origonal application for construction permit

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

APPLICATION TO OPERATE/CONSTRUCT AIR POLLUTION SOURCES

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

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

COMPANY NAME: City of Tampa COUNTY: Hillsborough

Identify the specific emission point source(s) addressed in this application (i.e. Lime Kiln No. 4 with Venturi Scrubber; Peeking Unit No. 2, Gas Fired) Tampa Incinerator Rehabilitation

SOURCE LOCATION: Street 14 Acre site adjacent to McKay Bay City Tampa

UTM: East 360000 North 3091900

Latitude 27 ° 56 ' 51 "N Longitude 82 ° 25 ' 14 "W

APPLICANT NAME AND TITLE: Dale H. Twachtmann, Administrator, Water Resources & Public Work

APPLICANT ADDRESS: 8th Floor - City Hall Plaza, Tampa, Florida 33602

SECTION I: STATEMENTS BY APPLICANT AND ENGINEER

A. APPLICANT

I am the undersigned owner or authorized representative* of McKay Bay Refuse-To-Energy Project

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

*Attach letter of authorization

Signed: [signature]

Dale H. Twachtmann, Administrator, WR&P
Name and Title (Please Type)

Date: 23 July 81 Telephone No. 813-223-8771

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 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: [signature]

Ralph Lee Torrens
Name (Please Type)

Henningson, Durham & Richardson
Company Name (Please Type)

8404 Indian Hills Drive; Omaha, NE 68114
Mailing Address (Please Type)

(Affix Seal)

Florida Registration No. 21274

Date: 7/23/81 Telephone No. 402-399-1000

[1]See Section 17-2.02(15) and (22), Florida Administrative Code, (F.A.C.)

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.

Renovate existing incinerator, add heat recover for steam production for electricity generation, addition of electrostatic precipitators to control particulate emissions. The facility will operate in full compliance of all existing regulations.

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

Start of Construction Early 82 Completion of Construction Early 84

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.)

Pollution Control $4,000,000-$7,000,000

Due to LAER requirements cost is not a factor in the technology choice.

See Chapter 5

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

Tampa Incinerator was shut down in Dec 1979 under consent decree of EPA

E. Is this application associated with or part of a Development of Regional Impact (DRI) pursuant to Chapter 380, Florida Statutes, and Chapter 22F-2, Florida Administrative Code? ____ Yes X No

F. Normal equipment operating time: hrs/day 24 ; days/wk 7 ; wks/yr 52 ; if power plant, hrs/yr 8760 ; if seasonal, describe: with approximately 20% down time for maintenance

G. 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 - Chapter 3
   a. If yes, has "offset" been applied? yes - Chapter 6
   b. If yes, has "Lowest Achievable Emission Rate" been applied? yes - Chapter 5
   c. If yes, list non-attainment pollutants.
      total suspended particulate and VOC
2. Does best available control technology (BACT) apply to this source? If yes, see Section VI. yes - Chapter 4
3. Does the State "Prevention of Significant Deterioriation" (PSD) requirements apply to this source? If yes, see Sections VI and VII. yes - Chapter 3
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? yes - Chapter 3

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

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

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

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

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

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

2. Product Weight (lbs/hr): ______

C. Airborne Contaminants Emitted:

Name of Contaminant	Emission[1]		Allowed Emission[2] Rate per Ch. 17-2, F.A.C.	Allowable[3] Emission lbs/hr	Potential Emission[4]		Relate to Flow Diagram
	Maximum lbs/hr	Actual T/yr			lbs/hr	T/yr	

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

Name and Type (Model & Serial No.)	Contaminant	Efficiency	Range of Particles[5] Size Collected (in microns)	Basis for Efficiency (Sec. V, It[5]

[1]See Section V, Item 2.

[2]Reference applicable emission standards and units (e.g., Section 17-2.05(6) Table II, E. (1), F.A.C. – 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)

[5]If Applicable

E. Fuels

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

*Units Natural Gas, MMCF/hr; Fuel Oils, barrels/hr; Coal, lbs/hr

Fuel Analysis:

Percent Sulfur: ______ Percent Ash: ______

Density: ______ lbs/gal Typical Percent Nitrogen: ______

Heat Capacity: ______ BTU/lb ______ BTU/gal

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

F. If applicable, indicate the percent of fuel used for space heating. Annual Average ______ Maximum ______

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

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

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

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

Water Vapor Content: ______ % Velocity: ______ FPS

SECTION IV: INCINERATOR INFORMATION

Type of Waste	Type O (Plastics)	Type I (Rubbish)	Type II (Refuse)	Type III (Garbage)	Type IV (Pathological)	Type V (Liq & Gas By-prod.)	Type VI (Solid By-prod.)
Lbs/hr Incinerated	5.7% $.473\times10^4$	29.5% 2.45×10^4	38.9% 3.23×10^4	9.6% $.797\times10^4$	None	None	16.3% 1.35×10^4

Description of Waste Municipal refuse collected within City of Tampa.

Total Weight Incinerated (lbs/hr) 8.3×10^4 Design Capacity (lbs/hr) 8.3×10^4

Approximate Number of Hours of Operation per day 24 days/week 7

Manufacturer Unknown - to be determined.

Date Constructed ______ Model No. ______

	Volume (ft)^3	Heat Release (BTU/hr)	Fuel		Temperature (°F)
			Type	BTU/hr	
Primary Chamber	N/A	3.56×10^8	solid waste	3.75×10^8	1600 - 1800° F
Secondary Chamber					

Stack Height: 150 ft. Stack Diameter 4 flues 4.43 ft Stack Temp. 450°F

Gas Flow Rate: 65,000 ACFM .03 gr/ DSCFM* Velocity 70 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: [X] Cyclone [ ] Wet Scrubber [ ] Afterburner [X] Other (specify) ESP

Brief description of operating characteristics of control devices: Electrostatic Precipitators work by electrostatic forces caused by charging the particles and collecting them on oppositely charged walls

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

Ash to permitted landfill

Cooling tower & boiler blowdown to sanitary sewer

SECTION V: SUPPLEMENTAL REQUIREMENTS

Please provide the following supplements where required for this application.

1. Total process input rate and product weight — show derivation.
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, 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 8½" 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 8½" 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 8½" x 11" plot plan of facility showing the location of manufacturing processes and outlets for airborne emissions. Relate all flows to the flow diagram.

9. An application fee of $20, unless exempted by Section 17-4.05(3), F.A.C. The check should be made payable to the Department of Environmental Regulation.

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

SECTION VI: BEST AVAILABLE CONTROL TECHNOLOGY *

A. Are standards of performance for new stationary sources pursuant to 40 C.F.R. Part 60 applicable to the source?
[X] Yes [ ] No

Contaminant	Rate or Concentration
Particulate	0.08 gr/dscf at 12% CO_2

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

C. What emission levels do you propose as best available control technology? None

Contaminant	Rate or Concentration
all emission but particulate	at potential to emit rate = without controls
	See Chapters 3 and 4

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

1. Control Device/System:
2. Operating Principles:
3. Efficiency:*
4. Capital Costs:
5. Useful Life:
6. Operating Costs:
7. Energy:
8. Maintenance Cost:
9. Emissions:

Contaminant	Rate or Concentration

*Explain method of determining D 3 above.

*See Chapter 6

10. Stack Parameters

a. Height: 150 ft. b. Diameter: 4 x 4.43 ft ft.

c. Flow Rate: 65,000/unit ACFM d. Temperature: 450 °F

e. Velocity: 70 FPS

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

1.

a. Control Device: wet scrubbers - for SO_2, HF, and gaseous Hg control

b. Operating Principles: gas intimately contacted with lime slurry. SO_2 and HF react and are removed. Hg condenses and is removed.

c. Efficiency*: 90% or better; literature d. Capital Cost: $5,280,000

e. Useful Life: 20 year f. Operating Cost: $643,000/yr

g. Energy*: 460 Kwh; literature h. Maintenance Cost: $528,500/yr

i. Availability of construction materials and process chemicals:

Available with appropriate lead time

j. Applicability to manufacturing processes: Has not been used on U.S. solid waste incineration

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

Could be installed and operated on space available. Has not been done on U.S. solid waste incinerator.

2.

a. Control Device: Dry scrubber - SO_2, HF, and gaseous Hg control

b. Operating Principles: lime slurry contacts gas and is dried by flue gas. Particulate control by baghouse on ESP

c. Efficiency*: 90-99%; literature d. Capital Cost: $7,920,000

e. Useful Life: projected for 20 yr f. Operating Cost: $ 322,000/yr

g. Energy**: 482 kwh; literature h. Maintenance Costs: $264,000/yr

i. Availability of construction materials and process chemicals:

Available with appropriate lead time

j. Applicability to manufacturing processes: has not been used on any combustion source in U.S. First unit to start up soon on coal-fired boiler.

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

Room to construct. Yet to be proven

*Explain method of determining efficiency.

**Energy to be reported in units of electrical power – KWH design rate.

3.

a. Control Device: Low sulfur fuel - SO_2 control

b. Operating Principles: Lower sulfur content in fuel, lower SO_2 emission

c. Efficiency*: - d. Capital Cost: -

e. Life: - f. Operating Cost: -

g. Energy: 0 h. Maintenance Cost: -

*Explain method of determining efficiency above.

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 Ammonia injection, wet scrubbers and catalytic reduction for NO_x control

b. Operating Principles:

A laboratory control device - Described in Chapter 4

c. Efficiency*:

d. Capital Cost:

e. Life:

f. Operating Cost:

g. Energy:

h. Maintenance Cost:

i. Availability of construction materials and process chemicals:

Not proven on any combustion source, not recommended

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:

1. Control Device: no additional collection device
2. Efficiency*: 0
3. Capital Cost:
4. Life:
5. Operating Cost:
6. Energy:
7. Maintenance Cost:
8. Manufacturer:
9. Other locations where employed on similar processes: This BACT recommendation used on all solid waste-fired boilers in U.S.

a.

(1) Company:

(2) Mailing Address:

(3) City:

(4) State:

(5) Environmental Manager:

(6) Telephone No.:

*Explain method of determining efficiency above.

(7) Emissions*:

Contaminant	Rate or Concentration

(8) Process Rate*:

b.

(1) Company:

(2) Mailing Address:

(3) City:

(4) State:

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

(5) Environmental Manager:

(6) Telephone No:

(7) Emissions*:

Contaminant	Rate or Concentration

(8) Process Rate*:

10. Reason for selection and description of systems:

See Chapters 4 and 5.

*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. HCEPC Monitored Data

1. 2 no sites ______ TSP 63/115 (C) SO^2* 63 Wind spd/dir

Period of monitoring 5 / / 80 to 5 / / 81
(month day year to month day year)

Other data recorded ______

Attach all data or statistical summaries to this application.

2. Instrumentation, Field and Laboratory

a) Was instrumentation EPA referenced or its equivalent? X Yes ___ No

b) Was instrumentation calibrated in accordance with Department procedures? X Yes ___ No ___ Unknown

B. Meteorological Data Used for Air Quality Modeling

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

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

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

4. Stability wind rose (STAR) data obtained from (location) ______

C. Computer Models Used

1. CRSTER Modified? If yes, attach description.

2. ______ Modified? If yes, attach description.

3. ______ Modified? If yes, attach description.

4. ______ Modified? If yes, attach description.

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

D. Applicants Maximum Allowable Emission Data

Pollutant	Emission Rate
TSP	46 grams/sec
SO^2	20.8 grams/sec

E. Emission Data Used in Modeling

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

F. Attach all other information supportive to the PSD review. See Chapter 3

*Specify bubbler (B) or continuous (C).

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.

See Other Impact Sections

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.

From Appendix F of origonal application submitted July 1981

Waste Quantities

A. PURPOSE

To verify the annual quantity of solid waste generated in Hillsborough County and determine if a solid waste generation rate of 4.3 lb/cap/day determined previously should be used for resource recovery procurement activities.

B. SUMMARY

a) This analysis indicated that 539,400 tons rather than the projected 495,000 tons was disposed of in Hillsborough County in 1980. We propose the use of the lower tonnage as the basis for the RFP procurement documents.

b) The analysis showed a unit waste generation rate of 4.7 lb/cap/day which was higher than the projected rate of 4.3 lb/cap/day. To conservatively estimate the quantities, we propose the use of the lower rate of 4.3 lb/cap/day as the basis for the RFP procurement documents and when it is to the County's advantage, increase the baseline quantities.

C. DISCUSSION

1. Introduction

As part of the work program, solid waste records were collected and analyzed to determine an appropriate waste generation rate to be used to estimate future waste quantities generated in Hillsborough County. The previous consultant, Brown & Caldwell, used a unit waste generation rate of 4.3 pounds/capita/day. HDR will determine if this waste generation rate is appropriate based upon the additional year of data that has been collected since Brown & Caldwell did their analysis in 1979. The updated unit waste generation factor will be used to estimate the future quantities of solid waste that will have to be accommodated by a solid waste management system.

2. Waste Quantities

Two sanitary landfills are currently in operation in Hillsborough County: the Northwest Landfill and Hillsborough Heights. These two landfills receive all of the waste disposed in the County. In the past, other landfills were also used.

The Ruskin Landfill was operational until August 1978 when its waste was diverted to the Taylor Road Landfill. Plant City's landfill was operational through September 1979 when its waste was diverted to the Taylor Road Landfill. Furthermore, the Tampa Incinerator was operational until December 1979, when its waste was also diverted to the Taylor Road Landfill. The Taylor Road Landfill was replaced by the Hillsborough Heights Landfill and daily operation was contracted to Waste Management, Inc. on February 11, 1980. Hillsborough County also operates the South County Transfer Station which hauls all of its waste to the Hillsborough Heights Landfill.

Scale data from the Hillsborough Heights Landfill is available for most of 1980. Scale data of the incoming waste stream is also available from the Transfer Station. Other pertinent data concerning the waste stream includes estimates of the total volume in cubic yards of the waste going to the landfills which do not or did not operate scales. For the months when no information on the waste stream was available; reasonable estimates of the incoming waste were made by the scale attendants.

TABLE A-1 - HILLSBOROUGH COUNTY 1980 SOLID WASTE DATA BY MONTH

	Northwest Landfill		Hillsborough Heights	
	Estimated Cu. Yards	Est. Tons @ 350 lb/c.y.	Tons	Total Tons
Jan.	53,206	9,311	28,896	38,207
Feb.	52,827	9,244	10,791 (1)	30,035
Mar.	58,050	10,159	33,634	43,793
Apr.	56,871	9,952	37,557	47,509
May	56,418	9,874	36,916	46,790
June	57,818	10,119	37,162	47,281
July	60,440	10,577	39,402	49,979
Aug.	61,150	10,701	38,514	49,215
Sept.	60,501	10,588	37,953	48,541
Oct.	83,391	14,593	33,614	48,207
Nov.	55,002	9,625	33,472	43,097
Dec.	60,859	10,650	36,097	46,747
Total	716,533	125,392	414,008	539,400

(1) Waste Management, Inc. (WMI) assumed operational control of the landfill in 1980. Scales were installed on February 11, and only a partial month of scale data is available.

Table A-2 shows the total waste quantities going into each landfill for the years 1978 and 1979.

TABLE A-2 - TOTAL WASTE QUANTITIES FOR 1978 AND 1979

	1978 Cubic Yards	Tons	1979 Cubic Yards	Tons
Northwest Landfill	755,085	132,140	838,538	146,744
Taylor Road	1,026,286	179,600	912,434	159,675
Tampa Incinerator	---	180,000	---	188,738
Plant City	---	10,514	---	8,370 (1)
Ruskin	55,844 (2)	9,773	Closed	Closed
Total	1,837,215	512,027	1,750,972	503,527

(1) The Plant City Landfill closed October 1, 1979 and the waste was diverted to the Taylor Road Landfill.

(2) The Ruskin Landfill closed August 1, 1978 and the waste was diverted to the Taylor Road Landfill.

Special Note: Waste quantities contain some white goods, demolition waste and tires.

Another minor problem with the 1980 waste quantities is that not all incoming vehicles using the Hillsborough Heights Landfill crossed the scale. For example, some cars, some tire loads, and some cash customers bypassed the scales. Records indicate that an average of 3100 cars and pickup trucks bypassed the scales each month in 1980. The peak number of cars and pickup trucks that passed the scales was 3428 vehicles in August 1980. The least amount of cars and pickup trucks bypassing the scales occurred during November when 2765 vehicles were recorded. The quantities hauled by these types of vehicles was determined to be insignificant. But, beginning in 1981, all incoming wastes will be weighted at Hillsborough Heights. This operating requirement will improve the data for future solid waste management planning activities in Hillsborough County.

3. Population Projections

Table A-3 lists the estimated population projections for Hillsborough County. These projections were obtained from the Hillsborough County City-County Planning Commission publication entitled, "Population and Housing Estimates, April 1, 1970 - April 1, 1980."

TABLE A-3 - POPULATION PROJECTIONS FOR HILLSBOROUGH COUNTY

Year	Population Projection
1980	630,698
1985	757,300
1990	848,500
1995	939,300
2000	1,030,000

4. Unit Waste Generation Factor

The unit waste generation factor is simply a per capita waste generation rate. The factor is calculated by dividing the total tonnage of waste disposed by the contributing population. Using the data presented in Table 4 and a countywide population of 630,698, the County's unit waste generation factor for 1980 was computed to be 4.7 pounds per capita per day. The 1979 data indicated a 4.7 pounds per capita per day was computed. The 1978 data equated to 4.8 pounds per capita per day rate.

In previous analyses, a unit waste generation rate of 4.3 pounds per capita per day was determined. This rate is approximately 8.5% less than the rate computed by HDR and this differential is small when determining unit waste generation rates. To be conservative, the 4.3 pounds per capita per day rate will be used in projecting waste quantities delivered to resource recovery facilities.

From our perspective, the unit factor of 4.3 pounds per capita per day is a reasonable estimate when compared to unit waste generation factors found in other HDR projects such as Pinellas County, Florida; DeKalb County, Georgia; Fort Worth, Texas; and Phoenix, Arizona. Furthermore, it is assumed that the unit waste factors will remain constant in the future. This assumption provides a reasonable compromise between past predictions of rising per capita waste generation rates and some recent indication of the trend toward slight decreases in the per capita waste generation rates.

Table A-4 lists the solid waste tonnage projections for Hillsborough County. These projections are based on the population projections listed in Table 3 and a constant unit waste generation rate of both 4.7 and 4.3 pounds per capita per day.

TABLE A-4 - SOLID WASTE PROJECTIONS FOR HILLSBOROUGH COUNTY

Year	Waste Quantity (Tons) 4.7 lb/cap/day	Resource Recovery Quantity 4.3 lb/cap/day
1980	539,000	495,000
1985	647,000	594,000
1990	725,000	666,000
2000	880,000	808,000

5. Seasonal Variations

Figure A-1 depicts the seasonal variation of waste quantities for the years 1978, 1979 and 1980. Figure A-2 gives reference to which months are above or below the average monthly waste generation percentage of 8.33% (100% - 12 months = 8.33%).

6. Solid Waste Composition

Local solid waste composition data was extracted from the Phase II Project Draft Report. This sampling program determined the composition of the municipal solid waste stream in Hillsborough County.

The sampling survey spanned six continuous days per month in each of the following months: November 1979, February 1980, May 1980 and August 1980.

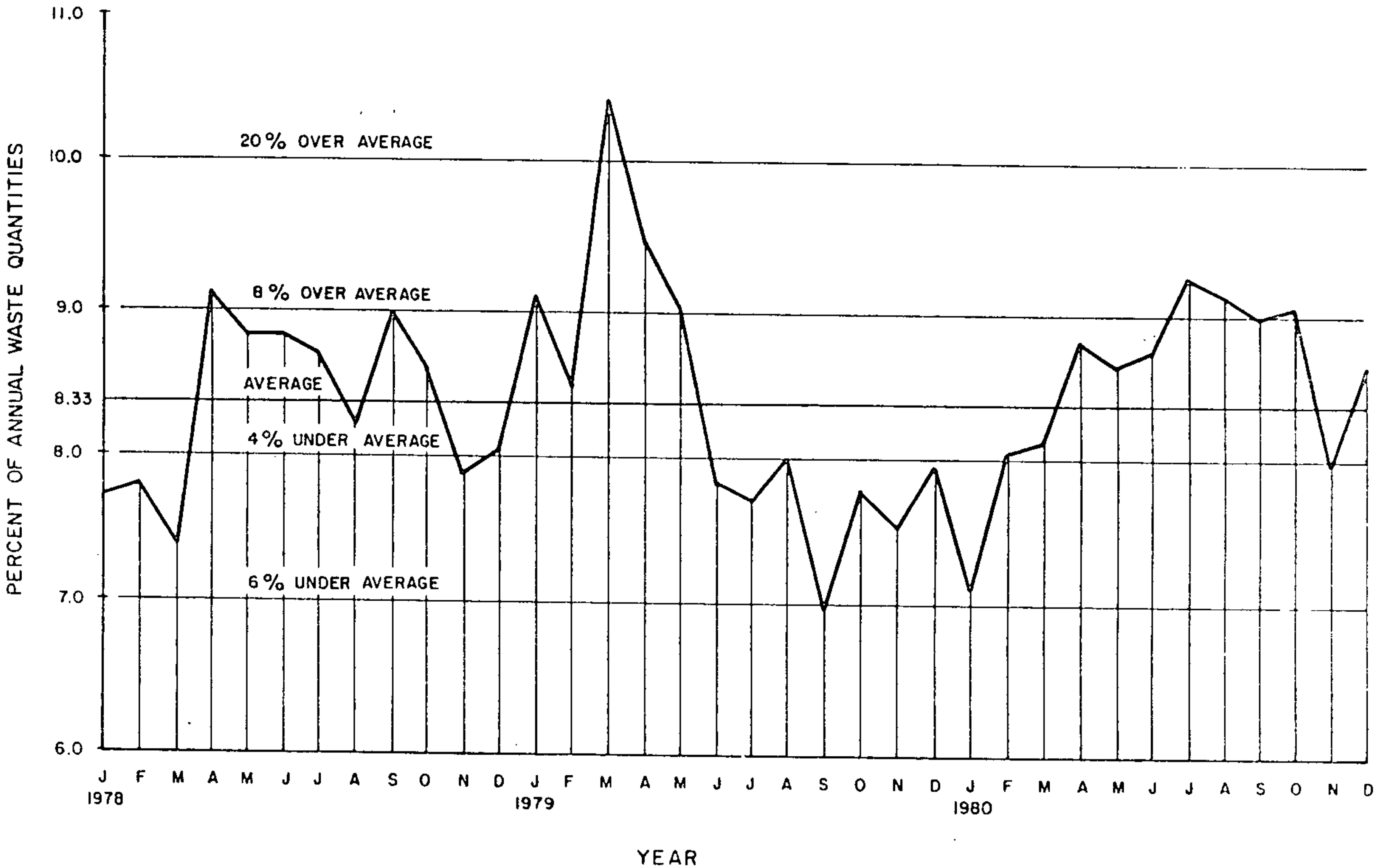


FIGURE A-1

SEASONAL VARIATIONS IN SOLID WASTE QUANTITIES
1978-1980

Table A-5 summarizes the seasonal variation in the waste stream composition. The percentage of combustibles was the highest at 89.8% in August 1980, and the lowest at 80.3% in February 1980.

TABLE A-5 - STUDY AREA MSW COMPOSITION COMPARISON

Category	November 1979(1)	February 1980(2)	May 1980(3)	August 1980(4)	Average (5)
	Waste Stream Composition, Percent				
Combustibles					
Paper					
Miscellaneous paper	33.4	33.1	27.2	24.4	29.5
Newspaper	11.2	7.6	9.6	9.4	9.4
Food and organics	9.5	16.2	7.9	4.8	9.6
Wood and garden	18.7	13.8	17.9	42.1	25.6
Rubber, leather, and textile	2.8	3.8	4.5	4.5	3.9
Plastics	6.2	5.8	6.1	4.6	5.7
Subtotal combustibles	81.8	80.3	83.1	89.8	83.7
Noncombustibles					
Ferrous					
Heavy	1.2	2.4	1.1	0.1	1.2
Light	4.0	4.7	2.9	2.3	3.5
Aluminum	1.1	1.0	.7	0.8	0.9
Other nonferrous metals	0.0	0.0	.5	0.0	0.1
Glass	7.9	8.3	9.2	6.0	7.9
Rocks, dirt, ash and miscellaneous	4.0	3.3	2.4	1.0	2.7
Subtotal noncombustibles	18.2	19.7	16.9	10.2	16.3

(1) Average wet weight from a 6-day sampling survey from November 12 to November 17, 1979.

(2) Average wet weight from a 6-day sampling survey from February 4 to February 9, 1980.

(3) Average wet weight from a 6-day sampling survey from May 5 to May 10, 1980.

(4) Average wet weight from a 6-day sampling survey from August 4 to August 9, 1980.

(5) Based on the November, February, May and August results.

Source: Hillsborough County Resource Recovery Planning Study, Chapter 2.

WASTE COMPOSITIONAL ANALYSES

HDR STUDIES

SOLID WASTE COMPONENT	IOWA: DUBUQUE (RES)	IOWA: DUBUQUE (COMM)	MINNESOTA: ST CLOUD (RES)	MINNESOTA: ST CLOUD (COMM)	MINNESOTA: OLMSTEAD CO (RES-COMM)	CALIFORNIA: COLTON (RES)	CALIFORNIA: COLTON (COMM)	CALIFORNIA: SAN DIEGO (RES)	CALIFORNIA: SAN DIEGO (COMM)
PAPER	37.0	42.2	37.0	36.1	53.4	26.9	35.4	38.6	44.1
CARDBOARD	3.5	11.0	14.0	22.6	12.8	6.2	20.4	6.6	22.8
PLASTIC	5.3	7.8	4.1	3.7	5.6	2.8	4.5	3.6	7.5
WOOD	0.6	1.0	2.3	1.6	2.0	2.2	4.5	1.4	3.9
FOOD WASTE	10.6	7.4	17.5	11.7	14.6	3.4	2.6	2.8	5.5
YARD WASTE	25.1	7.2	0.6	0	9.1	40.8	13.6	33.7	2.3
TEXTILES	2.3	1.7	3.6	4.4	3.2	2.5	6.3	2.3	2.6
RUBBER (LEATHER)	0.2	0	1.0	1.6		0.9	1.3	1.1	0.7
RESIDUE			2.6		1.7				
TOTAL PERCENT COMBUSTIBLE	64.6	78.3	82.7	85.0	80.7	85.7	88.6	90.3	89.4
FERROUS	8.8	13.6	8.0	8.8	9.5	5.5	5.6	4.5	5.2
ALUMINUM	1.1	1.1	0.5	0.3	0.8	0.6	0.6	1.0	0.8
GLASS	5.4	6.7	8.6	5.9	9.0	5.5	2.9	4.0	4.3
RESIDUE	0.1	0.3				2.7	2.5	0.2	0.3
TOTAL PERCENT NON COMBUSTIBLE	15.4	21.7	17.3	15.0	19.3	14.3	11.4	9.7	10.6
BTU/lb (AS RECEIVED)	3653	4796	3793	4155		4878.00		6456.00	
BTU/lb (DRY)	7010	8173							
BTU/lb (AVERAGE)	3600	5300	4000						
% MOISTURE	41.1	36.6	39.4	33.6		28.0		21.9	20.9
% RESIDUE	15.1	8.7	14.1	18.9					
CARBON	29.1	40.8	23.9	29.9					
HYDROGEN	2.3	2.2	5.1	3.3					
OXYGEN	11.6	11.2	16.5	16.7					
NITROGEN	0.52	0.37	0.64	0.56					
CHLORINE	0.17	0.15	0.25	1.47					
SULFUR	0.02	0.02	0.12	0.53					

SOLID WASTE COMPONENT	MONTANA: MISSOULA	MONTANA: BUTTE	MONTANA: BILLINGS	MONTANA: GREAT FALLS	MICHIGAN: MARQUETTE (RES-COMM)	ARIZONA: PHOENIX (RES)	ARIZONA: PHOENIX (COMM)	GEORGIA: DEKALB (RES)	GEORGIA: DEKALB (COMM)
PAPER	23.0	24.3	24.9	26.9	{46.6	{43.7	{50.8	{37.3	{58.2
CARDBOARD	10.3	7.0	10.1	8.2					
PLASTIC	4.3	6.1	6.1	4.2	7.0	4.1	5.3	3.5	4.5
WOOD	2.2	0.1	1.0	1.5	0.8	1.3	2.3	1.3	2.5
FOOD WASTE	12.9	21.9	20.5	13.6	13.8	12.2	12.5	3.9	2.7
YARD WASTE	29.6	14.3	12.2	28.0	10.0	17.2	6.9	26.6	0.5
TEXTILES	3.2	3.9	6.0	2.7	3.2	3.8	2.5	3.2	3.3
RUBBER (LEATHER)							-	0.7	0.6
RESIDUE						5.7	6.5	13.2	10.7
TOTAL PERCENT COMBUSTIBLE	87.5	77.6	80.8	85.1	81.4	88.0	86.8	89.7	83.0
FERROUS	6.2	9.0	9.0	6.7	8.1	4.9	5.6	5.5	10.7
ALUMINUM	1.4	2.5	1.8	1.7	1.3	0.9	0.5	1.0	1.0
GLASS	4.9	10.9	8.4	6.5	8.7	6.2	7.1	3.8	5.3
RESIDUE					0.5				
TOTAL PERCENT NON COMBUSTIBLE	12.5	22.4	19.2	14.9	18.6	12.0	13.2	10.3	17.0
BTU/lb (AS RECEIVED) (Montana AVG: 5039)	4843	6049	4519	4748		5000		4810	5227
BTU/lb (DRY)	7746	7402	7739	7278					
BTU/lb (AVERAGE)									
% MOISTURE	37.8	- 28.6	41.3	34.9		29.1	32.5	37.1	32.1
% RESIDUE	13.3	8.7	11.3	11.9				9.7	
CARBON	43.7	45.7	43.0	41.5					
HYDROGEN	6.2	6.4	6.2	5.6					
OXYGEN	35.2	39.1	37.5	39.6					
NITROGEN	0.88	1.01	1.07	0.68					
CHLORINE	0.60	0.49	0.75	0.45				0.04	
SULFUR	0.12	0.11	0.31	0.23				0.09	

SOLID WASTE COMPONENT	FLORIDA: ST PETERSBURG (RES)	ILLINOIS: SPRINGFIELD (RES)	ILLINOIS: SPRINGFIELD (COMM)	ILLINOIS: SPRINGFIELD (RES-COMM)	ALTERNATE SOURCE: WISCONSIN REGION I (RES)	ALTERNATE SOURCE: WISCONSIN REGION I (COMM)	ALTERNATE SOURCE: NCRR (RES-COMM)	ALTERNATE SOURCE: EPA 4TH REPT
PAPER	{31.4	27.6	21.7	25.9	25.4	27.4	{42.7	{35.0
CARDBOARD		4.2	22.7	9.4	10.2	36.1		
PLASTIC	1.3	5.3	5.1	5.5	3.2	3.3	1.7	3.8
WOOD	1.9	1.7	3.9	2.3	5.3	10.0	2.5	3.8
FOOD WASTE	0.8	15.5	18.6	16.4	17.2	11.0	14.6	14.9
YARD WASTE	46.7	21.0	2.3	15.6	24.1	–	12.5	16.5
TEXTILES	2.8	3.9	1.5	3.2	{2.1		2.4	1.7
RUBBER (LEATHER)	0	0.4	0.1	0.3		0.9	1.8	2.6
RESIDUE		4.2	1.5	3.3	0.3	3.6		
TOTAL PERCENT COMBUSTIBLE	85.0	83.8	77.4	81.9	87.8	92.3	78.2	78.0
FERROUS	5.4	7.1	12.4	8.6	6.4	5.4	8.2	{9.8
ALUMINUM	1.0	0.7	0.6	0.7	1.1	0.1	0.9	
GLASS	5.7	5.8	8.3	6.5	4.7	2.0	10.3	10.5
RESIDUE	2.9	2.6	1.3	2.3		0.2	2.4	1.6
TOTAL PERCENT NON COMBUSTIBLE	15.0	16.2	22.6	18.1	12.2	7.7	21.8	21.8
BTU/lb (AS RECEIVED)		5470.0	4972.9	5330.8				
BTU/lb (DRY)		7680.3	7953.6	7754.8				
BTU/lb (AVERAGE)			5331					
% MOISTURE		28.8	37.5	31.1				
% RESIDUE		12.8	10.3	11.6				
CARBON		42.8	44.3	43.2				
HYDROGEN		5.2	5.1	5.2				
OXYGEN		39.8	39.4	39.5				
NITROGEN		0.6	0.6	0.6				
CHLORINE		0.09	0.06	0.08				
SULFUR		0.08	0.18	0.11				

This table shows the high variability of % moisture and heating value found in MSW

TABLE 4

Table A-6 illustrates the seasonal variation of the higher heating value and moisture content of the solid waste. The heating value was lowest in May 1980, the highest values occurred in the months of November 1979 and August 1980. This local data correlates reasonably with HDR and other's sampling programs listed in Table A-7 and its use should provide a reasonable basis for the procurement activities.

TABLE A-6 - STUDY AREA HIGH HEAT VALUE, PROXIMATE ANALYSES

	High Heat Value, Btu per Pound				
Category	November 1979(1)	February 1980(2)	May 1980(3)	August 1980(4)	Average
Combustible fraction, as received	5750	5290	4910	5290	5310
Combustible fraction, moisture free	8100	7560	7220	7780	7660
MSW, as received	4710	4250	4080	4750	4450
MSW, moisture free	6630	6070	6000	6980	6420
Average Moisture %	29	30	32	32	-

(1) Based on a 6-day sampling survey from November 12 to November 17, 1979.

(2) Based on a 6-day sampling survey from February 4 to February 9, 1980.

(3) Based on a 6-day sampling survey from May 5 to May 10, 1980.

(4) Based on a 6-day sampling survey from August 4 to August 9, 1980.

Source: Hillsborough County Resource Recovery Planning Study, Chapter 2.

Special wastes can comprise a significant amount of the waste that is landfilled. Included in these wastes are large amounts of shrimp, tires, dead animals, lumber, and construction wastes. These non-processable wastes will go directly to the landfills and bypass any waste processing facilities. By selecting the 4.3 unit waste generation rate, we are of the opinion the special wastes have been adequately included in the total waste quantities listed in Table 4.

For the purposes of RFP procurement it is assumed that the waste stream delivered to resource recovery facilities will have the following characteristics:

Combustibles	-	80%
Ferrous	-	5%
Aluminum	-	1%
Other Non Ferrous Metals	-	0.1%
Average higher heating value	-	4500 Btus/lb. @ moisture content of 30%

E. CONCLUSIONS:

The primary purpose of this analysis was to confirm the quantity of waste that would be available for resource recovery in Hillsborough County. Our analysis indicated that more than the 1980 projected tonnage of 495,000 tons was disposed. Our analysis indicated that approximately 539,400 tons were disposed during 1980.

Since all waste is now being weighed at the Hillsborough Heights Landfill, we are proposing to use for the RFP procurement documents the lower tonnage of 495,000 tons (4.3 lbs/capita/day) as the basis for future projections. We will monitor the additional records and as more definitive data becomes available, we may recommend an increase in the quantity available for resource recovery when it is advantageous to the county.

From Chapter 3 of origonal application submitted July 1981

AIR QUALITY ANALYSIS

The purpose of air quality analysis is to determine the effects this Project will have on the surrounding area and the attainment status of that area. This is done first determining a good estimate of the emissions from the Project, then modeling the emissions from this facility and finally adding the modeled emissions to the existing background concentration. The area of air quality analysis is less than a precise science and assumptions must be made. These assumptions include the use of air quality models. A fundamental assumption used in the analysis is that the facility is operating at full-load, all day, everyday. This will lead to a more conservative analysis than will actually exist.

Facility Emissions and Monitoring

The emissions information for Facility 1 was obtained from Waste Management, Inc. (WMI), the current Volund technology licensee. The data represents the highest value obtained from stack tests done worldwide (see Appendix I). The expected emissions are shown in Table 3-1. The Project's emissions are compared to the PSD significance levels in Table 3-2.

Table 3-1
Emissions Expected from Project

	Facility 1		Facility 2		TOTAL
	gm/s	TPY	gm/s	TPY	TPY
Particulate (uncontrolled)	575	19970	400	13890	27350
Particulate (controlled)	4.6	160	3.2	109	269
Sulfur Dioxide	20.8	722	12.1	420	1142
Nitrogen Oxides	26.0	903	9.5	330	1233
Carbon Monoxide	1.68	58	5.8	200	258
Hydrocarbons	0.92	32	0.92	32	64
Lead	0.47	16.3	0.47	16.3	32.6
Mercury (vaporous)	0.05	1.8	0.05	1.8	3.6
Mercury (particulate)	2.3×10^{-3}	0.08	2.3×10^{-3}	0.08	0.16
Beryllium	4.0×10^{-5}	1.4×10^{-3}	4.0×10^{-5}	1.4×10^{-3}	2.8×10^{-3}
Flouride	0.53	18.4	.53	18.4	32.6
Hydrogen Chloride	23.7	823	23.7	823	1646

please note our actual stack test data shows lesser emissions at 1200TPD than origonally estimated for facility 1, the total for both facilities was used for air quality analysis please note that TPY values are for 2 facilities while only 1 facility was constructed at McKay Bay

Table 3-2

Project Emissions Versus PSD Significance Levels

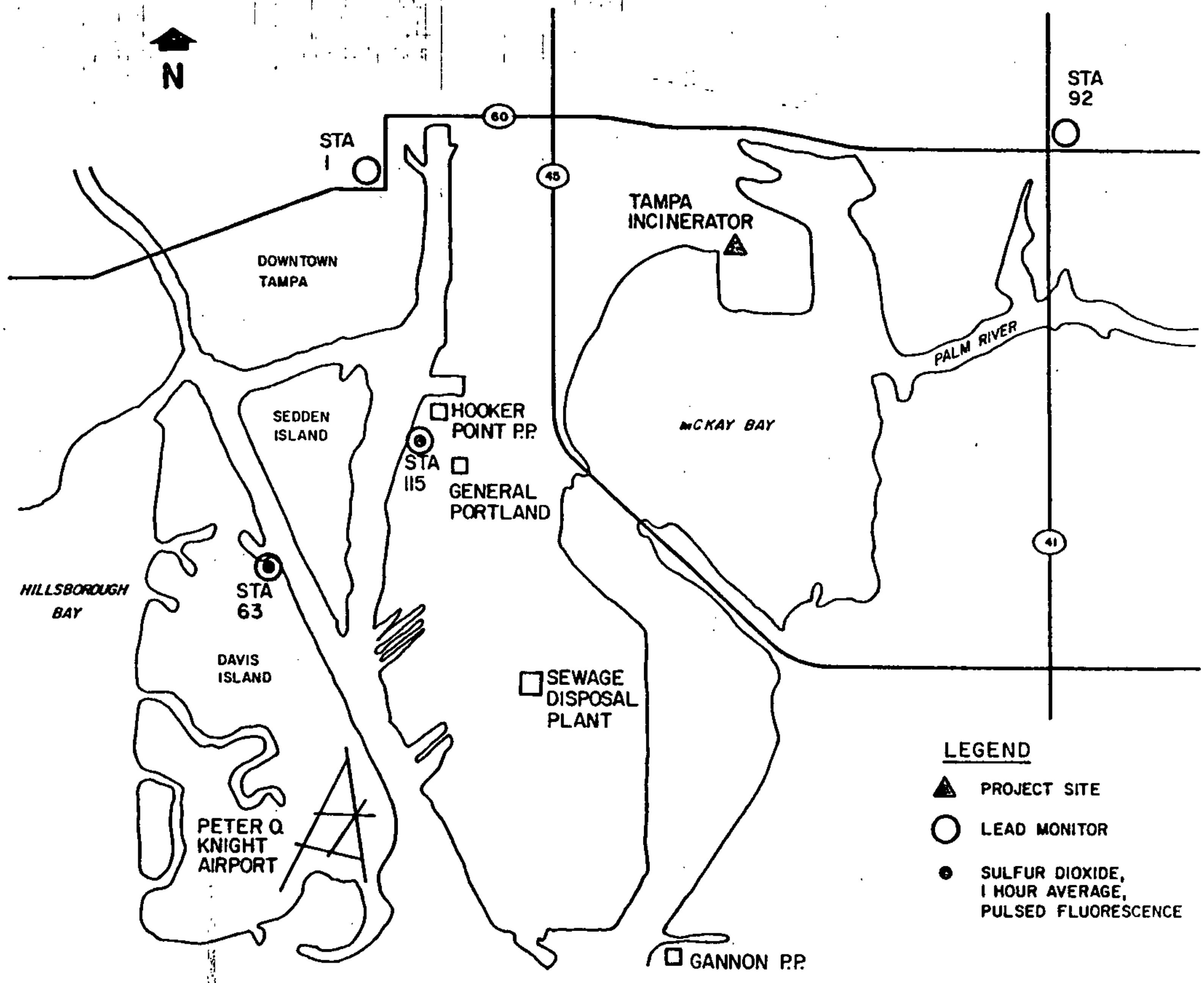
	TPY	Significance Level (TPY)	De minimus Impact Period (ug/m^3)	Worst Modeled Impact
Particulate (controlled)	269	25	10/24 hr.	5.8
Sulfur Dioxide	1142	40	13/24 hr.	24.8
Nitrogen Dioxide	1233	40	14/annual	2.3
Carbon Monoxide	258	100	575/8 hr.	11/3 hr.
Hydrocarbon	64	40	NV*	
Lead	32.6	0.6	0.1/24 hr.	0.7
Mercury (vaporous)	3.6	0.1	0.25/24 hr.	0.08
Mercury (particulate)	0.16			
Beryllium	2.8×10^{-3}	4×10^{-4}	5×10^{-4}/24 hr.	6×10^{-5}
Flourides	32.6	0.6	0.25/24 hr.	0.7

Worst 24-hour day - Day 175, 1972

*NV = No Value

The data in Table 3-2 indicate that the McKay Bay Refuse-to-Energy Project (Project) will be a major source for sulfur dioxide, carbon monoxide, nitrogen oxides, and a significant source for lead, mercury, hydrocarbons, beryllium and flouride. Based on the modeled impacts, monitoring data will be required for sulfur dioxide, lead and flourides.

To fulfill the monitoring requirements for sulfur dioxide and lead Hillsborough County Environmental Protection Commission (HCEPC) monitors have been used. Figure 3-1 shows the monitor location used in the analysis. The monitors are within the area of maximum impact. These monitors adequately reflect the air quality in the area except when the wind is from the southwestern quadrant. With southwesterly wind the effect of TECO's Gannon and Hooker's Point Powerplants and General Portland Cement Plant will be missed. To account for their effect these plants were modeled for specific days which coincided with the southwesterly quadrant maximum days and the impacts added to the Project's impact and the ambent concentrations.



MONITORING STATIONS

MCKAY BAY
REFUSE-TO-ENERGY PROJECT

FIGURE 3-1

The preamble to the August 7, 1980 PSD Rules states that, "For the noncriteria and hazardous pollutants, modeling, not monitoring, will be the mechanism used to perform most detailed air quality analyses. However, there may be circumstances where monitoring may be the only plan available to perform an adequate analysis ...", FR 52724, August 7, 1980 (in Appendix J). The flouride impact (in Table 3-2) is significant by the PSD rules, but negligible when compared to the Threshold Limiting Value (TLV) of 2 mg/m^3. Negotiations with the Florida DER have concluded that monitoring will not be required for flourides.

For acceptance testing at least EPA method 5 will be used. Any other emission test requested by the DER or EPA will also be performed.

Modeling

The CRSTER model was used to determine the effect of the sulfur dioxide emissions. These values were modified to develop modeled effects of the other pollutants. The meteorological input data was suppled by both the Florida Department of Environmental Regulation and the National Climatic Center (NCC). To reformat the NCC data to a form acceptable to the CRSTER, the preproscessor program RAMMET was used.

The modeled situation was six stacks colocated at Facility 1. The six stacks represent the four flues from Facility 1 and two flues from Facility 2. The parameters used are shown in Table 3-3. The ring distances were developed by the procedure outlined in the "Proposed Guideline to Air Pollution Models".

Table 3-3

Stack Parameters Modeled for Sulfur Dioxide

Stack	Emission Rate (gm/s)	Stack Height (m)	Stack Diameter (m)	Exit Velocity (m/sec)	Exit Temp. (°K)	Volumetric Flow Rate (m^3/s)
Facility 1						
1	5.2	45.72	1.35	21.3	500	30.49
2	5.2	45.72	1.35	21.3	500	30.49
3	5.2	45.72	1.35	21.3	500	30.49
4	5.2	45.72	1.35	21.3	500	30.49
Facility 2						
1	10.4	50.00	1.84	18.3	477	48.66
2	10.4	50.00	1.84	18.3	477	48.66

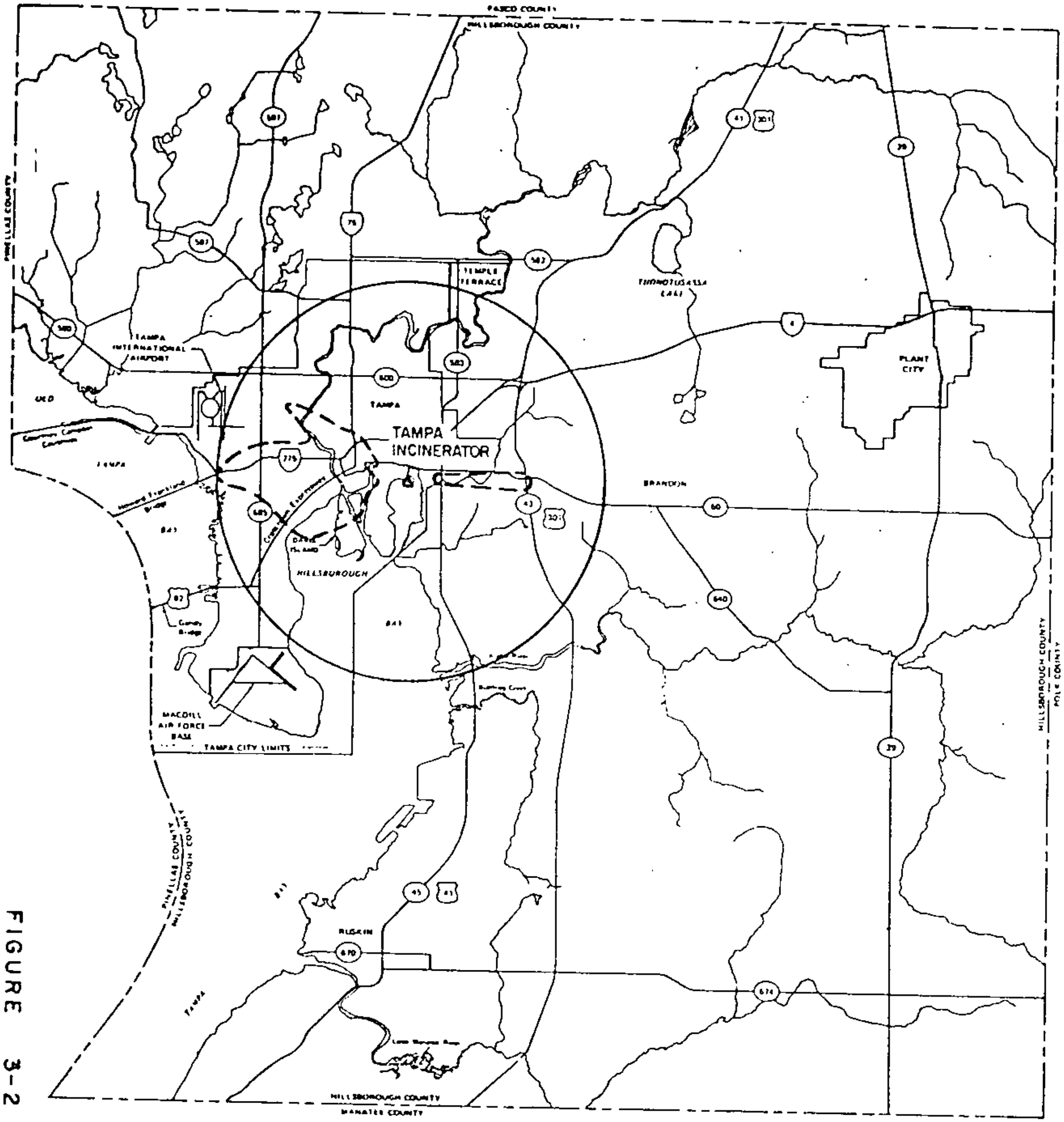
Ring Distances (km)= 0.5, 1.0, 1.2, 1.7, 2.2, 2.9. 3.8, 5.0, 6.6, 9.0

Impact Area

Based on the CRSTER model evaluation of 1970-74 the worst annual impact occurs in 1970. The impact area is shown in Figure 3-2 by a 10.2 km radius circle. The actual area of the 1 ug/m^3 impact is also shown on Figure 3-2.

Emission Inventories

The only facilities specifically inventoried were TECO's Gannon and Hooker Point Power plants, and General Portland Cement Plant. Additional data was obtained from the CONSRV PSD application recently submitted to DER. The TECO emissions were updated by conversations with TECO personnel. Other inventories were obtained from local agencies and are shown in Appendix A and B.



LEGEND

— — — ACTUAL IMPACT AREA 1 μg/M³

——— PSD IMPACT AREA

N

SCALE IN MILES

0 1 2 3 4

SULFUR DIOXIDE
SIGNIFICANT IMPACT AREA

MCKAY BAY REFUSE-TO-ENERGY PROJECT

FIGURE 3-2

Project Impacts

Sulfur Dioxide Analysis

Hillsborough County is presently an attainment area for sulfur dioxide. All of the monitoring data presented was developed by the Hillsborough County Environmental Protection Commission (HCEPC) and is presented in Appendix C. The data is summarized annually in the HCEPC Environmental Quality series. Table 3-3 presents a summary of the sulfur dioxide monitoring data for 1978 and 1979.

Table 3-4
Sulfur Dioxide
(micrograms/cubic meter)
1-hr Averages from Continuous Analysis

1978

Station	# of Observations	Minimum Value	Arithmetic Mean	Geometric Mean	Maximum Value
63	7803	2.6	25.7	14.3	584
115	4158	2.6	22.2	10.3	342

1979

Station	# of Observations	Minimum Value	Arithmetic Mean	Geometric Mean	Maximum Value
63	7066	2.6	19.6	10.8	540
115	6466	2.6	25.6	12.3	525

The modeled impacts of the sulfur dioxide emissions are shown in Tables 3-5, 3-6 and 3-7. These values represent the highest values for each of the eight compass direction over the five years of modeling. Included in Tables 3-6 and 3-7 are some of the meteorological parameters associated with the modeled day and the day from which the monitored data was chosen. Every effort was taken to find the closest calendar day and similar wind characteristics so that seasonal variations would be minimized. As a practical matter the high and 2nd high seldom differed by more than 3%.

Table 3-5
Sulfur Dioxide
Maximum Modeled Annual Impacts
(micrograms/cubic meter)

Direction	Concentration	Distance
N	0.7	1.7
NE	1.0	1.2
E	2.2	1.2
SE	0.8	2.9
S	0.7	2.9
SW	1.2	2.2
W	1.9	2.2
NW	1.2	1.7

The highest three hour impact occurs southwest of the Project. In this case the Project, TECO's Hooker Pt. Powerplant and General Portland Cement Plant are upwind of the Davis Island monitor, Station 63.

If the modeled impact from the Project is added to the highest monitored three hour value, a highest 3 hr. ambient concentration of 178 ug/m^3 occurs. This is significantly below the 3 hr. NAAQS of 1300 ug/m^3. The Project is modeled to provide 55 ug/m^3 of this amount. The highest three hour impact from the Project alone was modeled to be 77 ug/m^3 at 1.2 km east of the Project.

The highest ground level concentration is computed by adding the highest 24-hour southwest impact to the monitored data indicates a worst 24-hour average of 72 ug/m3. The Projects highest twenty-four hour impact is predicted to be 24 ug/m^3 2.2 km east of the Project.

Table 3-6
24 Hour Comparison
Sulfur Dioxide Concentration
(micrograms/cubic meter)

	Modeled Data			Meteorology Data			Monitored Data				
				Wind			Concentration			Wind	
Direction	Worst Conc.	Day	Yr.	Dir.	Spd. (m/s)	Stability	Sta. 63	Sta. 115	Date	Dir.	Spd. (m/s)
N 0, 360	12	175 6/25	74	S	7	4	16	32	7/2/80	SSW-SSE	3.1
NE 40, 50	12	158 6/7	74	S-SW	4	2-7	16	26	4/4/81	SE-SW	5
E 90	24	175 6/25	72	W	6	4-5	5.3	3.2	6/26/80	W	4.2
SE 130, 140	12	90 2/10	74	SE-NE	4	2-7	8	2.6	3/5/81	NNW	6
S 180	15	320 11/15	72	N-NW	5.5	4-6	37	5.3	11/2/80	N-ENE	ND*
SW 220, 230	22	270 9/1	71	NE	5	4-6	50	45	9/25/81	ENE	3.5
W 270	21	306 11/5	72	E	3.5	4-6	39	29	11/23/80	E	ND
NW 310, 320	16	136 5/15	74	ESE	5	3-6	18	ND	5/4/81	SE	2.7

*ND = No Data

Table 3-7
3 Hour Comparisons
Sulfur Dioxide Concentrations
(micrograms/cubic meter)

Modeled Data					Meteorology Data			Monitored Data					
	Worst				Wind			Concentration					
Direction	Conc. (ug/m^3)	Period	Day	Yr.	Dir.	Spd. (m/s)	Stability	Sta. 63	Sta. 115	Period	Date	Dir.	Spd. (m/s)
N 0, 360	51	4	33 2/3	74	S	4.3	3-7	21	26	5	3/15/81	S	4.5
NE 40, 50	75	5	90 3/31	74	SE-NW	3.3	2-7	71	ND*	2	5/10/81	SW	3.5
E 90	77	5	246 9/6	74	W-N	2	3-6	21	21	5	6/26/80	W	4
SE 130, 140	44	6	249 9/9	72	SW-SE	3	4-7	5.3	29	4	10/20/80	N	3.3
S 180	49	5	311 11/9	74	N-NE	5	3-5	26	42	3	11/29/80	N	ND*
SW 220, 230	55	4	172 6/20	74	N-NE	3	1-7	123	6	4	6/14/80	ENE	5
W 270	73	4	110 4/18	74	E	3.5	2-7	ND	29	5	5/27/81	ENE	4.5
NW 310, 320	67	4	64 3/3	74	E/W	3.2	2-6	37	ND	1	5/4/81	SE	1

*ND = No Data

The highest annual impact is 1.2 km to the east in 1974 with a value of 2.2 ug/m^3. The annual impacts for 1970-1974 varied from 1.3 to 2.2 ug/m^3. The monitored annual arithmetic average were 25.7 and 19.6 ug/m^3 in 1978 and and 1979 respectively at station 63.. Station 115 registered annual averages of 22.2 and 25.0 ug/m^3 in 1978 and 1979 respectively. The summation of the annual impact and the monitored annual average leads to a highest annual concentration of about 30 ug/m^3. This is significantly below the federal secondary standard of 80 ug/m^3 and the Florida Standard of 60 ug/m^3.

There are significant sulfur dioxide sources to the east of the Project site. The recent CONSRV PSD application analysed the impact it plus other significant sources would have in various directions. The CONSRV case VI analysed a SSE wind. This would align several facilities with the project site. The CONSRV results indicate that there would be essentially no impact from those facilities on the projects impact area.

The only other increment consuming source affecting the impact area is TECO's Gannon Powerplant. This powerplant is modifying its fuel and was granted a PSD permit around the first of the year. A letter from EPA to Mayor Bob Martinez of a Public Notice of the change is found in Appendix E. The Public Notice indicated that the maximum increment consumed by the proposed modification is as follows:

	Annual	24 Hour	3 Hour
SO_2	5 %	38 %	32 %

A condensation of Tables 3-5, 3-6, and 3-7, shows that the project's maximum increment consumption of the total allowed will be:

Annual	24 Hour	3 Hour
2.1 ug/m^3	22 ug/m^3	77 ug/m^3
or	or	or
11 %	24 %	15 %

Baseline was set by the TECO modification. There are two new PSD sources proposed for Hillsborough County, CONSRV and the McKay Bay Refuse-to-Energy Project. CONSRV's data indicates no impact on the Project's impact area and TECO's impact was given above. Table 3-8 shows our projection of the increment that has or will be consumed.

Table 3-8
Total Increment Consumed

	Annual		24 Hour		3 Hour	
	ug/m^3	Percent	ug/m^3	Percent	ug/m^3	Percent
McKay Bay	2.1	11	22	24	77	15
CONSRV	0	0	0	0	0	0
TECO	1.0	5	35	38	164	32
Total	3.1	16	57	62	341	47
Allowed	20		91		512	

Table 3-9 shows the increment used by the project and TECO added to the HCEPC monitored ambient conditions. This assumes that the ambient maximums plus both source maximums occur at the same place and time.

Table 3-9
Highest Predicted Ambient Concentrations
Sulfur Dioxide
(micrograms/cubic meter)

	Annual	24 Hour	3 Hour
Ambient (1979)	25.5	126	597
TECO	1.0	35	164
Project	2.1	22	77
Total	28.6	183	838
Standards			
EPA	80	365	1300
Florida	50	265	1300

Summary of Sulfur Dioxide Analysis

As was shown in Tables 3-8 and 3-9 the McKay Bay Refuse-to-Energy Project will not violate the Class II increments nor will it lead to a violation of either national or state ambient air quality standards.

Lead Analysis

The ambient lead values have exceeded the NAAQS of 1.5 ug/m^3 on a quarterly average in the past but the most recent data does not indicate an attainment problem. The highest ambient lead value consistantly occurs at station 92 (the intersection of Hwys 60 and 41). In the past year the situation has significantly improved. This is shown in Table 3-10.

Table 3-10
Lead in Suspended Particulate Matter
Quarterly Average in Micrograms/Cubic Meter

	Station Number	Quarter 1	2	3	4	Annual Average
			1978			
Health Dept.	1	0.6	0.6	2.0	0.9	1.0
Davis Island	63	0.3	0.4	0.7	0.6	0.5
Hwys 60 & 41	92	0.8	1.3	2.4	1.4	1.5
Hooker's Pt.	115	---	---	2.4	0.9	---
			1979			
Health Dept.	1	0.9	0.6	0.7	0.7	0.7
Davis Island	63	0.6	0.5	0.7	0.7	0.6
Hwys 60 & 41	92	2.1	1.4	1.4	0.9	1.4
Hooker's Pt.	115	0.6	0.5	0.5	0.4	0.5
			1980 - 1981			
Health Dept.	1	0.43	0.5	0.35	0.23	0.38
Davis Island	63	0.15	0.24	0.2	0.14	0.18
Hwys 60 & 41	92	0.60	0.93	0.74	0.44	0.68
Hooker's Pt.	115	0.14	0.26	0.6	0.28	0.32

The CRSTER model does not generate 90 day averages. To demonstrate the insignificance of the lead emissions on Station 92 the the highest 24-hour value will be used.

Flouride Analysis

By proportioning the respective emission rates the modeled data can be used to determine the highest concentration of flourides expected from the Project. The flouride concentration should be 32.6 TPY/1142 TPY or 2.8% of the sulfur dioxide concentration. The maximum 1-hour concentration is modeled to be 2.8 ug/m^3. The Occupational Safety and Health Administration threshold limiting value (TLV) for hydrogen flouride is 2.0 mg/m^3. The Project's impact is less than 2/10 of 1% of the TLV, and will not be significant.

Nitrogen Oxides

The Hillsborough Environmental Protection Commission data indicate that the highest annual average between 1975 and 1979 is 68 ug/m^3 in 1977. By proportioning the modeling results by the emission rates the nitrogen oxides are equal to 1233 TPY/1142 TPY or 108% of the sulfur dioxide values. The maximum annual nitrogen oxide impact is modeled to be 2.4 ug/m^3. This value added to the highest annual average gives a maximum annual concentration of 70 ug/m^3. When compared to the federal standard of 100 ug/m^3 it can be seen that the area will remain attainment for nitrogen oxides.

Mercury and Beryllium

The projected impact from the emissions of Mercury and Beryllium were shown in Table 3-2. Their worst impact are 1/3 and 1/8 of the de minimis values. The de minimis values are determined to be that value below which no impact is assumed to occur and the commitment of applicant and review authority resources would not be productive.

The NESHAP rules for Beryllium (40CFR61.30) require that no more than 10 grams/day be emitted. The conservative data used in these estimates indicate an emission rate of less than seven (7) grams of Beryllium per day. The NESHAP rules for Mercury (40CFR61.50) are applicable to those sources that process mercury ore, use mercury chlor-alkali cells, or dry and/or incinerate wastewater treatment plant sludges. Neither Facility 1 nor the Facility 2 is planned to process or burn any wastewater treatment plant sludges.

please note these values are for 2 facilities while only 1 was constructed at McKay Bay

The highest annual sulfur dioxide value determined in 5 years of modeling occurs due east of the Project site near Station 92 and is 24 ug/m^3. The impact of lead can be proportioned by comparing the emission rates of lead to sulfur dioxide. The Project will emit 32.6 TPY of lead and 1142 TPY of sulfur dioxides. The lead impact will be 32.6/1142 or 2.9% of the sulfur dioxide impact. Thus the lead concentration at Station 92 is modeled to be 0.70 ug/m^3. When added to the past years highest quarterly average of 0.93 ug/m^3 value barely exceeds the standard. This assumes the highest 24-hour average modeled over 5 years would somehow be a quarterly average.

Summary - Lead Analysis

Based on the data this Project will not endanger the National Ambient Air Quality Standard of 1.5 ug/m^3.

Carbon Monoxide Analysis

To determine the highest concentration of carbon monoxide attributable to the Project, the concentration modeled for sulfur dioxide will be proportioned by the emission rates 258 TPY/1142 TPY or 23% of the sulfur dioxide value. Table 3-11 shows the modeled impacts of the Project. To best utilize our modeling for a conservative analysis, the 8-hour values are actually the values modeled for a 3-hour average.

Table 3-11
Maximum Carbon Monoxide Concentrations
(micrograms/cubic meter)

	N	NE	E	SE	S	SW	W	NW
8 Hour (3-hr.)	12	17	18	10	11	13	17	15
1 Hour	21	23	22	19	19	23	23	23

The carbon monoxide NAAQS standards are 40,000 and 10,000 ug/mg for 1 hour and 8 hour average respectively. The area is attainment for carbon monoxide. The Project will not have a significant impact on the ambient levels of carbon monoxide.

McKAY BAY REFUSE-TO-ENERGY FACILITY
SUMMARY OF AIR EMISSIONS

POLLUTANT	PERMITTED DISCHARGE	ACTUAL DISCHARGE
Particulate	0.025 gr/dscf @ 12% CO_2 or 27.9 lb/hr	0.00088 gr/dscf @ 12% CO_2 or 8.07 lb/hr
VOC	9.0 lb/hr	2.7 lb/hr
SO_2	170.0 lb/hr	139.9 lb/hr
NO_x	300.0 lb/hr	94.8 lb/hr
Lead	3.1 lb/hr	0.40 lb/hr
Flouride	6.0 lb/hr	2.3 lb/hr
Mercury	0.6 lb/hr	0.36 lb/hr
Beryllium	0.00046 lb/hr	<0.00008 lb/hr
CO	no limits set	21.9 lb/hr (≈32 ppm dry)

The average flue gas parameters for the facility are:

350,000 actual cubic feet per minute
155,000 dry standard cubic feet per minute
545°F temperature
14% moisture content
12% oxygen content
8% CO_2 content

note: Unit 1 NO_x data and all Beryllium data from retesting, the September 1985 acceptance test was not valid for Beryllium or Unit 1 NO_x.
All other data taken during acceptance testing.

Section 1

Incineration Capacity Test

From Acceptance Test Report

1. OBJECTIVE

The objective of the Incineration Capacity Test is to demonstrate that the McKay Bay Refuse to Energy Facility meets the performance guarantee specified in the WMI/Tampa Design an Construction Contract, Exhibit 4.1.

2. REFERENCES

A. WMI/Tampa Design and Construction Contract

B. McKay Bay Facility Acceptance Test Methodology dated July 8, 1985

3. TEST PROCEDURE

During the days prior to the test commencement the refuse pit was dug down to the extent possible while final preparations of the plant were being made.

On Monday, September 16, 1985 the plant was stabilized at design steam flow at 10:00 a.m. as verified by the Data Logger Trendcurves attached, Addendum 2.

-- Refuse was received on a continuous basis beginning at approximately 7:00 a.m. During the midafternoon hours, efforts began to level the refuse pit for the initial level measurement.
-- At 5:48 p.m., WMI and HDR agreed that the pit was leveled sufficiently. The charging hoppers were filled to the bottom of the sloped portion of the hoppers.

-- The initial pit level was recorded per the procedure in the Acceptance Test Methodology.

-- The reject hopper was placed in service and discharged into an empty twenty cubic yard container. Refuse deliveries were curtailed during the pit measurement procedure.

-- Deliveries were then resumed and recorded on the tipping floor log.

-- The plant was maintained at the throughput rate of 50 tons per hour, using the refuse crane load cells to monitor the incineration rate.

-- Shutdown time was required for parts of the facility during the test which is summarized as follows:

LINE	DATE	TIME	DURATION	REASON
4	9/18/85	0650-0730 Hrs.	40 Min	Plugged feed chute
1	9/18/85	2200-2215 Hrs.	15 Min	Plugged feed chute
4	9/18/85	2250-2320 Hrs.	30 Min	Plugged feed chute
3	9/19/85	0710-0755 Hrs.	45 Min	Clinker in after-burner chamber

LINE	TOTAL TIME	TIME ALLOWED
1	.25 Hrs.	2 Hrs.
2	.0 Hrs.	2 Hrs.
3	.75 Hrs.	2 Hrs.
4	1.17 Hrs.	2 Hrs.

The shutdown time experienced was significantly less than the time allowed in the contract, therefore it was not necessary to extend the test beyond seventy-two hours duration.

-- On September 19, 1985, the refuse pit was leveled during the after-noon hours in preparation for the final pit level measurement.

-- At 5:48 p.m., the charging chutes were restored to the beginning level at the bottom of the sloped portion of the hopper. Refuse deliveries were curtailed. The final refuse pit level was recorded. The container under the process rejects hopper was removed and weighed at the scalehouse.

4. DATA

The following data recorded during the test is included in this section:

Tipping Floor Logs
Test Data Sheets - Efficiency Test
Refuse Elevation Data
Volume Addition Calculation

5. CALCULATIONS

The tipping floor log was reconciled with the Scalehouse Transaction Log to account for the deliveries received that did not have tare weights. Also several recorded as "not dumped in the pit" were not recorded on the Transaction Log as being returned to the transfer station. These transactions were subtracted from the total tons received.

The final refuse pit elevation was higher than the initial elevation. Therefore the volume difference must be subtracted from the tons received.

TOTAL RECEIVED - TONS	3,894.23	3 day total of actual weight incinerated: the stack testing occurred during this time
TOTAL PIT TONNAGE ADDITION - TONS	(264.04)	
TOTAL PROCESS REJECTS - TONS	(1.59)	
TOTAL PROCESSED - TONS	3,628.60	

EQUIVALENT WEEKLY CAPACITY $3{,}628.60 \times \frac{7}{3} = 8{,}466.73$

6. CONCLUSION

It can be concluded that the facility has met its Incineration Capacity performance guarantee since the facility incinerated the equivalent of 8,466.73 tons weekly. This is 1,466.73 tons per week, or twenty-one percent above the guaranteed incineration capacity of 7,000 tons per week, at a higher heating value of 4,500 Btu/lb.

VOLUME ADDITION CALCULATION **ACCEPTANCE TEST PERIOD: 9/16/85 THRU 9/19/85**

LOCATION	INITIAL ELEVATION A	B	C	FINAL ELEVATION A	B	C	AREA A-B	AREA B-C	TOTAL AREA	VOLUME
E. WALL	50.67	50.25	49.25	42.42	39.17	38.92	169.14	187.34	356.48	
										4802.61
PIER 1	54.08	50.92	50.25	42.25	43.00	40.25	172.81	156.80	329.61	
										4741.98
PIER 2	52.58	52.00	52.42	42.33	42.92	41.08	169.14	178.68	347.81	
										4659.90
PIER 3	52.58	52.00	50.17	41.92	43.00	42.50	172.03	145.86	317.89	
										4527.60
PIER 4	52.42	52.08	49.67	41.83	42.08	42.67	180.16	148.75	328.91	
										3558.01
PIER 5	49.00	49.50	47.92	44.00	44.67	42.08	86.01	93.36	179.38	
										2363.03
PIER 6	48.00	48.25	45.33	44.00	43.25	41.25	78.75	79.45	158.20	
										1725.41
PIER 7	48.33	45.92	43.67	43.25	43.50	43.50	65.63	22.66	88.29	
										1084.74
PIER 8	48.67	45.10	43.42	44.67	44.75	40.50	38.06	28.61	66.68	
										1017.36
PIER 9	47.33	45.33	42.33	43.42	44.33	39.25	42.96	35.70	78.66	
										1536.15
W. WALL	48.25	46.17	43.58	42.25	43.50	38.83	75.86	64.93	140.79	

VOLUME ADDITION (CF)	30016.79
TONNAGE ADDITION (TONS)	264.04
TOTAL RECEIVED (TONS)	3894.23
TOTAL PROCESS REJECTS (TONS)	1.59
TOTAL BURNED (TONS)	**3628.60**

SCOTIA MINE
QUALITY CONTROL SAMPLES
SULFUR REDUCTION

RUN OF MINE					3" X 0 PLANT PRODUCT				
ASH	SULFUR	BTU	LBS. SULFUR PER MMBTU		ASH	SULFUR	BTU	LBS. SULFUR PER MMBTU	% SULFUR REDUCTION
39.34%	1.01%	8951	1.128		6.18%	0.93%	14462	0.643	43.00%
43.63%	0.83%	8318	0.998		5.55%	0.97%	14559	0.666	33.27%
42.18%	0.96%	8532	1.125		6.12%	0.97%	14472	0.670	40.44%
39.05%	1.03%	8994	1.145		6.89%	0.93%	14353	0.648	43.41%
44.68%	0.99%	8163	1.213		6.12%	0.94%	14472	0.650	46.41%
42.70%	0.98%	8455	1.159		6.78%	1.01%	14370	0.703	39.34%
40.74%	0.98%	8744	1.121		5.93%	0.90%	14492	0.621	44.60%
43.05%	0.92%	8404	1.095		5.86%	0.96%	14512	0.662	39.54%
44.45%	1.01%	8197	1.232		6.57%	0.97%	14402	0.674	45.29%
44.51%	0.86%	8165	1.050		5.27%	0.93%	14448	0.644	38.67%
43.13%	0.84%	7506	1.119		7.29%	0.92%	14296	0.633	38.07%
48.05%	1.08%	7666	1.409		6.73%	1.01%	14373	0.702	50.13%
48.42%	0.86%	7611	1.130		6.31%	0.96%	14442	0.665	41.15%
45.98%	0.84%	7971	1.054		5.76%	0.94%	14527	0.647	38.61%
44.87%	0.75%	8135	0.922		5.64%	0.87%	14546	0.598	35.14%
43.06%	0.87%	8402	1.035		7.08%	0.88%	14324	0.614	40.68%
43.73%	0.89%	8303	1.072		5.86%	0.83%	14512	0.572	46.64%
49.96%	0.76%	7384	1.029		6.43%	0.88%	14424	0.610	40.72%
40.91%	0.78%	8719	0.895		7.03%	0.87%	14331	0.607	32.18%
40.05%	0.81%	8846	0.916		6.17%	0.80%	14464	0.553	39.63%
48.69%	0.62%	7571	0.819		6.89%	0.80%	14353	0.557	31.99%
48.74%	0.70%	7564	0.925		7.81%	0.88%	14211	0.619	33.08%
42.82%	0.69%	8437	0.818		6.62%	0.80%	14395	0.556	32.03%
53.99%	0.81%	6789	1.193		6.15%	0.79%	14467	0.546	54.23%
40.56%	0.65%	8771	0.741		6.25%	0.76%	14452	0.526	29.01%
37.87%	0.77%	9168	0.840		6.22%	0.76%	14456	0.526	37.38%
37.67%	0.96%	9197	1.044		6.16%	0.79%	14465	0.546	47.70%

OMPOSITE	44.00%	1.00%	8259	1.211	6.00%	1.00%	14429	0.693	42.80%
UMBER OF OBSERVATIONS		27							
EAN				1.045				0.619	40.09%
AXIMUM				1.409				0.703	54.23%
INIMUM				0.741				0.526	29.01%
TANDARD DEVIATION				0.147				0.054	5.98%

95% CONFIDENCE INTERVAL--UPPER LIMIT 42.34%
95% CONFIDENCE INTERVAL--LOWER LIMIT 37.83%

SCOTIA MINE
QUALITY CONTROL SAMPLES
SULFUR REDUCTION

	RUN OF MINE				3" X 0 PLANT PRODUCT				
	ASH	SULFUR	BTU	LBS. SULFUR PER MMBTU	ASH	SULFUR	BTU	LBS. SULFUR PER MMBTU	% SULFUR REDUCTION
7-83	35.88%	1.00%	9462	1.057	6.12%	0.96%	14472	0.663	37.28%
4-83	40.20%	0.89%	8824	1.009	6.37%	0.97%	14433	0.672	33.40%
0-83	45.19%	0.98%	8088	1.212	5.82%	0.94%	14518	0.647	46.62%
7-83	36.41%	1.08%	9383	1.151	6.54%	0.94%	14407	0.652	43.35%
4-83	39.02%	1.10%	8998	1.222	6.07%	0.84%	14479	0.58	52.54%
2-83	41.06%	0.84%	8697	0.966	5.14%	0.98%	14623	0.67	30.64%
8-83	42.70%	0.61%	8455	0.721	5.56%	0.98%	14558	0.673	6.66%
7-83	47.02%	0.94%	7818	1.202	5.29%	1.00%	14600	0.685	43.01%
3-83	44.90%	0.86%	8131	1.058	5.81%	0.94%	14519	0.647	38.85%
0-83	42.46%	0.91%	8491	1.072	5.96%	0.96%	14496	0.662	38.25%
7-83	47.38%	1.12%	7765	1.442	5.84%	0.99%	14515	0.682	52.70%
9-83	39.66%	0.92%	8904	1.033	5.94%	1.01%	14499	0.697	32.53%
3-83	40.96%	0.92%	8712	1.056	6.33%	0.98%	14439	0.679	35.70%
21-83	45.82%	0.86%	7995	1.076	6.09%	0.94%	14476	0.649	39.68%
1-84	37.10%	0.98%	9282	1.056	6.40%	0.92%	14428	0.638	39.58%
6-84	39.05%	1.02%	8994	1.134	6.37%	0.90%	14433	0.624	44.97%
8-84	40.76%	1.10%	8741	1.258	6.57%	0.82%	14402	0.569	54.77%
5-84	41.94%	1.01%	8567	1.179	6.83%	0.97%	14362	0.675	42.75%
6-84	40.28%	1.07%	8812	1.214	6.61%	0.96%	14396	0.667	45.06%
4-84	33.23%	0.93%	9853	0.944	8.07%	0.99%	14171	0.699	25.95%
24-84	44.96%	0.99%	8122	1.219	5.87%	0.97%	14510	0.669	45.12%
9-84	43.46%	1.14%	8343	1.366	6.37%	0.98%	14433	0.679	50.29%
13-84	51.32%	0.92%	7183	1.281	6.48%	0.91%	14416	0.631	50.74%
22-84	43.33%	0.99%	8362	1.184	6.37%	0.95%	14433	0.658	44.43%
28-84	40.35%	0.91%	8802	1.034	5.50%	0.90%	14567	0.618	40.23%
5-84	46.37%	1.01%	7914	1.276	5.86%	0.91%	14512	0.627	50.86%
12-84	43.38%	1.03%	8355	1.233	7.61%	1.15%	14242	0.807	34.55%
7-84	39.03%	0.90%	8998	1	8.16%	1.02%	14157	0.72	28.00%
9-84	39.62%	1.08%	8910	1.212	6.30%	0.98%	14444	0.678	44.06%
7-84	45.09%	0.90%	8103	1.111	5.97%	1.00%	14495	0.69	37.89%
23-84	32.46%	1.10%	9966	1.104	7.79%	0.83%	14214	0.584	47.10%
0-84	32.20%	1.21%	10005	1.209	5.31%	0.95%	14596	0.651	46.15%

5-23-84	32.46%	1.10%	9366	1.104	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
5-30-84	32.20%	1.21%	10005	1.209		5.31%	0.95%	14596	0.651	46.15%
6-05-84	50.57%	0.92%	7294	1.261		5.64%	0.90%	14546	0.619	50.91%
6-11-84	42.67%	0.84%	8460	0.993		5.23%	0.91%	14609	0.623	37.26%
6-20-84	45.79%	0.82%	7999	1.025		5.97%	0.93%	14495	0.642	37.37%
6-26-84	39.80%	0.92%	8883	1.036		5.56%	0.97%	14558	0.666	35.71%
7-12-84	39.21%	0.92%	8970	1.026		5.57%	0.88%	14556	0.605	41.03%
7-18-84	38.10%	1.01%	9134	1.106		6.21%	0.97%	14458	0.671	39.33%
7-25-84	54.47%	0.80%	6718	1.191		5.90%	0.92%	14506	0.634	46.77%
8-01-84	43.67%	0.93%	8312	1.119		6.04%	1.06%	14484	0.732	34.58%
8-07-84	52.63%	0.85%	6990	1.216		6.42%	0.97%	14425	0.672	44.74%
8-15-84	41.53%	1.39%	8628	1.611		5.58%	0.98%	14555	0.673	58.22%
8-22-84	46.71%	0.81%	7863	1.03		7.37%	0.97%	14279	0.679	34.08%
8-30-84	41.21%	0.99%	8675	1.141		6.85%	0.97%	14359	0.676	40.75%
9-05-84	40.15%	1.02%	8831	1.155		6.63%	0.95%	14393	0.66	42.86%
9-14-84	51.06%	0.85%	7222	1.177		6.75%	0.94%	14374	0.654	44.44%
9-20-84	36.30%	0.67%	9400	0.713		6.23%	0.92%	14455	0.636	10.80%
9-26-84	45.26%	0.92%	8077	1.139		6.61%	0.91%	14396	0.632	44.51%
10-04-84	45.38%	0.83%	8060	1.03		5.63%	0.92%	14547	0.632	38.64%
10-11-84	44.56%	1.05%	8181	1.283		6.13%	0.95%	14470	0.657	48.79%
10-17-84	47.15%	0.86%	7799	1.103		6.54%	0.91%	14407	0.632	42.70%
10-25-84	32.38%	0.94%	9978	0.942		6.32%	1.00%	14441	0.692	26.54%
11-01-84	48.96%	0.88%	7531	1.169		6.20%	0.91%	14459	0.629	46.19%
11-14-84	53.68%	0.76%	6835	1.112		9.76%	1.04%	13910	0.748	32.73%
12-06-84	63.50%	0.76%	5386	1.411		7.50%	1.08%	14259	0.757	46.35%
1-09-85	38.99%	1.13%	9003	1.255		6.80%	1.04%	14367	0.724	42.31%
1-17-85	41.28%	0.89%	8665	1.027		6.67%	0.98%	14387	0.681	33.69%
1-23-85	54.48%	0.81%	6717	1.206		6.86%	1.02%	14358	0.71	41.13%
1-31-85	52.90%	1.61%	6950	2.317		6.34%	1.00%	14438	0.693	70.09%
2-07-85	52.62%	0.97%	6991	1.387		6.99%	1.01%	14337	0.704	49.24%
2-15-85	46.12%	0.98%	7951	1.233		5.51%	0.93%	14566	0.638	48.26%
2-21-85	53.16%	0.69%	6912	0.998		6.66%	0.96%	14388	0.667	33.17%
3-14-85	42.79%	1.04%	8442	1.232		6.94%	1.06%	14345	0.739	40.02%
3-20-85	52.49%	0.65%	7011	0.927		6.53%	0.94%	14408	0.652	29.67%
3-27-85	47.53%	0.94%	7742	1.214		5.91%	0.92%	14504	0.634	47.79%
4-05-85	42.78%	0.94%	8443	1.113		5.74%	1.00%	14530	0.688	38.19%
4-16-85	39.52%	0.88%	8924	0.986		6.30%	0.99%	14444	0.685	30.53%
5-02-85	43.81%	0.82%	8291	0.989		5.82%	0.91%	14518	0.627	36.60%
5-09-85	57.31%	0.59%	6299	0.937		5.82%	0.93%	14518	0.641	31.59%
5-17-85	46.49%	0.99%	7896	1.254		5.10%	0.89%	14629	0.608	51.52%
[illegible]	34.33%	0.73%	[illegible]	0.815		5.20%	0.93%	14613	0.636	21.95%

6-20-85	47.49%	0.85%	7748	1.097	5.98%	0.93%	14493	0.642	41.48%
7-18-85	44.47%	0.80%	8194	0.976	7.12%	0.88%	14317	0.615	36.99%
7-24-85	44.27%	0.75%	8224	0.912	6.18%	0.83%	14462	0.574	37.06%
8-08-85	29.76%	0.96%	10365	0.926	6.21%	0.79%	14458	0.546	41.04%
8-14-85	48.87%	1.04%	7545	1.378	6.39%	0.92%	14432	0.637	53.77%
8-23-85	47.95%	0.80%	7680	1.042	9.51%	1.00%	13949	0.717	31.19%
9-06-85	51.73%	0.94%	7123	1.32	5.44%	0.78%	14576	0.535	59.47%
9-12-85	46.02%	0.95%	7965	1.193	5.95%	0.89%	14498	0.614	48.53%
9-18-85	37.11%	0.86%	9280	0.927	5.77%	0.81%	14526	0.558	39.81%
9-27-85	42.55%	0.76%	8477	0.897	6.06%	0.78%	14481	0.539	39.91%
10-03-85	41.22%	0.92%	8674	1.061	6.10%	0.88%	14475	0.608	42.70%
10-17-85	58.59%	0.55%	6110	0.9	5.78%	0.92%	14524	0.633	29.67%
10-23-85	44.32%	0.82%	8216	0.998	6.56%	0.90%	14404	0.625	37.37%
10-31-85	48.91%	0.92%	7539	1.22	6.45%	0.86%	14421	0.596	51.15%
11-07-85	43.50%	0.82%	8337	0.984	6.78%	0.82%	14370	0.571	41.97%
11-14-85	54.50%	0.71%	6714	1.057	6.56%	0.88%	14404	0.611	42.19%
11-21-85	44.07%	0.61%	8253	0.739	5.90%	0.88%	14506	0.607	17.86%
12-05-85	38.26%	0.73%	9110	0.801	6.31%	0.90%	14442	0.623	22.22%
12-12-85	52.08%	0.73%	7071	1.032	8.27%	0.91%	14140	0.644	37.60%
12-17-85	38.75%	0.96%	9037	1.062	8.18%	0.86%	14154	0.608	42.75%
1-10-86	31.39%	0.88%	10124	0.869	6.51%	0.80%	14411	0.555	36.13%
1-16-86	26.90%	0.78%	10787	0.723	6.79%	0.80%	14368	0.557	22.96%
1-23-86	38.67%	1.06%	9050	1.171	7.34%	0.82%	14284	0.574	50.98%
1-31-86	40.39%	0.77%	8796	0.875	4.74%	0.75%	14684	0.511	41.60%
2-05-86	40.89%	0.82%	8722	0.94	6.43%	0.82%	14424	0.568	39.57%
2-11-86	53.39%	0.64%	6878	0.931	5.54%	0.81%	14561	0.556	40.28%
2-20-86	31.08%	0.83%	10170	0.816	5.89%	0.85%	14507	0.586	28.19%
2-27-86	66.15%	0.55%	4995	1.101	6.46%	0.75%	14419	0.52	52.77%
3-06-86	38.19%	0.67%	9121	0.735	6.87%	0.81%	14356	0.564	23.27%
3-21-86	58.42%	0.49%	6136	0.799	7.44%	0.81%	14268	0.568	28.91%
3-28-86	49.61%	0.57%	7436	0.757	7.77%	0.79%	14217	0.556	27.51%
4-04-86	42.86%	1.18%	8432	1.393	7.86%	0.90%	14203	0.634	54.68%
4-10-86	44.06%	0.81%	8255	0.981	8.25%	0.95%	14143	0.672	31.50%
4-18-86	56.70%	0.53%	6389	0.83	7.69%	0.87%	14230	0.611	26.39%
4-22-86	47.09%	0.48%	7807	0.615	7.46%	0.84%	14265	0.589	4.23%
4-30-86	53.00%	0.51%	6935	0.735	7.80%	0.84%	14213	0.591	19.59%
5-07-86	52.76%	0.55%	6971	0.789	7.91%	0.81%	14196	0.571	27.53%
5-15-86	45.48%	0.89%	8045	1.106	5.46%	0.76%	14573	0.522	52.80%
5-22-86	40.98%	0.63%	8709	0.723	6.64%	0.83%	14391	0.577	20.19%
5-30-86	30.09%	0.77%	10316	0.746	5.87%	0.76%	14510	0.524	29.76%
6-13-86	44.80%	0.63%	8145	0.773	7.22%	0.83%	14302	0.58	24.97%
6-20-86	62.18%	1.84%	5581	3.237	6.16%	0.83%	14465	0.574	82.59%

6-25-86	42.41%	0.52%	8498	0.612	5.59%	0.75%	14553	0.515	15.85%
7-17-86	48.48%	0.55%	7602	0.723	6.80%	0.78%	14367	0.543	24.90%
7-25-86	52.62%	0.61%	6991	0.873	5.65%	0.79%	14544	0.543	37.80%
7-30-86	64.25%	0.55%	5275	1.043	6.56%	0.79%	14404	0.548	47.46%
8-12-86	27.52%	0.81%	10695	0.757	6.41%	0.81%	14427	0.561	25.89%
8-13-86	37.68%	0.55%	9196	0.598	5.62%	0.77%	14549	0.529	11.54%
8-27-86	46.75%	0.81%	7858	1.031	5.92%	0.71%	14502	0.49	52.47%
9-12-86	47.97%	0.53%	7678	0.69	7.06%	0.75%	14327	0.523	24.20%
9-19-86	42.89%	0.53%	8427	0.629	6.24%	0.77%	14453	0.533	15.26%
9-25-86	28.50%	0.85%	10551	0.806	6.17%	0.77%	14464	0.532	34.00%
10-07-86	46.68%	0.93%	7868	1.182	7.10%	0.80%	14321	0.559	52.71%
10-15-86	27.93%	0.81%	10635	0.762	5.76%	0.71%	14527	0.489	35.83%
10-22-86	49.40%	0.67%	7467	0.897	6.25%	0.75%	14452	0.519	42.14%
10-31-86	36.86%	0.61%	9317	0.655	5.82%	0.75%	14518	0.517	21.07%
11-05-86	49.10%	0.66%	7511	0.879	6.72%	0.78%	14379	0.542	38.34%
11-10-86	41.51%	0.82%	8631	0.95	5.99%	0.79%	14492	0.545	42.63%
11-19-86	26.79%	0.92%	10803	0.852	6.19%	0.83%	14461	0.574	32.63%
12-05-86	35.45%	0.69%	9525	0.724	5.99%	0.79%	14492	0.545	24.72%
12-12-86	35.48%	1.72%	9521	1.807	5.92%	0.75%	14502	0.517	71.39%
COMPOSITE	44.03%	0.86%	8259	1.044	6.40%	0.89%	14429	0.619	40.71%
							MAXIMUM		82.59%
							MINIMUM		4.23%
NUMBER OF OBSERVATIONS	135								
MEAN				1.057				0.619	38.50%
STANDARD DEVIATION				0.305				0.063	12.00%

95% CONFIDENCE INTERVAL--UPPER LIMIT 40.53%

95% CONFIDENCE INTERVAL--LOWER LIMIT 36.48%