Henningson, Durham & Richardson
P.L
Pensa... FL 32575
(904) 432-2481

August 31, 1983

R.E. Ratcliff, P.E.
K.L. Gregory, A.I.A.

Received DER

SEP 6 1983

P. P. S

State of Florida
Department of Environmental Regulation
Twin Towers Office Building

2600 Blair Stone Road
Tallahassee, Florida 32301-8241

Attention: Mr. Hamilton S. Oven, Jr., P.E.

Gentlemen:

Enclosed in this document is a revised application for Power Plant Siting for the third boiler expansion at the Pinellas County Resource Recovery Facility. It is hoped that the contents contained herein address those comments posed by the Department in a letter dated August 9, 1983.

Sections of the application which have been added or altered since its initial submittal on July 26 have been indicated by an asterisk (*) at the beginning of the pertinent paragraph. In addition, an index is presented following this letter, from which the Department can discern where in the application each comment has been addressed.

This revised application is substantially modified and expanded from its original form. Therefore, it is respectfully requested that the initial copies of the application (July, 1983) be discarded and this one substituted in its place.

Respectfully,

HENNINGSON, DURHAM & RICHARDSON, INC.

James C. Andrews

Enclosure

JCA/mr

Architecture
Engineering
Planning
Systems
Sciences

Alexandria
Atlanta
Austin
Charlotte
Chicago
Dallas
Denver
Helena
Knoxville
Minneapolis
Norfolk
Omaha
Pensacola
Phoenix
Santa Barbara
Seattle
Washington, D.C.

INDEX TO DEPARTMENT COMMENTS

NOTE:

On the following pages is a copy of the Department's insufficiency comments contained in a letter dated August 9, 1983. Each comment has a reference number on the left margin. Refer to this number in the subsequent index, which either addresses that comment or directs the reader to the proper section of the application.

Comment 1: The application was modified and expanded to include discussions of changes from the original application, the majority of which are presented in Chapters 1 through 3.

Comment 2: A Petition of Need will be filed with the Public Service Commission by September 30, 1983.

Comment 3: Figure 2.1 was expanded into three separate exhibits. Figure 2-1.a identifies general land use in the vicinity of the Resource Recovery Facility (RRF), Figure 2-1.b identifies the existing and proposed plant layout, and Figure 2-1.c features changes at the RRF since submittal of the original application - See Section 2.1.1. No changes to the materials handling area will be required (page 6).

Comment 4: Sections 2.1 through 2.7 have been expanded to identify changes in the RRF environment. Plans for corrective actions due to warning letters can be found in the following areas of the application; pages 36 through 38, Chapter 6, and Appendix VIII.

Comment 5: Details of the proposed bentonite-soil slurry wall are presented in Appendix VIII.

Comment 6: The reason for the reduced waste stream flow is discussed in Section 3.3, page 21. A letter stating the acceptability of the effluent is presented in Appendix VII.

Comment 7: The boiler discharge discussion is now in Section 3.6.3, page 25. The numbers given are for a three boiler plant.

Comment 8: The tonnages are for a three boiler plant and are the most recent estimates based on existing plant operation.

Comment 9: The construction period will be 33 months; an estimated 90,900 gpd of water will be used (page 30). Less than 25 tons of solid waste is estimated to be generated during construction. Noise levels are discussed in Section 4.1.f (page 31) and Section 4.1.3 (page 32). The construction work force and traffic are discussed in Sections 4.1.3.a and 4.1.4 (page 32), and in Table III-1, Appendix III. Construction areas and land impacts are identified in Section 4.1.1 (page 31) and Sections 4.1.2 and 4.1.3 (page 32).

Comment 10: At the time of this writing, the referenced USGS report is in final editorial review. It will be forwarded to the Department as Appendix X of this application.

Comment 11: Chapter 5 was expanded to identify operation impacts observed to date at the existing plants and those anticipated once the proposed expansion becomes operational.

Comment 12: See Page 49 and Appendix IX.

Comment 13: See pages 50-52.

Comment 14: The correct throughput is 1050 tons/day. This error has been corrected in this application.

Comment 15: The correct factor, shown in the revised tables, is .03 lb/ton MSW. This corresponds to an emission rate of 1.3 lb/hr.

Comment 16: The correct factor is 1.3×10^{-6} lb/ton MSW which equals an emission rate of 5.7×10^{-5} lb/hr.

Comment 17: This has been corrected. See revised Table II-10.

Comment 18: A complete copy of all model runs was submitted with this revised application: The CRSTER model was run on September 23 1982. The CRSTER version employed is from UNAMAP-4.

Comment 19: In the model results originally submitted the ISCST source code didn't initialize these numbers. In the new runs submitted with this revised application the numbers were input manually.

Comment 20: The STAR data was regenerated using 1970-1974 meteorologic data. However, no ISCLT runs are included in this revised application.

Comment 21: As approved by the Department on September 21, 1982, the following sources were included in the modeling: FPC Anclote, FPC Higgins, FPC Bartow, Golden Triangle asphalt plant, TECO Hooker Pt., TECO Big Bend, TECO Gannon, and Stauffer Chemicals. There are other sources within 50 Km of the plant which were not modeled, but which consume PSD increment. Most of these emitters were modeled in the original two-boiler plant application.

Comment 22: The grid size was amended to a more conservative spacing of less than 0.1 Km.

Comment 23: The turbine-generator will be cross-linked (section 3.0, page 20).

Comment 24: See Section 3.4, page 21.

Comment 25: The requirements for Federal PSD approval (which is required for the RRF expansion) are presented in Appendices I - VI.

STATE OF FLORIDA

DEPARTMENT OF ENVIRONMENTAL REGULATION

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

BOB GRAHAM
GOVERNOR

VICTORIA J. TSCHINKEL
SECRETARY

August 9, 1983

Mr. William E. Williams
Division of Administrative Hearings
2009 Apalachee Parkway
Tallahassee, Florida 32301

RE: Pinellas County Resource Recovery Project, Phase II, PA 83-18
DOAH Case No. 83-2355

Dear Mr. Williams:

The Department of Environmental Regulation has reviewed the Pinellas County Power Plant Siting Application pursuant to Section 403.5065(2), F.S. The subject application was received on July 26, 1983. It has been found incomplete based on the following:

(1) The new application does not show where the original application was altered in response to sufficiency and completeness issues from the first proceedings, and as modified. Because of difficulties this presents to the staff in determining whether the new version is complete and sufficient, the appropriate corrections must be made before the new application can be deemed complete.

The following areas of incompleteness or insufficiency have also been noted, identified by Chapter:

(2) Chapter 1 - It is our understanding that no petition for Determination of Need has been submitted yet to the Public Service Commission. In order for the PSC to be able to file their preliminary and final reports in a timely fashion, data will be needed. The process is presumed to be halted at day 150 of the timeclock if a positive finding of need has not been made by the Commission.

(3) Chapter 2 - Figure 2.1 is close to illegible and the distinction between what facilities are planned vs. certified but not yet constructed vs. constructed is not apparent. Provide a better Figure. Regarding the site layout depicted on the same figure, what will happen to the materials handling area once construction on the third boiler is commenced?

- It was stated that there were no changes in
(4) sections 2.3 through 2.7 from the original application. Since part of the site has been used for putrescible waste landfilling over the past few years and Units 1 & 2 construction has occurred, baseline data for the site as it applies to Unit 3 must be different, particularly with regard to site water quality, hydrology, flood prone configuration, plans for corrective action due to the warning letters received from the Department regarding ground water levels vs. solid waste disposal activities, etc.

- The application is incomplete in not providing
(5) information relating to groundwater protection:

1. Construction and hydraulic properties of the proposed perimeter slurry trench.
2. Associated borings.
3. "Bentonite" clay properties.
4. Underlying clay confining layer properties.
5. Associated borings.
6. Inside/outside water level projections.
7. Inside/outside ground water monitoring design.
8. Comprehensive runoff model.
9. Possible effects of flooding to contiguous housing.
10. Possible effects of salt water intrusion on the aquifer(s).

(6) Chapter 3 - Regarding Figure 3.1, the flow volume for the 1983 waste stream appears less than for 1978. It is assumed that the 1983 figures are revised and reflect more accurately the anticipated conditions, but this needs to be clarified. Is there documentation from Pinellas County that the effluent is acceptable? A tabulation of the characteristics of the effluent is needed.

(7) - Are the boiler discharges listed in3.2 given what is expected from Unit 3, or from the existing two units?

(8) - Volumes and tonnages for Section 3.6.3 need to be updated.

(9) Chapter 4 - Section 4.1; will construction plans for the new unit be identical to those for the older two, i.e., will there be a 32 month construction period requiring 750,000-100,000 gpd of water, will the noise levels still be the same, will there be as much construction debris generated, will there be as many construction workers and thus traffic? What is the status of all the various construction areas?

(10) Chapter 5 - Section 5.0; Submit a copy of the U.S.G.S. report on the treatment efficiency of the oxidation pond.

(11) - The same general comments as for chapter 4 apply, regarding whether it is expected that the magnitude of the new project and resultant impacts will be the same as the impacts of Phase I.

(12) Chapter 6 - Regarding the study on aerosolization of pathogenic organisms from the use of sewage effluent in the cooling towers, provide details on the contracted work, i.e., duration of the contract itself, details of the sampling, sampling frequency, intended result (a report?), etc.

(13) Chapter 7 - Address impacts on traffic in the vicinity. While it is logical to assume that there may be less construction traffic than before, considering your data on the increase in population in Pinellas County, a discussion on recent traffic patterns and possible problems caused by construction and operation is necessary.

Air Appendix - The following inconsistencies have been noted:

(14) 1. The particulate emission rate specified in Table II-1 is based on a throughput of 1050 ton/day; in Table II-2 on 1000 ton/day. Why?

(15) 2. The emission factor for lead is given as 0.1 lb/ton MSW in Table II-1 and 0.07 lb/ton MSW in Table II-2. The associated emission rate in Table II-2 (4.4 lb/hr) does not correspond to the 0.07 lb/ton MSW factor. Which factor are you proposing to meet? What emission rate?

(16) 3. The emission factor for Beryllium is given as 1.0 x 10_{15} lb/ton MSW in Table II-1 and as 7.7 x 10_{-5} lb/ton MSW in Table II-2. Which, if either, is the correct value? Note the emission rate given does not correspond to either factor.

(17) 4. The modeled concentrations in Table II-10 for CO, lead, and mercury do not correspond to the ratioed emission rates of these pollutants to SO_2. Have these concentrations been calculated differently? If so, how?

Modeling -

(18) 1. Send a copy of the computer output for the CRSTER model runs. Include all five years. Also state the approximate date in which these runs were made. State the differences in the CRSTER algorithm between the version run for your output and the current version (UNAMAP-4). How do these changes affect the results?

(19) 2. In the ISCST output given, the wind profile exponents and the vertical potential temperature gradients are listed as being 0.0 for all stability categories. How has the program been modified? Why? If this is true, the values need to be corrected and the model rerun.

(20) 3. The stability wind rose (STAR) input data to the ISCLT model is incorrect. There are frequencies listed in some wind speed categories that should not occur for stabilities 5 and 6. Correct this error. Five years of meteorological data should be used in creating the STAR input data. This model needs to be rerun with the corrected input data.

(21) 4. Identify the sources used in the ISC model runs. Which sources consume PSD increment? Are there additional major sources within 50 km of the RRf which were not included in the modeling? If so, why?

(22) 5. On Page II-3, Item B-7; what are the units defining the grid size?

Other Air-related concerns:

(23) 1. Will the 29 MW turbine generator be cross linked to the existing system?

(24) 2. What is the desing steam production rate for the proposed boiler? How will it be monitored?

(25) 3. Will a Federal PSD permit be required for the proposed expansion?

(26) 4. The existing units at this facility have already undergone compliance testing. Stack test results for TSP and SO_2, chlorides, hydrocarbons, CO, and NO_x should be obtained from testing which could be conducted on the existing facility instead of relying on the referenced information cited in the application.

(27) 5. How does the applicant propose to determine compliance with the emission limitation set by the BACT process? Stack testing and/or continuous emission monitors? Will limits for NO_x, CO, fluorides, chlorides, hydrocarbons be set in the Conditions for Certification? What are the particulate and visible emissions during soot blowing? Will a separate soot blowing emission standards be set? How will soot blowing operations be addressed during compliance testing?

(28) 6. What visible emission limitation does the applicant propose as BACT? How will compliance be determined?

(29) 7. Page I-4, Table I-3; under Incremental Costs = Additional Tons Removed, for the emission limit of 0.015 gr/dscf, 45 appears too low. What is the correct number?

(30) Responses to completeness and sufficiency remarks will be considered amendments to the application and must be done in a format which shows the alterations made. Appropriate page substitutions must be made, not just loose letter materials submitted.

Sincerely,

Hamilton S. Oven

Hamilton S. Oven, Jr., P.E.
Administrator
Power Plant Siting Section

HSO/sb

cc: D. F. Acenbrack
William Deane
Power Plant Siting Review Committee
Bill Hennessey
Paul Darst, DCA
Bob Trapp, PSC
Gary Kuhl, SWFWMD
Tom Cone
Jim Andrews
Robert Van Deman, Jr., P.E.

Comment 26: Stack emission tests were limited to particulate matter. The referenced values used in the modeling are more conservative than those observed.

Comment 27: Stack tests for particulate matter will be conducted on the new unit. Opacity will be continuously monitored. For details on operational monitoring for TSP and SO_2 see Chapter 6. Soot blowing opacity recorded to date has been around 8%. A soot blowing emission standard is without precedent and is not proposed. Soot blowing is not scheduled to be addressed during compliance testing (Note: was not conducted for existing plant).

Comment 28: The emission limitation proposed as BACT is 20%. Opacity of the third boiler emission will be continuously monitored and recorded, as is done with the existing units.

Comment 29: This has been revised.

Comment 30: The revised application is submitted in a ring-bound notebook which facilitates incorporating changes. Revised items are identified by an asterisk (*) at the beginning of the pertinent section.

BOARD OF COUNTY COMMISSIONERS

COMMISSIONERS
BARBARA SHEEN TODD, CHAIRMAN
JOHN CHESNUT, JR., VICE-CHAIRMAN
GABRIEL CAZARES
CHARLES E. RAINEY
BRUCE TYNDALL

DEPARTMENT OF SOLID WASTE MANAGEMENT
2800 110TH AVENUE NORTH
ST. PETERSBURG, FLORIDA 33702
PHONE (813) 825-1565

P.O. Box 21623
St. Petersburg, FL 33742-1623

June 28, 1983

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

ATTN: Mr. Hamilton Oven

Re: Application for Power Plant Siting Certification (PPSC), Phase II

Gentlemen:

The document enclosed herewith is Pinellas County's Phase II application for an electrical power plant siting certification, submitted in accordance with Florida Department of Environmental Regulation Chapter 17-17 Rules.

Hopefully, the information contained herein provides all that is necessary to permit a through evaluation of our application. If, however, you find that additional data is required, please contact me at your earliest convenience.

Activities covering our application to the Public Service Commission for a Certificate of Need are underway at this time.

Also enclosed is our check for $25,000.00 to cover the application fee.

Sincerely,

D. F. Acenbrack, Director
Solid Waste Management

ACE:ltl
Encl

Engineer Submitting Application:

Robert J. Van Deman Jr.

Robert J. Van Deman, Jr.
Florida Registration Number: 25963

NCNB National Bank of Florida · Trust Department
Post Office Box 1469
Tampa, Florida 33601

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TWIN TOWERS OFFICE BUILDING
2600 BLAIR STONE ROAD
TALLAHASSEE FL 32301

Peggy J. McManus

AUTHORIZED SIGNATURE

PINELLAS COUNTY RESOURCE RECOVERY FACILITY

APPLICATION FOR POWER PLANT SITING

Table of Contents

PERTINENT APPLICANT INFORMATION

Company or Applicant's Official Name:	Pinellas County
Address:	315 Court Street Clearwater, Florida 33516
Address of Official Headquarters:	Same
Business Entity:	County Government
Name and Title of Business Head:	Barbara Sheen-Todd, Chairman of Board of County Commissioners
Name, Title and Address of Official Representative Responsible for Obtaining Certification:	Gene Jordan, Director Public Works and Utilities 315 Court Street Clearwater, Florida 33516
Site Location:	Pinellas County
Nearest Incorporated City:	Pinellas Park
Latitude & Longitude:	27°52' N, 82°40' W
UTMs Northerly:	3084.1
UTMs Easterly:	335.2
Name Plate Generating Capacity Existing:	50.6 MW
Proposed:	Additional 29 MW
Remarks:	Pinellas County does not operate, maintain, or construct facilities for the purpose of electric generation. Neither does Pinellas County distribute electrical energy generated at facilities operated by others. The sole purpose of the proposed addition is to dispose of solid waste and recovery energy and materials. The proposed addition will afford Pinellas County a more flexible method of solid waste disposal which will substitute for the present landfilling operations.

CHAPTER 1
PURPOSE OF THE FACILITY

1.0 The Resource Recovery Facility (RRF) was planned and constructed as the ultimate solution to solid waste disposal in Pinellas County, Florida. Since the submittal of the site application for the original two boiler plant in 1978, refuse generation rates have risen faster than was anticipated. To meet the added demand on the processing capacity of the plant an additional boiler is needed.

*1.1 System Demand and Reliability

The proposed third boiler will be essentially identical to the two units in place. Specifically, the system offered by Signal-Resco (Signal-Resco recently acquired UOP, Inc.) is a mass-burning/electrical generation configuration. The facility utilizes waterwall combustion units incorporating the Martin combustion system. The main proprietary portion of the system is a precision tooled, reverse reciprocating stoker grate made of cast chrome steel. From the dependability standpoint, there appears to be an advantage with this type of grate as the frequent unscheduled outages common to other types are markedly reduced; these grates have demonstrated remarkable service life at the existing Pinellas Facility, and the Chicago Northwest facility where Martin units have been employed since 1971.

As proposed by Signal-Resco and specified by Pinellas County, Signal-Resco in association with Rust International, would design, construct, test, operate and maintain the RRF under the supervision of the County's Public Works and Utilities Department. Overall responsibility for the project (other than contractural covenants accepted by Signal-Resco) ultimately resides with the Board of County Commissioners.

The capital cost of the proposed expansion is approximately $52.5 million, subject to escalation, and will be financed by a parity bond issue.

*1.1.1 Load Characteristics

The proposed third boiler expansion will increase the total solid waste processing capacity of the plant to 3,150 tons per day (1,146,600 tons per year) at a fuel quality of 5,000 Btu per pound of solid waste. This added capacity will allow the incineration of all Class I solid waste through 1996.

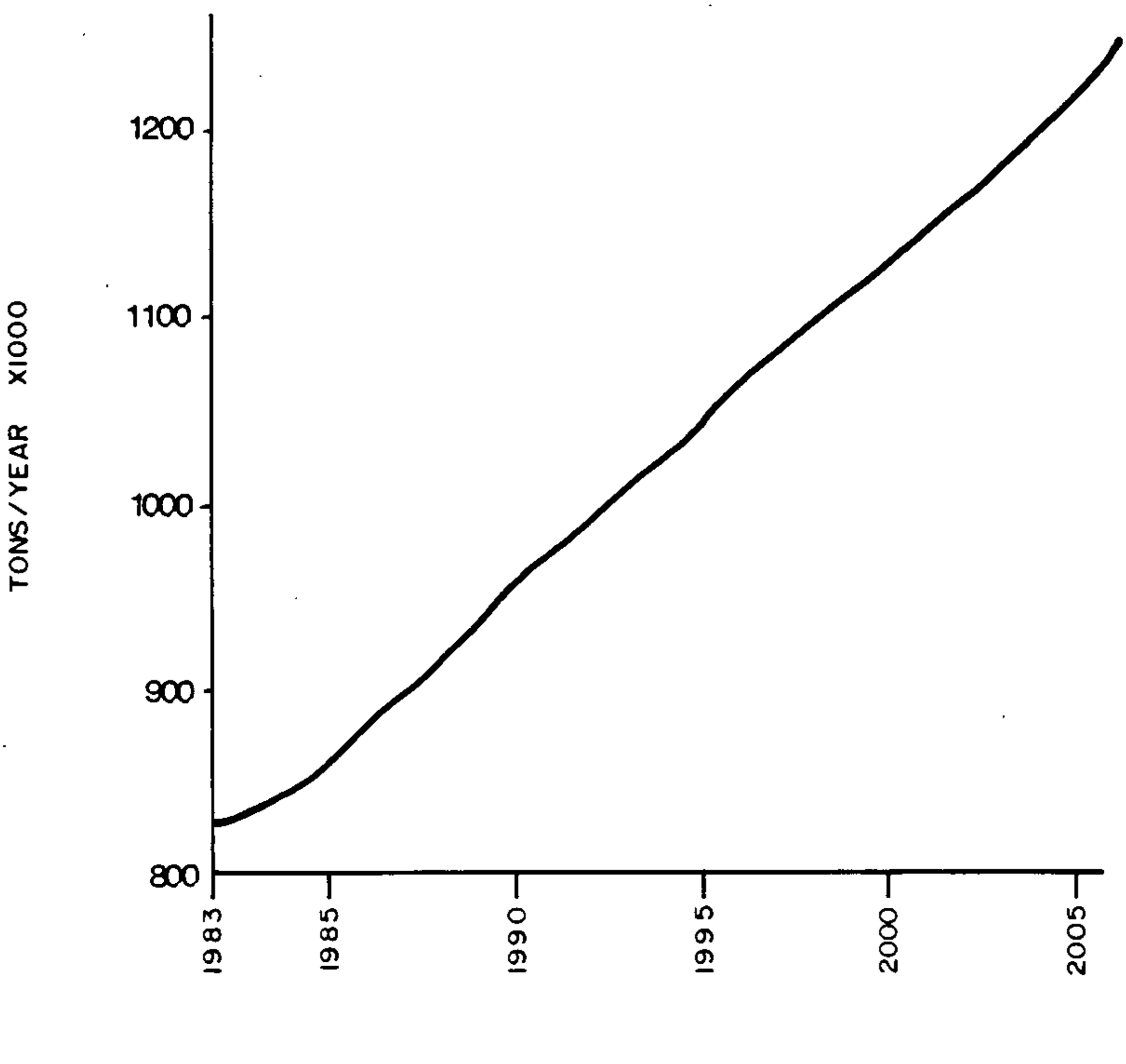
Currently, all solid waste generated in Pinellas County is disposed of by incineration at the plant or landfilling at on-site Class I or Class III landfills. The Class III landfill (Bridgeway Acres Phase I Extension) is not within the current certified power plant site and is operating under District DER permits. The Class I landfill (Bridgeway Acres II) is permitted in the existing plant license. All landfills are County owned and operated by a private firm under contract with Pinellas County.

Solid waste generation in Pinellas County, projected through the year 2005, is depicted in Figure 1-1. As shown, the rate of increase is basically linear and reflects both anticipated population and per capita solid waste generation changes. Population changes between 1970 and 1980 are featured in the next section (Table 2-1).

Since the submittal of the original application for the two-boiler plant, all Class I landfills in Pinellas County, except the two on-site facilities mentioned previously, have ceased operations. Bridgeway Acres I and the Windisch landfills are closed; the Toytown landfill no longer accepts solid waste, and is now undergoing closure procedures, as per Chapter 17-7, FAC.

The existing and proposed electrical generation capacities are

FIGURE I-1
SOLID WASTE PROJECTIONS



insignificant with respect to the demand on the peninsula Florida electrical grid. The current 50.6 MW generated (gross) supplies enough electricity to light up an estimated 15,000 residences. The proposed plant expansion will boost this amount by approximately 57%.

*1.1.2 System Capacity

The proposed expansion of electrical generation capacity of the plant is 29 MW; this would result in a total capacity of approximately 79 MW (gross). Based on the operation of the existing two-boiler plant, the net generating capacity of the proposed plant should be approximately 72 MW. The expanded capacity would be tied into the peninsula grid system, as is with the existing facility. 92%

*1.1.3 Reserve Margins

The addition of a third boiler will provide additional system redundancy in case of unit malfunction, or during routine boiler maintenance. Routine shutdowns are scheduled during periods of low quantity solid waste inflow; the duration of annual shutdown is approximately two weeks per boiler.

*1.2 Other Objectives

The primary objective of the plant is to dispose of solid waste. In doing this, adverse impacts on the environment are minimized with respect to landfill activities. Secondary objectives of the RRF are as follows:

1. Sale of electricity.
2. Recovery and sale of marketable combusted materials.
3. Reduction in requirements for land used for landfilling.

*1.3 Consequences of Delay

The capacity afforded by the third boiler will minimize the landfilling of Class I solid waste in the near future; this is the stated policy of the Board of County Commissioners, Pinellas County, Florida. Based on current estimates, all Class I material can be incinerated by a three boiler plant through 1996.

Without the proposed expansion in plant capacity a steadily increasing volume of putrescible solid waste would be disposed of at on-site Class I landfills. This promotes water quality degradation, increases the risk to public health, and uses far more land for landfilling than would otherwise be required, with resultant economic consequences. Available land for such purposes is already scarce and costs upwards of $30,000 per acre.

The effect of project delay on electrical capacity and consequences of demand in peninsula Florida are insignificant.

In accordance with Florida Statutes, a petition for Determination of Need will be submitted to the Florida Public Service Commission by September 30, 1983.

CHAPTER 2
THE SITE

*2.1 Changes in Site Location and Layout

*2.1.1 Maps

Figure 2-1.a shows the existing land use in the vicinity of the Resource Recovery site. The layout of the proposed plant expansion is shown in Figure 2-1.b. As shown, the battery limits of the plant will not be enlarged. The electrical generation capacity will be increased by 29 megawatts (MW). The third boiler is to be situated north of the existing units and adjacent to the materials recovery building. The project is designed so that the operation and layout of the materials recovery area is not affected by construction. The second turbine-generator will be constructed just south of the existing one. In addition to the construction of the two boiler plant and appurtenances, land use in the vicinity of the plant has undergone the following changes since the submittal of the original application (Figure 2-1.c):

1. New County Solid Waste Administration building
2. Materials Storage building (now under construction)
3. Construction of the Bridgeway Acres II landfill
4. Paving of 110th Ave.
5. Paving of 28th St. to Gandy Blvd. (now underway)
6. Construction of aesthetic berms around site
7. Finish landscaping of closed out landfills
8. Installation of site drainage ditches and swales
9. Installation of security fence around County lands
10. Tertiary, potable and wastewater pipelines installed
11. Irrigation piping
12. Tire split station (under construction)
13. Signage (under construction)
14. Electrical transmission line

FIGURE 2-1.a STUDY AREA

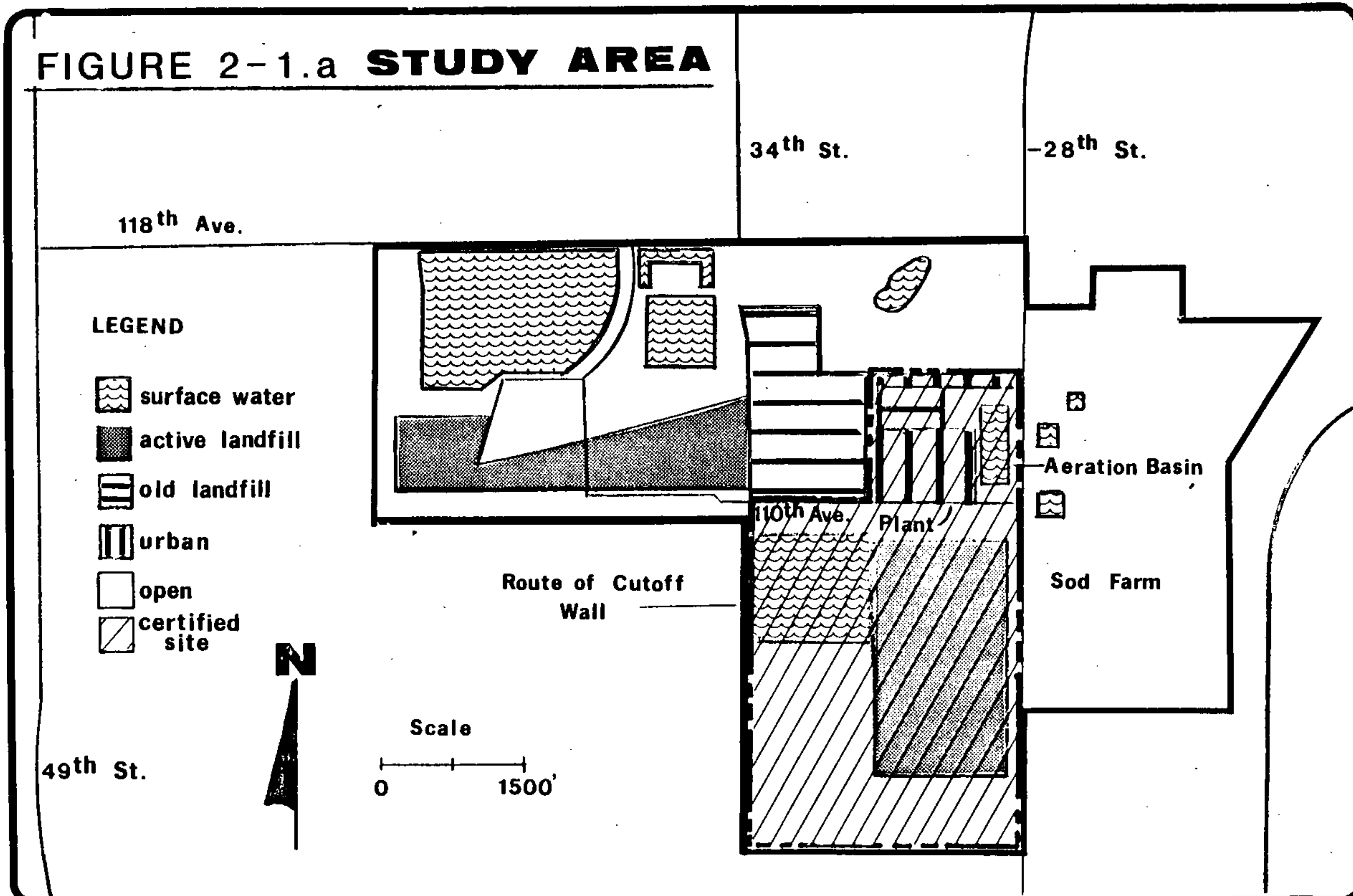
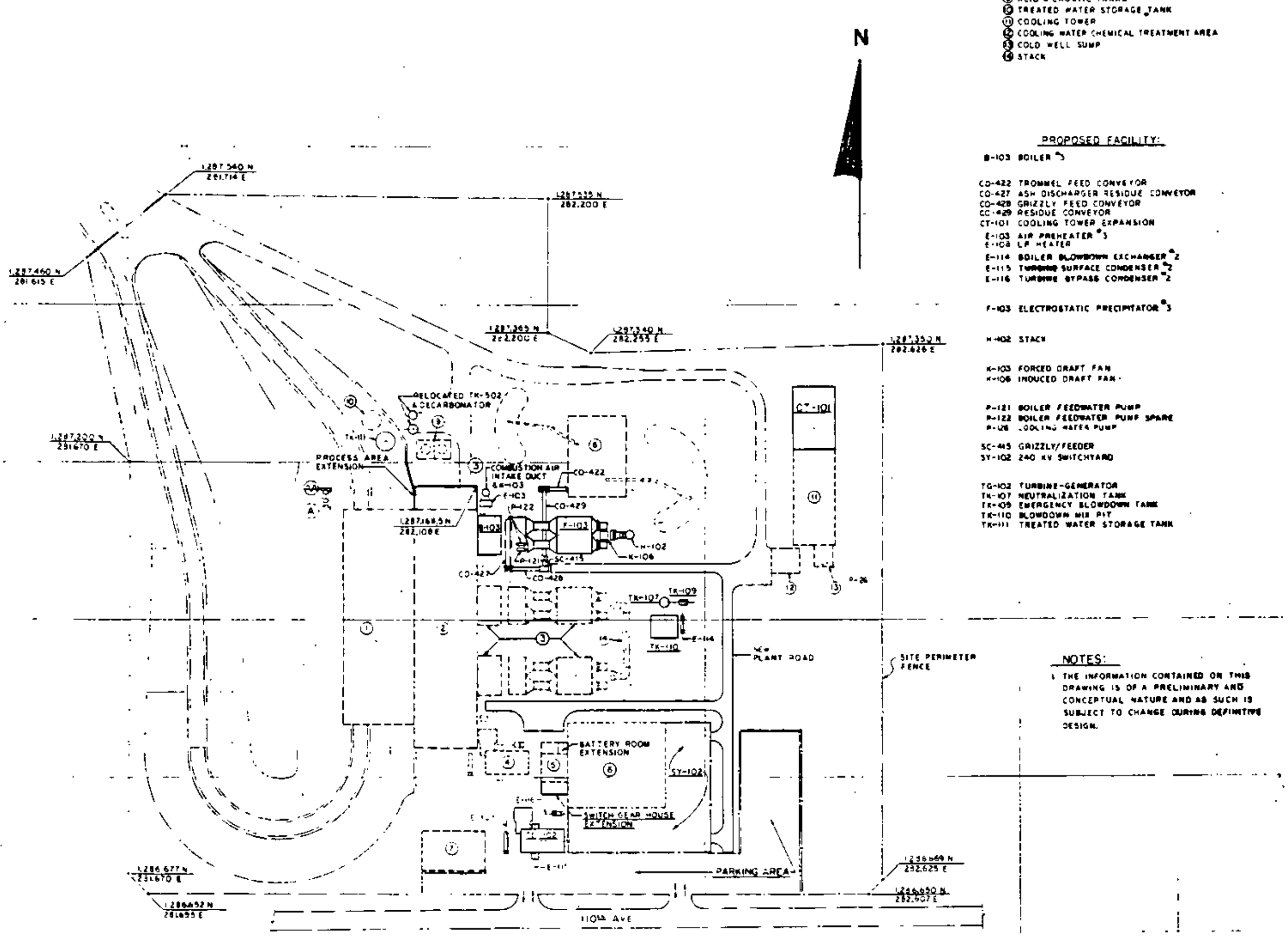


FIGURE 2.1.b

PLANT SITE LAYOUT



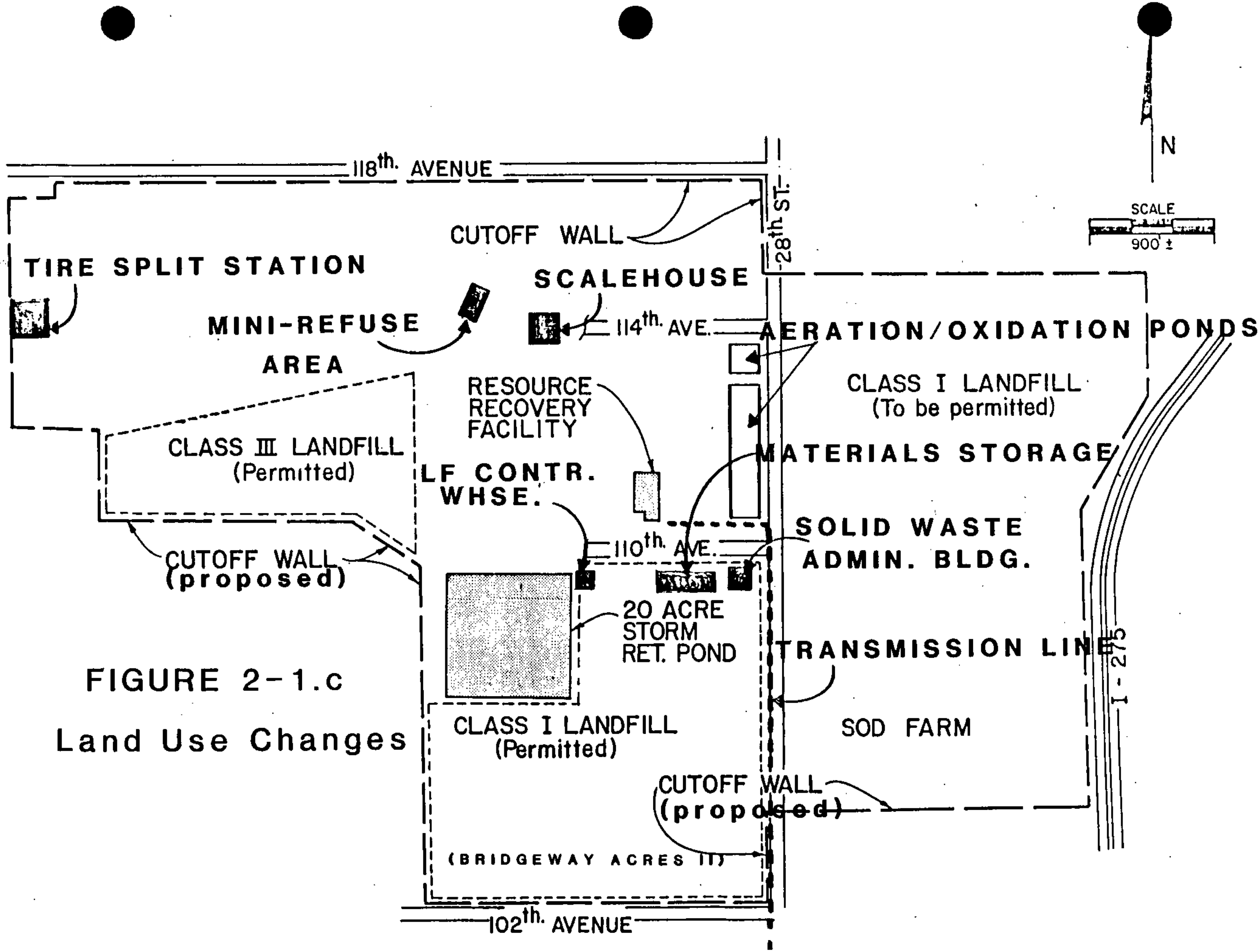


FIGURE 2-1.c

Land Use Changes

*2.1.2 Site Modifications

No new lands are to be added to the certified site in this application. No new roads, transmission lines, pipelines, drainage structures, or landfills are proposed. The County currently owns, or will soon acquire, approximately 460 acres of land surrounding the 240 acre certified site.

*2.1.3 Existing and Proposed Uses

Existing land uses are discussed in Section 2.1.1. The ultimate intent of Pinellas County is to propose to append all adjacent non-certified lands (approximately 460 acres maximum) into the power plant site. **This will be accomplished in another application to be submitted in the future.**

The proposed land uses in the certified 240 acre site have changed little from that specified in the original application. Class I and boiler residue landfilling have commenced at the Bridgeway Acres II site. The 20 acre stormwater holding pond is in place and will serve as the primary storage facility. The aeration and oxidation ponds have been installed as shown, however, hyacinths were not introduced, as discussed in Section 2.5.

One notable change in proposed land use from the original application is that land spraying of stormwater and effluent from the aeration-oxidation pond system will be limited to the aesthetic berms which surround the certified site; alternative spray sites are those lands to the northwest of the plant, as recognized in the Conditions of Certification (COC) for the existing plant. A reduction in spray volume has resulted, primarily, from the cessation of landfilling beneath the natural ground water table with a resultant elimination of dewater discharges to the aeration basin.

*2.1.3.a **Alternative Land Use Proposals Being Considered as Part of a Future Power Plant Site Expansion:**

As stated above, the County will ultimately propose to append adjacent lands to the certified power plant site. This serves the following purposes:

1. Reserves additional lands for landfilling well beyond the designated life of the plant and/or, in case of emergency plant shutdown, provides reserve landfill capacity.

2. Provides a land buffer around the RRF.

3. Facilitates the long term management of surface and ground water quality at the RRF.

4. Facilitates stormwater management at the RRF.

5. Provides land area for additional pollution control and recovery operations, as detailed below.

The lands east of the certified site, known as the Sod Farm, would be proposed as the primary solid waste and boiler residue landfill once the 160 acre Bridgeway Acres II site is filled. This would not occur until after the turn of the century if the proposed third boiler is constructed. Earlier this year, the County received approval of an Exceptional Use Permit for this purpose by the City of St. Petersburg Environmental Development Commission.

This same land expansion proposal would also include the permitted Class III landfill located west of the certified site and, at a maximum, the open lands north of the 10,000 "bird line" associated with the St. Petersburg-Clearwater airport. The Class III landfill would continue to receive yard trash and rubbish until its completion; at that time, Class III disposal would shift to the sod farm landfill. The open lands north of the "bird line" would be reserved for construction debris disposal and spray irrigation.

Another ultimate land usage being contemplated centers on the comprehensive disposal of landfill gases, domestic sewage sludge, and grease. Pinellas County has assumed responsibility to extract landfill gas from the Toytown, Bridgeway Acres (I and II) and any future sod farm landfills. The purpose of this project would be to control gas migration and odor, and to recover energy. Under this proposal all extracted landfill gas would be pumped to central flaring area, tentatively sited just north of the power plant and 114th Avenue (see Figure 2-1.c). In this same general area a domestic sewage sludge and grease receiving and holding area may be constructed. If this project is feasible, the gas would be used to fire a combination incinerator to combust a sludge-grease emulsion. If, after incinerator fuel needs are met and if excess landfill gas were available, a package boiler, using the gas as fuel, would be installed. Steam produced in this manner could be used to help power the existing and proposed turbine-generators. If negotiations with the plant operator for using the steam in this manner were not successful, the County would consider using the excess gas to fire internal combustion engine-driven generators to provide electrical capacity above that produced by the existing and proposed turbine-generators. In any case, the flaring hardware would always be maintained as a backup gas disposal alternative.

2.2 Changes in Regional Demography, Land and Water Use

Pinellas County continues to be one of the most densely populated of all Florida Counties. Since submittal of the original PPSC application in 1978, the four cities adjacent to the site (St. Petersburg, Largo, Pinellas Park and Kenneth City) have all increased their boundaries by annexation. Those increases that are within a five-mile radius of the Facility are indicated in Figure 2-2. The resident populations (1970 and 1980 census) for the above cities and for the rest of the County are listed in Table 2-1. Figure 1-1 shows solid waste generation projected through 2001.

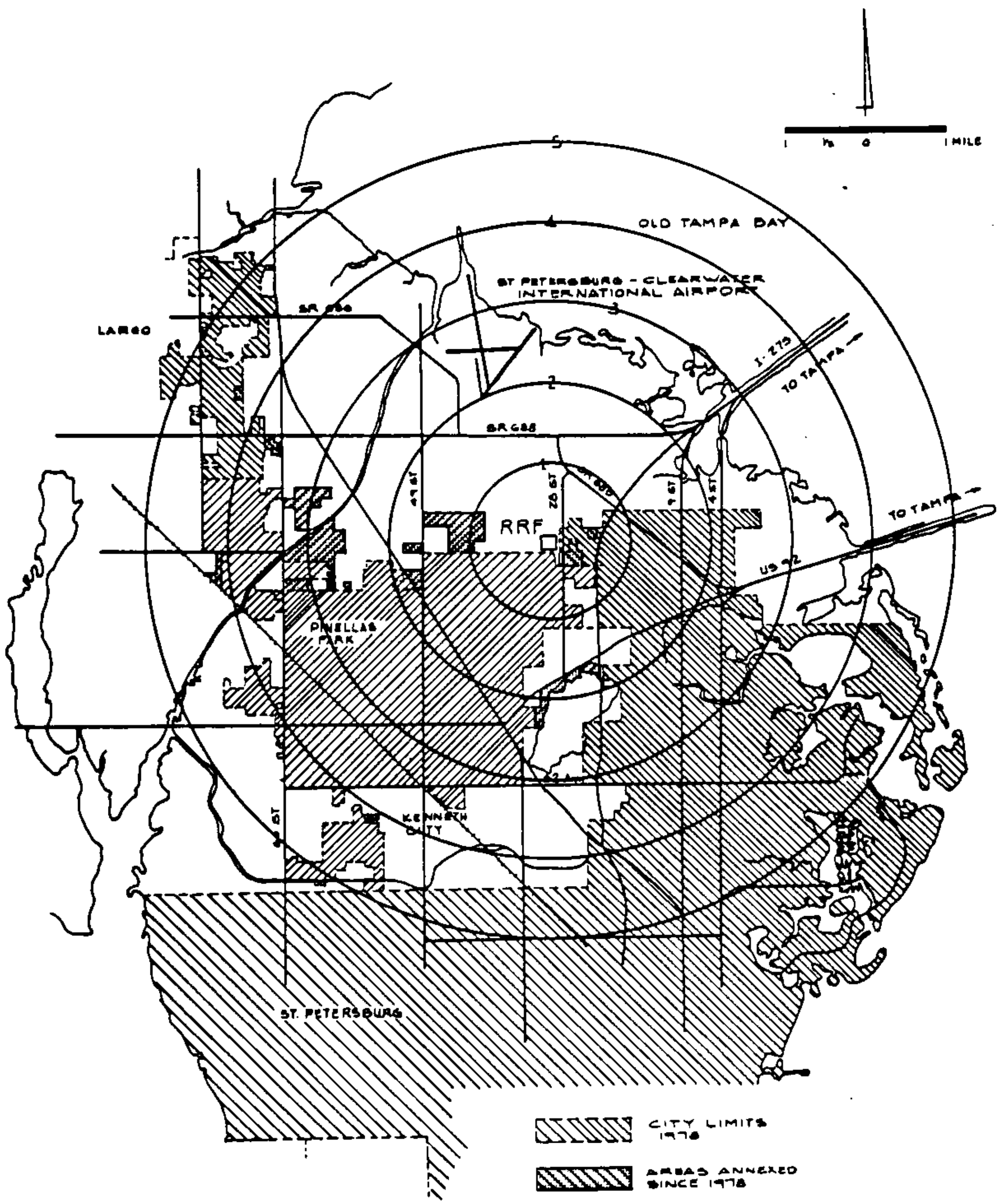
The present and projected land use within the five-mile radius is essentially the same as it was previously. The one notable change is the area within about two miles of the site which is becoming more industrialized; this change is reflected in the latest land use and zoning plans prepared by the County and the various municipalities. Figures 2-3 and 2-4 show the changes in the zoning between the original application and the present.

*The COC for the original application recommended actions on three parcels of land on and adjacent to the certified site. These issues were resolved as follows:

1. The 5 acre parcel zoned C-2 and located south of the plant and west of 28th Street was omitted from the certified site description.

2. The majority of the 160 acre portion of the certified site which was zoned M-1 was rezoned, by special ordinance, to IH, heavy industrial. This designation permits, among other things, solid waste landfills. A small portion of this tract, located in the southwest corner and nearest the residential area, was rezoned as P, public. This designation allows for the disposal of boiler residue only (see Figure 2-4).

3. Attempts by Pinellas County to implement the recommendations of the Department concerning zoning and



ANNEXATION CHANGES

FIGURE 2-2

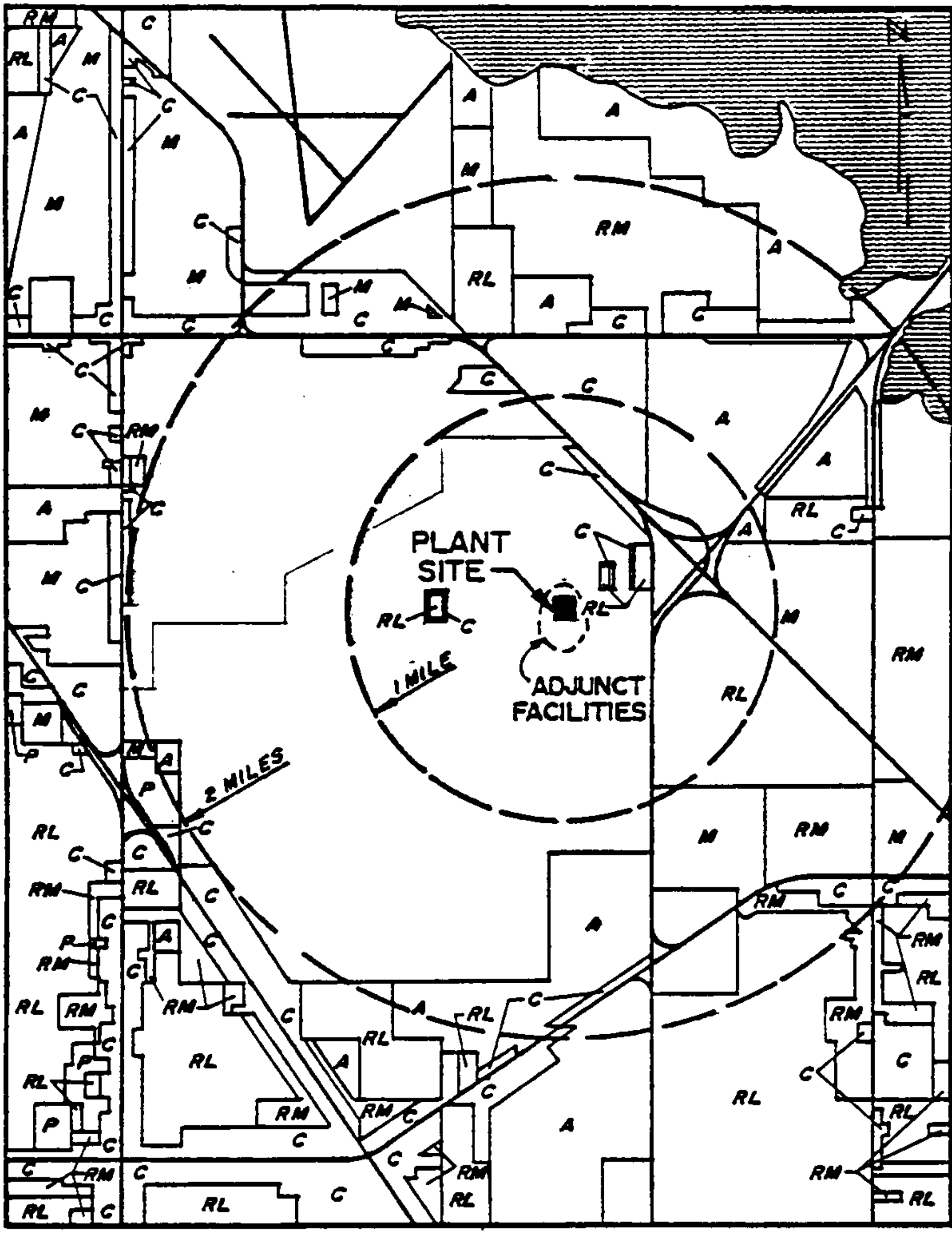
Table 2-1

Pinellas County, Florida

1970 and 1980 Census Counts

	Resident Populations		
	1970	1980	Percent Change
Belleair	2,962	3,673	24.0
Belleair Beach	952	1,643	72.6
Belleair Bluffs	1,910	2,522	32.0
Belleair Shores	124	80	(35.5)
Clearwater	52,074	85,528	64.2
Dunedin	17,639	30,203	71.2
Gulfport	9,976	11,180	12.1
Indian Rocks Beach	2,666	3,717	39.4
Indian Shores	791	981	24.4
Kenneth City	3,862	4,344	12.5
Largo	24,230	58,977	143.4
Madeira Beach	4,177	4,520	8.2
North Redington Beach	768	1,156	50.5
Oldsmar	1,538	2,608	69.6
Pinellas Park	22,287	32,811	47.2
Redington Beach	1,583	1,708	7.9
Redington Shores	1,733	2,142	23.6
Safety Harbor	3,103	6,461	108.2
St. Petersburg	216,159	238,647	10.4
St. Petersburg Beach	8,024	9,354	16.6
Seminole	2,121	4,586	116.2
South Pasadena	2,465	4,188	69.9
Tarpon Springs	7,118	13,251	86.2
Treasure Island	6,120	6,316	3.2
Total Incorporated	394,382	530,599	34.5
Total Unincorporated	127,947	197,932	54.7
Total County	522,329	728,531	39.5

Source: U.S. Department of Commerce, Bureau of the Census, 1980 Census of Population and Housing - Florida, Advanced Reports (PHC80-V-11).

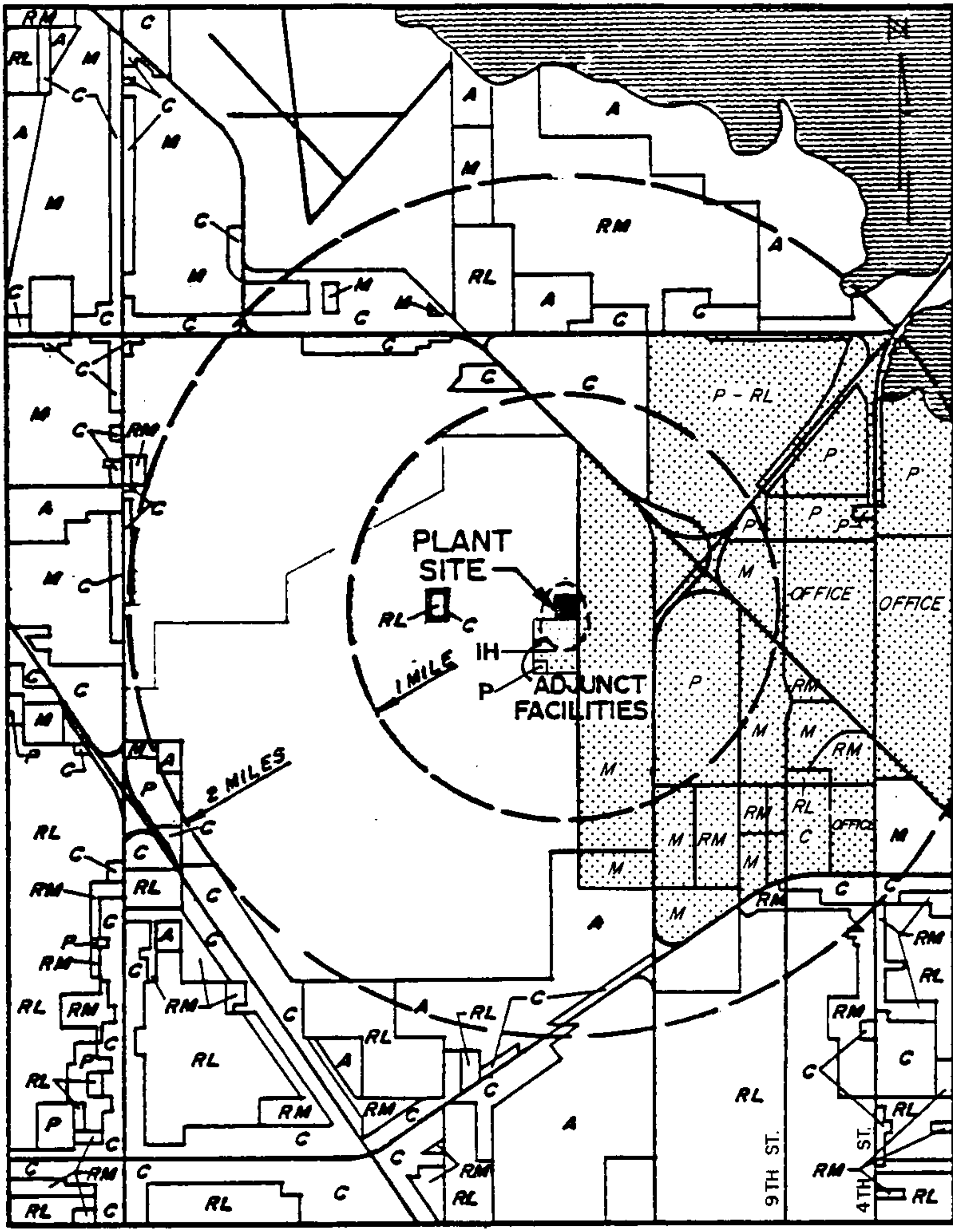


LEGEND

A–AGRICULTURAL C–COMMERCIAL M–MANUFACTURING, INDUSTRIAL
RL– LOW DENSITY RESIDENTIAL RM– MEDIUM DENSITY RESIDENTIAL
P– PUBLIC

ORIGINAL ZONING IN THE STUDY AREA

FIGURE 2-3



LEGEND

A–AGRICULTURAL C–COMMERCIAL M–MANUFACTURING, INDUSTRIAL
RL– LOW DENSITY RESIDENTIAL RM– MEDIUM DENSITY RESIDENTIAL
P– PUBLIC

CHANGES OF ZONING IN STUDY AREA

FIGURE 2-4

development of the tract of land between the western boundary of the site and the Florida Power Company (FPC) right-of-way, were less than successful. Neither the owner, U. S. Home Inc., nor the City of Pinellas Park were willing to rezone the tract; however, they both agreed to provide a buffer zone by constructing a large lake. This effort has the effect of insuring that no residence is located closer than approximately one-half mile from the Plant.

The proposed changes at the RRF will increase non-potable water consumption by 50%. Existing water mains from the St. Petersburg and Largo reclaimed water sources are capable of conveying the added flow. Only a slight increase in potable water consumption is anticipated. This water will still come from the Pinellas County water system.

* As recognized in the COC, the County has acquired a guaranteed supply of non-potable water from the City of St. Petersburg, and potable water from the Pinellas County Water System, both for the life of the plant. Since submittal of the original application, the primary, non-potable supply has been changed to the Largo line, with the St. Petersburg supply now being secondary (see Section 3.4.2). This is due to the better quality now afforded the Largo effluent since the plant upgraded its treatment to a tertiary level. The City of Largo, in an agreement with Pinellas County, Florida, dated May 11, 1982, has guaranteed the delivery of 3,000 gpm (maximum) for a period extending to May 11, 2004.

* An alternative cooling water source also recognized in the COC is stormwater. While the primary purpose of stormwater pumping would be to control surface water levels, there is a considerable portion of the cooling tower demand which could be satisfied in this manner. Investigations into required pretreatment and proposed continuous pumping rates are being finalized now.

Water supply wells within the vicinity of the site boundary are listed in Table 2-2. All wells within a one mile radius are inactive. In any case, no potable water wells exist, or are slated to be permitted.

*2.3 Changes in Historic, Scenic, Cultural and National Landmarks

Literature and field surveys conducted for the original application revealed that the construction and operation of the RRF would not adversely impact any historic, scenic, cultural and national landmarks. Installation of a third boiler on the existing site does not alter these findings.

*2.4 Changes in Site Geology

*2.4.1 There have been no new studies conducted in the study area regarding subterranean geology. As such, the description presented in the original application is unchanged.

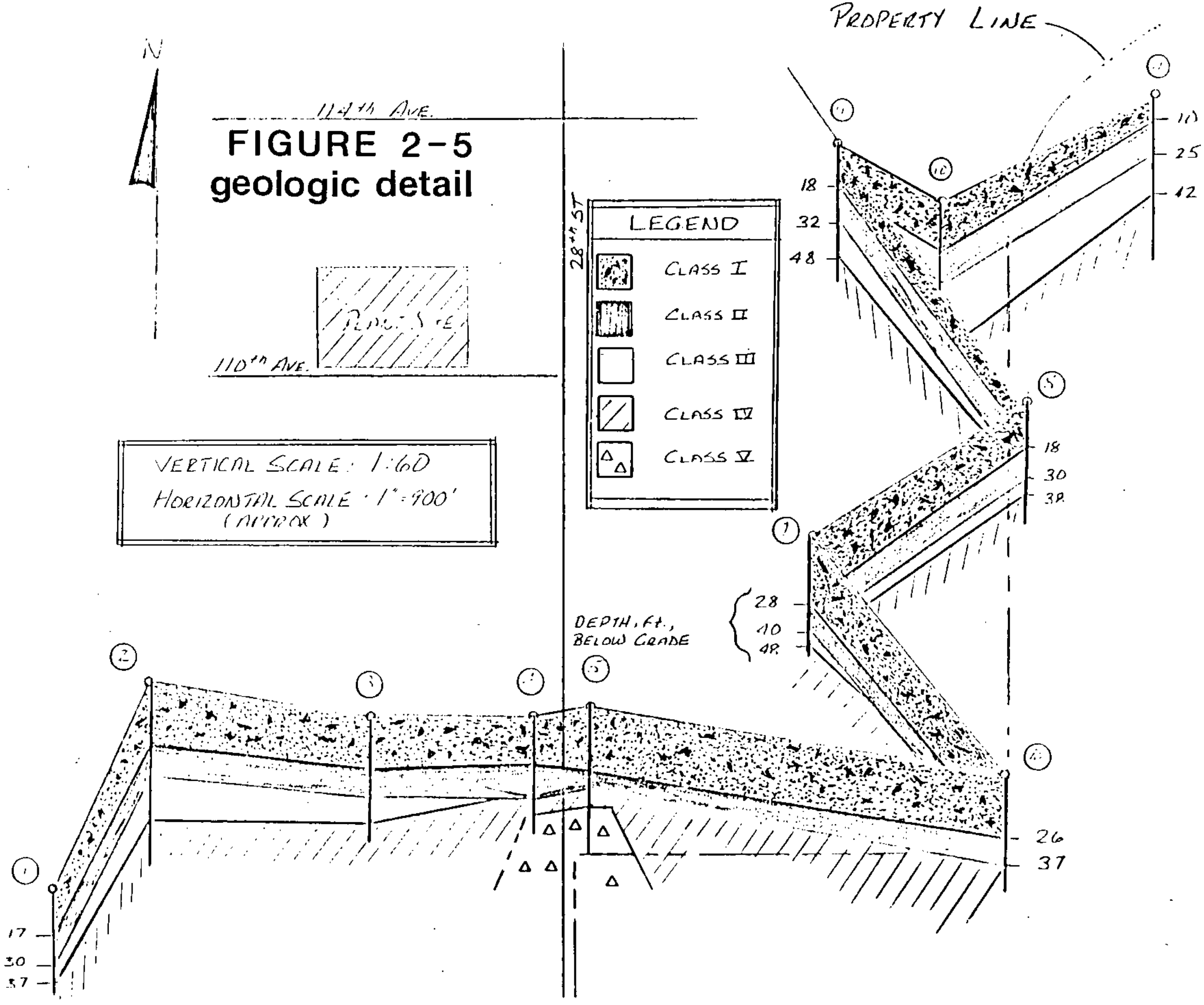
*2.4.2 Site borings have been conducted since the submittal of the original application. They verify the findings of that document. Specifically, site surficial geology is typical of coastal Florida landforms. The upper 10 ft. of soil consists of Plio-Pleistocene sands which grade into marl and clay with increasing depth. Discontinuous shell beds intermixed with fine sand occur between 5 and 15 ft. below grade. The clays form an underlying confining layer which is part of the Hawthorne formation. It contains hard sandstones and sandy clays and is impregnated in some areas with phosphate and chert fragments. Isolated lenses of sand may also be present. The confining layer has an average thickness of 37 ft.; a vertical permeability of less than 0.10 ft./yr. is typical. Beneath the Hawthorne formation lies the Tampa limestone, a hard sandy layer of lower Miocene Age. This limestone has an average thickness of 125 ft. A fence diagram based on the most recent borings at the site is featured in Figure 2-5; the physical characteristics of each of the

TABLE 2-2

WATER SUPPLY WELLS IN THE VICINITY OF THE SITE

LOCATION	EXPOSED DEPTH	SIZE	CASING LENGTH	OWNER
12099-44th St., N. Inactive	115 3/4' - 201'	4" 75 gpm	115 3/4'	M. Prusan
12295 Automobile Dr. (46th St.) Inactive	200'	3" 100 gpm	200' (?)	Mears Ind. Complex
118th Ave. N. 44th St.	201'	3" 40 gpd	99'	N & B Properties
13155 40th St. July, 1974 Active (Outside)	-	2" Nom.	-	Rebel Int.
June, 1974 126th Ave. & 44 St. Active (Outside)	101' - 127'	4" 70 gpm	100	Small World
12175 46th St. N. Inactive	-	-	-	Rich N Mix

FIGURE 2-5
geologic detail



respective layers shown in that figure are summarized in Table 2-3.

*2.5 Changes in Site Hydrology

The drainage patterns off the site boundary have remained much the same. On-site drainage has been altered due to the construction of the plant and appurtenances. The existing on-site drainage system is depicted in Figure 2-6. The major discharge point to waters of the state from the site is situated near the southwest corner of the intersection of 110th Ave. and 28th St. The discharge structure is a concrete spillway. The proposed stormwater management system being designed features the utilization of stormwater as make-up supply to the plant cooling towers. Water will be pumped from the 20 acre holding pond (see Figure 2-6) into the pretreatment units. Based on current estimates, approximately 25% of the three boiler plants' makeup requirements can be met in this manner while maintaining a desirable freeboard in the holding pond and, consequently, at the discharge spillway.

Drainage of closed and active landfill cells is accomplished through a system of interceptor berms which convey the flow to drainage inlets and pipes. The berms ring the perimeter of the final landfill elevation; the land surface is sloped and vegetated so that stormwater is conveyed to shallow swales located inside the berm. From there the water flows to drop inlets and down buried corrugated metal pipes where it is discharged into the drainage ditches which surround each landfill cell. By maintaining positive downstream discharge, the majority of water falling on the tops of closed cells will run off thereby minimizing leachate production.

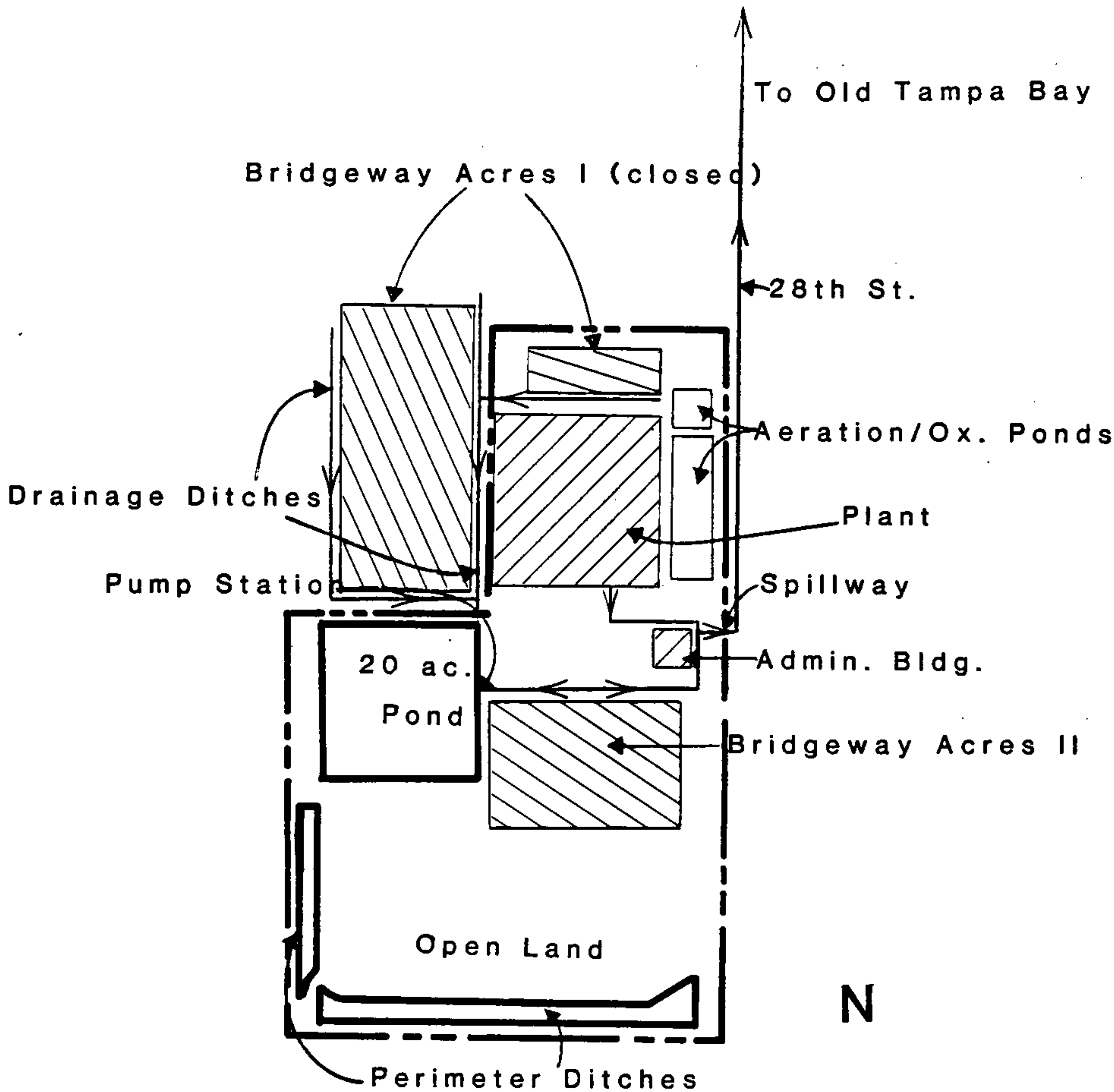
All runoff from the plant site, the County's Solid Waste Administration Building, the Materials Storage Building, Mini-Refuse area, and scalehouses is conveyed to the 20 acre holding pond. In the open lands south of the active Bridgeway

TABLE 2-3

GENERALIZED SOIL STRATIGRAPHY

CLASS	DESCRIPTION OF SOIL HORIZONS AND PERMEABILITY (cm/sec)
I	Loose to medium dense brown, tan, and grey brown fine sand with variable silt; clay and shell fragments......$1x10^{-3}$
II	Very soft to stiff light green calcareous clayey silt with small white cemented fragments and variable sand content......$1x10^{-5}$
III	Medium dense to dense green-grey to green clayey fine sand with clay and sand lenses......$1x10^{-4}$
IV	Firm to hard cemented green sandy clay to clay......$1x10^{-7}$
V	Very soft to hard cream colored sandy to clayey limestone......?

FIGURE 2-6
Site Drainage



Acres II landfill, runoff drains by overland flow to wet weather ponds and perimeter ditches (Figure 2-6).

Ground Water - Hydrogeologic data collected since original application submittal supports the information provided in that document. A surficial aquifer exists above the confining layer within the sand and marl layers. Water yields are low from this aquifer; wells tapping it provide less than 5 gpm of flow. Within the Tampa limestone exists the artesian Floridan aquifer. The potentiometric surface of this aquifer varies seasonally from 2.0 to 5.0 ft. above mean sea level; highest potentials occur in late summer and early autumn and coincide with the end of the rainy season. The water level in the surficial aquifer also fluctuates directly with rainfall. It varies in elevation above mean sea level from 8.0 to 13.0 ft. During as much as seven months of the year the water table is at or near grade in open lands.

Ground water flow velocity and direction are controlled by differences in water table elevations. Discharge areas are located wherever surface excavations exceed the depth to the water table. Based on vertically weighted permeability value of 274 ft/yr (derived from borings), the average horizontal flow velocity beneath the site is 1.41 ft/yr. This is based on a worst case hydraulic head of 1.55×10^{-3} ft/ft observed at the site. As you approach a discharge area, such as a canal, the flow accelerates due to the increase in hydraulic gradient. A velocity value of 20 ft/yr. is typical here. Vertical flow velocity through the confining layer is estimated at .31 ft/yr. This flow rate will depend on the differences in elevation between the potentiometric surface in the Florida aquifer and the water table elevation in the shallow aquifer.

Using the horizontal and vertical velocity components derived above, a two dimensional velocity of 1.46 ft./yr. in a direction 9.6 degrees below grade is calculated. Based on this, it is concluded that ground water flow follows a nearly horizontal path.

* 2.5.1 Affected Waters

Under heavy rainfall and wet ambient conditions, stormwater runoff from the site drainage system discharges into a ditch which runs along the west side of 28th Street. The ditch is heavily vegetated by the water-fern *Azolla* sp.; side banks are covered by cattails (*Typha* sp.). This ditch eventually enters the highway drainage system for Roosevelt Boulevard where it ultimately flows through mangrove tidal lands into Old Tampa Bay. Under existing drainage conditions no significant effect on ditch flora over background conditions has been observed.

Impacts on affected water quality due to construction of the proposed third boiler would be limited to turbidity increases. However, these will be mitigated by employing best management practices for construction (see Chapter 4).

The alternative stormwater management technique now being designed features its collection and use as cooling water. By maintaining a desirable static freeboard in the 20 acre holding pond, discharges to the 28th Street ditch would occur only during extreme meteorologic conditions. In such cases, water quality impacts would be minimal, due to dilution.

*2.5.2 Water Withdrawals

No on-site water withdrawls are required or proposed. Dewatering for foundation work will be minimal, if required.

*2.5.3 Affected Tributaries

See Section 2.5.1.

*2.5.4 Background Characteristics

Background water quality data for the site was forwarded to the

Department in March 1983. These data, submitted in compliance with the COC are summarized in Table 2-4. The wells used in this evaluation are featured in Figure 2-7.

Under the ground water rule amendments promulgated this past January the surficial unconfined aquifer beneath the power plant site is classified as G-II (potable water use). As such, the primary and secondary drinking water standards for public systems must be met in addition to the minimum criteria ("free froms") stated in Chapter 17-3.402 (FAC). The data compiled by the U.S.G.S. at the site and adjacent areas over the past decade (Table 2-4) indicate that the actual quality of underlying ground water does not meet the above criteria. This untoward quality is not limited to waters beneath the site proper but also encompasses adjacent off-site areas located up hydrologic grade in residential zones.

The causes of this situation are difficult to ascertain, but an historical note here is appropriate. At least seventy-five years ago, before Pinellas County became a separate governmental body (from Hillsborough County), the low-lying, flood prone Pinellas peninsula became a regional dump site. As the area became more populated the dumping became concentrated into specific areas, including the current plant site. As such, existing water quality in the surface aquifer is, in part, the product of abuses initiated before the County began managed landfill operations at the current location. The severity of contamination varies with location and with the parameter in question. From Table 2-4 it is observed that Iron, Coliform, Turbidity and Color standards are exceeded in virtually all samples at all sites. Minimum pH values are also routinely violated. Nitrate concentrations are very high in sod farm wells. In addition certain wells show occasional trace metal values which exceed those for G-II waters.

*2.5.5 Natural Variation of Waters

Surface water and surficial aquifer water levels vary according to

TABLE 2-4

PARAMETER[1]	1° & 2° DRINKING WATER STANDARDS	GROUNDWATER C3 MEAN	C3 MAX	13 MEAN	13 MAX	O3 MEAN	O3 MAX	LF18 MEAN	LF18 MAX	LF30 MEAN	LF30 MAX	63S MEAN	63S MAX	SF26 MEAN	SF26 MAX	54D MEAN	54D MAX	54S MEAN	54S MAX	55D MEAN	55D MAX
Zn	5	.018	.02	.041	.1	.024	.04	.055	.15	.065	.1	.058	.12	.049	.15	.0551	.15	.06	.15	.03	.07
SO_4	250	6.8	18	—		—		9.3	16	—		—		—		—		—		—	
pH[2]	6.5	6.8	6.15	6.85	6.28	6.88	6.3	6.81	6.08	7.31	7.1	—		7.2	6.3	7.5	6.7	7.4	6.4	7.4	7.0
Fe	.3	4.78	6.8	.556	7.0	5.06	8.7	4.34	14	7	10	2.84	18	6.1	7.8	2.56	4.4	2.16	9.6	2.1	2.2
Cu	1	.0017	.005	.005	.004	.009	.004	.008	.065	.0073	.01	—		.014	.041	.027	.045	.039	.8	.0023	.004
Color[3]	15	5	5	—		—		50	50	—		63.3	100	119	150	10.8	20	46	85	5.5	10
Cl	250	181.5	260	162	330	133.6	210	232	450	6.2	6.9	155	230	214	280	190	210	151	233	200	250
As	.05	.0041	.009	.0074	.01	.0087	.02	.0049	.008	.003	.004	.0056	.042	.008	.011	.002	.006	.0023	.007	.0015	.002
Cd	.01	.0024	.012	.0105	.054	.0024	.008	.0033	.027	.00033	.001	.0008	.009	.0004	.002	.0007	.002	.0007	.004	.0003	.001
Cr	.05	.014	.03	.019	.032	.0166	.03	.017	.03	.02	.02	.019	.03	.014	.02	.011	.02	.015	.03	.0009	.001
Pb	.05	.0046	.023	.00567	.018	.0036	.01	.017	.069	.0037	.007	.046	.17	.02	.042	.05	.16	.025	.08	.005	.005
Hg	.002	.0003	.0005	.00036	.0006	.0012	.006	.00043	.001	.0005	.005	.00016	.0018	.0002	.0007	.0002	.0006	.0002	.0007	.0011	.0011
Se	.01	.0006	.001	.0004	.001	.0004	.001	.0003	.001	—		—		—		—		—		—	
Ag	.05	.0004	.002	.0004	.002	.0005	.002	.0025	.001	—		—		—		—		—		—	
Na	160	107.7	160	205.3	320	89	120	87.8	280	4.9	5.5	72	120	147	160	64.2	120	103.3	130	77	78
NO_3-N	0	.02	.11	.015	.05	.12	.07	.006	.02	.37	1.1	99.1	300	.071	32	2.1	8	.251	126	.01	.04
Turbidity[4]	1 - MONTHLY 5 - 2-DAY	38.1	80	29	60	39.8	110	46	100	55	65	—		—		—		—		—	
Coliform (MPN)	1/100 ml 4/100 ml	4 (MF)	4 (MF)	—		—		1154	4600	—		1753	5000	182	2300	234	2400	263	9300	46	46

PARAMETER[1]	GROUNDWATER 55S MEAN	55S MAX	56 MEAN	56 MAX	57 MEAN	57 MAX	58 MEAN	58 MAX	60 MEAN	60 MAX	61 MEAN	61 MAX	62 MEAN	62 MAX	66 MEAN	66 MAX	64 MEAN	64 MAX	RAW LEACHATE MEAN	RAW LEACHATE MAX	SURFACE WATER AERATION POND MEAN	AERATION POND MAX
Zn	.018	.03	.054	.25	.144	.99	.051	.13	.062	.23	.075	.13	.032	.06	.028	.06	.057	.16	.373	.79	.2	.55
SO_4	—		—		—		—		—		—		—		—		—		—		47	47
pH[2]	7.2	6.9	7.4	6.7	7.5	6.6	7.2	6.4	7.5	6.7	7.4	7.1	7.1	6.5	7.3	6.1	7.3	6.5	6.87	6.2	8.2	6.99
Fe	2.6	4.0	4.9	8.1	15	110	5.7	28	4.96	49	6.4	6.8	5.3	11	3.78	9.4	6.66	36	58	35	1.94	5.7
Cu	.0038	.006	.021	.07	.099	.8	.072	.055	.028	.130	.029	.047	.008	.017	.0099	.022	.023	.126	.0247	.066	.0036	.006
Color[3]	32.5	200	77.5	150	42.5	100	46.7	60	58.3	90	45	40	15	20	32	64	20	122	—		0	0
Cl	79.1	124	81	200	43.1	59	52.8	110	159.2	210	193	250	61.3	90	34.2	63	[illegible]	280	108	130	120	200
As	.0015	.002	.005	.007	.009	.058	.0058	.013	.0075	.036	.0035	.005	.0038	.009	.0099	.016	.0034	.006	.0253	.061	.0053	.008
Cd	.0003	.001	.0012	.004	.0019	.015	.0004	.002	.002	.007	0	.00	.0005	.002	.0003	.001	.001	.003	.0027	.004	.00133	.002
Cr	.0008	.002	.012	.03	.054	.34	.005	.01	.036	.20	0	0	.025	.04	.02	.05	.016	.02	2	35	.0333	.06
Pb	.0058	.015	.041	.14	.071	.32	.02	.085	.045	.100	.9	.233	.016	.021	.016	.03	.039	.12	.036	.097	.00567	.09
Hg	.0003	.0005	.0002	.0005	.0002	.0009	.0001	.0005	.0020	.0004	—		.0006	.0021	.0002	.0006	.0005	.0012	.00054	.001	.000667	.001
Se	—		—		—		—		—		—		—		—		—		.022	.022	.001	.001
Ag	—		—		—		—		—		—		—		—		—		0	0	.000667	.002
Na	30.7	50	21.3	30	26.1	31	25.6	45	84.7	110	45	45	37.2	50	14.5	26	46.2	126	98.3	160	90	140
NO_3-N	.01	.02	.02	.11	.06	.19	7.3	84	.03	.19	0	0	.01	.03	.38	4.4	93.7	150	.41	.8	.04	.15
Turbidity[4]	—		—		—		—		—		—		—		—		—		5712	11000	47	130
Coliform (MPN)	6001	28000	26	150	1226	11000	4123	46000	2597	35300	420	790	598	4600	9417	24000	9968	46000	1.32 × 10[illegible]	2.9 × 10[illegible]	575 000 TCAL	2 × 10[illegible]

1 ALL IN MG/L UNLESS NOTED
2 pH UNITS
3 Pt-Co UNITS
4 NTU

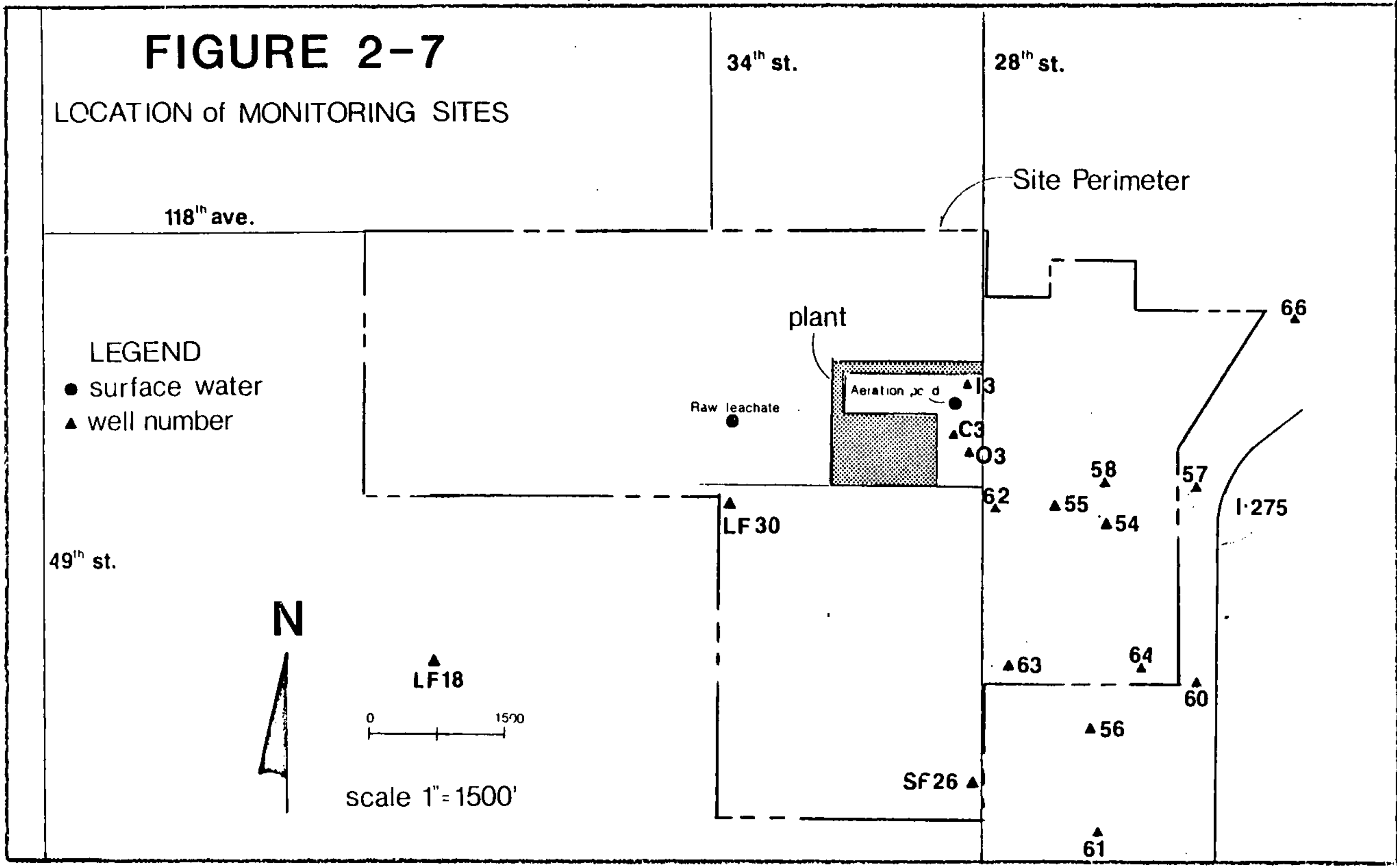


FIGURE 2-7

LOCATION of MONITORING SITES

the seasonal precipitation pattern in the Tampa Bay region. The potentiometric surface of the underlying confining layer also follows rainfall, but with a more obvious time lag. In all cases, highest levels occur at the end of the rainy season in October; lowest elevations generally occur in May. It is virtually impossible to differentiate surface water and surficial aquifer levels at the site as they are intimately connected. Factors influencing elevations in this hydrologic setting are the rate of discharge (surface and subsurface) to Old Tampa Bay, rate of offsite pumping, potentiometric surface in the Floridan aquifer (which controls vertical leakage through the confining layer), tidal cycles, and evapotranspiration.

*2.5.6 Ground Water

(See Section 2.5, Ground Water)

2.6 Meteorology

No change from original application.

*2.7 Ecology

Changes in the site ecology have occurred primarily at the plant site, the land just south of 110th Avenue, and that portion of the Bridgeway Acres II landfill currently used for solid waste disposal.

The area within the battery limits of the plant has been transformed from mixed pine flatwood and disturbed lands into urban types. Vegetation here is composed exclusively of landscape plantings around buildings and parking areas. This same situation has occurred along the south side of 110th Avenue where the County's Solid Waste Administration Building now stands and the Material Storage Building is being constructed. Just west of the Material Storage Bulding site, but east of the stormwater holding pond, is the staging area for construction of the proposed third boiler. Each of these areas offers little value as wildlife habitat. Approximately 18 acres of the certified Bridgeway Acres II landfill has now been used for that purpose. The remaining lands are still covered by pine flatwood and wet-weather pond communities.

*2.7.1 Important Species

Since startup of the RRF, landfilling of putrescible solid waste at Bridgeway Acres II has been limited. A very visible result of this is the drastic reduction in gulls at the site. When, on occasion, Class I materials are diverted to the landfill, some gulls do arrive; but not in the concentrations noted before the plant became operational. The predominant bird species now observed at the site is the crow (Corvus sp.). Wading birds (Ardeidae) are common in the stormwater holding pond and perimeter ditches. Unidentified species of broad-winged hawks have also been observed.

In general, surface waters at the site are eutrophic. Cattail (Typha sp.) dominate the shorelines of ponds, lakes, and ditches; approximately 60% of all surface waters are covered by water-fern (Azolla caroliniana). Shallow ponds are well mixed all year. Surface water ecosystems, including the existing oxidation ponds, support a diverse wildlife population, notably sunfishes (Centrarchidae), wading birds (Ardeidae), and alligators (Alligator mississippiensis).

Open lands consist of pine flatwood communities dominated by slash pine (Pinus elliottii), palmetto (Serenoa repens), and wiregrass (Aristida stricta). In areas disturbed by man's activities the exotic Brazilian pepper (Schinus terebinthifolius) forms dense thickets.

*2.7.2. Abundance of Organisms

With the exception of the gull situation, no changes have been observed.

*2.7.3 Pre-existing Stresses

The entire certified site, and most adjacent lands, have been subjected to varying degrees of man-induced stresses. These range from wholesale land alterations due to landfilling and plant construction, to the lowering of the water table in pine flatwoods and wet-weather ponds due to excavations and drainage improvements.

2.8 Ambient Air

Appendices I through VI detail all aspects of ambient air quality at the site and in the localized area.

The COC for the existing plant recognize the potential for localized air pollution due to building downwash. To monitor these effects, the Pinellas County Department of Environmental Management (DEM) has installed and is obtaining data from an SO_2 monitor situated in a "worst case" setting, several hundred yards downwind from, and in the wake of, the plant building. Since plant operations commenced in May, 1983, over 2100 hourly samples have been taken (for methods, see Chapter 6). The mean SO_2 concentration reported is 3.6 ppb with a maximum of 130 ppb., corresponding to a 1 hour high of 342 ug/m^3.

CHAPTER 3
THE PLANT

3.0 The Plant

The expansion features a third Martin combustion unit capable of handling 1,050 tpd of solid waste at 5,000 Btu/#. An additional cell will be added to the cooling tower system and a 29 MW (gross) turbine-generator will be installed adjacent to, and will be cross-linked with, the existing one. A new 161 ft. stack will be constructed just north of the one present. There will be minimal changes to other parts of the facility as needed by the third unit.

3.1 Changes in External Appearance

Figure 2-1.b shows a plot plan with the changes as planned for the facility. The visible changes include the second stack, an additional turbine-generator, the expanded cooling tower, and the boiler house. Figure 2-1.c shows the construction that has taken place since the original application was submitted.

3.2 Fuel

Solid waste projections are shown on Figure 1-1. The facility will be capable of handling up to 22,050 tons of solid waste per week, an increase of 7,350 tons. The third unit will allow for higher available capacity during times of maintenance or other unit shutdown. ?

Class II ? Based on operations at the existing RRF, the average composition of incoming solid waste to the plant is 85% Class I (garbage), 5% Class III material which is processible, 5% Class III material which is not processible, and 5% construction debris (not requiring DER permit).

*3.3 Plant Water Use Changes

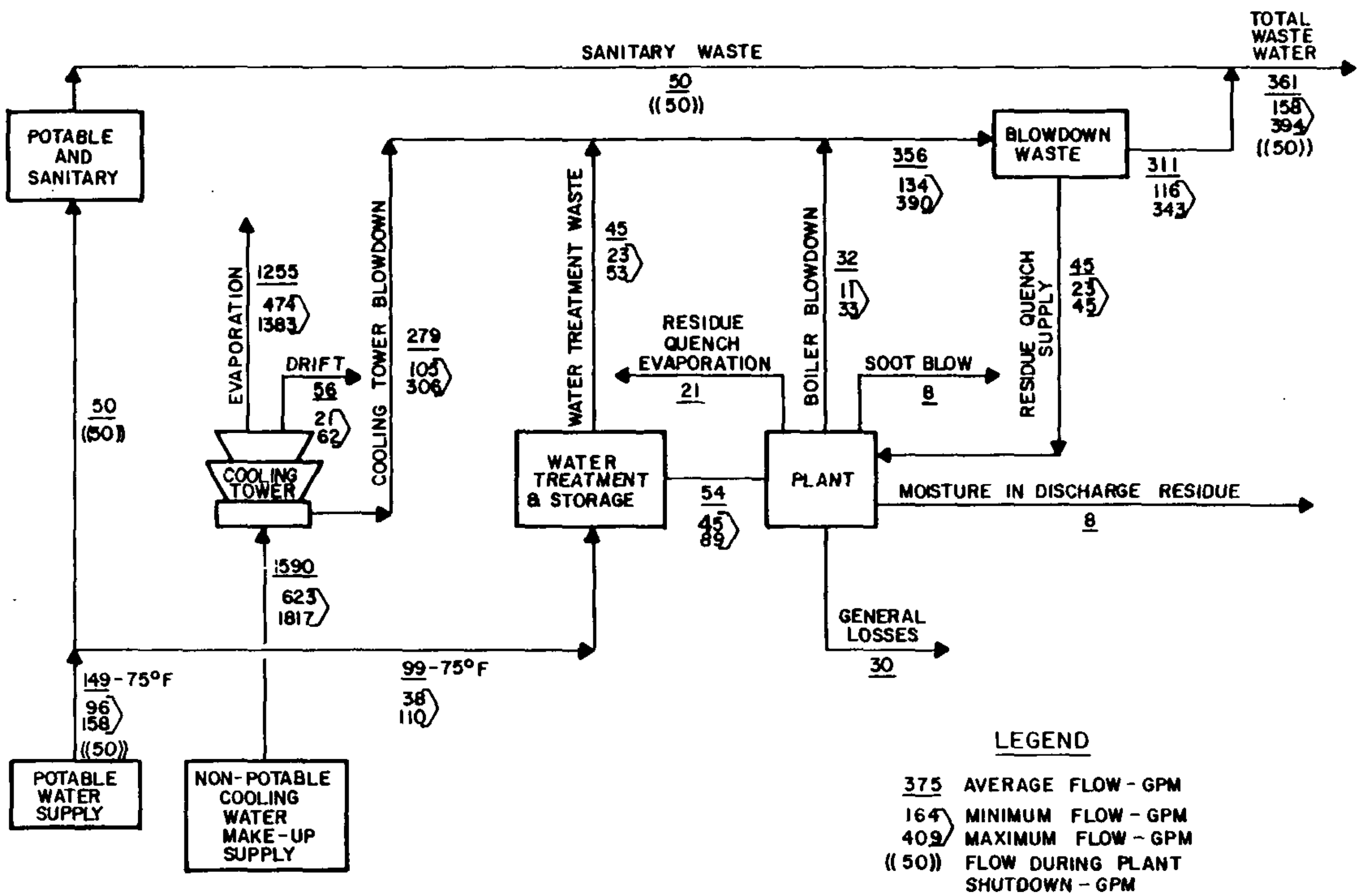
Figure 3-1 presents the revised design water use rates for normal and peak load operation of the facility with the addition of the third unit. The total water to waste is noticeably reduced from that stated in the original application; this is true even with the installation of a third boiler. This situation is due to the use of a better quality Largo supply with a resultant increase in cooling tower recycles.

3.4 Heat Dissipation System Changes

* The electric generating portion of the resource recovery facility will use water cooled condensers to condense the low pressure steam discharged from the turbine. The cooling water will leave the condenser at approximately 110 deg. F. The cooling water will pass through a wet mechanical draft cross-flow cooling tower for the dissipation of the waste heat. The design outlet temperature of the tower to the atmosphere is 86 deg. F with an ambient wet bulb temperature of 79 deg. F.

The flow rate will increase from 33,400 gpm to 50,100 gpm, and the heat rejection load will increase from 450,000,000 BTU/hr to 675,000,000 BTU/hr. Table 3-1 shows the typical analysis of the cooling tower supply waters. A preliminary water quality review of the makeup water potential of stormwater indicates it to be lower in dissolved solids, but high in suspended solids.

The steam production rate for the proposed boiler will be approximately the same as for an existing boiler. The flow rate will be monitored by an in-line Foxboro office plate which goes to a Taylor flow transmitter. The signal is then sent to a Taylor square root extractor which feeds a Taylor continuous recorder. A Taylor totalizer is also on-line.



SUMMARY WATER FLOW DIAGRAM
(BASED ON USING LARGO WATER)

FIGURE 3-1

Table 3-1

Chemical Characteristics of Facility Cooling Water Influent

Chemical Constituent	Potable Supply Pinellas County	Non-Potable Supply 1 Largo STP	Non-Potable Supply 2 St. Pete. NE STP
pH	7.7	7.6	6.9
Total hardness as ppm $CaCO_3$	124	248	412
Calcium hardness as ppm $CaCO_3$	108	232	282
Total Alkalinity as ppm $CaCO_3$	90	270	240
P-Alkalinity as ppm $CaCO_3$	-	0	0
OH-Alkalinity as ppm $CaCO_3$	0	0	0
Total dissolved solids, ppm	20	670	1394
Suspended solids, ppm	10	9	30
Conductivity, micromhos/cm	268	938	2390
Calcium, ppm Ca	43	80	97
Magnesium, ppm Mg	4	6	43
Ferric iron, ppm Fe	.05	.11	.298
Bicarbonate, ppm HCO_3	110	324	293
Carbonate, ppm CO_3	0	0	0
Sulfate, ppm SO_4	0	40	100
Chloride, ppm Cl	26	95	522
Silica, ppm SiO_2	16	19	20
Aluminum, ppm $Si0_2$	.1	.1	.1
Zinc, ppm Zn	.05	.016	.06
Orthophosphate, ppm PO_4	0	3.3	5

*3.4.1 Intake and Outfall

Cooling tower intake and outfall are "hard connected" to the plant. Blowdown from the towers is conveyed to a sump where it is combined with boiler blowdown, demineralizer and reverse osmosis reject waters and ash quench water; it is then discharged to the sanitary sewer. A letter from the receiving wastewater system stating that the sump effluent is acceptable is shown in Appendix VII.

The intake for use of stormwater as cooling tower makeup will be the existing stormwater pumps (150 gpm each) situated at the northeast corner of the 20 acre holding pond (Figure 2-6).

An alternative blowdown sump water disposal method receiving preliminary evaluation at this time is the land application of these waters on tidal wetlands.

3.4.2 Source of Cooling Water

Cooling tower make-up water is now obtained from the City of St. Petersburg Northeast Advanced Wastewater Treatment Plant (AWT). A second source from the City of Largo AWT will ultimately be the primary one and is coming on line at this time. Another source is the storm water runoff from the resource recovery site. Reclaimed quantities available are sufficient to supply the requirements individually. Use of stormwater runoff in the towers would be based on the need to maintain static water levels in on-site detention facilities.

3.4.3 System Design

The quantities of water withdrawn from sources of supply are shown in Figure 3-1. The average potable withdrawal is 149 gpm (maximum = 158 gpm and minimum = 96 gpm). The average non-potable withdrawal is 1590 gpm (maximum = 1817 gpm and minimum = 623 gpm).

The consumptive usage rate for the system is shown in Figure 3-1. The consumptive use of water by the facility is through cooling tower losses in the form of evaporation and drift. The average evaporative loss will be 1255 gpm (minimum = 474 gpm and maximum = 1383 gpm), and the average drift loss will be 56 gpm (minimum = 21 gpm and maximum = 62 gpm).

The location of the cooling towers was shown on the facility layout (Figure 2-1.b). The expanded cooling tower system will consist of a five (5) cell group of Class 600 Marley cross flow towers or approved substitutes. The average blow down rate for the towers is 279 gpm (minimum = 105 gpm and maximum = 306 gpm). The cooling tower blow down will accumulate along with the boiler demineralization back flush water (average flow 45 gpm, minimum = 23 gpm, maximum = 53 gpm), and the boiler blow down water (average flow 32 gpm, minimum = 11 gpm, maximum = 33 gpm) for a total process blow down average flow of 356 gpm (minimum = 134 gpm, maximum = 390 gpm). The water that is used to quench the residue discharged from the boiler grates will be drawn from the process blow down cumulative flow, leaving an average process discharge rate of 311 gpm. Minimum and maximum process flows are 116 gpm and 343 gpm, respectively. Sanitary flow, discharged at a rate of 50 gpm, will be added to the process flow for an average total discharge of 361 gpm (minimum = 158 gpm, maximum = 394 gpm).

The cooling water increases in temperature from 86^{o}F to 110^{o}F in the process of condensing the exhaust steam from the turbine. The water is then cooled by evaporation in the cooling tower. The maximum flow rate through the cooling tower is 56,250 gpm, and the evaporation rate from the tower will average 1255 gpm or approximately 2.2% of the circulation rate. No intake structure is anticipated at this time, since the cooling water will be drawn from a pressurized main which carries non-potable water. The potable water supply will also be drawn from a pressurized main. This plant effluent, with a maximum temperatue of 110° F, will be pumped to the Pinellas Park lift station; from there it will be diluted in the Pinellas County sewage collection and treatment system.

3.4.4 - No change from the original application.

3.4.5 Blowdown and Trash Disposal

Blowdown will be from the boilers, the cooling towers and the demineralizers as described in Section 3.4.3 above. This cumulative flow, less the 45 gpm which goes to quench the residue, is discharged after neutralization and stabilization to the sanitary sewage collection system. *The physical-chemical characteristics of each individual blowdown and reject stream, and the combined effluent is featured in Table 3-2.

3.4.6 Injection Wells

None proposed.

*3.5 Chemical and Biocide Waste

Both anti-corrosion and anti-fouling agents will be used at the facility in the boilers and in the coolng towers. These are listed below:

A. Corrosion Inhibitors

(1) Boiler - Hydrazine-oxygen scavenger. Concentration in the boiler will be maintained at 1.5 ppm.

(2) Cooling Tower - Non-polluting polysilicate/organic polymer-based corrosion inhibitors plus scale and foulant

TABLE 3-2

Characteristics of Blowdown Mixture (Using Largo Supply)

Parameter	Boiler Blowdown			Cooling Tower Blowdown			Demineralizer			R.O. Reject			Combined Effluent		
	Q(gpm)	mg/l	#/Day	Q(gpm)	mg/l	#/Day	Q(gpm)	mg/l	#/Day	Q(gpm)	mg/l	#/Day	Q(gpm)	mg/l	#/Day
Ca	32	0	0	279	400	1340	5	36	2	40	236	113	311*	340	1063
Mg	32	0	0	279	30	101	5	5	1	40	17	8	311	25	80
Na	32	350	135	279	445	1491	5	3398	204	40	248	119	311	456	1197
HCO_3	32	100	38	279	475	1592	5	144	9	40	266	128	311	413	1266
CO_3	32	0	0	279	0	0	5	0	0	40	0	0	311	0	0
SO_4	32	0	0	279	1445	4842	5	6277	377	40	118	57	311	1234	3806
Cl	32	100	38	279	475	1592	5	144	9	40	266	128	311	413	1266
PO_4	32	40	15	279	17	57	5	5	1	40	9	4	311	18	46
TDS	32	800	308	279	3017	10109	5	10194	612	40	1337	642	311	2730	8031
TSS	32	100	38	279	75	251	5	0	0	40	50	24	311	73	203
pH	32	10.5	-	279	7.5	-	5	8.5	-	40	6.5	-	311	7.7	-

* 45 gpm of 356 gpm total flow into sump is recycled as ash quench - combined effluent concentration is based on 356 gpm.

control (Zimmite ZD-300 series or equivalent) (or chemicals under B.).

B. Chemical and Biological Anti-fouling Agent

(1) Boiler - Deposition and caustic corrosion control - sodium Di- and Tri-Phosphates, 10 ppm.

(2) Cooling Tower

Scale and corrosion inhibitor and dispersant-polyester (Nalco 7350, 7351 or equivalent).

Biocide - Shock treatment with chlorine is a routine procedure.

Treatment of blowdowns of these two water systems will be limited to neutralization and stabilization.

*3.6 Sanitary and Other Waste Systems

*3.6.1 Volumes and Quality

Two types of effluents are discharged to the sanitary sewer line: sanitary wastes (50 gpm) and combined blowdown wastes (311 gpm). The quality of the latter stream is shown in Table 3-2.

*3.6.2 Treatment and Disposal

On site treatment of blowdown sump wastewater is limited to neutralization and stabilization. All discharges flow to a lift station located just west of the plant; from this point it is pumped into the Pinellas County Wastewater Collection and Treatment system.

*3.6.3 Solid Wastes

Domestic solid wastes are generated in insignificant quantities at the plant and surrounding buildings. With the third boiler on line, boiler residue will be produced at the plant with the following quality and quantity:

1.	Ferrous metals	133 tpd
2.	Aluminum	14 tpd
3.	Heavy on-ferrous	5 tpd
4.	+10" Iron	18 tpd
5.	Aggregate	683 tpd
6.	2-10" non-magnetic	18 tpd

All domestic solid wastes produced on-site are incinerated at the plant. Non-marketable boiler residue is disposed of in one of the following manners:

1. Landfill above the natural water table at the Class I site (Bridgeway Acres II).

2. Weekly cover for Class III landfill (experimental - coordinated with District DER).

3. Daily cover for Class I landfill (separated from putrescible solid waste).

4. Stockpiled and/or used above grade within County property.

Once a zone of discharge (ZOD) is established for the Class I landfill (see Section 5.3), non-marketable boiler residue may disposed of below grade and will come into contact with ground water.

3.7 Air Emissions

With the addition of the third unit, the facility will then consist of three combustion units and two stacks. Units 1 and 2 will be vented through a single stack, and Unit 3 will have a separate stack. A full discussion of the air pollution aspects is contained in Appendices I - VI.

*3.8 Directly Associated Transmission Line

230 KV transmission line was installed and connects the plant switch yard to the Florida Power Corporation Gandy substation, located 1.25 miles southeast of the plant.

*3.8.1 Route and Size

In a modification to the original application officially approved on June 2, 1981, the route of the certified transmission line was changed. The existing line lies completely within the right-of-way for 28th Street. It exits the plant site and parallels the road in a southerly direction until intersecting the Florida Power Corporation transmssion line corridor. The line follows this route eastward to the Gandy Substation.

3.8.2 - 3.8.5 - No changes from original application.

*3.9 Associated Facilities

Buildings and structures constructed in association with the RRF are as follows (Figure 2-1.c):

1. Scale house
2. Mini-refuse area (not in certified site)
3. Sanitary lift station
4. County Solid Waste Administration Building
5. Materials storage building (under construction)
6. Landfill contractor's office and maintenance building.
7. Tire split station (not in certified site and under construction).
8. Potable and non-potable water lines.

*3.9.1 Purpose and Location

The purposes of the above stated structures are, for the most part, self explanatory. The mini-refuse area is a solid waste disposal facility for non-commercial waste haulers, namely private citizens using personal vehicles. Allowing these individuals to dump refuse in containers at the mini-refuse site is done for safety and convenience. The Materials Recovery Building will be used to store marketable boiler residue streams until they are picked up by recycling contractors. The tire split station (under construction) will accept all tires coming to the plant. The tires are cut in half, bundled together and are ultimately used in the County's artificial reef program.

*3.9.2 Maps

See Figures 2-1.a, 2-1.b, and 2-1.c.

*3.9.3 Land Type and Uses

See Section 2.1.

*3.9.4 Visibility

The plant is visible from virtually all directions. This is due to the flat local terrain and the height of the building, stack, and cooling tower system. The greatest distance from which the plant can be seen is an estimated six miles; this can be observed from the Howard Franklin (I-275) and Courtney Campbell (SR 60) causeways. As you approach within one-half mile of the plant it is obscured to a significant degree by native pine trees.

3.10 On-Site Drainage

Site stormwater is conveyed to a 20 acre stormwater detention basin located south of the plant. Water in the pond is pumped to existing aeration-oxidation ponds for treatment and/or is subsequently sprayed on perimeter berms. An alternative stormwater management project being investigated is the use of stormwater as a makeup water source for the cooling towers. The volume of water supplied in this manner would be significant in comparison with total makeup water requirements (approximately 25%). Water levels in site storage facilities could be effectively regulated by this technique, assuming the stormwater is amenable to required pretreatment.

CHAPTER 4
ENVIRONMENTAL EFFECTS OF CONSTRUCTION

*4.1 Site Preparation and Plant Construction

The following structures are proposed for construction in this application (See Figure 2.1.b):

1. Third boiler, including support structures and all appurtenances necessary for design operation (e.g. piping, air pollution control equipment, etc.).

2. Flue gas stack for the third boiler (161 ft. elevation).

3. An additional cell in the cooling tower system.

4. A second turbine-generator.

No additional utilities, scales or transmission lines are proposed. The anticipated duration of the proposed construction project is 33 months.

4.1.a Impact on land use - The items to be constructed will all be sited within the battery limits of the plant. Impacts on land use surrounding the plant will be insignificant.

4.1.b Impact on water use - The total water requirement during construction is estimated at 90 million gallons. A portion of this total may be provided in the form of treated sewage plant effluent, provided the chemical content and turbidity is acceptable for the proposed use.

4.1.c Impact on water quality - Water quality impacts during construction would be primarily due to turbidity increases. These would arise from erosion of exposed soils and airborne dust. Erosion effects will be minimized by the use of such measures as diversions, holding ponds, and straw bale filters. Routine water spraydown of potential dusty areas will minimize fugitive dust emissions.

4.1.d Impact on air quality - Construction impacts on air quality will arise from fugitive dust and exhausts from vehicles and heavy equipment. Water sprays will be used to minimize dust levels. The impact of internal combustion engine exhausts on carbon monoxide and nitrous oxide levels will be acute and limited to the immediate site. No significant health effect due to plant construction is anticipated.

4.1.e Impact on solid waste generation and disposal - During construction of the proposed expansion, normal plant and landfill operations will not be significantly modified or interrupted. All combustible construction debris will be deposited at the facility for incineration; the non-combustibles will be landfilled at the County landfill adjacent to the facility.

4.1.f Impact on ambient noise levels - Noise levels at the site will increase to some degree as a result of the proposed construction. The most significant noise sources will be heavy equipment; activities during foundation work will create acute high level noise. As discussed in Chapter 6, the Pinellas County Department of Environmental Management (DEM) monitors noise in the area surroundiing the plant. To date, all measurements have been in the 47 to 51 decibel range, which is typical of undeveloped agricultural areas.

*4.1.1 Construction Areas

The structures described in Section 4.1 will be constructed within the battery limits of the existing certified plant. The proposed laydown and staging area is located on the south side of 110th Avenue, directly across from the existing plant (Figure 2.1.c). This land is currently cleared and sparsely vegetated by pioneer plant species (e.g. Lantana involucrata).

*4.1.2 Land Impact

All land which will be impacted by the proposed construction is cleared. No tree removals are required. Dust levels will be minimized by the use of water sprays, when required. All construction debris will be incinerated at the existing plant or landfilled at available facilities on site. There will be no open burning, nor will explosives be used during construction.

*4.1.3 Impact on Human Populations

The proposed construction site is on land already in an industrial setting. The noise associated with construction should not be significantly greater than those levels now experienced during normal plant operations. Therefore, adverse impacts on the closest human population will be negligible.

Since the construction work force will be almost exclusively composed of local persons, no additional demand on housing, transportation, educational facilities or other municipal services are expected.

The peak volume of traffic during construction will be when pouring concrete and is estimated at about 12 delivery trucks per hour for 1 to 2 day periods.

*4.1.4 Work Force

At peak time about 250 to 300 construction personnel will be used to build the third unit and ancillary facilities (see Apendix III,

Table III-1). All the construction work force will be composed of local personnel with the exception of staff supervisory persons.

*4.1.5 Impact on Accessibility

The proposed construction will not affect the accessibility of any historical, cultural, archeological, or natural landmark sites.

*4.1.6 Mitigating Measures

1. Dust levels will be mitigated by the application of water sprays when required.

2. Erosion control will take the following forms:
   a. Diversions around erosion susceptible areas.
   b. Straw bale filters around ditches, swales and holding ponds.
   c. Rapid re-establishment of vegetation on bare soils.

3. Adverse impacts from noise will be minimized by conducting construction activities only during times generally considered to be normal working hours.

*4.1.7 Benefits from Construction

Plant construction will provide jobs to an estimated 300 local tradesmen and laborers with resultant economic benefits.

*4.1.8 Impact on Water Bodies and Uses

The proposed construction will not affect the quantity, quality or use of any surface water body other than on-site holding ponds. In these areas short term turbidity increases may occur following significant storm events.

*4.2. Special Features

None anticipated.

4.3 Construction of Directly Associated Transmission Facilities

No additional transmission facilities are proposed in this application.

*4.4 Resources Committed

The proposed construction will involve the committment of construction materials and capital investment. The land on which the proposed expansion is to be situated has been reserved for this purpose. These committments are considered investments, not lost resources.

CHAPTER 5

ENVIRONMENTAL EFFECTS OF PLANT OPERATION

*5.1 Effects of the Operation of the Heat Dissipation System

Blowdown from the cooling tower will be discharged to the sanitary sewer system operated by Pinellas County. The maximum temperature of this discharge will be 110 deg. F. To date, no operating difficulties have resulted at the receiving treatment plant due to the RRF effluent. (Appendix VII).

Since no surface water discharges of thermal effluents are proposed, Sections 5.1.1 through 5.1.6 are not applicable.

*5.1.2 Effects of Offstream Cooling

There will be an estimated 51% increase in cooling tower losses due to evaporation and entrainment (see Figure 3-1). Appendix B of the original power plant site application discusses the dispersion of evaporative and entrained droplets in the environment. That discussion is referenced for this section. The primary difference between that analysis and the proposed condition is the increase in total volume of water discharged to the atmosphere.

The Department has expressed concern about the potential for viruses and other pathogenic organisms being entrained on water droplets. To monitor this possibility, Pinellas County has contracted with the State of Florida's Epidemiology Research Center. This program is discussed in Chapter 6 of this application and in Appendix IX.

*5.2 Effects of Chemical and Biocide Discharges

The primary receiving wastewater treatment plant is a contact stabilization with no primary treatment. The plant has experienced no operational or process malfunctions due to RRF effluents. No chemical or biocide wastes are discharged to the surrounding environment by the RRF.

*5.3 Effects of Sanitary and Other Waste Discharges

The sanitary discharge from the proposed plant will be 50 gpm. This represents less than 0.5% of the average daily flow at the receiving treatment plant. Therefore, no significant increase in plant demand will be realized.

The proposed plant expansion will minimize the disposal of putrescible solid waste by landfilling through 1996, with resultant beneficial environmental and economic benefits. Non-marketable boiler residue will be disposed of at the Bridgeway Acres II landfill. **Landfill cells are currently constructed above the existing grade; no residue or solid waste is disposed of below the natural ground water table.**

Pursuant to the revisions to Chapters 17-3 and 17-4, FAC, Pinellas County is requesting that all land up to the boundary of the certified power plant site be designated a Zone of Discharge (ZOD) for an existing facility. This request is based on the following portions of the regulations:

> Chapter 17-4.245 (1) (c) - "for the purposes of this section, "Existing installation" shall mean any installation having filed a complete application for a water discharge permit on or before January 1, 1983, or in fact discharging to ground water on or before July 1, 1982."

> Chapter 17 -4.245(4)(b) - "Existing installations shall have the zone of discharge specified in the permit or extending to the owner's property line if no zone of discharge is defined in the permit, until such time as

the permit is renewed or modified as provided in subsection (5) below."

After a ZOD is designated by the Department, non-marketable boiler residue will be disposed of below the natural ground water table within the ZOD. The ground water monitoring program (see Chapter 6) now being implemented, will be used to ensure that water quality at the edge of the ZOD is in compliance with the regulations. Disposal of putrescible solid wastes (if required) will be above grade, not in ground water nor in dewatered pits.

Pursuant to the COC for the existing RRF, Pinellas County has submitted the conceptual plant for permanent leachate control. This proposal is featured in Appendix VIII of this application. As depicted, the County proposes to encircle, at a maximum, 730 acres of County owned lands (including the certified 240 acre site) with a bentonite-soil slurry wall which is keyed into an underlying confining layer. Ultimately the County will propose to apend all lands within this wall to the certified RRF site (see Section 2.1).

The first step in the slurry wall design will be to verify the continuity and physical-chemical integrity of the underlying confining layer identified in earlier USGS reports. The proposed scope of work for this hydrogeologic survey is also included in Appendix VIII.

If the conclusions of this survey satisfactorally demonstraate to the Department that: 1) the layer is a suitable vertical barrier to leachate migration, 2) a slurry wall can be effectively keyed into the layer, and 3) wall installation will not upset the regional hydrogeologic scheme (e.g., flooding), then the wall will be designed and constructed. It is estimated that 1.5 million square feet of wall will be required at an estimated 1983 cost of $4.5 million. It would take approximately 18 months to encircle the 730 acres in this manner.

Once the proposed wall is in place, the County will request the Department to designate all lands within the slurry wall a ZOD. If approved, the County would commence disposal of any non-combusted solid waste in unlined, dewatered pits; this being permitted in Chapter 17-7, FAC, once permanent leachate controls are installed. The site monitoring plan would be accordingly expanded and, after Department approval, implemented to monitor compliance.

5.4 Effects of Air Emissions

See Appendices I through IV.

5.5 Effects of Operation and Maintenance of Directly Associated Transmissions System

No changes from original application.

*5.6 Directly Associated Facilities and Other Effects

Noise levels at the plant are a result, primarily, of truck traffic. Currently all commercial, municipal, and private waste haulers come to the plant. No additional vehicles will come to the plant as a result of the proposed third boiler expansion. The noise monitoring conducted to date by the Pinellas County Department of Environmental Management (DEM) indicates noise levels at the plant and approach roads is in the 47 to 51 decibel range.

In November 1983, the paving of 28th Street southward from the RRF to Gandy Boulevard is scheduled to be completed . Once this road is opened a considerable number of haul trucks will use it. Truck noise will be intermittent; the DEM has found noise levels from these vehicles to be in the 51 to 56 decibel range. The only area sensitive to the noises along the 28th Street route is a mobile home park situated north of Gandy Boulevard and west of 28th Street. The additional noise created by truck traffic in this area should not be significantly above existing conditions.

As previously described, the system which employs stormwater as cooling tower makeup is now being designed. Once operational, it will be possible to maintain a static freeboard in the 20 acre holding pond, thus restricting off-site discharges to extreme meteorologic events. This situation would become more critical if the proposed bentonite soil slurry wall is constructed. Preliminary calculations indicate that the water table within the wall would rise. This is an undesirable situation for two reasons. First, the rise in water table would further reduce the freeboard in site holding ponds. Second, the rise would create a hydraulic gradient through the slurry wall which would promote seepage out through the wall. By pumping stormwater to the cooling towers, it will be possible to maintain a "zero" hydraulic gradient through the wall which will minimize groundwater flux.

5.7 Resources Committed

Construction and subsequent operation of the proposed plant expansion will extend the life of available lands used for landfilling.

The recovery of energy and recyclable materials from solid waste will help conserve limited resources while facilitating remedial environmental programs.

CHAPTER 6

ENVIRONMENTAL MEASUREMENTS & MONITORING PROGRAMS

6.0 As required by the Conditions of Certification of the original Power Plant Site Certification an environmental monitoring plan was prepared and submitted to the Department. The proposal was found to be acceptable and major components of the plan have been implemented. Addition of the third boiler does not cause any changes in the original monitoring plan; therefore the document is inserted here to fulfill the requirements of this chapter. Since the plan was originally submitted for Department review, more detailed information on well construction and leachate plume detection methods have been added.

EXECUTIVE SUMMARY

PROGRAM OBJECTIVES

This monitoring program is designed to fulfill the requirements of the Conditions of Certification (COC) of the Power Plant Site Certification (PPSC) and to ensure that the operation of the plant does not cause harm to the surrounding environment and human population.

PROGRAM SUMMARY

The monitoring program is shown schematically in Figure 6.1 and described in Tables 6.1 and 6.2; program implementation is presented in Figure 6.2. The monitoring program consists of startup and continuous regimens, some of which are stipulated in the COC; others, which are labeled additional tests, are performed as insurance that the facility is operating in an environmentally sound manner. A specific sampling and analysis team is assigned to each task in as shown in Table 6.1. On May 24, 1983, Pinellas County contracted with the firm of Environmental Science and Engineering, Inc. (ESE) of Gainesville, Florida, to perform analytical tasks associated with the residue and water quality sampling. The County has also signed a contract with the Florida State Epidemiology Laboratory to conduct virus monitoring of the cooling towers. Noise sampling, initiated prior to plant construction, is being conducted by the Pinellas County Department of Environmental Management (DEM). The one year's background data prior to plant startup was collected by

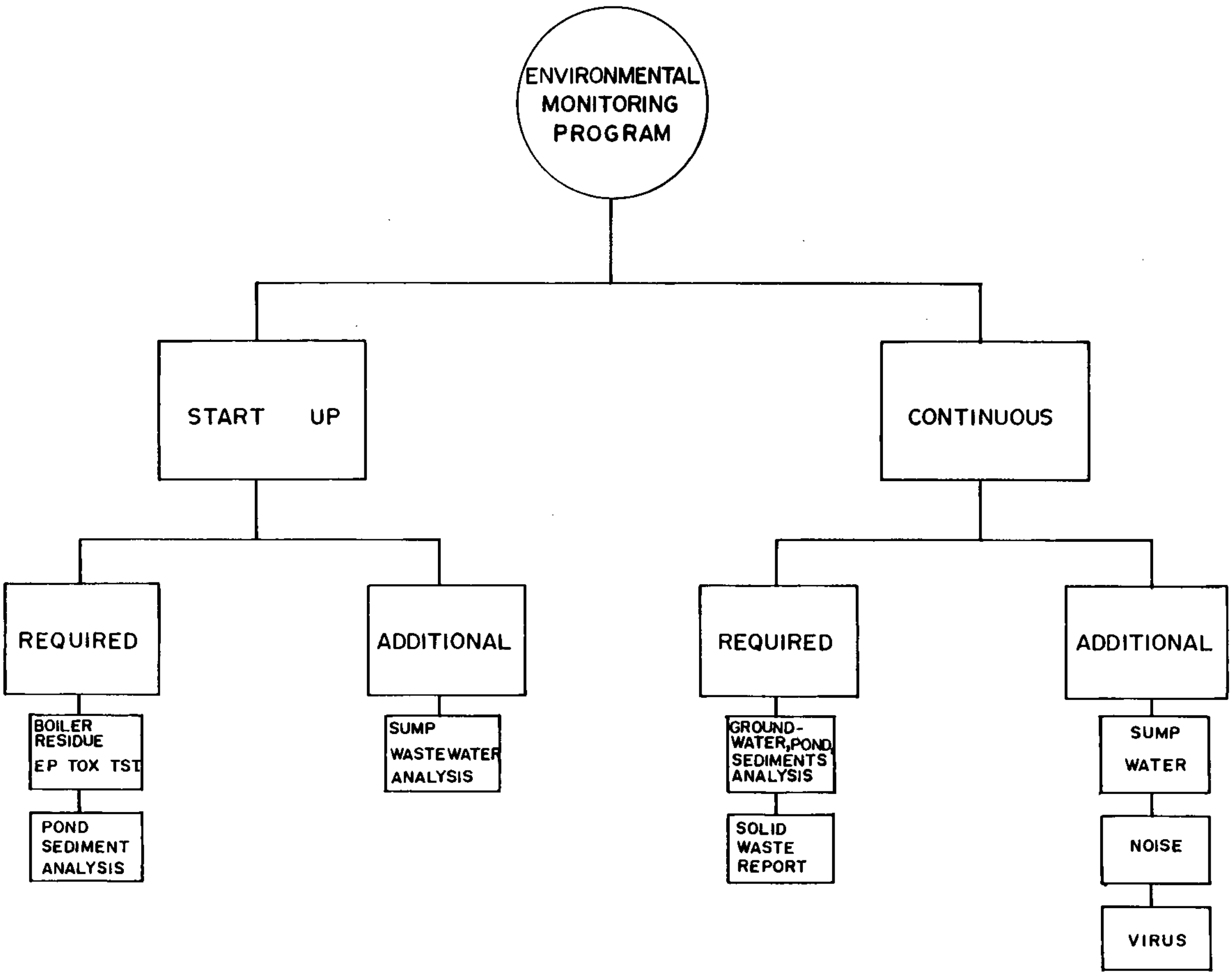


FIGURE 6-1
PROGRAM SCHEME

TABLE 6.1

PROGRAM SUMMARY

Program Component	Type/Regimen	Project Assignments
Boiler Residue	Required/Startup	ESE
Initial Pond Water & Sediment Tests	Required/Startup	ESE
Quarterly Groundwater, Pond Sediment Tests	Required/Continuous	ESE
Solid Waste Report	Required/Continuous	Pinellas County
Blowdown Sump Wastewater	Additional/Continuous	Refuse Tech, Inc. & ESE
Noise	Additional/Continuous	Pinellas County
Virus	Additional/Continuous	Florida HRS

TABLE 6.2

SUMMARY OF MINIMUM MONITORING REQUIREMENTS

Requirement	Frequency of Analysis	Purpose
Analyze water quality of pond water, sediments	Once, prior to pumping leachate and/or stormwater through system	To establish background concentrations in the pond system.
Collect groundwater data	Continuous for one year prior to plant startup	To establish background concentrations under sprayfield.
Analyze pond water & sediments	Quarterly, commencing within 3 months after commencement of pumping into system	To establish treatment effectiveness, heavy metal uptake and correlation with groundwater data.
Monitor groundwater quality	Quarterly	To determine impact of sprayfield and treatment pond system operation on underlying groundwater.
Solid waste report	Monthly, submit to District DER quarterly	To document fill quantity and applied treatment.
Analyze boiler residue	Completed on June 6, 1983	To determine if the boiler residue is a hazardous material.

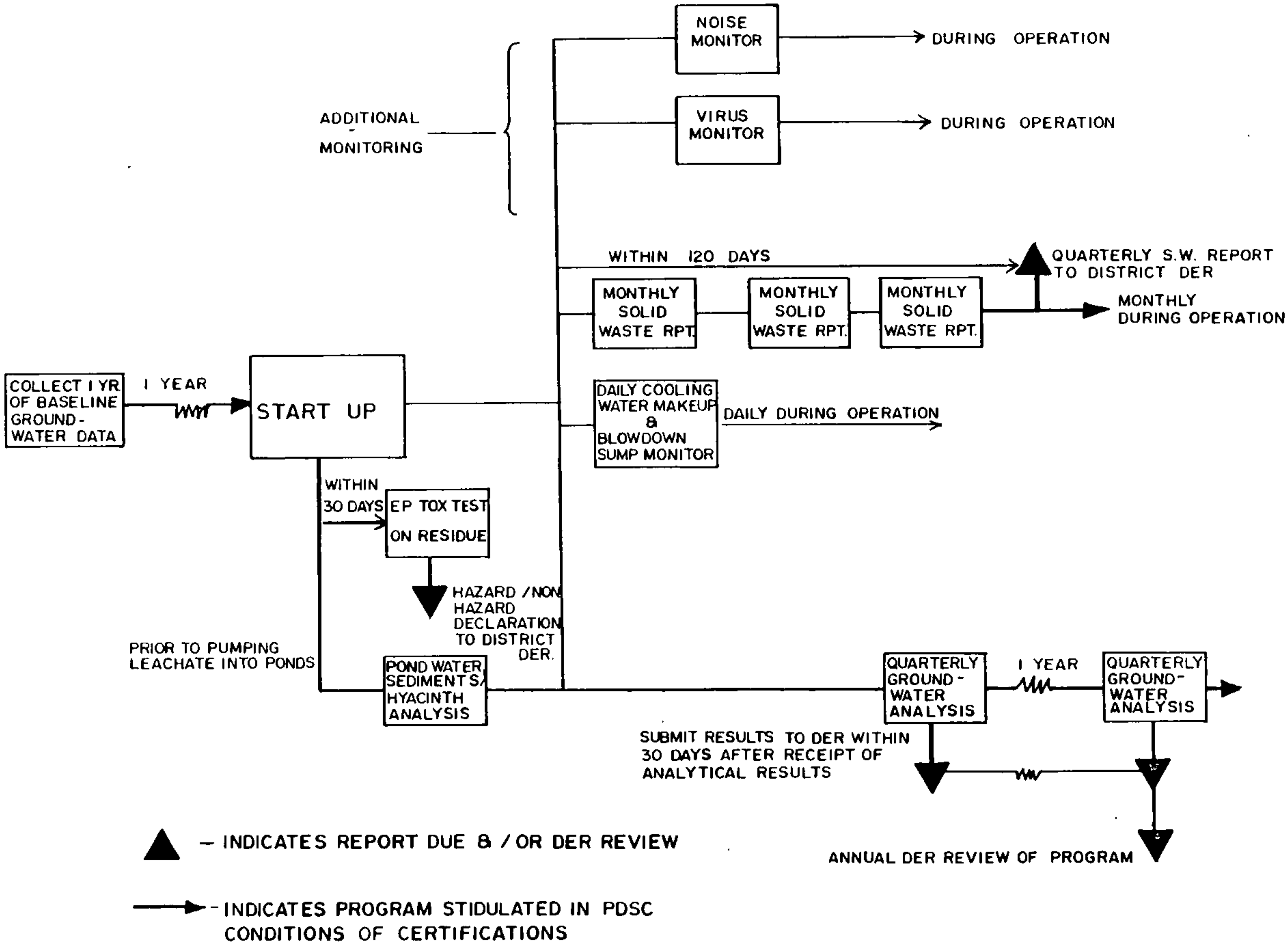


FIGURE 6-2
IMPLEMENTATION SCHEDULE

the U. S. Geological Survey (USGS) under contract with Pinellas County. A statistical analysis of the data from selected wells was submitted to the DER (Tallahassee) on March 8, 1983.

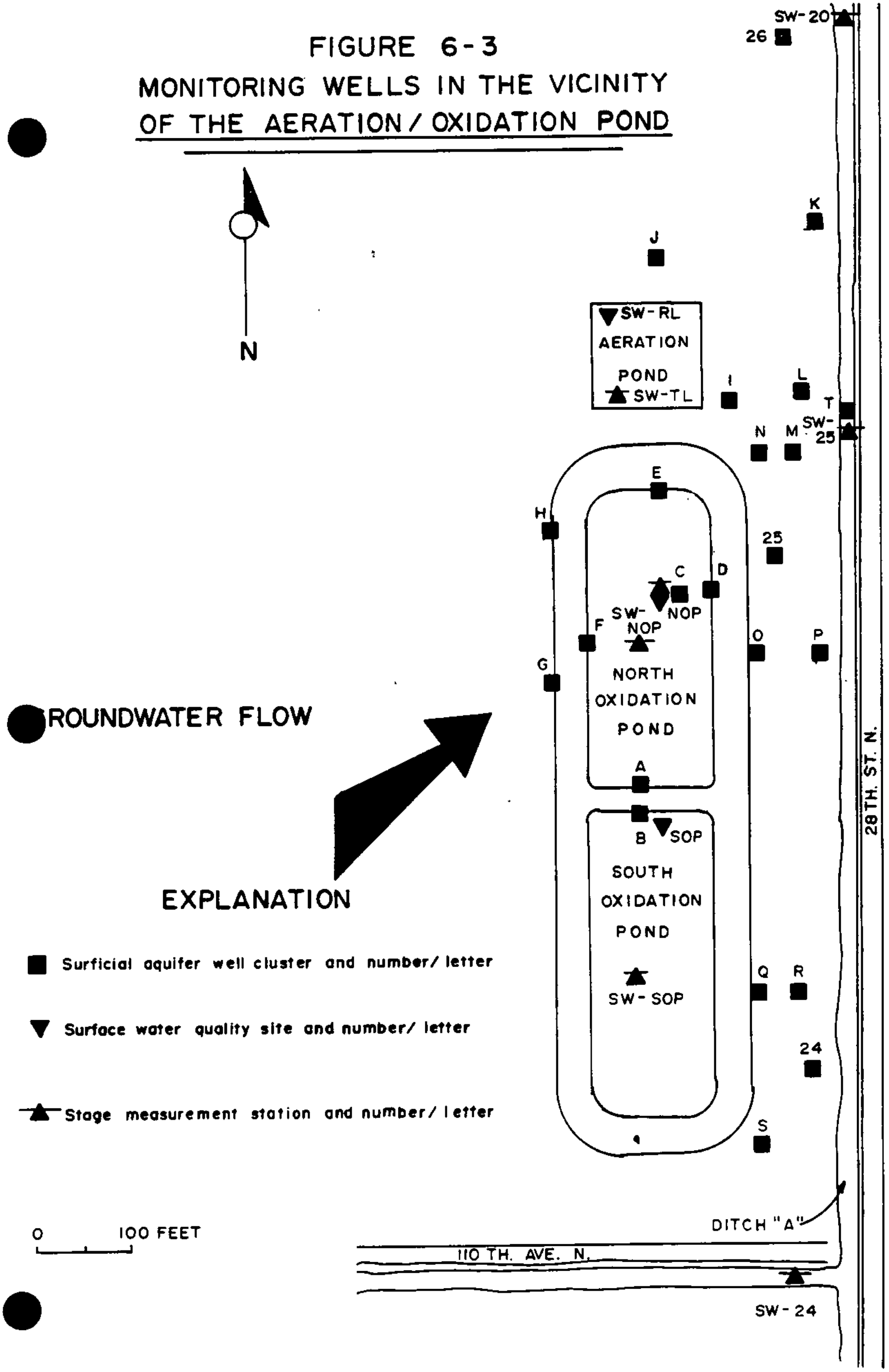
DESCRIPTION OF THE MONITORING PROGRAM

BACKGROUND DATA

In accordance with paragraphs 3a and 3b of Section D of the COC, at least one year prior to plant statup groundwater quality data shall be collected from a minimum of four wells: one upgrade hydrologically from the southern boundary of the Bridgeway Acres II landfill, one located in the immediate vicinity of the aeration/oxidation pond, and two located down slope from the landfill/sprayfield area. Locations of the wells constructed by the USGS under contract with Pinellas County are shown in Figure 6.3. Not shown in this Figure are wells LF-18, LF-15, and LF-30 and surface water station SW-2. LF-18 and SW-2 are located in the U.S. Homes area (they are both now destroyed), well 30 is at the northwest corner of the stormwater holding pond (Lake Acenbrack), and LF-15 is just north of U.S. Homes in a perimeter ditch bordering County property. The required parameters listed in the COC for routine monitoring are as follows:

Conductivity	Arsenic	Barium
Nitrates	Selenium	Silver
Iron	Cadmium	Chlorides
COD	Chromium	pH
Nickel	Copper	Lead
Aluminum	Mercury	Zinc
Total Coliform Bacteria		

FIGURE 6-3
MONITORING WELLS IN THE VICINITY
OF THE AERATION / OXIDATION POND



WELL LOCATIONS

Well clusters will be sited in locations best suited to monitor the ground water quality and identify any possible sources of contamination. The use of the cluster construction will provide vertical definition of any contaminant plumes. All well locations appear in Figure 6.4.

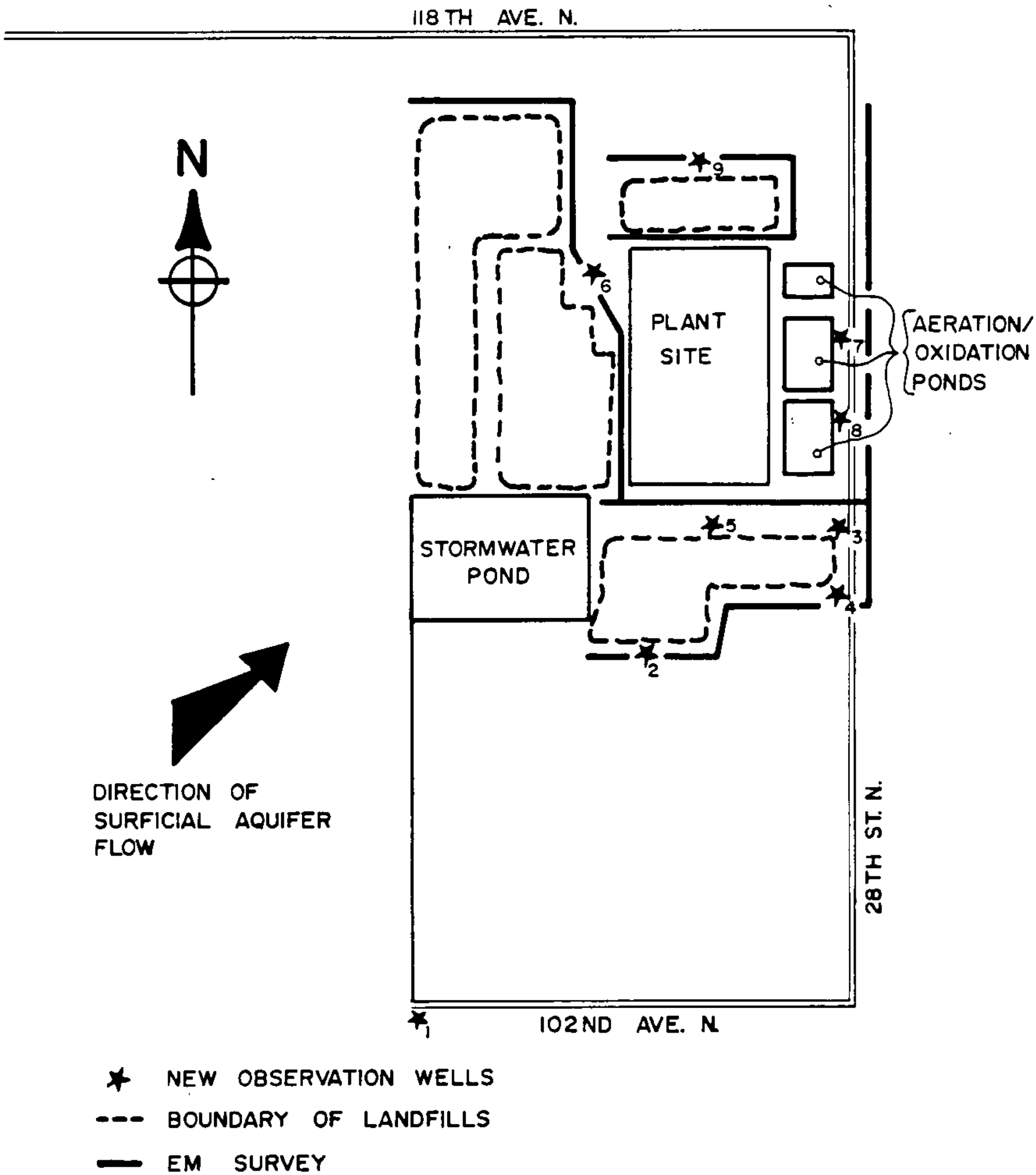
A limited EM survey of the site will be conducted using a Geonics EM-31 non-contact terrain conductivity meter. The purpose of this survey will be to determine the existence and extent of any subsurface contaminant plume. Parallel transects, 25 ft. apart, will be run at the site (see Fiure 6-4 for transect locations). EM reading will be taken and recorded at 25-ft intervals along each transect. On-site analysis of the data will be performed and, if a plume is suspected, a grid pattern with readings of 25-ft. spacing will be used to determine its extent.

WELL CONSTRUCTION

Each well cluster will contain two wells and will be installed so as to monitor the entire permeable zone and the underlying Floridan aquifer. All wells will be drilled using a water-rotary rig and will be constructed using 2-inch, schedule 40, flush-fitting, threaded PVC casing and screen. No glue or solvents will be used during construction. Undisturbed samples will be taken from the permeable zone and from the confining layer at four of the cluster locations (C-5, C-6, C-7, and C-9).

FIGURE 6-4

WELL LOCATIONS AND EM SURVEY LINES



The first well in the cluster will penetrate to the top of an underlying confining layer which is located at an average depth of 29 ft. below the site. The well will be screened throughout the more permeable sand stratum. The second well will penetrate to the first zone of high transmissivity encountered in the limestone of the Floridan aquifer which underlies the site at an average depth of 54 ft.

Well screen and casing will be installed in the completed hole and will extend approximately 2 ft. above the land surface. The annulus around the screen will be packed with sand to a point approximately 2 ft. above the top of the screen. A 2-ft. bentonite seal (1 ft. in the shallow wells) will be placed above the sand pack to prevent vertical migration of water in the borehole. The hole will then be grouted to the surface and a 4-in protective steel casing installed. All wells will be developed by pumping until the water runs clear.

Hydraulic testing (commonly called slug testing) will be performed on all newly installed monitor wells and selected existing wells to determine hydraulic conductivity of the surficial aquifer. The slug tests will be performed using a small-diameter pressure transducer which is lowered into the well; the pressure that corresponds to the water level is recorded with an Envirolab 2-channel pressure recorder. After the well has been allowed to stabilize, a mechanical slug is placed into the well to quickly raise the water level in the well. The slug will remain in place while the water levels are recorded at 1-second intervals until the well has reached equilibrium. At that pont the slug is removed and the water levels are recorded until equilibrium is reached again. Data obtained during the slug tests will be used to develop plots from which hydraulic conductivity can be determimed.

BOILER RESIDUE ANALYSIS

This test is to establish whether the boiler residue is a hazardous material in accordance with the Resource Conservation and Recovery Act (RCRA). It will yield data to assess the ignitability, corrosivity, reactivity, and toxicity of the residue. Test procedures are documented in the Federal Register, Vol. 43, No. 243 (12/18/78) and Vol. 45, No. 98 (5/19/80 amended 7/7/81). On June 6, 1983, individual composite samples were taken from three boiler residue streams: total combined residue as it flows off the conveyor, aggregate, and 2 - 10" non-magnetic (Figure 6.5). The results of the tests show that the residue is not hazardous. A declaration of this has been submitted to the DER.

STARTUP AND CONTINUOUS SAMPLING OF POND WATER, SEDIMENTS AND GROUNDWATER.

ESE will collect separate water and sediment samples at the RRF. Each well will be evacuated for a minimum of 3 well volumes. Conductivity, temperature, and pH will be measured on-site using portable S-C-T meters and pH meters which have been calibrated at the beginning of each trip. Well sampling will be accomplished using a bailer constructed of PVC materials. The samples will be collected in a manner which will minimize aeration and prevent oxidation of reduced compounds. All containers will be filled to the top and tightly stoppered. All samples

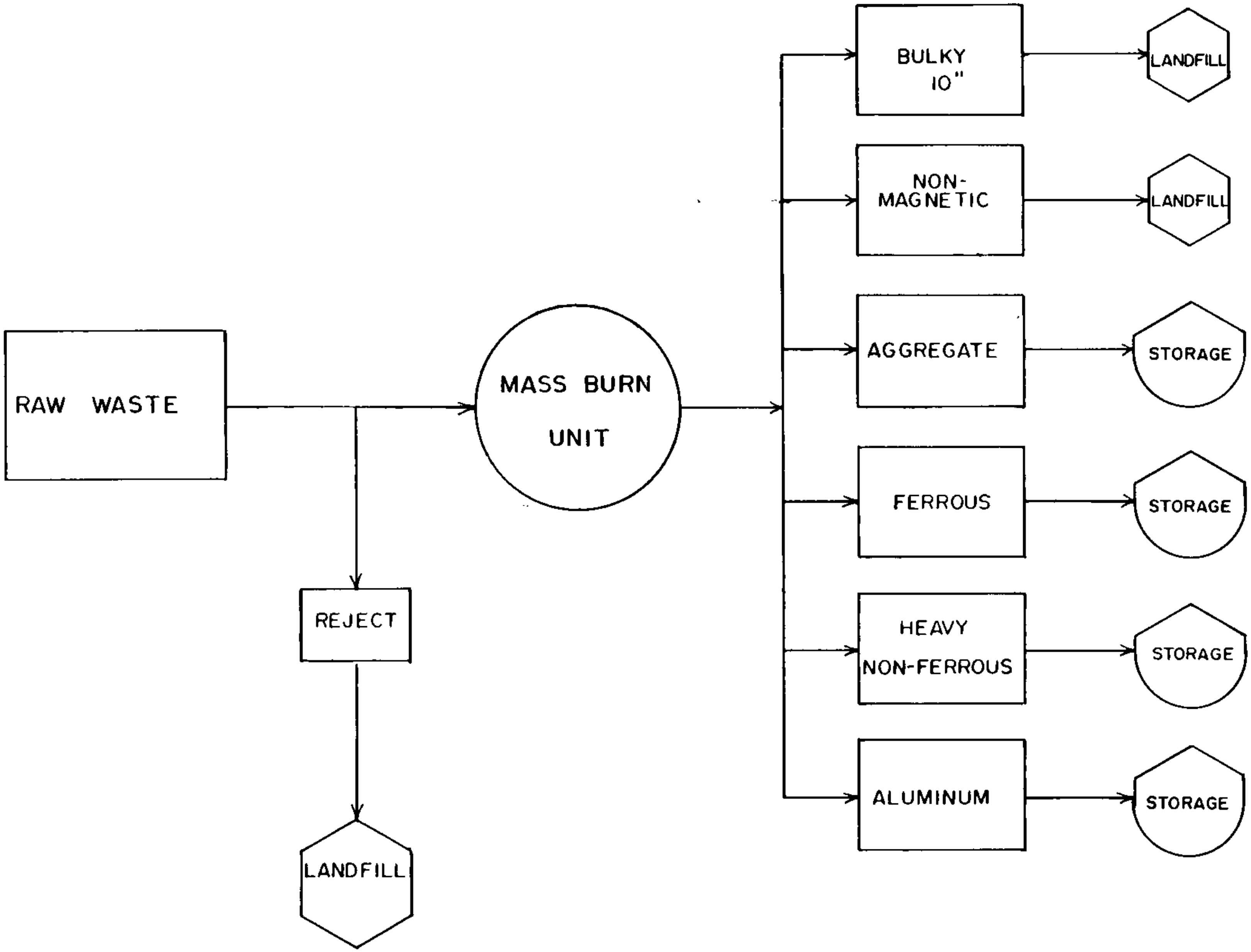


FIGURE 6-5
FATE OF RAW WASTE

will be chilled, preserved as appropriate, and transported to the Gainesville laboratory for analysis; all equipment will be rinsed between collections to avoid any posssible cross-contamination.

Samples will be drawn using a peristaltic pump and a vacuum bottle. The vacuum bottle for these samplings will be the actual sample bottles. A separate Teflon tube and stopper will be provided for each sampling station. The pump will create a vacuum in the sample container which will in turn draw the sample out of the well.

The samples will be preserved upon arrival at the laboratory as follows:

Metals fraction:	HNO_3 to pH	2
COD fraction:	H_2SO_4 to pH	2

Samples will be filtered and analyzed for total parameters (Table 6-3).

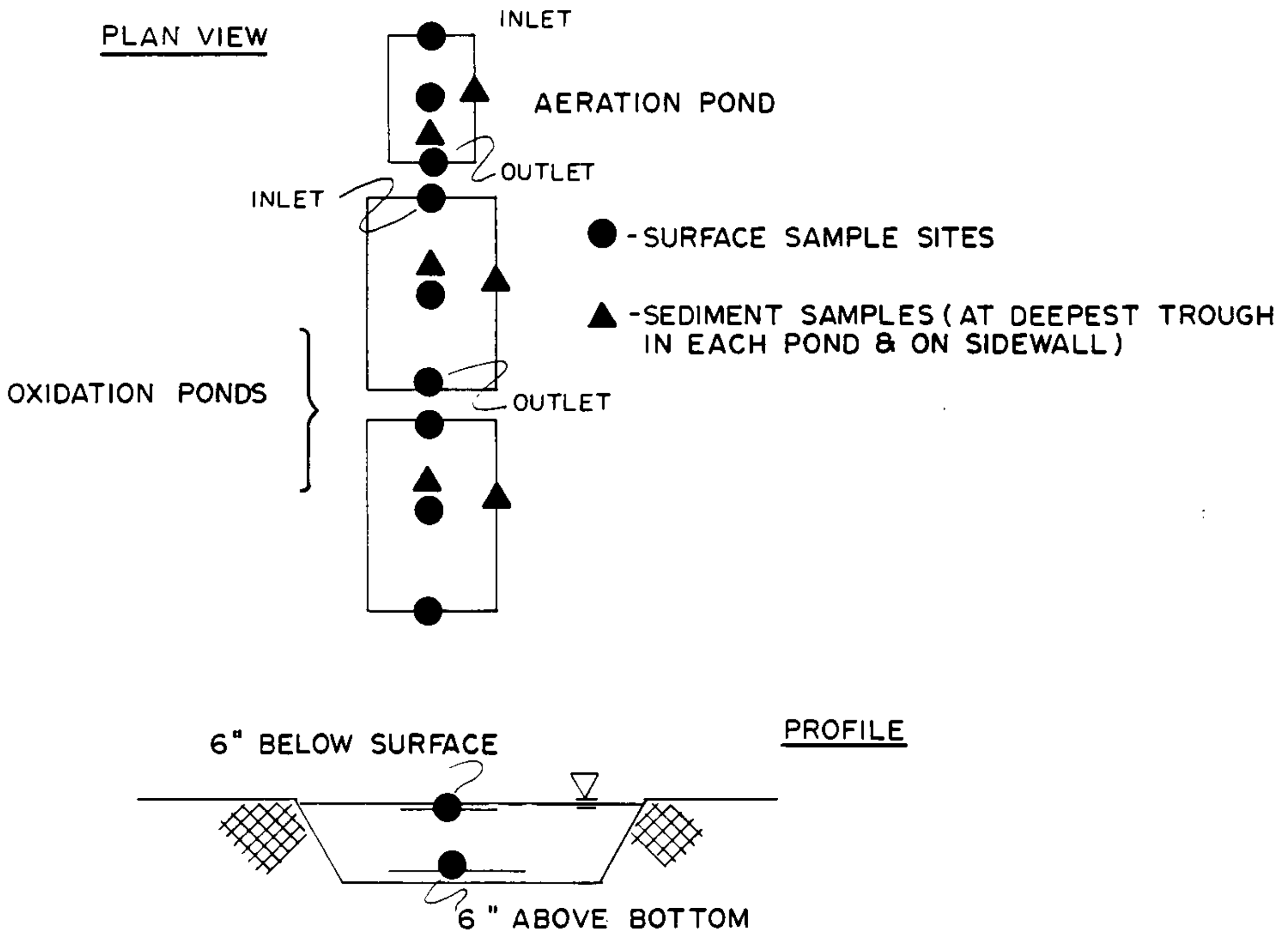
Samples of the pond surface and pond bottom waters will be composited from three locations in each of the three ponds shown in Figure 6.6. Sample volumes shall be sufficient to perform analyses of specified parameters (see Table 6.3). Individual samples of pond sediments shall be taken from the top four inches of the sediment layer at the locations specified in Figure 6.6.

SOLID WASTE REPORT

Monthly solid waste reports are prepared and submitted to the Southwest

FIGURE 6-6

SAMPLING LOCATIONS FOR POND WATER & SEDIMENTS



(NOT TO SCALE)

TABLE 6.3

PARAMETERS FOR ANALYSIS

SURFACE WATER SAMPLES			
Parameter	STORET #	Parameter	STORET #
Conductivity	00095	Nitrates	00620
Iron	01045	COD	00340
Total Coliform	31506	Aluminum	01105
Barium	01007	Arsenic	01002
Chromium	01034	Lead	01051
Mercury	71900	Selenium	01147
Silver	01077	Chlorides	00940
pH	00400	Copper	01042
Zinc	01092	Nickel	01067
Cadmium	01027		
SEDIMENT SAMPLES			
Barium	01008	Iron	01170
Nickel	01068	Aluminum	01108
Arsenic	01003	Cadmium	01028
Chromium	01029	Lead	01052
Mercury	71921	Selenium	01148
Silver	01078	Copper	01043
Zinc	01093		

District DER office on a quarterly basis. This function is performed by the Solid Waste Management Division of Pinellas County. The following items are to be included in ths report:

A. Amount and type (i.e., putrescible, special wastes, boiler residue, rejects, etc.) of materials landfilled.

B. The treatment provided (i.e., daily cover - if required, etc.).

BLOWDOWN SUMP ANALYSES

In accordance with Tables I and II of Appendix I of the Construction Agreement and Appendix D of the Management Agreement for the existing facility, maximum water quality values for system blowdown have been established. Accordingly, routine sampling and analysis for those parameters are performed. Supplementary sampling and analysis will be conducted by ESE.

NOISE MONITORING

Routine noise monitoring is now conducted by the Pinellas County Department of Environmental Management. Sampling sites are located in the more sensitive areas surrounding the facility, namely the residential areas southwest of the plant. Sampling frequencies are arbitrary and based on normal plant operating conditions. Maximum facility-associated noise can be anticipated when truck traffic is at a peak and during plant blowdowns.

VIRUS MONITORING

Virus monitoring is conducted for two reasons: (1) to ensure that viruses are not being discharged to the environment through the cooling towers and, (2) to allow adjustments to the chlorine dioxide dose in the cooling tower makeup water. The County has contracted with the State of Florida Epidemiology Research Center (DHRS) to collect and analyze samples for viruses. A copy of the monitoring plan proposed by that agency is featured in Appendix IX. To date, three sampling regimens have been conducted although results are only available for the first one. That regimen, which included eight samples, indicate that no viruses or other pathogenic organisms (e.g. Legionella, Naeglaria) were present in the cooling water influent or the recirculated stream.

CHAPTER 7
ECONOMIC AND SOCIAL EFFECTS OF PLANT CONSTRUCTION AND OPERATIONS

7.1 Benefits

The capacity afforded by the third boiler will minimize the landfilling of Class I solid waste; this is the stated policy of the Board of County Commissioners, Pinellas County, Florida. Based on current waste generation estimates, all Class I material can be incinerated by the three boiler plants through the year 1996. Specific benefits derived from this operation are as follows:

1. Drastically reduced land requirement for disposal of solid waste with a resultant savings in real estate costs.

2. Landfilling of the boiler residue, in contrast with garbage, will not contaminate ground water.

3. As boiler residue does not attract gulls and disease vectors, public health and aviation safety will be enhanced.

4. The increase in electrical generation capacity will reduce foreign oil import requirements by 4,521,957 barrels over a ten year period which translates conservatively into a savings of $135,658,707.

5. The additional 29 MW of electricity will satisfy the energy requirements for over 8500 Pinellas County homes.

7.2 Costs

The additional boiler, stack, turbine generator, cooling tower units, and associated hardware will be financed by a supplemental revenue bond issue. The 1983 construction cost for the expansion is $52.5 million, which will be escalated throughout construction until completed in 1986.

Revenue produced by the sale of electricity from the three boiler, two turbine-generator facility will help offset O&M costs throughout its operating life. It is estimated that $135,658,707 of revenue will be generated between 1986 and 1996 by energy sales.

*There has been a steady increase in automobile and truck traffic in the vicinity of the site. This is the result of the growth of light industry, especially along 49th Street N. Presently, waste haulers and plant personnel arrive at the site via two arteries:

1. Eastward from 49th Street along 118th Avenue, then south on 28th Street.

2. South on 28th Street from Roosevelt Blvd.

*To date, no traffic congestion has been observed on these roadways in the vicinity of the plant. Routine patrols by the Pinellas County Sheriff's Department have been established.

*By the time the proposed construction is scheduled to commence, the 28th Street extension southward from the plant to Gandy Blvd. will be complete. This south entrance to the facility will be used by a significant number of haulers and plant employees who now enter from the north.

*The impact of the rapid population growth in Pinellas County may affect traffic at the RRF in the following manners:

1. Increase in general vehicular traffic on major arteries which feed RRF access roads (e.g., Gandy Blvd., Roosevelt Blvd., Ulmerton Rd., 49th Street N.).

2. Increase in waste hauler traffic to the RRF due to

increased volume of solid waste.

*Item 1 is mitigated by the fact that the larger population growth centers in the County are not near the RRF (Table 2-1). Growth into the next century will be focused more and more on the northern part of the County.

*The increase in waste hauler traffic will be incorporated by the opening of a south entrance using the nearly completed 28th Street extension.

CHAPTER 8
ALTERNATE ENERGY SOURCES AND SITES

8.0 Construction of a new resource recovery plant in northern Pinellas County was proposed as an alternative method to provide the required capacity. This proposal was rejected in favor of the third boiler plan for the following reasons:

1. It is more economical to add the capacity at the existing facility.

2. No suitable site for the north County plant could be designated at this time.

3. Capacity could be added more quickly at the existing facility.

Once the ultimate capacity of the three boiler Pinellas Park plant is exceeded, future expansion, in the form of a new facility, will occur in northern Pinellas County.

The existing RRF does not accept hazardous materials. The proposed third boiler expansion will not accept hazardous materials.

8.1-8.3 No changes from original application.

CHAPTER 9
PLANT DESIGN ALTERNATIVES

9.0 No alternative incineration technology was evaluated. The utilization of the Martin process is the logical choice for integrating a third boiler into an operating Martin system.

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REFERENCES

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APPENDICES

PREFACE

The Air Quality Analysis featured in Appendices I - VI is submitted to meet requirements of:

1. Power Plant Site Certification and State Air Quality permits.

2. Federal Prevention of Significant Deterioration (PSD) review.

APPENDIX I

BEST AVAILABLE CONTROL TECHNOLOGY

AIR QUALITY SECTION

I. BEST AVAILABLE CONTROL TECHNOLOGY

A. INTRODUCTION

Best Available Control Technology (BACT) is defined in the 40 CFR 52.21 as follows:

> "An emission limitation based on the maximum degree of reduction of each pollutant emitted which the Department, taking into account, energy, environmental and economic impacts and other costs, determines on a case by case basis, is achievable through application of production processes and available methods, systems, and techniques, for control of each such pollutant".

Table I-1 lists the air emissions for which an evaluation for BACT was conducted and control alternatives (both commercially available and in the research stage) which were considered for the control of each of the pollutants. The air pollutants and the emission levels for which BACT must be determined are shown in Table I-2.

TABLE I-1
BACT POLLUTANTS AND CONTROL ALTERNATIVES

Air Emission Parameter	Control Alternatives
Particulate	Electrostatic Precipitator (ESP) Wet or Dry Scrubber Fabric Filter Electrostatic Baghouse
Sulfur Dioxide	Wet Scrubber Dry Scrubber Low Sulfur Fuel
Nitrogen Oxide	Ammonia Injection Wet Scrubber Catalytic Reduction Design and Operating Procedures
Carbon Monoxide	Design and Operating Procedures
Lead & Beryllium & Particulate Mercury	Electrostatic Precipitator (ESP) Wet or Dry Scrubber Fabric Filter
Hydrogen Fluoride & Gaseous Mercury	Wet & Dry Scrubber

TABLE I-2
BACT POLLUTANTS AND ANNUAL EMISSIONS

Air Emission Parameter	Tons/Year
Particulate	109
Sulfur Dioxide	577
Nitrogen Oxide	577
Carbon Monoxide	288
Lead	58
Beryllium	0.0019
Mercury (particulate & gaseous)	2.1
Hydrogen Fluoride	28

This BACT evaluation of the above described control alternatives considered their technical feasibility, energy usage and certain environmental factors. The proposed unit is projected to be on-line approximately 80-85% of the time. Air pollution control equipment must be reliable to minimize contribution to unit downtime. A projection of the equipment's reliability can be developed only after it has received commercial application; therefore, commercial application of the equipment was reviewed in formulating BACT. Installation of air pollution control equipment increases the facility cost, but results in benefits to the surrounding area and population. At some point, the cost of air pollution control equipment is not outweighed by the resulting benefits. To this end, the capital, operational and energy costs, were compared to the benefits. Air pollution control equipment will lessen the facility's air emissions, however, increasing the waste requiring land disposal resulting from the additional equipment operation is not advantageous.

B. TOTAL SUSPENDED PARTICULATE (TSP), LEAD, BERYLLIUM AND PARTICULATE MERCURY

In this section, BACT for control of total suspended particulate (TSP) emissions is proposed. The control device which is BACT for TSP will also concurrently control lead, beryllium and the particulate form of mercury, and is thus also proposed as BACT for these pollutants.

An electrostatic precipitator with an outlet particulate loading of 0.03 gr/dscf, corrected to 12% CO_2, is proposed as BACT for this project. Other control alternatives reviewed include ESP's with emission rates of 0.05 and 0.015 gr/dscf at 12% CO_2, two different Fabric Filters, and a Dry Acid Gas Scrubber.

1. Electrostatic Precipitators

Electrostatic precipitators function by imparting a negative charge to particulates in the flue gas stream. The particles are then attracted to positively charged plates, where they are collected. Characteristics of electrostatic precipitators include the following:

- Generally capable of particulate removal efficiencies greater than 98% with efficiencies as high as 99.8%.
- Can handle high temperature gases of over 600°F in special applications.
- Low pressure drop through units resulting in lower energy usage by fans.
- Performance is sensitive to actual vs. design flue gas flow rates (actual gas flow must be less than design) and particle resistivity.
- Consideration must be given to prevent corrosion caused by acid gas condensation. Acid mist condensation begins about 250°F.
- Recognized as the most reliable and efficient technology on resource recovery systems.

Table I-3 shows estimated costs for electrostatic precipitators investigated for this project.

2. Fabric Filters/Electrostatic Baghouses

Baghouses remove particulate by filtering the flue gas stream through a fabric. Actually, most of the effectiveness is attributed to filtering through a mat of particulate which has built-up on the surface of the fabric. Characteristics of baghouses are as follows:

- Particulate removal efficiencies as high as 99.8% have been demonstrated on coal fired units.
- Variations in flue gas flow rate and particulate composition do not generally effect performance.
- Pressure drop through units is significant resulting in relatively high energy usage by fans.
- Available filter materials limit operating temperatures to less than 500°F.
- Sparks in flue gas can cause pinhole leaks and even fires within the filter.

TABLE I-3
COSTS OF ELECTROSTATIC PRECIPITATORS
1050 TPD Unit

Emission Limit gr/dscf @ 12% CO_2	0.05	0.03	0.015
Removal Efficiency, Percent	98.0	98.7	99.4
Construction Cost	$1,707,700	$2,003,400	$2,592,300
Annual Cost:			
Net Debt Service	$ 299,500	$ 351,400	$ 454,700
Operating and Maintenance Costs	$ 179,300	$ 222,400	$ 298,100
Total	$ 478,800	$ 573,800	$ 752,800
Unit Cost:			
Per Ton MSW (300,000)	$ 1.60	$ 1.91	$ 2.51
Per Ton Particulate Removed	$ 45	$ 53	$ 69
Incremental :			
Additional Tons Removed	base	66	48
Additional Annual Cost	base	$ 95,000	$ 179,000
Per Ton Removed		$ 1,440	$ 3,730
Per Ton MSW (300,000)		$ 0.31	$ .60

- Consideration must be given to prevention of corrosion caused by acid gas condensation.

- Experience on resource recovery facilities is very limited.

Table I-4 shows estimated costs for the baghouse systems investigated for this project. The TSP emission rate would be guaranteed less than 0.01 gr/dscf corrected to 12% CO_2.

3. Dry Scrubbers

Dry scrubbers are devices which are designed to remove SO_2 and acid gases from the flue gas stream, in addition to particulates. Aqueous solutions of lime are sprayed into the gas stream, which react with the SO_2 and acid gases. Heat from the reaction, and from the flue gas, dry the resultant products, which are then collected in a baghouse. Characteristics of dry scrubbers are the same as those for baghouses, except as follows:

- SO_2, acid gases and other flue gas constituents, that may condense with lower exit gas temperatures are controlled.

- Acid gas corrosion may be less of a problem.

- Approximately twice as much residue is produced.

- Experience on resource recovery facilities is even more limited.

Table I-5 shows estimated costs for a dry scrubber and baghouse system, guaranteed for a TSP emission limit of 0.01 gr/dscf, corrected to 12% CO_2, and guaranteed to remove 70% of the SO_2 and 70% of the HCL in the flue gas stream.

C. SULFUR DIOXIDE (SO_2) AND ACID GASES

Use of a low sulfur fuel is currently considered by many as BACT for control of sulfur dioxide emissions Municipal solid waste (MSW) is inherently a low sulfur fuel with a sulfur content of approximately 0.15 $\pm$ 0.1%.

A control alternative which was examined for this report is the use of a dry scrubber system for SO_2 control, which simultaneously controls emissions of acid gases. Use of a dry scrubber has been examined for particulate control in the particulate BACT analysis. Wet scrubbing for SO_2 control was not investigated due to the presence of a vapor plume. Even though the gas has been cleaned the steam plume is considered unacceptable and eliminates this option.

TABLE I-4
COSTS OF FABRIC FILTER SYSTEMS
1050 TPD Unit

	Pulse Jet Fabric Filter	Reverse Air Fabric Filter
Emission Limit, * gr/dscf @ 12% CO_2	0.01	0.01
Removal Efficiency, Percent	99.6+	99.6+
Construction Cost	$1,381,000	$1,620,000
Annual Cost:		
Debt Service	$ 151,200	$ 177,700
Operating and Maintenance Costs	$ 359,000	$ 421,200
Total	$ 510,500	$ 598,900
Unit Cost:		
Per Ton MSW (300,000 tpy)	$ 1.70	$ 2.00
Per Ton Particulate Removed	$ 47	$ 55
Incremental Annual Cost	base	$ 88,400
Incremental Cost Per Ton MSW	base	$ 0.30

* Due to nature of fabric filters the collection efficiency and emission limit cannot be specified. The listed values indicate minimum acceptable performance.

TABLE I-5
DRY SCRUBBER/FABRIC FILTER SYSTEM
1050 TPD Unit

	Dry Scrubber Plus Fabric Filter
Emission Limit, gr/dscf @12% CO_2	0.015
Removal Efficiency, Percent	99 +
Construction Cost	$5,000,000
Annual Cost:	
Debt Service	$ 823,500
Operating and Maintenance Costs	$1,425,000
Total	$2,248,500
Unit Cost:	
Per Ton MSW (300,000 tpy)	$ 7.50
Per Ton Particulate Removed	$ 206

Table I-6 shows general effects of SO_2 control alternatives.

TABLE I-6
EFFECTS OF SO_2 CONTROL ALTERNATIVES

Area of Effect	Low Sulfur Fuel	Dry Scrubber
Energy Consumption	No effect	Increased facility energy consumption
Environmental	Reduced emissions of SO_2 compared to other fossil fuels	Reduced emissions of SO_2, HF and gaseous mercury; increased amounts of residues requiring land disposal
Economic	No direct facility related costs	Increased facility capital and operating costs

1. Low Sulfur Fuel

The emission rate of sulfur dioxide is dependent on the amount of sulfur in the fuel. Municipal solid waste is estimated to have a sulfur content of less than 0.2%. Generally, coal-fired facilities have switched from high (5-7%) to low (1-2%) sulfur coal to comply with laws and regulations. The proposed unit will utilize municipal solid waste which is much lower in sulfur content.

2. Dry Scrubbers

Dry scrubbers operate by injecting droplets of alkali reagent into the flue gas. The resulting reactions remove the sulfur dioxide as sulfites and sulfates in particulate form. The heat generated during the reaction plus flue gas heat evaporates the water carrying the alkali reagent. A particulate removal device is located downstream to remove the sulfate and sulfite particulates. The first commercial scale dry scrubber has just gone on-line at the coal-fired Northern States Power Company's Riverside Power Plant in Minneapolis, Minnesota. The system's costs and effects were based upon projections provided by system vendors.

Table I-7 shows estimated costs of a dry scrubber to control particulates, SO_2 and acid gases.

TABLE I-7
DRY SCRUBBER COSTS

Total Annual Cost (Debt Service + O&M)	$2,248,500 (1)
Annual Cost attributable to particulate control	$ 573,800/year (2)
Annual Cost attributable to SO_2 + acid gas control	$1,674,700/year (3)
Incremental Cost per ton of SO_2 + acid gas controlled	$ 1,600/ton (4)

Notes:
1. From Table I-5
2. Proportioned such that cost for particulate removal is equal to cost for electrostatic precipitator.
3. Total cost less that attributable to partiulate.
4. Based on guaranteed removal efficiencies, i.e. 70% removal of SO_2 and 90% removal of HCL.

D. NITROGEN OXIDE

The technologies for nitrogen oxide (NO_x) control include ammonia injection, wet scrubbers, and catalytic reduction. However, none have been utilized on a commmercial scale at either resource recovery facilities or coal-fired power plants in the United States.

Research relative to ammonia injection has revealed the following utilization limiting factors:

- When the flue gas temperature is between 1600°F and 1650°F, the reaction:

  $$NH_3 + NO + O_2 \quad N_2 + 3/2\ H_2O$$

  readily takes place, controlling NO emissions. Above 1800°F, the NH_3 is oxidized to NO. Below 1600°F, the reaction does not take place. A supplemental heating source may be required to maintain the appropriate temperature envelope.

- Ammonia can react with sulfur trioxide in the flue gas to form ammonium sulfate or ammonium bisulfate. Ammonium bisulfate can condense after emission to the atmosphere and act as a corrosive agent.

- Cyanide formation at the ammonia injection zone has occurred in the presence of hydrocarbons.

- Ammonium Chloride formation has been documented and forms a pervasive visible plume.

Research on nitrogen oxide control with catalytic reduction processes has identified the following problems:

- Formation of ammonium bisulfate with resulting corrosivity
- Blinding of the catalyst
- Catalyst corrosion
- Formation of unexpected compounds

The wet scrubber has been demonstrated only on a glass manufacturing furnace. The information is insufficient to judge its applicability to a municipal solid waste fired resource recovery facility.

Nitrogen oxides (NO_x) result from the reaction of atmospheric nitrogen and oxygen in the combustion zone and the partial combustion of nitrogenous compounds in the fuel. Important factors affecting NO_x production are flame and furnace temperature, residence time of combustion gases at flame temperature, rate of gas cooling, and amount of excess air.

Given the state of the art of NO_x control technologies, refuse feeding, and the importance of temperature zone parameters in NO_x generation, the BACT recommendation for the proposed resource recovery facilities is the use of proper boiler design and operating procedures.

E. CARBON MONOXIDE

Carbon Monoxide is a product of incomplete combustion. The generalized reaction is shown below:

$$HC + O_2 \quad CO + HC' + H_2O$$

When incomplete combustion takes place energy is lost, carbon monoxide and another hydrocarbon are formed. The new hydrocarbon is a pyrolyisis product and may combust further. BACT is the use of state-of-the-art boiler controls to insure sufficient underfire and overfire air so that the emissions of products of incomplete combustion are minimized.

The underfire air has three purposes: 1) to ignite the refuse, 2) cool the grates, and 3) supply air to all parts of the fuel bed. The overfire air causes turbulence in the fire ball to assist in complete burnout.

There are four steps in the combustion of refuse or any damp fuel:

1) drying
2) volitization
3) pyrolyzing
4) direct combustion

The step that contributes to carbon monoxide production is the pyrolysis step. Pyrolysing is the breaking down of larger organic compound in to smaller organic compounds by the application of heat. This differs little from cracking of crude oils into various fractions.

In a mass burn system, this cracking takes place in the presence of some air but still in a reducing atmosphere. Incomplete combustion can take place producing carbon monoxide. In a properly designed system, the products of pyrolysis are consumed in the fire ball section of the incinerator.

The fireball's intensity is controlled by high velocity overfire air. As long as sufficient overfire air is supplied to insure approximately 100% excess air, carbon monoxide production will be minimized.

There are no controls for carbon monoxide production other than state-of-the-art boiler design and control is BACT for CO control. The boiler will be designed to operate at peak efficiency which will minimize products of incomplete combustion.

APPENDIX II

AIR QUALITY ANALYSIS

II. AIR QUALITY ANALYSIS

A. INTRODUCTION

Available data indicate that emission levels as listed in Table II-1 are attainable by mass burn resource recovery facilities. These emission levels at a throughput of 1,050 TPD will be used in the modeling required for the PSD permit.

TABLE II-1
EXPECTED EMISSIONS

Pollutant	lb of Pollutant per ton of MSW	lb of Pollutant per hour
Particulate*	0.5	22.0
Sulfur Dioxide*	1.9	83.0
Nitrogen Dioxide	3.0	131.3
Carbon Monoxide	1.5	65.6
Hydrocarbons	0.3	13.1
Lead	0.03	1.3
Mercury	0.01	0.44
Beryllium	1.3×10^{-6}	5.7×10^{-5}
Fluorides	0.1	4.4
Chlorides	4.0	175

*Actual test results for Units 1 and 2.

Table II-1 is expanded in Table II-2 to indicate the equivalent emission factors used in the various parts of the Air Quality Analysis. The Resouce Recovery Facility (RRF) is a PSD significant source for all criteria and several non-criteria pollutants. Table II-3 lists the stack parameters used in the analysis of this unit.

TABLE II-2
3rd UNIT
RRF EMISSIONS AND STACK PARAMETERS

Pollutant	lb per ton MSW	Equivalent Factors lb/hr	TPY	Table I-2 TPY	gm/s
Particulate*	0.5	22	96	109	2.8
Sulfur Dioxide*	1.9	83	364	577	10.5
Nitrogen Dioxide	3.0	132	577	577	16.6
Carbon Monoxide	1.5	66	288	288	8.3
Hydrocarbons	0.3	13.1	58	58	1.68
Lead	0.03	1.3	5.7	5.7	0.17
Mercury	0.01	0.5	2.1	2.1	0.06
Beryllium	1.3×10^{-6}	5.7×10^{-5}	2.5×10^{-4}	1.9×10^{-3}	7.2×10^{-6}
Fluorides	0.1	4.4	19	22	0.55
Chlorides	4.0	174	764		22

*Actual test results for Units 1 and 2.

TABLE II-3
STACK PARAMETERS

Parameters	Unit 3 Metric	English
Volumetric Flow	118.0 m^3/s	251,000 acfm
Stack Diameter	2.37 m	7.8 ft
Stack Height	49.1 m	161 ft
Exit Velocity	26.8 m/s	88 ft/s
Exit Temperature	505 ^oK	450 ^oF

The Good Engineering Practice stack height for this facility is 290 ft. The planned stack height is 161 ft to be consistent with the existing construction. The shortness is due to the Clearwater - St. Petersburg Airport being 11,000 ft from the facility. Negotiations with the Federal Aviation Authority indicate that a stack higher than 178 ft will interfere with the approach surface to the airport.

A stack this short could significantly affect the air quality impacts caused by the facility. These impacts were investigated and are explained in Section II-D.

B. MODELING

To model the air quality impact due to the planned facility expansion, the following protocol was used:

1. Unit 3 will be identical to Units 1 and 2, actual design data for those units have been used for Unit 3. These data were developed in the design process and vary from that in the original application.

2. Results from previous CRSTER modeling of the facility using meteorological data from Tampa International Airport for the years 1970-74 were used to identify the worst years for pollutant concentrations from the facility. Data from the year 1970 were used for further short-term concentration estimates, while data from the year 1971 were used for annual estimates.

3. The ISCST model from UNAMAP4 was used to calculate the impacts of the emissions from 1) the project (Unit 3), 2) from all three Resource Recovery Facility (RRF) units, 3) from all of the PSD sources, and 4) from the RRF and other major interacting sources of SO_2 and TSP in the area.

4. PSD sources modeled include the three units of the Pinellas County RRF, the McKay Bay RRF, and the TECO Big Bend Plant.

5. The major interacting sources modeled include the aforementioned PSD sources, as well as the Florida Power facilities at Anclote, Higgins, and Bartow, TECO's Hooker Point and Gannon Plants, and the Golden Triangle Asphalt Plant.

6. Initial modeling was performed using a polar coordinate system for locating receptors every 22.5^{o} at distances of 500, 1,000, 1,500, 2,000, 2,500, 3,000, 3,500, 4,000, 4,500, 5,000, 6,000, 7,000, 8,000, and 9,000 meters. Subsequent modeling was performed at ring distances of 100, 200, 300, and 400 meters to ensure that the locations of maximum concentrations had been reached.

7. Hotspot analysis was performed using a 15 by 15 Cartesian receptor grid which extended from the maximum polar receptor to the receptors on either adjacent radial line.

8. Hotspot analysis was performed for the project (Unit 3) for all pollutants. Hotspot analyses were also performed for the combination of all three RRF units for 3-hour and 24-hour SO_2 concentrations. These results for SO_2 were scaled by the emission rates of the other pollutants to get hotspot results for all pollutants.

9. Because of the short stack used for the project, a downwash problem could occur. Therefore, the downwash option in the ISCST model was used for the Pinellas County RRF. Any effect of downwash will appear in the model calculations.

10. The results of the modeling of the interacting sources was added to the County's monitored background concentrations for comparison to Florida and federal standards. The source of the data is the County's 1981 Air Quality Annual Report.

C. CURRENT AMBIENT AIR QUALITY

Measured maximum ambient air quality concentrations for 1981 in the vicinity of the Pinellas County Resource Recovery Project are contained in Table II-4. The National Ambient Air Quality Standards (NAAQS) and Florida AAQS are included in the table for comparison. With the exception of ozone (O_3), all pollutant concentrations are considerably lower than the Florida and National standards.

There are two nonattainment areas in the region. A nonattainment area for SO_2 exists at Tarpon Springs, approximately 20 miles to the north-northwest of the project location. In addition, an area defined as a 12-kilometer circle around the intersection of the roads U. S. 41 and Florida 60 in Tampa has been designated nonattainment for TSP. The closest point of this nonattainment area to the project is 9 miles to the east-northeast.

D. IMPACT ANALYSIS

The impact analysis for the proposed project (Unit 3) as well as for all three units of the Pinellas County RRF was based on the sulfur dioxide emission rate. The impact of the facility on other pollutant concentrations was calculated by multiplying the SO_2 concentration by scaling factors which represent the other pollutants emission rates divided by the SO_2 emission rate. All pollutants were assumed to behave conservatively (i.e., no pollutant removal mechanisms). Summaries of the impacts on air quality of Unit 3 only and of all three units are contained in Tables II-5 and II-6, respectively.

Table II-7 contains a summary of the cumulative impacts of the proposed project and other major sources of SO_2 and TSP (as listed in Section II.B). The peak modeled concentration is added to the ambient air quality data from Table II-4 to give a predicted worst-case cumulative concentration. None of these predicted concentrations exceed Florida or National Ambient Air Quality Standards as listed in Table II-4.

Table II-8 contains the cumulative impacts of the project and other PSD sources. These peak modeled concentrations are compared to the PSD Class II increment in the table. None of the Class II increments are exceeded. Table

II-9 shows the predicted peak impact of the project on the SO_2 nonattainment area at Tarpon Springs and the TSP nonattainment area in Tampa. These impacts are practically negligible.

E. MONITORING

The PSD regulations require air monitoring to determine the existing air quality. Sources may be exempted from monitoring if the modeled ipacts are below certain de minimis values. The de minimis values and the modeled impacts are shown in Table II-10.

Based on the data in Table II-10, monitoring data are needed and will be supplied for lead.

The lead monitoring data will be supplied from the Sheriff's and Azalea Park monitoring stations. These stations are beyond the facility's highest impact area but are located to record the highest lead levels expected within the county. This technique will distinguish the facility's highest impact added to the county's highest monitored level.

The ambient lead levels have fallen significantly in the past three years. The quarterly maximum has fallen from a high of 1.0 ug/m^3 in 1979 to 0.3 ug/m^3 in 1981. Table II-11 shows the highest quarterly average for the past three years.

TABLE II-11
AMBIENT LEAD CONCENTRATIONS
LEAD QUARTERLY MAXIMUMS
(ug/m^3)

Station	1979	1980	1981
Azalea Park	0.9	0.6	0.5
Sheriff's	1.0	0.5	0.3

It can be seen that the unit's highest 24-hour average level concentration (0.25 ug/m^3) added to the county's highest recorded quarterly average level in the past htree years (1.0 ug/m^3) is still significantly below the NAAQS of 1.5 ug/m^3. Therefore, the facility will not violate the NAAQS for lead.

The data in Table II-10 also indicate that the de minimis values for sulfur dioxide and fluorides are exceeded. Sulfur dioxide monitoring data will be supplied from the nearby Derby Lane monitoring station. Table II-7 indicates that the modeled SO_2 impacts from all of the major interacting sources of SO_2, in addition to the SO_2 background concentration from Derby Park, result in cumulative concentrations which are well within Florida and National Ambient Air Quality Standards.

It is not anticipated that monitoring data will be required for fluorides. Modeling is generally the basis for analysis of non-criteria pollutants, unless the local air quality permitting agency determines otherwise (Federal Register **45**(154):52724). No major sources of fluorides are known to exist in the vicinity of the facility.

F. CONTINUED COMPLIANCE

To demonstrate compliance with the final permits stack testing will be performed as required. The tests performed will be requested by the DER and will be performed according to the procedures found in 40 CFR Part 60 Appendix A.

TABLE II-7
CUMULATIVE IMPACTS OF THE PROJECT
AND OTHER MAJOR SOURCES OF SO_2 AND TSP

Pollutant	Averaging Time	Background Concentration (ug/m^3)	Peak Modeled Concentration (ug/m^3)	Cumulative Concentration (ug/m^3)	Location [a]
SO_2	3-hour	476	269	745	(3000 m, 90^o)
	24-hour	104	96	200	(3000 m, 315^o)
	Annual	8.8	13.7	22.5	(8000 m, 67.5^o)
TSP	24-hour	89	6.1	95.1	(500 m, 247.5^o)
	Annual	44.6	0.7	45.3	(500 m, 90^o)

T7017/8-24-83

[a]The locations of peak concentration are expressed with respect to the location of the project (0,0) and are expressed in terms of a distance and direction.

TABLE II-9
IMPACT OF THE PROJECT ON SO_2 AND TSP
NONATTAINMENT AREAS IN THE VICINTY OF THE PROJECT

Location of Nonattainment Areas	Nonattainment Pollutant	Averaging Time	Modeled Impact of Project
Tarpon Springs	SO_2	3-hour	2.16 ug/m^3
		24-hour	0.29 ug/m^3
		Annual	0.019 ug/m^3
Tampa	TSP	24-hour	0.011 ug/m^3
		Annual	0.006 ug/m^3

T7015/8-29-83

TABLE II-8
CUMULATIVE IMPACTS OF THE PROJECT
AND OTHER PSD SOURCES

Pollutant	Averaging Time	Peak Modeled Concentration (ug/m^3)	PSD Class II Increment (ug/m^3)	Location [a] (Distance, direction)
SO_2	3-hour	246	512	(8000 m, 67.5^o)
	24-hour	81	91	(8000 m, 157.5^o)
	Annual	4.9	20	(8000 m, 67.5^o)
TSP	24-hour	5.7	37	(500 m, 247.5^o)
	Annual	0.38	19	(500 m, 90^o)

T7016/8-29-83

[a]The locations of peak concentration are expressed with respect to the location of the project (0,0).

APPENDIX III

OTHER IMPACT ANALYSIS

III. ADDITIONAL IMPACT ANALYSIS

A. PURPOSE

The basic purpose of the additional impacts analysis is to determine the effects of applicable criteria and noncriteria pollutant emissions on visibility, soils and vegetation. This assessment will be helpful in providing the Federal land manager with information regarding the potential impacts on Class I areas (Scenic areas, designated by Congress, to be protected from manmade air pollution, 33 U.S.C. 1288). In addition, this chapter of the air permit will help to inform the general public of potential impacts related air quality.

Three components of the additional impact analysis are: (1) a growth analysis, (2) a visibility impairment analysis, and (3) a soils and vegetation impact analysis. The final section of this chapter will summarize the results of these analyses.

B. GROWTH ANALYSIS

The Pinellas County Department of Planning estimates that the Pinellas County population will increase from the 1980 Census figure of 728,531 to 796,000 persons in 1985. This increase of approximately 68,000 people represents a 9% increase in five years or 1.8% per year. Future projections by the Department indicate an estimated population of 1,003,000 in the year 2000 which is a 38% increase over 20 years or an average of 1.6%/year.

The construction force is expected to range between 200 to 300 persons throughout the construction phase of the third unit. This represents less than 0.06% of the total population. It is expected that all of the construction work force except certain supervisory personnel will be from the local area. If there is any relocation of workers, housing is available in the vicinity of the proposed project. A sample of the types and numbers of construction workers is shown in Table III-1.

The operation of the proposed facility will require approximately 6 additional persons. A sample of the types and numbers of operations personnel is shown in Table III-2. It is expected that these personnel will also be from the local area.

The implementation of the proposed facility will cause a positive economic impact on Pinellas County because most, if not all, of the construction and operations work forces will be from the local community. Since there will not be a major influx of workers into the area, there will a minimal impact on the environmental quality of the community due to growth in the area's work force or secondary construction caused by the facility.

TABLE III-1

ESTIMATED CONSTRUCTION WORK FORCE
1050-TPD UNIT

Types	Work Force
Boilermakers	50
Carpenters	30
Electricians	15
Ironworkers	40
Laborers	50
Masons	15
Millwrights	25
Painters	5
Pipefitters	20
Total	250

TABLE III-2

ESTIMATED ADDITIONAL OPERATIONAL STAFF
1050 TPD UNIT

Types	Work Force
Supervisory	0
Clerical	1
Operators per shift	3
Maintenance	2
Security	0
Janitorial	0
Total	6

C. VISIBILITY ANALYSIS

The Clean Air Act Amendments of 1977 require evaluation of new and existing emission sources to determine potential impacts on visibility in Class 1 areas. These source evaluations are to be used as part of a regulatory program to prevent future and remedy existing impairment of visibility in Class 1 areas that results from man-made air pollution. The visibility analysis discussed below is taken from EPA's "Workbook for Estimating Visibility Impairment", November, 1980, which provides a general guidance for determining the potential impacts of an emissions source on visibility in a Class 1 area.

There are two separate types of visibility impairment: atmospheric discoloration and visual range reduction (increased haze); see Figure 1. EPA has defined "visibility impairment" to mean any humanly perceptible change in visibility (visual range, contrast, coloration) from that which would have existed under natural conditions. An important part of a visibility analysis is to determine the frequency of occurrence and magnitude of visual impact in, or within view of, a Class 1 area.

A schematic of EPA's recommended visibility screening analysis procedure is shown in Figure 2. A Level 1 analysis has been performed and is included in Appendix ___. The input data included in the analysis estimated NO_2, SO_2 and the particulate emissions for the proposed resource recovery facility. Regional visual range and distance to the nearest Class 1 areas were used. The nearest Class I area is the Chassahowitzka National Wildlife refuge, located on the west coast of Florida, 75 miles north of the site. A plume contrast rating load was established with reference to the sky, the terrain and the primary and secondary aerosols. EPA has established a rating factor for the plume contrasts which provides guidance for determination of further analysis. If the calculated plume contrast is less than 0.1, no further analyses of potential visibility impacts are necessary. The absolute values of each plume contrast for the proposed facility were calculated to be less than 0.001, which is less than the EPA rating factor. Therefore, further analyses of potential visibility impacts are unnecessary, as it is considered highly unlikely that the proposed facility would cause adverse visibility impairment in Class 1 areas.

D. SOILS AND VEGETATION ANALYSIS

The electrostatic precipitators and the stack height of the proposed Facility will be designed so that neither Florida Ambient Air Quality Standards (FAAQS) nor the PSD increments will be violated. The facility will not violate the secondary FAAQS's, estalished to protect vegetation, materials, visibility, etc. The secondary standards for CO, NO_x, O_3 and HC are equivalent to their respective primary standards, as can be seen in Table III-3. The secondary standards for TSP and SO_2 are more stringent than their respective primary standards.

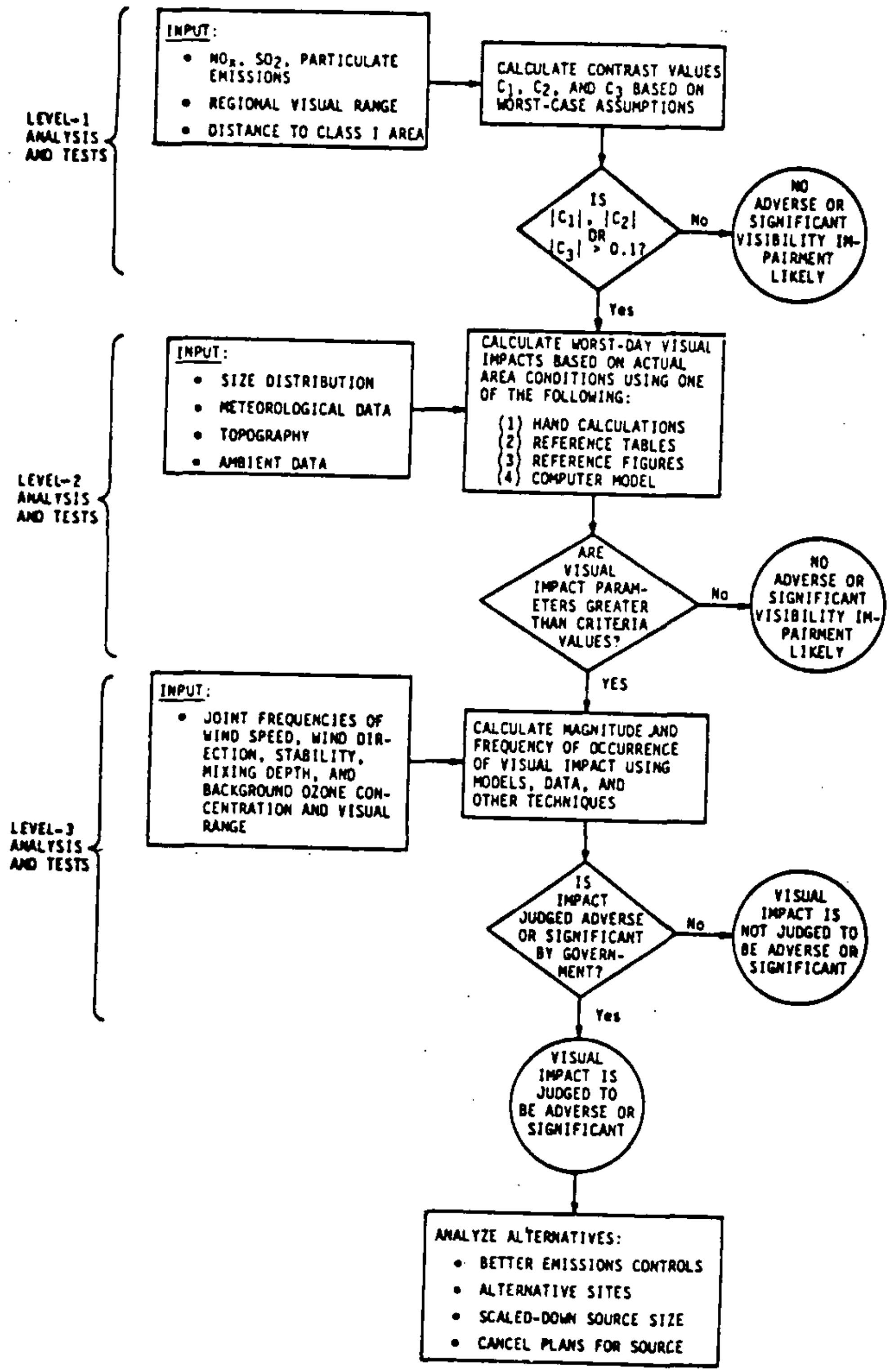

Figure 1. Schematic of visibility screening analysis procedure. The numerical meaning of the terms "significant" and "adverse" differ on a case-by-case basis and will be defined after an in-depth policy analysis of each case.

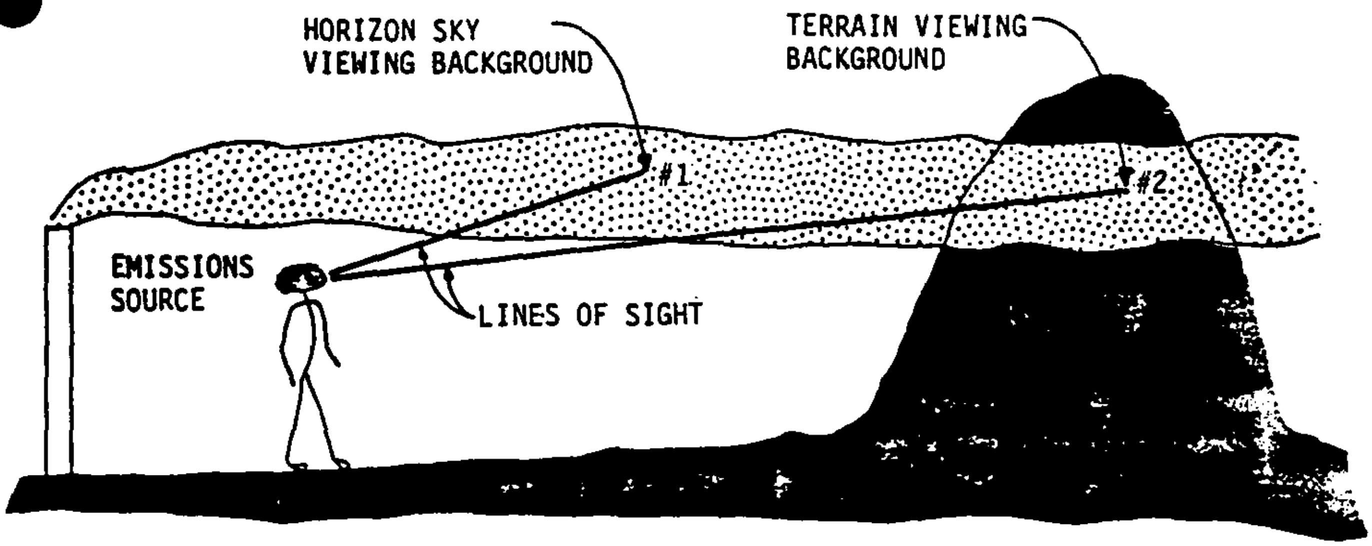

Figure 10. Two types of plume visibility impairment considered in the level-1 visibility screening analysis.

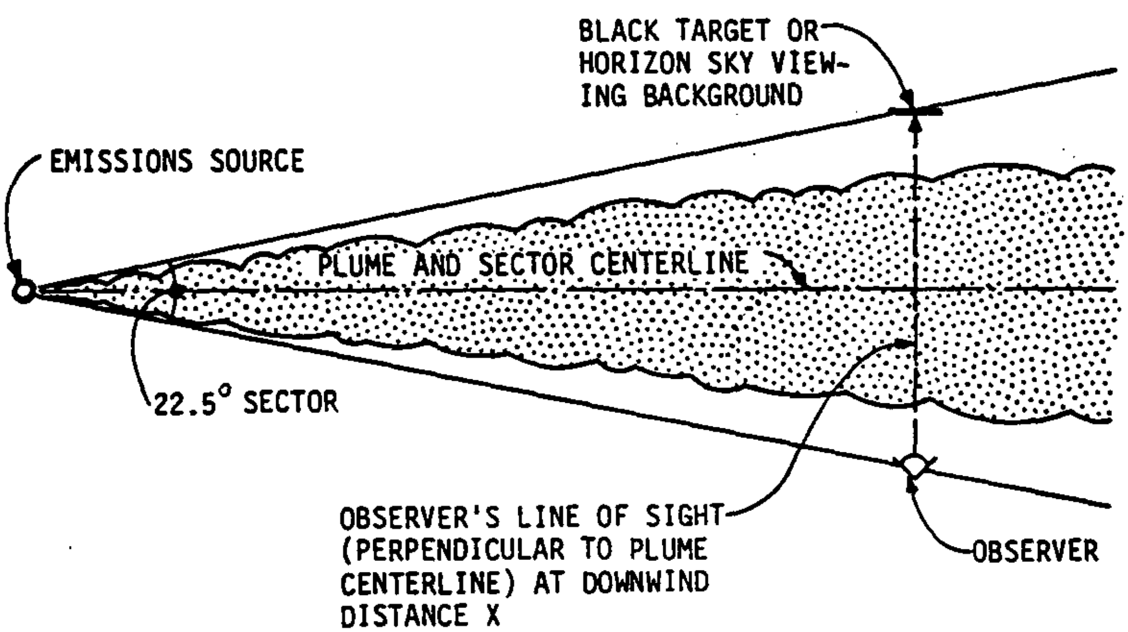

Figure 11. Geometry of plume, observer, and line of sight used in level-1 visibility screening analysis.

TABLE III-3
FLORIDA AMBIENT AIR QUALITY STANDARDS

Pollutant	Averaging Time[1]	Primary Standards	Secondary Standards
Particulate matter	Annual geometric mean	75 ug/m^3	60 ug/m^3
	24-hour	260 ug/m^3	150 ug/m^3
Sulfur oxides	Annual arithmetic mean	80 ug/m^3 (0.03 ppm)	---
	24-hour	365 ug/m^3 (0.14 ppm)	---
	3-hour	---	130 ug/m^3 (0.5 ppm)
Carbon monoxide	8-hour	10 mg/m^3 (9 ppm)	same
	1-hour	40 mg/m^3 (35 ppm)	same
Nitrogen dioxide	Annual arithmetic mean	100 ug/m^3 (0.05 ppm)	same
Ozone	1-hour	240 ug/m^3 (0.12 ppm)	same
Lead	Calendar quarter	1.5 ug/m^3	same

1. The 1-, 3-, 8-, or 24-hour standards are not to be exceeded more than once per year.

1. Soils

The air pollutants from a major stationary source could alter soil characteristics, which may affect vegetation in the area. Vegetation can also be affected directly by acid rain, the result of SO_2 and NO_x emissions. There are pollutant levels at which soils and vegetation are not affected. In fact, the soil is a natural sink for many pollutants such as CO. Soils in the temperate zone have been estimated to remove and assimilate, on the average, 8.44 mg of $CO/hr/m^2$ from the atmosphere (Inman and Ingersoll, 1971). Particulate matter that drops out of the atmosphere and into the soil is generally recycled as nutrients or fixed in a form that is unavailable to vegetation (Bonn, 1972, Rasmussen, et al., 1975).

Pollutants such as fluoride, mercury and beryllium are absorbed by soil and generally fixed by the organic and clay fractions of the soil.

Therefore, the pollutants would be in a form unavailable to plants. The tolerance of soils and plants is dependent on the soil type and plant species.

The most serious impact on soil would be caused by acid rain, which could increase the soil acidity and increase nutrient leaching rates. It appears unlikely that increasing annual ambient levels by 0.8 ug/m^3 of SO_2 and 0.8 ug/m^3 of NO_2 that the proposed facility would measureably alter long-term precipitation pH levels. In fact, no accurate estimation of the change in the pH of rainfall caused by the proposed facility is feasible within current state-of-the-art technology.

2. Vegetation

Native vegetation in the study is associated with specifc soil classifications. In areas of urban or agriculatural usage, non-native species have invaded or are cultivated. Table III-4 features a compilation of soil and vegetation communities found in the area.

In residential areas plantings of various ornamental species are common; also prevalent, especially in less dense residential subdivisions are backyard gardens. In vacant lots where the native vegetation has been removed, thick coppices of Brazilian pepper are found. Fringing the shores of Tampa Bay are stamps of Black Mangrove.

Table III-5 is a compilation of landscape, agricultrual and other non-native species observed in the study area. This listing presents only those speciments which commonly occur.

Backyard gardens range from several square feet to an acre in size. The local climate allows for year round planting although tender plants are generally sown in spring only. Vegetables grown include corn, beans (bush, pole, lima, and pinto), peas (English and southern), greens (collards, mustard, lettuce, cabbage, celery), tomatoes, okra, carrots, turnips, broccoli, cauliflower, eggplant, and peppers. The most common fruit are strawberries; garden specimens of citrus and avacado are not uncommon.

The land within the study area to the south and east characterized by urban usage and resultant landscape plantings. Immediately surrounding the facility site on disturbed open land are dense coppices of brazilian pepper. The tidal shoreline is fringed by black and red mangroves although the former species is more common. Severe freeze damage to the mangroves and many other tender exotics (e.g. Australian pine, cajeput) resulted from an unusually cold period during January, 1981. A few small citrus groves were identified in the far north portion of the study area.

TABLE III-4
SOIL AND VEGETATION COMMUNITIES

Soil Classification	Associated Major Community Species
Well drained deep sands	turkey oak, bluejack oak, slash pine, dogwood, hickory
Poorly drained sands over organic hardpans	pine flatwoods (slash pine, palmetto, wire grass)
Poorly drained sands over calcareous substrate	sabal palm, saw palmetto and wire grass
Well drained sands with phosphatic materials	live and laurel oaks, hickory, and pines
Tidal lands	white, black and red mangrove and black needlerush
Freshwater swamps	pond and bald cypress and sweet bay
Poorly drained acid sands	pine flatwoods (slash pine, palmetto, and wire grass)
Poorly drained neutral to alkaline soils	slash pine, water oaks, and sweet bay
Poorly drained dark colored sands	pine flatwoods (slash pine, palmetto, and wire grass)
Urban lands	landscape plantings and backyard gardens; commercial/industrial open land is covered by Brazilian pepper
Agricultural lands	pasture land of bahia grass; some citrus groves (oranges, grapefruit)

TABLE III-5
LANDSCAPE, AGRICULATURE AND OTHER
NON-NATIVE SPECIES

Common Name	Genus	Species	Location
Grasses			
Bahiagrass	Paspalum	notatum	Pastures and lawns
Bermudagrass	Cynodon	dactylon	lawns
St. Augustine Grass	Stenotaphrum	secundatum	lawns (most common lawn grass
Wire Grass	Aristida	stricta	native; pine flatwoods
Panic Grass	Panicum	sp.	native; on disturbed sites
Ground Coverings			
Periwinkle	Vinca	spp	native; disturbed sites and landscape plantings
Lily-turn	Liriope	muscari	landscape plantings
Flowers			
Chrysanthemum	Chrysanthemum	indicum	landscape plantings
Begonia	Begonia	sp	landscape plantings & hanging baskets
Geranium	Pelargonium	sp	landscape plantings
Marigold	Tagetes	spp	landscape plantings
Phlox	Phlox	drummondi	native; along roads and railroad tracks
Rose	Rosa	spp	landscape plantings
Bulbs			
Day-lily	Hemerocallis	sp	landscape plantings
Canna lily	Canna	sp	landscape plantings
Ferns			
Asparagus Fern	Asparagus	sp	hanging baskets and window pots
Succulents			
Spanish Bayonet	Yucca	aloifolia	native; landscape plantings and along roadways
Century Plant	Agave	americana	landscape plantings

TABLE III-5 (Continued)

Common Name	Genus	Species	Location
Palms			
Cabbage palm	Sabal	palmetto	native; prairies and landscape plantings (state fee)
Areca palm	Chrysali-docarpus	lutescens	landscape plantings
Canary Island data palm	Phoenix	canariensis	landscape plantings
Coconut palm	Cocos	nucifera	landscape plantings
Manila palm	Veitchia	merrillii	landscape plantings
Queen palm	Arecastrum	romanzof-fianum	landscape plantings
Native Trees			
Slash Pine	Pinus	elliottii	pine flatwoods, swamps, & left on developed land
Longleaf Pine	Pinus	palustris	on drier sites and in landscapes
Live Oak	Quercus	virginiani	better, dry soils and landscapes
Water Oak	Quercus	nigra	poorly trained sites
Red Cedar	Juniperus	silicicola	soils underlain by calcareous material and landscapes
Sweet Gum	Liquidambar	styraciflua	poorly drained sands and loams
Sweet Bay	Magnolia	virginiana	poorly drained acid sands
Turkey Oak	Quercus	laevis	excessively drained sands
Bluejack Oak	Quercus	incana	execeesively drained sands
Bald cypress	Taxodium	disthichum	riverine swamps
Pond cypress	Taxodium	ascendens	cypress domes and depressed lands among pine flatwoods along ditches and streams
Black mangrove	Avicennia	nitida	tidal swamps
Red mangrove	Rhizophora	mangle	tidal swamps seaward of black mangrove
Hickory	Carya	sp	mesic forests

TABLE III-5 (Continued)

Common Name	Genus	Species	Location
Native Shrubs			
Saw palmetto	Serenoa	sp	pine flatwoods and deep sands
Yaupon holly	Ilex	vomitoria	deep sands and landscapes
Gallberry	Ilex	coriacea	pine flatwoods
Wax myrtle	Myrica	cerifera	pine flatwoods
Exotic Species			
Australian Pine	Casuarina	spp	along roads and property lines
Citrus	Citrus	spp	oranges, grapefruits, lines, lemons, and tangerines in backyards or small groves
Jerusalem thorn	Parkinsonia	aculeata	disturbed open land and landscapes
Norfolk Island pine	Araucaria	excelsa	landscape plantings
Cajeput	Melaleuca	leucadendra	disturbed open land
Rubber tree	Ficus	sp.	landscape plantings
Banana	Musa	spp	landscape plantings
Bamboo	Bambusa	sp.	landscape plantings
Sago palm	Cycas	revoluta	landscape plantings
Pampas grass	Cortaderia	sellonna	landscape plantings
Copper leaf	Acalypha	wilkesiana	landscape plantings
Croton	Cordiaeum	Variegatum	landscape plantings
Hibiscus	Hibiscus	spp.	landscape plantings
Oleander	Nerium	oleander	landscape plantings
Surinam cherry	Eugenia	unifloria	landscape plantings
Brazilian pepper			grows in dense thickets on disturbed open land.

E. SENSITIVE ZONES

The area immediately surrounding the facility consists of open disturbed lands (created by recent construction) with some warehouse and other light manufacturing structures. The water body just east of this fill area is Tampa Bay, an emergent, or man-impacted ecosystem; it is the focal point of many area conservation groups primarily in conjunction with nesting and/or migratory bird populations. The mangrove ecosystem fringing tidal shores are important natural assets from both a fisheries and storm protection standpoints.

Tree species, such as black and red oak, white pine, gray and white birch, American elm and red maple, have been reported to be relatively sensitive to ambient SO_2 levels (Jones, et al., 1974, Davis and Wilhour, 1976). Concentrations of SO_2 between 786 and 1,572 ug/m^3 for three hours have developed visible injury symptoms (Jones, et al., 1974). White pines exposed to ambient SO_2 levels of more than 0.25 ppm are often stunted (Linzon, 1966). Maximum annual SO_2 concentrations are predicted to be less than 35 ug/m^3, which is considered to be below the threshold at which injury to even sensitive woody vegetation may occur (NAS, 1978).

Long-term exposure to 470 ug/m^3 NO_2 throughout the months of the growing season has been found to reduce growth, weight and yield in tomato plants (Spiering, 1971). However, the predicted peak annual ambient NO_2 concentration of 0.8 ug/m^3 will be well below the minimum concentration reported to cause injury to vegetation after long-term exposures.

Only small increases of ambient TSP levels, 1.44 ug/m^3 and 0.16 ug/m^3 for the 24-hour and annual averages will be caused by the proposed facility. These small increases will not be sufficient to coat foliage or block light and gas exchange (Lodge, et al., 1981).

Vegetation is extremely resistant to CO. In fact, plants exposed to 115 mg/m^3 CO for up to three weeks did not produce any visible injury (Zimmerman, et al., 1933). Predicted maximum CO levels in the vicinity of the proposed facility is 14 ug/m^3, per 8-hour interval.

Ambient lead levels are predicted to be less than 0.24 ug/m^3 for a calendar quarter. The proposed facility will contribute approximately 17% of the ambient standard. However, there have been no known reports of injury to vegetation from lead concentrations near highways where lead concentrations are expected to be high (NRC, 1979).

Plants can be particularly sensitive to fluoride emissions, especially as hydrofluoric acid. However, most of the fluoride emissions from the proposed plant will be in the form of an aerosol (suspended fine particulates), which is less damaging to vegetation. Fluorides can cause spotting or partial destruction of leaf surfaces and reduced plant growth.

Total ambient fluoride levels of 0.8 to 4.0 ug/m^3 for several days have been shown to adversely affect the most fluoride-sensitive plants, such as corn, cherry pine and gladiolus (Treshow, 1969). However, when gladiolus plants were exposed to average fluoride aerosol averaging levels of 1.9 ug/m^3 for four weeks, no damage to leaf areas was experienced (Pack, et al., 1960).

The proposed facility may have peak 24-hour averaging fluoride levels of 0.24 ug/m^3 in the immediate vicinity of the plant.

F. SUMMARY

There will be a positive economic impact on Pinellas County due to the implementation of the proposed facility, while environmental impacts will be slight. Workers for the construction and operation of the facility will be from the local work force; therefore, no growth impacts would be experienced due to an influx of workers from outside the county.

The Class 1 areas closest to the proposed facility are about at a 75 kilometers from the facility. A level 1 visibility analysis indicated that it is extremely unlikely that visibility would be affected in these areas.

The soils in Pinellas County have sufficient high clay content to resist acid precipitation, and should be good at absorbing pollutants such as particulate matter, fluoride, mercury and beryllium. Any increase in SO_2 or NO_2 due to the proposed facility should not significantly alter the pH of rainfall. In fact, any pH change experienced would not be measurable. Increased ambient levels of criteria and non-criteria pollutants due to the facility emissions are not likely to have a significant effect on vegetation in the area.

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APPENDIX IV

AIR PERMIT APPLICATION FORMS

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

APPLICATION TO OPERATE/CONSTRUCT AIR POLLUTION SOURCES

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

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

COMPANY NAME: Pinellas County COUNTY: Pinellas

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) Incinerator

SOURCE LOCATION: Street 28th SE & 110th Avenue City County

UTM: East ______ North ______

Latitude 27 ° 52 ' 18 "N Longitude 82 ° 40 ' 48 "W

APPLICANT NAME AND TITLE: Pinellas County, Dept. of Public Works & Utilities

APPLICANT ADDRESS: 310 Court Street, Clearwater, Florida 33516

SECTION I: STATEMENTS BY APPLICANT AND ENGINEER

A. APPLICANT

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

I certify that the statements made in this application for a Construction Permit 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: D F Acenbrack

D. F. Acenbrack, Director
Name and Title (Please Type)

Date: 6/10/83 Telephone No. 813-825-1565

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: Robert Van Deman

Robert Van Deman
Name (Please Type)

(Affix Seal)

(SEALED)

Henningson, Durham & Richardson, Inc.
Company Name (Please Type)

P.O. Box 5576, Clearwater, Florida 33518
Mailing Address (Please Type)

Florida Registration No. 25963 Date: 6/10/83 Telephone No. 813-577-9455

[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.

Addition of third combustion to existing facility. Advantages will be greater availability of energy production. Electrostatic precipitators will be used to control particulate.

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

Start of Construction August 1983 Completion of Construction August 1986

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.)

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

DER Powerplant Site Certification PA 78-11

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:

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
   a. If yes, has "offset" been applied? No
   b. If yes, has "Lowest Achievable Emission Rate" been applied? No
   c. If yes, list non-attainment pollutants.
      Ozone
2. Does best available control technology (BACT) apply to this source? If yes, see Section VI. Yes
3. Does the State "Prevention of Significant Deterioriation" (PSD) requirements apply to this source? If yes, see Sections VI and VII. Yes
4. Do "Standards of Performance for New Stationary Sources" (NSPS) apply to this source? Yes
5. Do "National Emission Standards for Hazardous Air Pollutants" (NESHAP) apply to this source? Yes

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 approx.	8% 7000	24% 21000	40% 35000	10% 8750	0	0	18% 15750

Description of Waste Municipal Solid Waste

Total Weight Incinerated (lbs/hr) 87500 @ 5,000Btu/lb Design Capacity (lbs/hr) 87500

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

Manufacturer UOP

Date Constructed ________ Model No. ________

	Volume (ft)^3	Heat Release (BTU/hr)	Fuel		Temperature (°F)
			Type	BTU/hr	
Primary Chamber	Na	4.11×10^8 Btu/hr	Solid Waste	4.11×10^8 Btu/hr	1600-1800°F
Secondary Chamber					

Stack Height: 161 ft. Stack Diameter 7.78bf Stack Temp. 450°F

Gas Flow Rate: 251,000 ACFM ______ DSCFM* Velocity 88 FPS

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

Type of pollution control device: [ ] Cyclone [ ] Wet Scrubber [ ] Afterburner [X] Other (specify) ESP

Brief description of operating characteristics of control devices:

Electrostatic collection of particulate matter

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

solids to landfill

liquids to 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 @ 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?

Contaminant	Rate or Concentration
Particulate	0.03 gr / dscf at 12% CO_2

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

1. Control Device/System: NONE
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.

10. Stack Parameters

a. Height: ft. b. Diameter: ft.

c. Flow Rate: ACFM d. Temperature: °F

e. Velocity: FPS

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

1.

a. Control Device: SEE BACT SECTION

b. Operating Principles:

c. Efficiency*: d. Capital Cost:

e. Useful Life: f. Operating Cost:

g. Energy*: h. Maintenance Cost:

i. Availability of construction materials and process chemicals:

j. Applicability to manufacturing processes:

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

2.

a. Control Device:

b. Operating Principles:

c. Efficiency*: d. Capital Cost:

e. Useful Life: f. Operating Cost:

g. Energy**: h. Maintenance Costs:

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:

*Explain method of determining efficiency.

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

3.

a. Control Device:

b. Operating Principles:

c. Efficiency*: d. Capital Cost:

e. Life: f. Operating Cost:

g. Energy: 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

b. Operating Principles:

c. Efficiency*:

d. Capital Cost:

e. Life:

f. Operating Cost:

g. Energy:

h. Maintenance Cost:

i. Availability of construction materials and process chemicals:

j. Applicability to manufacturing processes:

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

F. Describe the control technology selected:

SEE BACT SECTION

1. Control Device:

2. Efficiency*:

3. Capital Cost:

4. Life:

5. Operating Cost:

6. Energy:

7. Maintenance Cost:

8. Manufacturer:

9. Other locations where employed on similar processes:

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:

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

SECTION VII – PREVENTION OF SIGNIFICANT DETERIORATION

A. Company Monitored Data

1. ________ no sites None TSP ( ) SO^2* ________ Wind spd/dir

Period of monitoring ___/___/___ (month day year) to ___/___/___ (month day year)

Other data recorded Pinellas County Dept. of Environmental Management

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 / / 70 (month day year) to 12 / 31 / 74 (month day year)

2. Surface data obtained from (location) Tampa

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

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

C. Computer Models Used

1. CRSTER Modified? If yes, attach description.

2. PTP/U Modified? If yes, attach description.

3. PTDIS Modified? If yes, attach description.

4. ________ Modified? If yes, attach description.

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

D. Applicants Maximum Allowable Emission Data

Pollutant	Emission Rate
TSP	________ grams/sec
SO^2	________ grams/sec

E. Emission Data Used in Modeling

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

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

*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.

The project will create jobs and decrease need for landfill space.

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.

APPENDIX V

VISIBILITY ANALYSIS

LEVEL I - VISIBILITY ANALYSIS (Ref. EPA 450/4-8-031 Nov. 80)

Q = PINELLAS CTY. RRF UNITS 1, 2 & 3
$Q_{PART.}$ = 1.81 METRIC TONS / DY ; PARTICULATE
Q_{NO_2} = 4.31 METRIC TONS / DY ; NO_x
Q_{SO_2} = 4.31 METRIC TONS / DY ; SO_2

X = 75 Km TO CHASSAHOWITZKA NWR
σ_z = 90 m ; VERTICAL DISPERSION COEFF.

PLUME DISPERSION PARAMETER

$$P = \frac{2.0 \times 10^8}{(\sigma_z)\, x} = \frac{2.0 \times 10^8}{(90)\,75} = 2.96 \times 10^4$$

$\tau_{PART.}$ = OPTICAL THICKNESS
$= (10 \times 10^{-7})\, P\, Q_{PART} = (10 \times 10^{-7})(2.96 \times 10^{4})\, 1.81$
$= 5.36 \times 10^{-2}$

$\tau_{NO_2} = (1.7 \times 10^{-7})\, P\, Q_{NO_2} = (1.7 \times 10^{-7})(2.96 \times 10^{4})(4.31)$
$= 2.17 \times 10^{-2}$

γ_{vo} = 25 KM ; REGIONAL BACKGROUND VISUAL RANGE (FIG. 13)

$\tau_{aerosol}$ - PRIMARY & SECONDARY AEROSOL

$\tau_{ar} = 1.06 \times 10^{-5}\, \gamma_{vo}\, (Q_{PART} + 1.31\, Q_{SO_2})$
$= (1.06 \times 10^{-5})(25)(1.81 + 1.31(4.31))$
$= 1.98 \times 10^{-3}$

HDR

Project: PINELLAS RRF Computed: ED
Subject: VISIBILITY ANALYSIS Date: 2/28/83 Sht. 2 Of 2

C_1 = PLUME CONTRAST / SKY

$$C_1 = \frac{-\tau_{NO2}}{\tau_{PART} + \tau_{NO2}} \left[1 - \exp(-\tau_{PART} - \tau_{NO2})\right]\left[\exp(-0.78\, x/\, r_{Vo})\right]$$

$$= \frac{-2.17\times10^{-2}}{5.36\times10^{-2} + 2.17\times10^{-2}} \left[1 - \exp - (5.36\times10^{-2} + 2.17\times10^{-2})\right]\left[\exp(-0.78\; 75/25)\right]$$

$$= -2.01\times10^{-3}$$

C_2 = PLUME CONTRAST / TERRAIN

$$C_2 = \left[1 - (1/C_1+1)\exp(-[\tau_{PART} + \tau_{NO2}])\right]\left[\exp(-1.56\; x/\, r_{Vo})\right]$$

$$= \left[1 - (1/2.01\times10^{-3}+1)\exp(-[5.36\times10^{-2} + 2.17\times10^{-2}])\right]\left[\exp -1.56\; 75/25\right]$$

$$= -1.74\times10^{-5}$$

C_3 = CHANGE IN SKY / TERRAIN CONTRAST / AEROSOL

$$C_3 = 0.368\left[1 - \exp(-\tau_{ar})\right]$$

$$= 0.368\left[1 - \exp(-1.98\times10^{-3})\right]$$

$$= 7.28\times10^{-4}$$

<u>NOTE</u>: SINCE THE ABSOLUTE VALUES OF C_1, C_2 & C_3 ARE < 0.01 IT IS UNLIKELY THAT THE RRF, INCLUDING THE PROPOSED 3RD BOILER, WILL CAUSE VISIBILITY IMPAIRMENT IN THE CLASS I AREA.

APPENDIX VI

DEVELOPMENT OF EMISSION FACTORS

DEVELOPMENT OF EMISSION FACTORS FOR MASS BURN RESOURCE RECOVERY FACILITIES

FEBRUARY 1983

HDR TECHSERV, INC.

Emission factors for mass burn resource recovery facilities were developed from a survey of available emission data in the literature and in proposals made by prospective contractors in response to RFPs for the construction of mass burn resource recovery facilities. Available data are limited and frequently the literature references the same data base more than once. An effort was made only to use data from mass burn waterwall incinerators. However, for some pollutants, data from refractory lined incinerators and RDF plants were included because of limited data available from mass burn facilities.

The emission levels presented by contractors in their proposals are considered representative of average to maximum emission levels expected because contractors are concerned that these levels will be used as emission limits in the permit. Where a specific contractor has submitted different emission values for different proposals, only the highest value was used. The inconsistencies between proposals can be attributed to a changing attitude towards the margin of safety used in deriving these numbers. It is unrealistic to specify absolute maximum emission limits because of the heterogeneous composition of municipal solid waste.

The actual emissions from a new mass burn resource recovery facility may be lower than the emission values presented in this paper. In the first place, a new facility would provide current air pollution control technology whereas the technology used for the tested facilities may represent an earlier level of technology which is less efficient. Also, the composition of the solid waste which will be processed may be different from the waste from which the data were obtained. The solid waste burned will have a higher Btu content and significantly fewer glass and plastic bottles and metal cans if returnable container legislation has been enacted. The impact of this legislation may be to reduce emissions for certain pollutants such as lead, tin, and chlorides due to a reduction in the amount of cans and plastic bottles in the waste stream.

The emission factors presented herein (Tables 1 and 2) are averages of the various source data available. To avoid using the same test data twice, references that appeared to be duplicates of a previous source were eliminated. When an average emission value from three different facilities was presented in one reference, a weighted average of the three was assigned to this value. Thus, each facility tested and each proposal were given the same weight.

Emissions have been grouped into four major classifications. The first classification consists of total suspended particulates and is discussed separately. The next group consists of the major pollutants and includes SO_2, NO_x, CO, hydrocarbons; chlorides (represented as hydrogen chloride), and fluorides (represented as hydrogen fluoride). The last two groups consist of trace metals and certain organics.

1. Particulates

Uncontrolled particulate emission data is available from the Braintree, Nashville, Chicago Northwest, and Harrisburg facilities (1). The average uncontrolled particulate loading from these four plants is 26.6 lb/ton of solid waste fired. Based on seven proposals (2, 3, 4, 5, 6, 7, and 8) in which contractors estimated expected uncontrolled particulate levels, an average of 37.6 lb/ton was calculated. Contractors used these values to calculate the required efficiency of their electrostatic precipitators to meet a specific particulate emission requirement. The uncontrolled particulate emission values proposed by the contractors range from 18 to 103 pounds per ton of solid waste fired because there is a difference in the uncontrolled particulate loading based on the configuration of the proposed system and the amount of excess air used. In addition, these values vary because of the margin of safety the contractors allow themselves for meeting a guaranteed particulate loading. To be conservative without using the highest controlled values proposed by contractors, a maximum uncontrolled emission value of 60 lb/ton of solid waste was used for calculating the required particulate removal efficiency to be used in the air pollution control technology analysis. This equates to an uncontrolled particulate loading of 3 gr/dscf.

2. Major Pollutants

The emission of SO_2, chlorides, and fluorides through the stack is largely dependent on the respective amount of sulfur, chlorine, and fluorine present in the fuel. Based on SO_2 emissions from Braintree, Nashville, Chicago Northwest, and Harrisburg waterwall incinerators (1, 9) and SO_2 data given in six proposals (3, 6, 8, 11, 13, and 14), a weighted average of 3 lb SO_2/ton of solid waste was obtained. For chlorides, a weighted average of 5.3 lb/ton of solid waste was obtained using actual data from the four incinerators and data from four proposals (10, 11, 13, and 14). There was no data available on fluoride emissions from mass burn waterwall incinerators in the literature. However, the average for the four same proposals was 0.1 lb/ton of solid waste and equaled the values from the two sources found in the literature for other than waterwall incinerators.

Emissions of hydrocarbons, CO, and NO_x are dependent on the composition of the waste and on operating and design conditions at the facility. Based on data from Nashville (1) and Harrisburg (9) waterwall incinerators and six proposals (3, 6, 11, 12, 13, and 14), an emission factor of 0.8 lb of CO per ton of solid waste was derived. Data from Braintree was eliminated from the analysis because there are indications that the facility was operating under severe draft imbalance conditions at the time the tests were taken (15). The Braintree data were also eliminated when calculating the emission factor for hydrocarbons for the same reason. Based on four proposals (6, 11, 13, and 14), an emission factor of 0.2 lb of hydrocarbons per ton of solid waste was derived. Including the Braintree data would bring the weighted average up to 0.3 lb/ton. The NO_x emission factor of 4.3 lb/ton solid waste was derived from Braintree, Nashville, Chicago Northwest, and Harrisburg data (1), and emission values presented by six contractors in their proposals(3, 6, 11, 12, 13, and 14). Table 1 summarizes the derived emission factors for the major pollutants.

3. Trace Metals

Published data on trace metal emissions from incinerators in the United States and Europe were reviewed. Authors were contacted to discuss the data presented and to obtain additional data for making the proper corrections to report the data in pounds of pollutant per ton of solid

TABLE 1. EXPECTED EMISSION FACTORS OF MAJOR POLLUTANTS FROM RESOURCE RECOVERY FACILITIES

Pollutant	Pounds/Ton Solid Waste
Particulates	0.6
Hydrocarbons	0.2
Carbon Monoxide	0.8
Nitrogen Oxides	4.3
Sulfur Dioxide	3
Chlorides	5.3
Fluorides	0.1

waste fired. An effort was made to use data from mass burn waterwall incinerators only; but due to the limited available data, data from refractory lined incinerators and one RDF plant were used. The data from the RDF plant were very complete and were found to be of the same order of magnitude as the other data.

Six references (16, 17, 18, 19, 20, and 21) were found to be sufficiently complete, including additional data obtained from authors, to calculate the level of trace metals in the particulate fraction of the controlled flue gas. Table 2 summarizes these results. Each facility in the United States was given equal weight in the analysis, but all the seven facilities in Germany together were given the weight of one facility. This was done so the analysis would be more representative of data from facilities in the United States. The trace metals reported were those considered to be of concern which are listed in the USEPA report entitled "Environmental Assessment of Waste to Energy Processes" (1977). The trace metal emission factors were calculated based on a controlled particulate level of 0.6 pounds per ton (at 99% ESP efficiency) of solid waste fired. Portions of mercury, antimony, cadmium, lead, and tin emissions have been found to be present in the gaseous phase. Very little data are available quantifying the portion of these elements in the gaseous phase. Based on conversations with authors in the field, percentages were estimated as follows: mercury, 85%; antimony, 30%; cadmium, less than 10%; and lead and tin, less than 5% each. These percentages have been used to estimate the emission levels of these elements in the gaseous state. The last column in Table 2 represents a total of the various forms of the expected emissions of each pollutant.

TABLE 2. ESTIMATED TRACE METAL EMISSION FACTORS

Trace Metal	Measured Concentration in Controlled Particulates (ppm)	Estimated Uncontrolled Emissions (pounds per ton solid waste)		
		Particulate* Portion	Gaseous** Portion	Total
Antimony	1,388	8.3×10^{-4}	3.6×10^{-4}	1.2×10^{-3}
Arsenic	160.7	9.6×10^{-5}	-	9.6×10^{-5}
Barium	876	5.3×10^{-4}	-	5.3×10^{-4}
Beryllium	2.1	1.3×10^{-6}	-	1.3×10^{-6}
Cadmium	1,305	7.8×10^{-4}	0.9×10^{-4}	8.7×10^{-4}
Chromium	439.3	2.6×10^{-4}	-	2.6×10^{-4}
Cobalt	14.1	8.5×10^{-6}	-	8.5×10^{-6}
Copper	1,529	9.2×10^{-4}	-	9.2×10^{-4}
Manganese	778	4.7×10^{-4}	-	4.7×10^{-4}
Mercury	632	3.8×10^{-4}	2.2×10^{-3}	2.6×10^{-3}
Lead	47,100	2.8×10^{-2}	0.1×10^{-2}	2.9×10^{-2}
Lithium	100	6.0×10^{-5}	-	6.0×10^{-5}
Nickel	260.4	1.6×10^{-4}	-	1.6×10^{-4}
Silver	276.2	1.7×10^{-4}	-	1.7×10^{-4}
Tin	7,158	4.3×10^{-3}	0.2×10^{-3}	4.5×10^{-3}
Tungsten	14	8.4×10^{-6}	-	8.4×10^{-6}
Vanadium	52.6	3.2×10^{-5}	-	3.2×10^{-5}
Zinc	82,200	4.9×10^{-2}	-	4.9×10^{-2}
Zirconium	24.5	1.5×10^{-5}	-	1.5×10^{-5}

Note: * Based on a particulate loading of 0.6 lb/ton of solid waste fired.

** Percentages assumed to be in the gaseous state: mercury, 85%; antimony, 30%; cadmium, less than 10%; and lead and tin, less than 5% each.

4. Organic Compounds

Emission factors for certain organic compounds which have been identified as being of concern from a potential adverse health effect viewpoint, have been calculated based on test results on fly ash and stack particulates from unspecified European plants burning solid waste (22). Table 3 lists emission rates for these compounds based on a controlled particulate emission of 0.6 pounds per ton of solid waste. These compounds are absorbed on particulates and the potential emissions of these compounds is therefore dependent on the degree of particulate removal. Actual emissions of these compounds from a new mass burn resource recovery facility are expected to be minimal.

Research conducted by EPA indicates that at temperature of 1830F and higher in the combustion chamber, organic compounds are almost completely destroyed (more than 99%) if this temperature is maintained for at least two seconds (23, 24).

TABLE 3. ESTIMATED TRACE ORGANIC EMISSION FACTORS

Organic Compound	Emission Rate (10^{-6} lb/ton)
Total Polynuclear Aromatic Hydrocarbons (PAH)	240
Pyrene	6
Perylene	0.8
Ideno (1,2,3cd) pyrene	0.8
Fluoranthene	5
Coronene	0.8
Benzo(a)pyrene/benzo(e)pyrene	0.8
Benzo(ghi)perylene	2
Benzo(b)flouranthene	1.5
Benzo(a)anthracene	3
Chlorinated Dibenzodioxins	
2, 3, 7, 8 - TCDD	0.02
TCDD	0.2
P5CDD	0.5
HCDD	0.8
H7CDD	0.8
OCDD	0.2
Chlorinated Dibenzofurans	
TCDF	0.3
P5CDF	0.6
HCDF	1.0
H7CDF	0.7
OCDF	0.08

Notes: * Based on a particulate loading of 0.6 lb/ton of solid waste.

Source: Arthur D. Little, Inc., March 1981

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APPENDIX VII

CONFIRMATION OF PLANT EFFLUENT ACCEPTABILITY

BOARD OF COUNTY COMMISSIONERS
PINELLAS COUNTY, FLORIDA
315 COURT STREET
CLEARWATER, FLORIDA 33516

August 23, 1983

Re: Wastewater Discharge, Resource Recovery Plant

TO WHOM IT MAY CONCERN:

This is to confirm that the Pinellas County Wastewater Treatment Plant which receives the wastewater discharged by the Solid Waste, Resource Recovery Plant has ample capacity to handle the maximum design volume of wastewater expected to be discharged by the refuse processing plant and has experienced no problems with processing the liquid effluent as concerns its chemical make-up.

Existing wastewater treatment facilities are of sufficient size and capacity to conclude that ample processing equipment will be available to support the solid waste plant throughout the 20-year term of the permit being applied for in accordance with the Florida Power Plant Siting Certification process.

Todd L. Tanberg, Director
Pinellas County Sewer System

APPENDIX VIII

PROPOSAL FOR PERMANENT LEACHATE CONTROL

June 21, 1983

Mr. W. K. Hennessey
Southwest District Manager
Department of Environmental Regulation
7601 Highway 301 North
Tampa, FL 33610-9544

Re: Proposal for Compliance--FAC

Dear Mr. Hennessey:

It is Pinellas County's intent to operate the landfill at the Refuse-to-Energy Facility in an exemplary fashion, so it will in effect be a showcase operation. Our engineering staff has been formulating alternative development plans to meet this goal. We are now at a crossroads in this analysis and seek assistance from the Department before design commences.

The proposed testing and research will be very expensive so we naturally would like to do it properly and completely the first time. We believe that the best way to avoid unnecessary effort would be to get your Department's concurrence on our methods at each step.

Attached you will find a proposal for regulatory compliance which features a ground water containment method using a clay-soil slurry wall keyed into a natural geologic formation beneath the site. Review of this proposal by your technical staff is solicited.

When you have reviewed this proposal, it is requested that a meeting be held to discuss this matter.

Please advise if you require additional information.

Sincerely,

W. W. D.

for Gene E. Jordan, P.E.
Director, Public Works and Utilities

GEJ:WWD:ltl
Encls (Proposal and Drawings)

PROPOSAL FOR COMPLIANCE WITH FLORIDA ADMINISTRATIVE CODE AT THE PINELLAS REFUSE TO ENERGY FACILITY

JUNE 21, 1983

Attached are conceptual drawings for a system of ground water containment at the Pinellas Refuse to Energy Facility. As shown, it is proposed that all land within the 730 acre site be surrounded by a bentonite soil slurry wall keyed into an underlying clay layer of low permeability. Prior to wall construction a detailed hydrogeologic survey will be conducted to examine the real extent of the confining layer. The absence of undesirable features such as artesian flow and limestone outcrops will be verified. This evaluation will rely heavily on soil borings taken at centers of a 300' x 300' grid cell matrix over the entire site. The terminal depth of each boring will be the top of the calcareous Tampa limestone which lies at an average depth of 54 feet below land surface. Boring tests will include Atterburg limits, standard penetration tests, and sieve analysis. When the confining layer is encountered shelby tube samples will be taken at not less than 3 foot intervals through a minimum 10 foot thickness through the layer. The samples will be tested for permeability.

If the continuity and permeability of the underlying confining layer is suitable for vertical flow attenuation, the slurry wall will be constructed. With an in-place bentonite concentration of 1 to 3% by weight, the wall will have a permeability in the desired range of $1x10^{-7}$cm/s (.10 Ft/yr.). The wall will be 3 ft. thick and will be keyed into the confining layer a minimum of 3 ft.; this layer underlies the site at a nominal depth of 29 ft. below land surface. Since ground water coming into contact with the slurry wall may have a high dissolved mineral content some ionic substitution on the bentonite crystal lattice may occur resulting in a slight increase in permeability. Therefore, prior to wall placement, appropriate tests will be conducted to identify the magnitude of permeability change; derived data will aid in adjusting the clay-to-soil mix ratio so that the desired 10^{-7} permeability is attained.

During wall construction borings will be taken on 500 foot centers along the slurry wall right of way. The same boring tests described above will be repeated here. This will ensure that the wall is being keyed into proper strata and that no untoward geologic conditions are present.

Once the wall is in place the water level within will rise. This will result in an undesirable increase in outward flow through the wall. The ideal situation will be to maintain equal water table elevations on either side of the wall. Under this condition there will be virtually no flow. A comprehesnive water management plan is now being devised to accomplish this goal. A major effort in this design is the application of EPA's HSP-F (Hydrologic Simulation Program-Fortran) model.

With the site completely surrounded by the slurry wall, and the desired water levels maintained, leachate from solid waste cells would be contained. New cells would be constructed below grade. Before placing solid waste within, the excavated pit is dewatered and the removed water treated in an existing aeration pond. No liner would be placed on the cell bottom. After the cell is completed, it is permanently capped with a clay cover. Rain falling on this low permeability surface would be collected by interceptor drains and routed to perimeter ditches. Since no liner is provided, ground water will eventually seep back into the completed cell.

In accordance with the ground water revisions of January 1, 1983, it is proposed that the entire 730 acre site be designated a zone of discharge (ZOD). Specifically:

> Chapter 17-4,25 (2) (a) - "Unless exempted by sub-section (c) below or by Section 17-4.243, F.A.C., no installation shall discharge into ground water, either directly or indirectly, any contaminant that causes a violation in the water quality standards and criteria for the receiving ground water as established in Chapter 17-3, Part IV, F.A.C., except within a zone of discharge established by permit or rule pursuant to this section."
>
> Chapter 17-4.245 (4) - "Upon affirmative demonstration by an installation owner that a ground water discharge will not impair the designated uses of contiguous waters outside a zone of discharge, the Department shall establish a zone of discharge for Class G-II ground water ... in (one of) the following manners:"
>
>> 17-4.245 (4) 2 - "Any applicant seeking a zone of discharge and not electing to use the above procedure shall have a zone of discharge established by the Department. The boundary of the zone of discharge shall be 100 feet from the site boundary or to the installation's property boundary, whichever is less, unless a smaller zone of discharge is necessary to protect the designated use of contiguous waters."
>>
>> 17-4.245 (4) 3 - "Where mutliple sites occur within close proximity, a single zone of discharge for the sites may be established ..."

The slurry wall would be located inside the property boundary; monitoring wells inside and outside the wall would be sited after consultation with the Department. Each individual landfill cell is considered one of the "multiple sites" within the single zone of discharge. Two statements in Chapter 17-7 have direct bearing on this proposal:

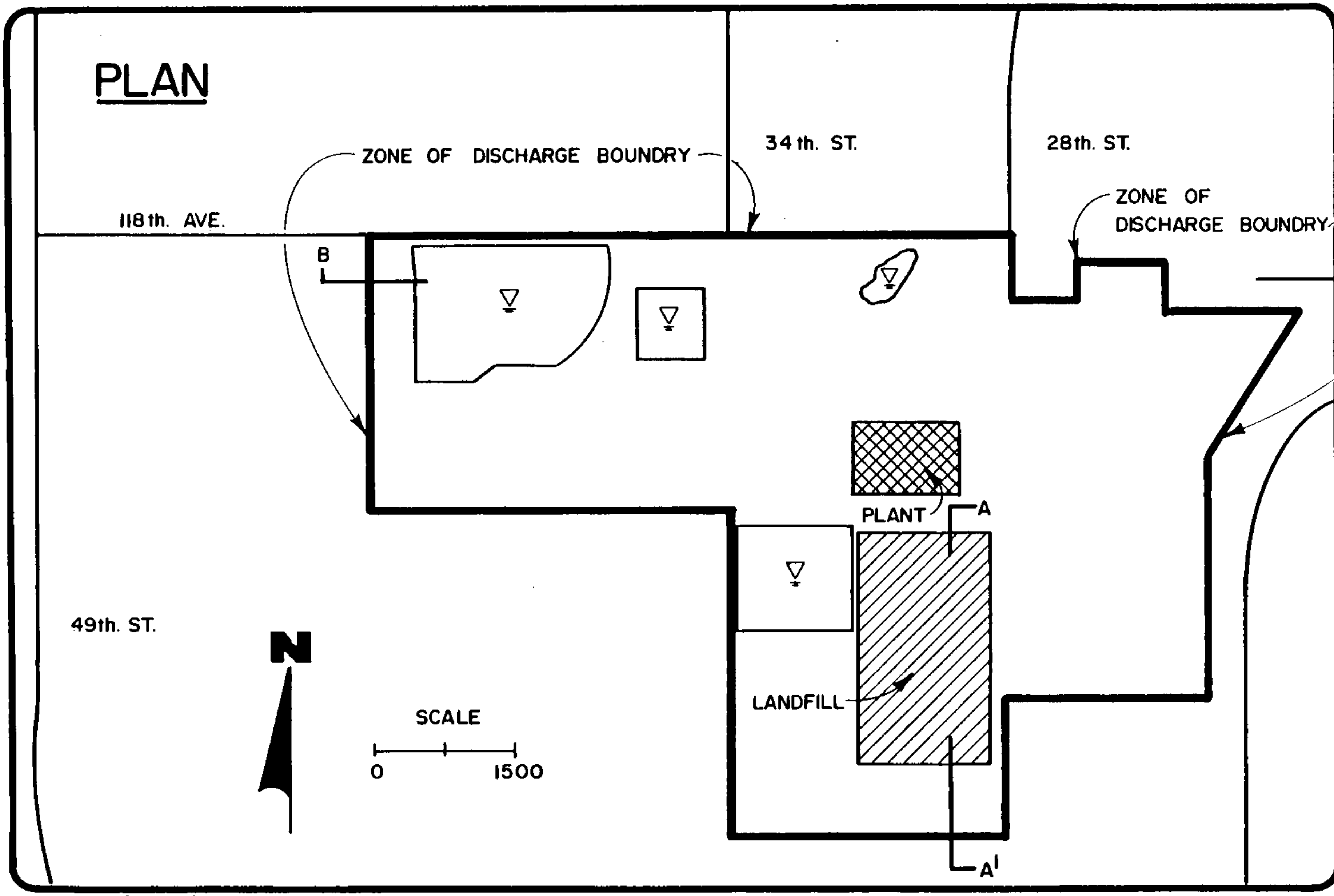
>> 17.704 (2) - "Unless permanent leachate control methods are installed, no solid waste shall be disposed of by being placed: (d) in a dewatered pit."
>>
>> 17-7.04 (3) - "No solid waste shall be disposed of: (b) in any natural or artificial body of water including ground water."

Considering the activities permitted within a designated ZOD the statements quoted from FAC 17-7 are interpreted to allow ground water to seep back into completed and unlined below-grade cells provided that waters contiguous to the ZOD are not adversely affected and "free from" criteria in the ZOD are met.

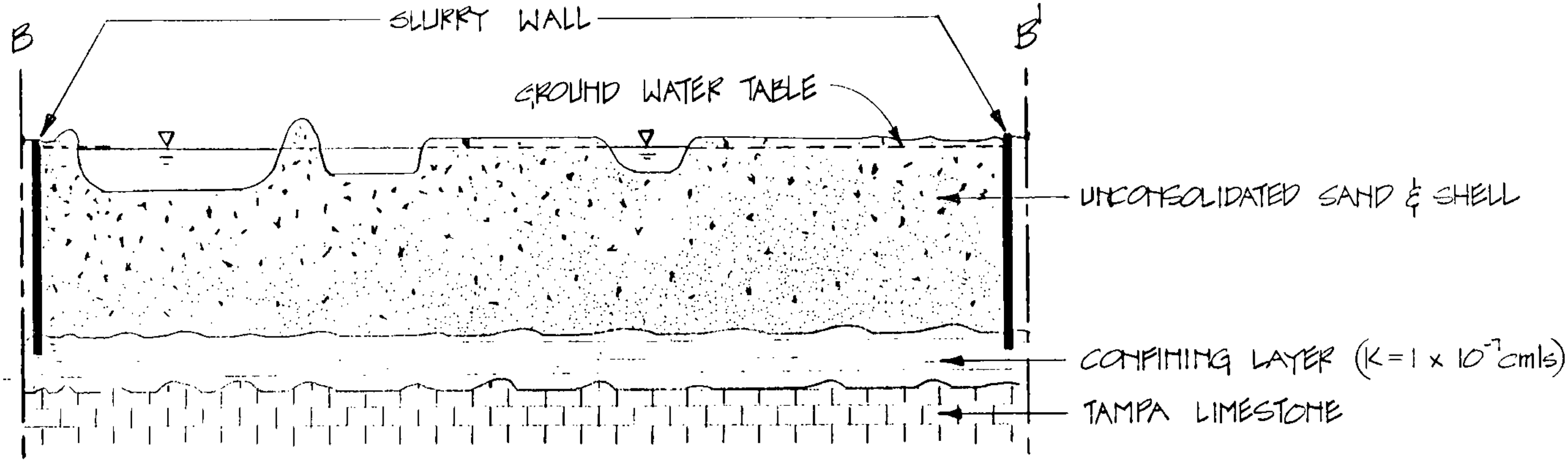
As previously stated, a comprehensive surface and ground water management program for the entire 730 acre site is now being formulated. The design will incorporate on-site retention and treatment. The Conditions of Certification for the facility recognize two manners in which site water levels could be regulated; water treatment and discharge to adjacent surface water and/or utilization of retained water as process cooling water. As stated in the C.O.C., discharges to off-site surface waters must meet the following condition:

> "Any discharges from the site stormwater/leachate treatment system via the emergency overflow structure which result from any event LESS than a ten-year, 24 hour storm (as defined by the U.S. Weather Bureau Technical Paper No. 40, or the DOT drainage manual, or similar documents) shall meet State Water Quality Standards, Ch. 17-3 FAC."

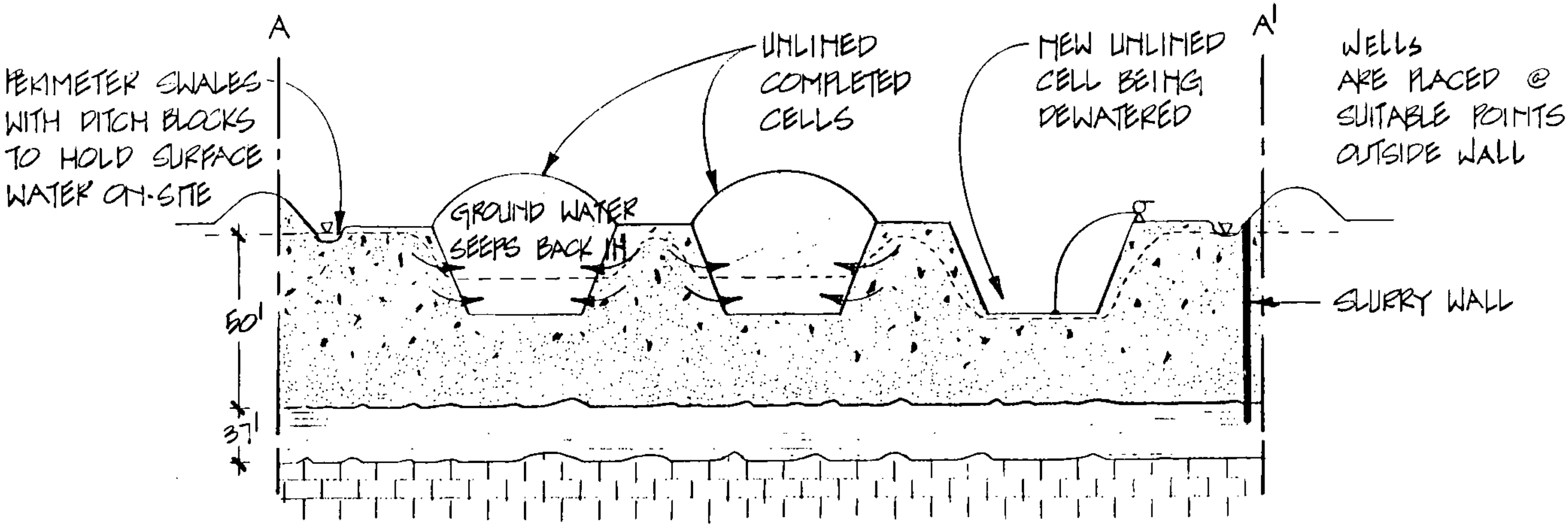
This proposal is preliminary and does not detail implementation procedures which may be required by the DER; notably approval of treatment facilities and discharge point, additional ground water monitoring, and inspection and evaluation during slurry wall construction.


PLAN
ZONE OF DISCHARGE BOUNDRY
34 th. ST.
28 th. ST.
ZONE OF DISCHARGE BOUNDRY
118 th. AVE.
B
B'
PLANT
A
A'
LANDFILL
49th. ST.
N
SCALE
0
1500

PROFILE



B
B'
SLURRY WALL
GROUND WATER TABLE
UNCONSOLIDATED SAND & SHELL
CONFINING LAYER (K = 1 x 10^-7 cm/s)
TAMPA LIMESTONE



A
A'
PERIMETER SWALES WITH DITCH BLOCKS TO HOLD SURFACE WATER ON-SITE
UNLINED COMPLETED CELLS
NEW UNLINED CELL BEING DEWATERED
WELLS ARE PLACED @ SUITABLE POINTS OUTSIDE WALL
GROUND WATER SEEPS BACK IN
SLURRY WALL
50'
37'

Ardaman & Associates, Inc.

Consulting Engineers in Soil Mechanics,
Foundations, and Materials Testing

AUG 10 1983
HDR

August 9, 1983
File Number 83-113

HDR
Post Office Box 12744
101 West Garden Street
Pensacola, Florida 32575

Attention: Mr. James C. Andrews

Subject: Hydrogeological Investigation for Pinellas County Resource Recovery Landfill Area

Gentlemen:

As requested by Mr. Andrews in Orlando on August 4, 1983, Ardaman & Associates, Inc. is pleased to present this proposal for conducting a hydrogeological investigation at the above mentioned facility in Pinellas County. This Phase 1 investigation is to determine the feasibility of the slurry wall concept as a leachate control system at the subject site. The feasibility would hinge on the integrity and continuity of the bottom, natural "clay" liner believed to exist at the site. Therefore, the investigation will determine the integrity and continuity of the bottom, natural "clay" liner through a three-element program: (1) lineament analysis; (2) geophysical survey; and (3) boring program. The Phase 2 investigation, not part of this proposal, would be the design and installation of a slurry wall around the 730-acre parcel occupying approximately 27,000 lineal feet.

The project area is located in Section 14 and 15, Township 30 South, Range 16 East as approximately shown in Figure 1. This area includes the UOP resource recovery facility, trash and garbage fill, closed brush fill, closed trash fill, stormwater pond, Windish landfill, sod farm, and undeveloped land. Interstate-275 represents the east boundary of the area. The north and south boundaries are 118th and 102nd Avenue, respectively. Twenty-eighth Street separates the sod farm from the rest of the site.

The following tasks have been identified for this three-element Phase 1 project:

1. Review existing literature data on the soils, geology, development history, and hydrogeology at the site and in the vicinity of the proposed site. Examples of sources of data include U.S. Soil Conservation Service, U.S. Geological Survey, University of Florida, Florida Bureau of Geology, Southwest Florida Water Management District, Pinellas County and the City of St. Petersburg.

2. Visit the area and collect available information on recent sinkhole development in the subject area. Other kinds of information to be collected include aerial photographs, topographic maps, and newspaper clippings. Information available from the City and County Engineers on sinkhole activity in the vicinity of the site will be documented.

3. Using the above data develop a lineament map for the subject site.

4. Using the lineament map, the hydrogeology data base and the development history for the subject site, finalize a field investigation program. The field investigation would include borings, water-level observation wells, a geophysical survey, a well inventory and soil sampling.

5. Perform a geophysical investigation within the project area to document the generalized soil profile and to determine the location of anomalous subsurface conditions. The geophysical survey will be performed using surface resistivity and electromagnetic equipment. The electrical resistivity equipment will be used for soundings at selected sites while the electromagnetic equipment will be used for profiling. The soundings will reflect the changes in lithology with depth while the profiles will reflect the changes in lithology over the area within the top 25 feet, approximately.

6. Conduct a subsurface investigation program consisting of Standard Penetration Test (SPT) borings and installation of piezometers. Based on the work of the U.S. Geological Survey at the St. Petersburg and Pinellas County landfills in the area, the near-surface lithology consists of a surficial layer of fine-grained sand and shells which grades downward to a calcareous clay or marl bed that overlies a stiff clay and hard chert and fossiliferous limestone. The surficial layer ranges from about 10 to 40 feet thick and averages on the order of 23 feet thick. The marl bed averages about 15 feet thick and overlies a 12-foot thick stiff dark-green clay. The test borings will penetrate the dark green clay layer and will be sealed upon completion.

   The SPT borings will be used to check out any anomalous conditions as determined by the geophysical survey and to calibrate the results of the geophysical survey. In addition, three typical "natural" depression features will be drilled to document whether these depressions are associated with collapse sinkholes or with solution sinks. One SPT test boring will be performed near the center of each depression, penetrating the confining clay layers. One similar SPT test boring will be performed along the perimeter of each depression. The soil profiles for the interior and perimeter borings associated with each depression will be compared to document whether the clay stratigraphy is continuous and relatively uniform beneath each investigated depression. For purposes of this proposal a budget of 750 lineal feet of SPT borings is considered. Access to and permits for drilling at the center of the selected depressions must be provided by the County. This program will supplement the 30+ borings previously performed at the site by others.

   The piezometers will be used to document water-level relations between the surficial and Floridan aquifers. A "perched" water table will document that there is no direct hydraulic connection between the two aquifers. Pairs of piezometers (e.g., shallow and deep) will be located in different parts of the site to document this relation. The final location for the 4 to 6 pairs of piezometers will be determined after literature review and geophysical survey have been completed. The piezometers will be 1½-inch diameter PVC casing with 5 feet of perforated pipe for the collection zone. For purposes of this proposal a budget item of 450 lineal feet of piezometers is considered reasonable.

7. Collect 8 to 10 undisturbed samples of the "clays" for laboratory analyses. The soil samples will be collected from the marl and clay layers. The laboratory analyses will determine the permeability of the different layers. Laboratory analyses will include classification and permeability testing.

8. Perform a well inventory within a one-mile radius of the site. The well inventory will provide location, well depth, casing diameter, and casing length.

9. Perform a laboratory testing program to verify field visual classifications of soils and to obtain values for the coefficient of permeability for the undisturbed samples. Cation exchange capacities will be determined for four soil samples.

10. Analyze the results of the field and laboratory investigation and develop recommendations concerning the feasibility of the slurry wall liner concept.

11. Prepare a report summarizing the results of the field and laboratory investigations and presenting our conclusions and recommendations.

We appreciate the opportunity to serve you on this element of the project. Please do not hesitate to contact the undersigned if you have questions or when we are authorized to proceed. The work could be started within 2 weeks of authorization to proceed. The work would be completed within 8 to 12 weeks.

Very truly yours,
ARDAMAN & ASSOCIATES, INC.

Herbert G. Stangland

Herbert G. Stangland, Jr., P.E.
Senior Water Resources Engineer

John E. Garlanger

John E. Garlanger, Ph.D., P.E.
Vice President

HGS:ed
Enclosures

APPENDIX IX

PROPOSAL FOR MONITORING OF PATHOGENIC ORGANISMS

IN THE COOLING TOWER SYSTEM

PROPOSAL

VIRUS MONITORING FOR PINELLAS COUNTY RESOURCE RECOVERY FACILITY JANUARY 1, 1983 - DECEMBER 31, 1983

Prepared by,

Flora Mae Wellings, Sc.D.
Director
Epidemiology Research Center
State of Florida
Department of Health & Rehabilitative Services
Health & Technical Support Services
Office of Laboratory Services
4000 West Buffalo Avenue
Tampa, Florida 33614

The use of secondary wastewater for cooling tower make-up water is a viable alternative to the use of surface or potable water. The major concerns are the pathogens, particularly viruses, known to be present in secondary wastewater. To circumvent public health problems which could occur, the wastewater should be free of detectable viruses before entering the cooling tower. Because of the expense (± $10,000/test) and inefficiency of aerosol testing, wastewater entering the cooling tower should be free of detectable virus. Testing the blown-down water is advisable as a fail safe procedure.

Pinellas County is planning to use treated wastewater from the Largo Treatment Plant as make-up water for the cooling tower of the Resource Recovery Facility. These waters are to be monitored for virus to preclude dissemination via the cooling tower. The following monitoring program is proposed.

Rationale

The viruses present in wastewater are those which traverse the alimentary tract of man and are excreted into the sewerage system with the feces. There are over 100 different types of these so-called enteroviruses. In less tropical areas of the State there is an enterovirus season, usually from May through October. However, in the Tampa Bay area, we have enterovirus infections year round, but usually, peaks occur in the spring and the fall. Because of this, year round monitoring should be done.

The presence of virus in treated wastewater is dependent upon the amount of virus entering the plant. So in order to determine the virus removal efficiency of the plant, influents must be tested. This is particularly important when relatively infrequent sampling is done. For instance, if only effluents are sampled and they are routinely negative, it may merely be reflecting a low virus input into the plant at that moment. The data would give no reassurance that when a surge of virus entered the plant, the treatment would be adequate. On the contrary, if it were determined that the effluent showed no detectable virus when large numbers were present in the influent, then the negative findings in the make-up water for the cooling tower would be reassuring.

MATERIALS AND METHODS

Sampling

Three small (500 mL) samples will be obtained from the plant influent. Three large (25 to 50 gal) samples of the chlorinated effluent entering the cooling tower and of the blow down-waters will be filtered. Sampling will be done monthly for a year. In all, nine samples will be processed monthly. However, if deemed advisable, additional sampling will be done.

Techniques

Small samples of influent will be processed by polyethylene glycol (PEG) hydroextraction. This consists of placing the 500 mL samples into a dialysis tubing with a 24Å pore size. After sealing, the filled tubing is exposed to PEG overnight at 4°C. The following morning the approximately 1 mL residual is carefully removed and the interior of the tubing thoroughly washed with eluting medium at pH 9.0. This is added to the concentrate and the resulting suspension subjected to sonication to disrupt solids. The mixture is then centrifuged to sediment bacteria, filtered to remove any remaining bacteria, treated with antibiotics and stored at -70°C until assayed for virus on Buffalo green monkey kidney cells.

Large samples will be concentrated either by sequential filtration or by the cellulose nitrate Millipore filter technique. In the first method, large water samples are sequentially filtered through a positively charged 1 MDS membrane at ambient pH, then through a less positivily charged zeta plus 60S (Z+60S) membrane at pH 5.3, and finally through a negatively charged cellulose nitrate Millipore filter with a .45 um pore size at pH 3.5. Each

filter is eluted _in situ_ with 500 mL of eluting medium at pH 9.0. The filtrate is placed in a resealable plastic bag for transport to the base laboratory. Here it is further concentrated by PEG as described above. Each filter is placed in a resealable plastic bag containing approximately 50 mL of eluting medium at pH 9.5 and transported to the base laboratory. Here the filters are eluted in the Stomacher Apparatus (squeezing eluting medium through the membrane) and the resulting suspension further concentrated by PEG hydroextraction as described above.

The cellulose nitrate Millipore filter method consists of collecting 50 gal of test water in a drum, reducing the pH to 3.5 with 10 N HCl and adding magnesium ions at a level of 0.05 mg/L. Celite is added to prolong the life of the membrane. The sample is passed under pressure through the 0.45 um pore sized Millipore filter(s). After filtration, the filter(s) is eluted _in situ_ as described above and placed in a resealable plastic bag containing approximately 50 mL of eluting medium at pH 9.5 and transported to the base laboratory where the filter is further processed as described above.

Virus Assay

Concentrates are thawed rapidly, tested for toxicity by inoculation into tube cell cultures, and if not toxic, the concentrate is inoculated in 0.5 mL amounts onto Buffalo green monkey kidney cell cultures in 25 cm^2 plastic bottles. When the concentrate is toxic, it is treated with chloroform before inoculation. After two hours for virus adsorption, during which the bottles are slowly rocked back and forth on a mechanical rocker, the bottles are overlayed with a maintenance medium containing agarose, followed at 72 hours by a second comparable overlay containing neutral red. Observations for plaque forming units (PFU) are made daily for fourteen days. Individual plaques are picked and inoculated into tube cell cultures to confirm the validity of the PFU and for antigen production.

Reports

Any virus isolations obtained from the cooling tower make-up water or blown-down waters will be reported immediately. A complete final report will be submitted four to six weeks after the last samples are obtained.

HDR Henningson, Durham & Richardson

P.O. Box 12744
Pensacola, FL 32575
(904) 432-2481

August 31, 1983

P.E. Ratcliff, P.E.
K.L. Gregory, A.I.A.

State of Florida
Department of Environmental Regulation
Twin Towers Office Building

2600 Blair Stone Road
Tallahassee, Florida 32301-8241

Attention: Mr. Hamilton S. Oven, Jr., P.E.

Gentlemen:

Enclosed in this document is a revised application for Power Plant Siting for the third boiler expansion at the Pinellas County Resource Recovery Facility. It is hoped that the contents contained herein address those comments posed by the Department in a letter dated August 9, 1983.

Sections of the application which have been added or altered since its initial submittal on July 26 have been indicated by an asterisk (*) at the beginning of the pertinent paragraph. In addition, an index is presented following this letter, from which the Department can discern where in the application each comment has been addressed.

This revised application is substantially modified and expanded from its original form. Therefore, it is respectfully requested that the initial copies of the application (July, 1983) be discarded and this one substituted in its place.

Architecture
Engineering
Planning
Systems
Sciences

Respectfully,

HENNINGSON, DURHAM & RICHARDSON, INC.

James C. Andrews

Alexandria
Atlanta
Austin
Charlotte
Chicago
Dallas
Denver
Helena
Knoxville
Minneapolis
Norfolk
Omaha
Pensacola
Phoenix
Santa Barbara
Seattle
Washington, D.C.

Enclosure

JCA/mr

PINELLAS COUNTY RESOURCE RECOVERY FACILITY

APPLICATION FOR POWER PLANT SITING

Table of Contents

PREFACE

The Air Quality Analysis featured in Appendices I - VI is submitted to meet requirements of:

1. Power Plant Site Certification and State Air Quality permits.

2. Federal Prevention of Significant Deterioration (PSD) review.

APPENDIX I

BEST AVAILABLE CONTROL TECHNOLOGY

AIR QUALITY SECTION

I. BEST AVAILABLE CONTROL TECHNOLOGY

A. INTRODUCTION

Best Available Control Technology (BACT) is defined in the 40 CFR 52.21 as follows:

> "An emission limitation based on the maximum degree of reduction of each pollutant emitted which the Department, taking into account, energy, environmental and economic impacts and other costs, determines on a case by case basis, is achievable through application of production processes and available methods, systems, and techniques, for control of each such pollutant".

Table I-1 lists the air emissions for which an evaluation for BACT was conducted and control alternatives (both commercially available and in the research stage) which were considered for the control of each of the pollutants. The air pollutants and the emission levels for which BACT must be determined are shown in Table I-2.

TABLE I-1
BACT POLLUTANTS AND CONTROL ALTERNATIVES

Air Emission Parameter	Control Alternatives
Particulate	Electrostatic Precipitator (ESP) Wet or Dry Scrubber Fabric Filter Electrostatic Baghouse
Sulfur Dioxide	Wet Scrubber Dry Scrubber Low Sulfur Fuel
Nitrogen Oxide	Ammonia Injection Wet Scrubber Catalytic Reduction Design and Operating Procedures
Carbon Monoxide	Design and Operating Procedures
Lead & Beryllium & Particulate Mercury	Electrostatic Precipitator (ESP) Wet or Dry Scrubber Fabric Filter
Hydrogen Fluoride & Gaseous Mercury	Wet & Dry Scrubber

TABLE I-2
BACT POLLUTANTS AND ANNUAL EMISSIONS

Air Emission Parameter	Tons/Year
Particulate	109
Sulfur Dioxide	577
Nitrogen Oxide	577
Carbon Monoxide	288
Lead	58
Beryllium	0.0019
Mercury (particulate & gaseous)	2.1
Hydrogen Fluoride	28

This BACT evaluation of the above described control alternatives considered their technical feasibility, energy usage and certain environmental factors. The proposed unit is projected to be on-line approximately 80-85% of the time. Air pollution control equipment must be reliable to minimize contribution to unit downtime. A projection of the equipment's reliability can be developed only after it has received commercial application; therefore, commercial application of the equipment was reviewed in formulating BACT. Installation of air pollution control equipment increases the facility cost, but results in benefits to the surrounding area and population. At some point, the cost of air pollution control equipment is not outweighed by the resulting benefits. To this end, the capital, operational and energy costs, were compared to the benefits. Air pollution control equipment will lessen the facility's air emissions, however, increasing the waste requiring land disposal resulting from the additional equipment operation is not advantageous.

B. TOTAL SUSPENDED PARTICULATE (TSP), LEAD, BERYLLIUM AND PARTICULATE MERCURY

In this section, BACT for control of total suspended particulate (TSP) emissions is proposed. The control device which is BACT for TSP will also concurrently control lead, beryllium and the particulate form of mercury, and is thus also proposed as BACT for these pollutants.

An electrostatic precipitator with an outlet particulate loading of 0.03 gr/dscf, corrected to 12% CO_2, is proposed as BACT for this project. Other control alternatives reviewed include ESP's with emission rates of 0.05 and 0.015 gr/dscf at 12% CO_2, two different Fabric Filters, and a Dry Acid Gas Scrubber.

1. Electrostatic Precipitators

Electrostatic precipitators function by imparting a negative charge to particulates in the flue gas stream. The particles are then attracted to positively charged plates, where they are collected. Characteristics of electrostatic precipitators include the following:

- Generally capable of particulate removal efficiencies greater than 98% with efficiencies as high as 99.8%.
- Can handle high temperature gases of over 600°F in special applications.
- Low pressure drop through units resulting in lower energy usage by fans.
- Performance is sensitive to actual vs. design flue gas flow rates (actual gas flow must be less than design) and particle resistivity.
- Consideration must be given to prevent corrosion caused by acid gas condensation. Acid mist condensation begins about 250°F.
- Recognized as the most reliable and efficient technology on resource recovery systems.

Table I-3 shows estimated costs for electrostatic precipitators investigated for this project.

2. Fabric Filters/Electrostatic Baghouses

Baghouses remove particulate by filtering the flue gas stream through a fabric. Actually, most of the effectiveness is attributed to filtering through a mat of particulate which has built-up on the surface of the fabric. Characteristics of baghouses are as follows:

- Particulate removal efficiencies as high as 99.8% have been demonstrated on coal fired units.
- Variations in flue gas flow rate and particulate composition do not generally effect performance.
- Pressure drop through units is significant resulting in relatively high energy usage by fans.
- Available filter materials limit operating temperatures to less than 500°F.
- Sparks in flue gas can cause pinhole leaks and even fires within the filter.

TABLE I-3
COSTS OF ELECTROSTATIC PRECIPITATORS
1050 TPD Unit

Emission Limit gr/dscf @ 12% CO_2	0.05	0.03	0.015
Removal Efficiency, Percent	98.0	98.7	99.4
Construction Cost	$1,707,700	$2,003,400	$2,592,300
Annual Cost:			
Net Debt Service	$ 299,500	$ 351,400	$ 454,700
Operating and Maintenance Costs	$ 179,300	$ 222,400	$ 298,100
Total	$ 478,800	$ 573,800	$ 752,800
Unit Cost:			
Per Ton MSW (300,000)	$ 1.60	$ 1.91	$ 2.51
Per Ton Particulate Removed	$ 45	$ 53	$ 69
Incremental:			
Additional Tons Removed	base	66	48
Additional Annual Cost	base	$ 95,000	$ 179,000
Per Ton Removed		$ 1,440	$ 3,730
Per Ton MSW (300,000)		$ 0.31	$ .60

- Consideration must be given to prevention of corrosion caused by acid gas condensation.

- Experience on resource recovery facilities is very limited.

Table I-4 shows estimated costs for the baghouse systems investigated for this project. The TSP emission rate would be guaranteed less than 0.01 gr/dscf corrected to 12% CO_2.

3. Dry Scrubbers

Dry scrubbers are devices which are designed to remove SO_2 and acid gases from the flue gas stream, in addition to particulates. Aqueous solutions of lime are sprayed into the gas stream, which react with the SO_2 and acid gases. Heat from the reaction, and from the flue gas, dry the resultant products, which are then collected in a baghouse. Characteristics of dry scrubbers are the same as those for baghouses, except as follows:

- SO_2, acid gases and other flue gas constituents, that may condense with lower exit gas temperatures are controlled.

- Acid gas corrosion may be less of a problem.

- Approximately twice as much residue is produced.

- Experience on resource recovery facilities is even more limited.

Table I-5 shows estimated costs for a dry scrubber and baghouse system, guaranteed for a TSP emission limit of 0.01 gr/dscf, corrected to 12% CO_2, and guaranteed to remove 70% of the SO_2 and 70% of the HCL in the flue gas stream.

C. SULFUR DIOXIDE (SO_2) AND ACID GASES

Use of a low sulfur fuel is currently considered by many as BACT for control of sulfur dioxide emissions Municipal solid waste (MSW) is inherently a low sulfur fuel with a sulfur content of approximately $0.15 \pm 0.1\%$.

A control alternative which was examined for this report is the use of a dry scrubber system for SO_2 control, which simultaneously controls emissions of acid gases. Use of a dry scrubber has been examined for particulate control in the particulate BACT analysis. Wet scrubbing for SO_2 control was not investigated due to the presence of a vapor plume. Even though the gas has been cleaned the steam plume is considered unacceptable and eliminates this option.

TABLE I-4
COSTS OF FABRIC FILTER SYSTEMS
1050 TPD Unit

	Pulse Jet Fabric Filter	Reverse Air Fabric Filter
Emission Limit, * gr/dscf @ 12% CO_2	0.01	0.01
Removal Efficiency, Percent	99.6+	99.6+
Construction Cost	$1,381,000	$1,620,000
Annual Cost:		
Debt Service	$ 151,200	$ 177,700
Operating and Maintenance Costs	$ 359,000	$ 421,200
Total	$ 510,500	$ 598,900
Unit Cost:		
Per Ton MSW (300,000 tpy)	$ 1.70	$ 2.00
Per Ton Particulate Removed	$ 47	$ 55
Incremental Annual Cost	base	$ 88,400
Incremental Cost Per Ton MSW	base	$ 0.30

* Due to nature of fabric filters the collection efficiency and emission limit cannot be specified. The listed values indicate minimum acceptable performance.

TABLE I-5
DRY SCRUBBER/FABRIC FILTER SYSTEM
1050 TPD Unit

	Dry Scrubber Plus Fabric Filter
Emission Limit, gr/dscf @12% CO_2	0.015
Removal Efficiency, Percent	99 +
Construction Cost	$5,000,000
Annual Cost:	
Debt Service	$ 823,500
Operating and Maintenance Costs	$1,425,000
Total	$2,248,500
Unit Cost:	
Per Ton MSW (300,000 tpy)	$ 7.50
Per Ton Particulate Removed	$ 206

Table I-6 shows general effects of SO_2 control alternatives.

TABLE I-6
EFFECTS OF SO_2 CONTROL ALTERNATIVES

Area of Effect	Low Sulfur Fuel	Dry Scrubber
Energy Consumption	No effect	Increased facility energy consumption
Environmental	Reduced emissions of SO_2 compared to other fossil fuels	Reduced emissions of SO_2, HF and gaseous mercury; increased amounts of residues requiring land disposal
Economic	No direct facility related costs	Increased facility capital and operating costs

1. Low Sulfur Fuel

The emission rate of sulfur dioxide is dependent on the amount of sulfur in the fuel. Municipal solid waste is estimated to have a sulfur content of less than 0.2%. Generally, coal-fired facilities have switched from high (5-7%) to low (1-2%) sulfur coal to comply with laws and regulations. The proposed unit will utilize municipal solid waste which is much lower in sulfur content.

2. Dry Scrubbers

Dry scrubbers operate by injecting droplets of alkali reagent into the flue gas. The resulting reactions remove the sulfur dioxide as sulfites and sulfates in particulate form. The heat generated during the reaction plus flue gas heat evaporates the water carrying the alkali reagent. A particulate removal device is located downstream to remove the sulfate and sulfite particulates. The first commercial scale dry scrubber has just gone on-line at the coal-fired Northern States Power Company's Riverside Power Plant in Minneapolis, Minnesota. The system's costs and effects were based upon projections provided by system vendors.

Table I-7 shows estimated costs of a dry scrubber to control particulates, SO_2 and acid gases.

TABLE I-7
DRY SCRUBBER COSTS

Total Annual Cost (Debt Service + O&M)	\$2,248,500 (1)
Annual Cost attributable to particulate control	\$ 573,800/year (2)
Annual Cost attributable to SO_2 + acid gas control	\$1,674,700/year (3)
Incremental Cost per ton of SO_2 + acid gas controlled	\$ 1,600/ton (4)

Notes:
1. From Table I-5
2. Proportioned such that cost for particulate removal is equal to cost for electrostatic precipitator.
3. Total cost less that attributable to partiulate.
4. Based on guaranteed removal efficiencies, i.e. 70% removal of SO_2 and 90% removal of HCL.

D. NITROGEN OXIDE

The technologies for nitrogen oxide (NO_x) control include ammonia injection, wet scrubbers, and catalytic reduction. However, none have been utilized on a commercial scale at either resource recovery facilities or coal-fired power plants in the United States.

Research relative to ammonia injection has revealed the following utilization limiting factors:

- When the flue gas temperature is between 1600°F and 1650°F, the reaction:

  $$NH_3 + NO + O_2 \quad N_2 + 3/2\ H_2O$$

  readily takes place, controlling NO emissions. Above 1800°F, the NH_3 is oxidized to NO. Below 1600°F, the reaction does not take place. A supplemental heating source may be required to maintain the appropriate temperature envelope.

- Ammonia can react with sulfur trioxide in the flue gas to form ammonium sulfate or ammonium bisulfate. Ammonium bisulfate can condense after emission to the atmosphere and act as a corrosive agent.

- Cyanide formation at the ammonia injection zone has occurred in the presence of hydrocarbons.

- Ammonium Chloride formation has been documented and forms a pervasive visible plume.

Research on nitrogen oxide control with catalytic reduction processes has identified the following problems:

- Formation of ammonium bisulfate with resulting corrosivity
- Blinding of the catalyst
- Catalyst corrosion
- Formation of unexpected compounds

The wet scrubber has been demonstrated only on a glass manufacturing furnace. The information is insufficient to judge its applicability to a municipal solid waste fired resource recovery facility.

Nitrogen oxides (NO_x) result from the reaction of atmospheric nitrogen and oxygen in the combustion zone and the partial combustion of nitrogenous compounds in the fuel. Important factors affecting NO_x production are flame and furnace temperature, residence time of combustion gases at flame temperature, rate of gas cooling, and amount of excess air.

Given the state of the art of NO_x control technologies, refuse feeding, and the importance of temperature zone parameters in NO_x generation, the BACT recommendation for the proposed resource recovery facilities is the use of proper boiler design and operating procedures.

E. CARBON MONOXIDE

Carbon Monoxide is a product of incomplete combustion. The generalized reaction is shown below:

$$HC + O_2 \quad CO + HC' + H_2O$$

When incomplete combustion takes place energy is lost, carbon monoxide and another hydrocarbon are formed. The new hydrocarbon is a pyrolyisis product and may combust further. BACT is the use of state-of-the-art boiler controls to insure sufficient underfire and overfire air so that the emissions of products of incomplete combustion are minimized.

The underfire air has three purposes: 1) to ignite the refuse, 2) cool the grates, and 3) supply air to all parts of the fuel bed. The overfire air causes turbulence in the fire ball to assist in complete burnout.

There are four steps in the combustion of refuse or any damp fuel:

1) drying
2) volitization
3) pyrolyzing
4) direct combustion

The step that contributes to carbon monoxide production is the pyrolysis step. Pyrolysing is the breaking down of larger organic compound in to smaller organic compounds by the application of heat. This differs little from cracking of crude oils into various fractions.

In a mass burn system, this cracking takes place in the presence of some air but still in a reducing atmosphere. Incomplete combustion can take place producing carbon monoxide. In a properly designed system, the products of pyrolysis are consumed in the fire ball section of the incinerator.

The fireball's intensity is controlled by high velocity overfire air. As long as sufficient overfire air is supplied to insure approximately 100% excess air, carbon monoxide production will be minimized.

There are no controls for carbon monoxide production other than state-of-the-art boiler design and control is BACT for CO control. The boiler will be designed to operate at peak efficiency which will minimize products of incomplete combustion.

APPENDIX II

AIR QUALITY ANALYSIS

II. AIR QUALITY ANALYSIS

A. INTRODUCTION

Available data indicate that emission levels as listed in Table II-1 are attainable by mass burn resource recovery facilities. These emission levels at a throughput of 1,050 TPD will be used in the modeling required for the PSD permit.

TABLE II-1
EXPECTED EMISSIONS

Pollutant	lb of Pollutant per ton of MSW	lb of Pollutant per hour
Particulate*	0.5	22.0
Sulfur Dioxide*	1.9	83.0
Nitrogen Dioxide	3.0	131.3
Carbon Monoxide	1.5	65.6
Hydrocarbons	0.3	13.1
Lead	0.03	1.3
Mercury	0.01	0.44
Beryllium	1.3×10^{-6}	5.7×10^{-5}
Fluorides	0.1	4.4
Chlorides	4.0	175

*Actual test results for Units 1 and 2.

Table II-1 is expanded in Table II-2 to indicate the equivalent emission factors used in the various parts of the Air Quality Analysis. The Resouce Recovery Facility (RRF) is a PSD significant source for all criteria and several non-criteria pollutants. Table II-3 lists the stack parameters used in the analysis of this unit.

TABLE II-2
3rd UNIT
RRF EMISSIONS AND STACK PARAMETERS

Pollutant	lb per ton MSW	Equivalent Factors		
		lb/hr	TPY	gm/s
Particulate*	0.5	22	96	2.8
Sulfur Dioxide*	1.9	83	364	10.5
Nitrogen Dioxide	3.0	132	577	16.6
Carbon Monoxide	1.5	66	288	8.3
Hydrocarbons	0.3	13.1	58	1.68
Lead	0.03	1.3	5.7	0.17
Mercury	0.01	0.5	2.1	0.06
Beryllium	1.3×10^{-6}	5.7×10^{-5}	2.5×10^{-4}	7.2×10^{-6}
Fluorides	0.1	4.4	19	0.55
Chlorides	4.0	174	764	22

*Actual test results for Units 1 and 2.

TABLE II-3
STACK PARAMETERS

Parameters	Unit 3	
	Metric	English
Volumetric Flow	118.0 m^3/s	251,000 acfm
Stack Diameter	2.37 m	7.8 ft
Stack Height	49.1 m	161 ft
Exit Velocity	26.8 m/s	88 ft/s
Exit Temperature	505 ^oK	450 ^oF

The Good Engineering Practice stack height for this facility is 290 ft. The planned stack height is 161 ft to be consistent with the existing construction. The shortness is due to the Clearwater - St. Petersburg Airport being 11,000 ft from the facility. Negotiations with the Federal Aviation Authority indicate that a stack higher than 178 ft will interfere with the approach surface to the airport.

A stack this short could significantly affect the air quality impacts caused by the facility. These impacts were investigated and are explained in Section II-D.

B. MODELING .

To model the air quality impact due to the planned facility expansion, the following protocol was used:

1. Unit 3 will be identical to Units 1 and 2, actual design data for those units have been used for Unit 3. These data were developed in the design process and vary from that in the original application.

2. Results from previous CRSTER modeling of the facility using meteorological data from Tampa International Airport for the years 1970-74 were used to identify the worst years for pollutant concentrations from the facility. Data from the year 1970 were used for further short-term concentration estimates, while data from the year 1971 were used for annual estimates.

3. The ISCST model from UNAMAP4 was used to calculate the impacts of the emissions from 1) the project (Unit 3), 2) from all three Resource Recovery Facility (RRF) units, 3) from all of the PSD sources, and 4) from the RRF and other major interacting sources of SO_2 and TSP in the area.

4. PSD sources modeled include the three units of the Pinellas County RRF, the McKay Bay RRF, and the TECO Big Bend Plant.

5. The major interacting sources modeled include the aforementioned PSD sources, as well as the Florida Power facilities at Anclote, Higgins, and Bartow, TECO's Hooker Point and Gannon Plants, and the Golden Triangle Asphalt Plant.

6. Initial modeling was performed using a polar coordinate system for locating receptors every 22.5^{o} at distances of 500, 1,000, 1,500, 2,000, 2,500, 3,000, 3,500, 4,000, 4,500, 5,000, 6,000, 7,000, 8,000, and 9,000 meters. Subsequent modeling was performed at ring distances of 100, 200, 300, and 400 meters to ensure that the locations of maximum concentrations had been reached.

7. Hotspot analysis was performed using a 15 by 15 Cartesian receptor grid which extended from the maximum polar receptor to the receptors on either adjacent radial line.

8. Hotspot analysis was performed for the project (Unit 3) for all pollutants. Hotspot analyses were also performed for the combination of all three RRF units for 3-hour and 24-hour SO_2 concentrations. These results for SO_2 were scaled by the emission rates of the other pollutants to get hotspot results for all pollutants.

9. Because of the short stack used for the project, a downwash problem could occur. Therefore, the downwash option in the ISCST model was used for the Pinellas County RRF. Any effect of downwash will appear in the model calculations.

10. The results of the modeling of the interacting sources was added to the County's monitored background concentrations for comparison to Florida and federal standards. The source of the data is the County's 1981 Air Quality Annual Report.

C. CURRENT AMBIENT AIR QUALITY

Measured maximum ambient air quality concentrations for 1981 in the vicinity of the Pinellas County Resource Recovery Project are contained in Table II-4. The National Ambient Air Quality Standards (NAAQS) and Florida AAQS are included in the table for comparison. With the exception of ozone (O_3), all pollutant concentrations are considerably lower than the Florida and National standards.

There are two nonattainment areas in the region. A nonattainment area for SO_2 exists at Tarpon Springs, approximately 20 miles to the north-northwest of the project location. In addition, an area defined as a 12-kilometer circle around the intersection of the roads U. S. 41 and Florida 60 in Tampa has been designated nonattainment for TSP. The closest point of this nonattainment area to the project is 9 miles to the east-northeast.

D. IMPACT ANALYSIS

The impact analysis for the proposed project (Unit 3) as well as for all three units of the Pinellas County RRF was based on the sulfur dioxide emission rate. The impact of the facility on other pollutant concentrations was calculated by multiplying the SO_2 concentration by scaling factors which represent the other pollutants emission rates divided by the SO_2 emission rate. All pollutants were assumed to behave conservatively (i.e., no pollutant removal mechanisms). Summaries of the impacts on air quality of Unit 3 only and of all three units are contained in Tables II-5 and II-6, respectively.

Table II-7 contains a summary of the cumulative impacts of the proposed project and other major sources of SO_2 and TSP (as listed in Section II.B). The peak modeled concentration is added to the ambient air quality data from Table II-4 to give a predicted worst-case cumulative concentration. None of these predicted concentrations exceed Florida or National Ambient Air Quality Standards as listed in Table II-4.

Table II-8 contains the cumulative impacts of the project and other PSD sources. These peak modeled concentrations are compared to the PSD Class II increment in the table. None of the Class II increments are exceeded. Table

TABLE II-4
PINELLAS COUNTY 1981 AMBIENT AIR QUALITY MONITORING DATA
IN VICINITY OF PINELLAS COUNTY RESOURCE RECOVERY PROJECT

Pollutant	Site	Averaging Time	Maximum Concentration	2nd Max. Concentration	Ambient Air Quality Standards	
					National	Florida
CO	Honeywell	1-hour	19.5 ppm	a	35 ppm	35 ppm
		8-hour	7.4 ppm	a	9 ppm	9 ppm
NO_2	Derby Lane	Annual	22.9 ug/m^3	-	100 ug/m^3	100 ug/m^3
O_3	Azalea Park	1-hour	125 ppb	105 ppb	120 ppb	120 ppb
SO_2	Derby Lane	3-hour	476 ug/m^3	380 ug/m^3	1,300 ug/m^3 [b]	1,300 ug/m^3 [b]
		24-hour	104 ug/m^3	97 ug/m^3	365 ug/m^3	260 ug/m^3
		Annual	8.8 ug/m^3	-	80 ug/m^3	60 ug/m^3
TSP	Derby Lane	24-hour	89 ug/m^3	a	260 ug/m^3	150 ug/m^3
		Annual [c]	44.6 ug/m^3	-	75 ug/m^3	60 ug/m^3
Pb	Azalea Park	Quarterly	0.5 ug/m^3	-	1.5 ug/m^3	1.5 ug/m^3

T7020/5-24-83

[a] 2nd maximum concentration not reported

[b] Secondary standard

[c] Geometric mean

Source: Air Quality 1981, Pinellas County Annual Report, Pinellas County Dept. of Environmental Management, 1982.

TABLE II-5
IMPACT OF THE PROPOSED PROJECT

Pollutant	Averaging Time	Peak Modeled Concentration (ug/m^3)	Location [a]
SO_2	3-hour	23.8	(300 m, -250 m)
	24-hour	15.6	(-110 m, -40 m)
	Annual	0.56	(200 m, 90^o)
TSP	24-hour	4.1	(-110 m, -40 m)
	Annual	0.15	(200 m, 90^o)
NO_2	Annual	0.88	(200 m, 90^o)
Lead	24-hour	0.25	(-110 m, -40 m)
Mercury	24-hour	0.082	(-110 m, -40 m)
Beryllium	24-hour	1.1×10^{-5}	(-110 m, -40 m)
Fluoride	24-hour	0.82	(-110 m, -40 m)

T7018/8-24-83

[a]The locations of peak concentration are expressed with respect to the location of the project (0,0). The 3-hour and 24-hour maximum locations are based on a Cartesian coordinate system while the others are based on a polar coordinate system.

TABLE II-6
IMPACT OF THE ALL 3 UNITS OF RESOURCE RECOVERY PROJECT

Pollutant	Averaging Time	Peak Modeled Concentration (ug/m^3)	Location [a]
SO_2	3-hour	71.5	(300 m, -250 m)
	24-hour	46.9	(-110 m, -40 m)
	Annual	1.69	(200 m, 90^o)
TSP	24-hour	12.3	(-110 m, -40 m)
	Annual	0.44	(200 m, 90^o)
NO_2	Annual	2.67	(200 m, 90^o)
Lead	24-hour	0.74	(-110 m, -40 m)
Mercury	24-hour	0.25	(-110 m, -40 m)
Beryllium	24-hour	3.2×10^{-5}	(-110 m, -40 m)
Fluoride	24-hour	2.47	(-110 m, -40 m)

T7019/8-24-83

[a] The locations of peak concentration are expressed with respect to the location of the project (0,0). The 3-hour and 24-hour maximum locations are based on a Cartesian coordinate system while the others are based on a polar coordinate system.

TABLE II-7
CUMULATIVE IMPACTS OF THE PROJECT
AND OTHER MAJOR SOURCES OF SO_2 AND TSP

Pollutant	Averaging Time	Background Concentration (ug/m^3)	Peak Modeled Concentration (ug/m^3)	Cumulative Concentration (ug/m^3)	Location [a]
SO_2	3-hour	476	269	745	(3000 m, 90^o)
	24-hour	104	96	200	(3000 m, 315^o)
	Annual	8.8	13.7	22.5	(8000 m, 67.5^o)
TSP	24-hour	89	6.1	95.1	(500 m, 247.5^o)
	Annual	44.6	0.7	45.3	(500 m, 90^o)

T7017/8-24-83

[a]The locations of peak concentration are expressed with respect to the location of the project (0,0) and are expressed in terms of a distance and direction.

TABLE II-8
CUMULATIVE IMPACTS OF THE PROJECT
AND OTHER PSD SOURCES

Pollutant	Averaging Time	Peak Modeled Concentration (ug/m^3)	PSD Class II Increment (ug/m^3)	Location [a] (Distance, direction)
SO_2	3-hour	246	512	(8000 m, 67.5^o)
	24-hour	81	91	(8000 m, 157.5^o)
	Annual	4.9	20	(8000 m, 67.5^o)
TSP	24-hour	5.7	37	(500 m, 247.5^o)
	Annual	0.38	19	(500 m, 90^o)

T7016/8-29-83

[a]The locations of peak concentration are expressed with respect to the location of the project (0,0).

TABLE II-9
IMPACT OF THE PROJECT ON SO_2 AND TSP
NONATTAINMENT AREAS IN THE VICINTY OF THE PROJECT

Location of Nonattainment Areas	Nonattainment Pollutant	Averaging Time	Modeled Impact of Project
Tarpon Springs	SO_2	3-hour	2.16 ug/m^3
		24-hour	0.29 ug/m^3
		Annual	0.019 ug/m^3
Tampa	TSP	24-hour	0.011 ug/m^3
		Annual	0.006 ug/m^3

T7015/8-29-83

TABLE II-10
DE MINIMIS IMPACTS AS COMPARED WITH
MODELED IMPACTS FOR THE PROJECT

Pollutant	De Minimus Level (ug/m^3)	Average Time	Modeled Concentration (ug/m^3)
Carbon Monoxide	575	8-hour	8.63
Nitrogen Dioxide	14	Annual	0.88
Particulate	10	24-hour	4.1
Sulfur Dioxide	13	24-hour	15.6
Lead	0.1	24-hour	0.25
Mercury	0.25	24-hour	0.082
Beryllium	5.0×10^{-4}	24-hour	1.1×10^{-5}
Fluoride	0.25	24-hour	0.82

T7014/8-24-83

II-9 shows the predicted peak impact of the project on the SO_2 nonattainment area at Tarpon Springs and the TSP nonattainment area in Tampa. These impacts are practically negligible.

E. MONITORING

The PSD regulations require air monitoring to determine the existing air quality. Sources may be exempted from monitoring if the modeled ipacts are below certain de minimis values. The de minimis values and the modeled impacts are shown in Table II-10.

Based on the data in Table II-10, monitoring data are needed and will be supplied for lead.

The lead monitoring data will be supplied from the Sheriff's and Azalea Park monitoring stations. These stations are beyond the facility's highest impact area but are located to record the highest lead levels expected within the county. This technique will distinguish the facility's highest impact added to the county's highest monitored level.

The ambient lead levels have fallen significantly in the past three years. The quarterly maximum has fallen from a high of 1.0 ug/m^3 in 1979 to 0.3 ug/m^3 in 1981. Table II-11 shows the highest quarterly average for the past three years.

TABLE II-11
AMBIENT LEAD CONCENTRATIONS
LEAD QUARTERLY MAXIMUMS
(ug/m^3)

Station	1979	1980	1981
Azalea Park	0.9	0.6	0.5
Sheriff's	1.0	0.5	0.3

It can be seen that the unit's highest 24-hour average level concentration (0.25 ug/m^3) added to the county's highest recorded quarterly average level in the past htree years (1.0 ug/m^3) is still significantly below the NAAQS of 1.5 ug/m^3. Therefore, the facility will not violate the NAAQS for lead.

The data in Table II-10 also indicate that the de minimis values for sulfur dioxide and fluorides are exceeded. Sulfur dioxide monitoring data will be supplied from the nearby Derby Lane monitoring station. Table II-7 indicates that the modeled SO_2 impacts from all of the major interacting sources of SO_2, in addition to the SO_2 background concentration from Derby Park, result in cumulative concentrations which are well within Florida and National Ambient Air Quality Standards.

It is not anticipated that monitoring data will be required for fluorides. Modeling is generally the basis for analysis of non-criteria pollutants, unless the local air quality permitting agency determines otherwise (Federal Register 45(154):52724). No major sources of fluorides are known to exist in the vicinity of the facility.

F. CONTINUED COMPLIANCE

To demonstrate compliance with the final permits stack testing will be performed as required. The tests performed will be requested by the DER and will be performed according to the procedures found in 40 CFR Part 60 Appendix A.

APPENDIX III

OTHER IMPACT ANALYSIS

III. ADDITIONAL IMPACT ANALYSIS

A. PURPOSE

The basic purpose of the additional impacts analysis is to determine the effects of applicable criteria and noncriteria pollutant emissions on visibility, soils and vegetation. This assessment will be helpful in providing the Federal land manager with information regarding the potential impacts on Class I areas (Scenic areas, designated by Congress, to be protected from manmade air pollution, 33 U.S.C. 1288). In addition, this chapter of the air permit will help to inform the general public of potential impacts related air quality.

Three components of the additional impact analysis are: (1) a growth analysis, (2) a visibility impairment analysis, and (3) a soils and vegetation impact analysis. The final section of this chapter will summarize the results of these analyses.

B. GROWTH ANALYSIS

The Pinellas County Department of Planning estimates that the Pinellas County population will increase from the 1980 Census figure of 728,531 to 796,000 persons in 1985. This increase of approximately 68,000 people represents a 9% increase in five years or 1.8% per year. Future projections by the Department indicate an estimated population of 1,003,000 in the year 2000 which is a 38% increase over 20 years or an average of 1.6%/year.

The construction force is expected to range between 200 to 300 persons throughout the construction phase of the third unit. This represents less than 0.06% of the total population. It is expected that all of the construction work force except certain supervisory personnel will be from the local area. If there is any relocation of workers, housing is available in the vicinity of the proposed project. A sample of the types and numbers of construction workers is shown in Table III-1.

The operation of the proposed facility will require approximately 6 additional persons. A sample of the types and numbers of operations personnel is shown in Table III-2. It is expected that these personnel will also be from the local area.

The implementation of the proposed facility will cause a positive economic impact on Pinellas County because most, if not all, of the construction and operations work forces will be from the local community. Since there will not be a major influx of workers into the area, there will a minimal impact on the environmental quality of the community due to growth in the area's work force or secondary construction caused by the facility.

TABLE III-1

ESTIMATED CONSTRUCTION WORK FORCE
1050-TPD UNIT

Types	Work Force
Boilermakers	50
Carpenters	30
Electricians	15
Ironworkers	40
Laborers	50
Masons	15
Millwrights	25
Painters	5
Pipefitters	20
Total	250

TABLE III-2

ESTIMATED ADDITIONAL OPERATIONAL STAFF
1050 TPD UNIT

Types	Work Force
Supervisory	0
Clerical	1
Operators per shift	3
Maintenance	2
Security	0
Janitorial	0
Total	6

C. VISIBILITY ANALYSIS

The Clean Air Act Amendments of 1977 require evaluation of new and existing emission sources to determine potential impacts on visibility in Class 1 areas. These source evaluations are to be used as part of a regulatory program to prevent future and remedy existing impairment of visibility in Class 1 areas that results from man-made air pollution. The visibility analysis discussed below is taken from EPA's "Workbook for Estimating Visibility Impairment", November, 1980, which provides a general guidance for determining the potential impacts of an emissions source on visibility in a Class 1 area.

There are two separate types of visibility impairment: atmospheric discoloration and visual range reduction (increased haze); see Figure 1. EPA has defined "visibility impairment" to mean any humanly perceptible change in visibility (visual range, contrast, coloration) from that which would have existed under natural conditions. An important part of a visibility analysis is to determine the frequency of occurrence and magnitude of visual impact in, or within view of, a Class 1 area.

A schematic of EPA's recommended visibility screening analysis procedure is shown in Figure 2. A Level 1 analysis has been performed and is included in Appendix ___. The input data included in the analysis estimated NO_2, SO_2 and the particulate emissions for the proposed resource recovery facility. Regional visual range and distance to the nearest Class 1 areas were used. The nearest Class I area is the Chassahowitzka National Wildlife refuge, located on the west coast of Florida, 75 miles north of the site. A plume contrast rating load was established with reference to the sky, the terrain and the primary and secondary aerosols. EPA has established a rating factor for the plume contrasts which provides guidance for determination of further analysis. If the calculated plume contrast is less than 0.1, no further analyses of potential visibility impacts are necessary. The absolute values of each plume contrast for the proposed facility were calculated to be less than 0.001, which is less than the EPA rating factor. Therefore, further analyses of potential visibility impacts are unnecessary, as it is considered highly unlikely that the proposed facility would cause adverse visibility impairment in Class 1 areas.

D. SOILS AND VEGETATION ANALYSIS

The electrostatic precipitators and the stack height of the proposed Facility will be designed so that neither Florida Ambient Air Quality Standards (FAAQS) nor the PSD increments will be violated. The facility will not violate the secondary FAAQS's, estalished to protect vegetation, materials, visibility, etc. The secondary standards for CO, NO_x, O_3 and HC are equivalent to their respective primary standards, as can be seen in Table III-3. The secondary standards for TSP and SO_2 are more stringent than their respective primary standards.

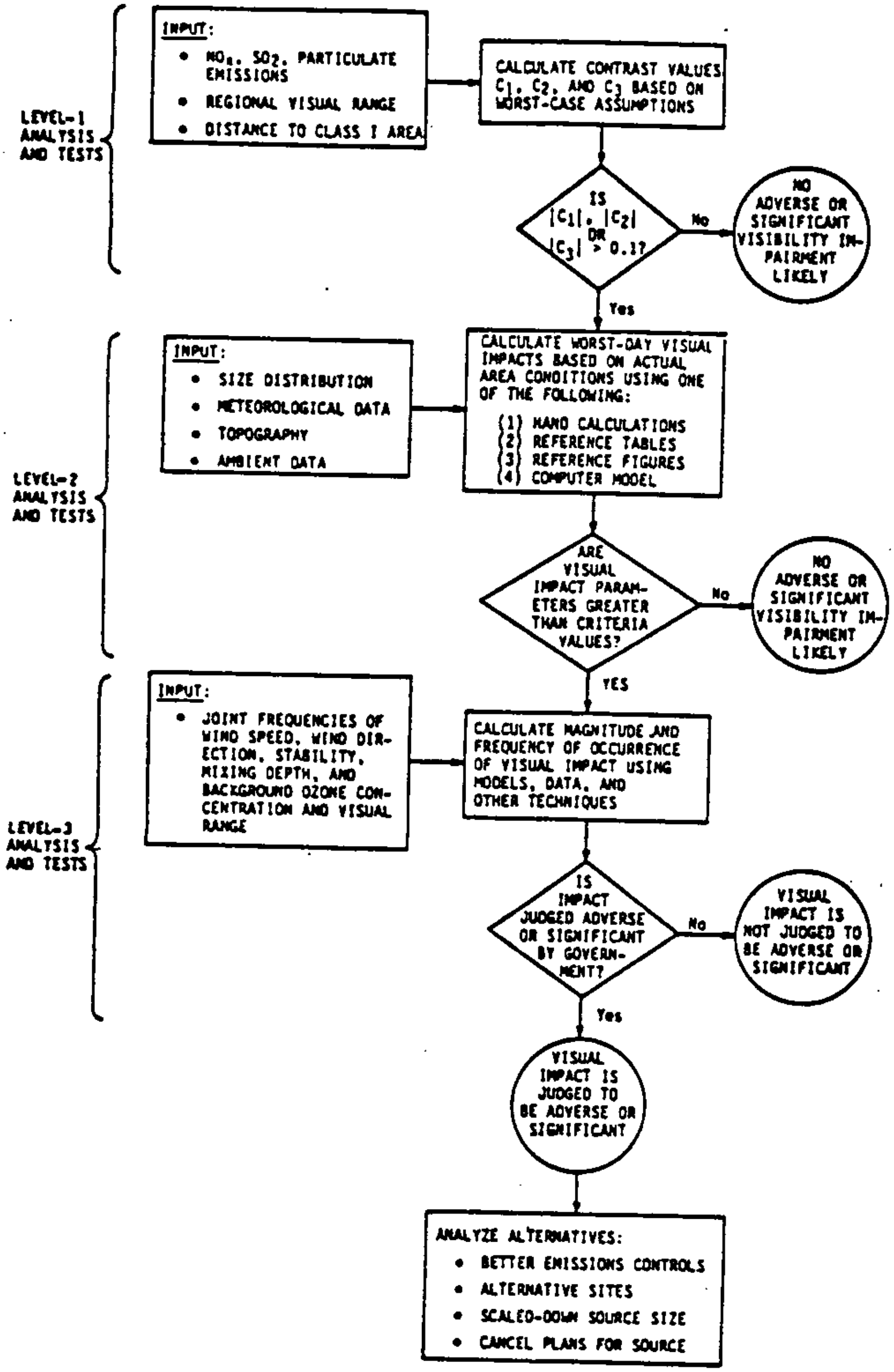


Figure 1. Schematic of visibility screening analysis procedure. The numerical meaning of the terms "significant" and "adverse" differ on a case-by-case basis and will be defined after an in-depth policy analysis of each case.

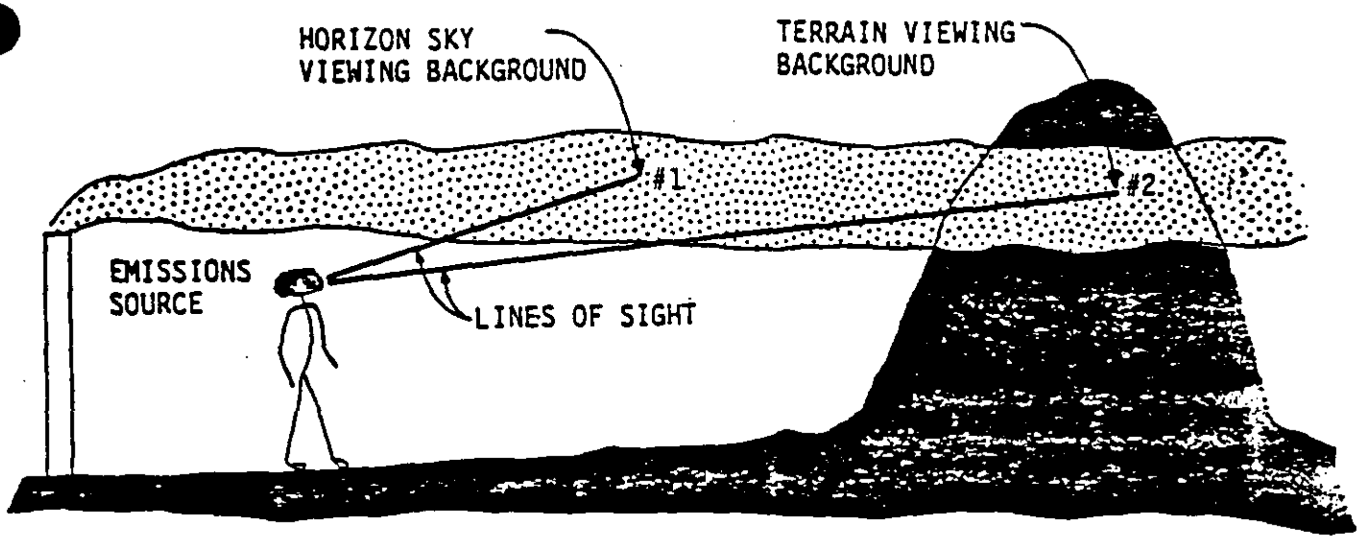


Figure 10. Two types of plume visibility impairment considered in the level-1 visibility screening analysis.

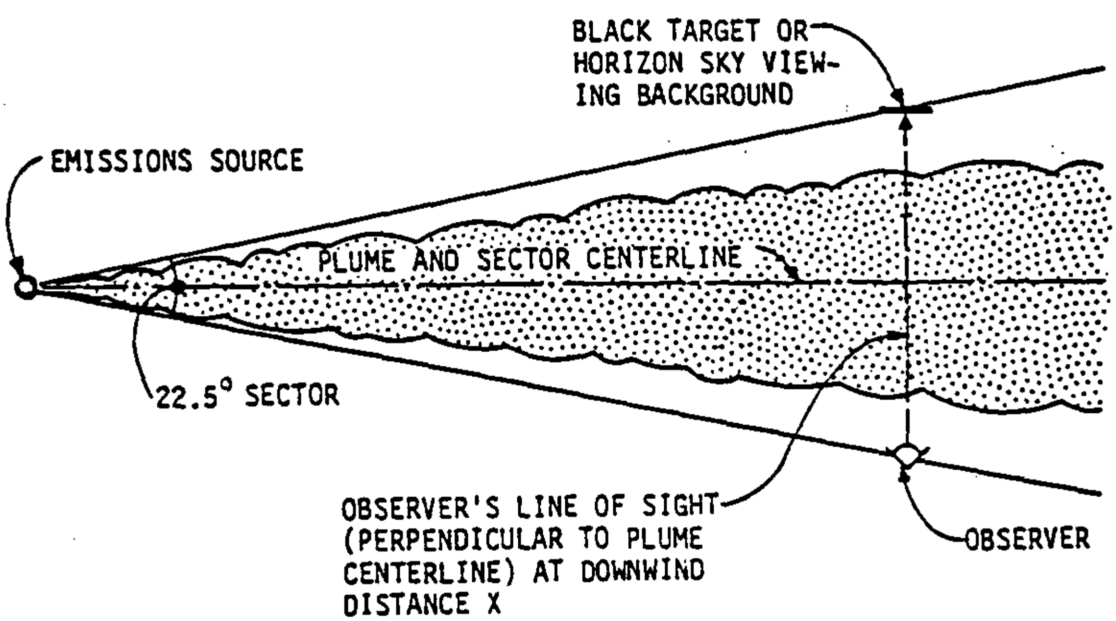


Figure 11. Geometry of plume, observer, and line of sight used in level-1 visibility screening analysis.

TABLE III-3
FLORIDA AMBIENT AIR QUALITY STANDARDS

Pollutant	Averaging Time[1]	Primary Standards	Secondary Standards
Particulate matter	Annual geometric mean	75 ug/m^3	60 ug/m^3
	24-hour	260 ug/m^3	150 ug/m^3
Sulfur oxides	Annual arithmetic mean	80 ug/m^3 (0.03 ppm)	---
	24-hour	365 ug/m^3 (0.14 ppm)	---
	3-hour	---	130 ug/m^3 (0.5 ppm)
Carbon monoxide	8-hour	10 mg/m^3 (9 ppm)	same
	1-hour	40 mg/m^3 (35 ppm)	same
Nitrogen dioxide	Annual arithmetic mean	100 ug/m^3 (0.05 ppm)	same
Ozone	1-hour	240 ug/m^3 (0.12 ppm)	same
Lead	Calendar quarter	1.5 ug/m^3	same

1. The 1-, 3-, 8-, or 24-hour standards are not to be exceeded more than once per year.

1. Soils

The air pollutants from a major stationary source could alter soil characteristics, which may affect vegetation in the area. Vegetation can also be affected directly by acid rain, the result of SO_2 and NO_x emissions. There are pollutant levels at which soils and vegetation are not affected. In fact, the soil is a natural sink for many pollutants such as CO. Soils in the temperate zone have been estimated to remove and assimilate, on the average, 8.44 mg of $CO/hr/m^2$ from the atmosphere (Inman and Ingersoll, 1971). Particulate matter that drops out of the atmosphere and into the soil is generally recycled as nutrients or fixed in a form that is unavailable to vegetation (Bonn, 1972, Rasmussen, et al., 1975).

Pollutants such as fluoride, mercury and beryllium are absorbed by soil and generally fixed by the organic and clay fractions of the soil.

Therefore, the pollutants would be in a form unavailable to plants. The tolerance of soils and plants is dependent on the soil type and plant species.

The most serious impact on soil would be caused by acid rain, which could increase the soil acidity and increase nutrient leaching rates. It appears unlikely that increasing annual ambient levels by 0.8 ug/m^3 of SO_2 and 0.8 ug/m^3 of NO_2 that the proposed facility would measureably alter long-term precipitation pH levels. In fact, no accurate estimation of the change in the pH of rainfall caused by the proposed facility is feasible within current state-of-the-art technology.

2. Vegetation

Native vegetation in the study is associated with specifc soil classifications. In areas of urban or agriculatural usage, non-native species have invaded or are cultivated. Table III-4 features a compilation of soil and vegetation communities found in the area.

In residential areas plantings of various ornamental species are common; also prevalent, especially in less dense residential subdivisions are backyard gardens. In vacant lots where the native vegetation has been removed, thick coppices of Brazilian pepper are found. Fringing the shores of Tampa Bay are stamps of Black Mangrove.

Table III-5 is a compilation of landscape, agricultrual and other non-native species observed in the study area. This listing presents only those speciments which commonly occur.

Backyard gardens range from several square feet to an acre in size. The local climate allows for year round planting although tender plants are generally sown in spring only. Vegetables grown include corn, beans (bush, pole, lima, and pinto), peas (English and southern), greens (collards, mustard, lettuce, cabbage, celery), tomatoes, okra, carrots, turnips, broccoli, cauliflower, eggplant, and peppers. The most common fruit are strawberries; garden specimens of citrus and avacado are not uncommon.

The land within the study area to the south and east characterized by urban usage and resultant landscape plantings. Immediately surrounding the facility site on disturbed open land are dense coppices of brazilian pepper. The tidal shoreline is fringed by black and red mangroves although the former species is more common. Severe freeze damage to the mangroves and many other tender exotics (e.g. Australian pine, cajeput) resulted from an unusually cold period during January, 1981. A few small citrus groves were identified in the far north portion of the study area.

TABLE III-4
SOIL AND VEGETATION COMMUNITIES

Soil Classification	Associated Major Community Species
Well drained deep sands	turkey oak, bluejack oak, slash pine, dogwood, hickory
Poorly drained sands over organic hardpans	pine flatwoods (slash pine, palmetto, wire grass)
Poorly drained sands over calcareous substrate	sabal palm, saw palmetto and wire grass
Well drained sands with phosphatic materials	live and laurel oaks, hickory, and pines
Tidal lands	white, black and red mangrove and black needlerush
Freshwater swamps	pond and bald cypress and sweet bay
Poorly drained acid sands	pine flatwoods (slash pine, palmetto, and wire grass)
Poorly drained neutral to alkaline soils	slash pine, water oaks, and sweet bay
Poorly drained dark colored sands	pine flatwoods (slash pine, palmetto, and wire grass)
Urban lands	landscape plantings and backyard gardens; commercial/industrial open land is covered by Brazilian pepper
Agricultural lands	pasture land of bahia grass; some citrus groves (oranges, grapefruit)

TABLE III-5
LANDSCAPE, AGRICULATURE AND OTHER
NON-NATIVE SPECIES

Common Name	Genus	Species	Location
Grasses			
Bahiagrass	Paspalum	notatum	Pastures and lawns
Bermudagrass	Cynodon	dactylon	lawns
St. Augustine Grass	Stenotaphrum	secundatum	lawns (most common lawn grass
Wire Grass	Aristida	stricta	native; pine flatwoods
Panic Grass	Panicum	sp.	native; on disturbed sites
Ground Coverings			
Periwinkle	Vinca	spp	native; disturbed sites and landscape plantings
Lily-turn	Liriope	muscari	landscape plantings
Flowers			
Chrysanthemum	Chrysanthemum	indicum	landscape plantings
Begonia	Begonia	sp	landscape plantings & hanging baskets
Geranium	Pelargonium	sp	landscape plantings
Marigold	Tagetes	spp	landscape plantings
Phlox	Phlox	drummondi	native; along roads and railroad tracks
Rose	Rosa	spp	landscape plantings
Bulbs			
Day-lily	Hemerocallis	sp	landscape plantings
Canna lily	Canna	sp	landscape plantings
Ferns			
Asparagus Fern	Asparagus	sp	hanging baskets and window pots
Succulents			
Spanish Bayonet	Yucca	aloifolia	native; landscape plantings and along roadways
Century Plant	Agave	americana	landscape plantings

TABLE III-5 (Continued)

Common Name	Genus	Species	Location
Palms			
Cabbage palm	Sabal	palmetto	native; prairies and landscape plantings (state fee)
Areca palm	Chrysali-docarpus	lutescens	landscape plantings
Canary Island data palm	Phoenix	canariensis	landscape plantings
Coconut palm	Cocos	nucifera	landscape plantings
Manila palm	Veitchia	merrillii	landscape plantings
Queen palm	Arecastrum	romanzof-fianum	landscape plantings
Native Trees			
Slash Pine	Pinus	elliottii	pine flatwoods, swamps, & left on developed land
Longleaf Pine	Pinus	palustris	on drier sites and in landscapes
Live Oak	Quercus	virginiani	better, dry soils and landscapes
Water Oak	Quercus	nigra	poorly trained sites
Red Cedar	Juniperus	silicicola	soils underlain by calcareous material and landscapes
Sweet Gum	Liquidambar	styraciflua	poorly drained sands and loams
Sweet Bay	Magnolia	virginiana	poorly drained acid sands
Turkey Oak	Quercus	laevis	excessively drained sands
Bluejack Oak	Quercus	incana	execeesively drained sands
Bald cypress	Taxodium	disthichum	riverine swamps
Pond cypress	Taxodium	ascendens	cypress domes and depressed lands among pine flatwoods along ditches and streams
Black mangrove	Avicennia	nitida	tidal swamps
Red mangrove	Rhizophora	mangle	tidal swamps seaward of black mangrove
Hickory	Carya	sp	mesic forests

TABLE III-5 (Continued)

Common Name	Genus	Species	Location
Native Shrubs			
Saw palmetto	Serenoa	sp	pine flatwoods and deep sands
Yaupon holly	Ilex	vomitoria	deep sands and landscapes
Gallberry	Ilex	coriacea	pine flatwoods
Wax myrtle	Myrica	cerifera	pine flatwoods
Exotic Species			
Australian Pine	Casuarina	spp	along roads and property lines
Citrus	Citrus	spp	oranges, grapefruits, lines, lemons, and tangerines in backyards or small groves
Jerusalem thorn	Parkinsonia	aculeata	disturbed open land and landscapes
Norfolk Island pine	Araucaria	excelsa	landscape plantings
Cajeput	Melaleuca	leucadendra	disturbed open land
Rubber tree	Ficus	sp.	landscape plantings
Banana	Musa	spp	landscape plantings
Bamboo	Bambusa	sp.	landscape plantings
Sago palm	Cycas	revoluta	landscape plantings
Pampas grass	Cortaderia	sellonna	landscape plantings
Copper leaf	Acalypha	wilkesiana	landscape plantings
Croton	Cordiaeum	Variegatum	landscape plantings
Hibiscus	Hibiscus	spp.	landscape plantings
Oleander	Nerium	oleander	landscape plantings
Surinam cherry	Eugenia	unifloria	landscape plantings
Brazilian pepper			grows in dense thickets on disturbed open land.

E. SENSITIVE ZONES

The area immediately surrounding the facility consists of open disturbed lands (created by recent construction) with some warehouse and other light manufacturing structures. The water body just east of this fill area is Tampa Bay, an emergent, or man-impacted ecosystem; it is the focal point of many area conservation groups primarily in conjunction with nesting and/or migratory bird populations. The mangrove ecosystem fringing tidal shores are important natural assets from both a fisheries and storm protection standpoints.

Tree species, such as black and red oak, white pine, gray and white birch, American elm and red maple, have been reported to be relatively sensitive to ambient SO_2 levels (Jones, et al., 1974, Davis and Wilhour, 1976). Concentrations of SO_2 between 786 and 1,572 ug/m^3 for three hours have developed visible injury symptoms (Jones, et al., 1974). White pines exposed to ambient SO_2 levels of more than 0.25 ppm are often stunted (Linzon, 1966). Maximum annual SO_2 concentrations are predicted to be less than 35 ug/m^3, which is considered to be below the threshold at which injury to even sensitive woody vegetation may occur (NAS, 1978).

Long-term exposure to 470 ug/m^3 NO_2 throughout the months of the growing season has been found to reduce growth, weight and yield in tomato plants (Spiering, 1971). However, the predicted peak annual ambient NO_2 concentration of 0.8 ug/m^3 will be well below the minimum concentration reported to cause injury to vegetation after long-term exposures.

Only small increases of ambient TSP levels, 1.44 ug/m^3 and 0.16 ug/m^3 for the 24-hour and annual averages will be caused by the proposed facility. These small increases will not be sufficient to coat foliage or block light and gas exchange (Lodge, et al., 1981).

Vegetation is extremely resistant to CO. In fact, plants exposed to 115 mg/m^3 CO for up to three weeks did not produce any visible injury (Zimmerman, et al., 1933). Predicted maximum CO levels in the vicinity of the proposed facility is 14 ug/m^3, per 8-hour interval.

Ambient lead levels are predicted to be less than 0.24 ug/m^3 for a calendar quarter. The proposed facility will contribute approximately 17% of the ambient standard. However, there have been no known reports of injury to vegetation from lead concentrations near highways where lead concentrations are expected to be high (NRC, 1979).

Plants can be particularly sensitive to fluoride emissions, especially as hydrofluoric acid. However, most of the fluoride emissions from the proposed plant will be in the form of an aerosol (suspended fine particulates), which is less damaging to vegetation. Fluorides can cause spotting or partial destruction of leaf surfaces and reduced plant growth.

Total ambient fluoride levels of 0.8 to 4.0 ug/m^3 for several days have been shown to adversely affect the most fluoride-sensitive plants, such as corn, cherry pine and gladiolus (Treshow, 1969). However, when gladiolus plants were exposed to average fluoride aerosol averaging levels of 1.9 ug/m^3 for four weeks, no damage to leaf areas was experienced (Pack, et al., 1960).

The proposed facility may have peak 24-hour averaging fluoride levels of 0.24 ug/m^3 in the immediate vicinity of the plant.

F. SUMMARY

There will be a positive economic impact on Pinellas County due to the implementation of the proposed facility, while environmental impacts will be slight. Workers for the construction and operation of the facility will be from the local work force; therefore, no growth impacts would be experienced due to an influx of workers from outside the county.

The Class 1 areas closest to the proposed facility are about at a 75 kilometers from the facility. A level 1 visibility analysis indicated that it is extremely unlikely that visibility would be affected in these areas.

The soils in Pinellas County have sufficient high clay content to resist acid precipitation, and should be good at absorbing pollutants such as particulate matter, fluoride, mercury and beryllium. Any increase in SO_2 or NO_2 due to the proposed facility should not significantly alter the pH of rainfall. In fact, any pH change experienced would not be measurable. Increased ambient levels of criteria and non-criteria pollutants due to the facility emissions are not likely to have a significant effect on vegetation in the area.

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APPENDIX IV

AIR PERMIT APPLICATION FORMS

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

APPLICATION TO OPERATE/CONSTRUCT AIR POLLUTION SOURCES

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

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

COMPANY NAME: Pinellas County COUNTY: Pinellas

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) Incinerator

SOURCE LOCATION: Street 28th SE & 110th Avenue City County

UTM: East ______ North ______

Latitude 27 ° 52 ' - "N Longitude 82 ° 40 ' - "W

APPLICANT NAME AND TITLE: Pinellas County, Dept. of Public Works & Utilities

APPLICANT ADDRESS: 310 Court Street, Clearwater, Florida 33516

SECTION I: STATEMENTS BY APPLICANT AND ENGINEER

A. APPLICANT

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

I certify that the statements made in this application for a Construction Permit 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: D F Acenbrack

D. F. Acenbrack, Director
Name and Title (Please Type)

Date: 6/10/83 Telephone No. 813-825-1565

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: Robert Van Deman

Robert Van Deman
Name (Please Type)

(Affix Seal)

(SEALED)

Henningson, Durham & Richardson, Inc.
Company Name (Please Type)

P.O. Box 5576, Clearwater, Florida 33518
Mailing Address (Please Type)

Florida Registration No. 25963 Date: 6/10/83 Telephone No. 813-577-9455

[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.

Addition of third combustion to existing facility. Advantages will be greater availability of energy production. Electrostatic precipitators will be used to control particulate.

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

Start of Construction August 1983 Completion of Construction August 1986

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.)

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

DER Powerplant Site Certification PA 78-11

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:

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
   a. If yes, has "offset" been applied? No
   b. If yes, has "Lowest Achievable Emission Rate" been applied? No
   c. If yes, list non-attainment pollutants.
      Ozone
2. Does best available control technology (BACT) apply to this source? If yes, see Section VI. Yes
3. Does the State "Prevention of Significant Deterioriation" (PSD) requirements apply to this source? If yes, see Sections VI and VII. Yes
4. Do "Standards of Performance for New Stationary Sources" (NSPS) apply to this source? Yes
5. Do "National Emission Standards for Hazardous Air Pollutants" (NESHAP) apply to this source? Yes

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 approx.	8% 7000	24% 21000	40% 35000	10% 8750	0	0	18% 15750

Description of Waste Municipal Solid Waste

Total Weight Incinerated (lbs/hr) 87500 @ 5,000Btu/lb Design Capacity (lbs/hr) 87500

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

Manufacturer UOP

Date Constructed ______ Model No. ______

	Volume $(ft)^3$	Heat Release (BTU/hr)	Fuel		Temperature (°F)
			Type	BTU/hr	
Primary Chamber	Na	$4.11x10^8$ Btu/hr	Solid Waste	$4.11x10^8$ Btu/hr	1600-1800°F
Secondary Chamber					

Stack Height: 161 ft. Stack Diameter 7.78bf Stack Temp. 450°F

Gas Flow Rate: 251,000 ACFM ______ DSCFM* Velocity 88 FPS

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

Type of pollution control device: [ ] Cyclone [ ] Wet Scrubber [ ] Afterburner [X] Other (specify) ESP

Brief description of operating characteristics of control devices:

Electrostatic collection of particulate matter

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

solids to landfill

liquids to 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 @ 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?

Contaminant	Rate or Concentration
Particulate	0.03 gr / dscf at 12% CO_2

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

1. Control Device/System: NONE
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.

10. Stack Parameters

a. Height: ft. b. Diameter: ft.

c. Flow Rate: ACFM d. Temperature: °F

e. Velocity: FPS

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

1.

a. Control Device: SEE BACT SECTION

b. Operating Principles:

c. Efficiency*: d. Capital Cost:

e. Useful Life: f. Operating Cost:

g. Energy*: h. Maintenance Cost:

i. Availability of construction materials and process chemicals:

j. Applicability to manufacturing processes:

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

2.

a. Control Device:

b. Operating Principles:

c. Efficiency*: d. Capital Cost:

e. Useful Life: f. Operating Cost:

g. Energy**: h. Maintenance Costs:

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:

*Explain method of determining efficiency.

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

3.

a. Control Device:

b. Operating Principles:

c. Efficiency*: d. Capital Cost:

e. Life: f. Operating Cost:

g. Energy: 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

b. Operating Principles:

c. Efficiency*:

d. Capital Cost:

e. Life:

f. Operating Cost:

g. Energy:

h. Maintenance Cost:

i. Availability of construction materials and process chemicals:

j. Applicability to manufacturing processes:

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

F. Describe the control technology selected:

SEE BACT SECTION

1. Control Device:

2. Efficiency*:

3. Capital Cost:

4. Life:

5. Operating Cost:

6. Energy:

7. Maintenance Cost:

8. Manufacturer:

9. Other locations where employed on similar processes:

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:

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

SECTION VII – PREVENTION OF SIGNIFICANT DETERIORATION

A. Company Monitored Data

1. ________ no sites None TSP ( ) SO^2* ________ Wind spd/dir

Period of monitoring ___/___/___ to ___/___/___ (month day year) (month day year)

Other data recorded Pinellas County Dept. of Environmental Management

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 / / 70 to 12 / 31 / 74 (month day year) (month day year)

2. Surface data obtained from (location) Tampa

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

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

C. Computer Models Used

1. CRSTER Modified? If yes, attach description.

2. PTP/U Modified? If yes, attach description.

3 PTDIS Modified? If yes, attach description.

4. ________ Modified? If yes, attach description.

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

D. Applicants Maximum Allowable Emission Data

Pollutant	Emission Rate
TSP	________ grams/sec
SO^2	________ grams/sec

E. Emission Data Used in Modeling

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

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

*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.

The project will create jobs and decrease need for landfill space.

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.

APPENDIX V

VISIBILITY ANALYSIS

HDR

Project: PINELLAS RRF   Computed: FR
Subject: VISIBILITY ANALYSIS   Date: 2/28/85   Sht. 1 of 2

LEVEL I - VISIBILITY ANALYSIS (Ref. EPA 450/4-8-03L Nov. '8_)

Q = PINELLAS CTY. RRF UNITS 1, 2 & 3

$Q_{PART.}$ = 1.81 METRIC TONS / DY ; PARTICULATE
Q_{NO_2} = 4.31 METRIC TONS / DY ; NO_x
Q_{SO_2} = 4.31 METRIC TONS / DY ; SO_2

X = 75 Km TO CHASSAHOWITZKA NWR
σ_z = 90 m ; VERTICAL DISPERSION COEFF.

PLUME DISPERSION PARAMETER

$$P = \frac{2.0 \times 10^8}{(\sigma_z)\,x} = \frac{2.0 \times 10^8}{(90)\,75} = 2.96 \times 10^4$$

$\tau_{PART.}$ = OPTICAL THICKNESS
$= (10 \times 10^{-7})\, P\, Q_{PART} = (10 \times 10^{-7})(2.96 \times 10^{4})\, 1.81$
$= 5.36 \times 10^{-2}$

$\tau_{NO_2} = (1.7 \times 10^{-7})\, P\, Q_{NO_2} = (1.7 \times 10^{-7})(2.96 \times 10^{4})(4.31)$
$= 2.17 \times 10^{-2}$

γ_{VO} = 25 KM ; REGIONAL BACKGROUND VISUAL RANGE (FIG. 13)

$\tau_{aerosol}$ - PRIMARY & SECONDARY AEROSOL

$\tau_{ar} = 1.06 \times 10^{-5}\, \gamma_{VO}\, (Q_{PART} + 1.31\, Q_{SO_2})$
$= (1.06 \times 10^{-5})(25)(1.81 + 1.31(4.31))$
$= 1.98 \times 10^{-3}$

HDR

Project: PINELLAS RRF — Computed: ED

Subject: VISIBILITY ANALYSIS — Date: 2/28/83 — Sht. 2 of 2

C_1 = PLUME CONTRAST / SKY

$$C_1 = \frac{-\tau_{NO2}}{\tau_{PART}+\tau_{NO2}}\left[1-\exp\left(-\tau_{PART}-\tau_{NO2}\right)\right]\left[\exp\left(-0.78\, x/r_{V_0}\right)\right]$$

$$= \frac{-2.17\times10^{-2}}{5.36\times10^{-2}+2.17\times10^{-2}}\left[1-\exp-\left(5.36\times10^{-2}+2.17\times10^{-2}\right)\right]\left[\exp\left(-0.78\ {}^{75}/_{25}\right)\right]$$

$$= -2.01\times10^{-3}$$

C_2 = PLUME CONTRAST / TERRAIN

$$C_2 = \left[1-\left(\tfrac{1}{C+1}\right)\exp\left(-\left[\tau_{PART}+\tau_{NO2}\right]\right)\right]\left[\exp\left(-1.56\, x/r_{V_0}\right)\right]$$

$$= \left[1-\left(\tfrac{1}{2.01\times10^{-3}+1}\right)\exp\left(-\left[5.36\times10^{-2}+2.17\times10^{-2}\right]\right)\right]\left[\exp -1.56\ {}^{75}/_{25}\right]$$

$$= -1.74\times10^{-5}$$

C_2 = CHANGE IN SKY / TERRAIN CONTRAST / AEROSOL

$$C_3 = 0.368\left[1-\exp\left(-\tau_{ar}\right)\right]$$

$$= 0.368\left[1-\exp\left(-1.98\times10^{-3}\right)\right]$$

$$= 7.28\times10^{-4}$$

NOTE: SINCE THE ABSOLUTE VALUES OF C_1, C_2 & C_3 ARE < 0.01 IT IS UNLIKELY THAT THE RRF, INCLUDING THE PROPOSED 3RD BOILER, WILL CAUSE VISIBILITY IMPAIRMENT IN THE CLASS I AREA.

APPENDIX VI

DEVELOPMENT OF EMISSION FACTORS

DEVELOPMENT OF EMISSION FACTORS FOR MASS BURN RESOURCE RECOVERY FACILITIES

FEBRUARY 1983

HDR TECHSERV, INC.

Emission factors for mass burn resource recovery facilities were developed from a survey of available emission data in the literature and in proposals made by prospective contractors in response to RFPs for the construction of mass burn resource recovery facilities. Available data are limited and frequently the literature references the same data base more than once. An effort was made only to use data from mass burn waterwall incinerators. However, for some pollutants, data from refractory lined incinerators and RDF plants were included because of limited data available from mass burn facilities.

The emission levels presented by contractors in their proposals are considered representative of average to maximum emission levels expected because contractors are concerned that these levels will be used as emission limits in the permit. Where a specific contractor has submitted different emission values for different proposals, only the highest value was used. The inconsistencies between proposals can be attributed to a changing attitude towards the margin of safety used in deriving these numbers. It is unrealistic to specify absolute maximum emission limits because of the heterogeneous composition of municipal solid waste.

The actual emissions from a new mass burn resource recovery facility may be lower than the emission values presented in this paper. In the first place, a new facility would provide current air pollution control technology whereas the technology used for the tested facilities may represent an earlier level of technology which is less efficient. Also, the composition of the solid waste which will be processed may be different from the waste from which the data were obtained. The solid waste burned will have a higher Btu content and significantly fewer glass and plastic bottles and metal cans if returnable container legislation has been enacted. The impact of this legislation may be to reduce emissions for certain pollutants such as lead, tin, and chlorides due to a reduction in the amount of cans and plastic bottles in the waste stream.

The emission factors presented herein (Tables 1 and 2) are averages of the various source data available. To avoid using the same test data twice, references that appeared to be duplicates of a previous source were eliminated. When an average emission value from three different facilities was presented in one reference, a weighted average of the three was assigned to this value. Thus, each facility tested and each proposal were given the same weight.

Emissions have been grouped into four major classifications. The first classification consists of total suspended particulates and is discussed separately. The next group consists of the major pollutants and includes SO_2, NO_x, CO, hydrocarbons, chlorides (represented as hydrogen chloride), and fluorides (represented as hydrogen fluoride). The last two groups consist of trace metals and certain organics.

1. Particulates

Uncontrolled particulate emission data is available from the Braintree, Nashville, Chicago Northwest, and Harrisburg facilities (1). The average uncontrolled particulate loading from these four plants is 26.6 lb/ton of solid waste fired. Based on seven proposals (2, 3, 4, 5, 6, 7, and 8) in which contractors estimated expected uncontrolled particulate levels, an average of 37.6 lb/ton was calculated. Contractors used these values to calculate the required efficiency of their electrostatic precipitators to meet a specific particulate emission requirement. The uncontrolled particulate emission values proposed by the contractors range from 18 to 103 pounds per ton of solid waste fired because there is a difference in the uncontrolled particulate loading based on the configuration of the proposed system and the amount of excess air used. In addition, these values vary because of the margin of safety the contractors allow themselves for meeting a guaranteed particulate loading. To be conservative without using the highest controlled values proposed by contractors, a maximum uncontrolled emission value of 60 lb/ton of solid waste was used for calculating the required particulate removal efficiency to be used in the air pollution control technology analysis. This equates to an uncontrolled particulate loading of 3 gr/dscf.

2. Major Pollutants

The emission of SO_2, chlorides, and fluorides through the stack is largely dependent on the respective amount of sulfur, chlorine, and fluorine present in the fuel. Based on SO_2 emissions from Braintree, Nashville, Chicago Northwest, and Harrisburg waterwall incinerators (1, 9) and SO_2 data given in six proposals (3, 6, 8, 11, 13, and 14), a weighted average of 3 lb SO_2/ton of solid waste was obtained. For chlorides, a weighted average of 5.3 lb/ton of solid waste was obtained using actual data from the four incinerators and data from four proposals (10, 11, 13, and 14). There was no data available on fluoride emissions from mass burn waterwall incinerators in the literature. However, the average for the four same proposals was 0.1 lb/ton of solid waste and equaled the values from the two sources found in the literature for other than waterwall incinerators.

Emissions of hydrocarbons, CO,and NO_x are dependent on the composition of the waste and on operating and design conditions at the facility. Based on data from Nashville (1) and Harrisburg (9) waterwall incinerators and six proposals (3, 6, 11, 12, 13, and 14), an emission factor of 0.8 lb of CO per ton of solid waste was derived. Data from Braintree was eliminated from the analysis because there are indications that the facility was operating under severe draft imbalance conditions at the time the tests were taken (15). The Braintree data were also eliminated when calculating the emission factor for hydrocarbons for the same reason. Based on four proposals (6, 11, 13, and 14), an emission factor of 0.2 lb of hydrocarbons per ton of solid waste was derived. Including the Braintree data would bring the weighted average up to 0.3 lb/ton. The NO_x emission factor of 4.3 lb/ton solid waste was derived from Braintree, Nashville, Chicago Northwest, and Harrisburg data (1), and emission values presented by six contractors in their proposals(3, 6, 11, 12, 13, and 14). Table 1 summarizes the derived emission factors for the major pollutants.

3. Trace Metals

Published data on trace metal emissions from incinerators in the United States and Europe were reviewed. Authors were contacted to discuss the data presented and to obtain additional data for making the proper corrections to report the data in pounds of pollutant per ton of solid

TABLE 1. EXPECTED EMISSION FACTORS OF MAJOR POLLUTANTS FROM RESOURCE RECOVERY FACILITIES

Pollutant	Pounds/Ton Solid Waste
Particulates	0.6
Hydrocarbons	0.2
Carbon Monoxide	0.8
Nitrogen Oxides	4.3
Sulfur Dioxide	3
Chlorides	5.3
Fluorides	0.1

waste fired. An effort was made to use data from mass burn waterwall incinerators only; but due to the limited available data, data from refractory lined incinerators and one RDF plant were used. The data from the RDF plant were very complete and were found to be of the same order of magnitude as the other data.

Six references (16, 17, 18, 19, 20, and 21) were found to be sufficiently complete, including additional data obtained from authors, to calculate the level of trace metals in the particulate fraction of the controlled flue gas. Table 2 summarizes these results. Each facility in the United States was given equal weight in the analysis, but all the seven facilities in Germany together were given the weight of one facility. This was done so the analysis would be more representative of data from facilities in the United States. The trace metals reported were those considered to be of concern which are listed in the USEPA report entitled "Environmental Assessment of Waste to Energy Processes" (1977). The trace metal emission factors were calculated based on a controlled particulate level of 0.6 pounds per ton (at 99% ESP efficiency) of solid waste fired. Portions of mercury, antimony, cadmium, lead, and tin emissions have been found to be present in the gaseous phase. Very little data are available quantifying the portion of these elements in the gaseous phase. Based on conversations with authors in the field, percentages were estimated as follows: mercury, 85%; antimony, 30%; cadmium, less than 10%; and lead and tin, less than 5% each. These percentages have been used to estimate the emission levels of these elements in the gaseous state. The last column in Table 2 represents a total of the various forms of the expected emissions of each pollutant.

TABLE 2. ESTIMATED TRACE METAL EMISSION FACTORS

Trace Metal	Measured Concentration in Controlled Particulates (ppm)	Estimated Uncontrolled Emissions (pounds per ton solid waste)		
		Particulate* Portion	Gaseous** Portion	Total
Antimony	1,388	8.3×10^{-4}	3.6×10^{-4}	1.2×10^{-3}
Arsenic	160.7	9.6×10^{-5}	-	9.6×10^{-5}
Barium	876	5.3×10^{-4}	-	5.3×10^{-4}
Beryllium	2.1	1.3×10^{-6}	-	1.3×10^{-6}
Cadmium	1,305	7.8×10^{-4}	0.9×10^{-4}	8.7×10^{-4}
Chromium	439.3	2.6×10^{-4}	-	2.6×10^{-4}
Cobalt	14.1	8.5×10^{-6}	-	8.5×10^{-6}
Copper	1,529	9.2×10^{-4}	-	9.2×10^{-4}
Manganese	778	4.7×10^{-4}	-	4.7×10^{-4}
Mercury	632	3.8×10^{-4}	2.2×10^{-3}	2.6×10^{-3}
Lead	47,100	2.8×10^{-2}	0.1×10^{-2}	2.9×10^{-2}
Lithium	100	6.0×10^{-5}	-	6.0×10^{-5}
Nickel	260.4	1.6×10^{-4}	-	1.6×10^{-4}
Silver	276.2	1.7×10^{-4}	-	1.7×10^{-4}
Tin	7,158	4.3×10^{-3}	0.2×10^{-3}	4.5×10^{-3}
Tungsten	14	8.4×10^{-6}	-	8.4×10^{-6}
Vanadium	52.6	3.2×10^{-5}	-	3.2×10^{-5}
Zinc	82,200	4.9×10^{-2}	-	4.9×10^{-2}
Zirconium	24.5	1.5×10^{-5}	-	1.5×10^{-5}

Note: * Based on a particulate loading of 0.6 lb/ton of solid waste fired.

** Percentages assumed to be in the gaseous state: mercury, 85%; antimony, 30%; cadmium, less than 10%; and lead and tin, less than 5% each.

4. Organic Compounds

Emission factors for certain organic compounds which have been identified as being of concern from a potential adverse health effect viewpoint, have been calculated based on test results on fly ash and stack particulates from unspecified European plants burning solid waste (22). Table 3 lists emission rates for these compounds based on a controlled particulate emission of 0.6 pounds per ton of solid waste. These compounds are absorbed on particulates and the potential emissions of these compounds is therefore dependent on the degree of particulate removal. Actual emissions of these compounds from a new mass burn resource recovery facility are expected to be minimal.

Research conducted by EPA indicates that at temperature of 1830F and higher in the combustion chamber, organic compounds are almost completely destroyed (more than 99%) if this temperature is maintained for at least two seconds (23, 24).

TABLE 3. ESTIMATED TRACE ORGANIC EMISSION FACTORS

Organic Compound	Emission Rate (10^{-6} lb/ton)
Total Polynuclear Aromatic Hydrocarbons (PAH)	240
Pyrene	6
Perylene	0.8
Ideno (1,2,3cd) pyrene	0.8
Fluoranthene	5
Coronene	0.8
Benzo(a)pyrene/benzo(e)pyrene	0.8
Benzo(ghi)perylene	2
Benzo(b)flouranthene	1.5
Benzo(a)anthracene	3
Chlorinated Dibenzodioxins	
2, 3, 7, 8 - TCDD	0.02
TCDD	0.2
P5CDD	0.5
HCDD	0.8
H7CDD	0.8
OCDD	0.2
Chlorinated Dibenzofurans	
TCDF	0.3
P5CDF	0.6
HCDF	1.0
H7CDF	0.7
OCDF	0.08

Notes: * Based on a particulate loading of 0.6 lb/ton of solid waste.

Source: Arthur D. Little, Inc., March 1981

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BOARD OF COUNTY COMMISSIONERS

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May 8, 1985

State of Florida
Department of Environmental Regulation
Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32301-8241

Attention: Mr. Hamilton S. Oven, Jr., P.E.

Subject: Air Emissions Modification, Pinellas County RRF

Gentlemen:

Pursuant to our meeting with the Bureau of Air Quality Management in Tallahassee on February 14, 1985, Pinellas County hereby submits proposed amendments and support documentation to the August 17, 1984, letter to the Department. Based on the discussions at the February 14 meeting, it is our understanding that the Best Available Control Technology (BACT) review process is conducted only once for each source and that it was not the Department's intent to designate that the emission limitations determined to be BACT for Unit #3 are also to be applied to existing Units 1 & 2.

Therefore, Pinellas County requests that the existing wording of Section XIV.A.1. of the February 29, 1984, Conditions of Certification (COC) be deleted, and the following text substituted in its place:

1. Emission Limitations upon Operation of Unit 3

    a. Emissions from Units 1 or 2 shall not exceed the following:

        (1) Particulate matter: in grains per standard cubic foot dry gas corrected to 12% CO_2 - 0.08.

        (2) SO_2-170 lbs./hr. each unit

        (3) Odor: there shall be no objectionable odor

        (4) Visible emissions: stack opacity shall be no greater than 20% except as provided for during start-up, shutdown, or malfunctions when the provisions of 17-2.250, FAC shall apply.

b. Emissions from Unit 3 shall not exceed the following:

(1) Particulate matter: in grains per standard cubic foot dry gas corrected to 12% CO_2 - 0.03.

(2) SO_2-170 lbs./hr.

(3) Nitrogen oxides - 254 lbs./hr.

(4) Carbon monoxide - 66 lbs./hr.

(5) Lead - 4.4 lb./hr.

(6) Mercury - 3200 grams/day when more than 2205 lbs./day of municipal sludge is fired. Compliance shall be determined in accordance with 40 CFR 6.1, Method 101, Appendix B.

(7) Odor - there shall be no objectionable odor

(8) Visible emissions - stack opacity shall be no greater than 20% except as provided for during start-up, shutdown or malfunctions when the provisions of 17-2.250,FAC shall apply.

c. The height of the boiler exhaust stack shall not be less than 161 feet above grade.

d. The incinerator boilers shall not be loaded in excess of their rated capacity of 87,500 pounds of municipal solid waste per hour each.

e. The incinerator boilers shall have a metal name plate affixed in a conspicuous place on the shell showing manufacturer, model number, type waste, rated capacity and certification number.

f. Compliance with the limitations for particulates, sulfur oxides, nitrogen oxides, carbon monoxide and lead shall be determined in accordance with Florida Administative Code Rule 17-2.700, DER Methods 1,2,3,5,6, and 40 CFR 60, Appendix A, Method 7. The stack test shall be performed at +/- 10% of the maximum steam rate of 250,000 pounds per hour.

(END OF PROPOSED WORDING CHANGE)

The rationale for the proposed amendments is as follows:

1. Particulate matter - Unchanged from the February 29, 1984 COC.

2. SO_2 - As Pinellas County has stated on several prior occasions, the concentration of SO_2 in emissions from resource recovery facilities is highly variable. This is due to the wide range in the sulfur content of solid waste, a very heterogeneous material. A compilation of tested stack emissions is presented in Appendix 1. From these data and from the data in the attached California Air Resources Board report (Appendix 2) the following conclusions are reached:

   A. The median SO_2 emission rate is 3.8 pounds of SO_2 per ton of solid waste.

   B. The SO_2 emissions exhibit wide deviations from the median.

      Based on these conclusions, an emission rate in the median area is proposed. It is proposed that this emission rate be stipulated for all three units. Currently, Units 1 and 2 are permitted at 1.2 pounds of SO_2 per million BTU's (10.8 lbs./Ton @ 4500 BTU/pound). Modeling results at the proposed emission rate are also attached for review (Appendix 3). The results indicate that no significant increase in ambient SO_2 will result from emissions at this level.

3. Nitrogen oxides - As discussed in the August 17 letter, nitrogen oxide emissions are largely the result of boiler operation. Newer, more efficient units, like Pinellas, generate more of these constituents. However, nitrogen oxide emissions do not exhibit the wide deviations as noted with SO_2. Therefore, it is proposed that the nitrogen oxide limit be based on an upper limit if it is to be defined as a "not-to-exceed" value. Appendix 4 features stack test results from four mass burn facilities. As shown, 95% of the time, the facilities can attain an emission limit of 5.8 lb./ton (254 lbs./hr. for Pinellas), which is the proposed level for Unit 3.

4. Carbon Monoxide - Unchanged from the February 29, 1984, COC for Unit 3.

5. Lead - Lead emissions are largely a function of particulate matter emissions. The attached report by Arthur D. Little, Inc. (Appendix 5) states that approximately 16% of the emitted particulate is in the form of lead. Based on an allowable particulate emission rate of 0.03 g/dscf, the corresponding lead emission is 4.4 lb./hr., which is proposed for Unit 3.

6. Mercury - Unchanged from February 29, 1984, COC for Unit 3.

7. Odor - Unchanged from February 29, 1984, COC for Unit 3.

8. Visible emissions - Opacity is a function of particulate and other gaseous stack emissions. While it is not possible at this time to state what the opacity values will be for Unit 3, the continuous data obtained from Units 1 & 2 indicate that the limitation in the current COC is not consistently attainable (See Appendix 6). Furthermore, opacity and particulate emissions have been compared for Units 1 & 2. Based on this comparison, the opacity at the allowable particulate emission of 0.03 g/dscf will generally be above 10%.

It is requested that the Department consider our request for COC amendment. If you require additional information, please contact this office.

Very truly yours,

Bob Van Deman

Bob Van Deman, P.E., Director
Solid Waste Management

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