certification Application. Sufficient acreage exists at the site for the developed facility to serve as a long-term contingency disposal landfill during periods of prolonged downtime at the proposed resource recovery facility due to unforeseen circumstances. Because design of the landfill facility will take into consideration the potential for delivery of most or all of the county solid waste stream at any given time (a worst case scenario for contingency planning purposes), sufficient capability to dispose of the potential volume of waste received will exist.

In summary, contingency planning has been, and continues to be an important part of the overall county solid waste management plan. The capacity of the facility proposed, the flexibility offered by the two-facility resource recovery project approach, and the existence of a permitted landfill site and development of a new landfill to address contingency disposal needs offers a three-tiered overall contingency program to serve Broward County into the foreseeable future.

Question 5: DER Form 17-1,202(1) has not been included as required by Section 3.4.1.

Response: Attached is DER Form 17-1.202(1), which was inadvertently omitted from the original submittal.

Question 6: In Section 3.4.3.4, there is insufficient discussion of design features of the facility to give reasonable assurance that dioxins and other chlorinated hydrocarbon emissions will be minimized.

Response: Dioxin emissions from resource recovery incinerators seem to be affected by a series of combustion conditions which can be controlled and monitored.

Researchers have found that when combustion temperatures are above 750°C emissions of such compounds are very low. Also, from these observations several studies have concluded that combustion conditions necessary for destruction of PCDDs, PCDFs and related compounds include a long residence time (a minimum of 1 second) in a high temperature zone, and an air/fuel mixture with a slight excess of oxygen. These studies have indicated that under such conditions destruction efficiencies for these compounds are over 99%.

The incineration design selected for the Broward facility appears to fulfill the requirements for maximum destruction of PCDDs and PCDFs. Residence times in the furnace chamber will be over two (2) seconds. Previous experience in designing and constructing refuse incinerators has resulted in furnaces which have very low levels of carbon monoxide emissions, an excellent indicator of mixing effectiveness and furnace turbulence. Lastly, to control carbon monoxide emissions and boiler corrosion, the Broward facility will normally operate under conditions of at least 90% excess air. This translates to an oxygen content in the combustion gases of approximately 10%, thus satisfying the requirement for an excess of oxygen to assist in destroying PCDDS.

Question 7: In Section 3.4 address:

*7a. *How will input rates to incinerator boilers be determined?*

Response: Load cells will be installed on the facility cranes to register the amount of garbage being inputed into the incinerator boilers. However, long term reliability of such load cells is questionable. As a result, during plant start-up, when confidence is high in the load cells, a correlation will be established between the amount of garbage being charged and the amount of steam and pressure being generated in the incinerator boilers. In this manner, the amount of garbage being charged will be readily determined by back calculating from the steam and pressure generated during plant operation.

7b. **Do emission estimates and expectation of compliance with the proposed 0.030 gr/dscf or better and 20% opacity include soot blowing?*

Response: Yes, the ESP will be designed to limit particulate emissions to less than 0.03 grains per day standard cubic foot, corrected to 12% CO_2, during soot blowing operations. During non-soot blowing operations, emission of particulate matter will be less. On a continuous basis, opacity will not be greater than 20%.

7c. **What is the retention time at 1800°F of pollutants in the exhaust gases?*

Response: The incinerator design calculations for the Broward project indicate over two (2) seconds of residence time down stream of the flame front at temperatures above 1,800°F.

7d. **What actual methods, if any, will be used to prevent hazardous pathological red-bag type wastes from being processed? Specifically, how will these items be handled? How effective do you estimate this will be?*

Response: Firstly, operators of delivery vehicles will be asked the source of the solid waste at the facility weigh station. Secondly, personnel will be present on the tipping floor and in the control room observing the dumping of garbage into the storage pit. Deliveries with a high probability for containing pathological wastes (or hazardous wastes), because of the nature of the source or generator of the wastes, will be periodically inspected by facility personnel. Also, any suspicious trucks will be required to dump their loads on the tipping floor and the contents inspected.

The above method is used by mass burn facilities in the United States and has proved to be a very effective way of preventing pathological and hazardous wastes from entering the process stream.

7e. **It appears from the emission estimates that VOC's should also be addressed under BACT.*

Response: The proposed facility will be located in Broward County, a nonattainment area for ozone. Therefore, PSD review, including a BACT evaluation, is not required for VOC emissions. Based on current nonattainment regulations, all major new sources locating in a nonattainment area must undergo nonattainment review procedures if the proposed pieces of equipment have the

potential to emit 100 tons per year (TPY) or more of the nonattainment pollutant. Because VOC emissions from the proposed facility will be less than 100 TPY (initial capacity of 2,705 tpd will have VOC emission of 57.8 TPY and the maximum capacity of 3,795 TPD will have VOC emissions of 81.0 TPY), nonattainment review is not required.

7f. **Design drawings, flow diagrams and detail specifications on all pollution sources and controls which will be operated in association with this facility are needed.*

Response: The project is a full service vendor design project and as a result we are seeking a condition that the design drawing and flow diagrams and detail specifications on all pollution sources and controls be provided to Florida DER for review and approval prior to construction of those portions of the facility.

7g. **Address the effects of burning cinders passing through to the ESP and measures to minimize this problem.*

Response: The carryover of burning cinders into the ESP is not considered a major problem in the proposed furnace/boiler design. Fluidization of waste is minimized by introduction of primary air at low velocity.

Those cinders which are entrained tend to be very small and burn out due to the long retention time in the boiler or settle out in the boiler hoppers and heat transfer surfaces.

7h. **What are start-up procedures and duration; expected emissions of PM and opacities and duration; and auxiliary fuels used to initiate burning? Indicate sulfur content of auxiliary fuels to be used.*

Response: On a preliminary basis, two auxiliary oil burners (per furnace), located in the combustion chamber, may be utilized during start-up and shutdown procedures. The burners are expected to be operated for two continuous hours during each procedure. The burners will utilize 0.3% sulfur residual (NO. 4) fuel oil and each be capable of consuming 500 kg/hr (2.5 GPM). Should natural gas be available in sufficient quantity that fuel may be considered.

During periods when only auxiliary fuel oil is combusted, the following combustion gas characteristics can be expected.

% Oxygen	4.85
% Moisture	9.84
Particulate, gr/wscf	0.0026
SO_2, gr/wscf	0.16
CO, gr/wscf	0.058
NO_x, gr/wscf	0.132

7i. **Please clarify the last sentence of second paragraph on page 3-50 with respect to CO emissions impact. What qualities?*

Response: The sentence is incomplete and should read..."The proposed CO emission limit results in maximum predicted impacts of less than 1 percent of any de minimis impact level, significant impact level, or Florida AAQS."

7j. **What chemical binders are proposed for fugitive controls?*

Response: Fugitive emissions will not be observed from the solid waste and residue handling areas of the project. All solid waste storage and handling will occur in totally enclosed structures and will be maintained under negative air pressure. All fugitive dusts and odors will be drawn into the furnace and subjected to extremely high temperatures. Residue hauling vehicles will be covered to minimize wind aide drying and dispersion during transport to the landfill.

During construction, on-site access roads will be adequately wetted to minimize wind erosion and dust generation as needed. Chemical binders will be used only as required. The specific binders have not yet been identified.

7k. **Address fugitive control measures for ash storage and subsequent handling.*

Response: The ash system proposed for the Broward project results in a residue containing approximately 10% to 15% bound moisture by weight. This ash is stored in an enclosed building in a concrete bunker. This practice effectively eliminates fugitive emissions.

Question 8: In Section 3.5, there are no plans showing connection of sanitary sewers to off-site sewage connections facilities to demonstrate compliance with Chapter 17-C, FAC.

Response: The plans showing connection of sanitary sewers to off-site sewage connections facilities are being prepared and will be provided to Florida DER for review and approval prior to facility construction. Please see also the response to Question 2j.

Question 9: In Section 3.5 discuss whether there is a collection and treatment system for oily wastes at the equipment repair facility.

Response: Spent oils used as lubricants in the rotating machinery will be collected separately and disposed at an approved facility.

An oily-water separator for wash water runoff from maintenance and scalehouse areas will be provided if required by local wastewater discharge regulations.

Question 10: In Section 3.8.6.1 on page 3-68, the last sentence in the third paragraph discussing on-site stormwater storage is not complete.

Response: The sentence should read as follows, "As available on-site stormwater storage is depleted due to the continued filling of cell 2 surface discharges from the stormwater pond to the C-11 pond will be utilized for flood control purposes.

Question 11: Section 4.6.4 does not adequately address construction noise impacts on residential areas to the south of the site?

Response: As discussed in the Appendix 10.10 (Technical Noise Analysis), construction equipment noise from the southern part of the site will travel an estimated 300 to 400 feet to residential-zoned properties across and south of the New River Canal. At these properties, the construction noises will have been reduced by 15 to 17 dB(A), or from 80 dB(A) to 65 to 62 dB(A), respectively. Noise-attenuating barriers will be built along the southern part of the site to bring the noise level down from 65 dB(A) to 55 dB(A) which is the sound level limit for residential-zoned areas.

Question 12: In Section 5.4.2, what methods will be used to prevent pathological or hazardous waste from entering the boilers.?

Response: Please see response to question 7.

Question 13: In Section 5.2 and 5.3, is there a sump large enough to prevent contaminated stormwater and leachate from overloading existing sewer lines?

Response: The landfill will be capable of holding a volumetric portion of stormwater from a significant rainfall event. Thus, stormwater will be retained in the landfill bed itself and serve to reduce potential surges of stormwater entering the leachate collection system. Furthermore, the installation of a new 8-inch diameter wastewater forcemain in combination with the 7 mgd excess capacity of the Hollywood Treatment Plant should provide the capability necessary to handle stormwater flow from a significant rainfall.

The project is a full service vendor design project and, as such, a condition is sought that the design of a sump be provided to Florida DER for review and approval prior to facility construction. In this manner it will be demonstrated, when the design details requested for in Questions 2j and 8 are submitted that any such sump will be adequately sized to prevent overloading of existing and new sewer lines.

Question 14: In Section 5.2, will there be any sludge from water treatment facilities? If so, where will it be disposed?

Response: There is no pretreatment of process waters anticipated and, therefore, no sludge generated. If pretreatment is necessary in the future, sludges will be disposed of off-site at approved facilities.

Question 15: In Section 5.6, address the impact on Dade County's ambient air quality standards for SO_2 for 1 hour, 4 hours, and 24 hours.

Response: The ambient air quality standards (AAQS) adopted by Dade County were not originally addressed in Section 5.6, since these standards were not considered applicable to the proposed recovery facility. The basis for this conclusion is threefold. First, the proposed facility is located in Broward County approximately 13.8 km from the Date County border. Second, neither DER Form 17-1.211(2) nor provisions in Chapter 17-17 and 17-2 specifically require addressing AAQS in counties outside the area of local jurisdiction. Finally, the existing Dade County Standards are a carryover of the previous Southeast Florida AAQS which were repealed from Chapter 17-2 in 1976. As a consequence, the applicability of the Dade County AAQS to the proposed facility is at best highly questionable.

Nonetheless, there is sufficient information contained in Section 5.6 to evaluate if there would be a possibility for the project to numerically exceed the Dade County AAQS. Presented below are the maximum predicted SO_2 impacts with maximum project operation (refer to Table 5.6.1.4) compared to the Dade County AAQS. All the impacts are within 5 km of the proposed facility.

Average Time	Maximum SO_2 Impact (ug/m^3)	Dade County AAQS
1-hour*	82.9	286
3-hour	29.1	57.2+
24-hour	5.9	28.6
Annual	0.6	8.6

*Estimated from CO impacts

+4-hour average - Note that a 3-hour average will be higher than a 4-hour average

As can be seen from the above comparison, the projected impacts will be numerically lower than the Dade County AAQS even in Broward County.

Question 16: In Section 5.5, or 5.3, discuss how and what tests will be made to determine compliance with pre-treatment standards.

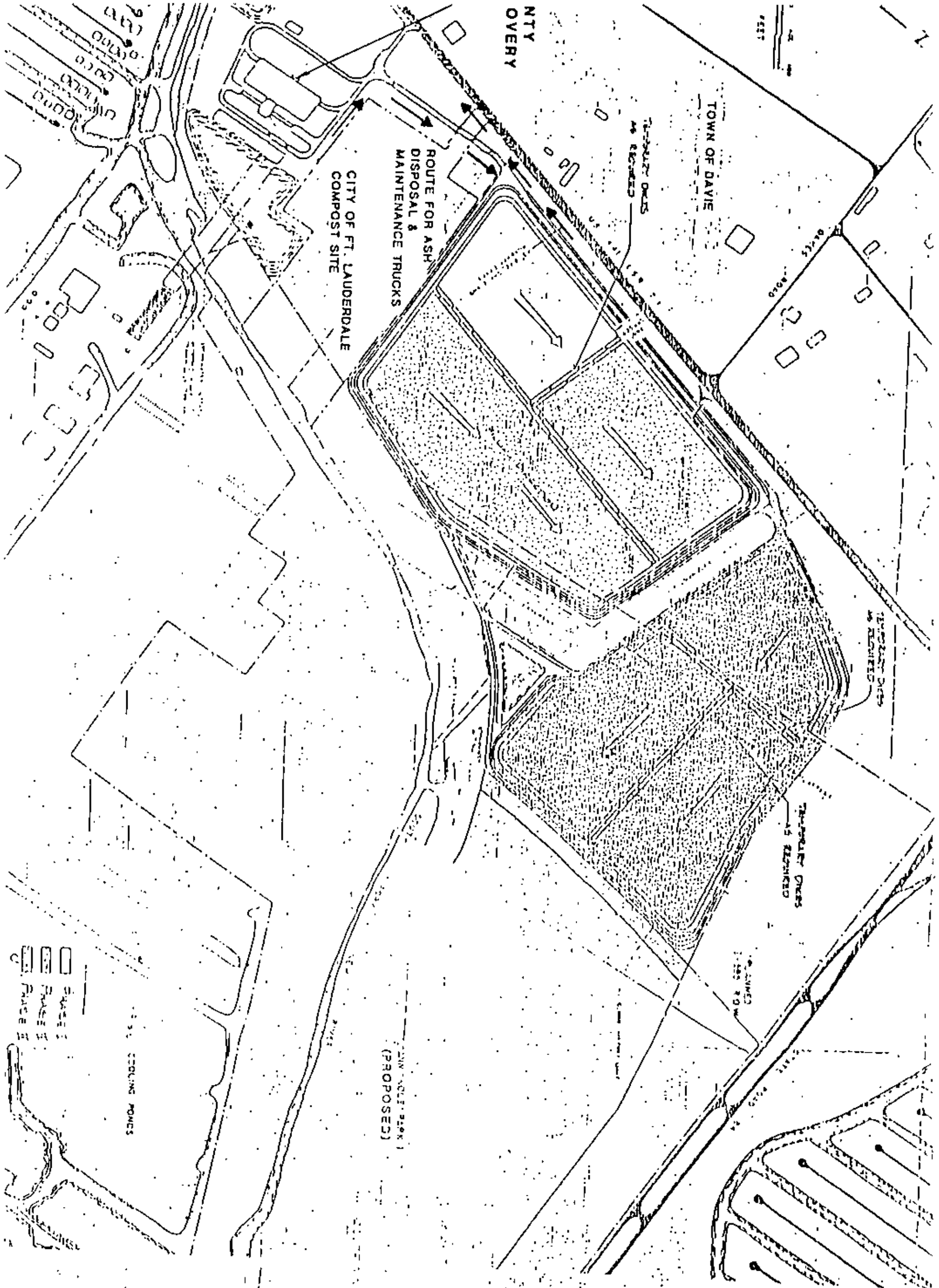
Response: Discussions are presently underway with officials representing the Hollywood Wastewater Treatment Plant for inclusion in the Plant Service Area. Based on requirements existing at the time the facility is operational, tests will be conducted to determine compliance. The Broward County Environmental Quality Control Board currently operates the pretreatment program for the plant.

Question 17: In Section 5.3.5 provide design details of monitoring wells, sample preservation techniques, and sampling frequency.

Response: Section 5.3.5 of Volume I of the Power Plant Site Certification Application presents a typical design of monitoring wells. Actual design will depend on final vendor design. Sample preservation techniques and sampling frequency is presented in Section 5.3.5.2 (Proposed Long-Term Ground Water Sampling Program).

Question 18: In Section 5.6, address fugitive dust control at the landfill and at ash storage and loading areas.

Response: At the landfill, water trucks will be utilized to spray down all access roads. Chemical binders will be used as required. Portions of the main access road and gateway intersection will be paved and regularly swept for dirt and litter. Areas to be inactive for more than three months will be seeded with indigenous grasses for erosion control. Fugitive dust control at the ash storage and loading area is addressed in the responses to Questions 7j and 7k.



ISTRUCTION PHASES

OPOSED LANDFILL DESIGN
HERN RESOURCE RECOVERY FACILITY
WARD COUNTY, FLORIDA

1" = 300'

BROWARD-FERRIS INDUSTRIES

ENGINEERING SERVICES

REV	DESCRIPTION

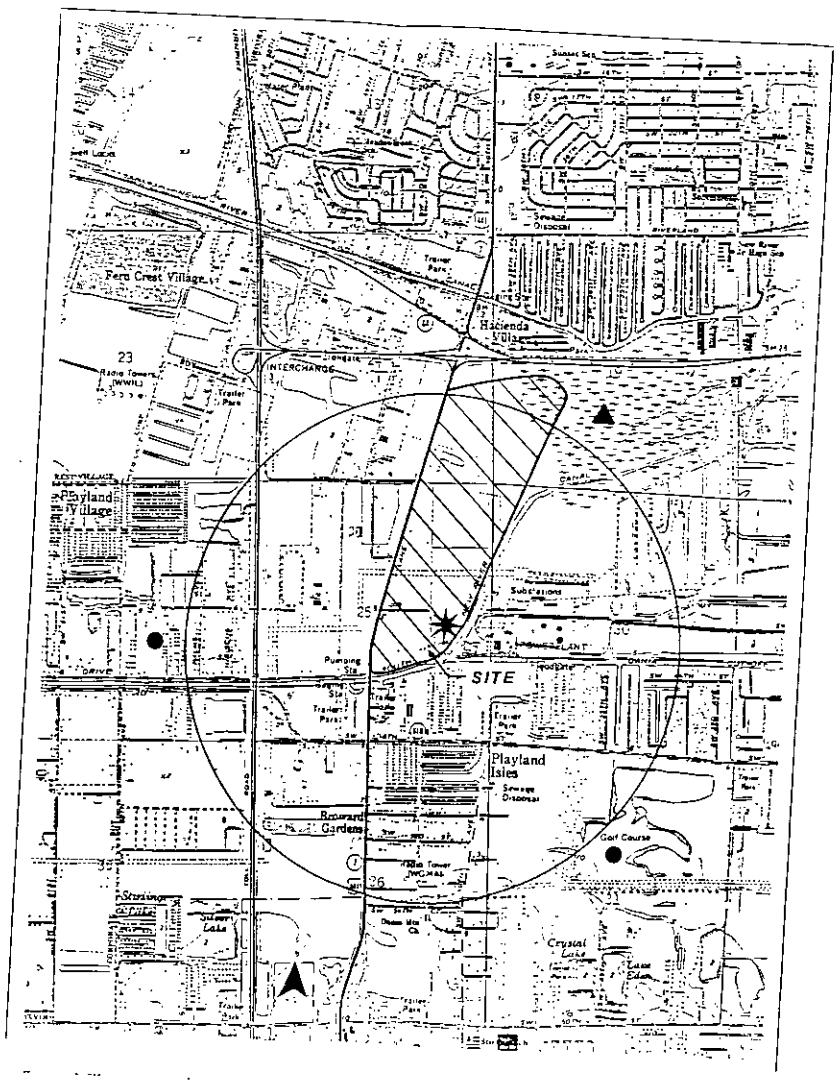
FIGURE 2.2.1

LEGEND

- Parks, & Golf Courses
- Unique Natural Areas
- Memorials
- Hospitals
- Indian Reservation
- Proposed Location of Facility Stack

SCALE

0 1/2 1 MILES



MALCOLM PIRNIE

BROWARD COUNTY

GOVERNMENTAL JURISDICTIONS AND REGIONAL SCENIC, CULTURAL AND NATURAL LANDMARKS

STATE OF FLORIDA

DEPARTMENT OF ENVIRONMENTAL REGULATION

BOB GRAHAM
GOVERNOR

VICTORIA J. TSCHINKEL
SECRETARY

ALEX SENKEVICH
DISTRICT MANAGER

APPLICATION TO OPERATE/CONSTRUCT AIR POLLUTION SOURCES

SOURCE TYPE: Resource Recovery Facility [X] New[1] [ ] Existing[1]

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

COMPANY NAME: South Broward County Resource Recovery Project Inc. COUNTY: Broward

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) Stack(s)

SOURCE LOCATION: Street Intersection US RT 441 & St. Rt. 84 City Unincorporated Broward County

UTM Zone 17 UTM: East 579.6 km North 2883.3 km

Latitude 26 ° 04 ' 02 "N Longitude 80 ° 12 ' 57 "W

APPLICANT NAME AND TITLE: Thomas M. Henderson, Attorney-in-Fact

APPLICANT ADDRESS: 115 South Andrews Ave., Room 521, Ft. Lauderdale, FL 33301

SECTION I: STATEMENTS BY APPLICANT AND ENGINEER

A. APPLICANT

I am the undersigned owner or authorized representative* of South Broward County Res. Recovery Project

I certify that the statements made in this application for a Power Plant Site Cert. 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

Please see Appendix 10.19 of the Certification Application

Signed: Thomas M. Henderson

Thomas M. Henderson, Attorney-in-Fact
Name and Title (Please Type)

Date: 6/3/85 Telephone No. 305/357-6456

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)

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 _____

Stephen C. Schwarz, Vice-President
Name (Please Type)

Malcolm Pirnie, Inc.
Company Name (Please Type)

2 Corporate Park Drive, White Plains, NY 10602
Mailing Address (Please Type)

Florida Registration No. 31306 Date: May 31, 1985 Telephone No. 914/694-2100

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.

Refer to: Solid Waste Energy Recovery Facility, Application for Power Plant Site Certification (here-after referenced as PPSC Application) Volume I, Section 1, March 1985

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

Start of Construction Winter 1985/86 Completion of Construction Summer 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.)

We estimate the cost to be $9,670,000

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

None

E. Requested permitted equipment operating time: hrs/day 24 ; days/wk 7 ; wks/yr 52 ; if power plant, hrs/yr 8760; if seasonal, describe: Not applicable (N/A)

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? No

   b. If yes, has "Lowest Achievable Emission Rate" been applied? No

   c. If yes, list non-attainment pollutants. Ozone (see note below)

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

3. Does the State "Prevention of Significant Deterioriation" (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? N/A

   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.

Note:

Broward County is currently designated as an ozone nonattainment area. There are no other designated nonattainment areas for other pollutants within 100 kilometers of proposed plant site. The violation upon which Broward County was designated as nonattainment area was based on a violation that occured on Virginia Key in Dade County. It was believed by Dade officials to be the result of digester gas from nearby sewage treatment plant rather than ozone. A three-part study has been implented to demonstrate that the readings that determine the above mentioned were false.

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		
Not Applicable				

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

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

2. Product Weight (lbs/hr): N/A

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	
	Not Applicable						

[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).

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)
Not Applicable				

E. Fuels

Type (Be Specific)	Consumption*		Maximum Heat Input (MMBTU/hr)
	avg/hr	max./hr	
Not Applicable			

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

Fuel Analysis:

Percent Sulfur: N/A Percent Ash: N/A

Density: N/A lbs/gal Typical Percent Nitrogen: N/A

Heat Capacity: N/A BTU/lb N/A BTU/gal

Other Fuel Contaminants (which may cause air pollution): N/A

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

Annual Average N/A Maximum N/A

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

N/A

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

Stack Height: N/A ft. Stack Diameter: N/A ft.

Gas Flow Rate: N/A ACFM N/A DSCFM Gas Exit Temperature: N/A °F.

Water Vapor Content: N/A % Velocity: N/A 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	Ref to	PPSC Application, Vol. I, Section 3			None	None	None
Uncontrolled (lbs/hr)					None	None	None

Description of Waste Refer to PPSC Application, Vol. I, Section 3

Total Weight Incinerated (lbs/hr) 316,250 (3795 Tons Per Day) Design Capacity (lbs/hr) 316,250

Approximate Number of Hours of Operation per day 24 day/wk 7 wks/yr. 52

Manufacturer To be determined following vendor selection

Date Constructed N/A Model No. N/A

	Volume $(ft)^3$	Heat Release (BTU/hr)	Fuel Type	Fuel BTU/hr	Temperature (°F)
Primary Chamber	To be determined following vendor selection				
Secondary Chamber					

Stack Height: 195 ft. Stack Diamter: 16.5 Stack Temp. 450°F

Gas Flow Rate: 970,134 ACFM 498,832 DSCFM* Velocity: 65 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.

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

[X] Other (specify) Electrostatic Precipitator

Brief description of operating characteristics of control devices:

Refer to PPSC Application, Vol. I, Section 3

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

Ash residue generated by the electrostatic precipitator units will be mixed with incinerator bottom ash and deposited at the Southern Residue/Unprocessable Waste Landfill adjacent to the Southern Resource Recovery Facility. Process water will be discharged to the sanitary sewer

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. N/A

*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.

*See PPSC Application, Vol. I, Sections 2,3

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. N/A

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 (Subpart (e))

Contaminant	Rate or Concentration
1. Particulate matter	0.08 grains per standard cubic foot dry gas, corrected to 50 percent excess air
2. No objectionable odor	

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

[ ] Yes [X] No

Contaminant	Rate or Concentration
N/A	

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

Contaminant	Rate or Concentration
1. Refer to PPSC Application, Vol. I, Section 3	
2. Particulate matter	0.03 grains per standard foot dry gas, corrected to 12 percent CO_2

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

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). Refer to PPSC Application, Vol. I, Section 3

1.

a. Control Device:

b. Operating Principles:

c. Efficiency:[1]

d. Capital Cost:

e. Useful Life:

f. Operating Cost:

g. Energy:[2]

h. Maintenance Cost:

i. Availability of construction materials and process chemicals:

j. Applicability to manufacturing processes:

k. Ability to construct with control device, install in available space, and operate within proposed levels:

2.

a. Control Device:

b. Operating Principles:

c. Efficiency:[1]

d. Capital Cost:

e. Useful Life:

f. Operating Cost:

g. Energy:[2]

h. Maintenance Cost:

i. Availability of construction materials and process chemicals:

[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:

3.

a. Control Device:

b. Operating Principles:

c. Efficiency:[1]

d. Capital Cost:

e. Useful Life:

f. Operating Cost:

g. Energy:[2]

h. Maintenance Cost:

i. Availability of construction materials and process chemicals:

j. Applicability to manufacturing processes:

k. Ability to construct with control device, install in available space, and operate within proposed levels:

4.

a. Control Device:

b. Operating Principles:

c. Efficiency:[1]

d. Capital Costs:

e. Useful Life:

f. Operating Cost:

g. Energy:[2]

h. Maintenance Cost:

i. Availability of construction materials and process chemicals:

j. Applicability to manufacturing processes:

k. Ability to construct with control device, install in available space, and operate within proposed levels:

F. Describe the control technology selected: Refer to PPSC Application, Vol. I, Section 3

1. Control Device:

2. Efficiency:[1]

3. Capital Cost:

4. Useful Life:

5. Operating Cost:

6. Energy:[2]

7. Maintenance Cost:

8. Manufacturer:

9. Other locations where employed on similar processes:

a. (1) Company:

(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.

(5) Environmental Manager:

(6) Telephone No.:

(7) Emissions:[1]

Contaminant	Rate or Concentration

(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:

[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 N/A

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).

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 Refer to PPSC Application, Vol. I, Section 5

1. 5 Year(s) of data from 01 / 01 / 70 to 12 / 31 / 74
month day year month day year

2. Surface data obtained from (location) Miami, Florida

3. Upper air (mixing height) data obtained from (location) Miami, Florida

4. Stability wind rose (STAR) data obtained from (location) N/A

C. Computer Models Used

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

2. ~~Only input/output data format modified~~ 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	_____	grams/sec
SO_2	_____	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.*

* Refer to PPSC Application, Vol. I, Section 3
** Refer to PPSC Application, Vol. I, Sections 3,4,5,7

STATE OF FLORIDA

DEPARTMENT OF ENVIRONMENTAL REGULATION

TWIN TOWERS OFFICE BUILDING
2600 BLAIR STONE ROAD
TALLAHASSEE, FLORIDA 32301-8241

BOB GRAHAM
GOVERNOR

VICTORIA J. TSCHINKEL
SECRETARY

June 12, 1985

Mr. Gary Carlson
Broward County EQCB
500 Southwest 14th Court
Ft. Lauderdale, Florida 33315

Dear Mr. Carlson:

Enclosed is the draft BACT review for the South Broward County Resource Recovery, Inc. Please review this preliminary determination and send to my attention any recommended changes or additions. The comment period deadline date is July 8, 1985.

The New Source Section review engineer is Ed Svec. If you need additional information, please call Ed or myself at (904)488-1344.

Sincerely,

E. F. Palagyi

E. F. Palagyi
BACT Coordinator
Bureau of Air Quality
Management

EP/ks

cc: E. Svec

DRAFT BACT
FOR REVIEW/COMMENTS
CONTENTS SUBJECT TO CHANGE

Best Available Control Technology (BACT) Determination

South Broward County Resource Recovery, Inc.

Broward County

The applicant plans to eventually construct a 3300 ton per day (TPD) municipal solid waste (MSW) incinerator facility to be located at 4400 South, State Road 7, Ft. Lauderdale, Florida. The thermal energy from combustion of the MSW will be used to produce steam for electric power generation.

The present plans are to install three 750 TPD mass burn incinerators that will process a total of 2250 TPD of MSW. This BACT review will apply only to these three units, at some future date a BACT review will be made for the fourth unit as a modification to an existing facility.

Each of the three mass burn incinerators will have an approximate heat input of 313 million Btu per hour, based upon a MSW calorific content of 5000 Btu per pound. Each incinerator will be scheduled to operate 8760 hours per year and on this basis the tons per year of the various air pollutants emitted were calculated. The applicant has projected the total annual tonnage of regulated air pollutants emitted from the three units to be as follows:

Particulate	(PM)	330	(25)*
Sulfur Dioxide	(SO_2)	2444	(40)*
Nitrogen Oxides	(NOx)	2488	(40)*
Carbon Monoxide	(CO)	395	(100)*
Lead	(Pb)	133	(1.6)*
Beryllium	(Be)	.0041	(.0004)*
Mercury	(Hg)	1.4	(0.1)*
Fluorides	(F)	111	(3)*
Ozone	(VOC)	58	(40)*
Sulfuric Acid Mist		12	(7)*

*Regulated Air Pollutants-Significant Emission Rates Florida Administrative Code Rule 17-2.500, Table 500-2.

The Broward County solid waste energy recovery facility was reviewed according to Florida Administrative Code Chapter 17-17, Electrical Power Plant Siting and Rule 17-2.50, Prevention of Significant Deterioration (PSD). The Bureau of Air Quality Management (BAQM) will perform the air quality review for the siting committee, which includes this BACT determination. The certification number assigned to the proposed facility is PA 85-21.

Rule 17-2.500(2)(f)3 requires a BACT review for all regulated pollutants emitted in an amount equal to or greater than the significant emission rates listed in Table 500-2, Regulated Air Pollutants. The facility is located in an area classified

as attainment for all air pollutants, except ozone. The emission limits for the air pollutant ozone (VOC) will be determined through the application and employment of Lowest Achievable Emission Rate (LAER), Rule 17-2.640, if applicable.

BACT Determination Requested by the Applicant:

The following emission limits are based upon tons of MSW charged.

PM - 0.67 lbs	CO - 0.80 lbs	Hg - 0.0023 lbs
SO_2 - 4.91 lbs	Pb - 0.27 lbs	F - 0.23 lbs
NOx - 5.00 lbs	BE - 8.4 x E-6	VOC - 0.12 lbs

Date of Receipt of a BACT Application:

June 9, 1985

Date of Publication with Florida Administrative Weekly:

June 14, 1985

Review Group Members:

Ed Svec - New Source Review Section

Clair Fancy - Central Air Permitting

Tom Rogers - Air Modeling Section

Buck Oven - Power Plant Siting

DRAFT BACT
FOR REVIEW/COMMENTS
CONTENTS SUBJECT TO CHANGE

BACT Determination by DER:

Pollutant	Emission Limit/Per Source
Particulate Matter	0.03 grains/dscf, corrected to 12% CO
Sulfur Dioxide	2.8 lb/ton MSW charged, 30 day average, not to exceed 5.6 Lb/Ton.
Nitrogen Oxides	3.0 lb/ton MSW charged
Carbon Monoxide	1.5 lb/ton MSW charged
Fluorides	(1)
Lead	(1)
Mercury	2240 grams/day [2]
Beryllium	8.4 x E-6 lb/ton MSW charged
Visible Emission	15 percent opacity

(1) No definite emission limit set but control technology discussed in BACT Determination Rationale.

(2) When more than 2205 lb/day of municipal sewage sludge is fired, compliance with the mercury emission limit shall be demonstrated in accordance with 40 CFR 61, Method 101 Appendix B.

Compliance with limitations for sulfur oxides, particulate matter, and nitrogen oxides will be demonstrated in accordance with Florida Administrative Code Rule 17-2.700, DER Methods, 1, 2, 3, 4, 5, and 6, and 40 CFR 60 Apendix A; Method 7. Compliance

with the opacity limit shall be demonstrated in accordance with Florida Administrative Code Rule 17-2.700(6)(a)9., DER Method 9.

A continuous monitoring system to measure the opacity of emissions of each stack shall be installed, calibrated, and maintained in accordance with the provisions of Rule 17-2.710 - Continuous Emission Monitoring Requirements. The CEM's must be installed and operational prior to compliance testing.

BACT Determination Rationale:

Each MSW incinerator will have a charging rate more than 50 tons per day, and therefore, is subject to the provisions of 40 CFR 60.50, Subpart E, New Source Performance Standards (NSPS). The NSPS standard regulates only particulate matter. The particulate matter standard is 0.08 grains/dscf, corrected to 12% CO. This NSPS was promulgated in 1971 and no longer reflects state-of-the-art for control of particulate emissions. The applicants proposed particulate matter emission limit of 0.03 grains/dscf, corrected to 12% CO is judged to represent BACT. All the other requirements as set forth in the NSPS, Subpart E will apply.

The Department has determined that the emission limit for SO_2 to be 2.8 pounds per ton of MSW charged into the incinerator based on a 30 day average. MSW components that appear to be major contributors of sulfur include rubber, plastics, foodwastes, yardwastes, and paper.

The SO_2 emission limit was determined to be BACT by evaluating studies of emissions test data for similar MSW incinerations. Various studies have indicated average emission levels of 2.0 to 2.8 Lb SO_2/ton MSW charged with deviations of $\pm$ 1.3 to 1.6 Lb/ton. The amount of SO_2 emitted would be comparable to the burning of distillate oil having less than a 0.5 percent sulfur content. Burning low sulfur fuel is one acceptable method of controlling SO_2 emissions. The installation of a flue gas desulfurization systems to control SO_2 emissions is not warranted when burning MSW.

The mercury emission limit determined as BACT is equal to 70% of the National Emission Standard for Hazardous Air Pollutants (NESHAPs), 40 CFR 61.50, Subpart E, for muncipal waste water sludge incineration plants. The provisions of this subpart, however, do not apply because no grease, scum, grit screenings or sewage slugde will be incinerated in the proposed incinerators. The BACT is determined to be 2240 grams per day. This level of mercury emissions is not considered to have a major impact on the environment.

The uncontrolled emission of beryllium, according to the California report, when firing MSW is estimated to be 6.2×10^{-6} pounds per million Btu. Uncontrolled beryllium emissions would be approximately 11 grams per 24 hours or 0.01 TPY. The operating temperature of the particulate matter emission control device will be below 500 °F. Operation below this temperature

is necessary to force absorption/condensation of beryllium oxides, present in the flue gas stream, onto available fly ash particles subsequentially removed by the particulate control device. Assuming 95% efficiency of the control device the annual beryllium emissions are estimated at 0.0007 tons per year. This amount of beryllium emitted is considered to have a negligible impact on the environment. The emission factor of 8.4×10^{-6} lb/ton MSW proposed by the applicant is judged to be BACT. If, however, beryllium containing waste as defined in the National Emission Standards for Hazardous Air Pollutants (NESHAPs), Subpart C, Subsection 61.31(g), is charged into the incinerator; emissions of beryllium to the atmosphere shall not exceed 10 grams per 24 hour or an ambient concentration of 0.01 ug/m^3, 30 day average. Compliance with this beryllium emission limit will be in accordance with the NESHAPs, Subpart C.

The applicant has projected lead and fluorides emissions to be 133 and 111 tons per year respectively. These amounts are well in excess of the significant emission rates given in Florida Admininstrative Code Rule 17-2.500, Table 500-2.

With respect to lead emissions, two conditions are needed to achieve high removal efficiencies of metallic compounds emitted at refuse burning facilities: (1) operation of particulate matter control equipment at temperatures below 260°C (500°F), and

(2) consistantly efficient removal of sub-micron fly ash particles. The temperature of the incinerator combustion gases at the inlet to the particulate control device is estimated to be 425-475°F. At these temperatures the particulate control equipment would be capable of removing the lead emissions from the flue gas stream.

When flue gas temperatures are lowered below 260°C (500°F), metallic compounds are removed from the vapor phase by absorption and condenstation preferentially on fine particles with sub-micron particles receiving the highest concentrations of metals. Properly designed and operational fabric filter systems appear at this time to offer the best method for consistent and efficient removal of fine (and in particular sub-micron) fly ash. Removal efficiencies of fine fly ash using these systems can be in excess of 99 percent with respect to MSW incinerators. Studies have indicated the weight percent of submicron particles emitted from combustion is on the order of 45% which clearly indicates the need for efficient control of particles in this range.

Emissions of fluoride orginates from a number of sources in the refuse. The mechanisms of governing fluoride release and formation of hydrogen fluoride at refuse-burning facilities are probably similar to those for hydrogen chloride. The control of fluorides can be reduced at refuse-burning plants by removal of selected refuse components with high fluoride contents, and the

use of flue gas control equipment. In view that it is propsed to incinerate materials that contain fluoride, BACT for the control of fluorides is installation of a wet or dry flue gas scrubber system. The addition of a scrubber system would also provide control for SO_2 emissions addressed earlier in this analysis as well as other acid gases which will be addressed in other sections of the analysis.

During combustion of municipal solid waste, NOx is formed in high temperature zones in and around the furnace flame by the oxidation of atmospheric nitrogen and nitrogen in the waste. The two primary variables that affect the formation of NOx are the temperature and the concentration of oxygen. Techniques such as the method of fuel firing to provide correct distribution of combustion air between overfire and underfire air, exhaust gas recirculation, and decreased heat release rates have been used to reduce NOx emissions. A few add-on control techniques such as catalytic reduction with ammonia and the thermal de-NOx are still experimental, and are not considered to be demonstrated technology for the proposed project. State-of-the-art control of the combustion variables will be used to limit NOx emissions at 3 pounds per ton of MSW charged. This level of control is judged to represent BACT.

Carbon monoxide is a product of incomplete combustion where there is insufficient air. Incomplete combustion will also result in the emissions of solid carbon particulates in the form of smoke or soot and unburned and/or partially oxidized hydrocarbons. Incomplete combustion results in the loss of heat energy to the boiler. The department agrees with the applicant that BACT is a combustion control system that will insure sufficient mixing of the MSW and air so that the emission of products of incomplete combustion are minimized. The proposed CO emission rate is 1.5 pounds per ton of MSW charged. This level of control is judged to represent BACT.

Furthermore, CO has a calorific value of 4347 Btu/lb and when discharged to the atmosphere represents lost heat energy. Since heat energy is used to produce the steam which drives the generator to produce electric power, there is a strong economic incentive to minimize CO emissions.

Hydrocarbon emissions, like carbon monoxide emissions, result from incomplete oxidation of carbon compounds. Control of CO and HC emissions can be mutally supportive events. BACT for hydrocarbons is high combustion temperature, good mixing, and proper air and fuel management.

The type of air pollutants emitted when incinerating plastics depends on the atomic composition of the polymer. Plastics composed of only carbon and hydrogen or carbon, hydrogen and

oxygen form carbon dioxide and water when completely combusted. Incomplete combustion yields carbon monoxide as the major pollutant.

Plastics containing nitrogen as a heteroatom, yields molecular nitrogen, some NOx, carbon dioxide, and water when completely combusted. Incomplete combustion may yield hydrogen cyanide, cyanogen, nitrites, ammonia and hydrocarbon gases. Complete combustion of plastics containing halogen or sulfur heteroatoms form acid gases such as hydrogen chloride, hydrogen fluoride, sulfur dioxide, carbon dioxide, and water. Halogen or sulfur compounds can form on incomplete combustion of the plastic. Polyvinyl chloride (PVC), one of the many polymers, has been implicated as causing the most serious disposal problem due to the release of hydrogen chloride (HCl) gas when incinerated. This problem has long been realized resulting in other polymers being used in packaging. For example, the weight percent of chlorine in polyurethane is 2.4, with only trace amounts in polyethlyene and polystyrene, as compared to the weight percent of 45.3 in PVC.

Plastic materials have a high heat of combustion, for example, coated milk cartons - 11,330 Btu/lb, latex - 10,000 Btu/lb and polyethylene 20,000 Btu/lb. For comparison, newspaper and wood have a heat content of 8,000 Btu/lb, and kerosene - 18,900 Btu/lb. Here again there is economic incentive to obtain as complete combustion as possible.

The department has not substantiated any acid gas emission problems from existing MSW incinerators. What impact future materials used in the manufacture of disposals will have on ambient air quality is unknown. Again, BACT for the control of acid gas emissions is the installation of a wet or dry flue gas scrubber system.

The applicant had indicated there would be sulfuric acid mist emissions from the proposed sources. Acid mist is created when sulfur trioxide combines with water vapor at a temperature below the dew point of sulfur. Sulfur trioxide is formed by the catalytic oxidation of sulfur dioxide. MSW does not contain vanadium pentioxide, the catalyst required for this distinct chemical reaction, therefore, no sulfuric acid mist will be emitted.

The air quality impact of the proposed emissions has been analyzed. Atmospheric dispersion modeling has been completed and used in conjunction with an analysis of existing air quality data to determine maximum ground-level ambient concentrations of the pollutants subject to BACT. Based on these analyses, the department has reasonable assurance that the proposed solid waste recovery facility in Broward County, subject to these BACT emission limitations, will not cause or contribute to a violation of any PSD increment or ambient air quality standard.