CDM Camp Dresser & McKee

Application

Hillsborough County Solid Waste Energy Recovery Facility

Application for Amendment of Power Plant Site Certification

Air Pollution Control Equipment Retrofit

Volume I

Power Plant Site Certification Application

September 1997

CDM Camp Dresser & McKee Inc.

consulting engineering construction operations

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Tampa, Florida 33607
Tel: 813 281-2900 Fax: 813 288-8787

50th 1947-1997 Anniversary

September 15, 1997

Mr. Clair Fancy, Chief
Bureau of Air Regulation
Florida Department of Environmental Protection
MS 5505
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Subject: Hillsborough County Solid Waste Energy Recovery Facility
Air Pollution Control (APC) Retrofit

Dear Mr. Fancy:

Accompanying this letter are 5 copies of Hillsborough County's Application for an Amendment to its Power Plant Site Certification (No. 83-19) to allow construction of new APC equipment to meet the Emission Guidelines for Municipal Waste Combustors [pursuant to 40 CFR 60 Subpart Cb as adopted in FAC 62-204.800(8)]. Also enclosed is a check in the amount of ten thousand dollars ($10,000), the permit fee.

If you have any questions or comments, do not hesitate to contact me.

Sincerely,

CAMP DRESSER & McKEE INC.

Daniel E. Strobridge
Associate

c: H. (Buck) Oven, FDEP Power Plant Siting
J. Campbell, Hillsborough County EPC
T. Smith, Hillsborough County Solid Waste Management Department
D. Elias, RTP
M. Chumbler, Carlton Fields

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[redacted] DOR NO. 103291 DATE PAID 09/11/97 WARRANT NUMBER 00020816

VOUCHER NUMBER	PURCHASE ORDER NUMBER	DESCRIPTION	AMOUNT
SW04071A		*090497 PPSA CERT MODIFICATION FEE*	1000000

BOARD OF COUNTY COMMISSIONERS-HILLSBOROUGH COUNTY
P.O. BOX 1110-TAMPA, FLORIDA 33601

1000000

BOARD OF COUNTY COMMISSIONERS
Hillsborough County Florida

Barnett Bank of Tampa 040-029
101 E. Kennedy Blvd. Tampa, FL 33602

[redacted] 631

WARRANT NUMBER 00020816

DATE 09/11/97

PAY THIS AMOUNT

*****10,000.00

[redacted] EXACTLY

TEN THOUSAND DOLLARS AND NO CENTS

PLEASE DEPOSIT PROMPTLY VOID AFTER SIX (6) MONTHS

AUTHORIZED IN OPEN SESSION

TO THE ORDER OF

FL DEPT ENVIRONMENTAL PROTECTION
BUREAU OF FINANCE & ACCOUNTING
P O BOX 3070
TALLAHASSEE FL 32315-3070

Dottie Berger CHAIRMAN

CLERK

[redacted]

[redacted]

[redacted]

Application

Hillsborough County Solid Waste Energy Recovery Facility

Application for Amendment of Power Plant Site Certification

Air Pollution Control Equipment Retrofit

Volume I

Power Plant Site Certification Application

September 1997

APPLICANT INFORMATION

Applicant's Official Name	Hillsborough County, Florida
Address:	601 East Kennedy P.O. Box 1110 Tampa, Florida 33601
Address of Official Headquarters:	Same as above
Business Entity	County Government
Name and Title of Business Head:	Dottie Berger, Chairman Board of County Commissioners
Name, Title, and Address of Official Representative Responsible for Obtaining Certification:	Mr. Thomas G. Smith, Executive Manager Department of Solid Waste 601 East Kennedy Tampa, Florida 33601
Site Location:	Hillsborough County
Nearest Incorporated City:	Tampa, Florida
Latitude & Longitude:	27°57'14" N / 82° 20'22" W
UTM Coordinates Northerly:	3092, 700mN
Easterly:	368, 200mE
Section/Township/Range:	T29S, R20E, Sections 18 and 19
Name Plate Generating Capacity	
Existing / Ultimate	29 MW / 39 MW
Proposed Increase:	None
Facility Purpose:	The Hillsborough County Solid Waste Energy Recovery Facility is operated primarily for the disposal of solid waste and recovery of energy and materials. The county does not operate the Facility or any associated transmission lines for the purpose of energy generation or distribution. The proposed physical modifications of the Facility are needed to comply with the requirements of Subpart Cb Emission Guidelines, 40 CFR Part 60, and Section 129 of the Clean Air Act of 1990 and Section 62-296.416, FAC.

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List of Abbreviations

ACI	activated carbon injection
APC	air pollution control
Btu	British thermal unit
$CaCl_2$	calcium chloride
CaO	pebble lime
$CaSO_3$	calcium sulphite
$CaSO_4$	calcium sulphate
CEM	continuous emission monitor
County	Hillsborough County, Florida
dscf	dry standard cubic foot
dscm	dry standard cubic meter
EG	Emission Guidelines for Municipal Waste Combustors (40 CFR 60 Subpart Cb)
EPA	United States Environmental Protection Agency
ESP	electrostatic precipitator
FAC	Florida Administrative Code
Facility	Hillsborough County Solid Waste Energy Recovery Facility
FDEP	Florida Department of Environmental Protection
FF	fabric filter
gr/dscf	grains per dry standard cubic foot
HCl	hydrochloric acid
ID	induced draft
lb	pound

m	meter
m^3	cubic meter
mg	milligrams
MG	million gallons
Mg	megagram
MMBtu	million British thermal units
MSW	municipal solid waste
MW	megawatt
MWC	municipal waste combustor
N_2	nitrogen
ng	nanograms
NH_3	ammonia
No_x	oxides of nitrogen
PM	particulate matter
PM_{10}	particulate matter with an aerodynamic diameter less than or equal to 10 microns
ppmdv	parts per million, dry, by volume
ppmv	parts per million, by volume
PPSA	Power Plant Siting Act
PSD	Prevention of Significant Deterioration
RACT	reasonably available control technology
Retrofit	all of the work included in the proposed upgrade of the Facility
SDA	spray dryer absorber
SNCR	selective non-catalytic reduction

SO_2	sulfur dioxide
TECO	Tampa Electric Company
tpd	tons per day
tpy	tons per year
μg	microgram
UTM	universal transverse Mercator coordinates

Introduction

This application is for replacement and upgrade of the air pollution control (APC) system (Retrofit) at the Hillsborough County Solid Waste Energy Recovery Facility (Facility). This application does not request any modification of the Facility's electrical generation capacity.

Hillsborough County and the operator of the Facility (Ogden Martin Systems of Hillsborough, Inc.), propose to replace the Facility's APC system with new, more efficient technology to meet new federal and state air emissions regulations for municipal waste combustors. Currently, the Facility has electrostatic precipitators to control stack emissions. The new system will include spray dryer absorbers/fabric filters (SDA/FF) for acid gas and particulate control, powdered activated carbon injection (ACI) for mercury and organics control, and selective non-catalytic reduction (SNCR) for control of nitrogen oxides. The new APC system will be constructed entirely within the limits of the existing Facility site.

The format of the application is consistent with the Florida Department of Environmental Protection (FDEP) application form to guide applicants in the preparation of an application for power plant site certification. However, a detailed response to all of the items in the form was not considered necessary because this document is an application for amendment of the existing site certification. An amendment to the existing site certification is sought because:

1. The facility already exists.

2. The construction and operations impacts were addressed in the original application for site certification.

3. The proposed modifications do not represent a major change from existing conditions.

4. The proposed improvements are required to satisfy new state and federal regulations.

As an example, Section 8.1 of the application form pertains to consideration of alternative sites. Because the Facility already exists in accordance with a previously issued site certification, consideration of alternative sites is not practical. Likewise, because the Facility already exists and because the socioeconomic costs and benefits of its operation have previously been analyzed as part of the original site certification, it was not considered necessary to provide a complete analysis of the socioeconomic costs and benefits of Facility operation in Section 7.0 of the form.

In all sections of the form where a detailed analysis is not provided, the justification for not providing the detailed analysis is printed in bold, italic type under the appropriate section heading. In some cases, relevant information may then follow (in normal type).

Section 1
Need for Power and the Proposed Facilities

The need for this Facility was adequately demonstrated as a condition for obtaining the original site certification. The proposed modifications to the air pollution control (APC) systems do not change the bases for that determination.

1.1 Purpose of the Facility

The primary objective of the Hillsborough County Solid Waste Energy Recovery Facility (Facility) is to dispose of solid waste generated within the unincorporated areas of Hillsborough County. The county decided to construct and operate the Facility in the early 1980s after several years of investigation by the Board of County Commissioners into alternative methods of disposing of solid waste. It was determined that the generation of electricity from the combustion of solid waste was the most feasible alternative. In 1984, the County submitted an Application for Certification under the Florida Electrical Power Plant Siting Act (PPSA). Based on this application process, the Facility received certification and was constructed in accordance with the act.

The Facility currently handles an average of 1,159 tons of solid waste daily on average and generates 26 megawatts (MW) of electricity for sale to Tampa Electric Company. The Facility consists of three boiler systems each with a nominal thermal input capacity of 150 million Btu/hour (MMBtu/hr) and capable of burning a nominal 400 tons of solid waste per day. Electricity is generated from a single 29-MW turbine generating unit. Operation of the Facility has allowed the county to reduce the volume of solid waste landfilled to 0.205 tons of residue per ton of solid waste. Through this reduction, the life of the current Southeast Landfill has been significantly extended.

1.2 Purpose of the Proposed Modifications

This application under the PPSA is for modifications to the Facility's APC equipment. Existing electrostatic precipitators will be replaced. New spray dryer absorber (SDA)/fabric filter (FF) systems, carbon injection systems, and induced draft (ID) fans will be installed downstream of each boiler. A selective non-catalytic reduction (SNCR) system (consisting of equipment to inject ammonia or urea into the combustion zone of each boiler) will also be installed. Continuous emission monitors (CEMs) will be installed in the boiler and FF outlet ducts. These modifications are necessary to comply with new emission control and continuous emission monitoring standards. This application does not request any modification of the Facility's electrical generation capacity or solid waste processing capacity, but does ask for increased flexibility in the Facility's operating window.

In December 1995, the United States Environmental Protection Agency (EPA) published Subpart Cb Emission Guidelines (EG) for municipal waste combustors (MWCs) pursuant to Sections 111 and 129 of the Clean Air Act Amendments (60 Federal Register 65387). Based on these revisions to the Federal Code, the state of Florida is required to revise its air pollution standards for MWCs.

In addition to the new EPA regulations, the Florida Department of Environmental Protection (FDEP) promulgated a new rule in October 1995 which restricts the amount of mercury which can be emitted. Under the new rules, mercury emissions shall not exceed 70 micrograms per dry standard cubic meter of flue gas or 20 percent by weight of mercury in the flue gas upstream of the mercury control system, which ever occurs first.

1.3 Description of the Hillsborough County Solid Waste Energy Recovery Facility

The Facility began commercial operation in May 1987. The Facility is owned by Hillsborough County and operated under a 20-year contract by Ogden Martin Systems of Hillsborough, Inc. The Facility consists of three combustion units/boilers, each with a nominal thermal input rating of 150 MMBtu/hr and nominal processing capacity of 400 tons of solid waste material per day (tpd). The current permit allows processing of up to 440 tpd. Electricity is generated by a single 29-MW turbine generator, manufactured by General Electric.

The waste handling/energy generation procedures at the Facility are as follows. Waste is hauled to the site via transfer, roll-off, or collection vehicles. Upon arrival, the vehicle is weighed at the scale house and the waste is categorized. Any unacceptable waste is diverted at this time. All acceptable waste is taken to the Refuse Receiving Building, where it is deposited into the Refuse Storage Pit. From this location, the refuse is stored until needed to charge the combustion units. When the storage pit is full, the refuse is temporarily stored on the tipping floor until it can be moved to the storage pit. The handling of solid waste is done in accordance with all applicable state and federal regulations.

Charging of the combustion units is accomplished using two overhead refuse cranes equipped with orange peel type grapples. These cranes are used to stack, mix, and relocate refuse within the pit. The crane operators are located in an enclosed control room near the feed hoppers where they can view the pit area and the charging hoppers. In addition, closed circuit television cameras are located above each charging unit to provide the crane operators with a better view of the current status of each unit.

Each combustion unit consists of a integrated mass-burn furnace and waterwall boiler, ash discharge system, followed by the APC equipment. As waste is combusted in these chambers, the ash is removed using a conveyor and transported to the Ash Handling Building, where the ash and ferrous metals are removed. The ash is then stockpiled for transport to the Hillsborough County Southeast Landfill. The heat from the combustion unit is transferred through the waterwall boiler to produce steam for the turbine generator.

To help reduce odors originating from the refuse, air is drawn from the Refuse Receiving Building into the combustion units. Through this process, negative air pressure is maintained in the Refuse Receiving Building, which helps prevent the escape of odors from the building.

The combustion gases flow from the combustion chamber through an economizer unit to the electrostatic precipitator (ESP). As the air passes through the economizer, additional heat is recovered and transferred to the water flowing into the boiler. After leaving the economizer, the flue gas passes through the ESP where particulate matter (PM) is removed before the gasses are discharged from the stack.

1.4 Determination of Need and Public Service Commission Approval

The PPSA applies to all electrical generating facilities with a total generating capacity of 50 MW or greater. In August 1983, the Hillsborough County Board of County Commissioners petitioned the Public Service Commission to allow this Facility to be permitted and operated under the PPSA. The original application for certification was submitted in August 1984. The certification was issued later that year, and was revised in 1987, and most recently in January 1995.

The Facility has been operating since May 1987 generating electricity. This electricity is sold to the Tampa Electric Company (TECO) for general distribution. Operating at an average generation rate of 26 MW, the Facility has been fully incorporated into TECO's plans for electrical capacity for the region.

This application has been prepared for the replacement and upgrade of the APC equipment and does not represent any modification to the Facility's electrical generation capacity or annual solid waste processing capacity. This application does request modification of the allowable operating window and of the manner in which Facility load is monitored, consistent with the EPA EG.

Section 2
Site and Vicinity Characterization

The suitability of the site and surrounding area for construction and operation of the Facility was demonstrated as a condition for obtaining the original site certification. The proposed modifications to the APC systems do not change the bases for that determination.

2.1 Site and Associated Facilities

2.1.1 Site Delineation and Ownership

The Facility was constructed on a 50.4-acre site owned by Hillsborough County. The site is part of a larger parcel originally purchased from the Seaboard System Railroad. The original property purchase has since been divided between several county departments, which include the Sheriff's Office, Animal Control, the Road and Street Department, and Public Utilities. Only facilities associated with the solid waste energy recovery facility are located within the boundaries of the certified site.

2.1.2 Existing Site Uses

Use of the certified site has not changed from the original permit application. The site contains facilities associated with the operation of the solid waste energy recovery facility. A current site plan is shown on Figure 2-1. No modifications to the boundaries of the certified site are proposed as part of this application.

2.1.3 Zoning and Land Use

Existing land uses in the general area (i.e., within a mile of the Facility) are predominantly commercial/light industrial, institutional, and undeveloped. Businesses in the area include a concrete plant, storage and transfer facilities, and several small light industrial/commercial parks. To the south of the Facility is the Falkenburg Road advanced wastewater treatment facility. To the east is the Hillsborough County road and street maintenance yard. To the northeast of the Facility is the Falkenburg Road jail and the area to the west is undeveloped. Farther south is the State Road 60 corridor which contains dense strip commercial development.

In 1984, the site was rezoned to a Community Unit (public/quasi-public/institutional) to allow for the construction and operation of this Facility. Documentation on the rezoning process was submitted as part of the original site certification process. Current zoning within a 2-mile radius of the certified site is shown on Figure 2-2.

PROPERTY LINE (TYP)

STORMWATER OUTFALL

EDGE OF PAVEMENT (TYP)

SCALE HOUSE

ENTRANCE

TO FAULKENBURG RD

RETENTION POND "A"

RETENTION POND "C"

RETENTION POND "D"

WASTEWATER SUMP

SCALPER BUILDING

ASH HANDLING BLDG

TRANSFORMER YARD

INCLINED BELT CONVEYOR

STACK

PRECIPITATOR ENCLOSURE

BOILER HOUSE

HOPPER AREA

REFUSE PIT

TIPPING FLOOR

CHLORINATION BUILDING

CHLORINATION TANK

FP TANK

C W PUMPS

COOLING TOWER

CONDENSATE TANK

TURBINE GENERATOR

ADMIN. BLDG

NEUTRALIZATION TANK

PARKING

WASTE TREATMENT BASIN

ACID & CAUSTIC AREA

PARKING

BUS AREA

RETENTION POND "B"

STORMWATER OUTFALL

N

APPROX. SCALE
1" = 120'
60 0 120

SDA

23:08:18

01/22/97 14:34:17

CSTPL000

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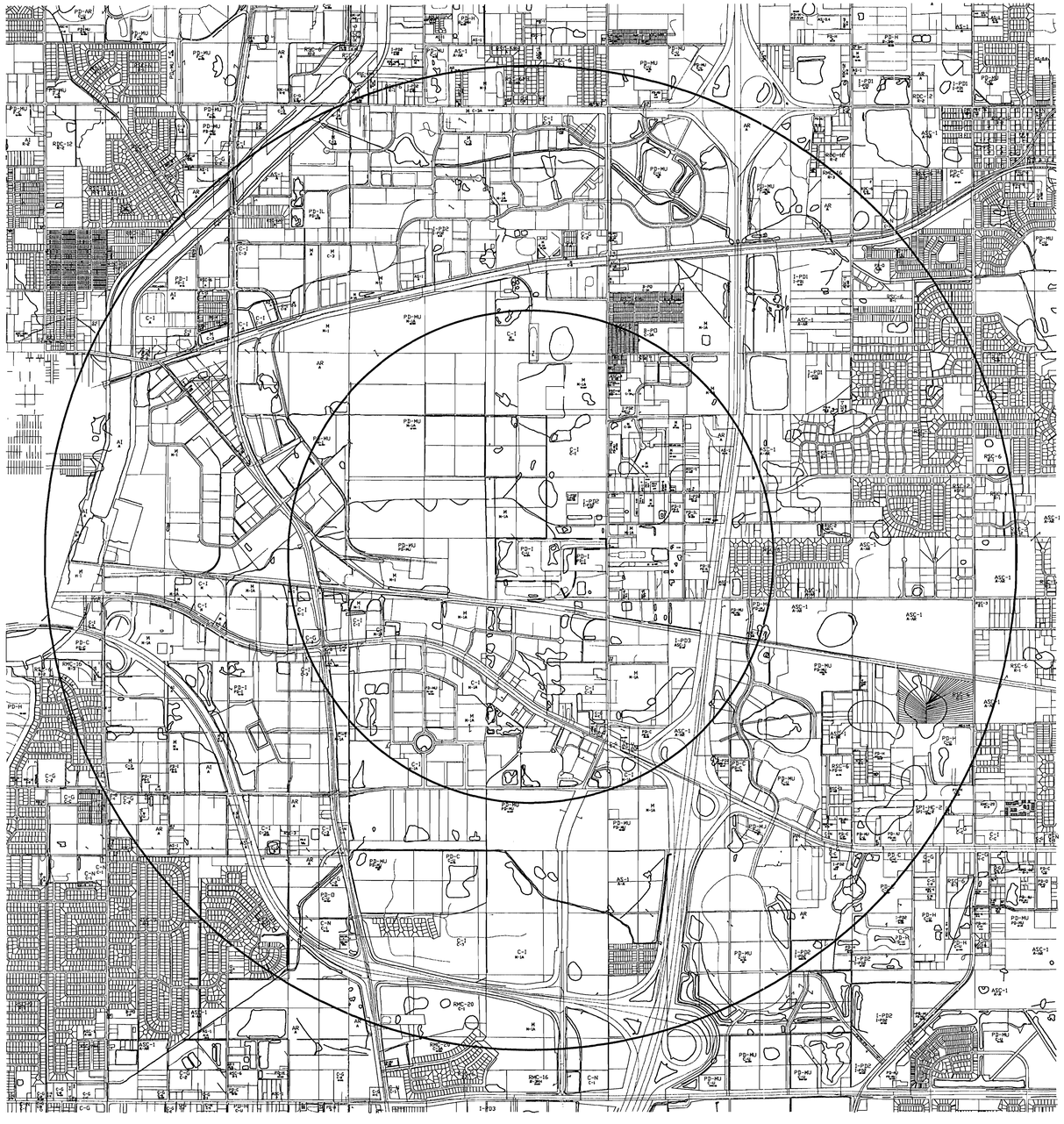
HILLSBOROUGH COUNTY, FLORIDA

SOLID WASTE ENERGY RECOVERY FACILITY SITE PLAN

Figure No. 2-1



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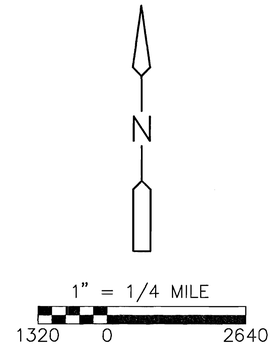
Zoning Districts



Agricultural Districts

AM	Agricultural Mining
A	Agricultural
AR	Agricultural Rural
AS-0.4	Agricultural, Single-Family Estate
AS-1	Agricultural, Single-Family
ASC-1	Agricultural, Single-Family Conventional
A-I	Agricultural, Industrial

Residential Districts

RSC-2	Residential, Single-Family Conventional
RSC-3	Residential, Single-Family Conventional
RSC-4	Residential, Single-Family Conventional
RSC-6	Residential, Single-Family Conventional
RSC-9	Residential, Single-Family Conventional
(MH)	Residential, Single-Family Mobile Home Overlay
RDC-6	Residential, Duplex Conventional
RDC-12	Residential, Duplex Conventional
RMC-6	Residential, Multi-Family Convential
RMC-9	Residential, Multi-Family Convential
RMC-12	Residential, Multi-Family Convential
RMC-16	Residential, Multi-Family Convential
RMC-20	Residential, Multi-Family Convential

Office Districts

BP-0	Business, Professional Office
O-R	Office Residential

Commercial Districts

C-N	Commercial, Neighborhood
C-G	Commercial, General
C-I	Commercial, Intensive

Industrial District

M	Manufacturing

Special Purpose District

(SB)	Show Business Overlay

Special Public Interest (SPI) Districts

SPI-HC	Historical and Cultural Conservation
SPI-RVR	Recreational Vehicle and Private Pleasure Craft Resicential Overlay
SPI-UC-1	University Community
SPI-UC-2	University Community
SPI-UC-3	University Community
SPI-AP-1	Airport
SPI-AP-2	Airport
SPI-AP-3	Airport
SPI-AP-4	Airport
SPI-AP-5	Airport
SPI-AP-V	Airport Vandenberg
SPI-NMD	North Dale Mabry Overlay

Planned Development District

PD	Planned Development

Interstate-75 Planned Development Districts

IPD-1	Interstate Planned Development
IPD-2	Interstate Planned Development
IPD-3	Interstate Planned Development

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HILLSBOROUGH COUNTY, FLORIDA

SOLID WASTE ENERGY RECOVERY FACILITY
ONE & TWO MILE RADIUS AREA ZONING

Figure No. 2-2

2.2 Sociopolitical Environment

2.2.1 Demography

Hillsborough County is located in west central Florida along Tampa Bay. The county covers 1,266 square miles and had a total population of approximately 834,000 in 1990 based on the 1990 census. A breakdown of population by community is included in Table 2-1. The population was estimated to be approximately 893,000 in 1995.

2.2.2 Governmental Jurisdictions

Within Hillsborough County there are four governmental jurisdictions, consisting of the county and the municipalities of Tampa, Temple Terrace, and Plant City. The closest incorporated area to the certified site is the city of Tampa.

2.2.3 Historic, Scenic, Cultural, and National Landmarks

During the original site permitting and development process, no historic, scenic, cultural, or national landmarks were identified within the boundaries or immediate surrounding areas. The proposed project will be constructed entirely within the previously developed areas of the site.

For a more regional perspective of historic and cultural landmarks, a search of the Florida Master Site File was requested. Based on this search, a total of 47 sites were identified in the area. None of these sites are within the project site or on immediately adjacent properties. A copy of the report and map provided by the Florida Department of State, Division of Historical Resources is provided in Appendix A.

2.3 Biophysical Environment

Other than reductions in stack emissions, the modifications proposed in this application will have no significant effect on the existing biophysical environment.

2.3.1 Geohydrology

The geohydrology of the project site was described in the previous PPSA Site Certification Application. As the proposed project addresses only modifications to the APC equipment, an update to this portion of the application has not been prepared.

2.3.2 Soils

Soils information for the project site was presented in the previous PPSA Site Certification Application. As the proposed project addresses only modifications to the APC equipment, an update to this portion of the application has not been prepared.

Table 2-1
Hillsborough County Solid Waste Energy Recovery Facility
Application for Amendment of Power Plant Site Certification

Population by Community
Hillsborough County, Florida

Area	*1980 Census*	*1990 Census*	*1995 Estimate*
Plant City	17,064	22,754	25,465
Tampa	271,577	280,015	285,153
Temple Terrace	11,097	16,444	18,724
Unincorporated	347,201	514,841	563,532
Total	646,939	834,054	892,874

2.3.3 Affected Waters

The Facility does not discharge wastewater to surface or groundwater in the area. All process and wastewater is discharged to the adjacent wastewater treatment facility. The only surface water discharge associated with the Facility is from the site's stormwater management system. Drainage from the site is treated in one of four stormwater detention basins before discharge to an adjacent swale. Drainage flows through offsite conveyances for final discharge in the Tampa Bypass Canal. No substantial modifications to the stormwater management system are proposed.

2.3.4 Site Water Budget and Area Uses

The majority of the water used at the Facility comes from the adjacent Falkenburg Road wastewater treatment plant. The Facility uses the treated effluent from this adjacent plant for cooling tower makeup water. In 1995, the Facility used 41.5 million gallons (MG) of reclaimed water. In addition, the Facility also uses potable water. A total of 1.14 MG of potable water was used by the Facility in 1995. It is proposed that the Facility will use reclaimed water as dilution water for the SDA/FF system. The amount of water required is estimated at about 5 MG per year. Potable water will be used for lime slaking, which will require an additional 18 MG of potable water per year.

2.3.5 Ecology

Before development, the site was predominately improved pasture and did not contain any ecologically significant habitats. Since that time, much of the site has been used for the development of the Facility and converted from pasture to landscaped area. No significant habitats will be disturbed as a result of modifications to the APC equipment.

2.3.6 Meteorology and Ambient Air Quality

The purpose of this amendment is to upgrade the existing APC system. With the exception of ammonia, emissions of Prevention of Significant Deterioration (PSD) regulated pollutants will be lower than, or the same as, those from the existing facility. A detailed discussion of the meteorology and air quality in the area and any associated impacts has been included in Volume II: Source Modification Construction Air Permit Application.

2.3.7 Noise

An ambient noise study is currently under way. Noise control will be incorporated into the APC modifications as necessary to comply with the Hillsborough County Code. Compliance with the noise code is a condition of the agreement between Hillsborough County and the Facility operator (Ogden Martin Systems of Hillsborough, Inc.).

Section 3
The Plant and Directly Associated Facilities

A complete description of the Facility was provided as a condition for obtaining the original site certification. Accordingly, this section of the application is limited to descriptions of the proposed modifications to the Hillsborough County Solid Waste Energy Recovery Facility which will enable the Facility to meet new federal and state air quality regulations, and any other changes to plant operations or discharges which will result from the proposed modifications.

3.1 Background

Under this application, the county and the facility's operator, Ogden Martin Systems of Hillsborough, Inc., propose to replace the Facility's existing air quality control system with a newer, more efficient technology. Currently, the Facility uses ESPs to control facility air emissions. This system will be replaced with a new SDA/FF system for control of acid gases and particulates, a powdered activated carbon injection (ACI) system for mercury and organics control, and an SNCR system for control of nitrogen oxides. Common reagent storage facilities will also be included as part of the APC improvements.

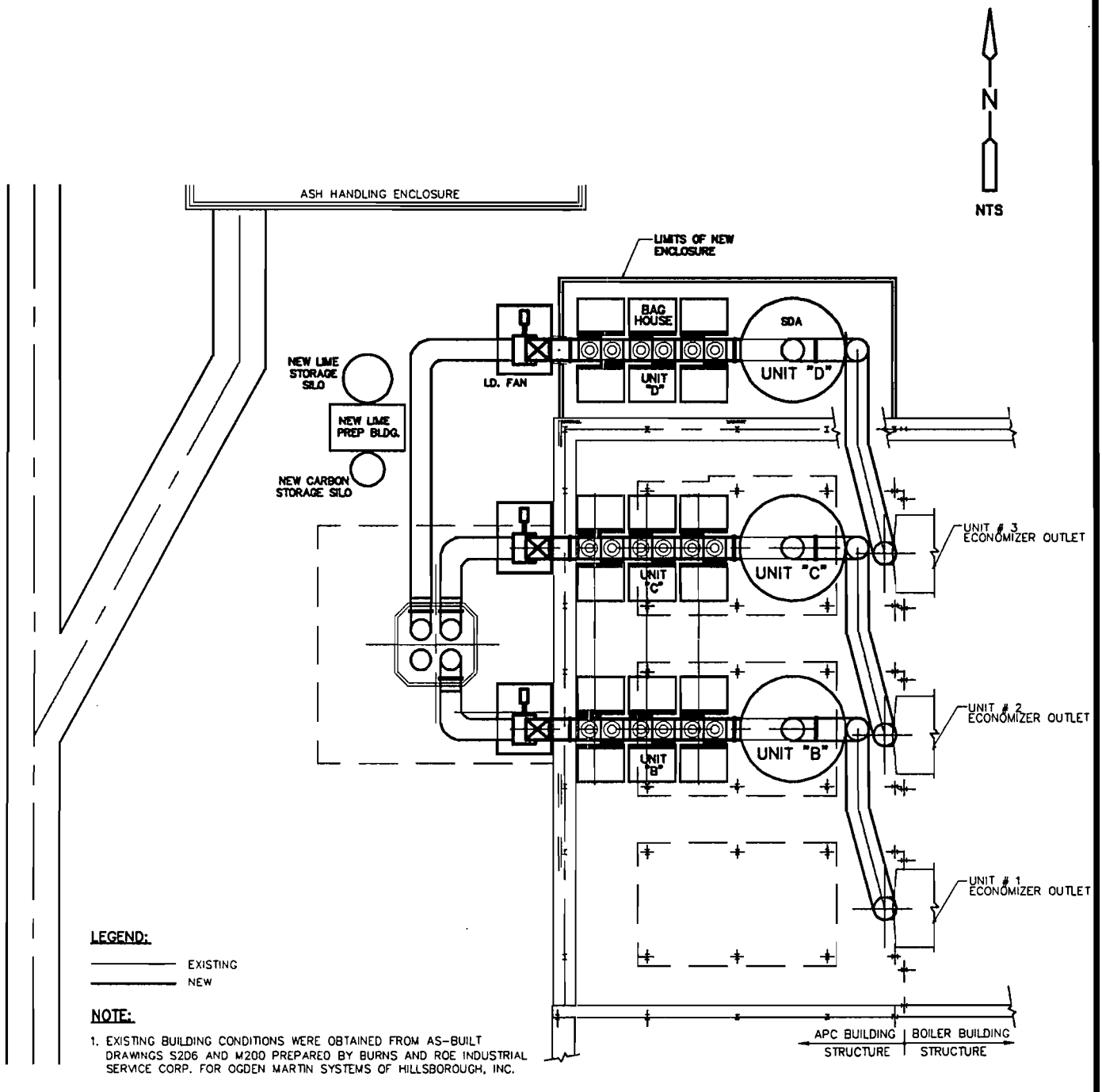
3.2 Site Layout

Figure 3-1 shows the general location of the proposed APC modifications. The existing APC enclosure will be expanded to house the new SDA/FF system. This layout was selected to minimize Facility downtime during construction of the proposed modifications. Note that the APC train for Unit No. 3 will be constructed in the vacant area reserved for the future combustion train.

3.3 Fuel

The Facility uses non-hazardous solid waste, including municipal solid waste (MSW) collected from residential, commercial, industrial, and institutional facilities to fuel the combustion process. The fuel is delivered to the Facility in solid waste collection transfer trucks and other vehicles. As they enter the site, the trucks are routed through a scale house Facility where the vehicle is weighed and the waste is identified. Any waste which appears to be hazardous, biohazardous, or non-processible is diverted from the Facility. Acceptable waste includes any and all non-hazardous wastes from residential, commercial, institutional, and industrial facilities. The Facility will continue to accept all solid waste which is not classified as: a hazardous waste under subtitle C of RCRA, a biohazardous waste, or a sludge.

Current permit conditions for the Facility allow the combustion of garbage and trash as defined in Chapter 62-701.200, FAC. The permit specifically excludes combustion of grease, scum, grit screenings or sewage sludge. MSW is defined as any solid waste, except sludge, resulting from the operation of residential, commercial, governmental, or institutional establishments that would normally be collected, processed, and disposed of through a public or private solid waste management



HILLSBOROUGH COUNTY, FLORIDA

AIR POLLUTION CONTROL GENERALIZED RETROFIT LAYOUT

CDM
environmental engineers, scientists, planners, & management consultants

Figure No. 3-1

service. MSW includes yard trash, but does not include solid waste from industrial, mining, or agricultural operations. MSW includes waste tires if they are collected as part of the normal waste stream (not segregated) and do not exceed more than 3 percent of the total charge at any given time. Other materials that cannot be charged at the Facility include biomedical waste, radiological waste, and hazardous waste.

3.4 Air Emissions and Controls

This permit application is for the upgrade of the APC equipment at the Facility. The new equipment will consist of SDAs/FFs, a powdered ACI system, and an SNCR system. Details of the new APC systems are presented below. Air emissions will be discharged through separate flues located within the existing stack.

3.4.1 Spray Dryer Absorber

The proposed Facility improvements include installation of an SDA at the outlet of each boiler. The SDA will be specifically designed to control acid gas emissions. The SDA will also provide a measure of control for organics and volatile metal emissions by cooling the flue gases. This will cause a significant percentage of these pollutants to condense on PM, which will then be captured downstream by the particulate control device. Since the SDA rapidly cools the flue gases, it also minimizes the formation of MWC organics in the PM control device.

The proposed SDA will consist of a cylindrical steel absorption chamber. Flue gases will be introduced at the top of the absorption chamber where the hot gases will be contacted with a finely atomized alkaline slurry. Acid gases will be absorbed by the moist alkaline component which reacts with the gases to form salts. Evaporation of the water will produce a finely divided dry particle of mixed salts and unreacted alkali, and will lower the overall flue gas temperature from approximately 450-525°F to approximately 285-325°F. The heavier portion of the dry powder produced in the SDA will drop to a hopper located at the bottom of the absorbing chamber, while the remaining portion (along with the particulate generated during the combustion process) will exit the vessel with the cooler flue gases.

Pebble lime (CaO) will be used as the alkaline reagent in the SDA. The CaO for all three SDAs will be stored in a common silo. Two 100 percent capacity lime slakers will be used to hydrate the CaO with water to form a calcium hydroxide [$CaO + H_2O \rightarrow Ca(OH)_2$] slurry. The slurry will be stored in a common slurry tank and transferred to each SDA using a dedicated transfer pump (one for each unit). A fourth lime slurry transfer pump will be installed to serve as a common spare. The slurry and additional dilution/cooling water will be pumped to either a single rotary atomizer or a series of dual fluid nozzles located at the top of the SDA. The rotary atomizer or dual fluid nozzles will reduce the slurry to fine particles which will then be sprayed into the absorption chamber with the flue gas flow. The amount of lime slurry and dilution water added will be closely controlled in response to data provided by the SO_2 CEMs installed at the economizer outlets and each FF outlet duct, and by the thermocouples installed in each SDA outlet duct, respectively.

The SDA process will produce a dry, relatively free-flowing powder consisting of unreacted lime, salts, and fly ash. The most prevalent salts will be calcium chloride ($CaCl_2$), calcium sulphite ($CaSO_3$), and calcium sulphate ($CaSO_4$).

The proposed SDAs will be designed to provide a very high level of acid gas control. Emission test data from other MWCs employing similar SDAs indicate that this technology is capable of achieving 75 plus percent removal of SO_2, and 95 plus percent removal of hydrochloric acid (HCl) on a routine basis.

3.4.2 Fabric Filter

The Retrofit project includes the proposed use of a FF downstream of each new SDA. The FF, commonly referred to as a baghouse, will be designed to control particulate emissions, including trace heavy metals. The FF will also provide a small measure of additional acid gas control as the flue gases pass through the unreacted lime caught on the outside of the filter bags.

The FFs will contain a number of fabric bags. Particulate laden gas from the SDA outlet will enter the FF inlet plenum. Dampers in the inlet plenum will distribute the flue gas to each compartment. PM is filtered from the flue gas as the gas passes through the combination of the accumulated dust cake and the bag fabric. The layer of dust cake which accumulates on the bags will be periodically removed using a pulse jet process. The primary layer of PM which maintains the high degree of filtration efficiency will remain on the bag. The released dust will fall into the ash collection hoppers located at the bottom of the FF.

The FFs will be designed to provide a very high level of particulate removal. Emission test data from other MWCs employing similar FFs indicate that particulate emissions can be reduced to the EG requirement of 0.012 gr/dscf on a routine basis. The use of FFs in combination with SDAs will also improve the collection efficiency of trace organic compounds and heavy metals by promoting condensation of the gaseous compounds into a solid form where they can then be collected as particulate. Enhanced acid gas control will also be realized in the FF since the acid gases have the opportunity to contact unreacted lime that is adhering to the fabric bags.

3.4.3 Activated Carbon Injection

The Retrofit project will include the use of a proposed system to store, convey and inject dry activated carbon into the flue gas duct immediately upstream of the SDA inlet. The carbon injection system will be specifically designed to control mercury emissions. The carbon injection system will also provide an additional measure of dioxin/furan control.

The carbon injection system will consist of a common storage silo with separate discharge hoppers for each combustion unit. Carbon will be conveyed from each hopper and pneumatically conveyed to the SDA inlet duct through a dedicated blower. The system will be designed to add a measured amount of carbon to each combustion line.

The proposed carbon injection system will be designed to provide a high degree of mercury control. The carbon particle physically adsorbs mercury and dioxin/furan compounds. The carbon particles are then collected downstream in the FF. The cooling effect of the SDA causes more of the gaseous emission to condense as particulate, thereby creating the opportunity for these substances to be collected. Emission data from other MWCs employing a similar injection system in conjunction with a SDA and FF indicate that mercury removal efficiencies greater than 85 percent are achievable.

3.4.4 Selective Non-Catalytic Reduction

The Retrofit project will include the use of a system to store, convey and inject aqueous ammonia (NH_3) or urea into the first pass of each boiler immediately above the combustion zone. The SNCR system will be designed to specifically control nitrogen oxide (NOx) emissions.

The proposed SNCR system will consist of a common storage tank and two 100 percent capacity feed pumps. The NH_3 (or urea) will be injected through the walls of the first boiler pass through a series of injection ports. The rate of NH_3 (or urea) injection will be controlled using the NOx CEM to be installed in the FF outlet duct from each unit.

The proposed SNCR system will be designed to provide a high degree of NOx control while minimizing the amount of NH_3 (or urea) that could potentially escape from the stack. The NH_3 (or urea) reacts with NOx compounds to form nitrogen (N_2). Emission data from other MWCs with SNCR systems indicate that NOx emissions can be reduced to the EG requirement of below 205 parts per million or less on a routine basis.

3.4.5 Auxiliary Burners

The proposed improvements include replacement of the existing auxiliary burners with new auxiliary burners which will be designed to raise the furnace temperatures during startup events before refuse is placed in the furnace, during shutdown events to maintain furnace temperatures until all of the refuse remaining on the furnace grate is combusted, and during routine operations as necessary to maintain adequate furnace temperatures (e.g., wet refuse). The use of auxiliary burners during these periods will improve combustion efficiency. The capacity of the existing auxiliary burners, 22 MMBtu/hr each, will be increased to about 60 MMBtu/hr each, or to about 40 percent of the rated heat input capacity of each unit (150 MMBtu/hr).

3.4.6 Ancillary Equipment

The Retrofit project will also include the construction of lime and carbon storage silos and new ID fans.

3.5 Plant Water Use

The Facility will continue to obtain its cooling tower makeup water from the adjacent wastewater treatment facility. Treated effluent from this facility has provided the necessary cooling tower makeup water since the Facility went on line in 1987. Currently, the Facility uses approximately 113,500 gallons of reclaimed water per day for cooling tower makeup water.

Reclaimed water will be used as SDA quench water. The additional reclaimed water used at the Facility will reduce the amount of reclaimed water which must be discharged to surface waters.

Domestic potable water is provided by a 12-inch water main operated by the city of Tampa which runs along Falkenburg Road. This line provides between 2,000 and 4,000 gallons per day as needed. The lime slakers will require an increase in the amount of potable water used.

3.6 Solid and Hazardous Waste

3.6.1 Solid Waste

The Facility generates two categories of solid waste: (1) MSW generated at the Facility, and (2) residue from the combustion processes. As this is a waste processing facility, all municipal waste is handled on site. The residue from the combustion process, which generally consists of non-combustible items, bottom ash, fly ash, salts from the SDA, and grate siftings, is collected in enclosed conveyors. All ash is hydrated before it is conveyed to the Ash Handling Building where it is loaded onto trucks and hauled over-the-road to the landfill. Except during construction, the proposed modifications will not significantly increase the volume of solid waste produced at the Facility. The SDA/FF system will result in a slight increase in ash residue quantities due to the addition of lime and activated carbon.

3.6.2 Metals Recovery System

A ferrous metals recovery system was added to the ash handling system after commencement of commercial operations. During 1995 and 1996, an average of 5,805 tons (dry weight) of ferrous metals were recovered annually. This metal was sold as recyclable material. No changes in the operation of this system are proposed under this permit application.

3.6.3 Hazardous Waste

The Facility does not accept, treat, or generate any hazardous wastes. The waste stream is monitored by the scale house operators, tipping floor monitors, and the refuse crane operators to identify any material which may be considered hazardous. When hazardous materials are found, they are isolated and diverted to a proper treatment and disposal facility.

3.7 Onsite Drainage System

The onsite drainage systems consists of a swale collection system and four ponds for attenuation. Discharge from these ponds drains to two drainage ditches; one north and one south of the Facility. Both ditches eventually discharge to the Tampa Bypass Canal. The modifications to the APC equipment will not result in any increases in impervious area or changes in the site's drainage characteristics. Therefore, no modifications to the Facility's surface water management system are proposed as part of these modifications.

Section 4
Environmental Effects of Construction

This section of the application details the anticipated impacts associated with the modifications to the APC systems. To minimize these impacts, the contractor will be required to install and maintain all necessary pollution controls in accordance with federal, state, and local regulations and in accordance with applicable conditions of the site certification. In addition, the contractor will be required to comply with noise provisions in the Hillsborough County Code.

4.1 Construction Phases and Activities

As previously discussed, this project consists of replacing the existing ESP APC equipment with new, more efficient SDA/FF, ACI, and SNCR technology. To limit disruption to the normal operation of the Facility, the construction will be broken into three phases. Each phase will be based on the combustion unit affected. The replacement process will involve the following major steps:

- Install foundations for APC train D.
- Remove the sides and roof of the existing APC equipment enclosure.
- Erect APC train D.
- Demolish ESP No. 3 and erect APC train C.
- Demolish ESP No. 2 and erect APC train B.
- Replace and expand APC enclosure.

Equipment replacement will be scheduled so that combustion unit downtime will be limited to approximately one month per unit. This will be accomplished by constructing the new equipment before the existing equipment is removed from service. The APC equipment for combustion Unit No. 3 will be replaced first. During Phase 1, the APC equipment for Unit No. 3 will be installed in the space reserved for the future combustion Unit No. 4. Upon completion, Unit No. 3 will be taken off-line and connected to the new APC equipment (APC train D). The ESP for Unit No. 3 will then be demolished. In the newly cleared space, the APC equipment for Unit No. 2 will be constructed. Upon completion, duct work will be installed to connect Unit No. 2 to the APC equipment installed in the area behind Unit 3 (APC train C). The same process will be followed for Unit No. 1. If combustion Unit No. 4 is needed in the future, then new APC equipment will be installed in the area behind Unit No. 1 and the duct work will be reconfigured to align the combustion units and the APC trains.

The construction schedule is presented in Figure 4-1. From start to finish, the onsite construction will take approximately 18 months.

4.1.1 Equipment Requirements

A list of anticipated construction equipment is provided in Table 4-1. The actual quantity and type of equipment will vary according to the stage of construction, schedule, and contractor's preference. Equipment needs will be lower during beginning and ending stages of the construction process. The peak equipment needs will be during the middle portion of the construction process when both erection and demolition activities will occur simultaneously.

4.1.2 Staging, Material, Laydown, and Work Force Parking Areas

All of the modifications proposed in this application will be constructed within the existing certified site. The actual layout of the staging, laydown, and construction parking areas will be identified in the final construction plans and will be designed to minimize impact on the Facility's normal operation and surrounding land uses. It has been assumed that construction staging and employee parking will occupy non-operational portions of the certified site, as well as adjacent vacant county-owned lands.

4.2 General Construction Impacts

4.2.1 Roads

As this project consists only of modifications to the existing APC equipment, no new or modified roads will be constructed. All construction related traffic will use existing access roads. The roads in the area of the project site currently carry heavy truck traffic, due to the nearby concrete plant and over-the-road truck terminals. The construction traffic will have a negligible impact on area roads.

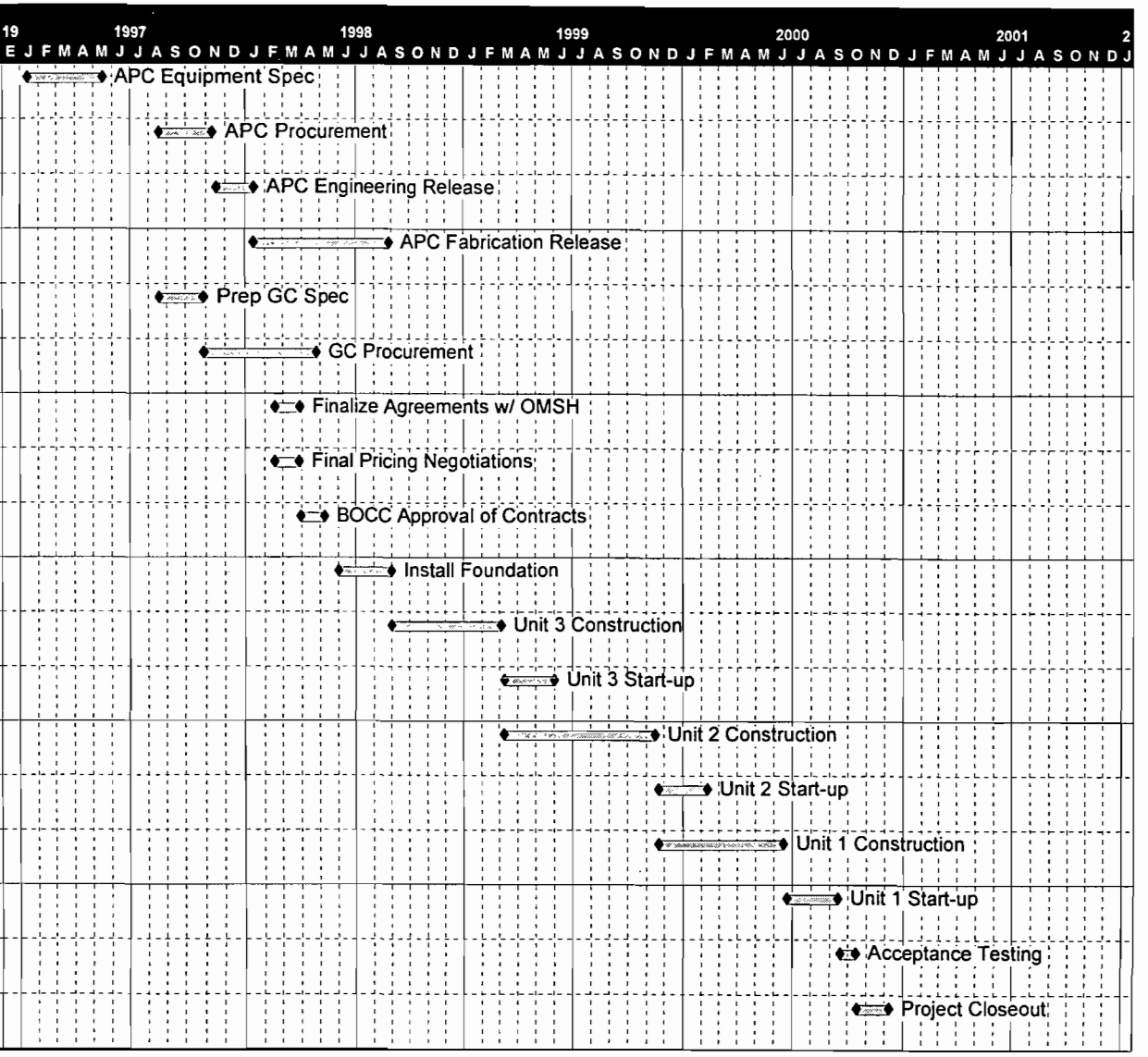
4.2.2 Flood Zones

The project will be completely constructed within the area previously developed for the Facility. Therefore, no impacts to flood zones will occur. All structures and equipment will be located above the 100-year flood elevation.

4.2.3 Topography and Soils

The equipment to be replaced will be housed within the existing structure or over existing paved areas, therefore topography and soil impacts will be negligible. However, when soil disturbing activities take place, best management practices (such as silt fences and hay bales) will be installed to minimize the transport of silts and sediments from the construction area.

Description	Dur	Start	Finish
APC Equipment Spec	90d	JAN 13, 97 *	MAY 16, 97
APC Procurement	60d	AUG 18, 97 *	NOV 10, 97
APC Engineering Release	40d	NOV 17, 97 *	JAN 14, 98
APC Fabrication Release	160d	JAN 14, 98 *	AUG 27, 98
Prep GC Spec	50d	AUG 19, 97 *	OCT 28, 97
GC Procurement	125d	OCT 29, 97 *	APR 24, 98
Finalize Agreements w/ OMSH	30d	FEB 16, 98 *	MAR 27, 98
Final Pricing Negotiations	30d	FEB 16, 98 *	MAR 27, 98
BOCC Approval of Contracts	30d	MAR 30, 98 *	MAY 08, 98
Install Foundation	65d	JUN 01, 98 *	AUG 31, 98
Unit 3 Construction	130d	AUG 31, 98 *	MAR 04, 99
Unit 3 Start-up	60d	MAR 09, 99 *	MAY 31, 99
Unit 2 Construction	180d	MAR 09, 99 *	NOV 16, 99
Unit 2 Start-up	60d	NOV 22, 99 *	FEB 11, 00
Unit 1 Construction	150d	NOV 22, 99 *	JUN 16, 00
Unit 1 Start-up	60d	JUN 22, 00 *	SEP 14, 00
Acceptance Testing	20d	SEP 18, 00 *	OCT 13, 00
Project Closeout	40d	OCT 16, 00 *	DEC 08, 00



CDM

Camp Dresser & McKee Inc.

environmental services

HILLSBOROUGH COUNTY, FLORIDA

SOLID WASTE ENERGY RECOVERY FACILITY
AIR POLLUTION CONTROL RETROFIT IMPLEMENTATION SCHEDULE

Figure No.4-1

Table 4-1
Hillsborough County Solid Waste Energy Recovery Facility
Application for Amendment of Power Plant Site Certification

Anticipated Construction Equipment

Equipment Type	***Estimated Quantity***
EARTH MOVING/DEMOLITION	
Loader	1
Backhoe	0
Dewatering Pump	1
Compaction Equipment	1
Truck	5
Crane	1
EQUIPMENT PLACEMENT	
Crane	2
Pneumatic Tools	2
Welders	2
Compressors	3
Generators	3
Boom Truck	1
Forklift	1
Trucks	3

4.3 Impacts on Water Bodies and Uses

4.3.1 Surface Water Impacts

No modifications to the surface water system of the Facility are planned as part of the construction process. Runoff from the construction area will flow through the site's stormwater treatment ponds prior to discharge. To minimize the transport of silts and sediments from the construction area, the contractor will install best management practices, such as silt fences and hay bales. The new APC equipment will be installed on existing impervious areas, and will not cause any impact to the surface water system.

4.3.2 Groundwater Impacts

No impacts to groundwater are anticipated as a result of this project. All water used during the construction process will be obtained from the potable water source or will be reclaimed water from the adjacent wastewater treatment facility.

4.3.3 Impact on Water Use

All water used during the construction process will be obtained from the potable water source or will be reclaimed water from the adjacent wastewater treatment facility. No significant impact on plant water use is anticipated during construction.

4.3.4 Impact on Water Quality

During construction, water quality of surface waters could be affected by silts and sediments from the construction area. To minimize any impact, runoff from the construction area will flow through the site's stormwater treatment ponds prior to discharge. To further control the transport of silts and sediments from the construction area, the contractor will be required to install best management practices (such as silt fences and hay bales).

4.4 Impact on Land Use

The proposed project consists of modifications to the APC equipment of an existing Facility to meet higher air quality standards. The project will not result in any changes to the land use on the existing site. No impacts to adjacent land use will occur.

4.5 Impact on Air Quality

The modifications to the APC equipment will result in either a reduction in, or no change in the amount of emissions to the atmosphere from the Facility for all pollutants except ammonia. This will occur as each unit is brought on line. The construction sequence has been planned so that the construction of the new APC equipment can occur with minimal interruption to normal plant operations.

During the construction process, several pieces of equipment will be used (such as front end loaders, forklifts, compressors, and cranes). As most of this type of equipment is powered using internal combustion engines, or by secondary power generated from internal combustion engines (such as compressors or welders), exhaust from these engines will cause additional emissions from the site. However, these emissions are considered an insignificant impact to the air quality of the area.

4.6 Impact on Solid Waste Generation and Disposal

Wastes will be generated during all phases of construction. These will include wastes composed of paper, wood, metal, and concrete. These wastes will be collected and stored in onsite containers until disposal either at the Facility or at the Southeast Landfill. In addition, it is estimated that a small quantity of waste oils and solvents will be generated from equipment maintenance and installation. These wastes will be stored in appropriate containers and hauled to appropriate disposal facilities. Whenever possible, waste metals will be recovered and recycled.

In addition to wastes generated during construction, the Facility must also address handling the waste/refuse which is normally handled at the Facility. The construction schedule provides for each of the units to be shut down for approximately 4 weeks to allow for connection to the new APC equipment. These outages will be scheduled so that only one combustion/boiler unit is off line at a time. During this period, the two remaining units will handle the incoming waste stream. Some solid waste may be diverted to the County's landfill for disposal during the construction period.

4.7 Impact on Ambient Noise Levels

Noise impacts associated with construction are generally considered to be short-term impacts, as they are limited to the construction period and often change in type and level based on the phase of construction. Noise produced by construction equipment depends on the source of the power used to run the equipment, and the material properties and operational characteristics of the equipment. Equipment expected to be used during construction includes the following:

- Foundation equipment, such as pile drivers
- Materials handling equipment, such as cranes, concrete mixers, and concrete pumps
- Stationary equipment, such as pumps and compressors

Construction noise impacts will be of short duration. Because of shielding due to existing buildings on site and vegetation, coupled with the industrial nature of the local area, temporary noise levels should result in only a slightly adverse impact on the local area.

Noise will be controlled during construction to comply with the Hillsborough County Code. Compliance with the code is a condition of the agreement between Hillsborough County and the Facility operator (Ogden Martin Systems of Hillsborough, Inc.).

4.8 Impact on Human Populations

Construction activities will occur only within the existing solid waste energy recovery facility site. Surrounding land uses are primarily commercial/light industrial, institutional, and undeveloped. The existing Facility location was selected and certified based on its compatibility with surrounding land uses and roadways. Construction activities will create only minor increases in traffic on adjacent roadways. No impact on level of service is expected.

4.9 Impacts on Landmarks and Sensitive Areas

The project site does not include any landmarks or sensitive areas, therefore, the proposed modifications should not result in any impact.

4.10 Impact on Archaeological and Historic Sites

The proposed modifications will be constructed within the general footprint of the original Facility. During a previous archaeological survey of the site and construction of the Facility, no significant archaeological features were found. Therefore, this project will have no impact on any archaeological or historic sites.

4.11 Construction of Directly Associated Transmission Lines

No additional transmission facilities are proposed as part of this application.

4.12 Benefits From Construction

There are two primary benefits from construction. The first is the creation of several construction jobs. This is considered to be a temporary benefit lasting only during the period of construction. The second benefit is improved APC equipment. The installation of APC equipment will result in either a reduction in, or no change in the amount of pollutants discharged from the Facility to the atmosphere for all pollutants except ammonia.

4.13 Variances

No variances from standards or guidelines are anticipated from this project.

Section 5.0
Environmental Effects of Plant Operation

A complete description of the environmental effects of plant operation was provided as a condition for obtaining the original power plant site certification. The only significant changes which will result from the APC system modifications are reduced pollutant emissions and increased usage of reclaimed water.

5.1 Effects of Operation of the Heat Dissipation System

The proposed project does not include any significant modifications to the Facility's heat dissipation system. Cooling tower blowdown will continue to be discharged to the adjacent wastewater treatment facility. New air compressors and rotary atomizers in the SDAs will require nominal amounts of cooling water.

5.2 Effects of Chemical and Biocide Discharges

All industrial wastewater from the Facility is disposed of at the adjacent wastewater treatment facility. This project does not propose any modifications to this portion of the Facility's operation and therefore is not applicable.

5.3 Impacts on Water Supplies

The addition of the SDA/FF equipment will require additional water associated with the operation of the SDAs. As previously described, the SDA sprays a lime slurry in the combustion gases. The water in the slurry is evaporated as the lime in the slurry reacts with particulates in the gases. In order to make the slurry needed for the operation of the SDAs, additional water will be needed to slake the pebble lime. The SDAs also require quench water. The original Facility design included the use of reclaimed water from the adjacent Falkenburg Road wastewater treatment facility for cooling makeup water. This water will also be of sufficient quality for use as quench water. The use of additional reclaimed water will not have any significant impact on the area's surface or groundwater supplies. It will reduce the quantity of excess reclaimed water that the Falkenburg Road wastewater treatment facility must discharge to surface waters.

5.4 Solid/Hazardous Waste Disposal Impacts

With the improved APC equipment, the Facility's production of ash residue is expected to increase slightly (approximately 15 pounds of additional ash per ton of processible solid waste). Disposal of the residue will follow the same procedures as are currently in place, including final disposal at the Southeast Landfill.

5.5 Sanitary and Other Waste Discharges

The operation of the new APC equipment will not require any modifications to the Facility's management of sanitary and other wastes. These wastes will continue to be discharged to the adjacent wastewater treatment facility.

5.6 Air Quality Impacts

The proposed modifications to the APC system are intended to comply with the EG published by EPA in December 1995, with the mercury emissions standards adopted by FDEP in October 1995, and with all other applicable emission standards. The improvements will result in a reduction in, or no change in the amount of air pollutants emitted by the Facility for all pollutants except ammonia. A complete discussion of air quality impacts and air monitoring is provided in Volume II - Source Modification Construction Air Permit Application.

5.7 Noise

An ambient noise study is currently under way. Noise control will be incorporated into the APC modifications as necessary to comply with the Hillsborough County Code. Compliance with the code is a condition of the agreement between Hillsborough County and the Facility operator (Ogden Martin Systems of Hillsborough, Inc.).

5.8 Changes in Non-Aquatic Species Populations

The operation of the updated APC equipment will decrease the quantities of certain air pollutants discharged from the Facility, except for a small amount of ammonia emissions due to operation of the SNCR system. No significant negative impacts are expected to result from operation of the modifications to the APC system.

5.9 Other Plant Operations Effects

The new APC equipment is not anticipated to have any environmental effects other than those described in this permit application.

5.10 Archaeological Sites

There are no archeological sites in the immediate vicinity of the Facility. The operation of the updated APC equipment will not result in any impacts to archaeological sites.

5.11 Resources Committed

The operation of the updated APC equipment will not result in any additional commitment of resources.

5.12 Variances

The County is requesting the EG fugitive opacity limits as reasonably available control technology (RACT) and Method 22 testing requirements for fugitive emissions from the ash handling system in lieu of the RACT requirements at Florida Administrative Code (FAC) 62-296.711(2)(a) and Method 9 testing requirements at FAC 62-296.711(3)(a). No other variances are sought.

Section 6
Transmission Lines and Other Linear Facilities

Hillsborough County does not operate any transmission lines or other linear features, such as fuel pipelines or inflow/outflow water lines, which leave the certified site. No changes are proposed to the existing interconnection with TECO, therefore, this section is not applicable.

Section 7
Economic and Social Effects of Plant Construction and Operation

Prior to applying for site certification, Hillsborough County conducted an extensive evaluation of alternatives for long-term management of the solid waste within the unincorporated County. This evaluation considered both the short and long-term impacts to the natural, economic, and social environments of the County. During this process, a number of public meetings and Commission meetings were dedicated to the topic. Based on this, the County committed the resources necessary to develop the solid waste energy recovery facility and applied for site certification. The economic, social, and environmental effects of plant construction and operation were addressed in the application as a condition for obtaining site certification. Construction and operation of the proposed APC modifications will have negligible economic and social impacts.

7.1 Socioeconomic Benefits

Hillsborough County has experienced significant population growth over the past 20 years. Because of this growth and anticipated future growth, the management of solid waste is a major concern. Related to this growth, the development of new sanitary landfills has also become increasingly more difficult. New solid waste facilities must not only address increased regulatory requirements, but also a strong public opinion/acceptance test. The Hillsborough County Board of County Commissioners committed to the development and operation of a solid waste energy recovery facility to meet the County's solid waste needs in the future. Construction of this Facility began in 1985, and the Facility was placed in operation in mid-1987. Through the operation of this Facility, the County has been able to reduce the volume of waste landfilled by approximately 80 percent.

The operation of the Facility has provided several socioeconomic benefits. First has been the generation of electrical power. During 1995 and 1996, the Facility generated an average of approximately 230,900 MW hours per year which has been sold to TECO for distribution. This can be related to an annual reduction of approximately 136,000 barrels of crude oil which would be required to generate the same amount of electricity by TECO. Regarding other commonly used fuels in Florida, the electrical output of the Facility offsets the annual use of 757 million cubic feet of natural gas, or 29,720 tons of coal.

In addition to energy production, the Facility contributes to the extension of the life of the County's Southeast Landfill. Through the combustion process, the Facility reduces the volume of solid waste by approximately 80 percent. By extending the life of the existing Facility, the land, permitting, and development costs for new facilities is decreased, thus allowing the County to pass on these savings

to its solid waste customers. Without the volume reduction provided by this Facility, the County would need to develop new landfills to handle the solid waste needs of the unincorporated county. Since the waste has been processed prior to disposal in the landfill, the potential impacts to surface and groundwater quality are also reduced.

In addition to the reduction in solid waste volume and the recovery of energy, the Facility also recovers ferrous metals from the ash residue for recycling. During 1995 and 1996, the Facility recovered an average of 5,805 tons (dry weight) of ferrous metals annually.

The Facility also provides benefits in the form of employment. The current Facility employs about 40 people with jobs ranging from plant managers, scale house and equipment operators, to maintenance personnel. The direct annual payroll of the Facility is approximately $1,750,000, and the Facility contributes another $8,000,000 to the local economy in indirect benefits, such as increased sales of goods and services.

The construction/installation phase of the project will also provide benefits to the local economy. Throughout the 18-month construction period, direct benefits of the $24.25 million project will be felt in the local economy through the employment of up to 105 skilled construction workers and the purchase of construction materials and services. There are also indirect benefits of construction related to goods and services purchased by workers employed by the proposed construction.

Resulting from the installation of the new equipment, several intangible benefits will be derived as well. These are generally related to the improved quality of air emissions which will contribute to improved air quality throughout the Tampa Bay Area.

7.2 Socioeconomic Costs

The proposed project consists of replacing the existing APC equipment with newer, more efficient SDA/FF, ACI, and SNCR equipment. No new land resources will be committed to the project. It is not anticipated that these modifications will have any adverse effect on the real estate values in the adjacent industrial area.

The cost of the site preparation, demolition, construction, and installation of the proposed modifications, along with engineering and management costs is estimated at about $24.25 million. A breakdown of construction related costs has been included in Table 7-1. Since the bonds have not been issued and the construction not bid, these costs are only estimates of the total cost of modification.

Table 7-1

Estimated Construction Cost

Site/Structural Work	
Existing APC Building Demolition/Modification	$250,000
Existing ESP Demolition	$250,000
Existing Foundation Improvements	$150,000
Expanded APC Building (5 ,000 sf) and Foundations	$1,000,000
Expanded Fire Protection and Detection Systems	$100,000
Stack Foundation Enhancement	$25,000
Site Work/Utility Relocation	$25,000
Subtotal Site/Structural Costs	$1,800,000
Installed Equipment	
Spray Dry Absorbers / Fabric Filter Baghouses	$8,500,000
Thermal DeNox Systems (Including Ammonia Storage)	$1,500,000
Activated Carbon Injection Systems (Including Carbon Storage)	$500,000
Lime Storage and Handling System (Including Slakers)	$400,000
Fly Ash Handling Systems	$900,000
Induced Draft Fans	$750,000
Interconnecting Duct Work and Breaching	$530,000
CEM System and Enclosure (Including Sample Lines and Probes)	$700,000
APC System Controls	$300,000
Electrical	$300,000
Process Piping	$500,000
Subtotal Installed Equipment Costs	$14,900,000
Subtotal Site/Structural and Installed Equipment Costs	$16,700,000
Engineering (10%)	$1,675,000
Construction Management (15%)	$2,500,000
Contingency (20%)	$3,350,000
Total Estimated Construction Cost Alternative 2	**$24,225,000**

Section 8
Site and Design Alternatives

Alternative sites for this Facility were evaluated as a condition of the original site certification. Evaluations of alternative sites for the proposed APC modifications are not applicable.

8.1 Alternative Sites

Due to the large capital investment in the existing Facility, alternative sites were not evaluated during the planning stages for this APC modifications project. These evaluations were conducted as part of the original planning, permitting, and design process.

8.2 Alternative Fuels

As previously discussed, the primary purpose of this Facility is the disposal of MSW generated in the unincorporated Hillsborough County area. Although alternative fuels may be capable of improving the Facility's generating capacity and discharge air quality, it would be adverse to the Facility's primary purpose. The electricity generated at the Facility does offset the need to generate electricity using other fuels, such as coal, oil, natural gas, and nuclear fuels. Because of this, the Public Service Commission has allowed the Facility to operate and sell the electricity produced to the TECO, provided the Facility meets the specified performance criteria. Over the 9 years it has operated, the Facility has consistently met the contract requirements.

8.3 Alternative Plant Design

During the initial planning stages for this APC modification project, the County did evaluate alternative APC equipment designs. This evaluation considered several options ranging from continued use of the ESPs with the addition of SDA/FF to total APC equipment replacement. Based on this evaluation, a report titled "Evaluation of Alternative Air Pollution Control Configurations for the Hillsborough County Solid Waste Energy Recovery Facility" was prepared. A copy of this report has been included as Appendix B. Based on the evaluation of cost, expected equipment life, performance and reliability, the alternative of replacing the ESPs with SDA/FF equipment was recommended.

Section 9
Coordination

The following individuals attended one or more coordination meetings at which the scope of this project and permit application requirements were discussed.

FDEP/HCEPC	Hillsborough County	11/7/96
Name	Organization	Phone
Donald F. Elias	RTP Environmental	(732) 968-9600
Bill Corbin	RTP Environmental	(732) 968-9600
Jerry Kissel	FDEP - Tampa	(813) 744-6100 x107
Dan Strobridge	Camp Dresser & McKee	(813) 281-2900
Bruce M. King	EPC	(813) 272-5530
Jerry Campbell	EPC	(813) 272-5530
Cynthia Hibbard	Camp Dresser & McKee	(617) 252-8233
Leroy Shelton	EPC	(813) 272-5530

Date: March 25, 1997

Name	Organization	Phone
Bill Corbin	RTP Env. Assoc.	(732) 968-9600
Tim Porter	Wheelabrator	(603) 929-3375
Clay Fuincy	FDEP	(904) 488-1344
A.A. Linero	FDEP	(904) 488-1344
Michael Hewett	FDEP/OPAPM	(904) 488-0114
David S. Dee	Launders & Parsons	(904) 681-0311
Pat Comeri	FDEP/OGC	(904) 48--9730
Ceresa Heron	FDEP/NSR	(904) 488-1344
Syed Arif	FDEP/NSR	(904) 488-1344
Donald F. Elias	RTP Env. Assoc.	(732) 968-9600
Dan Strobridge	CDM	(813) 281-2900
Louis Nichols	FDEP/EMS	(904) 488-6140
Paul J. Brandi	FDEP/EMS	(904) 488-6140
M.D. Harley	FDEP/EMS	(904) 488-6140

Section 10
References

CDM, 1996. Solid Waste Resource Recovery Facility Annual Inspection Report.

CDM, 1996. Evaluation of Alternative Air Pollution Control System Configurations for the Hillsborough County Solid Waste Energy Recovery Facility.

Ogden Martin Systems of Hillsborough, Inc., December 1995. Hillsborough County Solid Waste Energy Recovery Report, Status Report.

Ogden Martin Systems of Hillsborough, Inc., December 1996. Hillsborough County Solid Waste Energy Recovery Report, Status Report.

Appendix A

FLORIDA MASTER SITE FILE
R. A. Gray Building 500 South Bronough Tallahassee, Florida 32399-0250
Office Number (904) 487-2299 (FAX) Number (904) 921-0372

Florida Department of State
Sandra B. Mortham, Secretary of State
Division of Historical Resources
Director's Office (904) 488-1430 Telecopier Number (FAX) (904) 488-3353

February 3, 1997

Mr. Joseph W. Adcock, AICP
Camp Dresser & McKee Inc.
Westshore Center
1715 North Westshore Blvd., Suite 875
Tampa, Florida 33607

Dear Mr. Adcock:

In response to your inquiry of January 2, 1997, the Florida Master Site File lists 30 archaeological sites (see list), and 17 historical standing structure (see list) in the following parcels of Hillsborough County: T29S, R20E, Sec. 5-9, 16-21, 29, 30; T29S, R19E, Sec. 1, 2, 11-14, 23-26. This roughly covers the areas within 2 miles of your project area.

In interpreting the results of our search, please remember the following points:

(1) Areas which have not been completely surveyed, such as yours, may contain unrecorded archaeological sites or historical structures.
(2) While many of our records relate to historically significant properties, the entry of an archaeological site or an historical structure on the Florida Master Site File does not necessarily mean that the structure is significant.
(3) Since vandalism is common at Florida sites, we ask that you limit the distribution of location information on archaeological sites.
(4) As you may know, federal and state laws require formal environmental review for some projects. Record searches by the staff of the Florida Master Site File do not constitute such a review. If your project falls under these laws, you should contact the Compliance Review Section of the Bureau of Historic Preservation at 904-487-2333 or at this address. If you have any further questions concerning the Florida Master Site File, please contact the staff or me at 904-487-2299.

Sincerely,

Kim Heinz

Kim Heinz
Archaeological Data Analyst, Florida Master Site File

CULTURE: Decoding List

FLORIDA MASTER SITE FILE

CODE	CULTURE
19TH	Nineteenth Century American
20TH	Twentieth Century American
AFRO	Afro-American
ALAC	Alachua
AMAC	American Acqn. & Development
AMER	American
ARC	Archaic Unspecified **
ARCE	Early Archaic
ARCL	Late Archaic
ARCM	Middle Archaic
BLG	Belle Glade
BLG1	Belle Glade I
BLG2	Belle Glade II
BLG3	Belle Glade III
BLG4	Belle Glade IV
BOOM	Boom Times
BRIT	British
CADE	Cades Pond
CIVL	Civil War
CREE	Lower Creek
DEPR	Deppression / New Deal
DEPT	Deptford
DUTC	Dutch
ELLI	Elliots Point
ENGL	Englewood
EURO	European Misc. **
FREN	French
FTWL	Fort Walton
GL	Glades
GL1	Glades I
GL1A	Glades IA
GL1B	Glades IB
GL2	Glades II
GL2A	Glades IIA
GL2B	Glades IIB
GL2C	Glades IIC
GL3	Glades III
GL3A	Glades IIIA
GL3B	Glades IIIB
GL3C	Glades IIIC
HICK	Hickory Pond
HIST	Historic - Unspecified
INDE	Indeterminate **
ITAL	Italian
JAKE	Jaketown **
KOLO	Kolomoki
LAMA	Lamar
LEJE	Leon - Jefferson
MALI	Malabar I
MAL2	Malabar II
MANA	Manasota
MODE	Modern (post 1950)
MTTA	Mt. Taylor
NARF	Non - Artifact: Culture ?
NORW	Norwood
ORAN	Orange
OTHR	Other
PALE	Paleo - Indian
PENS	Pensacola
PERI	Perico
POSR	Post - Reconstruction
POTA	Potano
PREA	Prehistoric - Aceramic **
PREC	Prehistoric - Ceramic **
PREH	Prehistoric - Unspecified **
RECO	Reconstruction
SAFE	Safety Harbor
SEMI	Seminole
SJ	St. Johns
SJ1	St. Johns I
SJ1A	St. Johns IA
SJ1B	St. Johns IB
SJ2	St. Johns II
SJ2A	St. Johns IIA
SJ2B	St. Johns IIB
SJ2C	St. Johns IIC
SP16	First Spanish 1500-1599
SP17	First Spanish 1600-1699
SP18	First Spanish 1700-1763
SPAW	Spanish - American War
SPN	Spanish
SPN1	Spanish - First Period
SPN2	Spanish - Second Period
SRSC	Santa Rosa - Swift Creek
STAU	St. Augustine
STPB	Statehood & Prebellum
SWF	Swift Creek
SWFE	Swift Creek - Early
SWFL	Swift Creek - Late
TRAN	Transitional
UNSP	Unspecified on form **
WE	Weeden Island
WE1	Weeden Island 1
WE2	Weeden Island 2
WE3	Weeden Island 3
WE4	Weeden Island 4
WE5	Weeden Island 5
WEI	Weeden Island I
WEII	Weeden Island II
WOD	Woodland **
WODE	Early Woodland **
WODL	Late Woodland **
WODM	Middle Woodland **
WW1A	World War 1 & aftermath
WW2B	World War 2 & aftermath

** - Coding is too vague or otherwise to be avoided when possible.

SITE TYPE: Decoding List FLORIDA MASTER SITE FILE

CODE	SITE TYPE
ABOB	Aboriginal Boat
AGRI	Agriculture / Farm **
BLDG	Building Remains - foundation, chimney
BRID	Bridge
BURH	Burial(s) (historic)
BURP	Burial(s) (prehistoric)
CAMP	Campsite (prehistoric)
CANA	Canal
CAVE	Cave
CCCC	CCC Camp (forest)
CIST	Cistern
CLAY	Clay Pit **
DEST	Destroyed (totally)
FIEL	Old Field (historic)
FORT	Historic Fort
HABI	Habitation (prehistoric)
HEAR	Historic Earthworks
HOUS	House
INDE	Indeterminate **
INDU	Industrial
INUN	Inundated Land Site
LGTH	Lighthouse
MDBU	Prehistoric Burial Mound
MDPL	Platform Mound (prehistoric)
MDSH	Prehistoric Shell Midden
MIDD	Prehistoric Midden(s)
MILI	Military Unspecified
MILL	Mill
MISS	Mission
MLCO	Cotton Mill
MLGR	Grist Mill
MLLU	Lumber Mill
MLSU	Sugar Mill
MOUN	Prehistoric Mound(s)
NARF	Nonartifact: No Defining Artifacts
NVST	Naval Stores
OTHR	Other
PALE	Paleontological **
PLAN	Plantation
POPI	Possible Paleoindian
QUAR	Prehistoric Quarry
RAIL	Railroad Line Segment
REDE	Redeposited Site
REFU	Historic Refuse
RIDG	Shell Ridge (relict)
RING	Prehistoric Shell Ring
ROAD	Historic Road Segment
SALT	Saltworks
SCAR	Artifact Scatter
SCCE	Ceramic Scatter
SCLI	Lithic Scatter / Quarry (prehistoric)
SCNQ	Lithic Scatter / Non-quarry
SCSH	Prehistoric Shell Scatter
SHRI	Shrine **
SING	Single Artifact
STIL	Still
STOR	Store
TOWN	Historic Town
TURP	Turpentine Camp
UANC	Anchorage Midden - Underwater
UCAR	Careening Midden - Underwater
UDIS	Underwater Disposal Midden
UFRE	Freshwater Submerged - Unspecified
UNKN	Unknown
UNSP	Unspecified on Form
USAL	Saltwater Submerged - Unspecified
UUNS	Underwater - Unspecified
UWHF	Wharf Midden - Underwater
WALL	Wall
WELL	Historic Well
WHAR	Wharf / Wharves
WKER	Prehistoric Earthworks
WKSH	Prehistoric Shell Works
WREC	Historic Shipwreck

** - Coding is too vague or otherwise to be avoided when possible.

ORIGINAL and PRESENT USE

The first column is the meaning of the code value, the second is the code itself.

Use or function of structure	*Code*
Abandoned or vacant	VACA
Agricultural unspecified**	AGRI
Air terminal	TERM
Airport	AIRP
Animal shelter	KENN
Apartment	APTM
Apartment, garage	GAPT
Apartments & commrc.	CMAP
Arched entryway	GATE
Armory	ARMO
Army base	MILI
Art gallery	MUSE
Automobile dealership	AUTO
Auto repair shop	GAST
Bakery shop	BAKE
Band shell	BDSH
Bank	BANK
Bar	BAR
Barber shop	SBEA
Barn	BARN
Beauty shop	SBEA
Bed & Breakfast	BEDB
Belltower	TOWR
Blacksmith shop	SBLK
Blockhouse	FORT
Boardinghouse	ROOM
Boathouse	BOAT
Boat ramp	BOMP
Boat slip	SLIP
Boatworks, repairs and service	BOAW
Bridge	BRID
Bus terminal	TERM
Cabin	RESI
Cafeteria (commercial)	REST
Cafeteria-not retail	DINI
Cemetery	CEME
Charnel house	CHAR
Child care	CHIL
Children's home	ORPH
Church	HSEW
City hall	CIHL
Civic center	CIVI
Clinic-outpatient	OUTP
Clocktower	TOWR
Clubhouse	CLUB
College	SCHO
Commercial unspecified**	COMM
Commercial and apartments	CMAP
Commercial and residence	CMRE
Communications-related, unspecified**	CMUN
Community center (e.g., recreation hall)	BREC
Control tower for air traffic	CTOW

Convent	CONV
Correctional facilty	JAIL
Cottage	RESI
Courthouse	COUR
Credit union	BANK
Dairy	DAIR
Dam	DAM
Day care	CHIL
Demolished	DEST
Dentist's office	OFFI
Department store	SDEP
Depot	TERM
Destroved	DEST
Detention	JAIL
Diner	REST
Dining hall	DINI
Distribution structure (electrical)	ELEC
Dock	PIER
Drugstore	PHAR
Duplex	DUPL
Education related**	EDUC
Electrical plant	POWR
Electrical vault-struc for transmsn/distrib of pow	ELEC
Entertainment unspecified**	ENTE
Factory	PLNT
Farm	FARM
Farmers market structure	MARK
Farmstead	FARM
Financial institution	BANK
Firehouse	FIRE
Fish house	FISH
Fitness center or spa	GYMN
Fortification	FORT
Fraternal order-building	CLUB
Funeral home	MORT
Garage	GARA
Garage apartment	GAPT
Gas station	GAST
Gatewav/gatehouse/arched entryway	GATE
Gazebo	GAZE
Golf course	GOLF
Government unspecified**	GOVT
Gravevard	CEME
Greenhouse	GREE
Grist mill	MILL
Grocery store	SGRO
Gymnasium	GYMN
Hairdresser	SBEA
Hangar	HANG
Hardware store	SHRD
Health center	OUTP
Historic marker	MONU
Home--private	RESI
Hospital	HOSP
Hotel	HOTL
House	RESI
House of worship	HSEW

House--charnel	CHAR
House-prostitution	HPRO
Icehouse	ICEH
Industrial plant	PLNT
Industrial**	PLNT
Inn	HOTL
Inpatient care	HOSP
Jail	JAIL
Kennel	KENN
Kindergarten	SCHO
Kitchen	KITC
Labor housing	LABH
Laboratory--research	SCIE
Launch pad	LPAD
Laundry	LAUN
Library	LIBR
Lighthouse	LIGH
Lock structure-canal	CANL
Lodge (club) building	CLUB
Lounge	BAR
Lumber mill	MILL
Mall	MALL
Marker	MONU
Market structure	MARK
Mausoleum	MAUS
Medical offices	OFFI
Medical unspecific**	MEDI
Meetinghouse (club)	CLUB
Meetinghouse (religious)	CHUR
Migrant housing	LABH
Military base	MILI
Military**	MILI
Mill	MILL
Monastery	CONV
Monument	MONU
Moonshine Still	MOON
Mortuary	MORT
Motel	HOTL
Movie theater	THEA
Multiple important uses, as for a district	MULT
Multipurpose public roofed building or arena	CIVI
Municipal building	CIHL
Museum/art gallery/planetarium	MUSE
Nursery school	CHIL
Nursing home	NURS
Office	OFFI
Office building	BOFF
Offices, dental	OFFI
Offices--governmental	GOVT
Offices--medical	OFFI
Open air arena	STAD
Orphanage	ORPH
Outbuilding	OUTB
Outhouse	OUTH
Outpatient care	OUTP
Park	PARK
Parsonage	RESI

Pavilion	PAVI
Penetentiary	JAIL
Pharmacy	PHAR
Physician's office	OFFI
Pier	PIER
Planetarium	MUSE
Plant--industrial	PLNT
Plantation	PLAN
Plaza or square	SQUA
Police station	POLI
Pool--swimming	POOL
Post office	POST
Pound/kennel/animal shelter	KENN
Power plant	POWR
Preschool	CHIL
Prison	JAIL
Private residence	RESI
Privy	OUTH
Professional office	OFFI
Professional**	PROF
Quadraplex	APTM
Raceway	RACE
Railroad depot	TERM
Recreation hall	BREC
Recreation--building	BREC
Recreation--nonbuilding**	RECN
Religious**	RELI
Research laboratory	SCIE
Residence and commercial	CMRE
Residence--private	RESI
Resort complex--multiple recreational structures	RESO
Restaurant	REST
Restroom	OUTH
Retail establishment	STOR
Road	ROAD
Rooming house	ROOM
Ruin	DEST
Sailing vessel	VESS
Salon--beauty	SBEA
Saloon	BAR
Savings & loan	BANK
Saw mill	MILL
School	SCHO
Scientific laboratory	SCIE
Seawall	SEAW
Service station	GAST
Sewage treatment	WATW
Shed	OUTB
Ship	VESS
Ship--sailing	VESS
Shoe shop	SHOE
Shop unspecified**	SHOP
Shop--auto repair	GAST
Shop--bakery	BAKE
Shop--beauty	SBEA
Shop--blacksmith	SBLK
Shop--shoe	SHOE

Shopping center	MALL
Slave quarters	SLAV
Smithy	SBLK
Smokehouse	SMOK
Spa	GYMN
Springhouse	SPRG
Square or plaza: a designed, paved open area	SQUA
Stable	STAB
Stadium	STAD
Statue	MONU
Still-distillery	MOON
Storage building	BSTO
Store unspecified	STOR
Store--department	SDEP
Store--grocery	SGRO
Store--hardware	SHRD
Sugar mill	MILL
Supermarket	SGRO
Swimming pool	POOL
Synagogue	HSEW
Tavern	BAR
Technical school	SCHO
Temple (lodge)	CLUB
Temple (religious)	RELI
Temple--house of worship	HSEW
Temple--social club	CLUB
Terminal	TERM
Theater	THEA
Theme park (resort complex)	RESO
Tower	TOWR
Tower--control	CTOW
Town hall	CIHL
Transmission structure (electrical)	ELEC
Transportation**	TRAN
Triplex	APTM
Turpentine Still	TURP
University	SCHO
Unknown**	UNKN
Unused	VACA
Vacant	VACA
Vault, electric (transmission/distribution)	ELEC
Vehicle-road or rail	VEHI
Vessel--watergoing	VESS
Vocational school	SCHO
Wall	WALL
Warehouse	BSTO
Water fountain	WATF
Water Supply Structure--water pump or pumphouse	WSUP
Water Tower	WSUP
Waterworks	WATW
Wharf	PIER
Women's club	CLUB
Zoo	ZOO
Multiple important uses	MULT
Not applicable, e.g., a district or thematic group	NA
Unspecified by documenter	UNSP
Other	OTHR

South Tampa
Hi 2143
Hi 2144
Woodbury Lake
Hi 2142
Hi 2119
Mead Lake
Limona
20 Hi 2145
Gornto Lake
Hi 2146
Chapman Lake
Tenmile Lake
Hi 2138 NR
Sand Pond
BM 46
BM 47
Hi 538
Substation
UNDER CONSTRUCTION
Commemorative Cem
Hi 3993
Hi 3994
Hi 3981
Hi 3988
Delaney Creek
Tower (WFLA-FM)
Trailer Park
Hi 526
Hi 523
Hi 522
Substa
Tower (WTVT-TV)
Cem
Providence Ch
Landing Strip
Hickor Lake
Creek
4539 I" NW (TAM, AJ)

Hi 5070
Eureka Springs Ch
Hi 5050
Hi 333
Hi 5045
ST. PETERSBURG 29 MI.
TAMPA (COURTHOUSE) 1.1 MI.
3096000m N.
Sixmile Creek Ch
Hi 5367
Hi 516
Hi 512
Hi 477
Hi 518
Hi 474A
Hi 474B
Hi 515
Mango Hills
Trailer Park
Bethel Ch.
Mango
Orient Park
Sixmile Creek
Hi 2204
Hi 2188
Hi 519
Hi 1082(NR)
Hi 1081(GV)
Hi 1080
TAMPA
57'30"
3093
Hi 107(GV)
Hi 332
BM 23
South Tampa
Hi 2143
Hi 2144
Hi 2142
Woodbury Lake
Hi 2119
Mead Lake
Limona
Hi 2145
Hi 2146
Gornto Lake
Chapman Lake
Tenmile Lake
Sand Pond
Wee Lake
Hi 538
Substation
UNDER CONSTRUCTION
BOUNDARY
CANAL
CLEARWATER 29 MI.
TAMPA (COURTHOUSE) 5.4 MI.

Listing)) 02/03/1997

FSF SiteId	Form	Township/Range/Section	Type of Site	Site Name	National Reg.	Address or Mapname	Project No.	Use and/or Other Information
HI00107	MELD	29S/19E/013	Archaeological Site	SIX MILE CREEK		Mapname:BRANDON	243	culture:ARC sitetype:SCLI
HI00208	MELD	29S/20E/021	Historical Structure	MOSELEY HOMESTEAD	Listed	1820 W BRANDON BLVD, BRANDON	0	date built:1886 uses:RESI,FARM
HI00209	MELD	29S/20E/021	Historical Structure	1514 VICTORIA ST		1514 VICTORIA ST, BRANDON	0	date built: uses:RESI
HI00222	MELD	29S/19E/012	Historical Structure	MOORHOUSE, CHARLES HOUSE		2006 N CENTRAL AVE, TAMPA	0	date built:1904 uses:APTM,RESI
HI00283	MELD	29S/19E/013	Historical Structure	TAYLOR, LAURA HOUSE		2007 N CENTRAL, TAMPA	0	date built: uses:RESI
HI00325	199204	29S/19E/011	Archaeological Site			Mapname:	3243	culture: sitetype:
HI00332	MELD	29S/19E/013	Archaeological Site	NN		Mapname:BRANDON	0	culture:PREA sitetype:SCLI
HI00333	MELD	29S/19E/001	Archaeological Site	NN		Mapname:BRANDON	0	culture:PREA sitetype:REDE,SCLI
HI00476A	MELD	29S/20E/005	Archaeological Site	DIAMOND DAIRY: AREA A	Eligible	Mapname:BRANDON	487	culture:ARC,ARCM sitetype:HABI
HI00476B	MELD	29S/20E/008	Archaeological Site	DIAMOND DAIRY: AREA B	Eligible	Mapname:BRANDON	487	culture:ARCM,ARC sitetype:HABI
HI00477	MELD	29S/20E/007	Archaeological Site	SIXMILE CREEK		Mapname:BRANDON	0	culture:ARC sitetype:SCLI
HI00515	MELD	29S/20E/009	Archaeological Site	MUCK POND EAST	Eligible	Mapname:BRANDON	0	culture:ALAC,ARC sitetype:SCAR,SCLI
HI00516	MELD	29S/20E/006	Archaeological Site	BUFFALO AVENUE 1		Mapname:BRANDON	0	culture:ARC sitetype:SCLI
HI00517	MELD	29S/20E/006	Archaeological Site	BUFFALO AVENUE 2		Mapname:BRANDON	0	culture:ARC sitetype:SCLI
HI00518	MELD	29S/20E/007	Archaeological Site	SIX MILE SOUTH HEAD		Mapname:BRANDON	0	culture:ARC sitetype:SCLI
HI00519	MELD	29S/20E/017	Archaeological Site	GRAVES ROAD		Mapname:BRANDON	0	culture:ARC sitetype:SCLI
HI00520	MELD	29S/20E/020	Archaeological Site	SOUTH RAILROAD		Mapname:BRANDON	0	culture:PREH sitetype:SCLI
HI00538	MELD	29S/19E/024	Archaeological Site	WISE FARM		Mapname:BRANDON	276	culture:INDE sitetype:SCAR
HI01080	MELD	29S/20E/016	Archaeological Site	DEBORAH LYNN		Mapname:BRANDON	0	culture:ARC sitetype:SCAR
HI02142	MELD	29S/20E/020	Archaeological Site	NASTY KNOLL		Mapname:BRANDON	0	culture:INDE,PREH sitetype:SCLI
HI02143	MELD	29S/20E/020	Archaeological Site	REGENCY W		Mapname:BRANDON	0	culture:ARC sitetype:SCLI
HI02144	MELD	29S/20E/020	Archaeological Site	NN		Mapname:BRANDON	0	culture:INDE sitetype:SCLI
HI02145	MELD	29S/20E/020	Archaeological Site	STUCK CAR		Mapname:BRANDON	0	culture:INDE sitetype:SCLI
HI02146	MELD	29S/20E/020	Archaeological Site	REGENCY SW		Mapname:BRANDON	0	culture:INDE sitetype:SCLI
HI02188	MELD	29S/20E/007	Archaeological Site	EASTSHORE COMMERCE PARK		Mapname:BRANDON	0	culture:PREA sitetype:SCLI
HI02204	MELD	29S/20E/007	Archaeological Site	EASTSHORE COMMERCE PARK HISTORIC SITE		Mapname:BRANDON	0	culture:AMER sitetype:REFU
HI02315	MELD	29S/20E/009	Historical Structure	MANGO GROCERY		CR 574 & BROAD ST, TAMPA	0	date built: uses:VACA
HI03994	MELD	29S/20E/029	Archaeological Site	NN		Mapname:BRANDON	2758	culture:PREA sitetype:SING
HI04623	MELD	29S/20E/006	Historical Structure	5211 GARDEN LANE		5211 GARDEN LN, TAMPA	3543	date built:1918C uses:RESI,RESI
HI04624	MELD	29S/20E/006	Historical Structure	PRESTRESSED SYSTEMS, INC		9611 US92, TAMPA	3543	date built:1938C uses:COMM,RESI
HI04625	MELD	29S/20E/006	Historical Structure	WALKER AGENCY, INC		9729 US92, TAMPA	3543	date built:1925C uses:COMM,RESI
HI04626	MELD	29S/20E/005	Historical Structure	ANTHONY, NELSON G, HOUSE		10301 US92, TAMPA	3543	date built:1937C uses:RESI,RESI
HI04627	MELD	29S/20E/005	Historical Structure	MARY'S MIRACLE RESTAURANT		10203 US92 E, TAMPA	3543	date built:1930C uses:COMM,COMM
HI04628	MELD	29S/20E/005	Historical Structure	CLUB 92		10101 US92 E, TAMPA	3543	date built:1938C uses:COMM,COMM
HI04629	MELD	29S/20E/006	Historical Structure	9808 US 92		9808 US92, TAMPA	3543	date built:1938C uses:RESI,RESI
HI04630	MELD	29S/20E/006	Historical Structure	9810 US 92		9810 US92, TAMPA	3543	date built:1942C uses:VACA,RESI
HI04631	MELD	29S/20E/006	Historical Structure	9734 US 92		9734 US92, TAMPA	3543	date built:1942C uses:RESI,RESI
HI04632	MELD	29S/20E/006	Historical Structure	9732 US 92		9732 US92, TAMPA	3543	date built:1925C uses:VACA,RESI
HI04633	MELD	29S/20E/006	Historical Structure	9730 US 92		9730 US92, TAMPA	3543	date built:1940C uses:RESI,RESI
HI05044	MELD	29S/19E/002	Archaeological Site	BELLOWS LAKE		Mapname:TAMPA	3243	culture:PREH,20TH sitetype:SCAR
HI05045	MELD	29S/19E/002	Archaeological Site	ORIENT PARK		Mapname:BRANDON	3243	culture:PREH sitetype:VADE
HI05046	MELD	29S/19E/002	Archaeological Site	NORTH ORIENT PARK		Mapname:BRANDON	3243	culture:PREH sitetype:VADE
HI05047	MELD	29S/19E/002	Archaeological Site	FAIRGROUND HILL		Mapname:BRANDON	3243	culture:PREH,MODE sitetype:VADE
HI05048	MELD	28S/19E/036	Archaeological Site	US 301 CLOVERLEAF		Mapname:BRANDON	3243	culture:PREH sitetype:SCAR
HI05050	MELD	29S/20E/005	Archaeological Site	NOAJ'S SITE		Mapname:BRANDON	3243	culture:PREH sitetype:SCAR
HI05081	MELD	29S/20E/026	Historical Structure	5218 EUREKA SPRINGS RD		5218 EUREKA SPRINGS RD, TAMPA GV	3243	date built:1940C uses:RESI,RESI
HI05367	MELD	29S/20E/025	Archaeological Site	BABICZ		Mapname:BRANDON	0	culture:TRAN sitetype:HABI,SCDE

[] Search Information ...

Roster Cleared

Township/Range/Section Search ...
TRS' Requested in Search))
29S /20E / [5-9,16-21,29,30]
29S /19E / [1,2,11-14,23-26]
Search Results : 47 Record(s) Added

[] End Search Information.

Appendix B

Hillsborough County

Evaluation of Alternative Air Pollution Control System Configurations for the Hillsborough County Solid Waste Energy Recovery Facility

April 1996

CDM Camp Dresser & McKee Inc.

environmental services

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Tampa, Florida 33602
Tel: 813 221-2833 Fax: 813 221-2279

April 25, 1996

Mr. Thomas G. Smith, Executive Manager
Hillsborough County Department of Solid Waste
601 E. Kennedy
P.O. Box 1110
Tampa, Florida 33601

Subject: Evaluation of Alternative Air Pollution Control System Configurations for the Hillsborough County Solid Waste Energy Recovery Facility

Dear Thomas:

Three bound copies of the Evaluation of Alternative Air Pollution Control System Configurations for the Hillsborough County Solid Waste Energy Recovery Facility are enclosed with this letter. One unbound copy is also enclosed so that you may make additional copies, if necessary.

Please call if you have any questions.

Sincerely,

CAMP DRESSER & McKEE INC.

Daniel E. Strobridge
Associate

MEST6.59

EVALUATION OF
ALTERNATIVE AIR POLLUTION CONTROL SYSTEM CONFIGURATIONS
FOR THE HILLSBOROUGH COUNTY SOLID WASTE ENERGY RECOVERY FACILITY

SUMMARY

This report evaluates four alternative approaches to retrofitting the air pollution control ("APC") system for the Hillsborough County Solid Waste Energy Recovery Facility ("Facility"). The alternatives are composed of technology options as well as construction schedule and equipment location (configuration) options. The technologies considered include:

- Spray Dryer Absorbers and Fabric Filters (SDA/FF) sometimes referred to as a scrubber/baghouse
- SDA with a Cyclone and Existing Electrostatic Precipitators (ESPs)
- SDA with enhanced existing ESPs

Mercury and oxides of nitrogen (NOx) controls would be provided with each of the above systems.

The equipment configurations and construction schedule options evaluated in detail included:

- Locating new equipment behind the existing APC building
- Locating new equipment inside the existing APC building, but using the area reserved for Unit No. 4 for the APC equipment for Unit No. 3, thus minimizing facility downtime because the new APC equipment can be constructed without removing the unit from service during the entire construction period.

Several other equipment configurations were considered during our preliminary evaluations. These focused on maintaining, to the maximum extent possible, the existing Facility layout and process train centerline axis. These options required extended Facility downtime and increased construction cost and were discarded from further consideration.

Combining the above options, four retrofit alternatives were developed and evaluated. These are:

Alternative 1 - SDA/FF located *behind* the existing APC building
Alternative 2 - SDA/FF located *inside* the existing APC building
Alternative 3 - SDA/cyclone/relocated ESPs
Alternative 4 - SDA located behind expanded ESPs

The table below summarizes the estimated project costs (capital and associated landfill charges and energy revenue adjustments), the construction period, and process unit downtime.

Alternative	Project Costs	Construction Period (months)	Unit Downtime (months/unit)
1	$22,725,000	23	1
2	$24,225,000	38	1
3	$18,875,000	35	8
4	$22,250,000	35	8

Risk Issues

From the above table it appears that Alternatives 3 and 4 would be favored as the least cost alternatives. They are, in fact, less costly to implement than the others, but they carry additional risk which is difficult to precisely quantify. Risk used in this context means exposure to additional cost. Risk exposures for Alternatives 3 and 4 are in the areas of regulatory change, uncertainty about operating costs, and lack of a full environmental guarantee (the Facility operator would not provide a full environmental performance guarantee for either of these two technical options). These risks are further described below.

Regulatory risk stems from the way in which the Clean Air Act Amendments (CAAA) require the U.S. Environmental Protection Agency (EPA) to develop the emission guidelines (EGs) based on a concept referred to as MACT or Maximum Available Control Technology. The MACT concept requires that all air emission sources within a designated class meet the emission limitations achieved by the top 12 percent of the units in that class. Further, the CAAA require EPA to periodically review the MACT standards (every 5 years). These facts, combined with the recognition that the new source performance standards (NSPS) were based primarily on the use of SDA/FF technology, are the basis for the regulatory risk identified. Alternatives 3 and 4 employ ESPs. All new municipal waste combustors will employ SDA/FF technology which provides for some additional level of control of organics and very fine particulate matter. Consequently, there is

a risk that future MACT standards could be revised to numeric standards which would require fabric filter technology in lieu of ESPs. Just how soon that may be cannot be predicted at this time, but it is our speculation that such a revision is unlikely to occur within 10 years of the retrofit completion date.

The absence of a full environmental performance guarantee (a guarantee from the Facility operator that all applicable environmental regulations and the Facility's permit limitations will be met) is a significant risk that the county has not had in the past and that is not desirable to accept at this time. Discussions with Ogden representatives have revealed that Ogden, as a corporation, will not assume a full environmental guarantee for the EG limitations for facilities employing an ESP. Ogden believes that their risk exposure to permit violations and resulting fines is too great with ESP technology.

Disposal Capacity Consumption

The two least cost alternatives would require the county to consume considerably more landfill capacity than either of the other alternatives. Depreciation of the landfill capacity asset was not included in the analysis of project costs. If it were, the costs of Alternatives 3 and 4 would be closer to those of Alternatives 1 and 2. The project costs modeled reflect cash flows only (payments for landfill tipping fees). Alternatives 3 and 4 would consume about 4.8 years of landfill capacity for the disposal of ash residue.

Short List of Alternatives and Further Considerations

The selection of a retrofit alternative must include consideration of the risk issues, landfill capacity consumption, as well as other issues important to the community such as Facility aesthetics. The use of a cyclone, as proposed in Alternative 3, was a nonstarter in negotiations with Ogden, so it was eliminated from further consideration. The risks related to Alternative 4 also appear to outweigh any estimated cost differential between this alternative and those employing SDA/FF technology. The differences between the remaining two alternatives featuring the SDA/FF technology relate to construction schedule, facility layout, and cost. Alternative 1 is the less expensive of the two remaining alternatives, largely because of its shorter construction schedule. The construction schedule advantage is due to the fact that all new APC equipment can be erected simultaneously behind the existing Facility. The disadvantages of Alternative 1 are that the aesthetic appearance of the Facility would be compromised and some additional operational issues may be encountered (related to excessive fly ash conveyor lengths). Aesthetically, the facility would appear significantly larger than it does today with two new roof line elevations, one higher and one lower than the western-most roof line. Fly ash conveyors would approximately double in length, which increases maintenance requirements and adds potential for additional unscheduled Facility outages.

Alternative 2 is estimated to cost about 6.6 percent more than Alternative 1; however, it minimizes the disadvantages of Alternative 1. The aesthetic appearance of the existing facility would be maintained and operational issues related to long fly ash conveyor runs would be eliminated.

Recommendation

It is recommended that the county implement Alterative 2, Spray Dryer Absorber/Fabric Filter technology located inside the existing APC facility. This recommendation is made in recognition of the relatively small difference in capital costs between the two short listed alternatives. This difference is within the margin of error of the cost estimates that can be developed without detailed construction plans. Further the aesthetic and long-term operational benefits afforded by placing the APC equipment inside the existing building footprint warrant the incremental cost.

INTRODUCTION

CDM was requested by the Department of Solid Waste to evaluate several alternative air pollution control (APC) system configurations that could meet the requirements of the Emission Guidelines for Municipal Waste Combustors. We have identified and refined our analysis of four APC retrofit alternatives for the Hillsborough County Solid Waste Energy Recovery Facility. Descriptions of each alternative and estimated construction costs are provided below. The cost estimates provided include only the costs related to constructing each alternative and do not include any costs for permitting activities or consulting engineering fees. For comparison purposes, incremental disposal costs and lost energy revenues expected to be incurred during downtime periods are also identified for the alternatives which require extended process unit outages.

We have assumed that the height of the existing process stack is suitable for all alternatives. This must be confirmed, since that the new APC equipment will affect dispersion by lowering the flue gas temperature.

Layout plans and implementation schedules for each alternative are attached.

ALTERNATIVE 1 - SDA/FF LOCATED BEHIND EXISTING APC BUILDING

Under Alternative 1, the existing electrostatic precipitators (ESPs) would be maintained. New spray dry absorbers (SDAs), fabric filter baghouses (FFs) and induced draft (ID) fans would be constructed in the rear of the existing APC building. The SDAs and FFs would be erected concurrently while all three units remain in operation. The new SDA and FF for each unit would be tied into the ESP outlet during a 1-month shutdown. The existing ID fans would be removed. Interconnection of the three units would be staggered so that only one unit is off line at any time. NOx and mercury control systems would also be installed on each unit.

Fly ash from each SDA and FF train would be collected with a series of new screw conveyors. The new screw conveyors would be tied into the existing fly ash handling systems so that all of the fly ash would continue to be conveyed to the ash discharger on each unit. The existing fly ash handling systems would be upgraded as necessary to handle the increased load.

The roof and side walls of the existing APC building would remain as is. The wall panels on the rear wall would be removed to provide clear access to the SDA and FF area. A new enclosure would be erected around the new SDAs, FFs and ID fans.

The outlet of the Unit No. 3 ID fan would be connected to the existing, unused fourth flue to simplify the duct arrangement. The stack flue now used for Unit No. 3 would be available if Unit No. 4 is constructed in the future. The base of the stack would be contained within the expanded APC building.

The estimated construction schedule from notice to proceed for this alternative is 23 months. Total downtime is estimated at 1 month per unit to allow tie-in of the new APC equipment, with an earlier 1-month shutdown of Unit No. 2 for installation of temporary duct work.

The estimated cost of this alternative is:

Estimated Construction Cost

Site/Structural Work

Expanded APC Building (12,000 sf) and Foundations	$2,400,000
Expanded Fire Protection and Detection Systems	$100,000
Stack Foundation Enhancement	$50,000
Site Work/Landscaping/Utility Relocation	$125,000
Subtotal Site/Structural Costs	$2, 67500

Installed Equipment

Spray Dry Absorbers / Fabric Filter Baghouses	$7,000,000
Thermal DeNox Systems (Incl. Ammonia Storage)	$1,500,000
Activated Carbon Injection Systems (Incl. Carbon Storage)	$500,000
Lime Storage and Handling System (Incl. Slakers)	$400,000
Fly Ash Handling Systems	$900,000
Induced Draft Fans	$750,000
Interconnecting Duct Work and Breaching	$500,000
CEM System and Enclosure (Incl. Sample Lines and Probes)	$700,000
APC System Controls	$300,000
Electrical	$400,000
Process Piping	$600,000
Subtotal Installed Equipment Costs	$13,550,000
Subtotal Site/Structural and Installed Equipment Costs	$16,225,000
Engineering (10%)	$1,625,000
Construction Management (10%)	$1,625,000
Contingency (20%)	$3,250,000
Total Estimated Construction Cost Alternative 1	**$22,725,000**

ALTERNATIVE 2 - SDA/FF LOCATED INSIDE EXISTING APC BUILDING

Under Alternative 2, the existing ESPs would be replaced with SDAs and FFs. A new SDA, FF and ID fan would be installed first in the area reserved for the Unit No. 4 APC equipment. This equipment would then be interconnected to Unit No. 3. The rear wall and roof panels in the No. 3 ESP bay would be removed to improve access. The existing ESP and ID fan on Unit No. 3 would then be demolished and a new SDA, FF and ID fan installed in its place. This equipment would be interconnected to Unit No. 2. The rear wall and roof panels in the No. 2 ESP bay would be removed to improve access. The existing ESP and ID fan on Unit No. 2 would be demolished at this point and an SDA, FF and ID fan for Unit No. 1 installed in its place. The Unit No. 1 ESP and ID fan would be abandoned in place. If a fourth unit is installed in the future, the Unit No. 1 ESP and ID fan would be removed, an SDA and FF installed in its place, and the duct work from each unit shifted to the SDA located directly behind each boiler. Locating the new APC equipment in the area reserved for Unit No. 4 allows the units to continue to operate while the new equipment is being erected. NOx and mercury control systems would also be installed on each unit.

Fly ash from each SDA and FF train would be collected with a series of new screw conveyors. The new screw conveyors would be tied into the existing fly ash handling systems so that all of the fly ash would continue to be conveyed to each ash discharger. The existing fly ash handling systems would be upgraded as necessary to handle the increased load.

The roof and rear walls for the Unit No. 3 and Unit No. 2 ESP bays would be removed to facilitate installation of the SDAs and FFs. The roof would be replaced following installation. The roof above each SDA would be raised slightly to accommodate the increased height of the SDAs. The wall panels on the rear wall would be replaced following construction. The new ID fans would not be enclosed within the building.

The outlet of the Unit No. 3 ID fan would be connected to the unused fourth flue to simplify the duct arrangement. The outlet of the Unit No. 2 ID fan would be connected to the flue now used for Unit No. 3 and the Unit No. 1 ID fan would be connected to the flue now used by Unit No. 2. The duct work into the stack would be returned to the original configuration if the fourth unit is installed in the future.

The estimated construction schedule from notice to proceed for this alternative is 38 months. The increased implementation time is due to the need to install the new APC equipment sequentially as opposed to concurrently in order to maintain full facility capacity. Total downtime is estimated at 1 month per unit to permit tie-in of the new equipment. No temporary duct work would be required.

A 20 percent factor has been applied to the SDA and FF costs to reflect the added costs associated with installing two units inside an existing building. A higher construction management cost has also been carried to reflect the longer construction period.

The estimated cost of this alternative is:

Estimated Construction Cost

Site/Structural Work

Existing APC Building Demolition/Modification	$250,000
Existing ESP Demolition	$250,000
Existing Foundation Improvements	$150,000
Expanded APC Building (5 ,000 sf) and Foundations	$1,000,000
Expanded Fire Protection and Detection Systems	$100,000
Stack Foundation Enhancement	$25,000
Site Work/Utility Relocation	$25,000
Subtotal Site/Structural Costs	$1,800,000

Installed Equipment

Spray Dry Absorbers / Fabric Filter Baghouses	$8,500,000
Thermal DeNox Systems (Incl. Ammonia Storage)	$1,500,000
Activated Carbon Injection Systems (Incl. Carbon Storage)	$500,000
Lime Storage and Handling System (Incl. Slakers)	$400,000
Fly Ash Handling Systems	$900,000
Induced Draft Fans	$750,000
Interconnecting Duct Work and Breaching	$530,000
CEM System and Enclosure (Incl. Sample Lines and Probes)	$700,000
APC System Controls	$300,000
Electrical	$300,000
Process Piping	$500,000
Subtotal Installed Equipment Costs	$14,900,000
Subtotal Site/Structural and Installed Equipment Costs	$16,700,000
Engineering (10%)	$1,675,000
Construction Management (15%)	$2,500,000
Contingency (20%)	$3,350,000
Total Estimated Construction Cost Alternative 2	**$24,225,000**

ALTERNATIVE 3 - RELOCATED ESP WITH SDA/CYCLONE

Alternative 3 involves relocation of the existing ESPs closer to the stack and installation of SDAs and cyclones between the economizer outlet and ESP inlet. New ID fans would also be added. The cyclones will remove the large particulate generated in the SDA and eliminate the need to increase the number of existing ESP fields to meet the expected particulate standard. Modifications to each line will require an estimated 8-month total outage per unit. Only one unit would be modified at a time to maximize facility capacity. NOx and mercury control systems would also be installed on each unit.

Fly ash from each modified train would be collected with a series of new screw conveyors. The new screw conveyors would be tied into the existing fly ash handling systems so that all of the fly ash would continue to be conveyed to each ash discharger. The existing fly ash handling systems would be upgraded as necessary to handle the increase load.

The roof and rear walls for each ESP bay would be removed to facilitate repositioning of the ESP and installation of the SDA and cyclone. The roof would be replaced following installation of the SDA and cyclone. The roof above each SDA would be raised slightly to accommodate the increased height of the SDAs. The wall panels on the rear wall would be removed to provide clear access to the expanded APC building. A new enclosure would be erected around the portion of the ID fans and ESPs that extends beyond the limits of the existing APC building.

The outlet of the Unit No. 3 ID fan would be connected to the unused fourth flue to simplify the duct arrangement. The stack flue now used for Unit No. 3 would be available if Unit No. 4 is constructed in the future. The base of the stack would be contained within the expanded APC building.

The estimated construction schedule from notice to proceed for this alternative is 35 months. A 20 percent factor has been applied to the SDA and cyclone costs to reflect added costs for installing these units inside an existing building. A higher construction management cost has also been carried to reflect the longer construction period.

The estimated cost of this alternative is.

Estimated Construction Cost

Site/Structural Work

Existing APC Building Demolition/Modification	$250,000
Existing Foundation Improvements	$150,000
Expanded APC Building (8,000 sf) and Foundations	$600,000
Expanded Fire Protection And Detection Systems	$100,000
Stack Foundation Enhancement	$50,000
Site Work/Utility Relocation	$25,000
Subtotal Site/Structural Costs	$1,175,000

Installed Equipment

Spray Dry Absorbers	$3,600,000
Cyclones	$1,000,000
Relocate Existing ESPs	$500,000
Thermal DeNox Systems (Incl. Ammonia Storage)	$1,500,000
Activated Carbon Injection Systems (Incl. Carbon Storage)	$500,000
Lime Storage and Handling System (Incl. Slakers)	$400,000
Fly Ash Handling Systems	$300,000
Induced Draft Fans	$750,000
Interconnecting Duct Work and Breaching	$550,000
CEM System and Enclosure (Incl. Sample Lines and Probes)	$700,000
APC System Controls	$300,000
Electrical	$300,000
Process Piping	$500,000
Subtotal Installed Equipment Costs	$10,900,000
Subtotal Site/Structural and Installed Equipment Costs	$12,075,000
Engineering (10%)	$1,200,000
Construction Management (15%)	$1,800,000
Contingency (20%)	$2,400,000
Total Estimated Construction Cost Alternative 3	**$17,475,000**

ALTERNATIVE 4 - EXPANDED ESP WITH SDA

Under Alternative 4, the two additional fields would be added to the back end of the existing ESPs and SDAs would be added. The SDAs would be located in the rear of the existing APC building, since there is insufficient space between the economizer outlet and ESP inlet. Relatively long duct runs would be necessary to interconnect the SDA with the economizer outlet and ESP inlet. The potential for significant amounts of particulate to settle in the return duct to the ESP inlet needs to be evaluated further. New ID fans would also be added under this alternative. The additional ESP fields will serve to remove the incremental particulate generated in the SDA. Modifications to each line will require an estimated 8-month total outage per unit. Only one unit would be modified at one time to maximize facility capacity. NOx and mercury control systems would also be installed on each unit.

Fly ash from each modified train would be collected with a series of new screw conveyors. The new screw conveyors would be tied into the existing fly ash handling systems so that all of the fly ash would continue to be conveyed to each ash discharger. The existing fly ash handling systems would be upgraded as necessary to handle the increase load.

The roof and rear walls for each ESP bay would be removed to facilitate expansion of the existing ESP. The roof would be replaced following installation. The wall panels on the rear wall would be removed to provide clear access to the expanded APC building. A new enclosure would be erected around the SDA and relocated ID fans.

The outlet of the Unit No. 3 ID fan would be connected to the unused fourth flue to simplify the duct arrangement. The stack flue now used for Unit No. 3 would be available if Unit No. 4 is constructed in the future. The base of the stack would be contained within the expanded APC building.

The estimated construction schedule from notice to proceed for this alternative is 35 months. A 20 percent factor has been applied to the costs of expanding the ESPs to reflect the added costs for working inside an existing building. A higher construction management cost has also been carried to reflect the longer construction period.

The estimated cost of this alternative is:

Estimated Construction Cost

Site/Structural Work

Existing APC Building Demolition/Modification	$250,000
Existing Foundation Improvements	$150,000
Expanded APC Building (9,000 sf) and Foundations	$1,800,000
Expanded Fire Protection and Detection Systems	$100,000
Stack Foundation Enhancement	$25,000
Site Work/Utility Relocation	$25,000
Subtotal Site/Structural Costs	$2,350,000

Installed Equipment

Spray Dry Absorbers	$3,000,000
Expanded ESPs	$3,000,000
Thermal DeNox Systems (Incl. Ammonia Storage)	$1,500,000
Activated Carbon Injection Systems (Incl. Carbon Storage)	$500,000
Lime Storage and Handling System (Incl. Slakers)	$400,000
Fly Ash Handling Systems	$300,000
Induced Draft Fans	$750,000
Interconnecting Duct Work and Breaching	$750,000
CEM System and Enclosure (Incl. Sample Lines and Probes)	$700,000
APC System Controls	$300,000
Electrical	$300,000
Process Piping	$500,000
Subtotal Installed Equipment Costs	$12,000,000
Subtotal Site/Structural and Installed Equipment Costs	$14,350,000
Engineering (10%)	$1,450,000
Construction Management (15%)	$2,150,000
Contingency (20%)	$2,900,000
Total Estimated Construction Cost Alternative 4	**$20,850,000**

The following table summarizes the initial costs associated with these alternatives. From the table it is clear that salvaging the ESPs (Alternatives 3 and 4) is the least cost capital approach. However, these alternatives carry additional risk which is difficult to precisely quantify. Risk used in this context means exposure to additional cost. Risk exposures for Alternatives 3 and 4 are in the areas of regulatory change, uncertainty about operating costs, and lack of a full environmental guarantee (the Facility operator would not provide a full environmental performance guarantee for either of these two technical options). These risks are further described below.

Regulatory risk stems from the way in which the Clean Air Act Amendments (CAAA) require the U.S. Environmental Protection Agency (EPA) to develop the emission guidelines (EGs) based on a concept referred to as MACT or Maximum Available Control Technology. The MACT concept requires that all air emission sources within a designated class meet the emission limitations achieved by the top 12 percent of the units in that class. Further, the CAAA require EPA to periodically review the MACT standards (every 5 years). These facts, combined with the recognition that the new source performance standards (NSPS) were based primarily on the use of SDA/FF technology, are the basis for the regulatory risk identified. Alternatives 3 and 4 employ ESPs. All new municipal waste combustors will employ SDA/FF technology which provides for some additional level of control of organics and very fine particulate matter. Consequently, there is a risk that future MACT standards could be revised to numeric standards which would require fabric filter technology in lieu of ESPs. Just how soon that may be cannot be predicted at this time, but it is our speculation that such a revision is unlikely to occur within 10 years of the retrofit completion date.

The absence of a full environmental performance guarantee (a guarantee from the Facility operator that all applicable environmental regulations and the Facility's permit limitations will be met) is a significant risk that the county has not had in the past and that is not desirable to accept at this time. Discussions with Ogden representatives have revealed that Ogden, as a corporation, will not assume a full environmental guarantee for the EG limitations for facilities employing an ESP. Ogden believes that their risk exposure to permit violations and resulting fines is too great with ESP technology.

Disposal Capacity Consumption

The two least cost alternatives would require the county to consume considerably more landfill capacity than either of the more expensive alternatives. The costs modeled reflect cash flow and do not take into account depreciation of the landfill capacity asset. The additional landfill consumption required for Alternatives 3 and 4 represents about 4.8 years of landfill capacity for the disposal of ash residue. This is an important consideration which should be considered in the selection of an alternative.

Short List of Alternatives and Further Considerations

The selection of a retrofit alternative must include consideration of the risk issues, landfill capacity consumption, as well as other issues important to the community such as Facility aesthetics. The use of a cyclone, as proposed in Alternative 3, was a nonstarter in negotiations with Ogden, so it was eliminated from further consideration. The risks related to Alternative 4 also appear to outweigh any estimated cost differential between this alternative and those employing SDA/FF technology. The differences between the remaining two alternatives featuring the SDA/FF technology relate to construction schedule, facility layout, and cost. Alternative 1 is the less expensive of the two remaining alternatives, largely because of its shorter construction schedule. The construction schedule advantage is due to the fact that all new APC equipment can be erected simultaneously behind the existing Facility. The disadvantages of Alternative 1 are that the aesthetic appearance of the Facility would be compromised and some additional operational issues may be encountered (related to excessive fly ash conveyor lengths). Aesthetically, the facility would appear significantly larger than it does today with two new roof line elevations, one higher and one lower than the western-most roof line. Fly ash conveyors would approximately double in length, which increases maintenance requirements and adds potential for additional unscheduled Facility outages.

Alternative 2 is estimated to cost about 6.6 percent more than Alternative 1; however, it minimizes the disadvantages of Alternative 1. The aesthetic appearance of the existing facility would be maintained and operational issues related to long fly ash conveyor runs would be eliminated.

Recommendation

It is recommended that the county implement Alterative 2, Spray Dryer Absorber/Fabric Filter technology located inside the existing APC facility. This recommendation is made in recognition of the relatively small difference in capital costs between the two short listed alternatives. This difference is within the margin of error of the cost estimates that can be developed without detailed construction plans. Further the aesthetic and long-term operational benefits afforded by placing the APC equipment inside the existing building footprint warrant the incremental cost.

SUMMARY OF RETROFIT ALTERNATIVES

Alternative	Estimated Construction Cost	Other Costs[1]	Project Cost	Construction Period	Unit Shutdown Time
1 SDA/FF OUTSIDE	$22,725,000	-0-	$22,725,000	23 Months	1 Month Each
2 SDA/FF INSIDE	$24,225,000	-0-	$24,225,000	38 Months	1 Month Each
3 SDA/CYC /ESP	$17,475,000	$1,400,000	$18,875,000	35 Months	8 Months Each
4 SDA/ESP	$20,850,000	$1,400,000	$22,250,000	35 Months	8 Months Each

[1] Other costs include lost energy revenues and a credit for the disposal fee differential between the landfill charge and the excess tonnage fee at the Facility.

ASH HANDLING ENCLOSURE

NOTE:

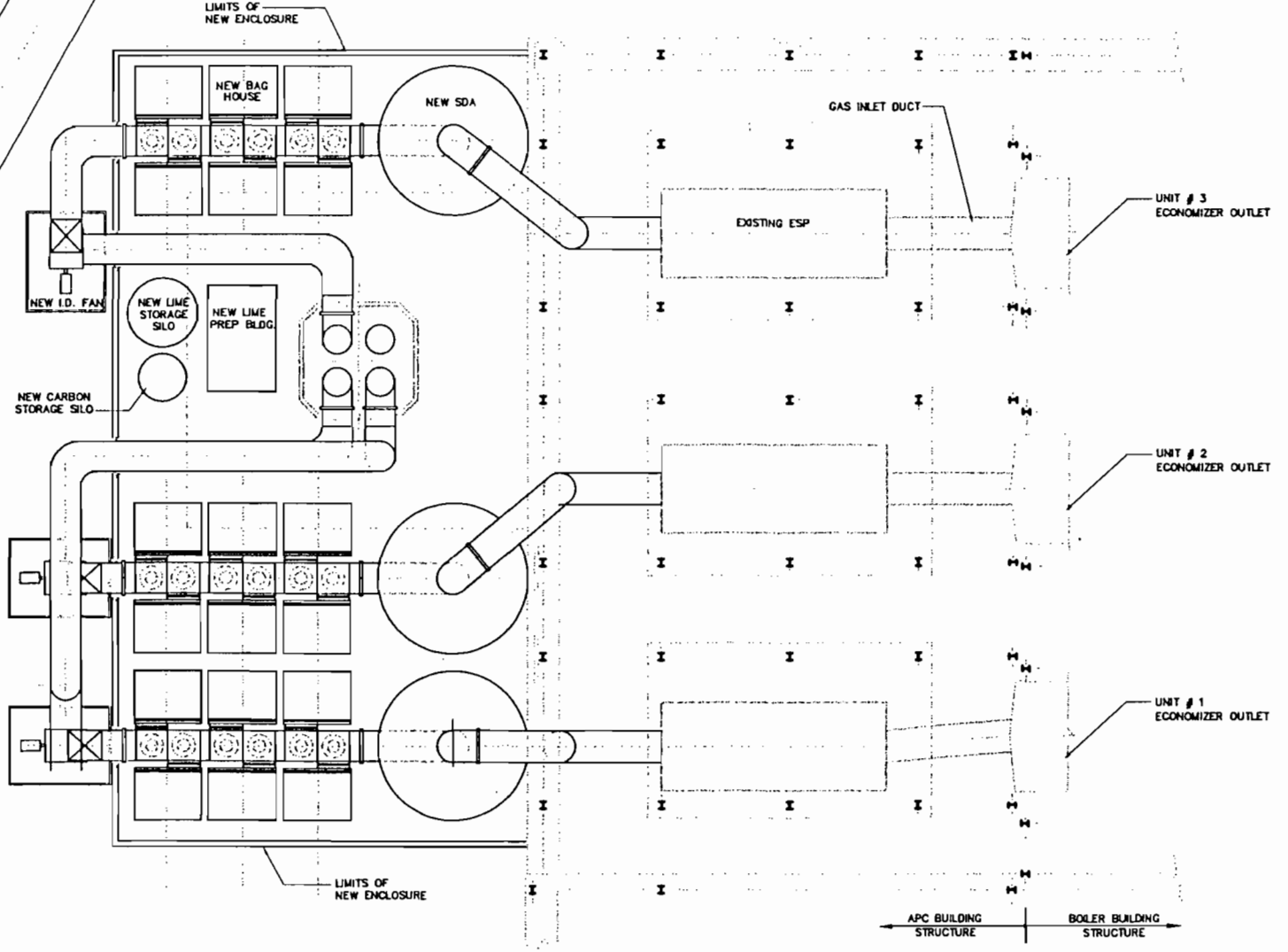
1. EXISTING BUILDING CONDITIONS WERE OBTAINED FROM AS-BUILT DRAWINGS S206 AND M200 PREPARED BY BURNS AND ROE INDUSTRIAL SERVICE CORP. FOR OGDEN MARTIN SYSTEMS OF HILLSBOROUGH, INC.

LEGEND:

EXISTING
NEW

SCALE
8 0 8 16 24

N



REV NO	DATE	DRWN	CHKD	REVISION RECORD
01	04/19/96	C.C.C.		CHANGES TO B.H. & APC BLDG.
00	08/31/95	C.C.C.		ORIGINAL DRAWING

DESIGNED BY: J.CURRO/A.LORE
DRAWN BY: C.CHANG
CHECKED BY: J.CURRO/A.LORE
APPROVED BY:
ENGINEER
DATE: AUGUST 1995

CAMP DRESSER & McKEE
One Cambridge Center
Cambridge, Massachusetts 02142

CDM

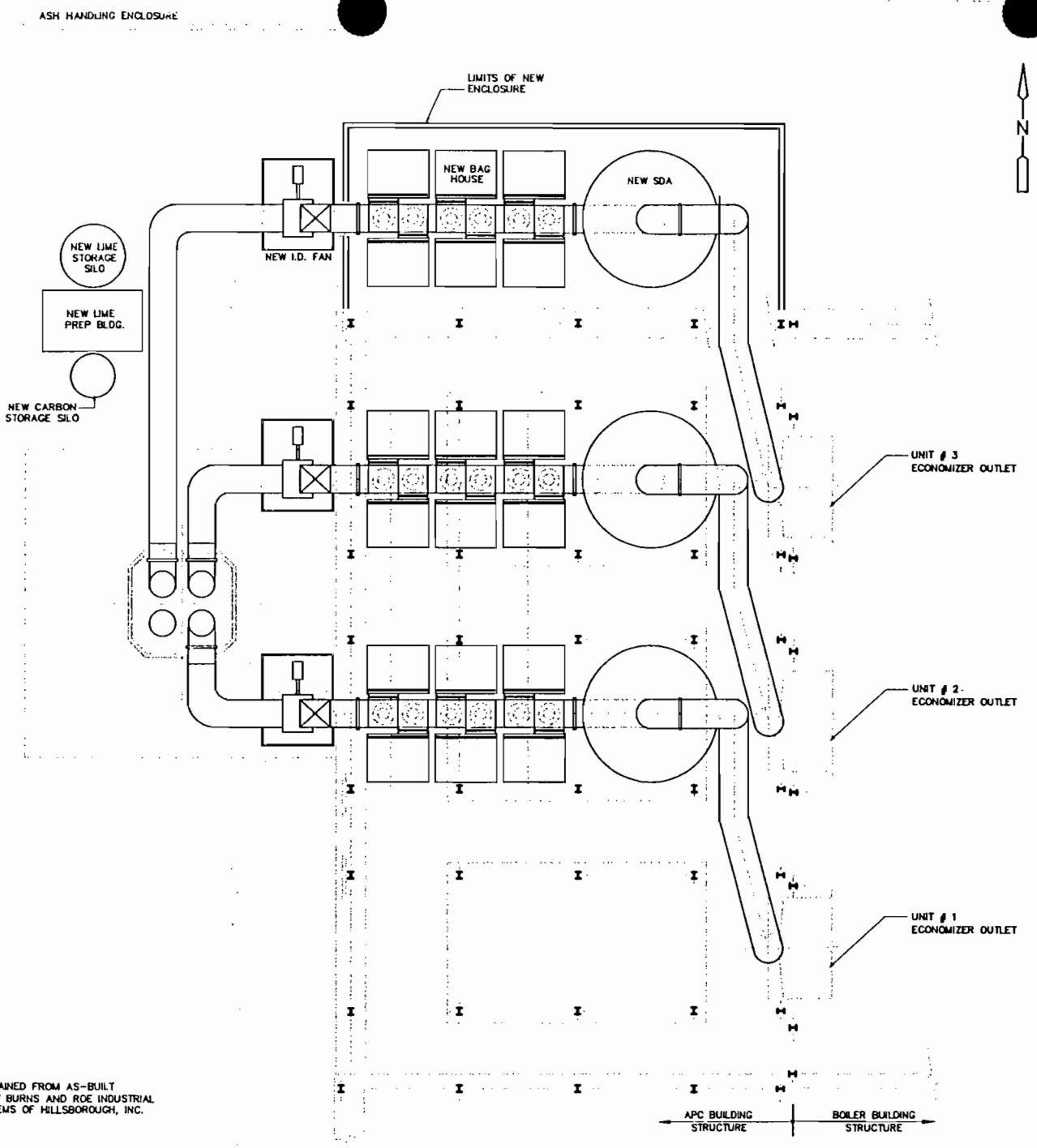
HILLSBOROUGH COUNTY
TAMPA, FLORIDA

SOLID WASTE ENERGY RECOVERY FACILITY

AIR POLLUTION CONTROL ARRANGEMENT
ALTERNATIVE I - LAYOUT PLAN

CDM PROJECT NO.
8033-040

SHEET NO.
C-1



LEGEND:

EXISTING

NEW

NOTE:

1. EXISTING BUILDING CONDITIONS WERE OBTAINED FROM AS-BUILT DRAWINGS S206 AND M200 PREPARED BY BURNS AND ROE INDUSTRIAL SERVICE CORP. FOR OGDEN MARTIN SYSTEMS OF HILLSBOROUGH, INC.

REV NO.	DATE	DR'N.	CH'K'D	REVISION RECORD
01	04/18/86	C.C.C.		CHANGES TO B.H. & APC BLDG.
00	06/21/85	C.C.C.		ORIGINAL DRAWING

DESIGNED BY: J.CURRO/A.LORE
DRAWN BY: C.CHANG
CHECKED BY: J.CURRO/A.LORE
APPROVED BY:
ENGINEER:
DATE: AUGUST 1986

CAMP DRESSER & McKEE
Two Cambridge Center
Cambridge, Massachusetts 02142

CDM

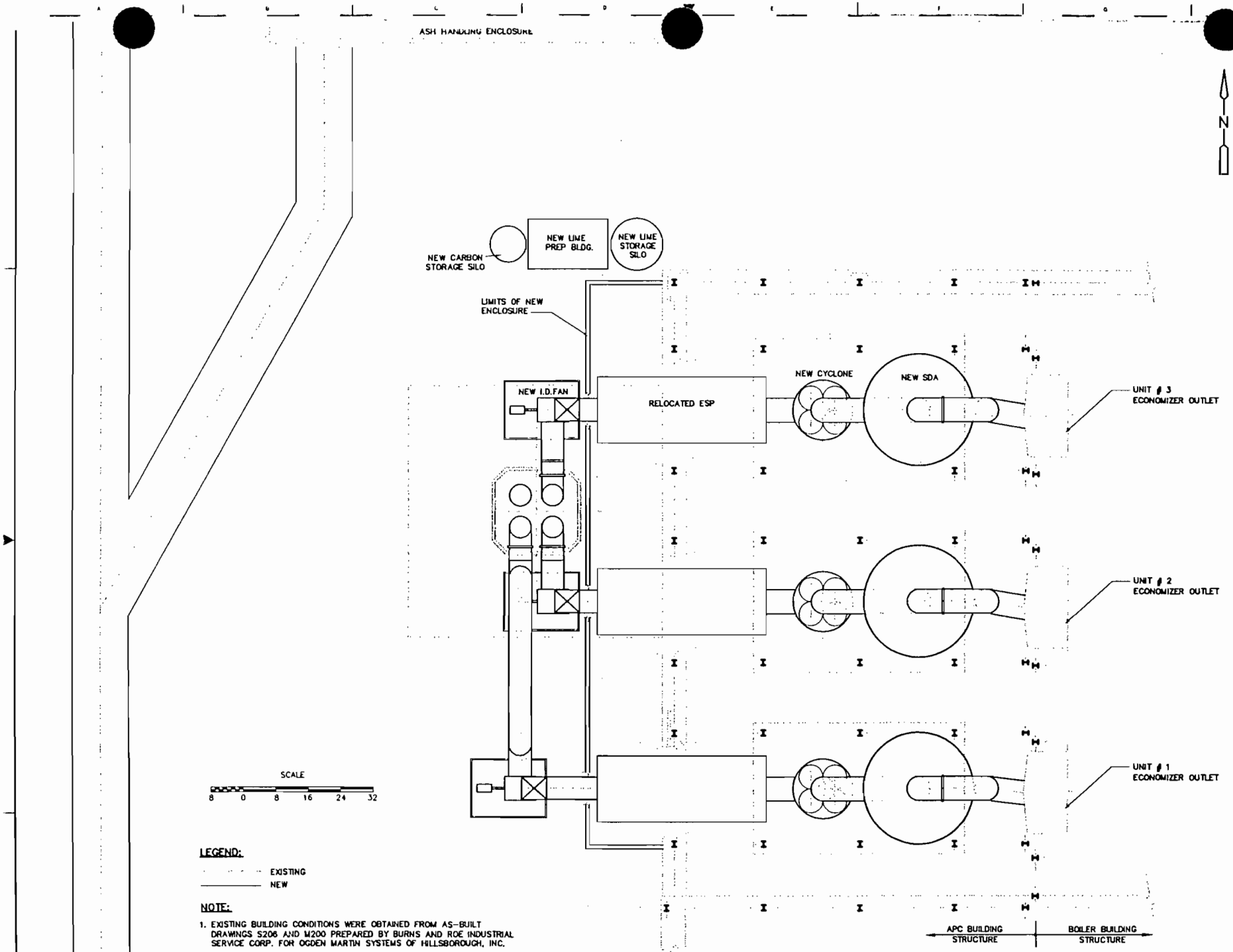
HILLSBOROUGH COUNTY
TAMPA, FLORIDA

SOLID WASTE ENERGY RECOVERY FACILITY

AIR POLLUTION CONTROL ARRANGEMENT
ALTERNATIVE 2 - LAYOUT PLAN

CDM PROJECT NO. 6033-040

SHEET NO. C-2



NOTE:

1. EXISTING BUILDING CONDITIONS WERE OBTAINED FROM AS-BUILT DRAWINGS S206 AND M200 PREPARED BY BURNS AND ROE INDUSTRIAL SERVICE CORP. FOR OGDEN MARTIN SYSTEMS OF HILLSBOROUGH, INC.

REV. NO	DATE	DRWN	CHK'D	REVISION RECORD
01	04/18/96	C.C.C.		CHANGES TO APC BLDG.
00	08/21/95	C.C.C.		ORIGINAL DRAWING

DESIGNED BY: J.CURRO/A.LORE
DRAWN BY: C.CHANG
CHECKED BY: J.CURRO/A.LORE
APPROVED BY:
ENGINEER:
DATE: AUGUST 1995

CAMP DRESSER & McKEE
Two Cambridge Center
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CDM

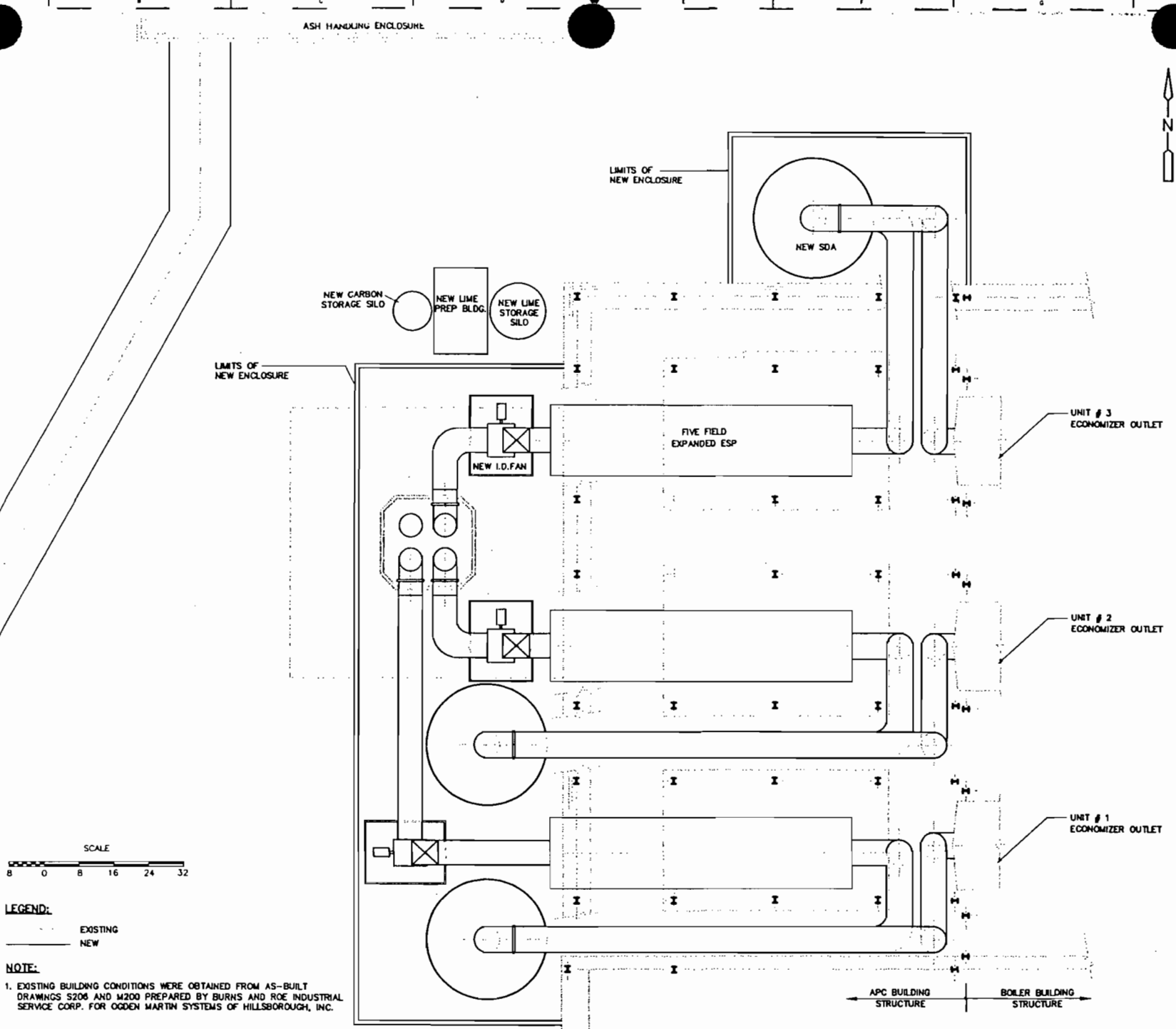
HILLSBOROUGH COUNTY
TAMPA, FLORIDA

SOLID WASTE ENERGY RECOVERY FACILITY

AIR POLLUTION CONTROL ARRANGEMENT
ALTERNATIVE 3 - LAYOUT PLAN

CDM PROJECT NO. 6033-040

SHEET NO. C-3



REV NO	DATE	DRWN	CHKD	REVISION RECORD
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DESIGNED BY: J.CURRO/A.LORE
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APPROVED BY:
ENGINEER:
DATE: AUGUST 1986

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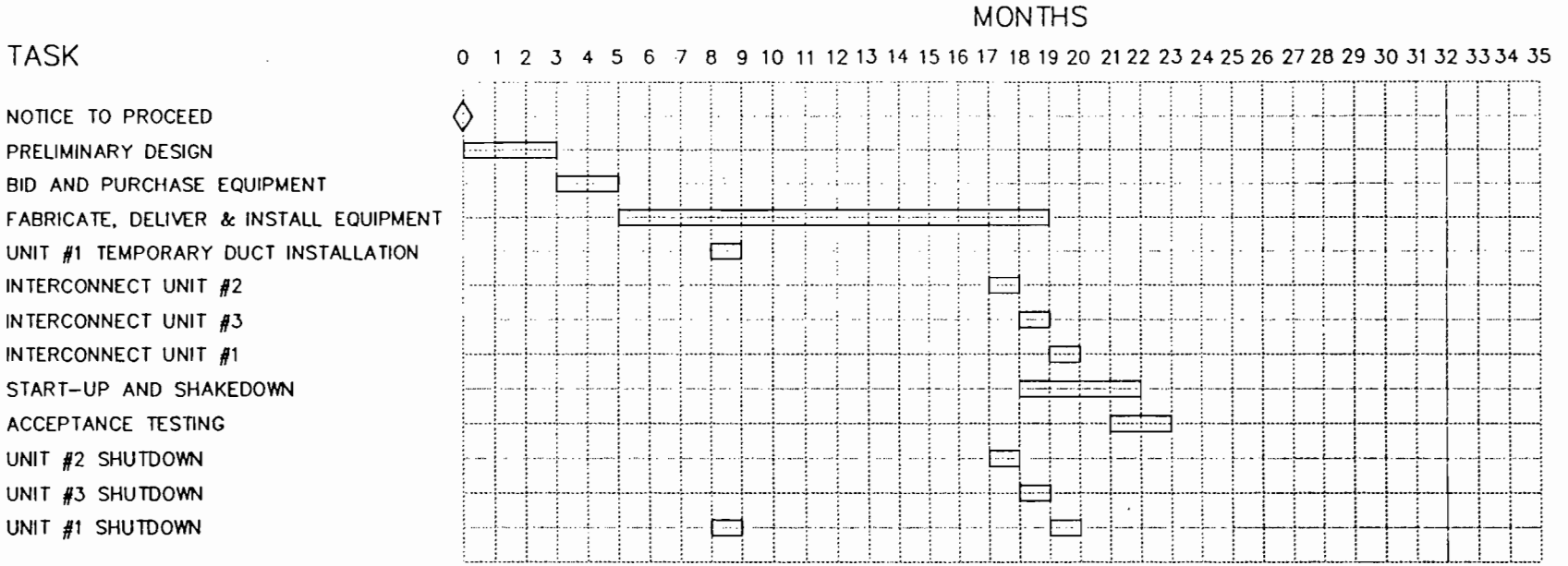

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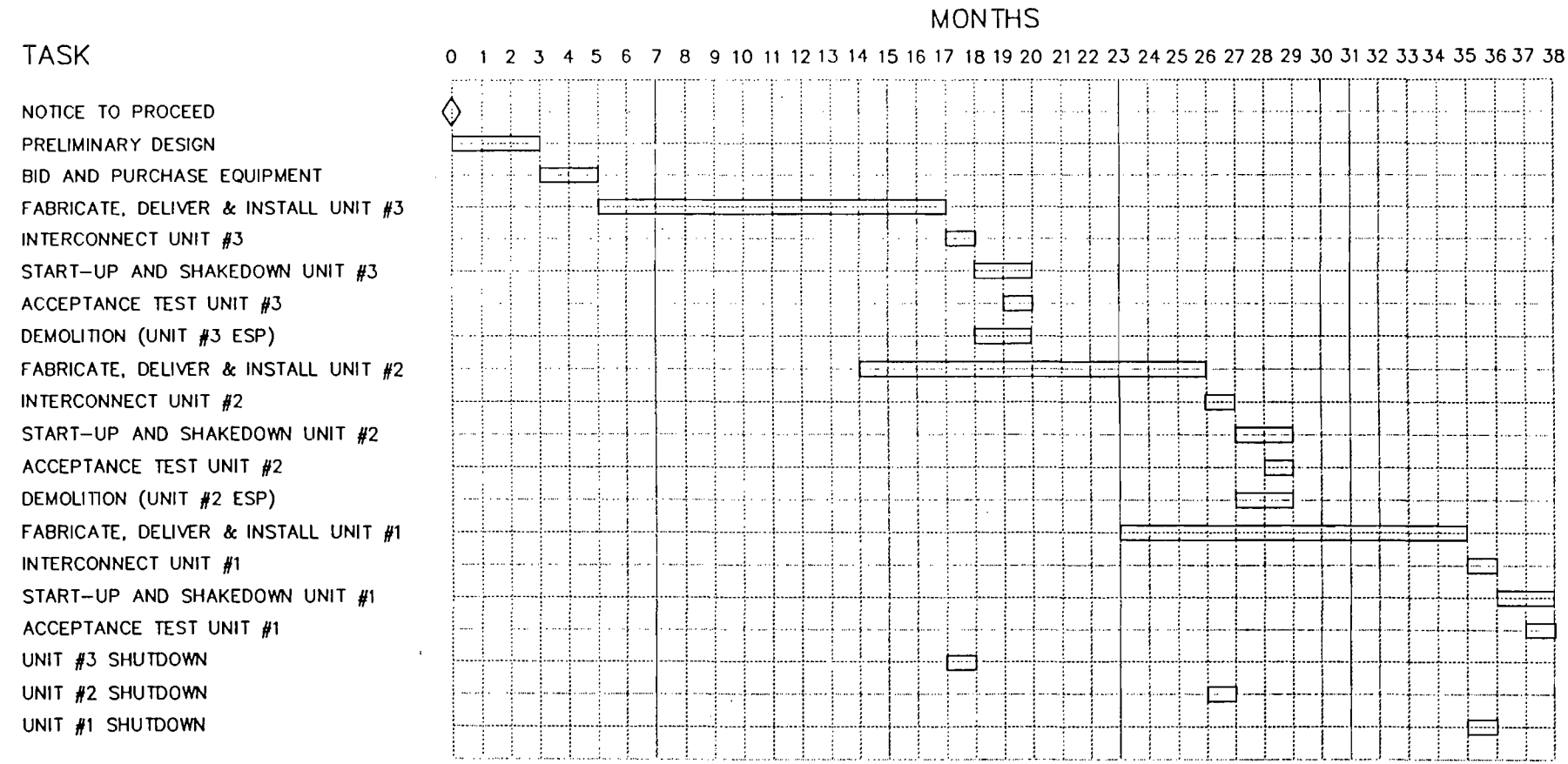
ALTERNATIVE 1 – IMPLEMENTATION SCHEDULE

FIGURE 1



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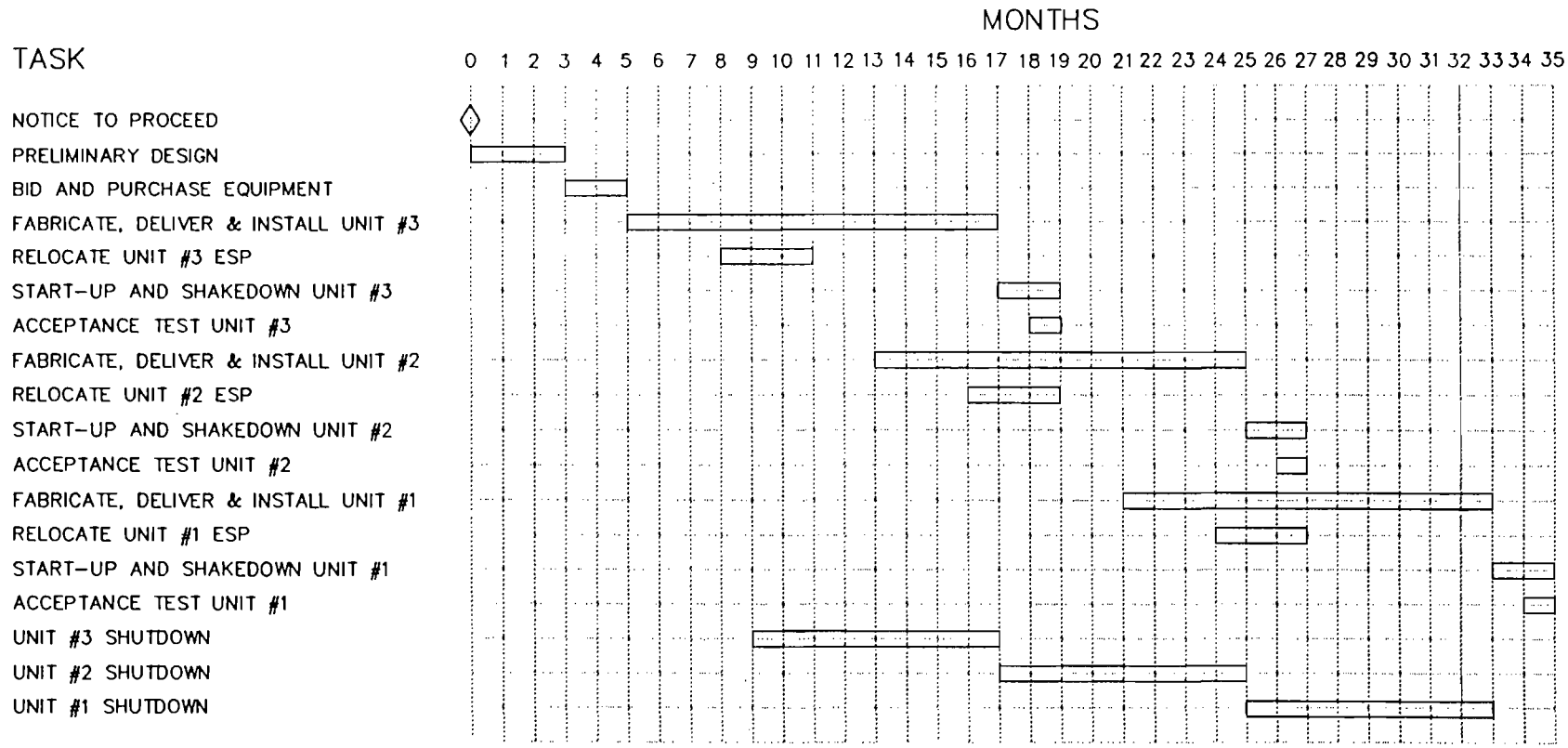
ALTERNATIVE 2 – IMPLEMENTATION SCHEDULE

FIGURE 2



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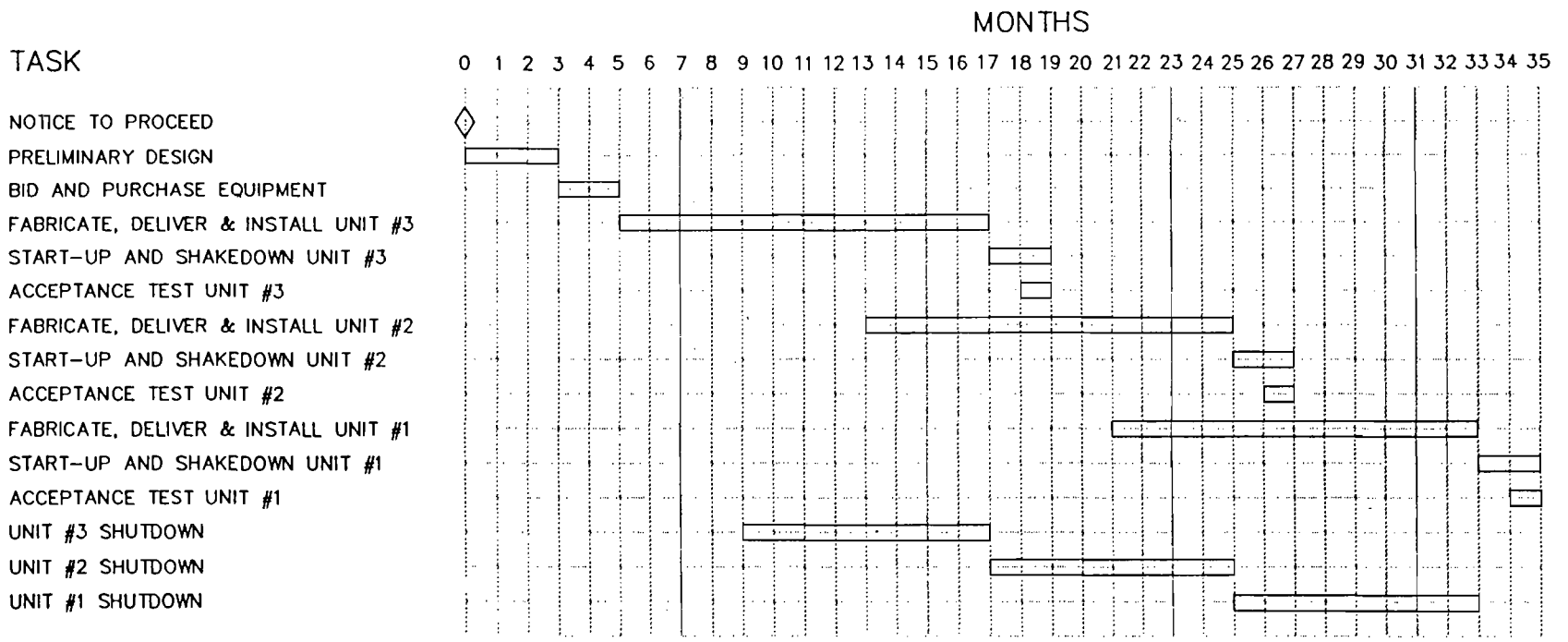
ALTERNATIVE 3 – IMPLEMENTATION SCHEDULE

FIGURE 3



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ALTERNATIVE 4 – IMPLEMENTATION SCHEDULE

FIGURE 4