

METROPOLITAN DADE COUNTY • FLORIDA

ENVIRONMENTAL RESOURCES MANAGEMENT

909 S.E. First Avenue
Brickell Plaza, Building - Rm. 402
Miami, Florida 33131
Telephone: 579-2760

September 30, 1977

Hamilton S. Oven, Jr., P.E.
Administrator, Power Plant Siting
State of Florida
Department of Environmental Regulation
2562 Executive Center Circle, East
Montgomery Building
Tallahassee, FL 32301

RECEIVED
OCT 17 1977

RE: Questions on the Resource Recovery,
Dade County, Inc. Application for
Power Plant Site Certification.

DIVISION OF
ENVIRONMENTAL PERMITTING

Dear Mr. Oven:

We are in receipt of your August 22, 1977 letter outlining various questions raised by your staff in connection with this application.

As you are aware, your Sub-District office at West Palm Beach has issued permit No. SWC13-038, dated June 13, 1977 for the Resource Recovery facility including the sanitary landfill, and permits No. SC13-2689, dated June 23, 1977, No. SC13-2690 and No. SC13-2691, dated August 4, 1977 for the pathological incinerator and the boiler stacks respectively.

We believe that the questions relative to the solid waste processing plant, including the sanitary landfill, and the particulate emission aspects of this project have been addressed to the satisfaction of your Department in the permit applications pursuant to Chapters 17-7 and 17-2 F.A.C. Nevertheless, we are herein addressing the seven questions outlined in your letter, in an effort to expedite your review of the Site Certification Application for this facility.

1. In an area with high water table and low permeability, how is a large septic tank expected to work? What would be the cost of connecting

the septic tank to the existing 58th Street sewer? Could the septic tank effluent be put into the process?

Answer

The area of the plant site itself will be raised to 8' final grade elevation (approximately 3.5' above mean high water). Since the proposed septic tank will be of the dosing type, the drainfield receiving the effluent will be installed 12" below grade. In addition, the area of the drainfield is to be de-mucked to provide an adequate percolation rate in conformance with the requirements of the Metropolitan Dade County Code. Also, the area under the drainfield will be filled with 2' (minimum) of fine grade silica sand and layers of washed crushed rock to provide added filtration. Enclosed as Exhibit "A" is a copy of the standard drainfield installation details.

Due to the Miami-Dade Water and Sewer Authority's minimum size requirements, the proposed sewer connection consists of a 12" sewermain extension from the existing 58th Street sewer to the plant site. This brings the estimated cost of a sewer extension and connection to approximately \$270,000.

The septic tank effluent cannot effectively be put into the system.

2. What is the expected chemical content of the ash to be disposed of in the landfill? What are the soluble fractions of such ash that may be expected to be leached out by rainwater?

Answer

The chemical composition of the ash was presented as Table 3-7 in the Application. An error however on this table was made in the preparation of the table. The carbon content was listed as $\leq 65\%$. The corrected value should be 0.69%. Presented below is a corrected Table 3-7.

Table 3-7. Chemical Composition of Pulped Fuel Ash.

Element	Percent
Silicon	35+
Calcium	3 - 8
Sodium	3 - 8
Titanium	1 - 5
Aluminum	4 - 9
Carbon	0.69
Iron	.25 - .75
Copper	.10 - .25
Magnesium	.05 - .10
Lead	.01 - .05
Manganese	.01 - .05
Chromium	.01 - .05
Nickel	.005 - .01
Cobalt	.005 - .01
Boron	.005 - .01
Molybdenum	.005 - .01
Bismuth	.005
Zinc	.005
Silver	.005
Cadmium	.005
Tin	.005
Arsenic	.001

Method of Analysis: Spectrographic

It is expected that no significant amount of contaminating leachate will be generated. Also, the leachate that may be generated will be generally inert. The following factors discuss the mitigative measures:

- A. Method of construction of cell.
- B. Low amount of water solubles in material sent to landfill.
- C. Low amount of organic matter.

Cell Construction: The design of each completed cell (or part thereof) is such that rain water will runoff rather than percolate through the fill. The active cell, from which leachate can also be generated, is drained to the lined two-acre collection pond. (Refer to answer in Question 5.)

Each ten-acre cell requires approximately 15 months to fill on the first lift. Less than one acre will be active at any one time. Since, the leachate will originate from only one acre, it can be diverted from the collection pond to the hydrasposal systems or makeup water without danger of buildup.

Water Soluble Material: The ash resulting from combustion of hydrasposal prepared fuel contains approximately 3.91% water solubles. The water soluble portion of the spectrographic analysis made on the ash was determined by digestion of 100 grams in one liter of water for one week. Chemical composition of the water solubles is listed below.

	Concentration mg/liter	Calculated to As Rec'd. %	Calculated Concentration in Soluble Portion, %
Calcium	454	0.454	11.61
Magnesium	0.175	0.175×10^{-3}	0.004
Sodium	492	0.492	15.14
Aluminum	1.72	0.172×10^{-2}	0.044
Molybdeum	0.17	0.17×10^{-3}	0.004
Copper	0.076	0.76×10^{-4}	0.002
Iron	0.071	0.71×10^{-4}	0.002
Zinc	0.019	0.19×10^{-4}	<0.001
COD	19	0.19×10^{-1}	0.49

To a lesser amount glass plant fines will also be landfilled on site. The glass plant fines contain water solubles in the following percentages:

<u>Chemical</u>	<u>% (Of Glass Plant Fines)</u>
Chloride	0.65
Sulphate	0.3
Total Organic Carbon	0.29
Nitrogen	0.015
Calcium	0.015
Magnesium	0.004
Chromium	0.00004
Nickel	0.00004
Aluminum	0.0023
Manganese	0.0019
Sub-total:	1.28
COD	0.534
BOD	0.305

Organic Matter: Due to the combustion process (boilers) the ash is relatively free of organic matter. This is apparent from the carbon content in the ash. This is somewhat atypical of incinerator operations.

The monitoring system described in the application will actually be in operation several months prior to commencement of land-filling. From this system, the extent of leachate infiltrating from the existing 58th Street landfill will be determined. Leachate concentrations are expected to subside when the municipal wastes are diverted to the resource recovery plant. Leachate concentrations in each test well will be closely monitored as the cell construction progresses to determine the effectiveness of the earth cover.

Landfill from the resource recovery facility represents only 2-3% by volume of the solid waste (garbage and trash) received. In addition, it should be pointed out that the landfill site will be graded in a manner that will allow the storm water runoff from the working face, which will never exceed 10 acres in size, to drain into a lined collection pond and this water will be pumped to the resource recovery plant for use as make-up water in the hydropulpers, effectively minimizing any leachate generation from the landfill operation.

3. Since the incremental SO_2 impact exceeds the Dade County ambient air quality standards, does Dade County plan on issuing a variance to the local pollution control standards?

Answer

The fact that the calculated concentrations of SO_2 appear to exceed the 4-hour incremental maximum standard for Dade County was addressed during the review of the Chapter 17-2 FAC permit applications at the local level.

The sulfur content of .1% used as the average sulfur content of municipal waste is very conservative. In addition, not all of the sulfur incoming to the plant is emitted as SO_2 into the atmosphere; approximately 45% to 55% of the total sulfur is present in the glass plant fines and ash which will be landfilled, and is not emitted as projected by the calculations. When adjusting the calculated SO_2 concentration by 45%, to reflect the recovered sulfur, the 90 ug/M^3 concentration is reduced to 40.5 ug/M^3 , which is well below the maximum allowable concentration of 57.2 ug/M^3 required by the Dade County Code.

In addition to the above consideration there are many reasons why these calculated concentrations are much greater than actual observations will be, and thus why the models may over predict.

A description of such factors are:

- (1) The fact that SO_2 may be removed in the atmosphere is ignored. Removal mechanisms for SO_2 have been determined which limit the residence time of this pollutant in the atmosphere from 20 minutes to 7 days. Rain, ocean absorption, dry deposition (absorption by soil and rocks), vegetal absorption and chemical conversion all have a significant influence on sulfur dioxide removal from the atmosphere.
 - (2) The Pasquill-Gillford dispersion coefficients utilized in the EPA short term model underestimate pollutant dispersion, and thus overestimate groundlevel concentrations. Dr. F. Pasquill recommended modifications of these parameters in a 1976 paper. The most pertinent of these recommendations were incorporated by ESE into the EPA short term model. The results show that under worst case meteorological conditions, the present EPA model overcalculates from ten to twenty percent.
 - (3) Meteorology utilized in short-term models assumes the wind direction is constant with no varying for a one-hour period. In the "real world" wind fluctuates constantly in the near-surface boundary layer primarily due to turbulence. Preliminary estimates indicate that the models should be adjusted by a factor of 0.74 to correct for this wind variance.
 - (4) The meteorological stability should be determined according to an objective system. Thus, the Pasquill stability category is properly calculated from the meteorological observations of the hour in question. The EPA short term model, however, incorporates a smoothing function whenever the stability category jumps more than one value during two adjacent hours. This smoothing function alters the more stable observation and makes it one category more unstable, or vice versa, depending on the sequence of the actual observations. The net result is a calculated 24-hour concentration which may exceed by ten percent the 24-hour calculated concentration based on the actual meteorological observations.
 - (5) The emissions from a plant like the Resource Recovery facility are assumed as a maximum. For short-term models we assume the maximum emissions occur concurrently with the same 24 and 3 hour "worst case" meteorology. Such probabilities are remote.
4. The projected annual average total suspended particulate concentration exceeds the local, federal and state ambient air quality standards. Since the Resource Recovery Facility will cause a small increase can it be permitted legally? Does

Dade County have a plan to reduce the emissions from other contributing sources?

Answer

Recent atmospheric dispersion modeling for Federal PSD requirements indicate that the maximum impact of the Resource Recovery Facility will not be in an area predicted to exceed Federal or State AAQS's. A copy of this analysis will be forwarded separately.

The anticipated completion of this facility as projected by the Metropolitan Dade County Solid Waste Master Plan has allowed the actual phase-out of several solid waste disposal sites which were heavy particulate emission sources. The main facility phased-out is the City of Miami 20th Street Incinerator which processed 130,000 tons of solid waste during 1975, with a settling chamber and water spray system for emission control. The total estimated emission from this facility alone is in the order of magnitude of 12 to 15 times the emissions anticipated from the Resource Recovery Facility.

In addition, several sanitary landfill operations in Dade County will be phased-out upon completion of this facility. Historically, these landfill operations have experienced accidental fires which have caused heavy particulate emissions.

5. What are the provisions for handling waste, processed or unprocessed, in the event of a plant failure? The use of glass plant fines, tree stumps and demolition debris does not provide the soils needed for the attenuation of leachate components from unprocessed waste to avoid contamination of the groundwater.

Answer

The question concerning the provisions for handling waste in the event of plant failure is a valid one. Such a concern was a major reason in the decision to design redundancy into the system. As can be noted from the application there are four independent systems i.e. four pulped fuel processing lines, four boilers and two turbine generators (one per two boilers). Consequently the probability of major mechanical problems with all systems is low.

The capacity of the garbage storage pit, trash storage and pulped fuel storage was designed to accomodate periods when the wastes are either not being processed or burned. Therefore, malfunctions will not cause major waste overloads.

The electrical power input to the facility plant is supplied by Florida Power and Light from the FP&L side of the generators. However, electricity can be supplied by FP&L independent of the facility's generators from either Turkey Point line or the Ft. Lauderdale line located south of the site. The electrical power generated from the facility is distributed by feeding directly to either Florida Power and Light's Turkey Point line or Ft. Lauderdale line.

If, in spite of the redundant systems, there was a total facility failure, the incoming solid waste will be received at Plant in normal fashion until the pit and trash storage areas are full. All excess will be sent directly to the adjoining landfill, where it will be landfilled in accordance with the procedure outlined in Section 3.7 of the Application.

The demolition material, tree stumps and glass plant fines are not intended as the basic material for the landfill. Since the landfill area is presently at approximately 4.5 ft. (MSL) a initial fill of 3.5 ft. will be applied. This will insure that the entire landfill is above the maximum predicted flood level (4.8 ft. MSL). In addition, a one ft. layer of clay type soil will be added to insure an impervious layer between landfill material and water table. (Refer to response to Question 2.) The attached Exhibit "B" presents the landfill cross section.

6. Construction details of monitoring wells were not presented in enough detail to indicate compliance with Chapter 17-21, Florida Administrative Code.

Answer

The attached Exhibit "C" is a revised Figure 6-1 for the site's monitoring wells. This monitoring well detail is consistent with Chapter 17-21 F.A.C.

7. The two calculations in Appendix C dealing with particulate don't indicate compliance and are inconsistent.

Answer

The calculations of particulate emissions presented in Appendix C in the Application include not only an allowable emission calculation but also an estimated actual emission based upon manufactures' guarantee. As this was not clear from the calculation sheet, below are the same calculations presented more clearly.

Design Information from Manufacturer:

Flow rate	314,000 ACFM
Stack Gas Temperature	420°F
Moisture Content	22%
Calculated Design CO ₂	11.6%
Design Excess Air	40%

Estimated Actual Emissions:

Manufacturer's Guarantee - 0.06 gr/SCF at 12% CO_x

Since estimated actual emissions are based on SCF the actual flow rate must be adjusted as follows:

$$314,000 \text{ ACFM} \times (1 - 0.22) \times \frac{528}{880} = 146,950 \text{ SCFMD}$$

Since the manufacturer's emission guarantee is based upon 12% CO₂ a correction for estimated % CO₂ must be made.

The correction for % CO₂ is given by the following:

$$C_{12} = C_A \quad 12 / (\% \text{CO}_2)_A \quad \text{where } C = \text{concentration}$$

$$C_{\text{Actual}} = 0.06 \times 1/12 \times 11.6 = 0.058 \text{ gr/SCF}$$

The actual estimated emissions:

$$0.058 \text{ gr/SCF} \times 1 / (7000 \text{ gr/lb}) \times 146,950 \text{ SCFMD} \times 60 \text{ min/hr} = 73.1 \text{ lbs/hr}$$

$$73.1 \text{ lbs/hr} \times 24 \text{ hrs/day} \times 6 \text{ days/week} \times 52 \text{ weeks/year} \times 1 \text{ ton/2000 lbs}$$

$$= 274 \text{ tons/year}$$

Regulated Emission Limitation:

Regulated limitation from Chapter 17-2 Section 17-2.04 (6) (a) 1.2-0.08 gr/SCFD corrected to 50% excess air.

The correction of % excess air is given by

$$C_{50} = C_A (100 + \% \text{EA}) / 150$$

Where: C = concentration
EA = excess air

Rearranging -

$$C_A = C_{50} \times 150 / (100 + \% EA)$$

$$C_{Actual} = 0.08 \times 150 / (100 + 40) = 0.086 \text{ gr/CDFD}$$

The regulated emission limitations is thus:

$$0.086 / \text{SCFD} \times 1 / (7000 \text{ gr/lb}) \times 146,950 \text{ SCFMD} \times 60 \text{ min/hr} \\ = \underline{108.3 \text{ lbs/hr}}$$

$$108.3 \text{ lbs/hr} \times 24 \text{ hrs/day} \times 6 \text{ days/week} \times 52 \text{ weeks/year} \\ \times 1 \text{ ton}/2000 \text{ lbs} = 405 \text{ tons/year}$$

On the same basis (SCFD, design % EA and design % CO₂) the regulated emission limit is 108.3 lbs/hr while the actual estimated emission rate is 73.1 lbs/hr. Therefore the proposed facility will meet regulated emission limits.

At this point we wish to address the additional questions received with your September 9, 1977 letter.

1. In response to the August 25, 1977 letter from A. W. Morrison, Jr., R.S., Administrator-Environmental Health Program, Department of Health and Rehabilitative Services to your Department (Attached Exhibit "D").

Answer

All sanitary flows from this facility will be centrally collected for treatment and disposal in one septic tank system pursuant to the requirements of Chapter 10D-6 F.A.C. The three additional flows of less than 500 gpd will be incorporated into the central sewage collection system. Treatment and disposal of the effluent will be accomplished by the drainfield and sand and rock bed discussed in Item 1, page 1 above and illustrated in Exhibit "A".

2. In response to the September 2, 1977 letter from L. Ross Morrell, Deputy State Historic Preservation Officer, Department of State to your Department (Attached Exhibit "E").

Answer

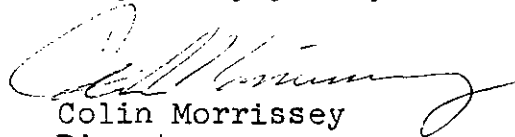
The firm of Environmental Science and Engineering, Inc. will address the Historic Preservation concerns in a separate letter.

Finally, with reference to the September 12, 1977 letter from J. Steve Reel, Director, Technical Review Division, South Florida Water Management District to your Department (Attached Exhibit "F"), it is our understanding that you will reply to Mr. Reel clarifying the fact that the applicable Water Management permits will be part of the Site Certification permit.

We hope the above information addresses your concerns in a clear and satisfactory manner. We look forward to completion of your technical review of this application.

Should you have any questions, please contact us.

Very truly yours,

A handwritten signature in dark ink, appearing to read 'Colin Morrissey', is written over the typed name.

Colin Morrissey
Director

Environmental Resources Management

CM:TS:df
Enc.

Organic Matter: Due to the combustion process (boilers) the ash is relatively free of organic matter. This is apparent from the carbon content in the ash. This is somewhat atypical of incinerator operations.

The monitoring system described in the application will actually be in operation several months prior to commencement of land-filling. From this system, the extent of leachate infiltrating from the existing 58th Street landfill will be determined. Leachate concentrations are expected to subside when the municipal wastes are diverted to the resource recovery plant. Leachate concentrations in each test well will be closely monitored as the cell construction progresses to determine the effectiveness of the earth cover.

Landfill from the resource recovery facility represents only 2-3% by volume of the solid waste (garbage and trash) received. The overall impact on ground water is therefore expected to be relatively small.

3. Since the incremental SO₂ impact exceeds the Dade County ambient air quality standards, does Dade County plan on issuing a variance to the local pollution control standards?

Answer

The fact that the calculated concentrations of SO₂ appear to exceed the 4-hour incremental maximum standard for Dade County was addressed during the review of the Chapter 17-2 FAC permit applications at the local level.

The sulfur content of .1% used as the average sulfur content of municipal waste is very conservative. In addition, not all of the sulfur incoming to the plant is emitted as SO₂ into the atmosphere; approximately 45% to 55% of the total sulfur is present in the glass plant fines and ash which will be landfilled, and is not emitted as projected by the calculations. When adjusting the calculated SO₂ concentration by 45%, to reflect the recovered sulfur, the 90 ug/M³ concentration is reduced to 40.5 ug/M³, which is well below the maximum allowable concentration of 57.2 ug/M³ required by the Dade County Code.

In addition to the above consideration there are many reasons why these calculated concentrations are much greater than actual observations will be, and thus why the models may over predict.