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

December 6, 1983

Mr. James Wilburn, Chief
Air Management Branch
USEPA, Region IV
345 Courtland Street, N.E.
Atlanta, Georgia 30365

Dear Mr. Wilburn:

Enclosed is a copy of the Pinellas County power plant siting application received by the department on September 6, 1983. This application is a revised version of an earlier submittal that was received in August. The project consists of the construction of a third boiler at the existing resource recovery facility. The increased emissions resulting from this project make it subject to the federal PSD regulations.

According to the November 22, 1983, Federal Register the State of Florida will assume full delegation of PSD review and approval as of December 22, 1983. At this time projects such as the above will be subject to the extensive power plant siting certification requirements only. These requirements include meeting all of the PSD regulations contained in the State rules. Until December 22, these projects are also required to obtain a federal PSD permit.

In view of the fact that Florida will receive full delegation in two weeks and that this application is in the beginning of the review process, we feel that a federal PSD permit, approved by your office, is not necessary in this particular case. The permit would only be a duplicative review of already mandated requirements and, in any case, will not be required after December 22.

Please inform us as to how you would like us to proceed in this case. If you need any clarification or have any questions please let us know.

Sincerely,

C. H. Fancy, P.E.
Deputy Chief
Bureau of Air Quality
Management

CHF/TR/s
enclosure

I. Impacts on Air Quality and Water Quality

1. Air Quality

a. Rule Applicability

The proposed site of the Pinellas County Resource Recovery Facility (RRF) is located in an area designated as nonattainment for ozone under 40 CFR 81.310 and Rule 17-2.410, Florida Administrative Code, and attainment under 40 CFR 81.310 and Rule 17-2.420, for all other criteria pollutants.

The maximum emissions for the proposed resource recovery facility and significant emission rates (40 CFR 52.21(b)(23) and Rule 17-2.500-2), in tons per year, are as follows:

Pollutant	Maximum Emission	Significant Emission Rate
Particulate Matter (PM)	109	25
Sulfur Dioxide (SO_2)	364	40
Nitrogen Oxides (NOx)	577	40
Carbon Monoxide (CO)	288	100
Hydrocarbons (HC)	58(1)	40(VOC)
Lead (Pb)	5.7	0.6
Mercury (Hg)	2.1	0.1
Beryllium (Be)	0.00025	0.004
Fluorides	19	3
Chlorides	764(2)	1 (Vinyl Chloride)

(1) non-methane HC emissions (VOC) will be less than 40 tons per year
(2) vinyl chloride emissions will be less than 1 ton per year

The proposed facility has the potential to emit more than 100 tons per year of one or more regulated pollutants and is, therefore, subject to review for prevention of significant deterioration (PSD) under 40 CFR 52.21 and Rule 17-2.500(5)(c). PSD review consists of a determination of best available control technology (BACT) and an air quality impact analysis for each attainment and noncriteria pollutant that would be emitted in a significant amount. For the proposed facility, PSD review is required for seven pollutants: PM, SO_2, NOx, CO, lead, mercury, and fluorides.

The proposed facility is not subject to nonattainment review for volatile organic compounds (VOC) because it is a minor source of this pollutant and the proposed increase will be less than 100 tons per year.

b. Control Technology Review

Based on an analysis of the economic, environmental, and energy impacts of the proposed project - the construction of a third Martin combustion unit, the Department has made a preliminary BACT determination for the boiler. The emission limits from the BACT determination are as follows:

Pollutant	Emission Limit
Particulate Matter	0.03 gr/dscf, corrected to 12 percent CO_2
Sulfur Dioxide	83 pounds per hour, maximum 3-hour average
Nitrogen Oxides	132 pounds per hour
Carbon Monoxide	66 pounds per hour
Lead	1.3 pounds per hour
Mercury	3200 grams per day*
Visible Emissions	10% opacity

* When more than 2,205 lb/day of municipal sewage sludge (dry basis) is fired, compliance with the mercury emission limit shall be demonstrated in accordance with 40 CFR 61, Method 101 Appendix B.

Compliance with the limitations for particulates, sulfur dioxide, visible emissions, and nitrogen oxides should be demonstrated in accordance with Florida Administrative Code Rule 17-2.700, DER Methods 5, 6, 9 and EPA Method 9 (40 CFR 60, Appendix A), respectively.

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

(1) BACT for Particulate Matter

The proposed mass burn combustion unit will have a charging rate of more than 50 tons per day, and is therefore, subject to the provisions of 40 CFR 60.50, Subpart E, New Source Performance Standards (NSPS). The NSPS for particulate matter emissions is a rate not to exceed 0.08 gr/dscf corrected to 12 percent CO_2. An electrostatic precipitator (ESP) will be installed to control particulate emissions. The two existing mass burn units have a permitted particulate emission limit not to exceed 0.08 gr/dscf (NSPS).

For the third unit, the applicant has proposed better control on particulate emissions than the 0.08 gr/dscf required by NSPS. The control equipment is an ESP capable of achieving the 0.03 gr/dscf particulate emission limit proposed by the County and accepted by the Departmenat as BACT. The baghouse is another control device capable of achieving the particulate emission limit determined as BACT, but was not recommended for two reasons: (1) the existing combustion units use ESPs, therefore, using an ESP will reduce the spare parts inventory; and (2) maintenance and operating personnel have experience with ESP control devices.

(2) BACT for Sulfur Dioxide

The Department has determined the limit for SO_2 emissions to be 83 pounds per hour. The amount of SO_2 generated when burning municipal type waste is less than the SO_2 emissions from the burning of distillate fuel oil containing 0.5 percent sulfur. The use of low sulfur fuel oil is considered one method of controlling SO_2 emissions, therefore, the installation of a flue gas desulfurization system is not warranted.

(3) BACT on Nitrogen Oxides

In the application, the applicant recommends that BACT is the use of proper boiler design and operating procedures. The proposed NOx emission rate is 132 pounds per hour as indicated in the air quality analysis. Annual emissions of NOx will be 577 tons. This level of control is judged to represent BACT.

During combustion of municipal solid waste, NOx is formed in high temperature zones in and around the furnace flame by 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, the 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 the catalytic reduction with ammonia process and the thermal de-NOx are still experimental. None of these techniques are considered to be demonstrated technology for the proposed project.

(4) BACT on Carbon Monoxide

Carbon monoxide is a product of incomplete combustion by insufficient air supply. 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 the use of state-of-the-art boiler controls to insure sufficient underfire and overfire air so that the

emissions of products of incomplete combustion are minimized. The proposed CO emission rate is 66 pounds per hour. This level of control is judged to represent BACT.

(5) BACT on Lead

Lead emissions from the boiler occur because this element is present in varying amounts in the solid waste. The inlet temperature of the ESP is estimated at 425-475 °F. At these temperatures the lead emissions should not be in a vaporous state, and will be removed by the ESP as particulate.

(6) BACT on Mercury

The mercury emission limit is the National Emission Standard for Hazardous Air Pollutants (NESHAPs), 40 CFR 61.50, Subpart E, for municipal waste water sludge incineration plants. The proposed source would be subject to the provisions of NSPS, 40 CFR 60.150, Sewage Treatment Plants, if more than 2,205 pounds per day (dry basis) municipal sewage sludge is charged. The Department has determined the emission limit for mercury to be 3,200 grams per day applicable only when more than 2,205 pounds per day municipal sewage sludge (dry basis) is charged into the mass burn combustion unit.

(7) BACT on PVC and Hydrogen Fluoride

The combustion of plastics can result in the emission of acid gases, such as hydrogen chloride and hydrogen fluoride. Burning polyvinyl chloride (PVC), of all the polymers, has been implicated as causing the most serious disposal problem due to the release of HCl gas. This problem has long been realized resulting in other polymers being used in packaging. Burning polypropylene and polystyrene, for example, produce carbon monoxide and the monomer styrene.

Both HCl and HF are hydrogen halides and are soluble in water. A water scrubbing system will remove approximately 75% of the HF gases. The Department does not believe the air quality impact due to HF emissions justifies the cost of installing a wet scrubber system.

(8) BACT on Visible Emissions

The visible emissions limit of 10% opacity is based on operating data from the two existing units.

c. Air Quality Impacts

As noted in section I. 1. a., the proposed source at the Pinellas County RRF will result in significant emissions of the criteria pollutants PM, SO_2, NOx, CO and lead, and of the non-criteria pollutants mercury and fluorides.

The air quality impact analysis required for these pollutants includes:

- An analysis of existing air quality;
- A PSD increment analysis (for PM and SO_2 only);
- An Ambient Air Quality Standards (AAQS) analysis;
- An analysis of impacts on soils, vegetation, visibility, acid rain, and growth-related air quality impacts; and;
- A "good engineering practice" (GEP) stack height determination.

The analysis of existing air quality generally relies on preconstruction monitoring data collected in accordance with EPA-approved methods. The PSD increment and AAQS analyses depend on air quality modeling carried out in accordance with EPA guidelines.

Based on these required analyses, the department has reasonable assurance that the proposed source at the Pinellas County RRF, as described in this report and subject to the conditions of approval proposed herein, will not cause or contribute to a violation of any PSD increment or ambient air quality standard. A discussion of the modeling methodology and required analyses follows:

(1) Modeling Methodology

Two EPA-approved dispersion models, the Single Source CRSTER model and the Industrial Source Complex Short-term (ISCST) model, were used in the air quality impact analysis. Both of these models relate ground-level concentrations at some distance to pollutant emissions of some inert gas or small particles from a point source by imposing a Gaussian solution to the steady-state mass conservation equation. The CRSTER model, which is confined by the colocation of all point sources, was used to identify the critical years of meteorology. The ISCST model, which allows for separation of sources and several other features, such as the inclusion of downwash, was used to refine the anlaysis.

The surface and upper air meteorological data used in these models were National Weather Service data collected at Tampa, Florida, during the period 1970-1974. Since five years of data were used, the highest, second-high short-term predicted concentrations may be used to compare with the appropriate ambient standard or PSD increment.

The stack parameters and emission rates used in evaluating the ambient impacts are contained in Table I-1 and Table I-2, respectively. Only for the pollutants SO_2 and PM were all the sources evaluated. Total ambient air quality impacts were based on the modeled impacts plus the monitored "background" concentrations.

(2) Analysis of Existing Air Quality

Preconstruction ambient air quality monitoring is required for all pollutants subject to PSD review. In general, one year of quality assured data using an EPA-reference, or the equivalent, monitor must be submitted. Sometimes less than one year of data, but no less than four months, may be accepted when department approval is given. An exemption to this requirement can be obtained if the maximum air quality impact, as determined through modeling, is less than a pollutant-specific deminimus concentration. In addition, if current monitoring data already exist and these data are representative of the proposed source area, then at the discretion of the department these data may be used.

The predicted maximum air quality impacts of the proposed project (Unit 3) for each of the seven pollutants subject to review are given in Table I-3 along with the monitoring deminimus levels. From this table it is seen that PM, NOx, CO, and Hg have maximum air impacts less than the deminimus level; therefore no preconstruction monitoring is required. Sufficient data in the area of the source already exist for SO_2 and Pb to define existing air quality for these pollutants. The department did not require additional monitoring for these pollutants. Although fluorides are subject to monitoring requirements, no EPA-approved method currently exists to measure ambient concentration of this pollutant.

Table I-4 shows the monitored ambient air quality levels for the most recent complete year (1982) for all the criteria pollutants, including the required data for SO_2 and Pb. These data were collected from existing monitors in Pinellas County.

(3) PSD Increment Analysis

The Pinellas County RRF is located in an area where the Class II PSD increments apply. The facility is also located approximately 75 kilometers from the Class I Chassahowitzka National Wilderness Area. As such as analysis of the impact on this area must be performed.

A PSD increment analysis is required for the pollutants SO_2 and PM only. The PSD increments represent the amount that new sources in the area may increase ambient ground-level concentrations of these pollutants for various time averages. At no time, however, can the increased loading of these pollutants into the atmosphere from these new sources cause or contribute to a violation of the ambient air quality standards.

For the Pinellas County RRF the proposed Unit 3 along with the previously built Units 1 and 2 all consume PSD increment. In addition, several other new sources in the area have been identified which may interact with the Pinellas County RRF in

consuming the allowed PSD increments. These sources are the McKay Bay RRF and the TECO Big Bend power plant.

Atmospheric dispersion modeling was performed, as discussed previously, taking into account only those new sources which consume PSD increment. The results of this modeling are summarized in Table I-5.

The impact of these sources on the nearest Class I area was not explicitly modeled. The models used in this air quality analysis are not appropriate for predicting ground-level concentrations beyond 50 kilometers. However, the impact on the Class I area may be extrapolated from the modeling results showing the proposed Unit 3 impact on the two distant nonattainment areas. An SO_2 nonattainment area is located near Tarpon Springs approximated 23.5 kilometers from the Pinellas County RRF. The impacts of Unit 3 alone on this area are 2.2 ug/m^3, 3-hour average; 0.3 ug/m^3, 24-hour average; and 0.02 ug/m^3, annual average. These values are less than significant for impacts on nonattainment areas and would be much less at the distance of the Class I area. A PM nonattainment area is located in Tampa, 14.4 kilometers from the RRF. Here, the impacts of Unit 3 alone are 0.01 ug/m^3, 24-hour average and 0.006 ug/m^3, annual average. Again, these impacts are less than significant for nonattainment areas and the concentrations would be much less at the distance of the Class I area. Table I-5 indicates the results of all the PSD increment modeling.

(4) AAQS Analysis

Given existing air quality in the area of the Pinellas County RRF, the proposed Unit 3 emissions are not expected to cause or contribute to a violation of an AAQS. The results of the AAQS analysis are contained in Table I-6.

Of the pollutants subject to PSD review only the criteria pollutants SO_2, PM, CO, NO_2, and Pb have an AAQS to compare with. All sources listed in Table I-1 were modeled to determine the maximum ground-level impacts for SO_2 and PM. For CO, NO_2, and Pb only the three units at the Pinellas County RRF were modeled to determine the maximum ground-level concentrations resulting from this facility.

The total impact on ambient air is obtained by adding a "background" concentration to the maximum modeled concentrations. This "background" concentration takes into account all sources of the particular pollutant in question that were not explicitly modeled. A conservative estimate of these "background" concentrations is given by the second highest monitored concentration as listed in Table I-4. This is a conservative estimate because sources used in the modeling may have contributed to the monitored value and this would be contributing doubly to the total impact.

(5) Analysis of Impacts on Soils, Vegetation, Visibility, and Acid Rain and Growth-Related Air Quality Impacts

(a) Impact on Soils and Vegetation

The maximum ground-level concentrations predicted to occur as a result of emissions from the proposed project in conjunction with all other sources, including a background concentration, will be below all applicable AAQS including the secondary standards designed to protect public welfare-related values. No soils or species of vegetation highly sensitive to these emissions in the concentrations predicted are known to occur in the site vicinity, or in the Chasshowitzka Class I area.

(b) Impact on Visibility

A level I visibility screening analysis was performed to determine if any impact may occur in the Class I area. The analysis showed that there was no potential for an adverse impact on visibility in this area.

(c) Acid Rain Impact

The increased emissions of SO_2 and NOx, precursors to possible acid formation and subsequent acidic rain, from the proposed Unit 3 project are relatively small. In comparison with the emissions of these pollutants from nearby power plants the increased loading due to the proposed project is inconsequential. Thus, no adverse impact on the acidity of rainfall is expected as a result of this project.

(d) Growth-Related Air Quality Impacts

The construction of the proposed Unit 3 will require between 200 and 300 persons. Nearly all will be from the local area. The project is not expected to stimulate any additional growth or shift the nature of projected growth to the extent that an air quality impact will result.

(e) GEP Stack Height Determination

Good engineering practice (GEP) stack height means the greater of: (1) 65 meters; or (2) the maximum nearby building height plus 1.5 times the building height or width, whichever is less. For the proposed project the building height is 35.4 meters and the building width is 35.0 meters. Thus definition (2) above leads to a GEP stack height of 87.9 meters.

Due to the proximity of the facility to an airport, the stack height cannot be built to the GEP height. The applicant has addressed the possible increased ground-level concentrations (as a result of aerodynamic effects of the nearby building) by including a downwash mechanism in the modeling.

TABLE I-1
PINELLAS COUNTY RESOURCE RECOVERY PROJECT
SOURCE PARAMETERS USED IN MODELING

Source	UTM-E (km)	UTM-N (km)	Stack Height (m)	Exit Temperature (K)	Exit Velocity (m/s)	Stack Diamete (m)
RRF Unit 3	335.2	3084.1	49.1	505	26.8	2.37
RRF Units 1-2	335.2	3084.1	49.1	505	26.8	2.37
McKay Bay RRF	360.0	3091.9	45.7	500	21.3	1.91
TECO Big Bend	361.9	3075.0	149.4	426	15.6	7.00
FPC Bartow	342.4	3082.7	91.4	408	44.0	3.35
FPC Higgins	336.5	3098.5	53.0	422	10.4	3.81
Anclote Unit 1	324.9	3119.0	152.1	416	50.0	3.66
Anclote Unit 2	324.9	3119.0	152.1	416	28.3	3.66
Hooker Pt. Units 1,2	360.0	3087.5	61.0	427	8.1	4.30
Hooker Pt. Units 3,5	360.0	3087.5	93.3	400	26.9	3.20
Hooker Pt. Unit 4	360.0	3087.5	93.3	438	42.4	2.90
Hooker Pt. Unit 6	360.0	3087.5	93.3	417	23.4	5.40
TECO Gannon Units 1-5	385.0	3091.0	85.3	403	9.2	3.43
TECO Gannon Unit 6	385.0	3091.0	85.3	403	18.0	2.87

Area Source	UTM-E (km)	UTM-N (km)	Release Height (m)	Area Width (m)
Golden Triangle	330.0	3085.0	12.45	100

TABLE I-2
PINELLAS COUNTY RESOURCE RECOVERY PROJECT
MAXIMUM HOURLY EMISSION RATES

Source	SO_2 (g/s)	PM (g/s)	NOx (g/s)	CO (g/s)	HC (g/s)	Pb (g/s)	Hg (g/s)	Be (g/s)	Fluorides (g/s)	Chloride (g/s)
RRF Unit 3	10.5	2.8	16.6	8.3	1.7	0.17	0.06	7.2×10^{-6}	0.55	22.0
RRF Units 1-2	21.0	5.6								
McKay Bay RRF	21.4	4.1								
TECO Big Bend	6002.2	79.2								
FPC Bartow	722.2	30.9								
FPC Higgins	286.7	8.9								
Anclote Unit 1	1631.9	58.1								
Anclote Unit 2	816.0	29.0								
Hooker Pt. Units 1,2	328.0	15.1								
Hooker Pt. Units 3,5	384.8	16.7								
Hooker Pt. Unit 4	142.6	9.6								
Hooker Pt. Unit 6	832.6	10.1								
TECO Gannon Units 1-5	130.7	11.8								
TECO Gannon Unit 6	58.3	2.6								

TABLE I-3

MAXIMUM AIR QUALITY IMPACTS (UNIT 3 ONLY)
FOR COMPARISON TO DEMINIMUS AMBIENT LEVELS

Pollutant	Maximum Modeled Concentration (ug/m^3)	Deminimus Ambient Impact Level (mg/m^3)
SO_2 (24-hour)	15.6	13
PM (24-hour)	4.1	10
NO_2 (Annual)	0.9	14
CO (8-hour)	8.6	575
Pb (24-hour)	0.25	0.1
Hg (24-hour)	0.082	0.25
Fluorides (24-hour)	0.82	0.25

TABLE I-4

PINELLAS COUNTY 1982 MONITORING DATA IN THE VICINITY OF THE PINELLAS COUNTY RESOURCE RECOVERY FACILITY

Pollutant	Site	Averaging Time	Maximum Concentration(ug/m^3)	2nd Maximum Concentration(ug/m^3)
SO_2	3980 023	3-hour	642	485
		24-hour	205	112
		Annual	24	-
PM	3980 023	24-hour	67	64
		Annual	33	-
NO_2	3980 018	Annual	27	-
CO	3980 018	1-hour	14000	11000
		8-hour	7000	6000
Pb	3980 024	Quarterly	0.8	0.7

TABLE I-5
COMPARISON OF NEW SOURCE IMPACTS
WITH PSD INCREMENTS

Pollutant and Time Average	PSD Class II Increment(ug/m^3)	Predicted Concentration(ug/m^3)	Increment Consumed(%)	PSD Class I Increment(ug/m^3)	Predicted Concentration(ug/m
SO_2					
3-hour	512	246	48	25	<<25
24-hour	91	81	89	5	<<5
Annual	20	5	25	2	<<2
PM					
24-hour	37	6	16	10	<<10
Annual	19	0.4	<0.1	5	<<5

TABLE I-6
COMPARISON OF TOTAL IMPACTS WITH
AMBIENT AIR QUALITY STANDARDS

Pollutant and Time Average	Maximum Impact Unit 3 (ug/m^3)	Maximum Impact All Sources (ug/m^3)	Existing Background (ug/m^3)	Maximum Total Impact (ug/m^3)	Florida AAQS (ug/m^3)
SO_2					
3-hour	24	269	485	754	1300
24-hour	16	96	112	208	260
Annual	0.6	14	24	38	60
PM					
24-hour	4	6	64	70	150
Annual	0.2	0.7	33	34	60
NO_2					
Annual	1	3	27	30	100
CO					
1-hour	13	39	11000	11039	40000
8-hour	9	27	6000	6027	10000
Pb					
Quarterly	0.3	0.7	0.8	1.5	1.5