

Dade County Resources Recovery Facility

Capital Expansion Project

Site Certification Application

Volume I

Submitted to:

**Florida Department of
Environmental Regulation
Tallahassee, Florida**

Submitted by:

Dade County, Florida

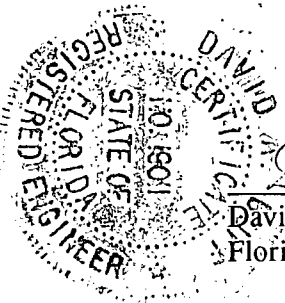
July 1992




SITE CERTIFICATION APPLICATION

FOR

**DADE COUNTY RESOURCES RECOVERY FACILITY
CAPITAL EXPANSION PROJECT**

The seal is circular with "REGISTERED ENGINEER" around the top and "STATE OF FLORIDA" around the bottom. In the center, it says "DAVID A. BUFF, P.E." and "FLORIDA NO. 19011".
David A. Buff
David A. Buff, P.E.
Florida No. 19011

The seal is circular with "REGISTERED ENGINEER" around the top and "STATE OF FLORIDA" around the bottom. In the center, it says "KENNETH F. KOSKY, P.E." and "FLORIDA NO. 14996".
Kenneth F. Kosky
Kenneth F. Kosky, P.E.
Florida No. 14996
KBN Engineering and Applied Sciences, Inc.
1034 NW 57th Street
Gainesville FL 32605

APPLICANT INFORMATION

Please supply the following information:

Applicant's Official Name Metropolitan Dade County

Address 8675 NW 53 St., Suite 201, Miami, FL 33166

Address of Official Headquarters 8675 NW 53 St., Suite 201, Miami, FL 33166

Business Entity (corporation, partnership, co-operative) Municipal (county)
Government

Names, owners, etc. Dade County Department of Solid Waste Management

Name and Title of Chief Executive Officer Ben J. Guilford II, Director

Name, Address, and Phone Number of Official Representative responsible
for obtaining certification: _____

Site Location (county) Dade County

Nearest Incorporated City Medley

Latitude and Longitude Lat. 25° 50' 06"; Long. 80° 21' 30"

UTM's Northerly 2857.4

Easterly 564.3

Section, Township, Range Section 17, Township 35 South, Range 40 East

Location of any directly associated transmission

facilities (counties) Dade County

Name Plate Generating Capacity 77 MW

Capacity of Proposed Additions and Ultimate Site

Capacity (where applicable) up to 142 MW site nameplate capacity

Remarks (additional information that will help identify

the applicant): Operator is Montenay Power Corp.

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AAQS	ambient air quality standards
acfm	actual cubic feet per minute
acre-ft/year	acre-feet per year
ANSI	American National Standards Institute
APIS	Air Pollutant Information System
AQRV	air quality related value
As	arsenic
BACT	best available control technology
BDL	below detection limit
Be	beryllium
B&K	Bruel & Kjaer
BOCC	Board of County Commissioners
Btu/lb	British thermal units per pound
Ca	calcium
CAA	Clean Air Act
CaCO ₃	calcium carbonate
CAP	contamination assessment plan
Cd	cadmium
CEP	Capital Expansion Project
CFR	Code of Federal Regulations
cfs	cubic feet per second
CIP	Capital Improvements Project
Cl	chloride
CNEL	Community Noise Equivalent Level
CNR	Composite Noise Rating
CO	carbon monoxide
Cr	chromium
cy	cubic yards
dB	decibels
dBA	A-weighted decibels
DCRRF	Dade County Resources Recovery Facility
DEHA	diethyl hydroxylamine
DERM	Dade County Department of Environmental Resources Management
DHR	Florida Department of State, Division of Historic Resources
DRI	Development of Regional Impact
DSWM	Dade County Department of Solid Waste Management
EEI	Edison Electric Institute
EIS	environmental impact statement
EM	electromagnetic
EP	extraction procedure
EPA	U.S. Environmental Protection Agency
ESE	Environmental Science and Engineering, Inc.
ESP	electrostatic precipitators

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F	fluoride
°F	degrees Fahrenheit
F.A.C.	Florida Administrative Code
FAA	Federal Aviation Administration
FDA	Florida Department of Agriculture
FDER	Florida Department of Environmental Regulation
FDOT	Florida Department of Transportation
FDPR	Florida Department of Professional Regulation
Fe	iron
FEPPSA	Florida Electrical Power Plant Siting Act
FGFWFC	Florida Game and Fresh Water Fish Commission
FLUCFCS	Florida Land Use, Cover and Forms Classification System
FNAI	Florida Natural Areas Inventory
FPC	Florida Power Corporation
FPL	Florida Power & Light Company
FPSC	Florida Public Service Commission
FR	Federal Register
FS	Florida Statutes
ft	feet
ft ²	square feet
ft/day	feet per day
ft/ft	feet per foot
ft/min	feet per minute
ft-msl	feet above mean sea level
gal/week	gallons per week
GEP	good engineering practice
g/hr	grams per hour
g/m ²	grams per square meter
g/m ² /yr	grams per square meter per year
gpd	gallons per day
gpm	gallons per minute
gr/billion dscf	grains per billion dry standard cubic feet
gr/dscf	grains per dry standard cubic foot
HCl	hydrochloric acid
HCO ₃	bicarbonate
HDPE	high-density polyethylene
Hg	mercury
HUD	Housing and Urban Development
Hz	Hertz
ISC	Industrial Source Complex
ISCST	Industrial Source Complex Short-Term

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K	potassium
KBN	KBN Engineering and Applied Sciences, Inc.
km	kilometers
kW	kilowatts
lb/cy	pounds per cubic yard
lb/day	pounds per day
lb/ft ³	pounds per cubic foot
lb/hr	pounds per hour
lb/MMBtu	pounds per million British thermal units
lb/ton	pounds per ton
LOS	Level of Service
LT	local time
m	meters
Mg	magnesium
mgd	million gallons per day
mgd/ft	million gallons per day per foot
mg/L	milligrams per liter
mg/Nm ³	milligrams per normal cubic meter
MMBtu/hr	million British thermal units per hour
Mn	manganese
MPC	Montenay Power Corp.
mph	miles per hour
MSW	municipal solid waste
MW	megawatts
MWC	municipal waste combustor
Na	sodium
NAAQS	National Ambient Air Quality Standards
NCDC	National Climatic Data Center
NEPA	National Environmental Policy Act
NESHAP	National Emission Standards for Hazardous Air Pollutants
ng/dscm	nanograms per dry standard cubic meter
ng/Nm ³	nanograms per normal cubic meter
NGVD	National Geodetic Vertical Datum
Ni	nickel
NO ₂	nitrogen dioxide
NO ₃	nitrate
NOAA	National Oceanic and Atmospheric Administration
NO _x	nitrogen oxides
NSPS	New Source Performance Standards
NTL	no-threat level
NTU	nephelometric turbidity units
NWS	National Weather Service
NYDPS	New York State Department of Public Service

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O ₂	oxygen
O&M	operation and maintenance
OSHA	Occupational Safety and Health Administration
oz/yd ²	ounces per square yard
Pb	lead
PCB	polychlorinated biphenyl
PM	particulate matter
PM10	particulate matter with an aerodynamic diameter less than or equal to 10 micrometers
PM(TSP)	particulate matter--total suspended particulates
PO ₄	phosphate
ppm	parts per million
ppmvd	parts per million by volume dry
PSD	prevention of significant deterioration
psf	pounds per square foot
psig	pounds per square inch gauge
PSIL	Preferred Speech Interference Level
PURPA	Public Utilities Regulatory Policies Act
PVC	polyvinyl chloride
RARE	Roadless Area Review and Evaluation
RDF	refuse-derived fuel
RIMS	Regional Input/Output Modeling System
SCA	Site Certification Application
SCS	U.S. Soil Conservation Service
Se	selenium
SEL	sound exposure level
SFWMD	South Florida Water Management District
SiO ₂	silica
SO ₂	sulfur dioxide
SO ₃	sulfite
SO ₄	sulfate
SOR	Save Our Rivers
SPL	sound pressure level
SPT	standard penetration test
SR	State Road
TCLP	toxicity characteristic leachate procedure
TDS	total dissolved solids
TETF	totally enclosed treatment facility
TPD	tons per day
TPH	tons per hour
TPW	tons per week
TPY	tons per year

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$\mu\text{g}/\text{m}^3$	micrograms per cubic meter
μm	micrometers
$\mu\text{mho}/\text{cm}$	micromhos per centimeter
UNAMAP	User's Network for Applied Modeling of Air Pollution
μPa	microPascals
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geologic Survey
UTM	Universal Transverse Mercator
VOC	volatile organic compound
WASAD	Metro-Dade Water and Sewer Authority Department
W+E	W+E Environmental Systems
yd^3	cubic yards

1.0 NEED FOR POWER AND THE PROPOSED FACILITIES

1.1 INTRODUCTION

Metro-Dade County owns a resources recovery facility located in northwest Dade County. The facility, known as Dade County Resources Recovery Facility (DCRRF), is currently operated under contract by Montenay Power Corp. (MPC). Municipal solid waste (MSW) is processed into refuse-derived fuel (RDF) by removing ferrous metal, glass, and aluminum, and the RDF is burned in four boilers. The boilers produce steam which in turn is used to generate electrical power.

DCRRF was originally designed and constructed from 1979 to 1982 after receiving licensing approval under the Florida Electrical Power Plant Siting Act (FEPPSA) on January 9, 1978. The U.S. Environmental Protection Agency (EPA) issued a federal prevention of significant deterioration (PSD) permit for construction of the facility on February 27, 1978. The facility has operated under these approvals since initial construction and operation.

DCRRF was originally constructed to provide an alternative to disposing of MSW in a landfill in Dade County, while providing beneficial byproducts to the community. It was originally designed as a 3,000-ton-per-day (TPD) resources recovery facility [936,000-ton-per-year (TPY) facility receiving MSW 6 days per week].

Metro-Dade County is planning to expand DCRRF with the addition of two new combustion trains (units) and one new steam electric generator of 65 megawatts (MW) capacity. The addition of these new units will increase the total MSW processing capability of the facility to 4,500 TPD (1,404,000 TPY) of MSW. The new units will be equipped with modern air pollution controls to minimize air emissions. After the two new units begin operating, the four existing units will be retrofitted with new, modern air pollution control equipment. In addition, new, taller stacks will be constructed for the four existing units.

Dade County is seeking approval for this expansion project under FEPPSA, Chapter 403, Part II, Florida Statutes (FS). FEPPSA provides a centralized review process for new electrical generating facilities in Florida, involving a balancing of "the increasing demand for electrical power plants with the broad interests of the public," including human health, the environment, state waters, and wildlife. Under FEPPSA, the Florida Public Service Commission (FPSC) is the sole forum for the determination of need for a proposed facility. The Florida Department of

Environmental Regulation (FDER) acts as the coordinator for the remainder of the certification process, with input from various state, regional, and local agencies and ultimate disposition by the governor and cabinet sitting as the Siting Board.

Dade County submitted a letter dated June 14, 1992, to FPSC requesting a statement as to whether a determination of need will be required for the expansion. A copy of this letter is provided in Appendix 10.6 of this application. The letter, along with supporting documentation, refers to the original DCRRF site determination of need for electrical power. In that determination, FPSC determined that the 62 MW of electrical power to be provided by the facility was not in itself significant, and a determination of need was not necessary. FPSC then concluded that approval or disapproval of the facility should be made on the basis of environmental impacts and not on a need-for-power basis.

Dade County is proposing to increase the electrical energy export of DCRRF to 80 MW. Similar to the original FPSC determination, FPSC has suggested that this relatively small size is not significant and that a determination of need may not be necessary. The June 14, 1992, letter requests a statement from FPSC as to whether a determination of need will be required.

This Site Certification Application (SCA) is being filed with FDER pursuant to Chapter 17-17, Florida Administrative Code (F.A.C.). It addresses the environmental and socioeconomic aspects of the DCRRF Capital Expansion Project (CEP) by presenting information on the existing natural and human environment, on the facilities proposed to be constructed and operated, and on the impacts of those facilities on those environments. In accordance with the Plan of Study, the primary focus of the SCA is upon changes to the DCRRF site and concomitant changes in environmental impacts resulting from the CEP.

1.2 THE APPLICANT

Dade County, the most populated county in Florida, has seen significant growth in the number of residents and the quantity of MSW generated in the past 10 years. Currently, approximately 3 million TPY of MSW is generated in Dade County. Less than one-third of this amount is processed at DCRRF. The remainder is recycled or sent to landfills, materials recovery facilities, or mulching facilities in the county.

DCRRF is owned by Dade County and operated under contract by Montenay Power Corp. The facility is the sole facility in the county dedicated to MSW processing and volume reduction through incineration. This facility provides recycling of recovered materials and considerably reduces the volume of material that would otherwise be landfilled.

1.3 OVERVIEW OF THE DCRRF CEP

DCRRF has provided for significant disposal of MSW in Dade County since it began operating in 1982. This facility, which is located about 0.5 mile north of NW 58th Street immediately west of NW 97th Avenue in the unincorporated area of Dade County, has been upgraded over the years through the addition of capital improvements to more efficiently recycle and dispose of MSW, as well as to meet increasingly stringent environmental regulations. As part of Dade County's management plans to meet the continued demand for MSW disposal in Dade County, the CEP will be undertaken at the DCRRF site.

The DCRRF site occupies 160 acres and currently consists of four RDF-fired combustion units (Units 1 through 4) and two steam electric generators. About 40 acres of the plant site comprise the MSW processing and combustion units, and 80 acres is dedicated to an ash landfill. Currently, the site has a total net generating capability of about 62 MW.

The CEP includes addition of two new 40-ton-per-hour (TPH) maximum RDF-fired combustion units with air pollution control systems for control of particulates, acid gases, heavy metals, nitrogen oxides, and mercury emissions. The project also includes the retrofitting of the existing four combustion units with modern air pollution control equipment. This will include control of particulates, acid gases, heavy metals, and mercury emissions. In addition, a new steam electric generator with a capacity of up to 65 MW will be added.

The DCRRF site was selected for expansion because it is centrally located in relation to the increasing quantity of MSW being generated in Dade County. In addition, the use of shared facilities for the existing and new units will result in significant savings in resources committed for the expansion project. The DCRRF site has sufficient land area and infrastructure to accommodate the expanded facilities.

By expanding an existing plant, environmental impacts will be significantly minimized. No new off-site transmission lines or rights-of-way are required to serve the new units. No new off-site fuel supply lines or rights-of-way will be required. The existing ash landfill will continue to be used to dispose of ash produced from the combustion process. Only a small portion of the site is currently undeveloped, although this area will be permanently used to accommodate a stormwater

collection pond. No new roads are required to serve the new facilities. About 60 additional employees will be required to operate the expanded plant.

1.4 NEED FOR THE PROJECT

Dade County has identified a need for increased MSW processing capabilities in the county. This capacity is needed to maintain adequate MSW disposal reliability in light of increasing generation of MSW coupled with decreasing landfill space. Even considering state-mandated recycling requirements, significant quantities of MSW will be landfilled in the future.

The proposed unit additions identified by Dade County reflect the need for new disposal capacity that remains after implementation of all reasonably available, cost-effective alternatives to new construction. These alternatives include:

1. Increasing recycling to the greatest extent possible.
2. Using the South Dade landfill to the maximum extent.
3. Using trash for compost to the maximum extent possible.
4. Using ash generated from the combustion process as a raw material in the cement or asphalt production industry.

Dade County's determination of these new capacity needs results from its ongoing solid waste master planning process.

1.5 BENEFITS OF THE DCRRF CEP

The principal benefits of the DCRRF CEP will be those inherent in the increased capacity and efficiency in the processing and disposal of MSW. In addition to improving the efficiency and capacity of existing facilities by approximately 50 percent, the CEP will result in reduced air emissions for nearly all regulated air pollutants.

Along with disposing of MSW and supplying electricity in an efficient manner, the CEP will contribute to both the public and private sector economies. The project will generate new direct and indirect jobs during both construction and operation of the units. The local economy will benefit by local purchases of services, supplies, and materials by Dade County and its employees. The public sector will benefit by the project's addition to the local tax base which will generate additional funds to local governments. These additional public sector revenues will exceed the additional public sector costs, thereby making the DCRRF CEP a net revenue source for local and state governments.

2.0 SITE AND VICINITY CHARACTERIZATION

2.1 SITE AND ASSOCIATED FACILITIES DELINEATION

2.1.1 SITE LOCATION

The site for the Dade County Resources Recovery Facility (DCRRF) expansion project is the existing DCRRF site, which is located in unincorporated northwest Dade County (Figure 2.1-1). The plant site lies about 1 mile east of Florida's Turnpike and 2 miles west of the Palmetto Expressway. The Miami International Airport is approximately 6 miles east-southeast of the site. Northwest 58th Street is about 0.5 mile south of the site, and NW 97th Avenue is adjacent to the eastern boundary of the site. A photo of the existing facility is provided following Figure 2.1-1.

2.1.2 EXISTING SITE USES

A resources recovery facility and electric generating units have been operating at this site since 1982. Four refuse-derived fuel (RDF) boilers and two steam electric generating units were originally constructed. These boilers and units are still in operation today. Garbage and trash generated in Dade County are delivered to the site via trucks. The municipal solid waste (MSW) undergoes processing and material separation resulting in RDF. The RDF is burned in the four combustion units, and steam is generated to produce electrical energy.

The DCRRF site occupies 160 acres. Approximately one-quarter of the site (40 acres) is occupied by MSW processing, RDF combustion, and electrical generating facilities. Approximately 40 acres is occupied by an ash landfill. The remaining portions of the site are open fields or undeveloped. Of this area, 40 acres is set aside for additional ash landfill cells. The undeveloped areas are located in the northeastern portions of the property.

Operation of DCRRF is currently authorized under the original site certification issued by the Florida Department of Environmental Regulation (FDER) in 1978 (Case No. PA 77-08), and the federal prevention of significant deterioration (PSD) permit issued in 1978 (PSD-FL-006).

2.1.3 ADJACENT PROPERTIES

Adjacent properties in the general area are a mixture of residential, commercial, and industrial uses. Property located east and southeast of the site is owned by Dade County. Dade County's 58th Street landfill, now closed, is located immediately east of the site.

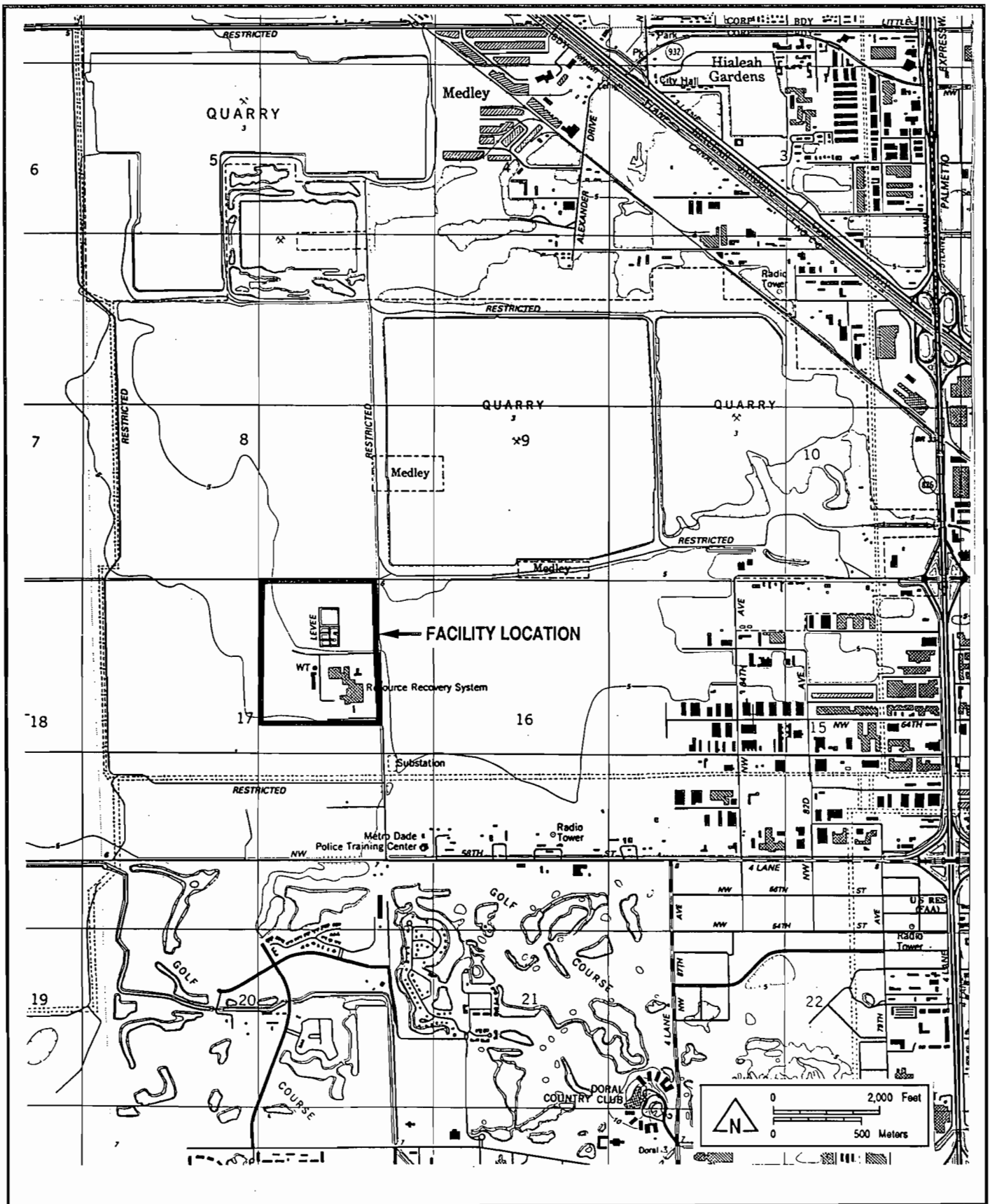


Figure 2.1-1 DCRRF SITE LOCATION MAP

**DADE COUNTY RESOURCES RECOVERY FACILITY
CAPITAL EXPANSION PROJECT**

Owner: Dade County
Operator: Montenay Power Corp.

**dade county, florida**

This Refuse Derived Fuel (RDF) facility processes 3000 TPD of solid waste - producing electricity for sale & in-plant needs, and providing ferrous & aluminum recovery. In 1987, Montenay executed a 15-year contract to operate the plant as well as to finance, design and implement a \$55 million capital improvement plan to refurbish the entire complex.



A residential community, Doral Country Club, is located south of the site and is currently being developed. Low-density residential, light industrial, and open land lie immediately south, west, and north of the site.

2.1.4 PROPOSED SITE USES

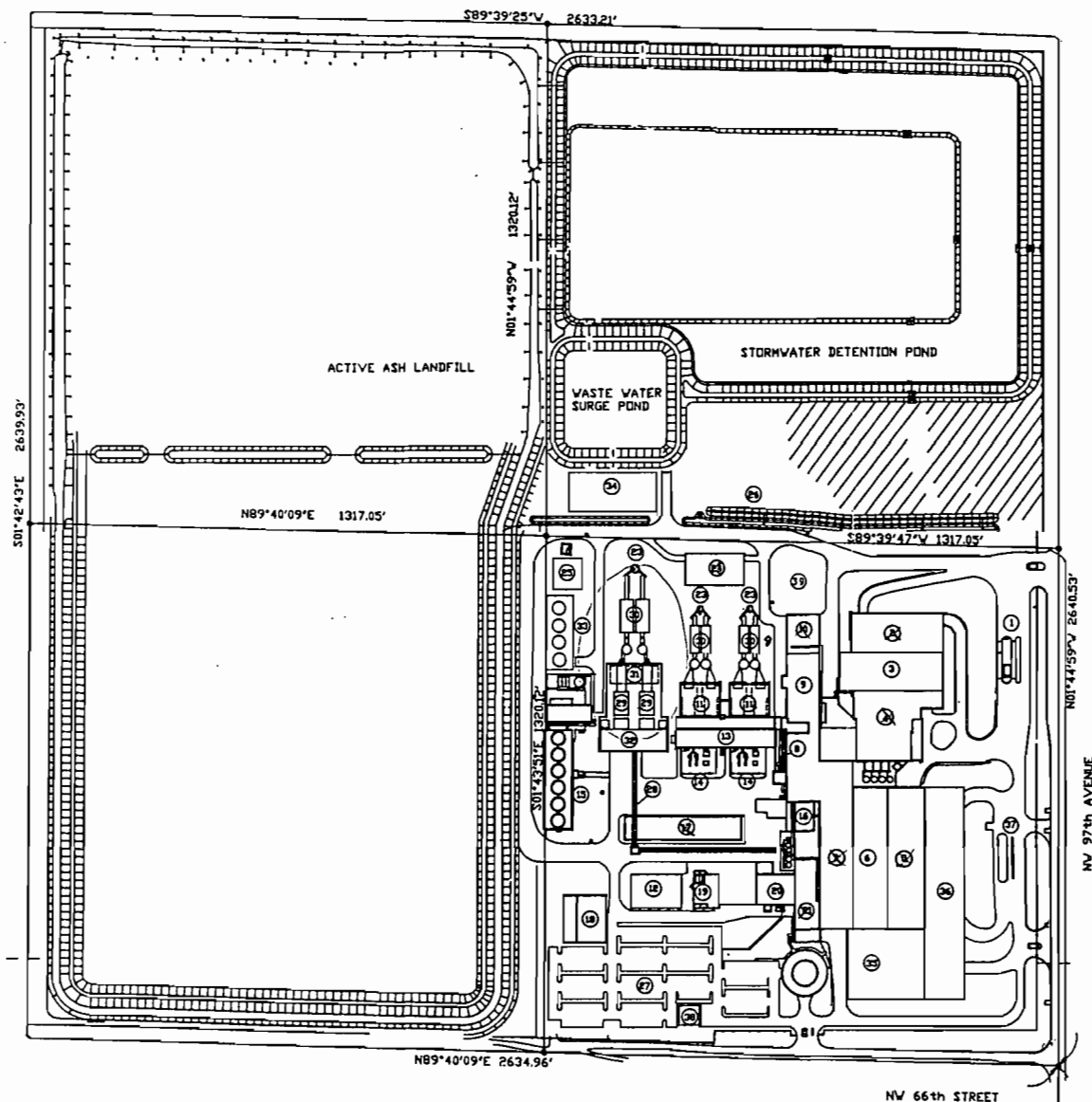
The DCRRF Capital Expansion Project (CEP) consists of constructing two new RDF-fired combustion units, adding a new steam electric generator, and retrofitting the four existing combustion units with modern air pollution controls. The two new units will be constructed adjacent to the existing units. The MSW processing area and power block area will remain within the 40-acre block located in the southeast one-quarter of the site. An existing ash landfill dedicated to 80 acres of the site will continue to be used in the future. The remaining 40 acres of the site may be used for a stormwater retention pond upon completion of the CEP.

A site plan of the proposed expanded DCRRF is included in Figure 2.1-2.

No new offsite transmission corridors or substations will be required for the CEP. However, in order to integrate the CEP into the existing transmission system, the following on-site transmission improvements will be made:

1. Construction of substation facilities (switchyards) to accept the output of the new units, and
2. Relocation of existing transmission line onsite to eliminate conflicts with the two new boilers.

These transmission improvements will not impact any currently unaffected areas of the site.

**LEGEND****EXISTING FACILITIES**

- 1 SCALES
- 2 TRASH RECEIVING BLDG.
- 3 TRASH PIT
- 4 TRASH PROCESSING BLDG.
- 5 GARBAGE RECEIVING BLDG.
- 6 GARBAGE PIT
- 7 GARBAGE PROCESSING BLDG.
- 8 RDF-3 FUEL FEED
- 9 RDF-3 FUEL STORAGE
- 10 PROCESS UNDERS BLDG.
- 11 BOILERS (4 EA)
- 12 STORE YARD
- 13 TURBINE HALL
- 14 SWITCHYARD
- 15 COOLING TOWER
- 16 AL/FE BUNKERS
- 17 FERROUS PROCESSING BLDG.
- 18 TIRE BUNKER
- 19 FUEL OIL DEPOT
- 20 HEAVY EQUIP. MAINT. BLDG.
- 21 OFFICES/ADMIN. BLDG.

PROPOSED FACILITIES

- 23 STACKS (3 EA)
- 24 ASH BUILDING
- 25 WATER TREATMENT PLANT
- 26 PROPANE STORAGE
- 27 EMPLOYEE PARKING
- 28 RDF-2 FUEL FEED
- 29 NEW BOILERS (2 EA)
- 30 AGCS (6 EA)
- 31 NEW TURBINE
- 32 RDF-2 STORAGE
- 33 NEW COOLING TOWER
- 34 WASTE WATER TREATMENT PLANT
- 35 GARBAGE PIT EXTENSION
- 36 GARBAGE RECEIVING/TRANSFER EXTENSION
- 37 NEW SCALES
- 38 DADE COUNTY ADMIN. BLDG.
- 39 YARD TRASH PROCESSING SYSTEM

**LEGAL DESCRIPTION OF SITE:**

NORTHEAST 1/4 SECTION 17, TOWNSHIP 33 SOUTH
RANGE 40 EAST OF DADE COUNTY, FLORIDA

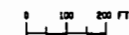


Figure 2.1-2 SITE PLAN OF PROPOSED EXPANDED DCRRF

**DADE COUNTY RESOURCES RECOVERY FACILITY
CAPITAL EXPANSION PROJECT**

Owner: Dade County
Operator: Montenay Power Corp.

2.2 SOCIO-POLITICAL ENVIRONMENT

2.2.1 GOVERNMENTAL JURISDICTIONS

2.2.1.1 LOCAL GOVERNMENTS

The DCRRF plant site occupies 160 acres of unincorporated Dade County in the northeast quarter of Section 17, Township 53 South, Range 40 East. The site is located in the northwestern portion of the county, northwest of the intersection of NW 58th Street and NW 97th Avenue. The existing plant occupies 40 acres of the site, and another 80 acres are used for ash disposal. The remaining 40 acres are reserved and will be used for stormwater retention, and temporary storage of wastewater.

Six local government boundaries lie within a 5-mile radius of the plant site (see Figure 2.2-1). The municipalities located within the 1-, 2-, 3-, 4-, and 5-mile radii of the site are listed in Table 2.2-1. The closest municipality is the City of Medley, whose boundary is located 1.7 miles north of the plant site. The cities of Hialeah, Hialeah Gardens, Miami Springs, and Virginia Gardens fall within the 3-mile radius from the plant site; Sweetwater's city limits begin within the 5-mile radius. No local governments exist to the west of the plant site within the 5-mile study area. The populations of the six municipalities within the 5-mile radius of the plant site are listed in Table 2.2-2.

2.2.1.2 PUBLIC PRESERVATION AND RECREATION LANDS

None of the following local, regional, state, or federal areas are located within the 5-mile study area of the DCRRF plant site.

1. National parks, forests, seashores, wildlife refuges, wilderness areas, memorials, monuments, marine sanctuaries, estuarine sanctuaries, or national wild and scenic rivers.
2. Military lands or Indian reservations.
3. Roadless Area Review and Evaluation (RARE) areas, critical habitat of endangered species, state parks, forests, game management areas or special management areas established by law, Areas of Critical State Concern, Conservation and Recreation Lands, Save Our Rivers (SOR) lands, archaeological landmarks or landmark zones, aquatic preserves, Outstanding Florida Waters, or Scenic and Wild Rivers.

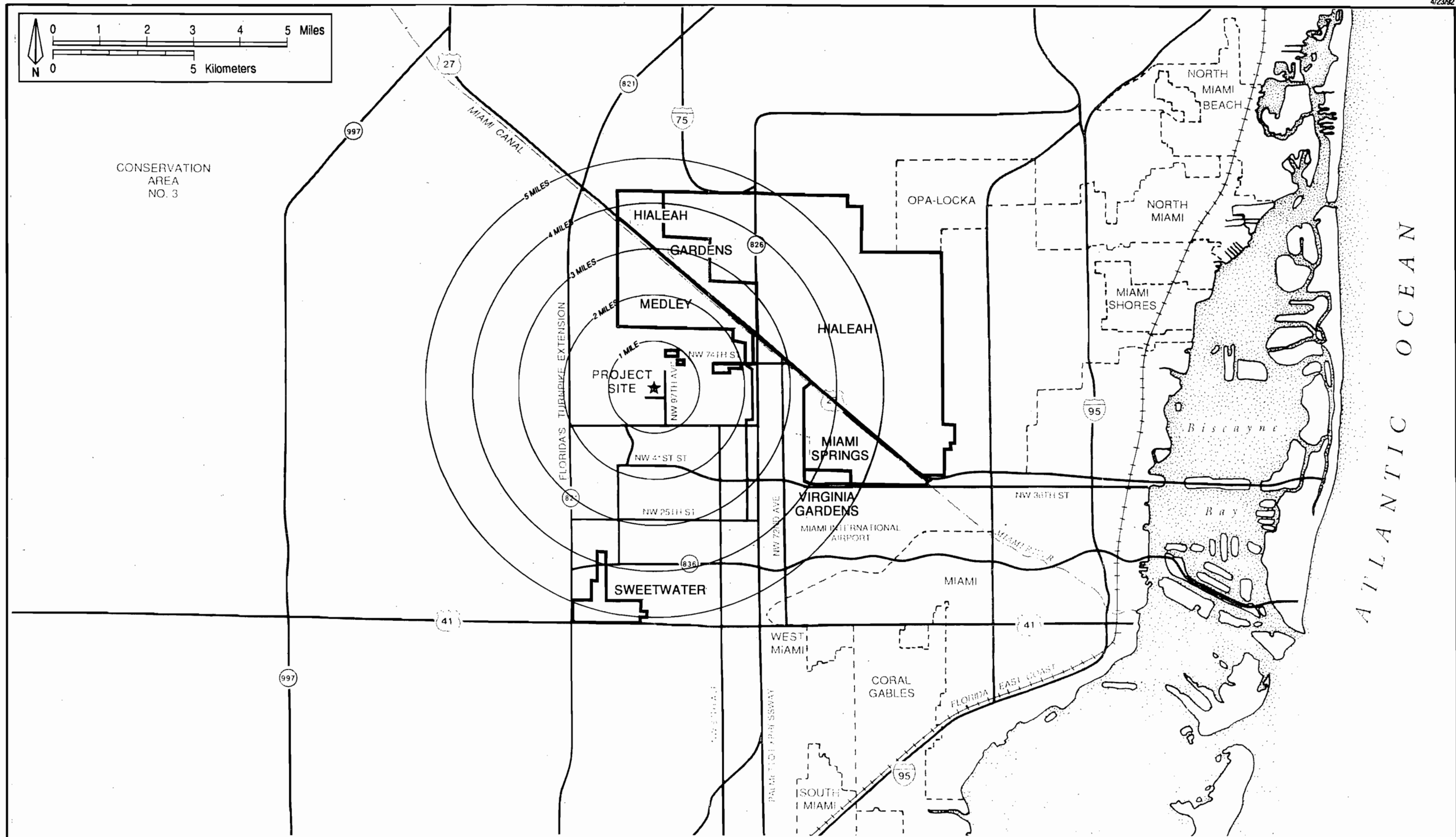


Figure 2.2-1 GOVERNMENTAL JURISDICTIONS WITHIN 5 MILES OF DCRRF

DADE COUNTY RESOURCES RECOVERY FACILITY
CAPITAL EXPANSION PROJECT

Owner: Dade County
Operator: Montenay Power Corp.

Table 2.2-1. Municipalities in the Vicinity of DCRRF

1 mile	2 miles	3 miles	4 miles	5 miles
	Medley	Medley	Medley	Hialeah
		Hialeah	Hialeah	Hialeah Gardens
		Hialeah Gardens	Hialeah Gardens	Miami Springs
		Miami Springs	Miami Springs	Sweetwater
			Virginia Gardens	Virginia Gardens

Source: KBN, 1992.

Table 2.2-2. Populations of Municipalities Within 5 Miles of DCRRF

Municipality	Population ^a		Percent Change 1980-1990	Projections for 2000
	1980	1990		
Hialeah Gardens	2,700	7,713	185.7	10,000 ^b
Hialeah	145,254	188,004	29.4	200,000 ^c
Medley	537	663	23.5	2,000 ^d
Miami Springs	12,350	13,268	7.4	13,268 ^e
Sweetwater	8,251	13,909	68.60	15,315 ^f
Virginia Gardens	2,098	2,212	5.4	2,212 ^g

^a Census data.^b City of Hialeah Gardens, unofficial estimate.^c City of Hialeah Planning Department, 1992.^d City of Medley, 1992.^e City of Miami Springs, 1992.^f City of Sweetwater, 1992.^g City of Virginia Gardens, 1992.

Source: KBN, 1992.

4. Major private landholdings for which the primary purpose is environmental protection.

There are no designated recreation areas open to the public located within 1 mile of the plant site. However, six county parks are located within the 5-mile radius of the study area (Figure 2.2-2).

2.2.2 LAND USE AND ZONING PLANS

2.2.2.1 LAND USE

When originally certified in 1978, the land use within a 1-mile radius of the plant site was predominantly undeveloped (1,402 acres) and mining (379 acres). Small areas were in agricultural use (78 acres) and in light industry (43 acres).

Currently, the plant site is designated Institutional and Public Facility by the Metro-Dade County Adopted 2000 and 2010 Land Use Plan Map, as amended April 23, 1991 (Figure 2.2-3). Land use designations for areas adjacent to the site are also shown in Figure 2.2-3. Land to the north, west, and south is designated Industrial and Office; land to the east is designated Parks and Recreation. According to representatives of the Metro-Dade Planning Department, a recreational area will be established after the existing Metro-Dade landfill located to the east of the plant site reaches capacity.

The Metro-Dade Comprehensive Development Master Plan (adopted December 1988), describes the Institutional and Public Facility land use classification, in part, as follows:

The Plan map illustrates, for information purposes only, the location of major institutional uses and utilities of metropolitan significance. Depicted are such uses as major hospitals and medical complexes, colleges and universities, regional water-supply, wastewater and solid waste utilities facilities such as the resources recovery plant, and major government office centers and military installations (pages I-33 and I-34).

The Comprehensive Development Master Plan further states that any development in the classification must be consistent with the Comprehensive Plan, as well as follow procedures for approval as set forth in the Zoning Code.

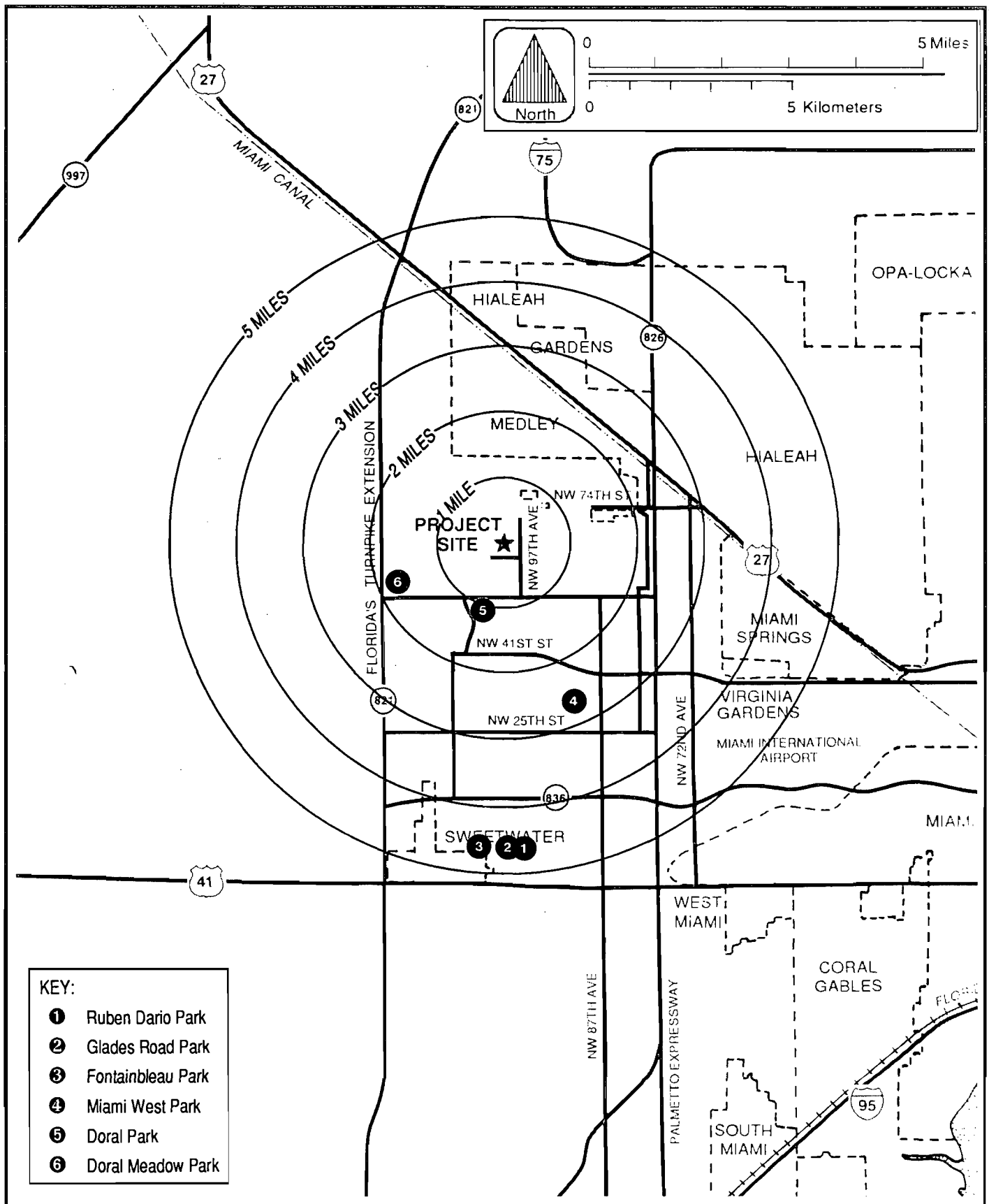
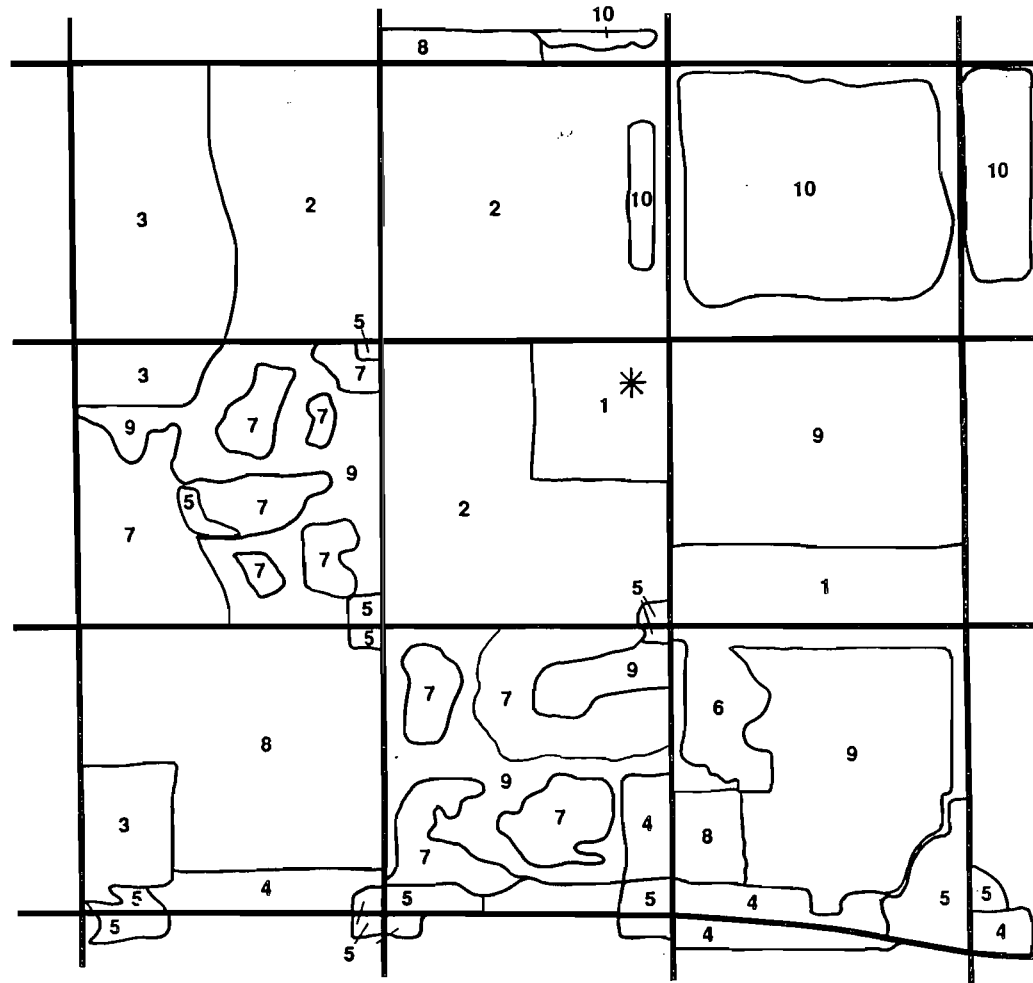


Figure 2.2-2 COUNTY RECREATIONAL FACILITIES WITHIN 5 MILES OF DCRRF

**DADE COUNTY RESOURCES RECOVERY FACILITY
CAPITAL EXPANSION PROJECT**

Owner: Dade County
Operator: Montenay Power Corp.

**KEY****LAND USE PLAN CLASSIFICATIONS**

- 1 Institutional and Public Facility
- 2 Industrial and Office
- 3 Restricted Industrial and Office
- 4 Office/Residential
- 5 Business and Office
- 6 Low Density Residential
- 7 Low-Medium Density Residential
- 8 Medium Density Residential
- 9 Parks and Recreational
- 10 Water

* Subject Site

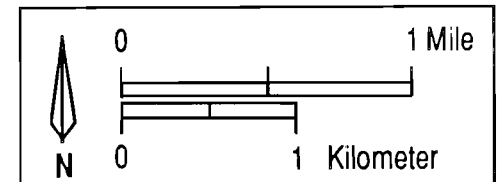


Figure 2.2-3 DESIGNATED FUTURE LAND USE FOR DCRRF
AND ADJACENT PROPERTIES

SOURCES: METRO-DADE COUNTY, 1991a; KBN, 1992.

**DADE COUNTY RESOURCES RECOVERY FACILITY
CAPITAL EXPANSION PROJECT**

Owner: Dade County
Operator: Montenay Power Corp.

Applicable statements in the adopted Comprehensive Development Master Plan include:

- Policy 5B, page I-7, Future Land Use Element: Requires that residential neighborhoods be protected from intrusions that would have negative impacts on health, safety, and welfare.
- Wellfield protection areas, text on pages I-60 and I-61 in the Future Land Use Element: Land use is restricted within portions of public water supply wellfields, as shown on the future wellfield protection map (page I-66). While the plant site is not included in future wellfield protection areas, it is located within the existing Northwest Wellfield Protection Area. [Note: As described in Section 2.2.2.2, the plant site will not be in the Northwest Wellfield Protection Area when plant expansion is completed.] Policies 3A-F in the Conservation Element refer to the Northwest Wellfield Protection Area and require regulation of hazardous waste facilities within the wellfield areas (pages VI-4 and VI-5).
- Policy 1K, page VI-4, Infrastructure Element: Requires that potential land use conflicts and nuisances from public facilities be minimized.
- Policy 4A, page VI-10, Infrastructure Element: Provides for the expansion of resource recovery activities in order to process more waste and reduce use of landfills.

The proposed expansion is consistent with the Future Land Use Map classification and the applicable goals, objectives, and policies in the Comprehensive Development Master Plan. Relevant portions of the Metro-Dade County Comprehensive Development Master Plan are provided in Appendix 10.3. The Metro-Dade County Planning Department, in a memorandum dated March 31, 1992, has stated that the proposed expansion is consistent with the Comprehensive Development Master Plan. A copy of this memo is included in Appendix 10.3.

2.2.2.2 ZONING

When originally certified in 1978, the DCRRF plant site was zoned general use (GU) by Dade County. Currently, the plant site is zoned general use (GU)--Interim District on the Metro-Dade County zoning map (see Figure 2.2-4). Land immediately adjacent to the plant site is zoned GU, with the exception of an industrially zoned parcel that abuts the southwest corner of the plant site.

The GU zoning district includes all unincorporated areas of the county where land use trends have not resulted in the establishment of another zoning district (Section 13-194, Metro-Dade County

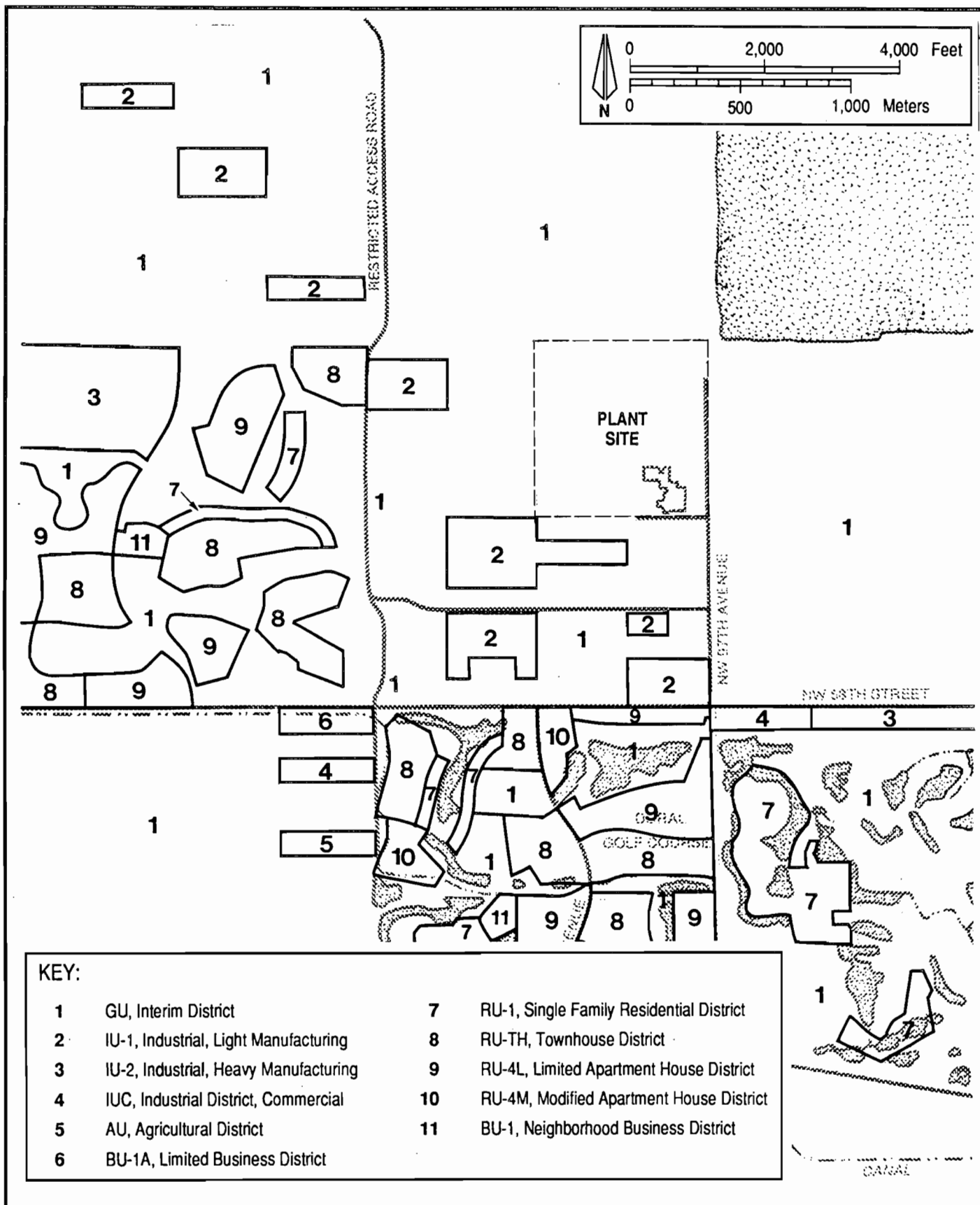


Figure 2.2-4 ZONING MAP OF DCRRF AND ADJACENT PROPERTIES

SOURCES: METRO-DADE COUNTY, 1992a; KBN, 1992.

**DADE COUNTY RESOURCES RECOVERY FACILITY
CAPITAL EXPANSION PROJECT**

Owner: Dade County
Operator: Montenay Power Corp.

Zoning Code, as amended May 1991). "Unusual uses" in the GU zoning district, as defined by Section 33-13 of the Zoning Code, must be approved by the Board of County Commissioners (BOCC). The existing resource recovery facility was defined as an unusual use and was granted BOCC approval on June 4, 1975 (under Resolution #569) (refer to Appendix 10.2). The Exclusive Procedure process, by which such approval is granted, is described in Section 33-303 of the Zoning Code. A memo from the Director of the Metro-Dade County Building and Zoning Department dated March 31, 1992, confirms the site zoning and 1975 unusual-use approval. A copy of this memo is included in Appendix 10.2.

The plant site is currently located in the Northwest Wellfield Protection Area. Section 24.12 of the Zoning Code sets forth restrictions on land uses and activities within the protection area. Restrictions are summarized in Appendix 10.3. According to Metro-Dade County representatives, the boundary of the Northwest Wellfield Protection Area will be shifted west of the site within the next year to be consistent with the future wellfield protection area depicted in the Comprehensive Development Master Plan. The relocation of the protection area will occur prior to initiation of plant expansion construction in 1993. Changes in the protection area are based on two actions: (1) 1990 deepening of the Snapper Creek Canal which will result in increased recharge of the aquifer to the west of the plant site, and (2) planned pumping from the Hialeah-Preston Wellfield to the east, which should balance and/or reduce withdrawals from the Northwest Wellfields.

Appendix 10.2 provides excerpts of relevant portions of the Metro-Dade County Zoning Code.

2.2.3 DEMOGRAPHY AND ONGOING LAND USE

2.2.3.1 DEMOGRAPHY

Portions of six local governments are located within a 5-mile radius of the plant site. Population counts for 1980 and 1990 and population projections for 2000 for each of the six municipalities are presented in Table 2.2-2. The majority of population growth has occurred to the east of the plant site in Hialeah, although Hialeah Gardens has experienced the greatest percent change in population since 1980. Population growth has been moderate in Medley, Miami Springs, Sweetwater, and Virginia Gardens. Future municipal growth in the study area is expected to

occur in Hialeah and Hialeah Gardens and, to a lesser extent, in Medley and Sweetwater. Miami Springs and Virginia Gardens have reached a near buildout of residential lands; therefore, population growth in those two cities is expected to be minimal.

The locations of the 1990 census tracts within 5 miles of the plant site are shown in Figure 2.2-5; the 1980 and 1990 census counts and the projected populations for 2000 and 2010 by census tract are presented in Table 2.2-3.

The 1980 and 1990 census counts for the area within the 5-mile radius reveal a pattern of slow growth and low population counts with the following exceptions:

- The Fontainebleau Park area, which is directly south of SR 836 and to the east of Sweetwater and southwest of Miami Springs (census tracts 90.04 and 90.05), grew by more than 30,000 people between 1980 and 1990.
- Census tracts 7.01, 101.15, and 101.16, which represent the largest population increases in the study area, gained more than 39,000 additional residents since 1980. Most of the area included in these tracts lies within the cities of Hialeah and Hialeah Gardens. Both of these cities grew significantly in the same time period (Table 2.2-2).

1990 population counts for the 1- and 2-mile radii (generally census tract 90.03) are low: 6,458 people. Higher population densities are present in the 3-, 4-, and 5-mile radii to the north, east, and south. These areas also include the six municipalities within the 5-mile study area.

Population forecasts for the next 20 years show a substantial shift in growth patterns. The census tract encompassing land in the 1- to 2-mile radius of the site (Tract 90.03) is shown as growing from a 1990 population of 6,458 to populations of 24,832 in 2000 and 38,059 in 2010. The additional population in this area will be accommodated by the Doral Country Club, an approved and partially developed Development of Regional Impact (DRI), and a 1-square-mile area with a Future Land Use Designation of medium-density residential (up to 25 dwelling units per acre). Only a small portion of the Doral Country Club lies within the 1-mile radius of the site; the majority of the DRI and the future medium-density area lie in the 2- and 3-mile radii.

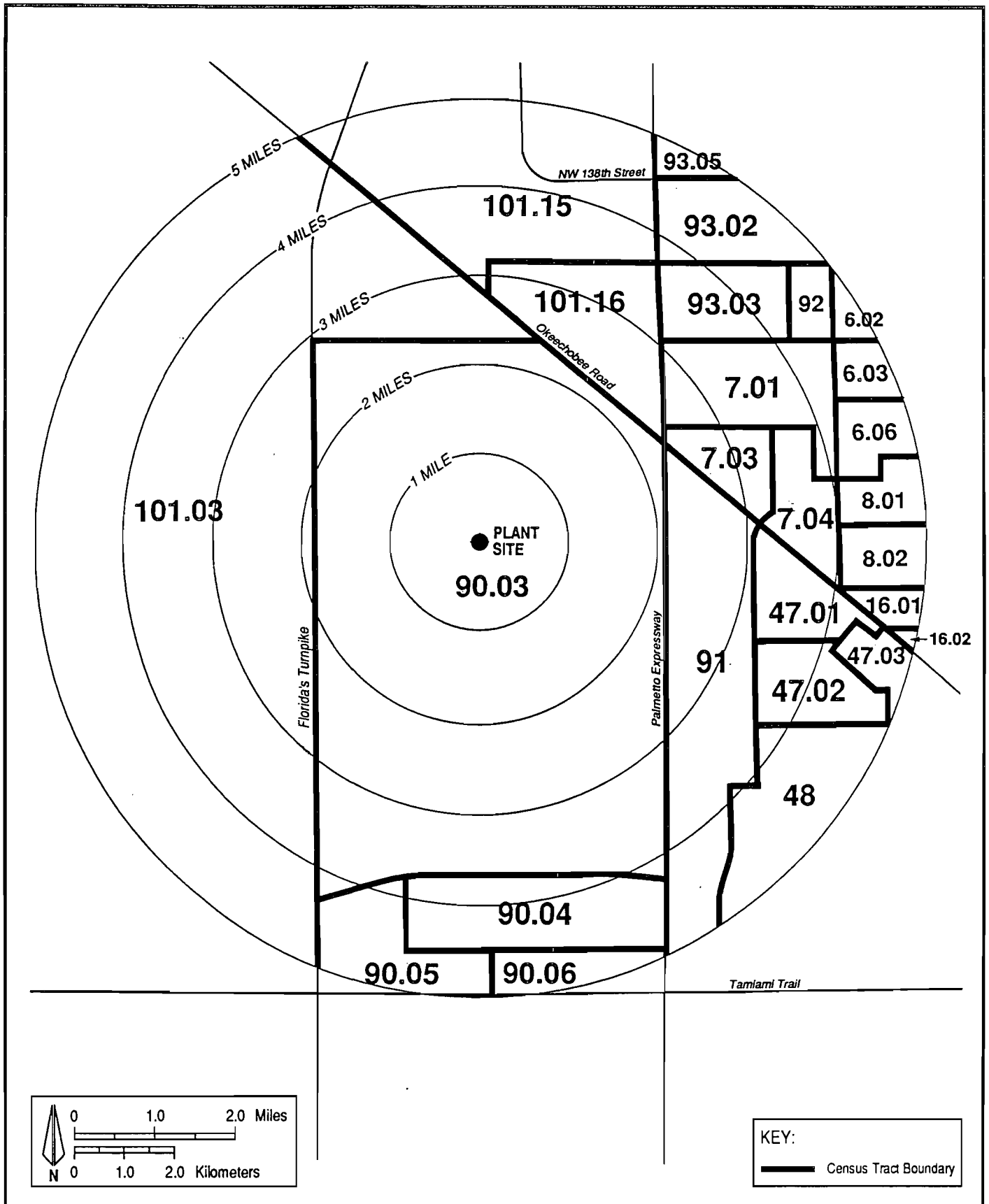


Figure 2.2-5 CENSUS TRACTS WITHIN 5 MILES OF DCRRF

SOURCES: METRO-DADE COUNTY, 1990; KBN, 1992.

DADE COUNTY RESOURCES RECOVERY FACILITY
CAPITAL EXPANSION PROJECT

Owner: Dade County
Operator: Montanay Power Corp.

Table 2.2-3. Resident Population Within 5 Miles of DCRRF by Census Tract

Census Tract	Census Count		Forecast	
	1980	1990	2000	2010
6.02	4,728	4,769	4,861	4,862
6.03	4,766	5,204	5,256	5,316
6.06	10,078	10,669	10,607	10,618
7.01	15,491	26,016	28,964	29,833
7.03	10,258	10,658	10,530	10,521
7.04	8,053	7,923	7,693	7,661
8.01	9,297	9,980	9,972	10,001
8.02	10,745	11,919	12,023	12,081
16.01	7,675	8,744	8,909	8,993
16.02	5,411	5,752	5,754	5,797
47.01	4,996	5,135	5,135	5,163
47.02	5,588	5,765	5,769	5,803
47.03	4,102	4,580	4,691	4,751
48.00	224	105	97	99
90.03	3,330	6,458	24,832	38,059
90.04	9,939	28,761	31,906	33,300
90.05	12,167	23,993	25,242	25,674
90.06	5,265	7,816	8,489	9,010
91.00	4,651	8,867	8,901	8,908
92.00	4,115	3,940	4,008	4,009
93.02	18,210	20,359	20,448	20,458
93.03	20,048	22,712	22,850	22,871
93.05	5,325	4,989	5,010	5,011
101.03	1,792	8,535	34,031	60,094
101.15	1,087	8,571	30,060	56,126
101.16	1,916	23,455	28,109	30,409

Sources: Metro-Dade County, 1991b.

KBN, 1992.

High growth is forecast for census tract 101.03, where population is expected to increase by more than 51,000 people by the year 2000. This growth is scheduled to occur within the existing and future growth boundaries set by Metro-Dade County on the Future Land Use Map in areas located outside of the 5-mile radius north of 8th Street. Census tracts 101.15 and 101.16 (Hialeah and Hialeah Gardens and surrounding unincorporated areas) are expected to continue to grow in the next 20 years. These areas are in the 4- and 5-mile radii of the site.

Despite shifts in growth patterns, population concentrations will remain in the existing urbanized areas in, or adjacent to, the six described municipalities, with the exception of the Doral Country Club and the nearby designated medium-density residential area.

2.2.3.2 ONGOING LAND USE

Existing land use in the 5-mile radius of the plant site is primarily industrial and extractive with scattered residential enclaves. Much of the land lies in unincorporated Metro-Dade County; however, portions of six municipalities are also included in the 5-mile radius. The existing land uses within 5 miles of the site using Level II of the Florida Land Use, Cover and Forms Classification System (FLUCFCS) are shown in Figure 2.2-6. The FLUCFCS classifications are listed in Table 2.2-4. A description of general land uses in each radius of the 5-mile study area follows.

The plant site, the center of the radii, is occupied by a resource recovery power generating facility that has been in operation since 1982. Land use in the 160-acre plant site includes the resource recovery facility, an ash disposal area, and vacant land that will be used for the proposed expansion. A Metro-Dade County landfill lies directly east of the site, across NW 97th Avenue. The landfill abuts several other Metro-Dade facilities to the south, including several public works buildings which front NW 58th Street. Land within 0.5 mile to the north, west, and south of the site is undeveloped. Parts of the Doral Park DRI (Doral Country Club), a low- to medium-density residential development, are also included in the southern portion of the 1-mile radius. In addition, the 2506 Brigade Military Camp is located to the southwest of the site within the 1-mile radius.

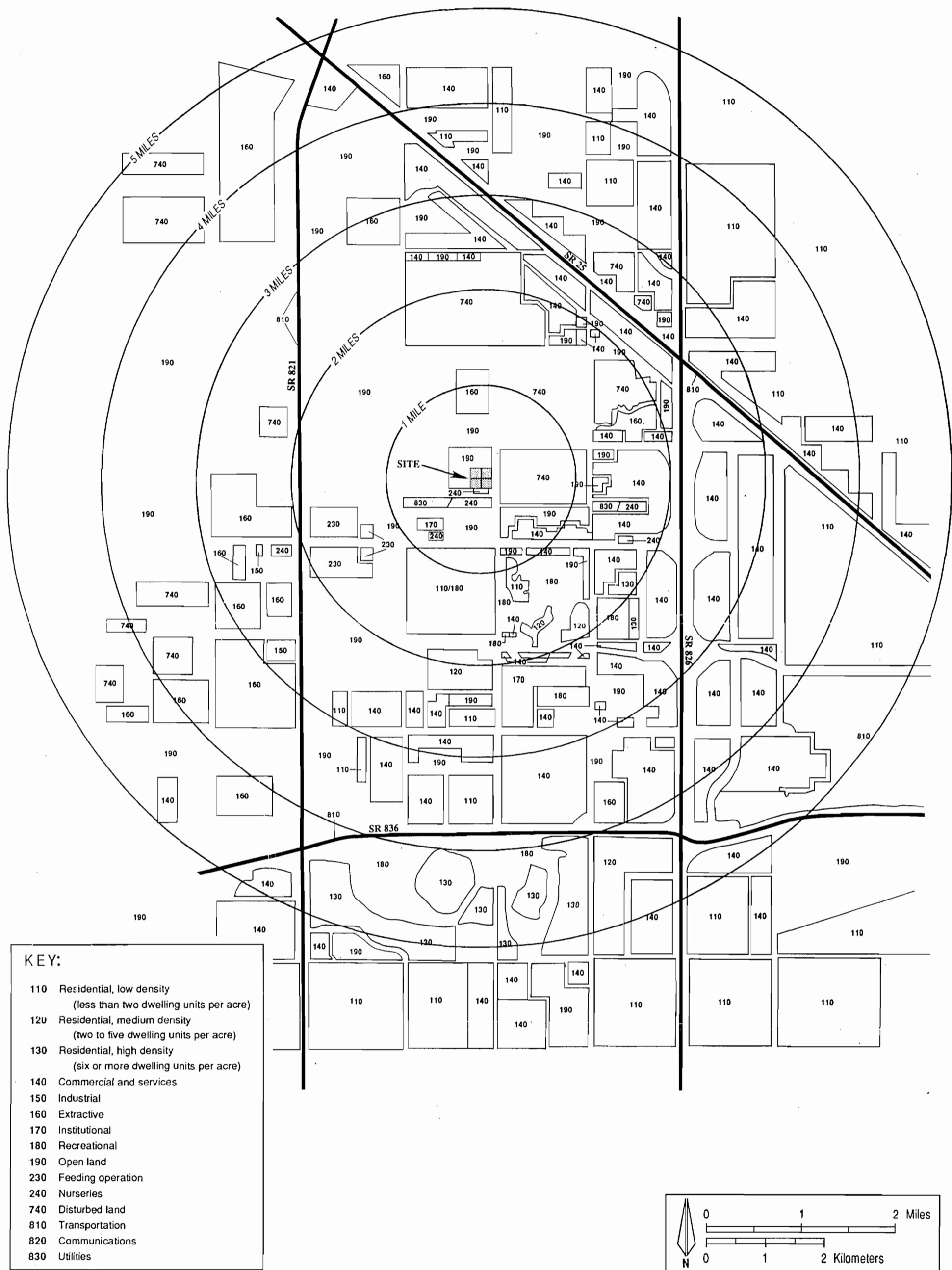


Figure 2.2-6 EXISTING LAND USE WITHIN 5 MILES OF DCRRF

DADE COUNTY RESOURCES RECOVERY FACILITY
CAPITAL EXPANSION PROJECT

Owner: Dade County
Operator: Montenay Power Corp.

Table 2.2-4. Existing Land Use^a Within 5 Miles of DCRRF

Hierarchical Listing of Land Use and Cover Classifications Level II

110	Residential, low density (less than two dwelling units per acre)
120	Residential, medium density (two to five dwelling units per acre)
130	Residential, high density (six or more dwelling units per acre)
140	Commercial and services
150	Industrial
160	Extractive
170	Institutional
180	Recreational
190	Open land
230	Feeding operation
240	Nurseries
740	Disturbed land
810	Transportation
820	Communications
830	Utilities

^a Level II Florida Land Use, Cover and Forms Classification System.

Sources: FDOT, 1985.
KBN, 1992.

The 2-mile radius includes a number of limestone aggregate mines and associated industrial uses to the north and northwest and industrial parks to the east and southeast. Low- and medium-density residential development associated with the Doral Country Club continues to the south. Land to the southwest and west of the site is currently vacant; however, a later phase of the Doral Country Club is planned for part of this area.

The City of Medley is located north of the plant site, in the 2- and 3-mile radii vicinity. Medley consists almost entirely of industrial uses and mobile home parks. North and east of Medley is the City of Hialeah Gardens, which falls within the 3- to 5-mile radii of the plant site. Hialeah Gardens is also dominated by industrial and medium-density-residential uses. The City of Hialeah is located to the northeast and east of the site, within the 3-, 4-, and 5-mile radii. Hialeah is the largest municipality within the 5-mile study area and includes a mix of residential, commercial, and light industrial uses.

The 3-mile radius south of the plant site consists of vacant and industrial land and scattered single-family enclaves. Miami Springs, which is located within the 3-, 4-, and 5-mile radii of the site, is a low-density residential community with a limited number of commercial uses. South of Miami Springs, also in the 4- and 5-mile radii, is the small City of Virginia Gardens, which is almost entirely single-family residential development. The City of Sweetwater, which is located within the 4- and 5-mile radii of the site, is predominantly low- to high-density residential. The Miami International Airport is directly south of Virginia Gardens in the 5-mile radius.

Fontainebleau Park, an unincorporated, high-density residential area, lies east of Sweetwater in the 5-mile radius. In addition, two cemeteries are located to the south and southwest of the plant in the 5-mile radius. The remaining areas to the southwest and northwest contain various mining and quarry areas that exist on unincorporated land.

Land use patterns in the area are expected to remain stable, with extractive and industrial uses dominating unincorporated areas and residential growth concentrated in or near established municipalities and the later phases of the Doral Country Club. An expansion of the existing resource recovery plant at the selected site is consistent with the current trend of development.

2.2.4 EASEMENTS, TITLES, AND AGENCY WORKS

All permanent facilities associated with the project are to be located on land currently owned by Metro-Dade County and operated by Montenay. Because no new off-site transmission or other rights-of-way will be necessary for the project, no additional easements or titles will be required for the plant or associated facilities. Agency works will not be affected.

2.2.5 REGIONAL SCENIC, CULTURAL, AND NATURAL LANDMARKS

There are no regional scenic, cultural, or national landmarks in the 5-mile study radius.

2.2.6 ARCHAEOLOGICAL AND HISTORIC SITES

The Florida Department of State, Division of Historical Resources (DHR), was contacted and requested to identify known archaeological or historic sites on the DCRRF site and to determine whether a cultural resource survey was necessary. In a letter dated October 30, 1991, DHR indicated that no significant archaeological or historical sites are recorded for or considered likely to be present within the study area. It is DHR's opinion that the proposed project will have no effect on any sites listed, or eligible for listing, in the National Register of Historic Places, and that the project may proceed without further involvement from DHR. A copy of the letter is provided in Appendix 10.4.

2.2.7 SOCIOECONOMICS AND PUBLIC SERVICES

Socioeconomic characteristics are described by statistics compiled by various federal, state, and local agencies which report on a countywide level. Public services are generally described on a more localized basis, depending (for the most part) on service area.

2.2.7.1 SOCIAL AND ECONOMIC CHARACTERISTICS

Dade County's labor force totalled 952,318 in 1990, an increase of 8.3 percent from a 1985 labor force of 879,290. The 1990 count represents 45.6 percent of the South Florida region's total labor force (see Table 2.2-5). Dade County's unemployment rate was 6.7 percent, slightly higher than the statewide unemployment rate of 5.9 percent. Monroe County had the lowest unemployment rate for both the region and the state, at 3.3 percent in 1990.

Average monthly employment by major industry group is presented in Table 2.2-6. Between 1988 and 1989, employment in Dade County increased in 5 of the 11 major industry groups.

Table 2.2-5. 1990 Labor Force, Employment, and Unemployment for Dade County, the South Florida Region, and the State of Florida

Area	Labor Force	Employment	Unemployment	Unemployment Rate (%)
Dade County	952,318	888,469	63,849	6.7
South Florida Region				
Broward County	660,159	623,928	36,231	5.5
Dade County	952,318	888,469	63,849	6.7
Monroe County	44,370	42,891	1,479	3.3
Palm Beach County	<u>430,148</u>	<u>402,062</u>	<u>28,086</u>	<u>6.5</u>
REGIONAL TOTAL	2,086,995	1,957,350	129,645	6.2
Florida	6,365,258	5,986,867	378,392	5.9

Sources: UF, 1991.
KBN, 1992.

Table 2.2-6. 1990 Average Monthly Employment by Major Industry Group for Dade County, the South Florida Region, and the State of Florida

Industry	Dade County	South Florida Region	Florida
Agriculture, Forestry, and Fishing	12,544	37,248	145,229
Mining	858	880	8,886
Construction	37,748	101,005	329,399
Manufacturing	87,733	166,866	519,385
Transportation, Communication, and Public Utilities	78,799	125,738	317,511
Wholesale Trade	69,582	114,298	293,090
Retail Trade	164,265	373,409	1,161,920
Finance, Insurance, and Real Estate	69,469	138,830	368,784
Services	296,489	609,470	1,882,489
Government	55,013	109,187	371,509
Other	438	620	2,439
TOTAL	872,938	1,777,551	5,400,641

Sources: UF, 1991.
KBN, 1992.

Mining, construction, manufacturing, agriculture, retail trade and finance, insurance, and real estate each experienced a slight decrease. Most employment occurs in the services and retail trade categories, while the smallest number of jobs are held in the agriculture and mining categories.

Personal income data are presented in Table 2.2-7. Five of the nine major employment groups in private, nonfarm industries in Dade County experienced an increase in personal income between 1988 and 1989. The largest increase came in the services industry. Similar increases occurred for the South Florida region. Manufacturing showed the slowest personal income growth from 1988 to 1989, posting only a 1.5 percent increase in Dade County. The largest industry sector in Dade County is the service sector, which generated 33.9 percent of total personal income in 1989. The service sector is also the largest industry in the South Florida region and the state.

In addition to the private, nonfarm industries depicted in Table 2.2-7, there are also farm and government industries that contribute to personal income. In the farm industry, Dade County posted a 6.6-percent increase in total personal income from 1988 to 1989. This increase was a significant portion of the 3.13-percent increase experienced in the South Florida region.

The government industry also produced increases in Dade County, the South Florida region, and the state. A large personal income increase came from the South Florida region, primarily due to Dade County government industries, which generated 54.9 percent of the region's personal income in the government sector in 1989.

2.2.7.2 HOUSING

The total number of housing units in Dade County increased 9.3 percent from 665,400 in 1980 to 727,100 in 1985. Much of this growth took place in the unincorporated areas of the county. In addition to traditional housing, Dade County has 582 hotels and motels that provide 53,716 units for short-term accommodations.

The largest year-round housing unit type in Dade County is the single-family dwelling, which accounts for 44 percent of year-round countywide housing. Apartment buildings containing five or more units comprise the second largest type of housing in Dade County, with a significantly greater percentage of the units located in the Miami Beach area. Fifty-five percent of all

Table 2.2-7. 1989 Personal Income for the Major Private Nonfarm Industries in Dade County, the South Florida Region, and the State of Florida

Private, Nonfarm Industries	1989 Personal Income (\$1,000)		
	Dade County	South Florida Region	Florida
Mining	61,745	167,289	574,292
Construction	1,189,997	3,246,820	10,092,400
Manufacturing	2,110,993	4,774,743	14,966,319
Transportation, Communication, and Public Utilities	2,399,977	3,698,318	8,907,457
Wholesale Trade	2,301,240	3,877,409	9,011,995
Retail Trade	2,792,685	6,115,690	17,226,768
Finance, Insurance, and Real Estate	2,213,978	4,298,695	10,593,697
Services	7,939,984	16,181,684	42,007,309
Other	<u>115,998</u>	<u>399,245</u>	<u>1,393,775</u>
TOTAL	21,126,597	42,759,893	114,768,012

Sources: UF, 1991.
KBN, 1992.

year-round housing units are owner occupied. This is significantly lower than the statewide and surrounding Broward and Palm Beach County percentages of owner-occupied units, which are 68, 72, and 73 percent, respectively. In 1989, 6,222 building permits were issued to Dade County. Of these permits, 78.7 percent were issued for multifamily dwellings, with the majority being issued for construction in Miami Beach and Hialeah. In the South Florida region, which consists of Broward, Dade, Monroe, and Palm Beach Counties, Palm Beach County registered the largest number of building permits in 1989, with a total of 57 percent of the permits for single-family dwellings and 43 percent of the permits for multifamily dwellings.

The Florida Association of Realtors has determined that the median price of housing in Dade County was \$89,000 in the fourth quarter of 1991.

2.2.7.3 AREA PUBLIC SERVICES AND UTILITIES

Reviews of public documents and maps, conversations with cognizant officials, and a land use inventory (windshield survey) were conducted to identify public facilities within 5 miles of the proposed site. These facilities include schools, roads and highways, medical facilities, fire and police services, recreational facilities, and utilities, as described below.

2.2.7.3.1 Public Education

Public educational facilities identified within 5 miles of DCRRF are listed in Table 2.2-8. No schools were identified to be within a 1-mile radius of the site. The nearest educational facility is Springview Elementary School, located approximately 3.75 miles east of the project site.

2.2.7.3.2 Transportation

The roadway transportation network near the proposed plant site consists of the Florida Turnpike Extension, the Palmetto Expressway [State Road (SR) 826], several county collectors, and local roads (see Figure 2.2-7). Functional classifications, laneage, and orientation for roadways in the vicinity of the plant site are presented in Table 2.2-9.

As Figure 2.2-7 indicates, access to the plant site is limited by the existing roadway configuration. Although the Florida Turnpike Extension passes within 2.5 miles of the plant site, the nearest turnpike exit is 4 miles south at SR 836. Therefore, the site cannot currently be

Table 2.2-8. Public Educational Facilities Within 5 Miles of DCRRF

Facility	Distance From DCRRF (miles)
<u>Elementary Schools</u>	
Sweetwater	4.75
Stirrup	4.50
Hadley	4.25
Springview	3.50
<u>Middle Schools</u>	
Ruben Dario	4.25
<u>Senior High Schools</u>	
Miami Springs	3.75

Source: KBN, 1992.

Table 2.2-9. Roadway Facilities in the Vicinity of DCRRF

Roadway	Functional Classification	Laneage	Orientation (in area of plant site)
Florida Turnpike Extension	State principal arterial	4-lane divided	North-South
SR 826 (Palmetto Expressway)	State principal arterial	8-lane divided	North-South
NW 36th Street	State arterial east of Palmetto Expressway	6-lane divided	East-West
NW 41st Street	County collector	6-lane divided	East-West
NW 58th Street	County collector	4-lane undivided east of NW 97th Avenue; 2-lane undivided west of NW 97th Avenue	East-West
NW 79th Avenue	County collector	2-lane undivided	North-South
NW 87th Avenue	County collector	2-lane undivided	North-South
NW 97th Avenue	County collector	2-lane undivided	North-South
NW 102nd Avenue	Local road	4-lane divided	North-South

Sources: Metro-Dade County, 1992b.
KBN, 1992.

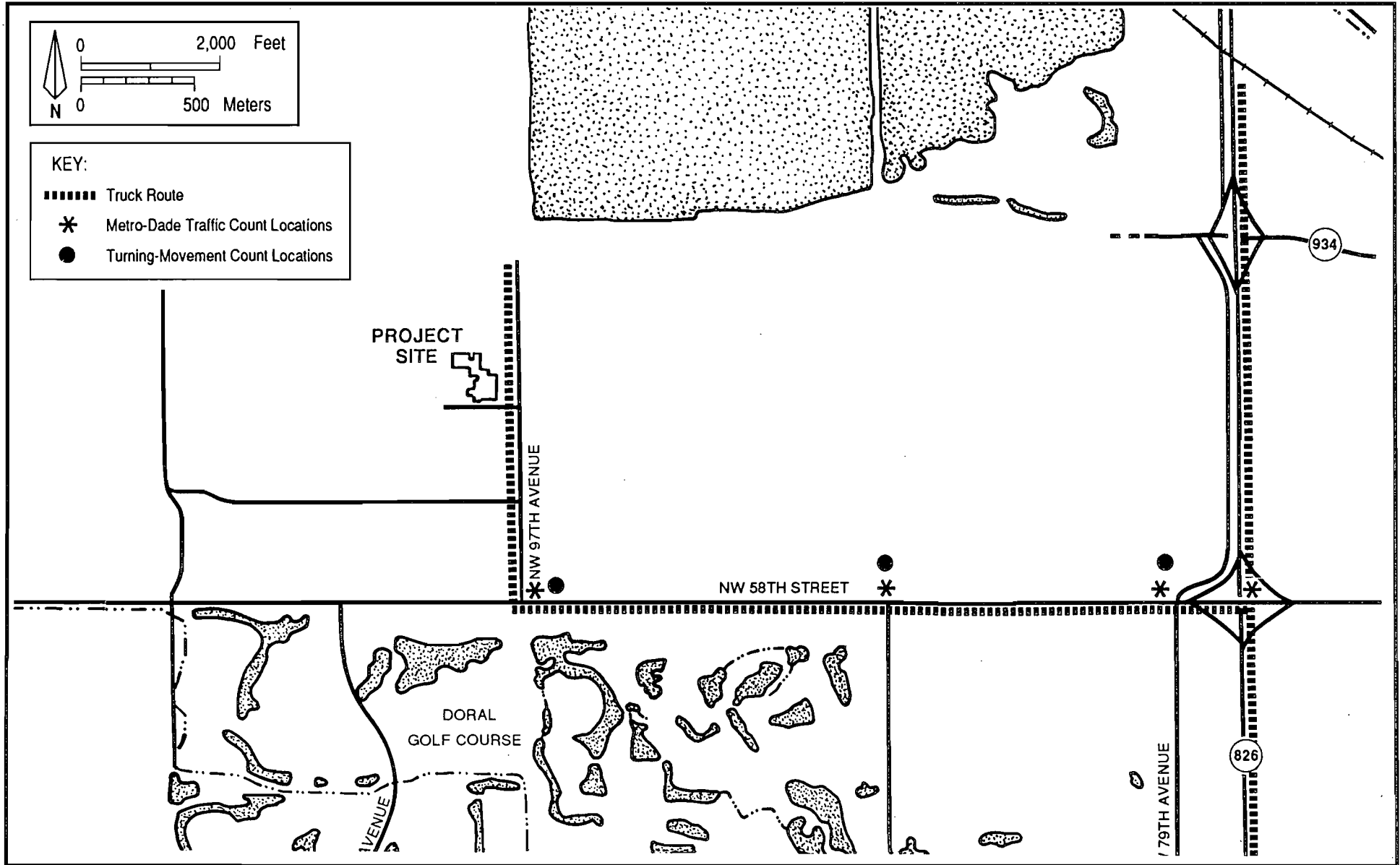


Figure 2.2-7 EXISTING ROADWAY FACILITIES IN THE VICINITY OF DCRRF

DADE COUNTY RESOURCES RECOVERY FACILITY
CAPITAL EXPANSION PROJECT

Owner: Dade County
Operator: Montenay Power Corp.

accessed from the west via a major north-south roadway. In addition, there is no access from the north (the plant is located on a dead end street), and access to the south is only possible from NW 58th Street. However, a new turnpike exit is under construction at NW 41st Street, about 2.5 miles southwest of the plant site.

For traffic generated from the north or south, the most direct route to the plant site is via the Palmetto Expressway (SR 826), west onto NW 58th Street, and then north onto NW 97th Avenue. Northwest 58th Street is the only point of intersection with NW 97th Avenue, which provides the sole access to the plant site. Traffic generated from the east of the site, in the Miami area, accesses the site via NW 36th Street, and then north to NW 58th Street on either NW 79th Avenue or NW 87th Avenue.

The future transportation network is expected to change access to the site from the west (see Figure 2.2-8). The construction of a new turnpike interchange at NW 41st Street and accompanying improvements will allow access from NW 41st Street to NW 58th Street via 102nd Avenue.

Traffic counts and roadway capacity determinations were obtained from the Metro-Dade County Development Impact Committee. The Metro-Dade County traffic counts reflect peak-hour periods, which are the highest count taken on a single day between the hours of 7:00 to 9:00 a.m. and 4:00 to 6:00 p.m. Therefore, the data represent the worst-case traffic scenario for the project area. Traffic data from 1992 for roadway segments relevant to the existing plant site accesses are presented in Table 2.2-10.

To monitor the impacts of development on roadways in the county, Metro-Dade County has followed Florida Department of Transportation (FDOT) guidelines and calculated levels of service for significant roadways. Level of service (LOS) criteria are based in part on the functional classification, roadway laneage, and the number of signalized intersections per mile along the roadway. There are six levels of service categories (A through F), with LOS A representing the best operation condition and LOS F representing the worst. Metro-Dade County has adopted LOS D as the standard for all roadways in the county. Development which would degrade the level of service below LOS D on any given roadway segment is not permitted unless roadway

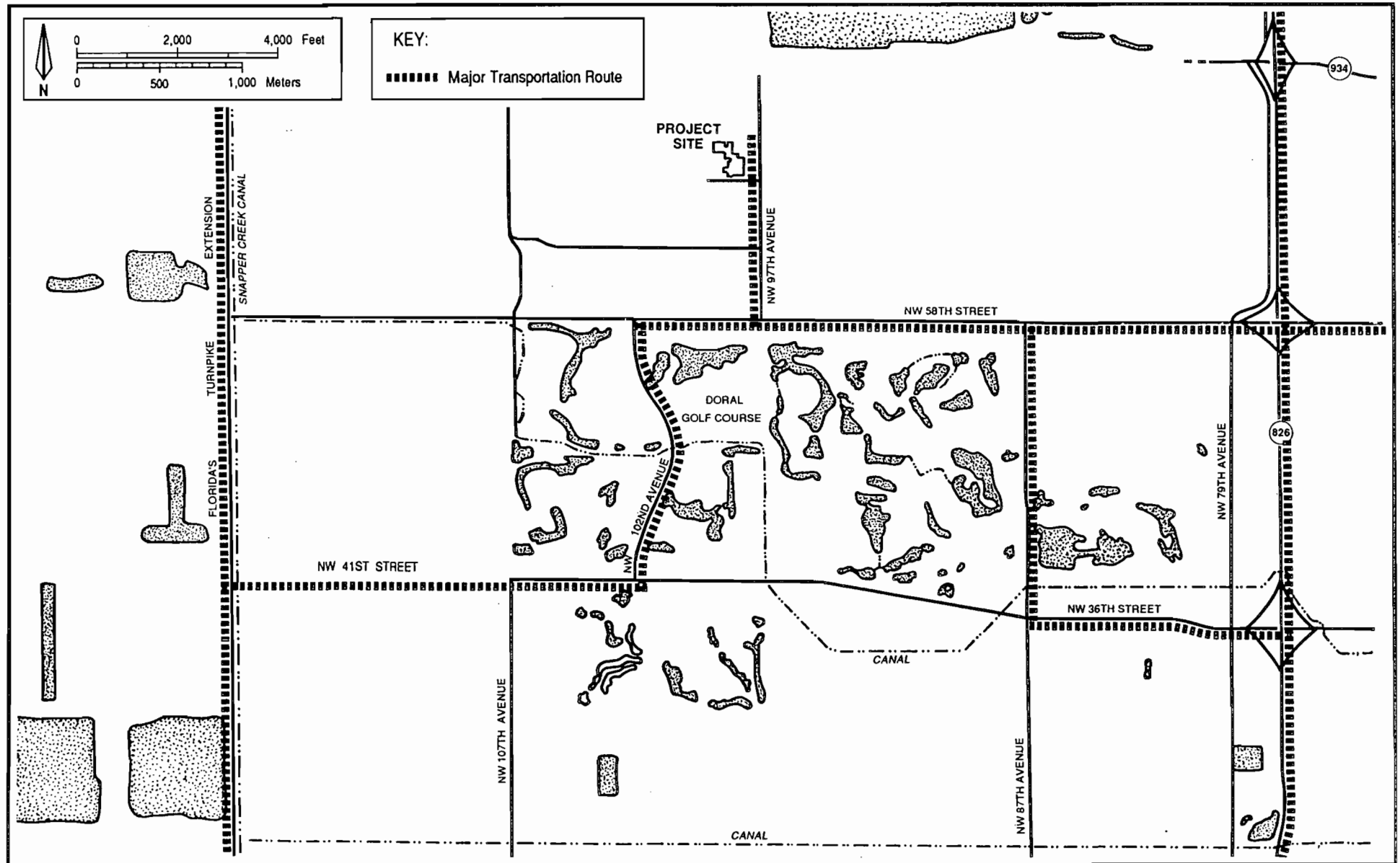


Figure 2.2-8 FUTURE ROADWAY FACILITIES IN THE VICINITY OF DCRRF

**DADE COUNTY RESOURCES RECOVERY FACILITY
CAPITAL EXPANSION PROJECT**

Owner: Dade County
Operator: Montenay Power Corp.

Table 2.2-10. Traffic Data for Roadway Facilities in the Vicinity of DCRRF

Roadway	Location	Peak-Hour Period	Available Trips	Existing LOS
NW 58th Street	West of NW 72nd Avenue	1,387	974	C
NW 58th Street	East of NW 84th Avenue	2,280	684	C
NW 58th Street	West of NW 87th Avenue	980	1,161	B
NW 58th Street	West of NW 97th Avenue	474	631	C
Palmetto Expressway/SR 826	North of NW 58th Street	13,188	1,650	D
NW 87th Avenue	North of NW 41st Street	2,439	327	C
NW 36th Street	West of NW 87th Avenue	1,805	2,319	B
Florida Turnpike Extension	South of Okeechobee Boulevard	2,257	3,993	A

Sources: Metro-Dade County, 1992b.
KBN, 1992.

improvements will be in place at the time the development impact occurs. As shown on Table 2.2-10, roadways in the vicinity of the plant site are currently operating at LOS D or better.

2.2.7.3.3 Medical Facilities

There is one hospital, Palmetto General Hospital, within a 5-mile radius of DCRRF. The hospital is located at 2001 West 68th Street in unincorporated Dade County, approximately 3.5 miles northeast of the site. The facility has a 300-bed capacity and is capable of providing emergency medical service.

2.2.7.3.4 Fire Protection

Emergency fire response in the vicinity of DCRRF is provided by the Dade County Fire Department. The primary responder is Station 17, which is located at 7050 NW 36th Street, approximately 5 miles east of the plant site. Station 17 is equipped with a ladder truck that contains a 1,250-gpm pump and is staffed with a four-person crew. In addition to emergency fire response, a hazardous materials unit staffed by two professionals is available. The response time from this facility is expected to be approximately 5 minutes. The backup responder is Station 28, which is located at 10350 NW 87th Avenue in unincorporated Dade County, approximately 2.25 miles southeast from the plant site. Station 28 can respond with a seven-person crew and a 1,200-gpm pumper in 6 minutes and can also provide emergency medical service.

2.2.7.3.5 Police Protection

Police protection in the vicinity of the plant site is currently provided by the Metro-Dade County Police Department. The site is located in Area 1. Each area in Dade County is patrolled by approximately 10 officers. Officers from adjacent areas are available to provide backup if necessary. The response time is approximately 2 to 3 minutes, depending on the location and workload of the officer on duty in the area and the type of assistance requested.

2.2.7.3.6 Public Recreation

Public recreational facilities within the study area are listed in Table 2.2-11. Privately owned recreational facilities open to the public are included in the table.

Table 2.2-11. Recreational Facilities and Parks Within 5 Miles of DCRRF

City of Hialeah Gardens	Virginia Gardens
Bernie Wilson Park	Virginia Gardens Park
Joe Sharon Park	
City of Hialeah	City of Sweetwater
Proposed Adult Center	Carlow Park
M.A. Milan Park	Sweetwater Youth Center (SW Ronselli)
Sparks Park	
Wilde Park	Medley
John Dupuis Park	Toby Wilson Park
Meadow Lane Park	
Mae Walters Park	Unincorporated Dade County
Hialeah Race Track	Ruben Dario Park
Walker Park	Glades Road Park
J. Bright Park	Fontainebleau Park
J.W. Johnson Park	Miami West Park
Cotson Reid Pool	Doral Park
Cotson Park	Doral Meadow Park
Adult Center	
City of Miami Springs	
Springview Park	
Miami Springs Park	
Miami Springs Recreation Center	
Miami Springs Golf Course	

Source: KBN, 1992.

2.3 BIOPHYSICAL ENVIRONMENT

2.3.1 GEOHYDROLOGY

2.3.1.1 GEOLOGIC DESCRIPTION OF THE SITE AREA

DCRRF is located in the Coastal Plain physiographic province, a region of low relief underlain by unconsolidated to poorly consolidated sediments and indurated carbonate rocks. The subsurface stratigraphy in the region (Table 2.3-1) consists of approximately 15,000 feet (ft) of sedimentary rocks of late Cretaceous through late Quaternary age overlying igneous and metamorphic rocks. These basement rocks are overlain by a thick sequence (up to 10,000 ft) of late Cretaceous carbonate rocks of Austin limestones, the Pine Key Formation, and the Lawson Limestone (Carter, 1984). Overlying Cretaceous rocks are 600 to 1,800 ft of Eocene through Early Miocene carbonates of the Oldsmar, Lake City, and Avon Park Limestones, the Ocala Group, the Suwannee Limestone, and the Tampa Limestone. These highly transmissive solution-cavity-riddled rocks comprise the Floridan aquifer in south Florida (Florida Bureau of Geology, 1986). Overlying the Floridan aquifer is a thick sequence (up to 600 ft) of low-permeability clays and marls of the Miocene Hawthorn Formation and the lower portion of the Miocene Tamiami Formation (Anderson et al., 1986).

Overlying these low-permeability clays and marls is a series of porous clastic and carbonate sedimentary rocks of Miocene to late Quaternary age, which comprise the Biscayne aquifer. Distinct lithologic units within the Biscayne aquifer include the upper portion of the Miocene Tamiami Formation, the Pliocene Caloosahatchee Marl, and the Pleistocene Fort Thompson Formation, Key Largo Limestone, Anastasia Formation, Miami Limestone, and Pamlico Sand (Schroeder et al., 1958). The Tamiami Formation varies in composition from pure quartz sand to highly permeable indurated beds of pure limestone. The proportion of limestone to sand increases with depth. The Caloosahatchee Marl consists of sandy marl, clay, silt, and sand with shell beds and yields less water than most other parts of the Biscayne aquifer. The Pleistocene formations are contemporaneous, in part, with the basal Fort Thompson Formation comprised of marls, limestones, and sandstones interfingering with coralline reef limestone of the Key Largo Limestone. The Anastasia Formation consists predominantly of coquina and calcareous sandstone representing littoral facies equivalents of the Fort Thompson Formation and Key Largo

Table 2.3-1. Stratigraphic Column of Rock Units in the Vicinity of the DCRRF Site (Page 1 of 3)

Age	Formation	Lithologic Description	Thickness (ft)	Water-Bearing Unit
Holocene	Soils	Peat and muck.	0-12	
	Lake Flirt Marl	White to gray calcareous mud, rich with shells of <u>Helisoma</u> sp., a fresh-water gastropod. In some places cemented to form dense limestone. Relatively impermeable.	0-6	
Pleistocene (formations are contemporaneous in part)	Pamlico Sand	Quartz sand, white to black or red, depending upon nature of staining materials, very fine- to coarse-grained, average medium-grained. Mantles large areas underlain by Miami oolite and Anastasia Formation.	0-40	Biscayne aquifer
	Oolite facies of the Miami Limestone	Limestone, oolitic, soft, white to yellowish containing thin layers of calcite, massive to cross-bedded and stratified; generally perforated with vertical solution holes. Fair to good aquifer.	0-40	Biscayne aquifer
	Anastasia Formation	Coquina, sand, calcareous sandstone, sandy limestone, and shell marl. Probably composed of deposits equivalent in age to marine members of Fort Thompson Formation. Fair to good aquifer.	0-120	Biscayne aquifer
	Key Largo Limestone	Coralline reef rock, ranging from hard and dense to soft and cavernous. Probably inter-fingers with the marine members of the Fort Thompson Formation. Crops out along southeastern coastline of Florida from Soldier Key in Biscayne Bay to Bahia Honda. Excellent aquifer.	0-60	Biscayne aquifer

Table 2.3-1. Stratigraphic Column of Rock Units in the Vicinity of the DCRRF Site (Page 2 of 3)

Age	Formation	Lithologic Description	Thickness (ft)	Water-Bearing Unit
	Fort Thompson Formation	Alternating marine, brackish-water and fresh-water marls, limestones, and sandstone. A major component of the highly permeable Biscayne aquifer of coastal Dade and Broward Counties, which yields copious supplies of groundwater.	0-150	Biscayne aquifer
Pliocene	Caloosa-hatchee Marl	Sandy marl, clay, silt, sand, and shell beds. Yields groundwater less abundantly than most other parts of the Biscayne aquifer.	0-25	Biscayne aquifer
Miocene	Tamiami Formation	Cream, white and greenish-gray clayey marl, silty and shelly sands, and shelly marl, locally hardened to limestone. Upper part, where permeability is high, forms the lower part of the Biscayne aquifer. Lower and major part of formation is low permeability and forms the upper beds of the aquiclude that confines water in the Floridan aquifer below.	0-500	Biscayne aquifer and confining horizon
	Hawthorn Formation	Sandy, phosphatic marl, interbedded with clay, shell, marl, silt, and sand. Greenish color predominates. Water is generally scarce, of poor quality, and in the permeable beds is confined under low-pressure head. Comprises the major part of aquiclude confining the Floridan aquifer.	50-500	Confining horizon
	Tampa Limestone	White to tan, soft to hard, often partially recrystallized limestone. Yields artesian water, but not as abundantly as lower parts of the Floridan aquifer.	150-250	Floridan aquifer
Oligocene	Suwannee Limestone	Creamy soft to hard limestone, lithologically similar to underlying Ocala Limestone.	0-450	Floridan aquifer

Table 2.3-1. Stratigraphic Column of Rock Units in the Vicinity of the DCRRF Site (Page 3 of 3)

Age	Formation	Lithologic Description	Thickness (ft)	Water-Bearing Unit
Eocene	Ocala Group Avon Park Limestone Lake City Limestone Oldsmar Limestone	Crystalline carbonate rocks; limestone and dolomite, generally yields highly mineralized water.	1,500-3,000	Floridan aquifer
Paleocene	Absent	—	—	Not a source of water
Cretaceous	Lawson Limestone Pine Key Formation Austin Age Limestone	Crystalline carbonate rocks; limestone and dolomite, not used as source of water.	>10,000	Not a source of water
Precambrian and Paleozoic	—	Crystallized igneous and metamorphic rocks.	—	Not a source of water

Sources: Schroeder et al., 1958; Carter, 1984; Sherwood et al., 1973; Vecchioli and Foose, 1984; Florida Bureau of Geology, 1986; Anderson et al., 1986; KBN, 1992.

Limestone. These three units range in thickness from 0 to 150 ft (Sherwood et al., 1973). The overlying Miami Oolite is an oolitic facies of the Miami Limestone and is often perforated by vertical solution holes caused by burrowing and slightly developed karst activity. The Pamlico Sand is a well-sorted fine- to coarse-grained quartz sand of littoral origin. Both the Miami Oolite and Pamlico Sand range in thickness from 0 to 40 ft.

The near-surface soils overlying the Biscayne aquifer consist of sand with limestone fragments and organic deposits (peat), the latter of which is characteristic of the flatland areas west of the Atlantic Coastal Ridge.

2.3.1.2 DETAILED SITE LITHOLOGIC DESCRIPTION

Several investigations have been conducted at the DCRRF to define the site-specific geologic conditions underlying the site. These investigations included standard penetration test (SPT) borings performed by Pittsburgh Testing Laboratory (1978), a geotechnical investigation performed by ATEC Associates, Inc. (1987), and a hydrogeologic investigation performed at the site by Environmental Science and Engineering, Inc. (ESE), in 1988. Data collected during these investigations are presented in the final reports of each respective study. The scope of work and findings associated with these investigations are summarized in the following paragraphs.

Pittsburgh Testing Laboratory (1978) performed a foundation soils investigation at the following locations:

1. The east side of the site between NW 66th and NW 74th Streets, and
2. East of the landfill area in the vicinity of the boiler house and associated tipping and administrative buildings.

This study consisted of 40 SPT borings drilled according to ASTM D1586 and unconfined compression tests on two samples cored from excavated limerock. Nine of the borings were drilled to 50 ft, and 31 were drilled to a depth of 25 ft.

ATEC Associates, Inc. (1987), performed a geotechnical investigation in the vicinity of the trash containment building that involved three SPT soil borings to depths of 30 and 60 ft and one standard usual open-hole percolation test in accordance with SFWMD requirements.

ESE conducted the first of a two-phase hydrogeologic investigation at the DCRRF to define the characteristics of groundwater flow and contaminant transport. The study involved the determination of groundwater flow by measuring water levels in 39 wells at the site and the surrounding vicinity, while considering the effects of groundwater withdrawals and rainfall and establishing properties of the aquifer from the results of a pumping test. The investigation also involved mapping the potential contaminant plume by utilizing electromagnetic (EM) conductivity surveys.

The investigation involved installing nine shallow piezometers, designated P1 to P9, to a depth of 13 ft, one shallow well (RW1), to 13 ft, and two deep wells (OB1 and OB2) to a depth of 60 ft. Dade County Department of Solid Waste Management (DSWM) cluster wells RR1, RR2, RR3, and RR4, which are used to provide quarterly sampling at the site, also were used. Each cluster consists of three wells installed at 10, 20, and 30 ft. Cluster RR2 also has a fourth well extending to 50 ft. Two additional DSWM cluster wells (NW18 and NW23), located outside the facility also were used. These clusters contain two wells each at depths of 21 and 61 ft, and 24 and 50 ft, respectively. Two clusters of USGS wells (M1 and M2), also located off-site, were used. Cluster M1 contained four wells at 10, 20, 30, and 40 ft, and cluster M2 contained six wells: two at 10 ft, one at 20 ft, one at 30 ft, and two at 60 ft. The location of the wells is presented in Figure 2.3-1.

ESE's hydrogeologic investigation included an EM survey at 100- to 200-ft intervals to assist in the delineation of potential contaminants at the site. These surveys used an EM-31 instrument to investigate to a depth of 20 ft and an EM-34 to investigate to a depth of 50 ft.

The detailed site lithology description that follows was developed, based on the evaluation of data from published literature and aforementioned investigations.

A soil survey for Dade County [U.S. Soil Conservation Service (SCS), 1983], available in draft form, does not include a classification of the native soils in the immediate area of the plant. The site soils were altered as a result of construction activities in which various fill materials, usually sand, shell, and limerock fragments, were used. SCS (1983) does not assign a capability

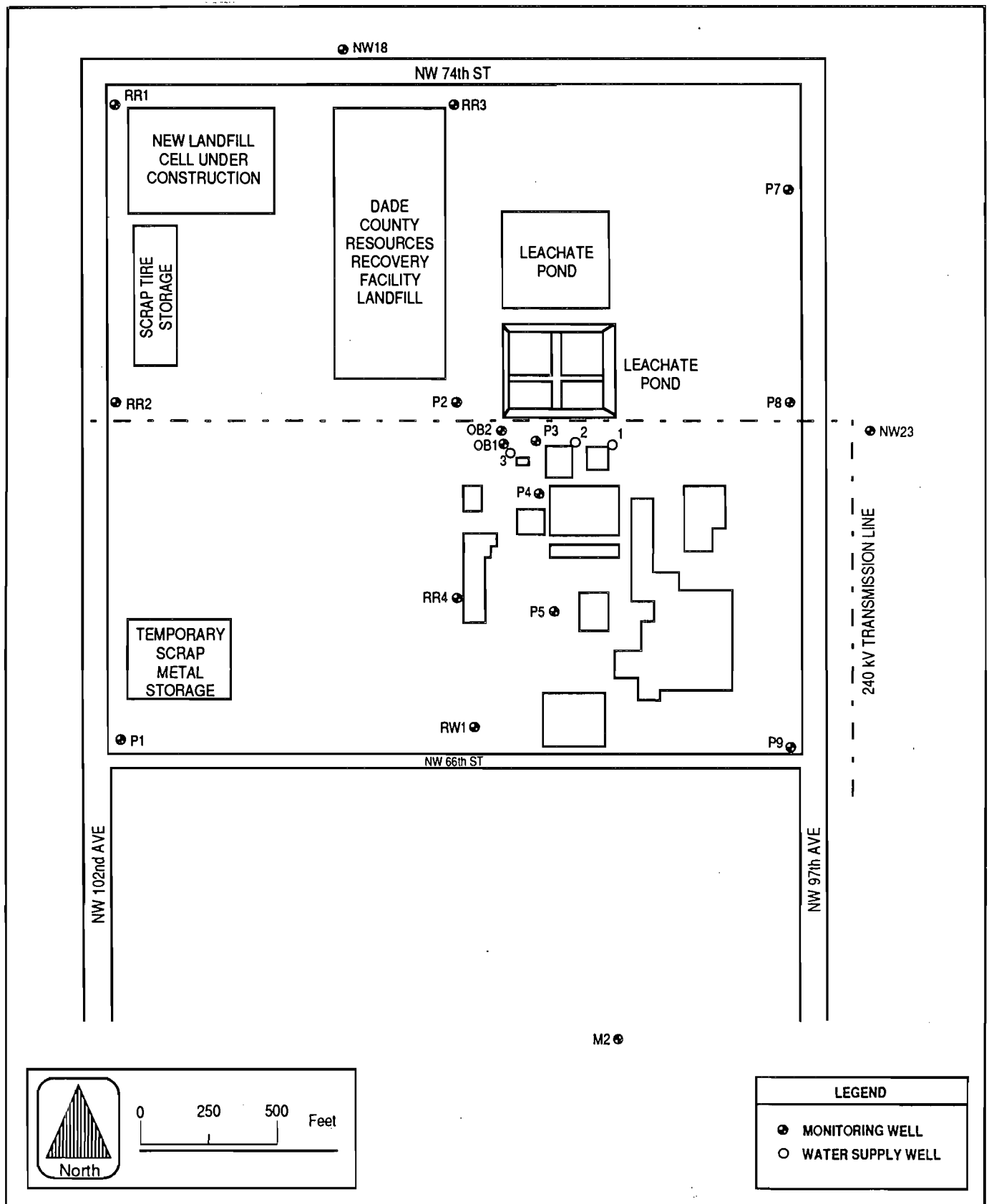


Figure 2.3-1 MONITOR WELLS AND WATER SUPPLY WELLS LOCATED AT DCRRF

DADE COUNTY RESOURCES RECOVERY FACILITY
CAPITAL EXPANSION PROJECT

Owner: Dade County
Operator: Montenay Power Corp.

designation to this soil category but rather designates it as urban land. Borings completed by ATEC Associates and ESE during the installation of the monitoring wells confirm that much of the site is underlain by fill material.

Figure 2.3-2 is a geologic cross-section defining the location of the monitoring wells, along with data defining the shallow stratigraphy underlying the site. The lithology of the sedimentary unit immediately underlying the site consists of the Miami Oolite. The Oolitic limestone is fairly consistent throughout the site and is approximately 17 ft thick. Underlying the oolitic limerock is a 10-ft thick sand layer with limerock fragments. This sand unit may represent the Pleistocene Anastasia Formation. The sand unit is underlain by limerock that extends to 80 ft below ground level at the site and is consistent with the Fort Thompson Formation. The Fort Thompson Formation is a major component of the highly permeable Biscayne aquifer, which yields abundant amounts of groundwater to wells in Dade County.

2.3.1.3 GEOLOGIC MAPS

The surficial distribution of lithologic units in south Florida is presented in Figure 2.3-3. The geologic map indicates that the formations that comprise the Biscayne aquifer are exposed at the surface across much of south Florida. In the vicinity of DCRRF, the Pleistocene Miami Limestone Oolite is exposed at the surface or overlain by muck or recently imported fill cover.

Figure 2.3-4 is an isopleth map indicating the thickness of the Biscayne aquifer and the depth to the underlying impermeable rocks of the Tamiami Formation. In the vicinity of DCRRF, the Biscayne aquifer is approximately 80 ft thick.

There is no known documentation of karst occurrences at the site. Research on the occurrence and distribution of sinkholes in Florida indicates that sinkhole formation is rare in south Florida (Lane, 1986; Sinclair and Stewart, 1985).

2.3.1.4 BEARING STRENGTH

A geotechnical investigation was performed by ATEC Associates, Inc. (1987). During that investigation, three soil test borings were drilled, one to 30 ft and two to 60 ft. The borings

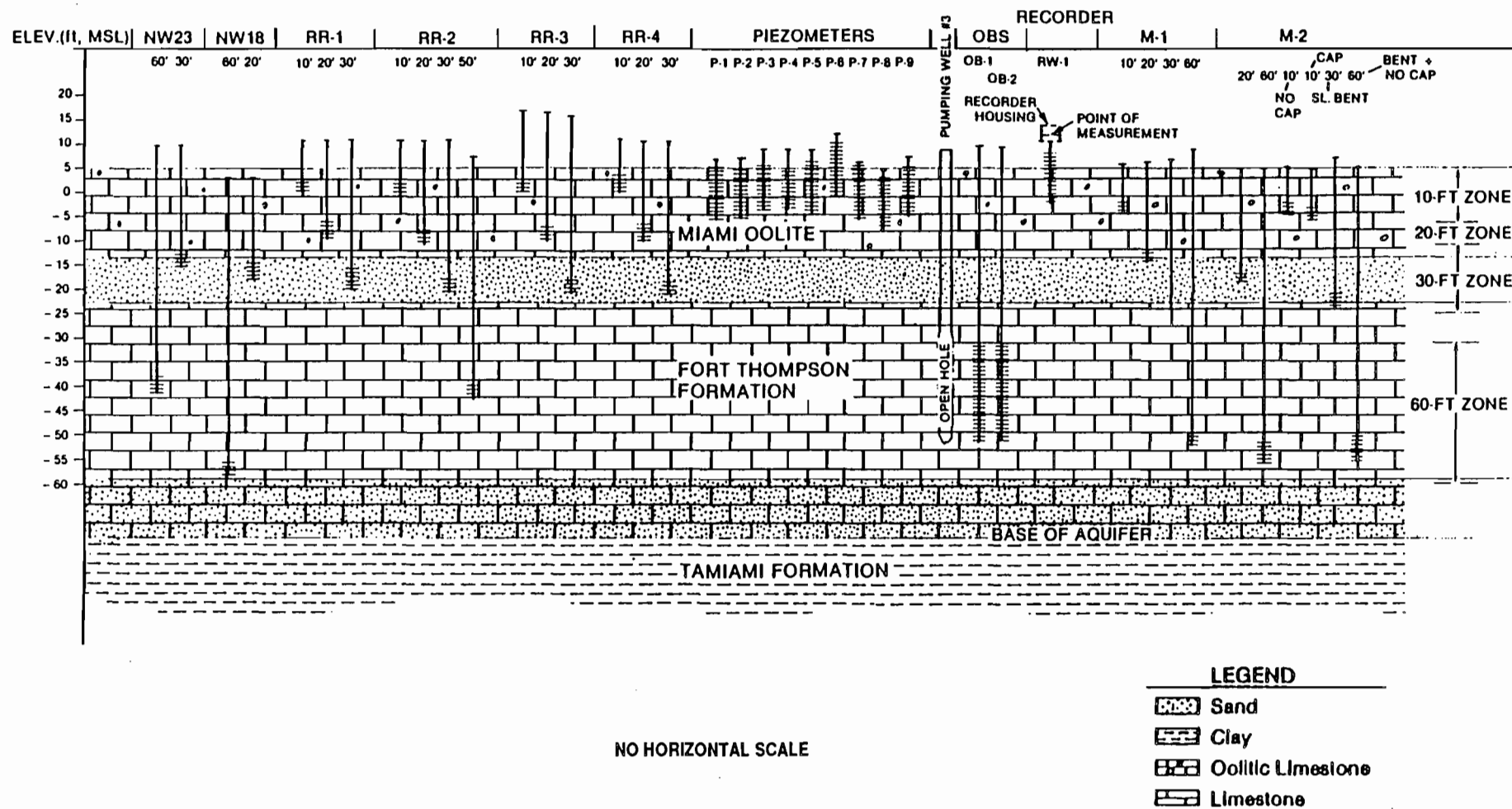


Figure 2.3-2 POSITION OF MONITOR WELLS AND PIEZOMETERS
WITHIN THE BISCAYNE AQUIFER

SOURCE: ESE, 1988.

DADE COUNTY RESOURCES RECOVERY FACILITY
CAPITAL EXPANSION PROJECT

Owner: Dade County
Operator: Montenay Power Corp.

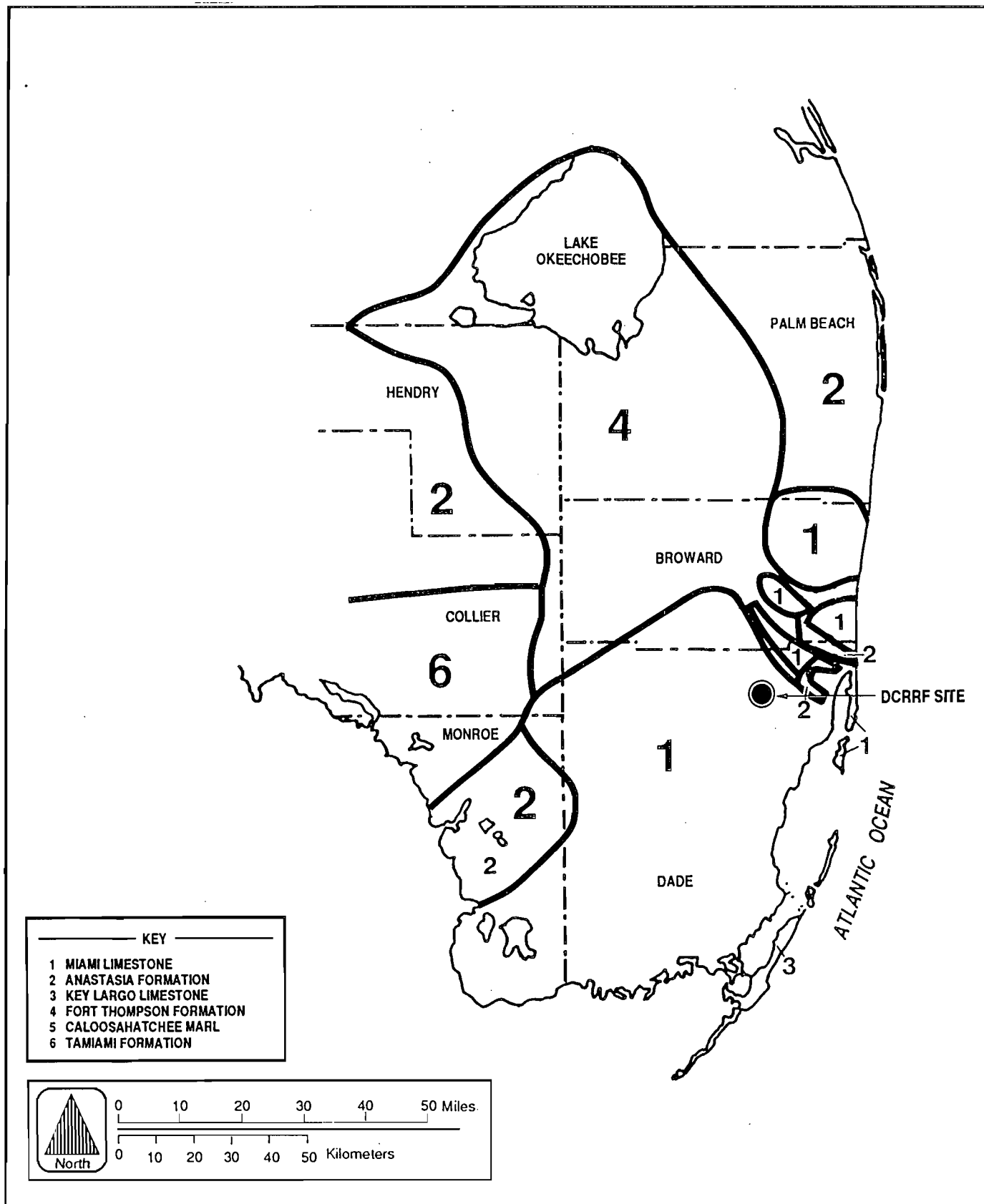


Figure 2.3-3 GEOLOGIC MAP OF SOUTHERN FLORIDA

SOURCE: MODIFIED FROM SCHROEDER ET AL., 1958.

DADE COUNTY RESOURCES RECOVERY FACILITY
CAPITAL EXPANSION PROJECT

Owner: Dade County
Operator: Montenay Power Corp.

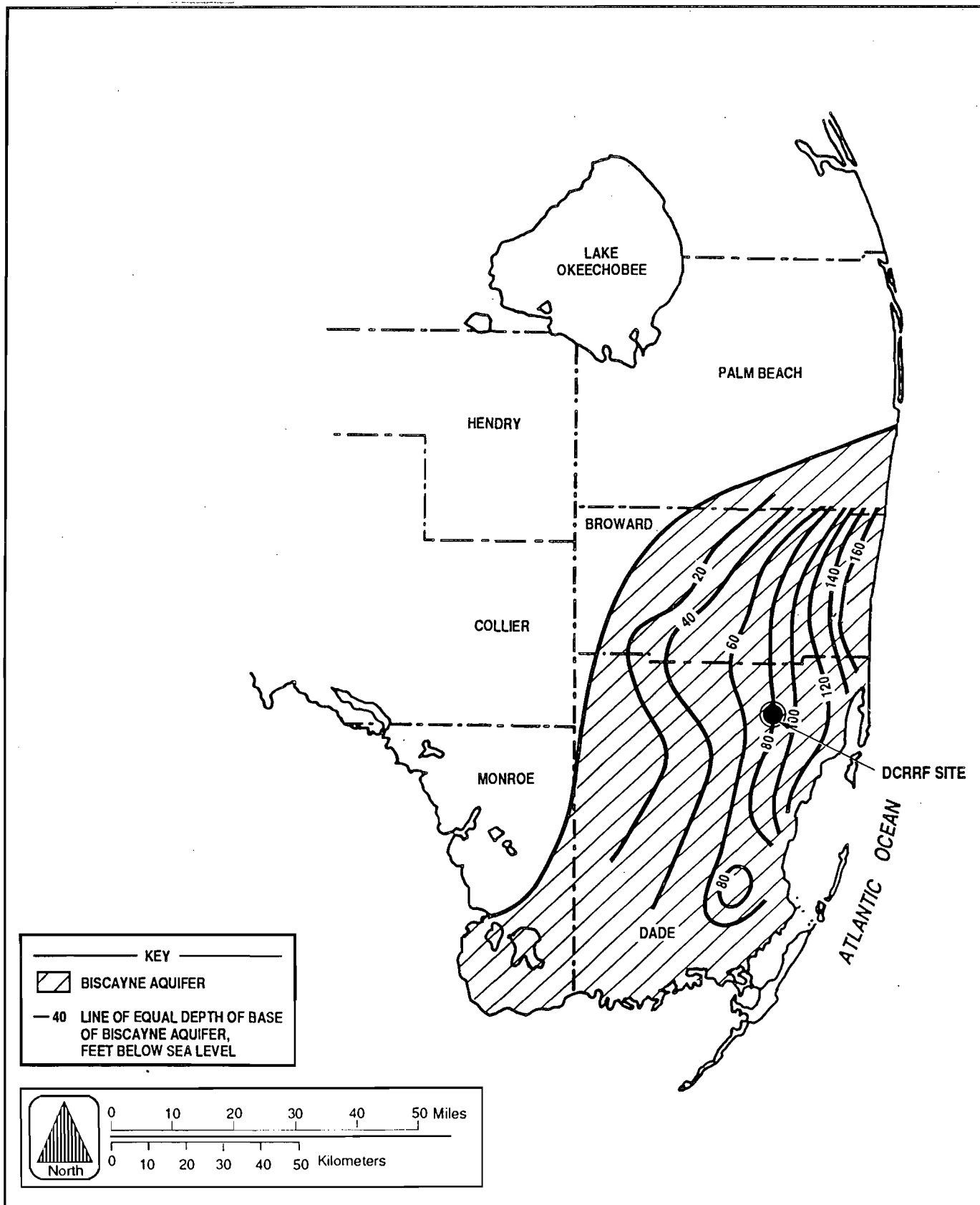


Figure 2.3-4 ISOPLETH MAP OF THE BISCAYNE AQUIFER

SOURCE: MODIFIED FROM KLEIN AND HULL, 1978.

DADE COUNTY RESOURCES RECOVERY FACILITY
CAPITAL EXPANSION PROJECT

Owner: Dade County
Operator: Montenay Power Corp.

were drilled to develop a generalized soil profile of subsurface conditions below the trash containment building. Soil conditions were evaluated by performing SPTs for each boring in accordance with the ASTM D1586 and by performing visual classification on collected soil samples.

Based on the results of the subsurface investigation, ATEC Associates, Inc. (1987), reported that the subsurface conditions consisted of medium to very dense sand and limerock from below the surficial pavement to the termination depths of the borings. The depth to groundwater at the time of the geotechnical investigation ranged between 4 to 4.5 ft below ground surface.

Based on the subsurface conditions encountered during the borings, the site will provide adequate support for the proposed structures if measures are taken to prepare the subgrade before footing installation. Conventional shallow spread footings are designed to bear at a depth of 3 ft and are designed for a maximum allowable bearing pressure of 3,000 pounds per square foot (psf) having been identified as the most feasible foundation system. Actual foundation systems to be used during the expansion of the facility are discussed in Chapter 3.0.

2.3.2 SUBSURFACE HYDROLOGY

2.3.2.1 SUBSURFACE HYDROLOGIC DATA FOR THE SITE

The two aquifers that underlie Dade County are the shallow Biscayne aquifer, which is unconfined, and the deeper Floridan aquifer, which is artesian (Sherwood et al., 1973). The Biscayne aquifer is the source of potable water in Dade County. The top of the Biscayne aquifer generally occurs approximately 2 to 3 ft below ground surface near the site and extends to depths of greater than 150 ft below ground surface near the coast. It is a highly permeable wedge-shaped hydrostratigraphic unit that thins landward to less than 30 ft thick in western Dade County. The Biscayne aquifer is underlain by 500 to 600 ft of low permeability clays and marls that serve as a confining unit between it and the underlying Floridan aquifer. The top of the Floridan aquifer occurs approximately 900 ft below ground surface in coastal Dade County and extends to a depth of more than 3,000 ft below ground surface. The water from the Floridan aquifer generally contains more than 1,500 milligrams per liter (mg/L) of chloride (Cl) and 3,500 mg/L total dissolved solids (TDS). The Floridan water is sulfurous, hard, and corrosive in this area and not currently suitable as a potable water source.

The Biscayne aquifer is a single hydrologic unit of permeable materials ranging in age from late Miocene through Quaternary. The extent of the aquifer, both horizontal and vertical, is not set by lithologic contacts or chronostratigraphic boundaries but by differences in the hydrologic properties of the sediments. The lowermost component of the Biscayne aquifer is a limestone or shelly calcareous sandstone of the upper part of the Tamiami Formation in the northeastern part of Dade County and the southeastern part of Broward County. The remaining and major portion of the Biscayne aquifer is composed of rocks ranging in age from Pliocene through late Quaternary in the following ascending sequence: Caloosahatchee Marl (as erosional remnants), Fort Thompson Formation, Key Largo Limestone, Anastasia Formation, oolitic and burrowed facies of the Miami Limestone, and Pamlico Sand. The aquifer is underlain by a relatively impermeable greenish marl of the Tamiami Formation. The contact between the marl and the limestone of the Tamiami, Fort Thompson, or Anastasia Formations, or the Key Largo Limestone, forms the lower boundary of the aquifer (Schroeder et al., 1958). A description of each of these rock units is provided in the stratigraphic column presented in Table 2.3-1. The lateral extent of the aquifer and the depth to the underlying low permeability marl are presented in Figure 2.3-4.

The Biscayne aquifer is composed predominantly of limestone, sandstone, and sand of marine origin. The aquifer is reportedly more than 150 ft along the coast in Dade County. The thickness of the consolidated limestone sections and the permeability of the aquifer as a unit generally decrease to the north. The Biscayne aquifer also thins westward, being a few feet thick in the central Everglades, to approximately 80 ft thick at DCRRF (Sherwood et al., 1973).

Most of the limestone beds in the Biscayne aquifer are capable of yielding large amounts of water to wells. Wells that tap the thick limestone in the deeper part of the aquifer commonly yield more than 1,500 gpm with only 3 to 6 ft of drawdown (Sherwood et al., 1973). Most municipalities obtain water from the intermediate to deeper part of the aquifer.

The regional flow of groundwater in the Biscayne aquifer is seaward at an average velocity of 1.5 feet per day (ft/day) (Parker et al., 1955). Locally, however, the direction of flow may be influenced by drainage canals or wellfields. Water levels are highest in the water-conservation areas and lowest along the coast, along uncontrolled reaches of canals, and in the centers of large municipal wellfields. During rainy seasons, control structures in canals are opened in order to discharge surplus water to prevent flooding in urban and agricultural areas. The control structures also are used to control salinity intrusion. Opening the controls lowers the level in the canals, thereby permitting more groundwater to move to the canals and then seaward. Rainy season high-water levels of June 1968, some of the highest on record in southeast Florida, showed a maximum water level elevation of approximately 6 feet above mean sea level (ft-msl) in the vicinity of DCRRF (Leach et al., 1972). Average water level elevations at the site are 2 to 3 ft-msl (ESE, 1988).

Infiltration of rainfall through surface materials and seepage from controlled canals and the conservation areas are the principal means of recharging the Biscayne aquifer. Recharge by rainfall is greatest during the rainy season (June to November). Recharge from canals is greatest during the dry season (December to May) when canal levels are maintained at higher levels than adjacent water levels in the aquifer. High vertical permeabilities of surficial sediments permit rapid infiltration of rainfall to recharge the Biscayne aquifer. Discharge from the aquifer is by evapotranspiration, by groundwater flow to canals and to the sea, and by pumping from wells. Discharge by groundwater flow to canals and by evapotranspiration is greatest after periods of rainfall when water table levels are high; discharge by pumping from wells is greatest during the dry season as a result of the overall increase in demand from heavy irrigation use when water

levels are low. Well yield is only a small part of the total discharge from the aquifer. However, during the dry season, its importance is amplified because it occurs when recharge and aquifer storage are smallest.

Calculated transmissivity and storativity values for the Biscayne aquifer in south Florida based on aquifer tests have been reported by various authors, including Parker (1951), Voorhis (1948), Parker et al. (1955), Schroeder et al. (1958), Sherwood et al. (1973), and Klein and Hull (1978), and summarized by Anderson et al. (1986). Transmissivity values are approximately 4 million gallons per day per foot (mgd/ft) for the eastern side of conservation Area B, near DCRRF. Storativity values, which are dimensionless, generally range from 0.10 to 0.35 and average approximately 0.20 (Parker et al., 1955). An aquifer pumping test performed at DCRRF indicated that transmissivity averaged 5.422 mgd/ft and the storage coefficient averaged 0.27. The test was performed during a July 1987 hydrogeologic investigation conducted at the facility (ESE, 1988).

The Miami Canal, located approximately 2 miles north of the site, is the closest drainage feature. The Miami Canal runs in a northwest to southeast direction, with a water flow from the west in the Everglades to the east towards Biscayne Bay. A secondary drainage feature is the 58th Street Canal, located 0.5 mile southeast of the site, and the Dressel Canal, located 1 mile south of the site. Both of these canals drain to the east to the Florida East Coast Canal, which in turn drains to the Miami Canal. According to the Dade County Department of Environmental Resources Management (DERM), potentiometric maps of the Biscayne aquifer in the Northwest Wellfield protection area indicate that the Snapper Creek Extension Canal serves as a local recharge boundary for the Biscayne aquifer near the site (ESE, 1988) (see Figure 2.3-5). The canal provides recharge to the Northwest Wellfield and areas downgradient to the canal.

The potentiometric surface at the site was established by measuring water levels in the monitoring wells surrounding the site. Water level measurements were obtained at monthly intervals commencing on May 1987 and ending on June 1988 for the circuit of wells at the site. These measurements were taken before and during the pumping test at the site, with continuous recording of well RW1 for 1 year (June 1987 through June 1988). Water level measurements taken before the start of the pumping test and during the 1 year monitoring of well RW1 indicate that groundwater ranges from 2.64 to 2.93 ft-msl and 1.6 to 3.9 ft-msl, respectively. Water level

Figure 2.3-5 LOCATIONS OF WELLFIELDS AND CANALS IN THE VICINITY OF DCRRF

SOURCE: ESE, 1988.

**DADE COUNTY RESOURCES RECOVERY FACILITY
CAPITAL EXPANSION PROJECT**

Owner: Dade County
Operator: Montenay Power Corp.

measurements taken before the pump test are presented in Table 2.3-2. Water level contour maps developed from the water level measurement data indicate that the direction of groundwater flow was in a northern direction towards the Miami Canal, with variations to the northeast and northwest. This trend was consistent over time within the four zones monitored at 10, 20, 30, and 60 ft, with variations occurring at the 10-ft zone as a result of surface recharge. The groundwater flow varied in the month of November to the south, with variations to the southeast and southwest in all four zones monitored because of rainfall and the influence of rainfall on the nearby canals.

The effects of DCRRF's pumpage on the potentiometric surface is limited in extent and has no effect on the overall direction of groundwater flow beyond the immediate vicinity of the production well. The effects of pumpage at the Northwest Wellfield may affect the direction of groundwater, but this pumpage does not appear to be the controlling factor. The Snapper Creek Extension Canal, which lies between the Northwest Wellfield and DCRRF, provides a recharge boundary for both the wellfield and DCRRF and can influence the direction of groundwater flow towards the northwest at the site during periods of low water level in the canal. The influence of the Hialeah and Miami Springs wellfields and their relatively minor pumpage has an insignificant effect on the direction of groundwater flow at the site. The controlling factor affecting the direction of groundwater flow at the site appears to be the association of the aquifer with the nearby canals. Recent improvements have been made to the Snapper Creek Canal by extending the canal to convey water from the Conservation Area to replenish the Northwest Wellfield. The improvements have also created a drainage divide at the Snapper Creek Canal producing an easterly groundwater gradient east of the canal.

The chemical quality of the groundwater in Dade County is generally good. Water quality in the Biscayne aquifer differs slightly from place to place; most differences in quality are related to the nature of the aquifer and local land use. In general, the water is hard, a calcium bicarbonate type, neutral to slightly alkaline, and contains different amounts of dissolved iron (Klein and Hull, 1978). Dissolved constituents in the groundwater are influenced by rainfall and dry fallout, reaction with soil and aquifer material, application of fertilizers and pesticides, biological processes at the surface and within the aquifer, infiltration of wastes, chemical reactions among constituents, temperature, and pressure. Groundwater quality in the vicinity of the canals also is affected by canal water during dry seasons. However, the areas affected are probably small because of the seasonal reversals of hydraulic gradients between the canals and the aquifer.

Table 2.3-2. Water Level Data at DCRRF With No Wells Pumping, July 1987

Well Designation	Elevation of Top of Casing (ft-msl)	Depth of Water (ft)	Elevation of Water (ft-msl)
M2-30	7.33	4.69	2.64
M2-10	5.67	2.92	2.75
NW23-60	9.79	7.06	2.73
NW23-30	9.95	7.20	2.75
NW18-60	3.44	0.63	2.81
NW18-30	3.44	0.65	2.79
RR4-30	10.65	7.92	2.73
RR4-20	10.67	7.93	2.74
RR4-10	11.10	8.38	2.72
RR3-30	15.82	13.13	2.69
RR3-20	16.71	14.05	2.66
RR3-10	16.93	14.28	2.65
RR2-60	7.71	4.98	2.73
RR2-30	10.60	7.90	2.70
RR2-20	10.56	7.84	2.72
RR2-10	10.30	7.63	2.67
RR1-30	10.81	8.13	2.67
RR1-20	11.05	8.38	2.67
RR1-10	10.84	8.16	2.68
P1	6.91	4.18	2.73
P2	7.58	4.83	2.75
P3	8.97	6.23	2.74
P4	8.83	5.90	2.93
P5	8.72	5.95	2.77
P6	12.07	9.34	2.73
P7	6.75	3.98	2.77
P8	4.87	2.12	2.75
P9	7.63	4.84	2.78
OB1	9.51	6.80	2.71
OB2	9.54	6.80	2.74
RW1	11.89	—	2.72

Note: ft-msl = feet above mean sea level.

Sources: ESE, 1988.
KBN, 1992.

The RR series of wells at the site is sampled and analyzed by DERM on a quarterly basis. In May 1987, NW18, NW23, and M2 (background sample) were added to the sampling network. The samples were analyzed for primary and secondary drinking water standards. Analytical results for the period January 1986 through November 1988 are presented in Tables 2.3-3 through 2.3-9.

The results indicate elevated levels of iron in all wells sampled, with minor occurrences of elevated levels of chromium and lead.

Elevated levels of chlorides, total dissolved solids, and pH also were noted throughout most of the wells sampled, with the highest concentration of TDS at RR1 and RR3 at the northwest and northeast corners of the site near the ash landfill area. These results coincide with EM surveys performed by ESE during the 1988 study.

Recently, a contamination assessment plan (CAP) has been developed for DCRRF. This plan includes compilations of groundwater monitoring data for the period January 1988 through July 1991. Relevant portions of the CAP are provided in Appendix 10.8.

2.3.2.2 KARST HYDROGEOLOGY

There is no documentation of karst development at this site. In addition, no mention is made in the geologic literature of karst development in this region of south Florida (Sinclair and Stewart, 1985; Lane, 1986). Karst investigation was, therefore, not undertaken at the time of the preparation of the hydrogeologic investigation (ESE, 1988; Technos, 1984) or in connection with this application.

Table 2.3-3. Summary of Analytical Results^a From Groundwater Monitoring Plan Sampling, January 1986 Through November 1988—Well RR1

Parameter	RR1-10			RR1-20			RR1-30			Primary Drinking Water Standards	Secondary Drinking Water Standards
	Min	Max	N ^b	Min	Max	N ^b	Min	Max	N ^b		
Nitrate	0.69	2.72	0	0.78	1.25	0	0.75	2.3	0	10	—
Nitrite	<0.01	0.04	—	<0.01	0.06	—	<0.01	0.114	—	—	—
Ammonia	0.19	5.24	—	0.21	5.53	—	0.17	5.04	—	—	—
Chloride	175	675	12	235	450	10	192	380	13	250	—
Total Dissolved Solids	100	2,100	13	806	7,190	—	792	1,329	14	—	500
Chemical Oxygen Demand	25.2	229	—	22.4	134	—	25.6	128	—	—	—
Biological Oxygen Demand,											
5-Day	2.3	21.6	—	6.4	25	—	4.2	20.1	—	—	—
Cadmium	<0.001	0.008	0	<0.001	0.007	0	<0.001	0.006	0	0.01	—
Iron	<0.01	3.02	12	0.2	0.72	12	0.22	1.05	13	—	0.3
Copper	<0.001	0.014	0	<0.001	0.01	0	<0.001	0.012	0	—	1.0
Zinc	<0.001	0.02	0	<0.001	0.017	0	<0.001	0.055	0	—	5.0
Lead	<0.001	0.007	0	<0.001	0.21	1	<0.001	0.006	0	0.05	—
Chromium	<0.001	0.070	1	<0.001	0.07	1	<0.001	0.045	0	0.05	—
Mercury	<0.0001	<0.0002	0	<0.0001	<0.0002	0	<0.001	<0.002	0	0.002	—
Endrin	BDL	<0.0001	0	BDL	<0.0001	0	BDL	<0.00007	0	0.0002	—
Lindane	BDL	<0.0002	0	BDL	<0.0001	0	BDL	<0.0002	0	0.004	—
Toxaphene	BDL	<0.0001	0	BDL	<0.0001	0	BDL	<0.001	0	0.005	—
Methoxychlor	BDL	<0.0005	0	BDL	<0.0005	0	BDL	<0.005	0	0.10	—
Conductivity,											
μmho/cm	1,083	2,400	—	1,147	1,810	—	1,031	1,695	—	—	—
pH	6.66	7.82	13	6.3	8.05	13	6.58	7.45	13	—	>6.5

Note: BDL = below detection limits.

— = no standard.

μmho/cm = micromhos per centimeter.

^a All measurements are in milligrams per liter (mg/L) unless otherwise specified.^b Total number of times primary and/or secondary drinking water standards were exceeded, January 1986 through May 1988.

Sources: DERM, 1991.

KBN, 1992.

Table 2.3-4. Summary of Analytical Results^a From Groundwater Monitoring Plan Sampling, January 1986 Through November 1988—Well RR2

Parameter	RR2-10			RR2-20			RR2-30			RR2-60			Primary Drinking Water Standards	Secondary Drinking Water Standards
	Min	Max	N ^b	Min	Max	N ^b	Min	Max	N ^b	Min	Max	N ^b		
Nitrate	0.22	2	0	0.30	1.83	0	0.34	1.44	0	0.32	2.3	0	10	
Nitrite	<0.01	0.027	—	<0.01	0.02	—	<0.01	0.02	—	<0.01	0.04	—	—	—
Ammonia	<0.03	2.69	—	0.30	3.12	—	0.09	2.21	—	1.30	2.14	—	—	—
Chloride	53	320	1	42	345	1	70	330	1	60	240	0	250	
total Dissolved Solids	394	948	8	447	976	10	464	968	10	488	758	9		500
Chemical Oxygen Demand	17.6	96	—	16	150	—	25.6	147	—	28.4	93	—	—	—
Biological Oxygen Demand,														
5-Day	4.4	21.3	—	1.8	17.1	—	0.9	22.5	—	0.9	22.2	—	—	—
Cadmium	<0.001	0.005	0	<0.001	0.005	0	<0.001	0.004	0	<0.001	0.001	0	0.01	
Iron	0.16	1.67	7	0.19	5.65	10	0.29	1.105	13	4.74	41.5	10		0.3
Copper	<0.001	0.022	0	<0.001	0.007	0	<0.001	0.007	0	<0.001	0.006	0		1.0
Zinc	<0.001	0.03	0	<0.001	0.03	0	<0.001	0.04	0	<0.001	0.03	0		5.0
Lead	<0.001	0.027	0	<0.001	0.007	0	<0.001	0.028	0	<0.001	0.033	0	0.05	
Chromium	<0.001	0.131	1	<0.001	0.065	1	<0.001	0.05	0	<0.001	0.005	0	0.05	
Mercury	<0.0002	<0.001	0	<0.0002	<0.001	0	<0.0002	<0.001	0	<0.0002	<0.0002	0	0.002	
Endrin	BDL	<0.00007	0	BDL	<0.00007	0	BDL	0.00007	0	BDL	<0.00007	0	0.0002	
Lindane	BDL	<0.0002	0	BDL	<0.0002	0	BDL	0.0002	0	BDL	<0.0002	0	0.004	
Toxaphene	BDL	<0.001	0	BDL	<0.001	0	BDL	0.001	0	BDL	<0.001	0	0.005	
Methoxychlor	BDL	<0.005	0	BDL	<0.005	0	BDL	0.005	0	BDL	<0.005	0	0.10	
Conductivity,														
μmho/cm	450	1,610	—	504	1,830	—	517	1,640	—	653	8,781	—	—	
pH	6.43	7.25	0	6.67	7.93	0	6.47	7.71	0	6.5	7.98	0		>6.5

Note: BDL = below detection limits.

— = no standard.

μmho/cm = micromhos per centimeter.

^a All measurements are in milligrams per liter (mg/L) unless otherwise specified.^b Total number of times primary and/or secondary drinking water standards were exceeded, January 1986 through May 1988.

Sources: DERM, 1991.

KBN, 1992.

Table 2.3-5. Summary of Analytical Results^a From Groundwater Monitoring Plan Sampling, January 1986 Through November 1988--Well RR3

Parameter	RR3-10			RR3-20			RR3-30			Primary Drinking Water Standards	Secondary Drinking Water Standards
	Min	Max	N ^b	Min	Max	N ^b	Min	Max	N ^b		
Nitrate	0.61	2.26	0	0.45	2.26	0	0.42	1.99	0	10	
Nitrite	<0.01	0.06	—	<0.01	0.034	—	<0.01	0.009	—	—	—
Ammonia	<0.04	8.41	—	0.34	8.12	—	0.26	7.25	—	—	—
Chloride	315	530	13	125	520	11	160	410	13	250	
Total Dissolved Solids	970	1,857	13	777	1,366	14	748	1,264	14		500
Chemical Oxygen Demand	75.3	313	—	40	262.4	—	28.8	211.2	—	—	—
Biological Oxygen Demand, 5-Day	1.5	27	—	6.3	30	—	3.3	60	—	—	—
Cadmium	<0.001	0.004	0	<0.001	0.006	0	<0.001	.006	0	0.01	
Iron	<0.01	13,060	9	.12	1.49	5	.27	1.08	13		0.3
Copper	<0.001	.011	0	<0.001	.023	0	<0.001	.012	0		1.0
Zinc	<0.001	.04	0	<0.001	.063	0	0.001	0.052	0		5.0
Lead	<0.001	0.011	0	<0.001	0.087	1	<0.001	0.076	1	0.05	
Chromium	<0.001	0.018	0	<0.001	0.049	0	<0.001	0.026	0	0.05	
Mercury	<0.0002	<0.001	0	<0.0002	<0.001	0	<0.0002	<0.001	0	0.002	
Endrin	BDL	<0.00007	0	BDL	<0.00007	0	BDL	<0.00007	0	0.0002	
Lindane	BDL	<0.0002	0	BDL	<0.0002	0	BDL	<0.0002	0	0.004	
Toxaphene	BDL	<0.001	0	BDL	<0.001	0	BDL	<0.001	0	0.005	
Methoxychlor	BDL	<0.005	0	BDL	<0.005	0	BDL	<0.005	0	0.10	
Conductivity, μ mho/cm	677	2,620	—	1,028	2,370	—	925	1,990	—	—	
pH	6.22	7.26	0	6.18	7.38	0	6.28	9.13	0		>6.5

Note: BDL = below detection limits.

— = no standard.

 μ mho/cm = micromhos per centimeter.^a All measurements are in milligrams per liter (mg/L) unless otherwise specified.^b Total number of times primary and/or secondary drinking water standards were exceeded, January 1986 through May 1988.

Sources: DERM, 1991.

KBN, 1992.

Table 2.3-6. Summary of Analytical Results^a From Groundwater Monitoring Plan Sampling, January 1986 Through November 1988--Well RR4

Parameter	RR4-10			RR4-20			RR4-30			Primary Drinking Water Standards	Secondary Drinking Water Standards
	Min	Max	N ^b	Min	Max	N ^b	Min	Max	N ^b		
Nitrate	<0.13	0.78	0	0.12	1.26	0	<0.04	0.56	0	10	
Nitrite	<0.001	0.09	—	<0.01	0.015	—	<0.001	0.014	—	—	—
Ammonia	0.13	3.03	—	0.15	2.3	—	0.7	1.74	—	—	—
Chloride	30	458	1	25	132	—	25	85	—	250	
Total Dissolved Solids	351	581	2	341	675	3	354	603	1		500
Chemical Oxygen Demand	27.2	101	—	14.4	107	—	22.6	193	—	—	—
Biological Oxygen Demand, 5-Day	3	21.9	—	2.1	30	—	2.1	21.3	—	—	—
Cadmium	<0.001	0.001	0	<0.001	0.004	0	<0.001	0.004	0	0.01	
Iron	0.22	1.64	10	0.14	0.98	6	0.2	1.55	13		0.3
Copper	<0.001	0.013	0	<0.001	0.006	0	<0.001	0.006	0		1.0
Zinc	<0.001	0.04	0	0.001	0.04	0	<0.001	0.05	0		5.0
Lead	<0.001	0.006	0	<0.001	0.007	0	<0.001	0.04	0	0.05	
Chromium	<0.001	0.045	0	<0.001	0.06	1	<0.001	0.1	1	0.05	
Mercury	<0.0002	<0.001	0	<0.0002	<0.001	0	<0.0002	<0.001	0	0.002	
Endrin	BDL	<0.00007	0	BDL	<0.00007	0	BDL	<0.00007	0	0.0002	
Lindane	BDL	<0.0002	0	BDL	<0.0002	0	BDL	<0.0002	0	0.004	
Toxaphene	BDL	<0.001	0	BDL	<0.001	0	BDL	<0.001	0	0.005	
Methoxychlor	BDL	<0.005	0	BDL	<0.005		BDL	<0.005	0	0.10	
Conductivity, μ mho/cm	493	780	—	483	940	—	455	732	—	—	
pH	5.76	7.44	0	6.40	7.38	0	5.88	7.15	0		>6.5

Note: BDL = below detection limits.

— = no standard.

 μ mho/cm = micromhos per centimeter.^a All measurements are in milligrams per liter (mg/L) unless otherwise specified.^b Total number of times primary and/or secondary drinking water standards were exceeded, January 1986 through May 1988.

Sources: DERM, 1991.

KBN, 1992.

Table 2.3-7. Summary of Analytical Results^a From Groundwater Monitoring Plan Sampling, January 1986 Through November 1988--Well NW18

Parameter	NW18-20			NW18-60			Primary Drinking Water Standards	Secondary Drinking Water Standards
	Min	Max	N ^b	Min	Max	N ^b		
Nitrate	0.74	1.62	0	0.28	1.40	0	10	
Nitrite	<0.01	0.01	—	<0.01	0.01	—	—	—
Ammonia	2.30	5.51	—	1.2	1.95	—	—	—
Chloride	193	400	6	120	315	1	250	
Total Dissolved Solids	707	1,099	10	502	693	10		500
Chemical Oxygen Demand	54	118.4	—	19.2	720	—	—	—
Biological Oxygen Demand, 5-Day	1.8	18.4	—	3	21.3	—	—	—
Cadmium	<0.001	0.002	0	<0.001	0.001	0	0.01	
Iron	1.81	17.3	10	1.980	16.1	10		0.3
Copper	<0.001	0.004	0	<0.001	0.006	0		1.0
Zinc	<0.001	0.55	0	0.001	1.25	0		5.0
Lead	0.003	0.112	1	<0.001	0.156	1	0.05	
Chromium	<0.001	0.005	0	<0.001	0.003	0	0.05	
Mercury	<0.0002	<0.0002	0	<0.0002	<0.0002	0	0.002	
Endrin	BDL	<0.00007	0	BDL	<0.00007	0	0.0002	
Lindane	BDL	<0.0002	0	BDL	<0.0002	0	0.004	
Toxaphene	BDL	<0.001	0	BDL	<0.001	0	0.005	
Methoxychlor	BDL	<0.005	0	BDL	<0.005	0	0.10	
Conductivity, μ mho/cm	1,084	1,502	—	729	1,090	—	—	
pH	6.64	7.43	0	6.31	7.19	0		>6.5

Note: BDL = below detection limits.

— = no standard.

 μ mho/cm = micromhos per centimeter.^a All measurements are in milligrams per liter (mg/L) unless otherwise specified.^b Total number of times primary and/or secondary drinking water standards were exceeded, January 1986 through May 1988.

Sources: DERM, 1991.

KBN, 1992.

Table 2.3-8. Summary of Analytical Results From Groundwater Monitoring Plan Sampling, January 1986 Through November 1988--Well NW23

Parameter	NW23-30			NW23-60			Primary Drinking Water Standards	Secondary Drinking Water Standards
	Min	Max	N ^b	Min	Max	N ^b		
Nitrate	0.21	1.18	0	0.23	1.23	0	10	
Nitrite	<0.01	0.01	—	<0.01	0.02	—	—	—
Ammonia	<0.01	18.88	—	<0.02	22.92	—	—	—
Chloride	70	240	0	60	87	0	250	
Total Dissolved Solids	414	562	5	456	554	8		500
Chemical Oxygen Demand	30	190.4	—	42	148.8	—	—	—
Biological Oxygen Demand, 5-Day	1.2	21.3	—	0.3	22.2	—	—	—
Cadmium	<0.001	0.001	0	<0.001	0.001	0	0.01	
Iron	1.05	14.2	10	2.07	20.7	10		0.3
Copper	<0.001	0.009	0	<0.001	0.005	0		1.0
Zinc	0.001	0.04	0	<0.001	0.04	0		5.0
Lead	0.003	0.068	1	0.001	0.019	0	0.05	
Chromium	<0.001	0.005	0	<0.001	0.006	0	0.05	
Mercury	<0.0002	<0.0002	0	<0.0002	<0.0002	0	0.002	
Endrin	BDL	<0.00007	0	BDL	<0.00007	0	0.0002	
Lindane	BDL	0.0002	0	BDL	<0.0002	0	0.004	
Toxaphene	BDL	<0.001	0	BDL	<0.001	0	0.005	
Methoxychlor	BDL	0.005	0	BDL	<0.005	0	0.10	
Conductivity, μ mho/cm	666	1,031	—	746	1,008	—	—	
pH	6.36	7.03		6.49	7.06	0		>6.5

Note: BDL = below detection limits.

— = no standard.

 μ mho/cm = micromhos per centimeter.^a All measurements are in milligrams per liter (mg/L) unless otherwise specified.^b Total number of times primary and/or secondary drinking water standards were exceeded, January 1986 through May 1988.

Sources: DERM, 1991.

KBN, 1992.

Table 2.3-9. Summary of Analytical Results^a From Groundwater Monitoring Plan Sampling, January 1986 Through November 1988--Well M2

Parameter	M2-10			M2-60			Primary Drinking Water Standards	Secondary Drinking Water Standards
	Min	Max	N ^b	Min	Max	N ^b		
Nitrate	0.10	2.42	0	0.08	1.26	0	10	
Nitrite	<0.01	0.01	—	<0.01	0.01	—	—	—
Ammonia	<0.01	0.82	—	0.88	1.08	—	—	—
Chloride	20	65	0	35	75	0	250	
Total Dissolved Solids	348	531	1	344	400	0		500
Chemical Oxygen Demand	21	62.4	—	25	64	—	—	—
Biological Oxygen Demand, 5-Day	0.6	21.5	—	2.4	14.4	—	—	—
Cadmium	<0.001	0.001	0	<0.001	0.001	0	0.01	
Iron	0.21	7.4	9	2.12	13.1	8		0.3
Copper	<0.001	0.003	0	<0.001	0.003	0		1.0
Zinc	<0.001	0.03	0	<0.001	0.05	0		5.0
Lead	<0.001	0.007	0	<0.001	0.006	0	0.05	
Chromium	<0.001	0.005	0	<0.001	0.004	0	0.05	
Mercury	<0.0002	<0.0002	0	<0.0002	<0.0002	0	0.002	
Endrin	BDL	<0.0007	0	BDL	<0.0007	0	0.0002	
Lindane	BDL	<0.0002	0	BDL	<0.0002	0	0.004	
Toxaphene	BDL	<0.001	0	BDL	<0.001	0	0.005	
Methoxychlor	BDL	<0.005	0	BDL	<0.005	0	0.10	
Conductivity, μ mho/cm	497	712	—	445	599	—	—	
pH	6.52	7.15	0	6.33	7.25	0		>6.5

Note: BDL = below detection limits.

— = no standard.

 μ mho/cm = micromhos per centimeter.^a All measurements are in milligrams per liter (mg/L) unless otherwise specified.^b Total number of times primary and/or secondary drinking water standards were exceeded, January 1986 through May 1988.

Sources: DERM, 1991.

KBN, 1992.

2.3.3 SITE WATER BUDGET AND AREA USERS

The climate of Dade County is tropical with a significant marine influence from the Atlantic Ocean and Biscayne Bay. The mean monthly temperature varies from 67 degrees Fahrenheit (°F) in January to 83°F in August, with a mean annual temperature of 75.7°F (NCDC, 1990). Table 2.3-10 shows monthly mean temperatures and extreme temperatures for the area.

The average annual rainfall is approximately 58 inches, with wide fluctuations in yearly totals (NCDC, 1990). More than 75 percent of the annual precipitation falls during the 6 warmest months, May through October. The majority of rain is in the form of short-lived convective showers. Precipitation means and extremes are presented in Table 2.3-11.

It is estimated that evaporation from surface waters and transpiration from the water table return 35 inches or 60 percent of the average annual rainfall (58 inches) to the atmosphere. Approximately 20 inches of precipitation percolates into the aquifer. The remaining 3 inches of total rainfall flows to the canal system and ultimately is recharged to groundwater. There is very little standing surface water in the area (personal communication, Mr. Hernandez, DERM).

The major use of water in the area is public water supply. The primary source of public water supply in Dade County is groundwater. The Miami Springs wellfield, located 2 to 3 miles from the plant site (Figure 2.3-5), uses the Biscayne aquifer as a water source. The wellfield is one of the major sources of water supply for the greater Miami area, with a capacity of about 130 million gallons per day (mgd) or approximately 40 percent of the estimated public supply use in the county. The Miami Canal conveys water from the Okeechobee-Everglades system and serves as a recharge source for the wellfield. The Doral Country Club sewage treatment and disposal system south of the 58th Street landfill discharges treated effluent into a private lake. Agricultural irrigation in the vicinity of the site is minor. Most of the land within 5 miles of the site is in urban development, undeveloped, or controlled by some form of government (ESE, 1977).

Table 2.3-10. Monthly Temperature Means and Extremes for Miami, Florida--1961 Through 1990

Month	Temperature (°F)		
	Mean	Maximum	Minimum
January	67.1	75.5	58.7
February	68.1	76.6	59.5
March	71.4	79.5	63.3
April	74.8	82.6	67.1
May	78.2	85.4	70.9
June	81.2	88.0	74.6
July	82.5	89.3	75.6
August	82.8	89.7	75.9
September	81.7	88.2	75.2
October	78.1	84.7	71.4
November	72.9	80.2	65.7
December	68.8	76.8	60.8
Annual	75.7	83.1	68.2

Sources: National Climatic Data Center (NCDC), 1990.
KBN, 1992.

Table 2.3-11. Monthly Precipitation Means and Extremes for Miami, Florida--1961 Through 1990

Month	Precipitation (inches)		
	Mean	Maximum	Minimum
January	1.97	6.66	0.18
February	1.92	8.07	0.10
March	2.28	10.57	0.23
April	3.57	17.29	0.07
May	6.16	18.54	0.44
June	8.61	22.36	3.02
July	6.65	11.23	1.77
August	7.40	14.60	3.24
September	8.31	14.79	3.09
October	6.68	16.79	1.25
November	2.75	7.09	0.09
December	1.80	6.24	0.12
Annual	58.11	83.39	39.10

Sources: National Climatic Data Center (NCDC), 1990.
KBN, 1992.

2.3.4 SURFICIAL HYDROLOGY

The DCRRF site is surrounded by canals (Figure 2.3-5). These canals include the Snapper Creek Canal to the west, the Miami Canal to the north, a canal parallel to the Florida East Coast Line to the east, the 58th Street Canal to the south, and the Dressel Canal south of the site. In this part of the state, the surface water and groundwater systems (i.e., Biscayne aquifer) are highly interconnected. The average water table and surface water levels are equal because the aquifer is under water-table conditions. The closest major surface water feature to the site is the Miami Canal located 2 miles northeast of the site. Two large quarry ponds, each approximately 1 square mile in surface area, are located north and northeast of the site.

The Miami Canal is tidally affected and is occasionally subjected to flow reversals. The average discharge of the Miami Canal is 251 cubic feet per second (cfs), or 181,800 acre-feet per year (acre-ft/year) [U.S. Geological Survey (USGS), 1989]. Water stage in the Snapper Canal ranges from a minimum of 1.13 ft National Geodetic Vertical Datum (NGVD) to a maximum of 4.47 ft NGVD (USGS, 1989).

2.3.5 VEGETATION/LAND USE

The existing DCRRF encompasses 160 acres of land. The existing MSW/RDF processing facilities, combustion units, and electrical generating facilities are located within the southeast 40-acre block of the site. The existing ash landfill occupies the northwest 40-acre block. The proposed expansion of the DCRRF in northwest Dade County will be accomplished entirely within the 160 acres of the existing facility.

The natural habitat of the entire site has been disturbed previously. The 40-acre plant site is FLUCFCS code 831, which is an electrical power facility. The ash landfill is categorized as FLUCFCS 835.

The southwest 40-acre block was filled to a depth of a few feet (FLUCFCS 744) during initial construction of the facility, and is currently in the same state. There is no standing water and the vegetation is primarily early successional and weedy which is represented by dog fennel (*Eupatorium capillifolium*), melaleuca (*Melaleuca quinquenervia*), showy croton (*Crotalaria spectabilis*), seashore paspalum (*Paspalum vaginatum*), slender amaranth (*Amaranthus viridis*), and coral dropseed (*Sporobolus domingensis*).

The northeast 40-acre block is comprised of 10 acres in the southwest corner which has been cleared and 30 acres of ditched and bermed vegetation. The 10-acre cleared area (FLUCFCS 194) contains a water retention pond of approximately 3 acres (FLUCFCS 534). The 30-acre vegetated area is dominated by melaleuca (FLUCFCS 424).

2.3.6 ECOLOGY

Prior to urbanization of the region, this area was a part of the Everglades which covered South Florida (Davis, 1943). No rare or endangered species of plants or animals are known to occur on the site [Florida Natural Areas Inventory (FNAI), 1990; Florida Game and Fresh Water Fish Commission (FGFWFC), 1991], and the likelihood of such species being found on the site is low because of the unique habitat requirements of the species and the disturbed nature of the site. Representative plant species found on the DCRRF site are listed in Table 2.3-12; typical fauna possibly associated with the DCRRF site are listed in Table 2.3-13. Rare and endangered plant and animal species and species of special concern which might reasonably be found in the vicinity of the DCRRF site are listed in Table 2.3-14.

Several species of birds considered species of special concern (FNAI) have been seen in the area when water levels are high enough to provide adequate feeding. However, the present disturbed nature of the site lowers the probability of their use of the site as a feeding area.

Botanical publications dealing with this area of Florida are conveniently listed in the compendium A Bibliography of South Florida Botany by Lloyd Loope (1980). Ecosystems of Florida (Myers and Ewel, 1990) also has extensive references, many of which are applicable to this area, for both plants and animals.

2.3.6.1 SPECIES-ENVIRONMENTAL RELATIONSHIPS

Game species including rabbits (*Sylvilagus palustris* and possibly *S. floridanus*) and mourning dove (*Zenaidura macroura*) are found in the area or are known to pass through the area. Bobcats (*Felis rufus*) and rodents (Family Cricetidae) are also reported to be found in this habitat.

2.3.6.2 PRE-EXISTING STRESSES

The most indicative plant or animal species found on this site is melaleuca. This plant is a tree introduced from Australia. Melaleuca makes up approximately 90 percent of the canopy on the 30 acres which is still vegetated. This tree is an indicator of disturbance of the wetland system. Ecological changes which favor this pest include changes in the hydroperiod (lack of prolonged flooding), destruction of natural vegetation, and lack of fire (Myers, 1975). Melaleuca out-competes other plant species (Myers, 1975). The dense stands effectively reduce the light available for understory species. The few ferns, the introduced weedy *Schefflera*, and the native

Table 2.3-12. Representative Plant Species of the DCRRF Site (Page 1 of 2)

Common Name	Scientific Name
<u>Dominant</u>	
Melaleuca	<i>Melaleuca quinquenervia</i>
<u>Understory</u>	
Royal Fern	<i>Osmunda regalis</i>
Hairy Maiden Fern	<i>Thelypteris hispidula</i>
Ladder Brake	<i>Pteris vitata</i>
Swamp Fern	<i>Blechnum serrulatum</i>
Schefflera	<i>Schefflera actinophylla</i>
Dahoon Holly	<i>Ilex cassine</i>
<u>Edges and Openings</u>	
Saw-grass	<i>Cladium jamaicense</i>
Silk Reed	<i>Neyraudia reynaudiana</i>
Bushy Fleabane	<i>Pluchea symphytifolia</i>
Swamp Bay	<i>Persea palustris</i>
Dahoon Holly	<i>Ilex cassine</i>
Strangler Fig	<i>Ficus aurea</i>
Brazilian Pepper Tree	<i>Schinus terebinthifolius</i>
White Bachelor's-button	<i>Polygala balduinii</i>
Willow Busic	<i>Bumelia salicifolia</i>
Yellow-top	<i>Flaveria linearis</i>
Marlberry	<i>Ardisia escallonioides</i>

Table 2.3-12. Representative Plant Species of the DCRRF Site (Page 2 of 2)

Common Name	Scientific Name
<u>Edges and Openings (continued)</u>	
Phyla	<i>Phyla stoechadifolia</i>
Florida Trema	<i>Trema micrantha</i>
Torpedo Grass	<i>Panicum repens</i>
Australian-pine	<i>Casuarina</i> hybrid
Showy Crotalaria	<i>Crotalaria spectabilis</i>
Seashore Paspalum	<i>Paspalum vaginatum</i>
Coral Dropseed	<i>Sporobolus domingensis</i>
Slender Amaranth	<i>Amaranthus viridis</i>

Source: KBN, 1992.

Table 2.3-13. Typical Fauna Possibly Associated With the DCRRF Site (Page 1 of 3)

Common Name	Scientific Name
<u>Birds</u>	
Great Blue Heron	<i>Ardea herodias</i>
Great Egret	<i>Casmerodius albus</i>
Green Heron	<i>Butorides striatus</i>
Snowy Egret	<i>Egretta thula</i>
Tricolored Heron	<i>Egretta tricolor</i>
White Ibis	<i>Eudocimus albus</i>
Turkey Vulture	<i>Cathartes aura</i>
Black Vulture	<i>Coragyps atratus</i>
Sharp-shinned Hawk	<i>Accipiter striatus</i>
Red-tailed Hawk	<i>Buteo jamaicensis</i>
Red-shouldered Hawk	<i>Buteo lineatus</i>
Marsh Hawk	<i>Circus cyaneus</i>
King Rail	<i>Rallus elegans</i>
Common Gallinule	<i>Gallinula chloropus</i>
Killdeer	<i>Charadrius vociferus</i>
Common Snipe	<i>Capella gallinago</i>
Laughing Gull	<i>Larus atricilla</i>
Ring-billed Gull	<i>Larus delawarensis</i>
Mourning Dove	<i>Zenaida macroura</i>
Ground Dove	<i>Columbina passerina</i>
Smooth-billed Ani	<i>Crotophaga ani</i>
Barn Owl	<i>Tyto alba</i>
Barred Owl	<i>Strix varia</i>
Common Nighthawk	<i>Chordeiles minor</i>
Belted Kingfisher	<i>Megaceryle alcyon</i>
Common Flicker	<i>Colaptes auratus</i>
Red-bellied Woodpecker	<i>Melanerpes carolinus</i>
Downy Woodpecker	<i>Picoides pubescens</i>
Tree Swallow	<i>Iridoprocne bicolor</i>
Rough-winged Swallow	<i>Stelgidopteryx ruficollis</i>

Table 2.3-13. Typical Fauna Possibly Associated With the DCRRF Site (Page 2 of 3)

Common Name	Scientific Name
<u>Birds (continued)</u>	
Barn Swallow	<i>Hirundo rustica</i>
Purple Martin	<i>Progne subis</i>
Blue Jay	<i>Cyanocitta cristata</i>
Common Crow	<i>Corvus brachyrhynchos</i>
House Wren	<i>Troglodytes aedon</i>
Carolina Wren	<i>Thryothorus ludovicianus</i>
Northern Mockingbird	<i>Mimus polyglottos</i>
Grey Catbird	<i>Cumetella carolinensis</i>
Brown Thrasher	<i>Toxostoma rufum</i>
American Robin	<i>Turdus migratorius</i>
Blue-gray Gnatcatcher	<i>Polioptila caerulea</i>
Loggerhead Shrike	<i>Lanius ludovicianus</i>
Starling	<i>Sturnus vulgaris</i>
White-eyed Vireo	<i>Vireo griseus</i>
Black and White Warbler	<i>Mniotilta varia</i>
Black-throated Blue Warbler	<i>Dendroica caerulescens</i>
Black-poll Warbler	<i>Dendroica striata</i>
Prairie Warbler	<i>Dendroica discolor</i>
Palm Warbler	<i>Dendroica palmarum</i>
Northern Waterthrush	<i>Seiurus noveboracensis</i>
Common Yellowthroat	<i>Geothlypis trichas</i>
American Redstart	<i>Setophaga ruticilla</i>
Eastern Meadowlark	<i>Sturnella magna</i>
Red-winged Blackbird	<i>Agelaius phoeniceus</i>
Boat-tailed Grackle	<i>Quiscalus major</i>
Common Grackle	<i>Quiscalus quiscula</i>
American Goldfinch	<i>Carduelis tristis</i>
Rufous-sided Towhee	<i>Pipilo erythrophthalmus</i>

Table 2.3-13. Typical Fauna Possibly Associated With the DCRRF Site (Page 3 of 3)

Common Name	Scientific Name
<u>Mammals</u>	
Opossum	<i>Didelphis marsupialis</i>
Least Shrew	<i>Cryptotis parva</i>
Marsh Rabbit	<i>Sylvilagus palustris</i>
Cottontail Rabbit	<i>Sylvilagus floridanus</i>
Rice Rat	<i>Oryzomys palustris</i>
Cotton Rat	<i>Sigmodon hispidus</i>
Raccoon	<i>Procyon lotor</i>
Mink	<i>Mustela vison</i>
Striped Skunk	<i>Mephitis mephitis</i>
Bobcat	<i>Lynx rufus</i>
White-tail Deer	<i>Odocoileus virginianus</i>
Black-tailed Jackrabbit	<i>Lepus californicus</i>
Black Rat	<i>Rattus rattus</i>
House Mouse	<i>Mus musculus</i>
Grey Fox	<i>Urocyon cinereoargenteus</i>
<u>Amphibians</u>	
Oak Toad	<i>Bufo quercicus</i>
Squirrel Treefrog	<i>Hyla squirella</i>
<u>Reptiles</u>	
Yellow Rat Snake	<i>Elaphe obsoleta quadrivita</i>
Everglades Racer	<i>Coluber constrictor paludicola</i>
Southern Black Racer	<i>Coluber constrictor priapus</i>
Yellow-bellied Turtle	<i>Chrysemys scripta scripta</i>
Florida Box Turtle	<i>Terrapene carolina bauri</i>

Source: KBN, 1992.

Table 2.3-14. Rare and Endangered Species and Species of Special Concern Which Might Reasonably Be Found in the Vicinity of the DCRRF Site (Page 1 of 3)

Common Name	Scientific Name	Species of Regulatory Concern	
		USFWS	FDA
<u>Plants</u>			
Ray Fern	<i>Actinostachys pennula</i>	3B	E
Southern Maidenhair Fern	<i>Adiantum capillus-veneris</i>	N	T*
Fragrant Maidenhair Fern	<i>Adiantum melanoleucum</i>	N	E
Brittle Maidenhair Fern	<i>Adiantum tenerum</i>	N	T*
Four-leaved Maidenhair Fern	<i>Adiantum tetraphyllum</i>	N	T*
Crenulate Lead-plant	<i>Amorpha crenulata</i>	E	E
Blodgett's Wild-mercury	<i>Argythamnia blodgettii</i>	C2	E
Auricled Spleenwort	<i>Asplenium auritum</i>	N	E
Bird's Nest Spleenwort	<i>Asplenium serratum</i>	N	E
Slender Spleenwort	<i>Asplenium trichomanes</i>	N	T*
Florida Thoroughwort Brickell-bush	<i>Brickellia mosieri</i>	C2	E
Narrow-leaved Strap Fern	<i>Campyloneurum angustifolium</i>	N	E
Southern Lip Fern	<i>Cheilanthes microphylla</i>	N	E
Cow-horned Orchid	<i>Cyrtopodium punctatum</i>	N	E
Florida White-top Sedge	<i>Dichromena floridensis</i> ^a	N	N
Orchid	<i>Eltroplectris calcarata</i>	N	E
Narrow-leaved Carolina Scalystem	<i>Elytraria caroliniensis</i> var. <i>angustifolia</i>	C2	N
Dollar Orchid	<i>Encyclia boothiana</i>	C2	E
Night-scented Orchid	<i>Epidendrum nocturnum</i>	N	T*
Red Stopper	<i>Eugenia rhombea</i>	N	E
Tampa Vervain	<i>Glandularia tampensis</i>	C1	E
Wild Cotton	<i>Gossypium hirsutum</i>	N	E
Fuch's Bromeliad	<i>Guzmania monostachia</i>	N	E
Krug's Holly	<i>Ilex krugiana</i>	N	E
Delicate Ionopsis	<i>Ionopsis utricularioides</i>	N	E
Wild-potato Morning-glory	<i>Ipomoea microdactyla</i>	N	E
Pineland Jacquemontia	<i>Jacquemontia curtisii</i>	C2	E

Table 2.3-14. Rare and Endangered Species and Species of Special Concern Which Might Reasonably Be Found in the Vicinity of the DCRRF Site (Page 2 of 3)

Common Name	Scientific Name	Species of Regulatory Concern	
		USFWS	FDA
<u>Plants (continued)</u>			
Lowland Loosestrife	<i>Lythrum flagellare</i>	C2	N
Hand Fern	<i>Ophioglossum palmatum</i>	3C	E
Everglades Peperomia	<i>Peperomia floridana</i>	3B	E
Terrestrial Peperomia	<i>Peperomia humilis</i>	N	E
Blunt-leaved Peperomia	<i>Peperomia obtusifolia</i>	N	E
Boykin's Few-leaved Milkwort	<i>Polygala boykinii</i> var. <i>sparsifolia</i>	C2	N
Ghost Orchid	<i>Polyprrhiza lindenii</i>	N	E
Queen's Delight	<i>Stillingia sylvatica</i> ssp. <i>tenuis</i>	C2	N
Young-palm Orchid	<i>Tropidia polystachua</i>	N	E
Worm-vine Orchid	<i>Vanilla mexicana</i>	N	T*
<u>Reptiles</u>			
American Alligator	<i>Alligator mississippiensis</i>	T(S/A)	SSC
Eastern Indigo Snake	<i>Drymarchon corais couperi</i>	T	T
Miami Black-headed Snake	<i>Tantilla oolitica</i>	C2	T
<u>Birds</u>			
Cooper's Hawk	<i>Accipiter cooperii</i> ^a	N	N
Roseate Spoonbill	<i>Ajaia ajaja</i>	C2	SSC
Limpkin	<i>Aramus guarauna</i>	N	SSC
Short-tailed Hawk	<i>Buteo brachyurus</i> ^a	N	N
Great Egret	<i>Casmerodius albus</i> ^a	N	N
Antillean Nighthawk	<i>Chordeiles gundlachii</i> ^a	N	N
Little Blue Heron	<i>Egretta rufescens</i>	N	SSC
Snowy Egret	<i>Egretta thula</i>	N	SSC
Tricolored Heron	<i>Egretta tricolor</i>	N	SSC
Black-shouldered Kite	<i>Elanus caeruleu</i> ^a	N	N

Table 2.3-14. Rare and Endangered Species and Species of Special Concern Which Might Reasonably Be Found in the Vicinity of the DCRRF Site (Page 3 of 3)

Common Name	Scientific Name	Species of Regulatory Concern	
		USFWS	FDA
<u>Birds (continued)</u>			
White Ibis	<i>Eudocimus albus</i> ^a	N	N
Merlin	<i>Falco columbarius</i> ^a	N	N
Peregrine Falcon	<i>Falco peregrinus</i> ^a	N	N
Wood Stork	<i>Mycteria americana</i>	E	E
Yellow-crowned Night-heron	<i>Nyctanassa violacea</i> ^a	N	N
Black-crowned Night-heron	<i>Nycticorax nycticorax</i> ^a	N	N
Hairy Woodpecker	<i>Picoides villosus</i> ^a	N	N
Glossy Ibis	<i>Plegadis falcinellus</i> ^a	N	N
<u>Mammals</u>			
Everglades Mink	<i>Mustela vison evergladensis</i>	C2	T
Round-tailed Muskrat	<i>Neofiber alleni</i>	C2	N

Note: E = Endangered

T = Threatened

T* = Proposed threatened

T(S/A) = Threatened due to Similarity of appearance.

C1 = A candidate for federal listing, with enough substantial information on biological vulnerability and threats to support proposals for listing.

C2 = A candidate for listing, with some evidence of vulnerability, but for which not enough data exist to support listing.

3B = Taxa which are no longer being considered due to questionable taxonomy.

3C = Taxa which have proven to be more abundant than would warrant listing as threatened or endangered.

N = Not listed.

SSC = Species of special concern.

^a Species of conservation interest (FNAI, 1990).

Source: KBN, 1992.

dahoon holly are practically all that will survive at this site under such reduced light. This lower habitat diversity leads to lower animal diversity.

Wetlands have recognized environmental values which provide important services to man [Moler and Franz, 1987; Myers and Ewel, 1990; Weller, 1978; Chapters 120, 373, and 403, Florida Statute (FS); Chapters 17-40, 40E-4, and 40E-40, Florida Administrative Code (F.A.C.); Federal Water Pollution Control Act, Section 404, Clean Water Act]. Because of the altered nature of the DCRRF site, the values of some of these services to man is lower on the site than in undisturbed wetlands. The entire 30-acre vegetated area of this site is surrounded by ditches and berms. Additionally, three sides are bordered by roads and the fourth is occupied by the ash disposal site and retention pond.

2.3.6.3 MEASUREMENT PROGRAMS

Wildlife and plants on the property were surveyed by walking throughout the entire site. The vegetated area was transected by walking along all the ditches and through the vegetation. The 30 acres of vegetation is divided into approximately 10-acre sections by several ditches and roads. The intrusions through the vegetation result in many open edges along the Melaleuca stands. An "edge effect" is exhibited by these margins as they are filled in with dense stands of plants which are primarily weedy. Rather than record all of these common weedy plant species, the edges were searched for endangered, threatened, and species of special concern and a few of these plants were recorded as examples. Plant identifications were verified by D.W. Hall using Long and Lakela, 1971; Wunderlin, 1982; and Scurlock, 1987.

2.3.7 METEOROLOGY AND AMBIENT AIR QUALITY

2.3.7.1 METEOROLOGY

Meteorological data collected at existing monitoring stations were used to describe the local and regional climatology representative of the DCRRF site. The meteorological station located closest to the site which has available complete meteorological data is the primary National Weather Service (NWS) station located at the Miami International Airport. This NWS station is situated approximately 10 kilometers (km) (6 miles) to the east-southeast of the site. The NWS has recorded weather observations for more than 50 years at this site, and these data are the most complete and representative for the region surrounding the DCRRF site.

2.3.7.1.1 Temperature

The climate in the south Florida area, including the project site, is tropical with a marine influence from the Atlantic Ocean and Biscayne Bay. Temperature means and extremes for Miami are presented in Table 2.3-15. The mean annual temperature is 76°F, with mean monthly temperatures varying from a maximum of 89°F to a minimum of 59°F. Record extreme temperatures range from a low of 30°F to a record high of 98°F. Although the sun's elevation is nearly zenith during the summertime, temperatures usually do not exceed 100°F. The reason can be attributed to the high relative humidities with subsequent cloud cover formation and the abundant convective-type precipitation.

2.3.7.1.2 Relative Humidity and Precipitation

Relative humidity, an indication of the amount of moisture in the air at a given temperature, is presented for Miami in Table 2.3-16 for the morning hours of 0100 and 0700 and early afternoon and evening hours of 1300 and 1900. The highest humidities are coincident with the coolest ambient temperatures, which generally occur at 0700 or near dawn. The lowest humidities coincide with the highest ambient temperatures.

Precipitation means and extremes for Miami are also presented in Table 2.3-16. Approximately 76 percent of the annual precipitation falls during the 6 warmest months, May through October. The mean annual precipitation is 58 inches, but this has varied from as little as 37 inches to over 89 inches in the last 30 years. The majority of rain is in the form of short-lived convective showers.

Table 2.3-15. Temperature (°F) Means and Extremes Measured at Miami International Airport

Month	Temperature Means			Temperature Extremes ^a	
	Mean ^a	Maximum ^b	Minimum ^b	Maximum	Minimum
January	67.1	75.0	59.2	88	30
February	68.1	75.8	59.7	89	32
March	71.4	79.3	64.1	92	32
April	74.8	82.4	68.2	96	46
May	78.2	85.1	71.9	95	53
June	81.2	87.3	74.6	98	60
July	82.5	88.7	76.2	98	69
August	82.8	89.2	76.5	98	68
September	81.7	87.8	75.7	97	68
October	78.1	84.2	71.6	95	51
November	72.9	79.8	65.8	89	39
December	68.8	76.2	60.8	87	30
Annual	75.7	82.6	68.7	98	30

^a51-year period of record, 1940 to 1990.^b30-year period of record, 1951 to 1980.

Sources: National Oceanic and Atmospheric Administration (NOAA), 1990.
KBN, 1992.

Table 2.3-16. Precipitation and Diurnal Relative Humidity Measured at Miami International Airport

Month	Precipitation (inches)			Relative Humidity ^c (%) hour (LT)			
	Mean ^a	Maximum ^b	Minimum ^b	0100	0700	1300	1900
January	1.97	6.66	0.04	81	84	59	69
February	1.92	8.07	0.01	79	83	57	66
March	2.28	10.57	0.02	77	82	56	65
April	3.57	17.29	0.05	76	80	53	63
May	6.16	18.54	0.44	79	81	59	69
June	8.61	22.36	1.81	83	84	65	74
July	6.65	13.51	1.77	82	84	63	72
August	7.40	16.88	1.65	83	86	65	74
September	8.31	24.40	2.63	85	88	66	76
October	6.68	21.08	1.25	82	86	63	73
November	2.75	13.15	0.09	81	85	61	71
December	1.80	6.39	0.12	79	83	60	70
Annual	58.11	89.33	37.00	81	84	61	70

Note: LT = local time.

^a30-year period of record, 1951 to 1980.

^b48-year period of record, 1943 to 1990.

^c26-year period of record, 1965 to 1990.

Sources: NOAA, 1990.
KBN, 1992.

2.3.7.1.3 Wind Patterns

The DCRRF site area lies entirely within the trade wind belt (i.e., below 30°N latitude) resulting in predominant winds from the east. Also, because of the location of the Atlantic Ocean, moderate to strong late afternoon sea breezes occur on days in which strong land heating occurs. These sea breezes produce locally onshore winds (i.e., wind with an easterly component) which are superimposed on the frequent easterly trade winds. Annual and seasonal wind roses for Miami for the 5-year period from 1982 through 1986 are given in Figures 2.3-6 and 2.3-7. A summary of the average wind speeds for each season and annually, including calm conditions, is presented in Table 2.3-17. As indicated in the figures and tables, the predominant wind throughout the year is from the east.

2.3.7.1.4 Atmospheric Stability

Atmospheric stability is a measure of the atmosphere's capability to disperse pollutants. During the daytime, when clear skies and strong solar insolation occur, the atmosphere can disperse pollutants quickly for a relatively short period of time. This condition is characterized as "very unstable" and generally occurs infrequently during the year. During the nighttime, under clear skies and light wind speeds, the atmosphere is characterized as stable, with low potential to disperse pollutants. Under moderate to high wind speeds during day or night, pollutants are dispersed at moderate rates, and the atmosphere is characterized as "neutral". Neutral conditions are generally more prevalent throughout the year than the other stability categories.

The seasonal and annual average occurrences of atmospheric stability classes are shown in Table 2.3-18. Frequent and strong sea breezes cause a predominance of neutral and stable air (neutral and stable classes), counteracting the effect of high incidence of sunshine over the land areas. During the summer months in Miami, unstable classes occur nearly 36 percent of the time due to strong insolation, while occurring only 14 percent of the time during the winter months. Neutral stability occurs most frequently during the winter months due to the higher wind speeds in this season. Stable conditions occur nearly uniformly throughout the year in Miami, with a maximum occurrence of approximately 43 percent in the fall. The annual and seasonal stability frequencies for West Palm Beach are similar to those for Miami.

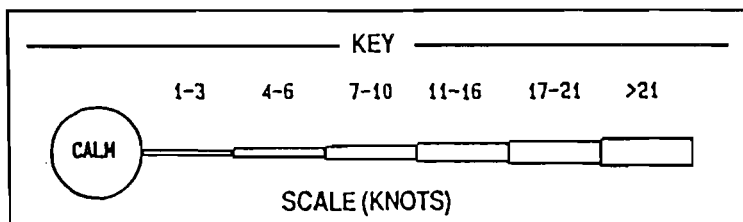
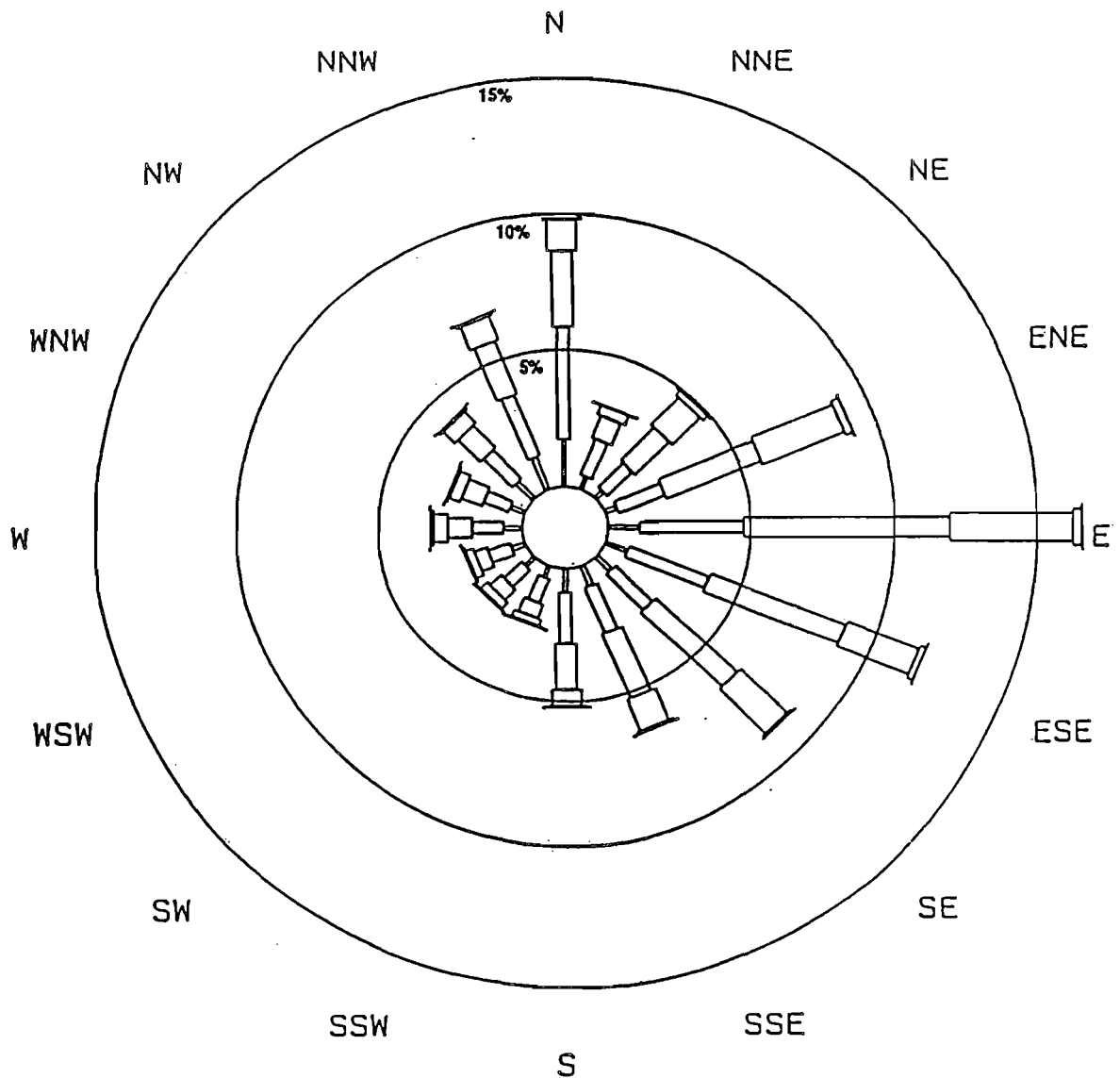


Figure 2.3-6 ANNUAL AVERAGE WIND FREQUENCY DISTRIBUTION, 1982 TO 1986 — NWS STATION, MIAMI, FLORIDA

**DADE COUNTY RESOURCES RECOVERY FACILITY
CAPITAL EXPANSION PROJECT**

Owner: Dade County
Operator: Montenay Power Corp.

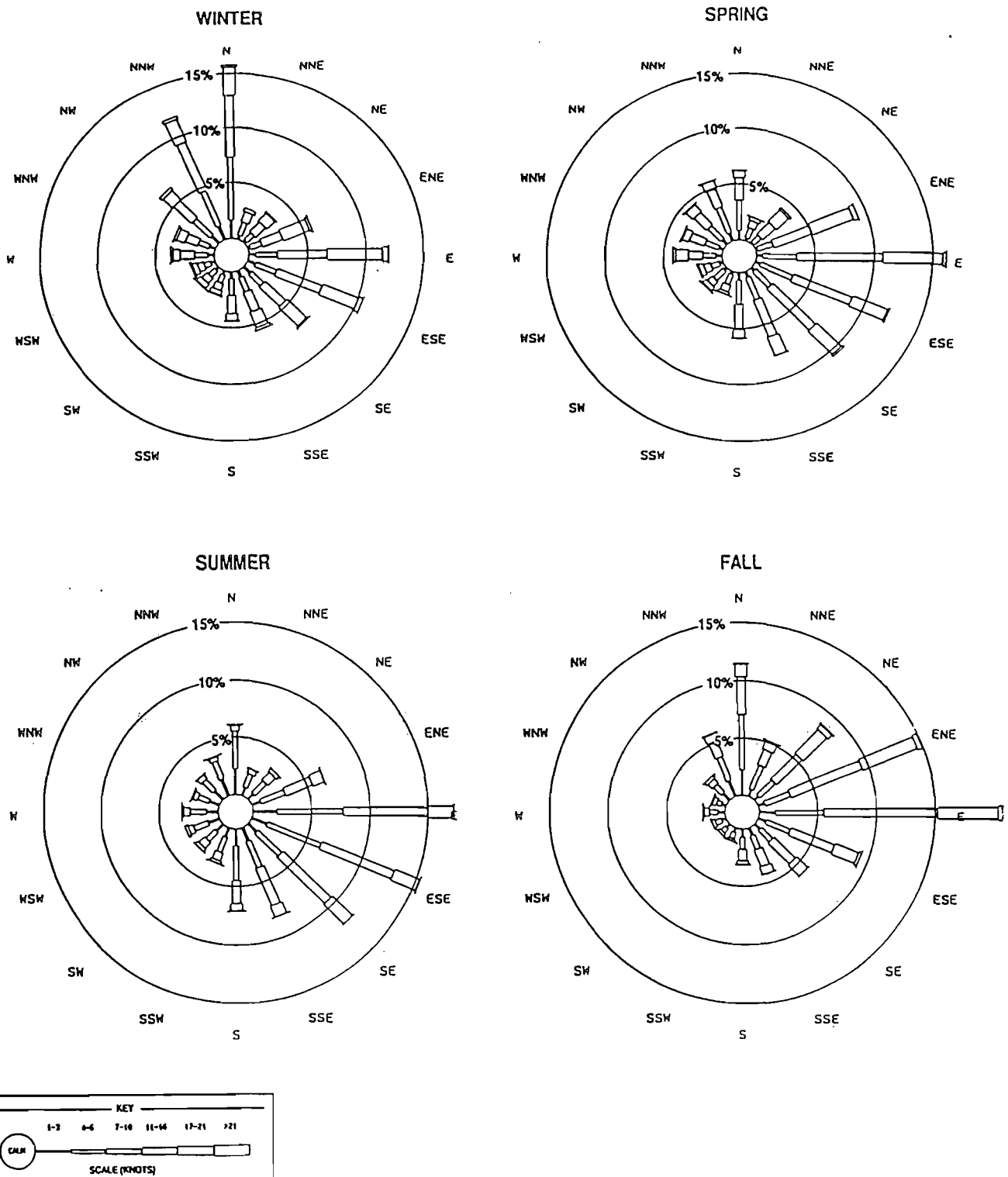


Figure 2.3-7 SEASONAL AVERAGE WIND FREQUENCY DISTRIBUTION, 1982 TO 1986 — NWS STATION, MIAMI, FLORIDA

**DADE COUNTY RESOURCES RECOVERY FACILITY
CAPITAL EXPANSION PROJECT**

Owner: Dade County
Operator: Montenay Power Corp.

Table 2.3-17. Wind Direction and Wind Speed Measured at Miami NWS Station^a

Season	Average Wind Speed (mph)	Calm ^b (percent)	<u>Prevailing Wind Direction</u>	
			Direction	Average Wind Speed (mph)
Winter	9.7	2.2	North	8.7
Spring	9.7	1.4	East	10.7
Summer	7.5	3.4	East	8.4
Fall	9.1	2.7	East	10.2
Annual	9.0	2.4	East	10.1

^a5-year period of record, 1982 to 1986.

^bWind speeds less than approximately 3 miles per hour (mph).

Sources: NOAA, 1986.
KBN, 1992.

Table 2.3-18. Occurrences of Atmospheric Stability Classes Determined at Miami NWS Station^a

Season	Occurrence (percent) of Stability Class					
	Very Unstable	Moderately Unstable	Slightly Unstable	Neutral	Slightly Stable	Moderately Stable
Winter	0.0	2.9	10.6	45.9	20.4	20.2
Spring	0.5	6.6	17.7	37.1	18.1	19.9
Summer	1.6	13.2	20.8	21.7	16.1	26.5
Fall	0.3	5.1	13.8	37.9	20.8	22.1
Annual	0.6	7.0	15.8	35.6	18.8	22.2

^a5-year period of record, 1982 to 1986.

Sources: NOAA, 1986.
KBN, 1992.

2.3.7.1.5 Mixing Heights

The mixing height is a parameter used to define the vertical height to which pollutants can disperse and, therefore, is used in estimating the volume of air in which pollutants are emitted and can be dispersed. In general, the higher the mixing height, the greater the potential for pollutants to be dispersed.

The seasonal and annual average morning and afternoon mixing heights determined for Miami using the Holzworth method are listed in Table 2.3-19. The highest afternoon mixing heights occur in the spring, and the lowest morning mixing heights occur in winter.

2.3.7.1.6 Severe Storms

Thunderstorms are the most frequent of severe storms, occurring an average of 74 days per year in Miami. These storms occur throughout the year, but about 90 percent occur from May through October.

In the 50-mile coastal strip from South Miami to Pompano Beach, there is a 20-percent probability that a tropical storm will pass over the area during any given year. For storms of hurricane strength [i.e., wind speeds exceeding 73 miles per hour (mph)], the probability reduces to 1 in 6 (i.e., 16 percent), with a 7-percent chance the winds will be greater than 124 mph (i.e., wind speeds of a great hurricane). Tropical cyclones usually approach Miami during the period from early August through late October.

Statistics compiled by the Severe Local Storms branch of the National Severe Storms Forecast Center (Pautz, 1969) show that 25 tornadoes (or waterspouts) were spotted within the 1-degree latitude by 1-degree longitude square that includes Miami from 1955 to 1967. This averages approximately two tornadoes per year. The tornado recurrence interval for any specific point location within the 1-degree square is estimated by the methodology of Thom (1963) to be 740 years. Therefore, the mean recurrence interval for a tornado striking a point within this square is 740 years. The most common tornado month is June.

Table 2.3-19. Morning and Afternoon Mixing Heights Determined at Miami NWS Station^a

Season	Mixing Height (m)	
	Morning	Afternoon
Winter	788	1,287
Spring	950	1,474
Summer	990	1,368
Fall	976	1,315
Annual	926	1,362

^a5-year period of record, 1982 to 1986.

Source: NOAA, 1986.
KBN, 1992.

2.3.7.2 AMBIENT AIR QUALITY

2.3.7.2.1 Ambient Air Standards

There are two types of ambient air standards that are applicable to DCRRF. The first type of standard is referred to as an ambient air quality standard (AAQS). This type of standard establishes a maximum ground level air pollutant concentration which cannot be exceeded by the combination of all emission sources, including natural background sources. AAQS are established by federal and state air pollution control agencies and are specified in terms of averaging times (e.g., annual, 24-hour, 3-hour, etc.).

The second type of standard is referred to as an air quality increment. Air quality increments are set by the U.S. Environmental Protection Agency (EPA) and allow a limited amount of air quality degradation above a defined baseline air quality level, referred to as PSD increments. Both types of ambient air standards are discussed in the following sections.

National, State of Florida, and Dade County AAQS

The existing national, State of Florida, and Dade County AAQS are presented in Table 2.3-20. As indicated, EPA has established primary and secondary national AAQS for six air pollutants. The pollutants for which national AAQS have been set are referred to as the criteria pollutants, because air quality criteria documents have been issued for each. The criteria documents set forth the scientific data and the basis for the AAQS.

The national primary AAQS were promulgated to protect the public health against any known or anticipated adverse effects associated with the presence of pollutants in the ambient air. The national secondary AAQS were set to protect the public welfare against adverse effects, including effects upon plant and animal life, soils, property, and visibility. The national AAQS apply to areas which meet the definition of ambient air. EPA defines ambient air in 40 CFR 50.1 as "that portion of the atmosphere, external to buildings, to which the general public has access."

Under this definition, areas within plant property boundaries that are not accessible by the general public are not considered as ambient air. Implicit in this definition of ambient air is the exclusion of locations at elevated heights above ground to which the public does not have access. Thus, AAQS do not apply at the top of a stack.

Table 2.3-20. Federal, State, and Dade County AAQS

Pollutant	Averaging Time	AAQS ($\mu\text{g}/\text{m}^3$)			
		National Primary Standard	National Secondary Standard	State of Florida	Dade County
Particulate Matter (PM ₁₀)	Annual Arithmetic Mean	50	50	50	50
	24-Hour maximum ^a	150	150	150	150
Sulfur Dioxide	Annual Arithmetic Mean	80	NA	60	25
	24-Hour Maximum ^b	365	NA	260	110
	3-Hour Maximum ^b	NA	1,300	1,300	350
Carbon Monoxide	8-Hour Maximum ^b	10,000	10,000	10,000	10,000
	1-Hour Maximum ^b	40,000	40,000	40,000	40,000
Nitrogen Dioxide	Annual Arithmetic Mean	100	100	100	100
Ozone	1-Hour Maximum ^c	235	235	235	235
Lead	Calendar Quarter Arithmetic Mean	1.5	1.5	1.5	1.5

^a Achieved when the expected number of exceedances per year is less than 1.

^b Maximum concentration not to be exceeded more than once per year.

^c Achieved when the expected number of days per year with concentrations above the standard is less than 1.

Note: PM₁₀ = Particulate matter with an aerodynamic diameter less than or equal to 10 micrometers (μm).

$\mu\text{g}/\text{m}^3$ = micrograms per cubic meter.

NA = Not applicable (i.e., no standard exists).

Sources: 40 CFR 50

Chapter 17-2, F.A.C.

Dade County Code, Section 24-17.

KBN, 1992.

The State of Florida has also adopted AAQS for the six air pollutants (Table 2.3-20) for which national AAQS have been set. The Florida AAQS are the same as the national AAQS, except Florida has adopted more stringent standards for sulfur dioxide than the national AAQS.

Florida has not adopted a definition for ambient air. However, past policy of the FDER Bureau of Air Regulation has been to apply the EPA definition of ambient air, as described previously.

Dade County has adopted the federal and State of Florida AAQS for all pollutants except sulfur dioxide (SO₂). Dade County's SO₂ AAQS are more stringent than the state AAQS.

PSD Increments

The 1977 Clean Air Act (CAA) Amendments enacted into law provisions concerning prevention of significant deterioration of air quality. The law specified that certain increases in air quality concentrations above the baseline concentration level of SO₂ and particulate matter--total suspended particulates [PM(TSP)] would constitute significant deterioration. The magnitude of the allowable increment depends on the classification of the area in which a new source (or modification) will be located or will have an impact. Congress also directed EPA to evaluate PSD increments for other criteria pollutants and, if appropriate, promulgate PSD increments for such pollutants.

Three classifications were designated based on criteria established in the CAA Amendments. Certain types of areas (international parks, national wilderness areas, and memorial parks larger than 5,000 acres, and national parks larger than 6,000 acres) were designated as Class I areas. All other areas of the country were designated as Class II. PSD increments for Class III areas were defined, but no areas were designated as Class III. However, Congress made provisions in the law to allow the redesignation of Class II areas to Class III areas.

In 1977, EPA promulgated PSD regulations related to the requirements for classifications, increments, and area designations as set forth by Congress. PSD increments were initially set for only SO₂ and PM(TSP). However, in 1988 EPA promulgated final PSD regulations for nitrogen oxides (NO_x) and established PSD increments for nitrogen dioxide (NO₂).

On October 5, 1989, EPA proposed PSD increments for PM₁₀. These proposed increments are shown in Table 2.3-21. The PM₁₀ increments as proposed are somewhat lower in magnitude than the current PM(TSP) increments.

The current federal PSD increments are shown in Table 2.3-21. As shown, Class I increments are the most stringent, allowing the smallest amount of air quality deterioration, while the Class III increments allow the greatest amount of deterioration. FDER has adopted the EPA class designations and allowable PSD increments for PM(TSP), SO₂, and NO₂.

The term "baseline concentration" evolves from federal and state PSD regulations and refers to a fictitious concentration level corresponding to a specified baseline date and certain additional baseline sources. In reference to the baseline concentration, the baseline date actually includes three different dates:

1. The major source baseline date, which is January 6, 1975, in the cases of SO₂ and PM(TSP) and February 8, 1988, in the case of NO₂;
2. The minor source baseline date, which is the earliest date after the trigger date on which a major stationary source or major modification subject to PSD regulations submits a complete PSD application; and
3. The trigger date, which is August 7, 1977, for SO₂ and PM(TSP) and February 8, 1988, for NO₂.

By definition in the PSD regulations, baseline concentration means the ambient concentration level which exists in the baseline area at the time of the applicable baseline date. A baseline concentration is determined for each pollutant for which a baseline date is established and includes:

1. The actual emissions representative of sources in existence on the applicable baseline date; and
2. The allowable emissions of major stationary sources that began construction before January 6, 1975, for SO₂ and PM(TSP) sources, or February 8, 1988, for NO_x sources; but which were not in operation by the applicable baseline date.

The following emissions are not included in the baseline concentration and therefore affect PSD increment consumption:

Table 2.3-21. Federal and State Allowable PSD Increments

Pollutant	Averaging Time	PSD Increments ($\mu\text{g}/\text{m}^3$)		
		Class I	Class II	Class III
Particulate Matter (TSP)	Annual Geometric Mean	5	19	37
	24-Hour Maximum ^a	10	37	75
Particulate Matter (PM ₁₀) ^b (proposed)	Annual Arithmetic Mean	4	17	34
	24-Hour Maximum	8	30	60
Sulfur Dioxide	Annual Arithmetic Mean	2	20	40
	24-Hour Maximum ^a	5	91	182
	3-Hour Maximum ^a	25	512	700
Nitrogen Dioxide	Annual Arithmetic Mean	2.5	25	50

^aMaximum concentration not to be exceeded more than once per year.

^bProposed by EPA in the Federal Register, October 5, 1989.

Sources: 40 CFR 52.21
Chapter 17-2, F.A.C.
54 Federal Register (FR) 192, pages 41218-41232.
KBN, 1992.

1. Actual emissions from any major stationary source on which construction began after January 6, 1975, for SO₂ and PM(TSP) sources, and after February 8, 1988, for NO_x sources; and
2. Actual emission increases and decreases at any stationary source occurring after the major source baseline date that resulted from a physical change or change in the method of operation of the facility.

The minor source baseline date for SO₂ and PM(TSP) has been set as December 27, 1977, for the entire state of Florida (Chapter 17-2.450, F.A.C.). The minor source baseline date for NO₂ has been set as March 28, 1988, for all of Florida.

2.3.7.2.2 Emission Sources

The DCRRF site is located in northwestern Dade County. This area of Dade County is primarily residential, commercial, and light industrial in character, and there are only a few large point sources of air emissions in the county. Adjacent Broward and Palm Beach Counties have similar demographic characteristics.

In order to define other air emission sources which may potentially affect the air quality in the vicinity of DCRRF, an emissions inventory of criteria air pollutants was compiled. Emission source information was obtained from the FDER Air Pollutant Information System (APIS) for Dade, Broward, and Palm Beach Counties. Other information, such as county-wide emission inventories, air operating and construction permits, and previous air modeling studies, were also reviewed to supplement the APIS data.

All air emission sources that are located within 20 km of DCRRF, as identified through the above investigation, are presented in Table 2.3-22. Source name, location, and emission rates are shown. The emission rates reflect the allowable or maximum emissions from the source in tons per year.

The major air emission sources located within 20 km of DCRRF are Tarmac Florida and Rinker, both portland cement plants. Tarmac is located about 4.5 km north of DCRRF, and Rinker is located about 9 km southwest.

Table 2.3-22. Summary of SO₂ and NO_x Emitting Facilities Within 20 km of the DCRRF Site^a

APIS No.	Facility Name	County	UTM Coordinates (km)		Location Relative to DCRRF ^b		SO ₂ Q, Emission Threshold (TPY)	NO _x Q, Emission Threshold (TPY)	SO ₂ Emissions (TPY)	NO _x Emissions (TPY)
			East	North	Distance (km)	Direction (degree)				
50DAD130396	MEDX	Dade	566.3	2856.4	2.2	117	SIA	SIA	10.0	13.0
50DAD130263	Monnah Park Block	Dade	567.0	2858.5	2.9	68	SIA	SIA	5.0	6.0
50DAD130010	Pan American Con.	Dade	567.4	2857.8	3.1	83	SIA	SIA	-	20.0
50DAD130311	Benalco	Dade	567.4	2859.3	3.6	58	SIA	SIA	-	3.0
50DAD130022	U.S. Foundry	Dade	567.3	2859.8	3.8	51	SIA	SIA	19.0	-
50DAD130020	Tarmac	Dade	562.9	2861.7	4.5	342	SIA	SIA	3,505.0	622.0
50DAD130005	General Asphalt	Dade	568.7	2855.6	4.8	112	SIA	SIA	-	2.0
50DAD130483	General Asphalt	Dade	561.5	2853.2	5.0	214	SIA	SIA	103.0	33.0
50DAD130378	Quickrete South	Dade	562.0	2863.9	6.9	341	SIA	SIA	3.5	0.7
50DAD130532	Blue Side Corporation	Dade	570.7	2854.0	7.2	118	SIA	SIA	-	4.5
50DAD130014	Rinker Materials	Dade	558.2	2851.3	8.6	225	SIA	SIA	488.0	702.0
50DAD130503	H & J Paving	Dade	575.1	2854.4	11.2	106	SIA	SIA	-	16.0
50DAD130267	Gold Coast Oil	Dade	556.7	2847.0	12.9	216	SIA	SIA	1.0	1.0
50DAD130235	LDG Corp	Dade	576.0	2848.8	14.5	126	SIA	SIA	1.0	1.0
50DAD130232	Jackson Mem. Hospital	Dade	579.0	2852.3	15.6	109	SIA	11.2	8.0	54.0
50DAD130531	South Miami Hosp.	Dade	570.7	2842.5	16.2	157	SIA	24.3	12.0	15.0
50DAD130034	Mechanics Uniform Ser.	Dade	580.5	2853.3	16.7	104	SIA	34.2	15.0	13.0
50DAD130470	S. Florida Cogeneration	Dade	580.5	2850.9	17.5	112	SIA	49.1	-	217.0
50BRO060072	Weekly Asphalt	Broward	560.5	2875.0	18.0	348	SIA	60.1	75.0	31.0
50BRO062081	Ryan Sales and Service	Broward	560.7	2876.5	19.4	349	SIA	88.7	6	200.0

Note: km = kilometers.

NO_x = nitrogen oxides.

Q = emission threshold (see Appendix 10.1.5).

SIA = Source is within the significant impact area for this pollutant.

SO₂ = sulfur dioxide.

TPY = tons per year.

UTM = Universal Transverse Mercator.

^a The SO₂ and NO_x significant impact areas are 21 and 15 km, respectively.^b The UTM coordinates of DCRRF are 564.3 km East and 2857.4 km North, Zone 17.

Source: FDER, 1991; KBN, 1992.

All air emission sources located between 15 km and 50 km from DCRRF are shown in Table 2.3-23. Major sources include the Florida Power & Light Company (FPL) Cutler, Fort Lauderdale, Port Everglades, and Turkey Point power plants and the South Broward County Resource Recovery Facility.

2.3.7.2.3 Area Classification

Areas with an air pollutant concentration above an AAQS are designated as nonattainment areas. Dade County is designated as attainment for all pollutants except ozone. Both the EPA and the State of Florida have designated Dade County, as well as adjacent Broward County and Palm Beach County, as nonattainment for ozone (40 CFR Part 81, Subpart C; Chapter 17-2.410, F.A.C.). Dade, Broward, and Palm Beach Counties are designated as attainment areas for all other pollutants.

The area surrounding the DCRRF site is designated as a PSD Class II area. A PSD Class I area, the Everglades National Park, is located in southwest Dade County. The park's nearest boundary is located about 12 km southwest of the DCRRF site.

2.3.7.2.4 Ambient Air Monitoring Data

Requirements--The FDER Instruction Guide For Certification Applications [Form 17-1.211(1)] requires that the source applicant meet the requirements of Chapter 17-2.500(5)(f), F.A.C., which relates to PSD preconstruction air quality monitoring and analysis. This rule requires that any application for a PSD permit must contain an analysis of continuous ambient air quality data in the area affected by the proposed major stationary facility or major modification. For a new major facility, the affected pollutants are those that the facility would potentially emit in significant amounts. For a major modification, the pollutants are those for which the net emissions increase exceeds the significant emission rate shown in Table 2.3-24.

Ambient air monitoring for a period of up to 1 year is generally appropriate to satisfy the PSD monitoring requirements. A minimum of 4 months of data is required. Acceptable air monitoring methods and quality assurance procedures, as specified in the Ambient Monitoring

Table 2.3-23. Summary of SO₂ and NO_x Emitting Facilities Located 20 to 50 km From the DCRRF Site

APIS No.	Facility Name	County	UTM Coordinates (km)		Location Relative to DCRRF ^a		SO ₂ Q, Emission Threshold (TPY)	NO _x Q, Emission Threshold (TPY)	SO ₂ Emissions (TPY)	NO _x Emissions (TPY)
			East	North	Distance (km)	Direction (degree)				
50DAD130505	Gulfstream Park	Dade	582.3	2868.6	21.2	58	4.0	124.0	0.2	6.0
50DAD130476	Miami Dade W and S	Dade	585.4	2847.6	23.3	115	45.3	165.3	20.0	249.0
50DAD130001	FPL-Cutler	Dade	570.4	2834.9	23.3	165	46.2	166.2	5,904.0	4,796.0
50BRO060036	FPL - Port Ever.	Broward	587.4	2875.3	29.2	52	164.5	284.5	76,239.0	90.0
50DAD130314	Miami Dade W and S	Dade	534.4	2858.2	29.9	272	178.2	298.2	1.0	29.0
50WPB062119	South Broward R.R.	Broward	579.6	2883.3	30.1	31	181.6	301.6	1,318.0	2,383.0
50BRO060037	FPL - Fort Laud.	Broward	580.1	2883.3	30.3	31	186.8	306.8	40,400.0	37,292.0
50DAD130520	Miami Dade W and S	Dade	565.2	2826.9	30.5	178	190.3	310.3	-	122.0
50BRO062050	Associated Disposal	Broward	582.6	2884.9	33.0	34	240.6	360.6	0.4	0.5
50BRO061030	Doctors Hospital	Broward	576.2	2891.0	35.6	20	292.9	412.9	1.0	1.2
50BRO060034	Owens Corning	Broward	587.0	2886.4	36.8	38	316.6	436.6	4.0	15.0
50BRO062024	Gold Coast Crem.	Broward	587.0	2889.1	39.0	36	359.8	479.8	1.2	0.4
50BRO060014	East Coast Asphalt	Broward	583.6	2893.7	41.1	28	402.2	522.2	80.1	1.3
50DAD130013	Homestead City Utilities	Dade	552.5	2817.0	42.1	196	421.8	541.8	76.0	185.0
50DAD130053	Brewer Company	Dade	551.0	2816.8	42.7	198	434.5	554.5	85.0	22.0
50DAD130003	FPL-Turkey Point	Dade	567.2	2813.2	44.3	176	465.9	585.9	37,099.0	16,521.0
50DAD130023	U.S. Asphalt	Dade	553.1	2812.1	46.7	194	513.3	633.3	1.0	1.0
50BRO060015	East Coast Asphalt	Broward	584.9	2902.2	49.3	25	566.2	686.2	0.9	1.2

Note: km = kilometers.
 NO_x = nitrogen oxides.
 Q = emission threshold (see Appendix 10.1.5).

SO₂ = sulfur dioxide.
 TPY = tons per year.
 UTM = Universal Transverse Mercator.

^a The UTM coordinates of DCRRF are 564.3 km East and 2857.4 km North, Zone 17.

Source: FDER, 1991; KBN, 1992.

Table 2.3-24. PSD Significant Emission Rates and De Minimis Monitoring Concentrations

Pollutant	Regulated Under	Significant Emission Rate (TPY)	<u>De Minimis</u> Monitoring Concentration ($\mu\text{g}/\text{m}^3$)
Sulfur Dioxide	NAAQS, NSPS	40	13, 24-hour
Particulate Matter (TSP)	NAAQS, NSPS	25	10, 24-hour
Particulate Matter (PM ₁₀)	NAAQS	15	10, 24-hour
Nitrogen Oxides	NAAQS, NSPS	40	14, annual
Carbon Monoxide	NAAQS, NSPS	100	575, 8-hour
Volatile Organic Compounds (Ozone)	NAAQS, NSPS	40	100 TPY ^a
Lead	NAAQS	0.6	0.1, 3-month
Sulfuric Acid Mist	NSPS	7	NM
Total Fluorides	NSPS	3	0.25, 24-hour
Total Reduced Sulfur	NSPS	10	10, 1-hour
Reduced Sulfur Compounds	NSPS	10	10, 1-hour
Hydrogen Sulfide	NSPS	10	0.2, 1-hour
Asbestos	NESHAP	0.007	NM
Beryllium	NESHAP	0.0004	0.001, 24-hour
Mercury	NESHAP	0.1	0.25, 24-hour
Vinyl Chloride	NESHAP	1	15, 24-hour
MWC Organics	NSPS	3.5×10^{-6}	NE
MWC Metals (as PM)	NSPS	15	NE
MWC Acid Gases (SO ₂ + HCl)	NSPS	40	NE

Note: Ambient monitoring requirements for any pollutant may be exempted if the impact of the increase in emissions is below de minimis monitoring concentrations.

MWC = Municipal Waste Combustor.

NAAQS = National Ambient Air Quality Standards.

NE = Not yet established.

NESHAP = National Emission Standards for Hazardous Air Pollutants.

NM = No ambient measurement method.

NSPS = New Source Performance Standards.

TPY = tons per year.

$\mu\text{g}/\text{m}^3$ = micrograms per cubic meter.

^aNo de minimis concentration; an increase in VOC emissions of 100 TPY or more will require monitoring analysis for ozone.

^bAny emission rate of these pollutants.

Sources: F.A.C., Rule 17-2.510, Table 500-2.

Federal Register, Vol. 56, No. 28, Feb. 11, 1991, p. 5506.

KBN, 1992.

Guidelines for Prevention of Significant Deterioration (PSD) (EPA-450/4-87-007), must generally be used to collect the data. Existing data from the vicinity of the proposed source may be utilized if the data meet certain quality assurance requirements; otherwise, additional data may need to be gathered.

The FDER regulations include an exemption in Chapter 17-2.500(3)(e), F.A.C., which excludes or limits the pollutants for which an air quality analysis must be conducted. This exemption states that a proposed major stationary facility or major modification shall be exempt from the monitoring requirements of Chapter 17-2.500(5)(f), F.A.C., with respect to a particular pollutant if:

1. The emissions increase of the pollutant from the facility or modification would cause, in any area, air quality impacts less than the de minimis monitoring concentrations presented in Table 2.3-24; or
2. The existing ambient concentrations of the pollutant in the area that the proposed facility or modification would locate is less than the de minimis monitoring concentration listed in Table 2.3-24; or
3. The pollutant is not listed in Table 2.3-24.

The PSD pollutant applicability determination for DCRRF shows that NO_x and carbon monoxide (CO) must undergo PSD review and, therefore, a preconstruction ambient monitoring analysis must be performed for those pollutants (refer to Air Permit Application, Appendix 10.1.5). A comparison of the de minimis monitoring concentrations and the predicted net increase in impacts due to the proposed project is presented in Table 2.3-25. The table indicates that both NO_x and CO impacts are below their de minimis monitoring concentrations. Therefore, preconstruction monitoring is not required.

Although preconstruction monitoring is not required, supplemental air quality data were obtained to support the PSD Permit application and Site Certification Application. These supplemental data include data from FDER and DERM monitoring stations. Locations of the monitoring sites in the vicinity of the DCRRF site are shown in Figure 2.3-8. The available data for each pollutant monitored are discussed in the following paragraphs. A more detailed presentation and discussion of the data, are presented in the PSD air permit application (Appendix 10.1.5).

Table 2.3-25. Comparison of Maximum Predicted Increase in Impacts From the Proposed DCRRF Capital Expansion Project and De Minimis Monitoring Concentrations

Pollutant	Maximum Predicted Increase in Impacts ^a ($\mu\text{g}/\text{m}^3$)	<u>De Minimis</u> Monitoring Concentration ($\mu\text{g}/\text{m}^3$)
Nitrogen Oxides	0.9	14, annual
Carbon Monoxide	13	575, 8-hour

Note: Ambient monitoring requirements for subject pollutants may be exempted if the impact of the increase in emissions is below air quality impact de minimis levels.

$\mu\text{g}/\text{m}^3$ = micrograms per cubic meter.

^a For the averaging time indicated for the de minimis monitoring concentration.

Sources: 40 CFR 52.21.
Chapter 17-2, F.A.C.
KBN, 1992.

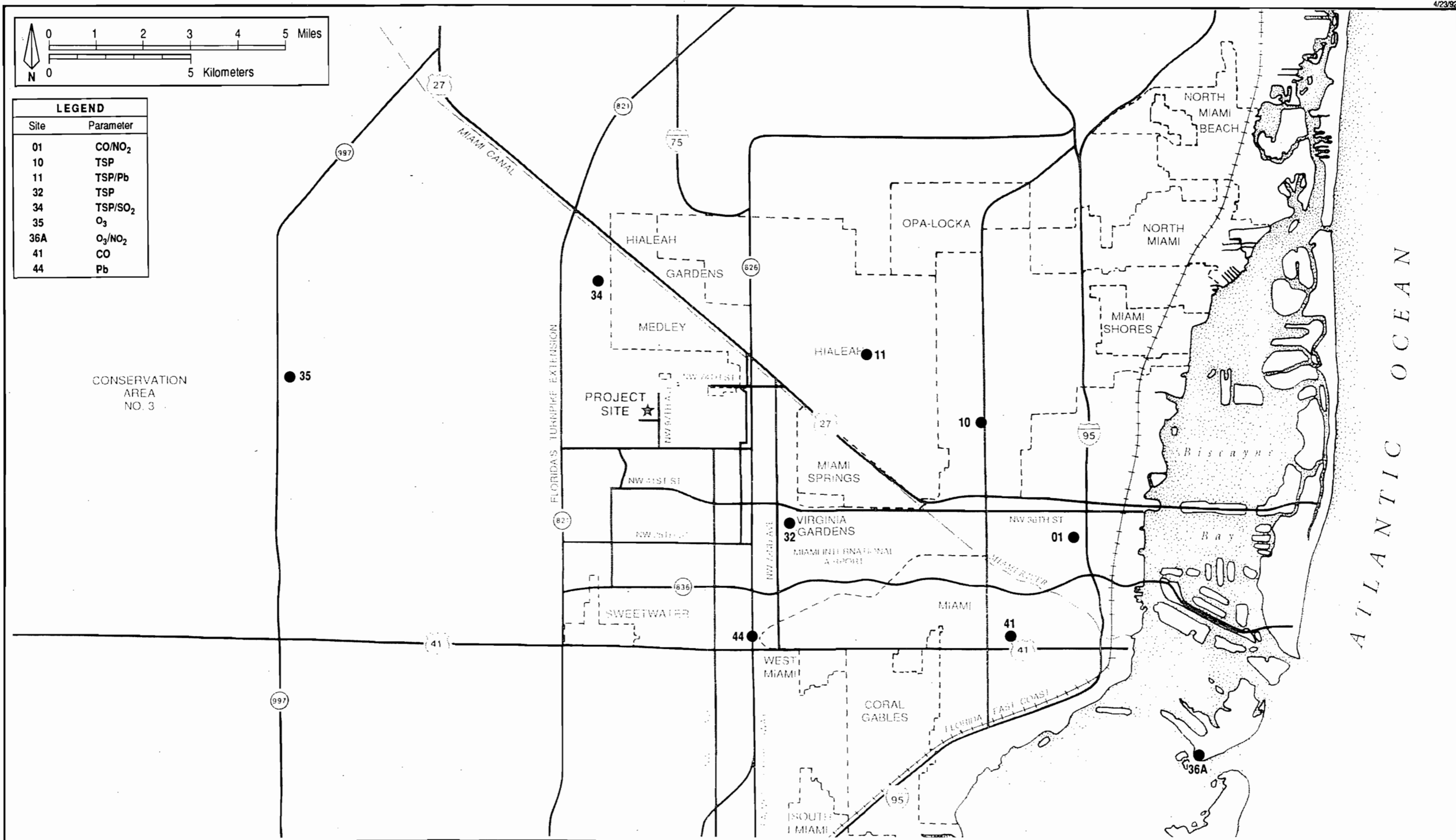


Figure 2.3-8 LOCATIONS OF AMBIENT AIR MONITORING SITES IN THE VICINITY OF DCRRF

**DADE COUNTY RESOURCES RECOVERY FACILITY
CAPITAL EXPANSION PROJECT**

Owner: Dade County
Operator: Montenay Power Corp.

Particulate Matter (PM10)--Ambient PM10 data from two monitoring stations in the vicinity of the DCRRF site for the period 1988 through 1991 are presented in Table 2.3-26. The two FDER stations are operated according to PSD quality assurance requirements.

Nearly all particulate data collected to date in Florida have been for PM(TSP). In July 1987, EPA changed the national AAQS from a PM(TSP) standard to a standard based upon particulate matter with an aerodynamic diameter less than or equal to 10 micrometers (μm) (PM10). Subsequently, FDER adopted the national AAQS. Since PM(TSP) is collected by a method which captures particles up to 60 μm in diameter, PM(TSP) data are always higher in magnitude than the corresponding PM10 data. However, the ratio of PM(TSP) to PM10 in the atmosphere is not constant and is dependent upon a number of factors.

As shown in Table 2.3-26, data from all of the monitoring sites are generally well below the AAQS. The highest 24-hour concentration measured during any year at any site was 65 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$), compared to the AAQS of 150 $\mu\text{g}/\text{m}^3$. The highest annual mean concentration measured was at Site 0860-020 (29 $\mu\text{g}/\text{m}^3$).

Sulfur Dioxide--Ambient SO_2 data from an FDER continuous air monitoring site located in the vicinity of the DCRRF site, for the period 1988 through 1991, are presented in Table 2.3-27. All data meet PSD criteria for continuous monitors.

As indicated in the table, all recorded SO_2 concentrations are low, and well below the federal, state, and local AAQS. The highest measured 3-hour concentration was 51 $\mu\text{g}/\text{m}^3$, and the highest measured 24-hour concentration was 12 $\mu\text{g}/\text{m}^3$. These values are well below the Florida AAQS of 1,300 $\mu\text{g}/\text{m}^3$ and the Dade County AAQS of 350 $\mu\text{g}/\text{m}^3$, 3-hour averages, and the Florida AAQS of 260 $\mu\text{g}/\text{m}^3$ and Dade County AAQS of 110 $\mu\text{g}/\text{m}^3$, 24-hour averages.

The highest recorded annual mean SO_2 concentration at the site was 3 $\mu\text{g}/\text{m}^3$. This concentration is well below the Florida AAQS of 60 $\mu\text{g}/\text{m}^3$ and the Dade County AAQS of 25 $\mu\text{g}/\text{m}^3$ for the annual averaging period.

Table 2.3-26. Summary of PM10 Ambient Monitoring Data in the Vicinity of the DCRRF Site

Site No.	Site Name	Sampling Period	N	Concentration ($\mu\text{g}/\text{m}^3$)		
				Max. 24-hr	2nd Max. 24-hr	Arithmetic Mean
0860020G01	Miami-Traffic Cont. NW 36th St & 72Av Dade County #32	03-12/90	49	51	49	29
		01-12/91	60	65	50	25
0860001G01	Miami- 6400 NW 27th Av Dade County #10	01-12/89	61	49	48	25
		01-12/90	61	50	46	25
		01-12/91	60	55	51	24

Note: Federal, Florida, and Dade County AAQS for PM10 are:
 150 $\mu\text{g}/\text{m}^3$, 24-hour AAQS not to be exceeded more than once per year.
 50 $\mu\text{g}/\text{m}^3$, annual arithmetic mean.

N = number of observations.
 $\mu\text{g}/\text{m}^3$ = micrograms per cubic meter.

Sources: FDER, 1989, 1990, and 1991.
 KBN, 1992.

Table 2.3-27. Summary of Continuous Sulfur Dioxide Ambient Monitoring Data in the Vicinity of the DCRRF Site

Site No.	Site Name	Sampling Period	Concentration (µg/m³)					Arithmetic Mean
			N	Max. 3-hr	2nd Max. 3-hr	Max. 24-hr	2nd Max. 24-hr	
0860019G02	Miami - US 27 & SR 821 #34 Dade County	01-10/88 ^a	6,605	15	13	8	5	3
		01-12/89	0	-	-	-	-	-
		06-12/90 ^a	4,634	25	25	10	9	3
		01-12/91	8,282	51	37	12	9	3
Federal Primary AAQS				-	-	-	365	80
Federal Secondary AAQS				-	1,300	-	-	-
Florida AAQS				-	1,300	-	260	60
Dade County AAQS				-	350	-	110	25

Note: AAQS = ambient air quality standards.

N = number of observations.

 $\mu\text{g}/\text{m}^3$ = micrograms per cubic meter.^aPartial year.Sources: FDER, 1988, 1989, 1990, and 1991.
KBN, 1992.

Nitrogen Dioxide--Available NO_x data from a monitoring site located in the vicinity of the DCRRF site are presented in Table 2.3-28. Continuous data are available from one FDER site and cover the period 1988 through March 1991. All data have been gathered according to recommended quality assurance techniques for continuous monitors.

The highest measured annual mean NO_x concentration measured at the site was $33 \mu\text{g}/\text{m}^3$. This level is one-third the AAQS of $100 \mu\text{g}/\text{m}^3$, annual average concentration.

Carbon Monoxide--Ambient CO data available from two monitoring sites in the vicinity of the DCRRF site for the period 1988 through 1991 are presented in Table 2.3-29. Both of these sites use continuous monitors and are operated by FDER. All data from the sites are gathered according to required quality assurance procedures.

Measured CO data reflect concentrations well below both the 1-hour and 8-hour AAQS. The highest 1-hour concentration measured at any site was 19 parts per million (ppm) while the highest 8-hour concentration was 9 ppm. The 1-hour and 8-hour AAQS for CO are 35 and 9 ppm, respectively.

Ozone--Ambient ozone data from the period 1988 through 1991 are available from two sites in the vicinity of the DCRRF site and are shown in Table 2.3-30. All are operated by FDER and meet minimum quality assurance requirements. The maximum measured 1-hour ozone concentration at either station was 0.145 ppm, and the second highest concentration was 0.132 ppm. The state and national AAQS is 0.125 ppm, 1-hour average not to be exceeded on more than one calendar day per year.

As indicated in Table 2.3-30, the monitoring station at the Rosenstiel School had two exceedances in 1988, and the Thompson Park monitoring station recorded two exceedances in 1988. Thompson Park recorded one exceedance in 1990. The latest year of available data (1991) shows compliance with the standards at both stations.

Lead--Ambient lead data from the period 1988 through 1991 are available from two FDER monitoring sites in the vicinity of the DCRRF site and are shown in Table 2.3-31. The

Table 2.3-28. Summary of Continuous Nitrogen Dioxide Ambient Monitoring Data in the Vicinity of the DCRRF Site

Site No.	Site Name	Sampling Period	Concentration ($\mu\text{g}/\text{m}^3$)			
			N	Max. 1-hr	2nd Max. 1-hr	Arithmetic Mean
2700002G01	Miami-Metro-Annex 864 NW 23rd St #01 Dade County	01-12/88	8,126	173	171	31
		01-12/89	8,027	180	179	33
		01-12/90	7,939	165	149	30
		01-12/91	8,002	154	137	28

Note: The Federal, Florida, and Dade County nitrogen dioxide AAQS is $100 \mu\text{g}/\text{m}^3$, annual arithmetic mean.

N = number of observations.
 $\mu\text{g}/\text{m}^3$ = micrograms per cubic meter.

Source: FDER, 1988, 1989, 1990, and 1991.
KBN, 1992.

Table 2.3-29. Summary of Continuous Carbon Monoxide Ambient Monitoring Data in the Vicinity of the DCRRF Site

Site No.	Site Name	Sampling Period	N	Concentrations (ppm)			
				Max. 1-hr	2nd Max. 1-hr	Max. 8-hr	2nd Max. 8-hr
2700002G01	Miami -Metro Anx 864 NW 23rd St Dade County #01	01-12/88	8,336	12	9	6	5
		01-12/89	8,362	19	13	9	7
		01-12/90	8,524	10	9	5	5
		01-12/91	8,610	11	10	9	7
2700018G01	Miami - 2201 SW 4th St Dade County #41	01-12/88	8,063	12	10	6	5
		01-12/89	8,612	15	13	8	7
		01-12/90	8,664	11	10	7	7
		01-12/91	8,619	12	12	9	8

Note: Federal, Florida, and Dade County AAQS for carbon monoxide are:
 35 ppm (40,000 $\mu\text{g}/\text{m}^3$), 1-hour concentration not to be exceeded more than once per year.
 9 ppm (10,000 $\mu\text{g}/\text{m}^3$), 8-hour concentration not to be exceeded more than once per year.

N = number of observations.
 ppm = parts per million.

Sources: FDER, 1988, 1989, 1990, and 1991.
 KBN, 1992.

Table 2.3-30. Summary of Continuous Ozone Ambient Monitoring Data in the Vicinity of the DCRRF Site

Site No.	Site Name	Sampling Period	N	Concentration (ppm)		
				Max. 1-hr	2nd Max. 1-hr	3rd Max. 1-hr
2700021G03	Miami -Thomson Pk at SR 27 Dade County #35	01-12/88	8,636	0.120	0.111	0.110
		01-12/89	8,138	0.145	0.132	0.121
		01-12/90	8,423	0.127	0.108	0.095
		01-12/91	8,468	0.124	0.123	0.096
2700027G01	Miami -Rosenstiel School of Medicine Dade County #36A	01-12/88	7,799	0.138	0.129	0.122
		01-12/89	8,515	0.112	0.111	0.102
		01-12/90	8,619	0.117	0.104	0.096
		01-12/91	8,486	0.095	0.086	0.084

Note: N = number of observations.
ppm = parts per million.

Sources: FDER, 1988, 1989, 1990, and 1991.
KBN, 1992.

Table 2.3-31. Summary of Lead Ambient Monitoring Data in the Vicinity of the DCRRF Site

Site No.	Site Name	Sampling Period	Number of Daily Obs. By Quarter				Quarterly Arithmetic Average ($\mu\text{g}/\text{m}^3$)			
			Jan/ Mar	Apr/ Jun	Jul/ Sep	Oct/ Dec	Jan/ Mar	Apr/ Jun	Jul/ Sep	Oct/ Dec
0860024G09	Miami -SW 4th St at SR 826 Dade County #44	01-12/88	15	15	16	15	0.1	0.1	0.0	0.0
		01-12/89	15	15	14	16	0.1	0.0	0.0	0.1
		01-12/90	15	15	15	16	0.0	0.0	0.0	0.0
		01-12/91	15	15	15	15	0.0	0.0	0.0	0.0
1760001G01	Miami -251 E 47th St., Hialeah HS Dade County #11	01-12/88	14	13	16	13	0.0	0.0	0.0	0.0
		01-12/89	15	13	15	13	0.0	0.0	0.0	0.0
		01-12/90	15	15	14	15	0.0	0.0	0.0	0.0
		01-12/91	11	15	15	14	0.0	0.0	0.0	0.0

Note: The Federal, Florida, and Dade County AAQS for lead is $1.5 \mu\text{g}/\text{m}^3$, quarterly arithmetic average.

Sources: FDER, 1988, 1989, 1990, and 1991.
KBN, 1992.

maximum quarterly concentration at either site is $0.1 \mu\text{g}/\text{m}^3$, which is well below the AAQS of $1.5 \mu\text{g}/\text{m}^3$.

2.3.7.3 MEASUREMENT PROGRAMS

Due to the availability of existing ambient air monitoring data, no additional measurement programs for air quality were conducted by the applicant.

2.3.8 NOISE

2.3.8.1 REGULATIONS AND CRITERIA

Decibels are calculated as a logarithmic function of the sound level in air to a reference effective pressure, which is considered the hearing threshold. Sound pressure level (SPL) is defined as:

$$\text{SPL} = 20 \log_{10} (P_e/P_o) \text{ [decibels]}$$

where: P_e = measured RMS effective pressure of the sound wave, and
 P_o = reference effective pressure of 20 micropascals (μPa).

SPLs must be measured using a properly calibrated sound level meter meeting American National Standards Institute (ANSI) specifications for Type II or better equipment.

2.3.8.1.1 U.S. Environmental Protection Agency (EPA)

EPA (1974) has developed indoor and outdoor noise criteria for various land uses (see Table 2.3-32) as a guide for protecting public health and welfare. These criteria relate to short-term and day-night average SPLs. The L_{eq} is the equivalent constant SPL that would be equal in sound energy to the varying SPL over the same time period. The L_{dn} is the 24-hour average SPL calculated for two daily time periods, i.e., day and night, but has 10 A-weighted decibels (dBA) added to nighttime SPL. The equation for L_{dn} is:

$$L_{dn} = 10 \log 1/24 [15 \times 10^{(L_d/10)} + 9 \times 10^{[(L_n+10)/10]}]$$

where: L_d = daytime L_{eq} for the period 0700 to 2200 hours, and
 L_n = nighttime L_{eq} for the period 2200 to 0700 hours.

For residential areas, EPA recommends an outdoor L_{dn} of 55 dBA.

2.3.8.1.2 State of Florida

FDER has not promulgated noise regulations. Ambient noise levels and projected impacts, however, must be addressed in the Site Certification Application (SCA) [FDER Form 17-1.211(1)]. Specifically, baseline noise information must be included in Section 2.3.8, and impacts must be addressed in Sections 4.6 and 5.7 of the SCA.

Table 2.3-32. EPA-Recommended Noise Criteria

	Measure ^a	Indoor			Outdoor		
		Activity Interference	Hearing Loss Consideration	To Protect Against Both Effects (b)	Activity Interference	Hearing Loss Consideration	To Protect Against Both Effects (b)
Residential With Outside Space and Farm Residences	L_{dn}	45		45	55		55
	$L_{eq}(24)$		70			70	
Residential With No Outside Space	L_{dn}	45	45				
	$L_{eq}(24)$		70				
Commercial	$L_{eq}(24)$	(a)	70	70(c)	(a)	70	70(c)
Inside Transportation	$L_{eq}(24)$	(a)	70	(a)			
Industrial	$L_{eq}(24)(d)$	(a)	70	70(c)	(a)	70	70(c)
Hospitals	L_{dn}	45		45	55		55
	$L_{eq}(24)$	70			70		
Educational	$L_{eq}(24)$	45		45	55		55
	$L_{eq}(24)(d)$	70			70		
Recreational Areas	$L_{eq}(24)$	(a)	70	70(c)	(a)	70	70(c)
Farmland and General Unpopulated Land	$L_{eq}(24)$				(a)	70	70(c)

Notes:

- Since different types of activities appear to be associated with different levels, identification of a maximum level for activity interference may be difficult except in those circumstances where speech communication is a critical activity.
- Based on lowest level.
- Based only on hearing loss.
- An $L_{eq}(8)$ of 75 dB may be identified in these situations so long as the exposure over the remaining 16 hours per day is low enough to result in a negligible contribution to the 24-hour average, i.e., no greater than an L_{eq} of 60 dB.

^a L_{dn} is the day-night average A-weighted equivalent sound level, with a 10-decibel weighting applied to nighttime levels.
 $L_{eq}(24)$ is the equivalent A-weighted sound level over 24 hours.

Sources: EPA, 1974. ↓
 KBN, 1992.

2.3.8.1.3 Dade County

Dade County has not promulgated a noise ordinance or noise regulations at this time.

2.3.8.1.4 Community Noise Criteria

Several methods have been developed to assess community response and acceptability to noise levels. The more prominent methodologies include the Preferred Speech Interference Level (PSIL), Modified Composite Noise Rating (CNR), Normalized Day-Night Sound Level, Community Noise Equivalent Level (CNEL), Noise Pollution Level (L_{NP}), and Housing and Urban Development (HUD) Criteria and Standards [Edison Electric Institute (EEI), 1984]. CNR is suggested as the most comprehensive technique for evaluating steady broadband, steady tonal, and short-term noise (EEI, 1984). This recommendation is based on meeting the following criteria:

1. Objective Factors
 - a. Level of intruding noise
 - b. Spectrum shape of intruding noise
 - c. Level of background sound
 - d. Spectrum shape of background sound
 - e. Audible tonal components
 - f. Impulsive noise
 - g. Very low frequency noise
 - h. Noise level fluctuations
 - i. Duration of noise
 - j. Time of day
 - k. Season of year
2. Subjective Factors
 - a. History of previous exposure
 - b. Community attitude toward source
3. Other factors
 - a. Ease of use
 - b. Interpretation

The Modified CNR system uses a series of curves to develop a noise-level ranking based on sound pressure level and frequency as shown in Figure 2.3-9. These rankings are adjusted for background noise according to the curves shown in Figure 2.3-10 and for temporal and seasonal

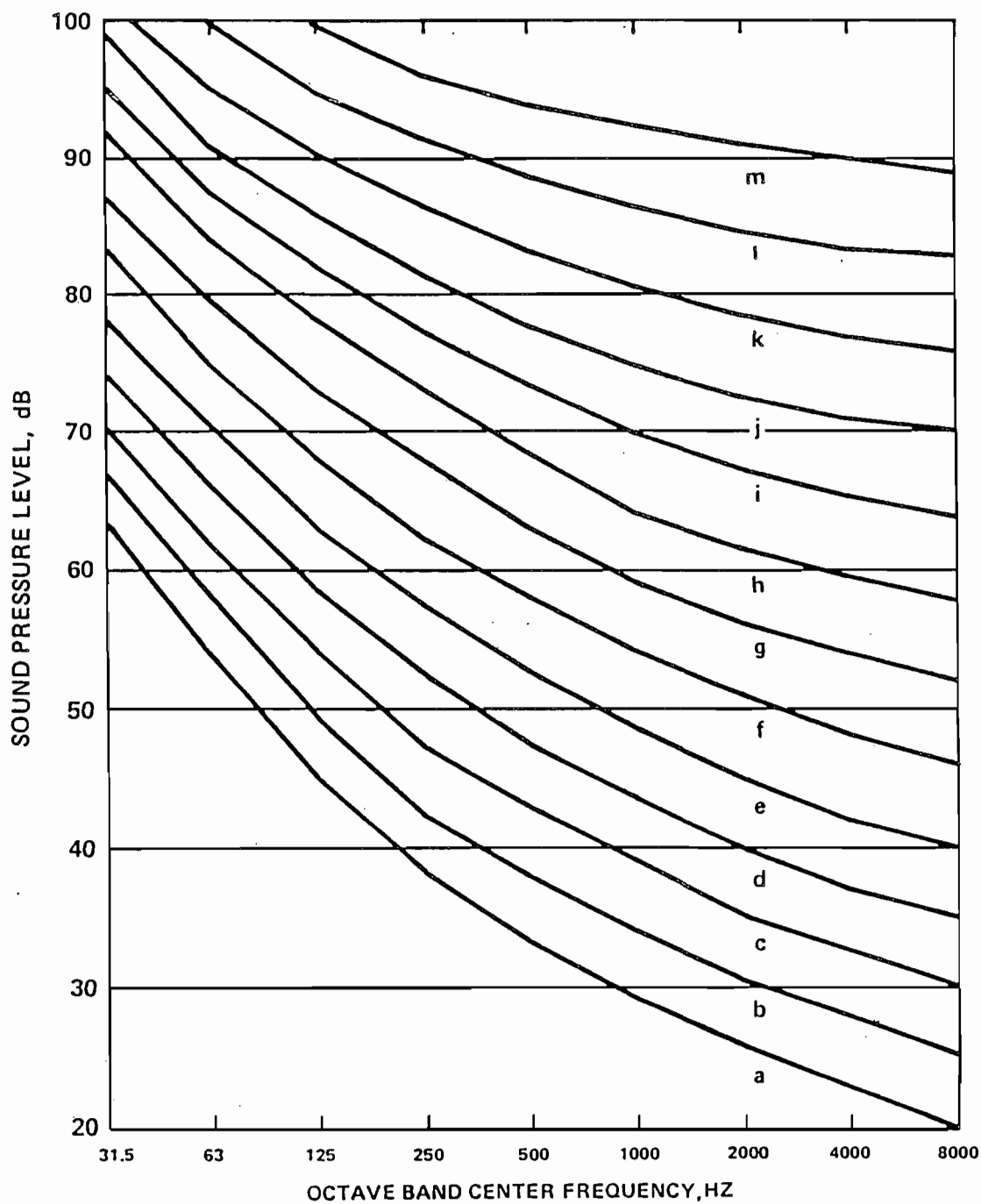


Figure 2.3-9 NOISE LEVEL RANK CURVES FOR MODIFIED CNR SYSTEM

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Owner: Dade County
Operator: Montenay Power Corp.

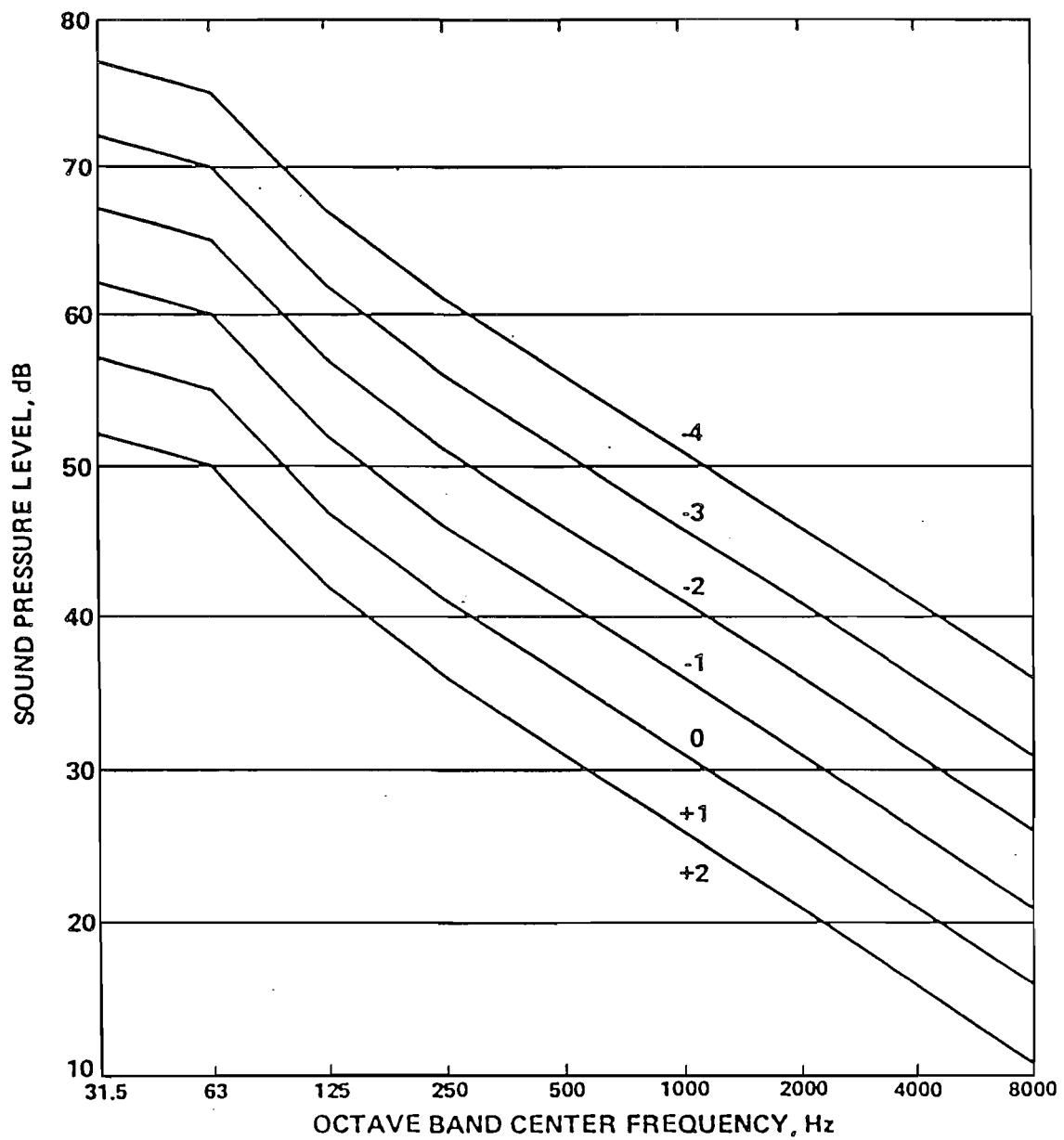


Figure 2.3-10 BACKGROUND NOISE CURVES FOR MODIFIED CNR SYSTEM

**DADE COUNTY RESOURCES RECOVERY FACILITY
CAPITAL EXPANSION PROJECT**

Owner: Dade County
Operator: Montenay Power Corp.

variations, intermittency of noise, noise character, and previous exposure and community attitude by applying the correction factors listed in Table 2.3-33. Corrections either add (+) or subtract (-) from the initial noise-level ranking. The community response is evaluated based upon the expected community reaction to the noise source as shown in Figure 2.3-11. The Modified CNR system was used as an additional technique to evaluate the impacts of the project.

2.3.8.2 EXISTING NOISE MEASUREMENTS

A baseline noise survey was conducted from October 14 through 17, 1991, at the DCRRF site. The objectives of the survey were to determine ambient noise levels at the plant's property boundary and nearby receptors and to obtain source noise levels for the plant equipment. These objectives were accomplished by collecting two different types of noise measurement data during the survey:

1. Sound-level measurements at eight locations surrounding the DCRRF plant, and three locations near the existing plant power block.
2. Octave band analysis of major plant noise sources within the plant boundaries.

The subsections that follow present the equipment, procedures, monitoring locations, and results of the survey. The noise survey did not address any Occupational Safety and Health Administration (OSHA)-regulated workplace noise levels.

2.3.8.2.1 Noise Monitoring Equipment

The noise monitoring equipment used during the survey was as follows:

1. Continuous Noise Monitoring Equipment:
 - a. Bruel & Kjaer (B&K) Type 2230 Precision Integrating Sound-Level Meter
 - b. B&K Type 2639 Microphone Preamplifier
 - c. B&K Type 4155 Prepolarized Condenser Microphone
 - d. Primeline Model 6723 Two-Pen Portable Strip Chart Recorder
 - e. Windscreen, tripod, and various cables
2. Octave-Band Sound-Level Monitoring Equipment
 - a. Continuous noise monitoring equipment noted above
 - b. B&K Type 1625 One-Third-Octave and Full-Octave Filter Set
3. Sound-Level Meter Calibration Unit
 - a. B&K Type 4230 Sound-Level Calibrator [94 decibels (dB) at 1,000 Hertz (Hz)]

Table 2.3-33. Correction Factors for Determining the Modified Composite Noise Rating

1.	Correction for temporal and seasonal factors (for full-time plant activity, the total correction here is 0)		
a.	Daytime only		-1
	Nighttime (2200 to 0700 hrs)		0
b.	Winter only		-1
	Summer		0
c.	Intermittency: ratio of source "on" time to reference time period		
	$2 \log \frac{\text{source "on" time}}{\text{reference period}} = n$		
	1.00 - 0.57		0
	0.56 - 0.18		-1
	0.17 - 0.06		-2
	0.05 - 0.018		-3
	0.017 - 0.0057		-4
	0.0056 - 0.0018		-5
2.	Correction for character of noise		
a.	Noise is very low frequency		+1
b.	Noise contains tonal components		+1
c.	Impulsive sound		+1
3.	Correction for previous exposure and community attitude		
a.	No prior exposure or some previous exposure but poor community relations		0
b.	Some previous exposure and good community relations		+1

Sources: EEI, 1984.¹
KBN, 1992.

COMMUNITY REACTION

VIGOROUS ACTION

SEVERAL THREATS OF LEGAL
ACTION OR STRONG APPEALS
TO LOCAL OFFICIALS TO
STOP NOISEWIDESPREAD COMPLAINTS
OR SINGLE THREAT OF
LEGAL ACTION

SPORADIC COMPLAINTS

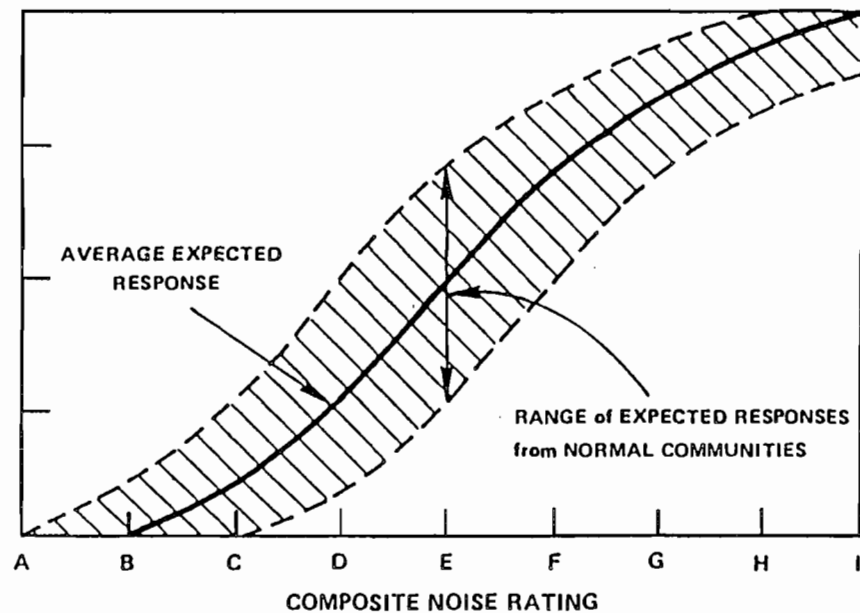
NO REACTION, ALTHOUGH
NOISE IS GENERALLY
NOTICEABLE

Figure 2.3-11 ESTIMATED COMMUNITY RESPONSE
VERSUS COMPOSITE NOISE RATING

DADE COUNTY RESOURCES RECOVERY FACILITY
CAPITAL EXPANSION PROJECT

Owner: Dade County
Operator: Montenay Power Corp.

The B&K Type 2230 sound-level meter complies with Type I precision requirements set forth by ANSI S1.4 for sound-level meters. The specifications for this equipment are presented in Appendix 10.5.6.

2.3.8.2.2 Noise Measurement Procedures

Monitoring was conducted using the procedures specified by ANSI. The continuous ambient noise monitoring was performed using fast-response mode to obtain A-weighted sound levels. A windscreen was used since all measurements were taken outside. Random incidence response as specified by ANSI was used for microphone positions. A continuous record of the output data was made on the strip chart during all monitoring. SPLs were collected at each location and consisted of four noise parameters:

L_{eq} -- The sound pressure level averaged over the measurement period; this parameter represents the continuous steady sound pressure level which would have the same total acoustic energy as the real fluctuating noise over the same time period.

Maximum-- The maximum sound pressure level observed during the sampling period.

Minimum-- The minimum sound pressure level observed during the sampling period.

SEL-- The sound exposure level (SEL) is the constant level which, if maintained for a period of 1 second, would have the same acoustic energy as the A-weighted measured noise event.

Monitoring was conducted using the sound-level meter mounted on a tripod at a height of 5 ft abovegrade. An output cable connected the sound-level meter with the strip chart recorder. The strip chart recorder was located away from the sound-level meter so that the time of day and comments could be recorded without disturbing or influencing the sound-level meter during sampling. Field notes were recorded during monitoring and included identifying meteorological conditions and major noise sources.

The B&K Type 2230 sound-level meter and the B&K Type 1625 octave band analyzer, which are designed to be connected and operated as a single unit, were used to measure source noise characteristics. This system setup permitted the measurement and recording of octave band sound pressure levels. Both instrument systems were calibrated at the beginning and at the end of each sampling period using the B&K Type 4230 sound-level calibrator. All calibrations were within 0.1 dBA of the reference sound level.

2.3.8.2.3 Noise Monitoring Locations and Schedule

Eight noise monitoring sites were located around the property boundaries of the DCRRF site, and three monitoring sites were located at discrete points within the site. The noise monitoring locations are shown on Figure 2.3-12. Table 2.3-34 shows the grid coordinates of the noise monitoring sites relative to the grid center reference point at the facility. Sites 1 through 8 were located along the facility's boundary. Sites 9 and 10 were located where the new unit will be situated. Site 11 was located 50 ft east of the ash building.

Noise monitoring was conducted to obtain 30-minute readings during daytime (i.e., 7:00 a.m. to 10:00 p.m.), and nighttime sampling periods.

2.3.8.2.4 Results

The results of the ambient sound-level survey are presented in Table 2.3-35. This table presents minimum, maximum, and L_{eq} sound pressure levels expressed in A-weighted decibels observed at each monitoring site.

Based on a review of the strip charts, the minimum SPL represents the baseline conditions in the vicinity of the plant. These values were used to describe the baseline conditions exclusive of the major non-facility noise sources, i.e., aircraft and vehicles, which were excluded from the database whenever possible.

The maximum L_{eq} levels for the on-property monitoring locations ranged from 78.2 dBA at Site 11 during the early afternoon to 52.1 dBA at Site 1 during the early morning (3:00 a.m.).

The major contributing noise source in the area exclusive of the facility is aircraft, with minor contributions by normal vehicular traffic on and off the DCRRF site. The L_{eq} levels at all sites were influenced mainly by aircraft from nearby Miami International Airport during the daytime and early evening. In contrast, late-night aircraft and local vehicular traffic were significantly reduced; therefore, most of the nighttime L_{eq} levels were also reduced.

Average L_{eq} levels were calculated for each site based on the collected data and were used in the impact analysis (Section 5.8) and the Modified CNR scheme.

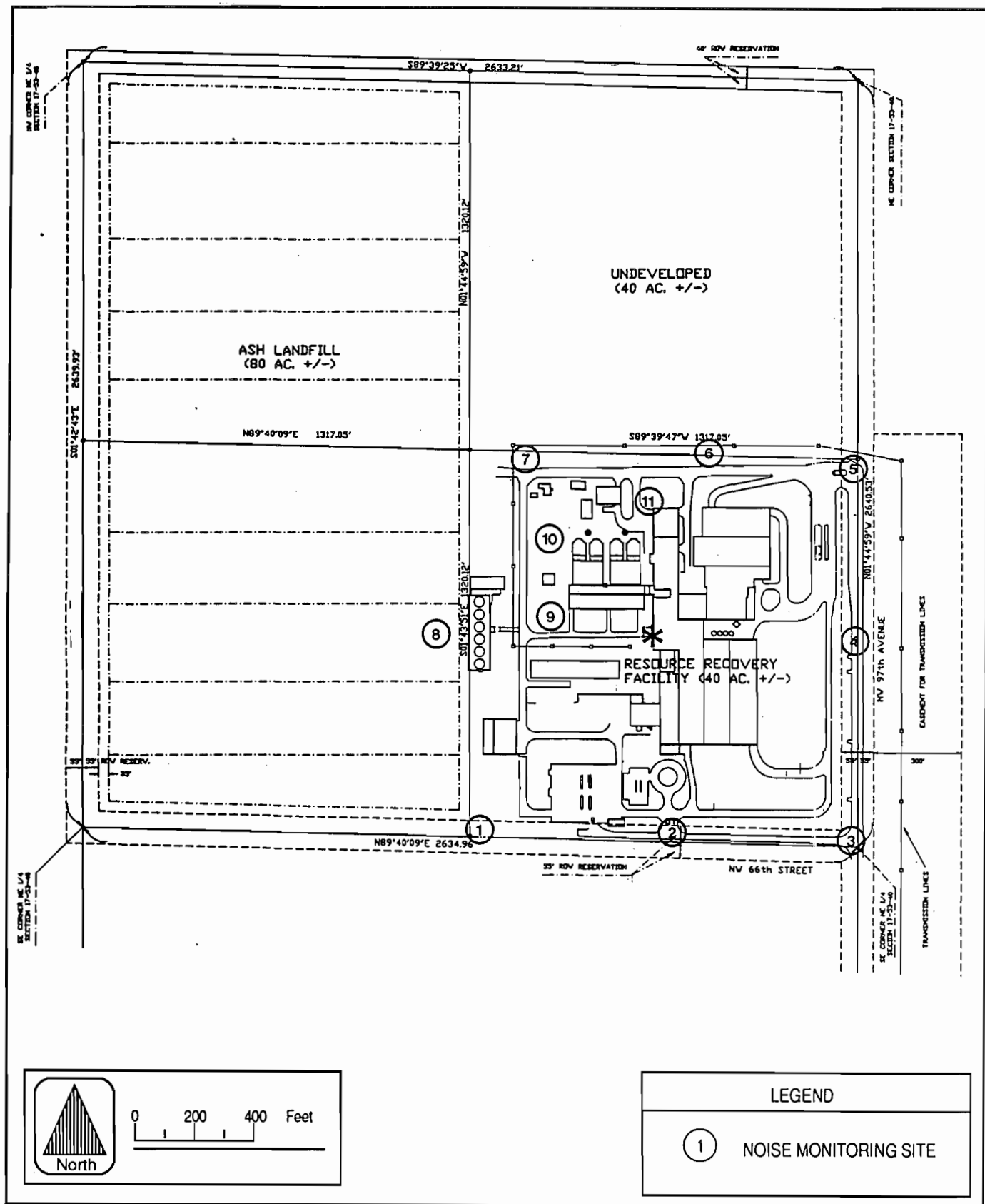


Figure 2.3-12 DCRRF NOISE MONITORING
SITE LOCATIONS

**DADE COUNTY RESOURCES RECOVERY FACILITY
CAPITAL EXPANSION PROJECT**

Owner: Dade County
Operator: Montenay Power Corp.

Table 2.3-34. Noise Monitoring Sites at DCRRF

Site Number	Site Location ^a		Distance From Grid Center (ft)	Direction From Grid Center (degrees)
	X (ft)	Y (ft)		
1	-607.2	-700.0	927	221
2	85.7	-714.3	719	173
3	714.3	-750.1	1,036	136
4	692.9	-21.4	693	92
5	714.3	578.6	919	51
6	192.9	600.0	630	18
7	-607.2	628.6	874	316
8	-728.6	-7.1	729	269
9	-321.5	78.6	331	284
10	-321.5	342.9	470	317
11	-7.1	428.6	429	359

^a Relative to a grid center reference point located near the RDF-3 fuel feed area.

Source: KBN, 1992.

Table 2.3-35. Noise Monitoring Study Results

Monitoring Site Number	Monitoring Date	Start		Microphone Orientation ^a (degrees)	Wind Speed (mph)	Wind Direction (degrees)	Temperature (°F)	Relative Humidity (%)	Sound Pressure Levels (dBA)		
		Start	End						Minimum	Maximum	L _{eq}
1	14 Oct 91	1500	1530	230	10-14	150	83	+80%	57.0	68.6	61.4
1	14 Oct 91	2028	2058	230	5-9	100	80	+80%	55.2	63.9	58.3
1	17 Oct 91	0243	0313	230	7-10	350	68	+80%	48.7	64.8	52.1
2	14 Oct 91	2130	2200	180	5-9	100	80	+80%	51.0	71.0	55.6
2	17 Oct 91	0155	0225	180	7-10	350	69	+80%	48.4	80.4	53.3
3	15 Oct 91	0710	0740	090	0-7	090	75	+80%	46.8	79.2	62.4
3	15 Oct 91	0620	0650	090	0-7	095	75	+80%	48.5	80.8	65.6
4	17 Oct 91	1124	1154	090	3-5	000	80	+80%	53.7	85.1	68.2
4	16 Oct 91	0500	0530	090	0-3	350	73	+80%	47.3	86.4	65.0
5	15 Oct 91	1104	1134	075	3-7	150	82	+80%	56.5	83.3	66.2
5	16 Oct 91	0558	0628	075	0-2	350	73	+80%	52.7	80.5	64.5
6	15 Oct 91	1155	1225	000	3-7	150	82	+80%	65.3	77.2	68.1
6	16 Oct 91	0646	0716	000	0-2	350	73	+80%	63.8	77.5	71.0
7	15 Oct 91	1325	1355	320	3-7	150	83	+80%	61.7	79.9	70.0
7	16 Oct 91	0833	0903	320	3-7	350	74	+80%	59.6	81.0	65.9
7	16 Oct 91	2252	2322	320	4-7	350	73	+80%	55.2	77.5	60.8
8	16 Oct 91	0745	0816	270	3-5	350	73	+80%	65.4	77.2	67.4
8	16 Oct 91	2200	2230	270	2-4	350	73	+80%	58.5	69.2	62.2
9	16 Oct 91	0917	0947	090	7-10	350	78	+80%	69.2	89.0	72.7
9	16 Oct 91	1943	2013	090	3-7	100	78	+80%	70.7	95.2	78.9
9	15 Oct 91	2338	0008	090	7-10	350	73	+80%	62.9	72.6	64.8
10	15 Oct 91	1000	1030	090	5-10	150	76	+80%	69.3	87.6	73.9
10	16 Oct 91	2036	2106	090	3-7	100	74	+80%	68.4	87.7	73.5
10	17 Oct 91	0025	0055	090	7-10	350	70	+80%	58.0	80.1	60.5
11	15 Oct 91	1242	1312	180	0-5	150	83	+80%	77.0	84.4	78.2
11	17 Oct 91	0110	0140	180	7-10	350	70	+80%	60.5	73.1	63.3

^a Relative to true north.

2.3.9 OTHER ENVIRONMENTAL FEATURES

As an existing resources recovery facility, DCRRF has ongoing programs of renovation and upgrading of existing facilities that will be initiated prior to commencement of construction of the CEP. In addition, in order to implement the CEP, certain existing facilities will be removed or relocated. These activities will not alter the physical environment or ecology of the site. These changes are described in more detail in Section 3.0.

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3.0 THE PLANT AND DIRECTLY ASSOCIATED FACILITIES

3.1 BACKGROUND

Metro-Dade County owns a resources recovery facility located in northwest Dade County. The facility, known as Dade County Resources Recovery Facility (DCRRF), is currently operated under contract by Montenay Power Corp. (MPC). Municipal solid waste (MSW) is processed into refuse-derived fuel (RDF) by removing ferrous metal, glass, and aluminum, and the RDF is burned in four boilers. The boilers produce steam which in turn is used to generate electrical power.

DCRRF was originally designed and constructed from 1979-1982 after receiving licensing approval under the Florida Electrical Power Plant Siting Act (FEPPSA) on January 9, 1978. The original conditions of certification are contained in Appendix 10.4. The U.S. Environmental Protection Agency (EPA) issued a federal prevention of significant deterioration (PSD) permit for construction of the facility on February 27, 1978 (see Appendix 10.4). The facility has operated under these approvals since initial construction and operation.

DCRRF was originally constructed to provide an alternative to disposing of MSW in a landfill in Dade County, while providing beneficial byproducts to the community. It was originally designed as a 3,000-ton-per-day (TPD) resource recovery facility [936,000-ton-per-year (TPY) facility receiving MSW 6 days per week]. RDF is generated in the front-end processing systems for incineration in four spreader-stoker type boilers. Steam is generated in the boilers and then used to drive two steam turbines/generators to produce electricity. Part of the electricity is consumed to operate the plant, and the remainder is exported off-site for sale.

The original design of the plant included different techniques for processing of trash and garbage, and two separate process lines were established:

1. Trash System--A dry-line shredding system for processing trash, and
2. Garbage System--A wet-line system for processing garbage.

However, the wet system originally installed to process garbage proved to be inefficient and environmentally problematic and, therefore, was abandoned. The facility was altered to provide dry processing systems on both trash and garbage from 1987 through 1990, as well as general renovation of the facility. This renovation is known as the Capital Improvements Project (CIP).

The CIP involved refurbishing and upgrading the facility to better serve its intended purpose while assuring the original conditions of certification were met. The activities involved in the CIP are identified in Table 3.1-1 which presents a comprehensive list of the many attributes of the facility. The attributes listed include the site, land use and zoning, RDF process, facilities, fuel, air pollution control, stacks, water use, industrial wastewater, solid waste, and storm water. The attributes of the originally certified facility and the CIP are shown. The CIP did not result in any new, different, or increased discharges of pollutants, change in fuel, or expansion in steam generating capacity. Rather, the CIP in some cases involved refurbishing and upgrading the facility to meet the original conditions of certification and Florida Department of Environmental Regulation (FDER) rules. Table 3.1-1 also presents the proposed changes to the facility for comparison with the original certified facility and the CIP.

Metro-Dade County is planning to expand DCRRF with the addition of two new combustion trains (units). The addition of these new units will increase the total MSW processing capability of the facility. The new units will be equipped with modern air pollution controls to minimize air emissions. After the two new units begin operating, the four existing units will be retrofitted with new, modern air pollution control equipment. These existing units are currently equipped with particulate control equipment, but have no acid gas control. In addition, new, taller stacks will be constructed for the four existing units.

3.1.1 DEFINITIONS

The following definitions are used throughout this chapter.

- a. Garbage--Principally household waste collected from residential communities.
- b. Trash--Principally refuse collected from commercial, industrial, and agricultural enterprises.
- c. MSW--Generic name for all types of trash and garbage as received at the facility.
- d. RDF-2--Waste of coarse particle size from the outlet of the primary and secondary trommels which will be used as fuel for the two new units constructed for plant expansion.
- e. RDF-3--Screened or shredded fuel derived from RDF-2 that has been processed with removal of one or more of the following materials: metal, glass, and other inorganics. This fuel will be used for the four existing units.

Table 3.1-1. Summary of Certified, Existing, and Proposed DCRRF (Page 1 of 2)

Attribute	Facility as Certified	Existing Capital Improvements Project	Proposed Capital Expansion Project
SITE			
Total Land Area	160 acres	No change	No change
Plant Site	40 acres	No change	No change
Landfill	80 acres	No change	No change
LAND USE AND ZONING			
	Consistent with Dade County Rules	No change	No change
CAPACITY			
MSW-Daily	3,000 tons	No change	4,500 tons
-Yearly	936,000 tons	No change	1,404,000 tons
Electrical	77 MW	No change	142 MW
RDF PROCESS			
Type	Wet	Dry	Dry
Ferrous Separation	Included	Upgraded	No change
Glass Separation	Included	No change	No change
Aluminum Separation	Included	No change	No change
FACILITIES			
Scales	Included	No change	New scales to be added
Garbage Receiving	Included	No change	To be extended
Garbage Processing	Included	Refurbished	No change
Trash Receiving	Included	Upgraded	No change
Trash Processing	Included	Refurbished	To be upgraded
RDF Storage	Included	No change	Add capacity
Ferrous Processing	Included	Relocated/upgraded	No change
Ash Handling	Included	Upgraded	To be upgraded
Tire Shredding	—	Added	No change
Cooling Towers	Included	No change	One new tower
RDF Boiler Feed System	Included	Refurbished	To be upgraded
Boilers	Included	Refurbished	Two new boilers
Turbines	Included	No change	One new turbine
Switchyard	Included	No change	To be upgraded and relocated (on-site)
Water Treatment	Included	No change	To be upgraded
Pathological Incinerator	Included	Removed (prior to CIP)	Not included
Heavy Equipment Maintenance	Included	Relocated	No change
Offices	Included	No change	New administration building
FUEL			
	RDF	Process change	No change in existing RDF2 in new boilers
BOILERS			
Number	Four	No change	Four existing/two new
RDF Burning Capacity	Four units at 39.1 TPH each	Four units at 28 TPH each	No change in existing units; two new units at 40 TPH
AIR POLLUTION CONTROL			
Type	ESP	No change	Spray dryer absorber/fabric filters
Standard	NSPS: 40 CFR Subpart E	No change	NSPS: 40 CFR Subparts Ea and C
Mercury Control	Not required	Not required	To be installed on existing and new units
NO _x Control	Not required	Not required	Included for new units

Table 3.1-1. Summary of Certified, Existing, and Proposed DCRRF (Page 2 of 2)

Attribute	Facility as Certified	Existing Capital Improvements Project	Proposed Capital Expansion Project
STACKS			
Height	Two @ 150 ft	No change	Three @ 250 ft
Type	Common flue	No change	Dual flue
WATER USE			
Groundwater			
Well Capacity	Three @ 1,222 gpm	No change	No change
Maximum Daily Use	1.85 mgd	<1.85 mgd	Maximum 3.16 mgd
Average Daily Use	1.85 mgd	<1.85 mgd	Average 1.4 mgd
City Water	4,500 gpd	Maximum 0.41 mgd	Maximum 0.41 mgd
		Average 0.21 mgd	Average 0.21 mgd
INDUSTRIAL WASTEWATER DISCHARGE			
To Waters of the U.S.	No discharge	No change	No change
To Waters of the State	No discharge	No change	No change
Cooling Tower Blowdown	Recycled	Sanitary sewer	Recycled
Boiler Blowdown	Recycled	Sanitary sewer	Recycled
Leachate	Pond and recycled	Sanitary sewer	Recycled
Contact Stormwater	Recycled	Sanitary sewer	Recycled
SOLID WASTE			
Leachate Collection	Included	Upgraded	No change-alternative uses to be sought
STORMWATER			
	Included	Upgraded	To be upgraded for the new and expanded facilities

Source: KBN, 1992.

It is also noted that a settlement agreement was reached between FDER, Dade County, and Montenay Power Corp. in early 1992. The agreement was in response to certain work undertaken during the CIP that did not satisfy the regulatory agencies in specific areas. These areas involved stormwater management, groundwater assessment, odor control, closure of a portion of the ash landfill, and maintenance and operation of equipment. The settlement agreement is in the process of being implemented at DCRRF. A copy of the settlement agreement is contained in Appendix 10.4.

3.1.2 EXISTING FACILITIES

A recent photograph of the plant as it currently exists is provided in Chapter 2.0. A site location map is presented in Figure 3.1-1. A process flow diagram, Figure 3.1-2, illustrates how material is currently processed in the plant. The current plant operations are described briefly in the following paragraphs.

3.1.2.1 MSW RECEIPT AND STORAGE

MSW is delivered to the plant by both private and municipal refuse trucks. The trucks are weighed on arrival at either of two weigh scales prior to offloading in separate trash and garbage tipping buildings.

3.1.2.2 TRANSPORTATION

Delivery of MSW to the facility is exclusively by truck transportation. Private haulers truck in the majority (70 to 75 percent) of the MSW, and Dade County trucks in the balance. Since the facility is located on the northwest corner of the intersection of NW 97th Avenue and NW 66th Street, primary access to the facility is via NW 58th Street from the east. The principal connectors to NW 58th Street are the Palmetto Expressway [State Road (SR) 826], NW 87th Avenue, NW 82nd Avenue, and NW 72nd Avenue. A minor amount of traffic from the south accesses the facility via NW 58th Street from the west along rural roads. All traffic currently accesses the plant via NW 97th Avenue from NW 58th Street.

If justified by traffic studies, NW 74th Street could be extended from the Palmetto Expressway to 97th Avenue for alternate access to the north of the facility. This would alleviate traffic from the north having to utilize the Palmetto Expressway, NW 82nd Avenue, or NW 72nd Avenue.

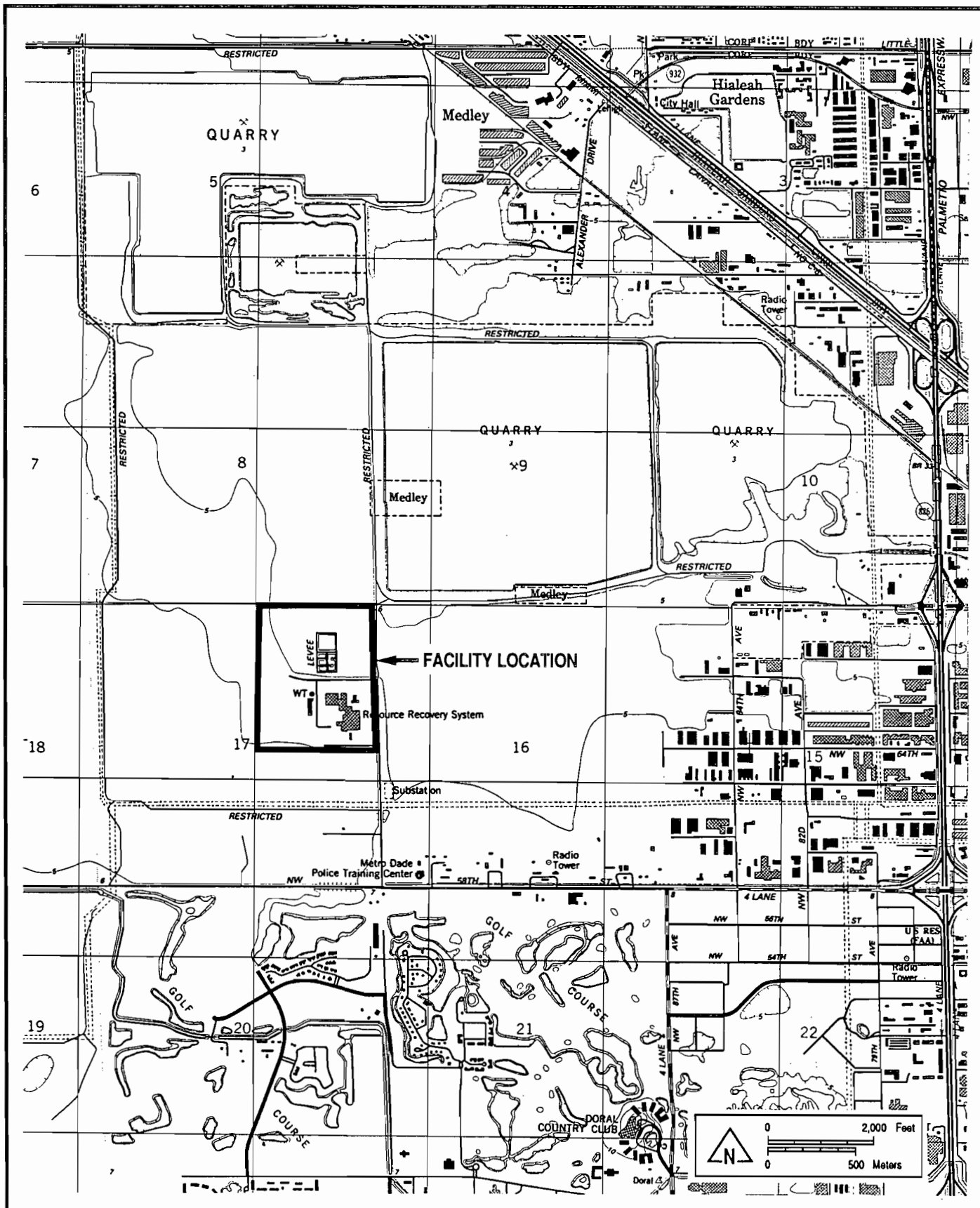


Figure 3.1-1 DCRRF SITE LOCATION MAP

**DADE COUNTY RESOURCES RECOVERY FACILITY
CAPITAL EXPANSION PROJECT**

Owner: Dade County
Operator: Montenay Power Corp.

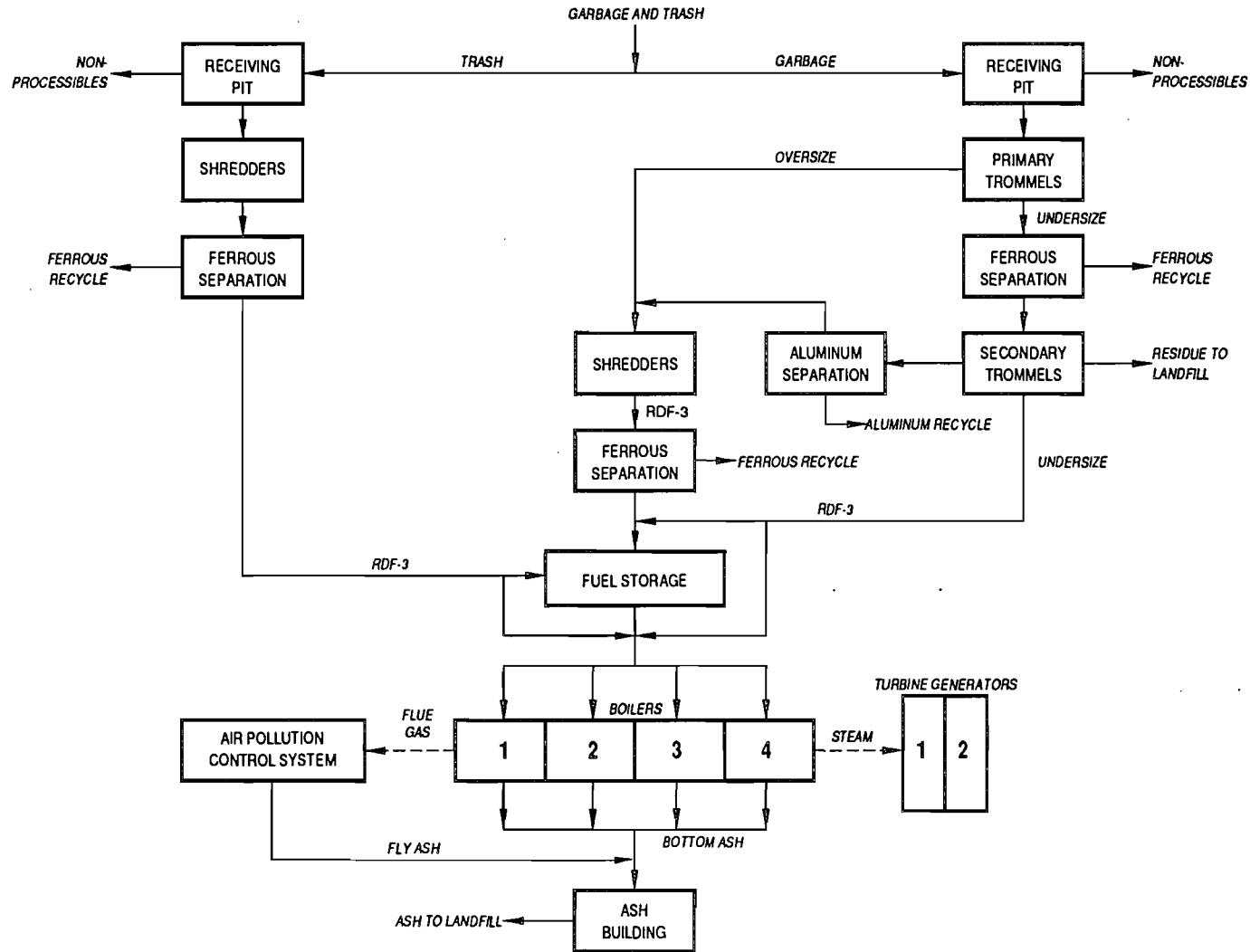


Figure 3.1-2 GENERAL PROCESS FLOW DIAGRAM FOR EXISTING DCRF

**DADE COUNTY RESOURCES RECOVERY FACILITY
CAPITAL EXPANSION PROJECT**

Owner: Dade County
Operator: Montenay Power Corp.

Most deliveries to the facility are made during normal delivery hours which are 6:00 a.m. to 6:00 p.m. Monday through Friday. Deliveries are accepted between 4:00 a.m. and 12:00 midnight Monday through Saturday.

3.1.2.3 STORAGE

MSW is categorized into two types of waste, "trash" and "garbage," for processing in the front-end processing system at the facility. Trash typically consists of:

1. Large bulky waste generated by commercial businesses and light industries, and
2. Yard waste (composed primarily of wood, paper, and plastic products), which is generally delivered in open air trucks or trailers.

Garbage is typical household waste delivered in compactor-type trucks or from Dade County transfer stations in county trucks.

These two types of MSW are delivered to separate buildings, each with an enclosed tipping floor and storage pit. The trash tipping floor has 10 tipping bays with a capacity to handle up to 1,500 trucks per week during normal delivery hours. The trash storage pit has approximately 20,000 cubic yards (cy) storage capacity weighing approximately 3,000 tons with a density of 300 pounds per cubic yard (lb/cy). MSW deliveries suspected of containing nonprocessable waste are dumped onto the tipping floor for inspection prior to storage in the pit. Rejects are loaded back onto the delivery truck or turned over to the county for disposal off-site. Acceptable material is pushed into the storage pit with front-end loaders along with any spillage from other deliveries. Overhead bridge cranes distribute material within the pit and clear the tipping bays. The trash tipping floor and storage pit are already sized to accommodate the expanded plant capacity.

The garbage tipping floor has 12 tipping bays with a capacity to handle approximately 2,000 trucks per week during normal delivery hours. The garbage storage pit has approximately 30,000 cy storage capacity weighing approximately 6,750 tons with a density of 450 lb/cy. Loads suspected of containing nonprocessable waste are treated in the same manner as in the trash tipping building.

Currently, 18,000 tons per week (TPW) of refuse is received at the plant, of which about 100 TPW of nonprocessable trash is reloaded and exported to the county landfill. In accordance with the contract between the county and the operator, at least 60 percent of the waste must be garbage.

3.1.2.4 TRASH SYSTEM

The present dry process trash system has two independent lines, each rated at 40 tons per hour (TPH). The two lines incorporate a total of three shredders, primary and secondary magnets for ferrous materials separation, and interconnecting conveyors. All trash is currently being processed through the system as shown in the general process flow diagram of the existing system (Figure 3.1-2).

Trash is offloaded from trucks into a receiving pit as described in Section 3.1.2.3. Two overhead bridge cranes recast the material as necessary and deliver the material to three infeed conveyors. Three cherry pickers, one for each conveyor, redistribute the refuse on the conveyors and extract materials too large or unsuitable for processing by the shredders. Typically, nonprocessable materials are removed from the shredding areas by truck and sent to dedicated landfill areas.

Two hammermill shredders rated at 20 TPH each and one hammermill shredder rated at 40 TPH shred the trash, reducing its volume by approximately 50 percent. This operation prepares and homogenizes the fuel as well as reduces odors and enhances the ability to separate ferrous metals. Primary and secondary magnetic separators on each line extract ferrous material from the RDF stream. The recovered ferrous is conveyed to the loadout area for recycling. The resulting material, suitable for combustion in the boilers, is delivered to the fuel storage building and then fed to the boilers. A provision for discharge of the RDF directly onto the fuel feed system has been installed to preclude a shutdown of the boilers should a problem arise in delivering fuel from the fuel storage building.

3.1.2.5 GARBAGE PROCESSING SYSTEM

The garbage processing system has two independent lines rated at 100 TPH each. The general process flow is presented in Figure 3.1-2. Incoming waste is off-loaded from trucks into the receiving pit and loaded onto one of two 7-ft-wide infeed conveyors by overhead cranes at a rate of 100 TPH. The conveyors transfer the material to the 12-1/2-ft-diameter x 60-ft-long primary

trommel. Unprocessable waste is removed from the inclined trommel feed conveyor by plant personnel. These items are dropped into the pit on either side of each feed conveyor and later removed by overhead crane. The primary trommel is equipped with 5-inch-diameter holes and tear pins to open bags of refuse. The refuse is rotated and tumbled in the trommel, and items less than 5 inches in diameter fall through the holes of the trommel to be collected on the trommel "unders" conveyor.

The primary trommel "unders" material is transported by belt conveyor to the feed chute of the secondary trommel. Before secondary trommeling, an overhead belt magnet removes ferrous material from this "unders" stream and deposits the ferrous material on a belt conveyor leading to the ferrous loadout area for recycling.

The primary trommel "unders", after ferrous removal, enter the 10-1/2-foot (ft)-diameter by 50-ft-long two-stage secondary trommel. Broken glass, sand, grass clippings, etc. pass through the first stage of the trommel which contains 1-1/4-inch-diameter holes. This material then passes through an air classifier to recover another 5 to 7 percent of light combustibles. The remaining material is conveyed to the loadout area for landfill disposal. Material which is larger than 1-1/4 inches in diameter continues on to the second stage of the trommel.

The trommel second stage contains 2-1/2-inch-diameter holes through which paper, plastic, wood, and other combustibles smaller than aluminum beverage cans are removed. This RDF-3 material is conveyed to the fuel feed system.

The material that passes through the end of the secondary trommel (oversize material) is greater than 2-1/2 inches but less than 5 inches in size and is the aluminum-can-rich stream. This material is uniformly fed via conveyor to three eddy current Pulsort[®] aluminum sorters which remove the aluminum cans. The cans, after manual removal of contaminants, are conveyed to the loadout area for recycling.

The secondary trommel oversize material, after aluminum removal, is recombined with the material that passed through the primary trommel. This material is conveyed to the shredder where 95 percent is reduced to less than 4 inches in diameter. The material, which is RDF-3, discharges from the shredder onto a belt conveyor. This material passes under a magnetic

separator where ferrous material is removed and dropped onto the ferrous conveyor. The remaining RDF-3 is placed onto the fuel feed system and conveyed to the fuel storage area. The clean ferrous material is conveyed to the loadout area for recycling. Dust generated during shredding is withdrawn via ducting to a cyclone precleaner and bag filter. Clean air is exhausted to the atmosphere.

3.1.2.6 FUEL FEED SYSTEM

The fuel feed system consists of a series of apron, belt, and drag type conveyors with the ability to transport fuel from the fuel storage building to the combustion units on two independent lines. Excess material can be returned to fuel storage. This system also provides the means for transporting the RDF-3 generated by the garbage processing system to fuel storage.

3.1.2.7 BOILERS

Four refurbished combustion trains, each capable of burning approximately 27 TPH of RDF, are in operation [high heating value of 5,200 British thermal units per pound (Btu/lb) and producing 180,000 pounds per hour (lb/hr) of steam at 625 pounds per square inch gauge (psig) and 730 degrees Fahrenheit (°F)]. Boiler control is automatic. All auxiliary systems are in good operating condition, and the units meet the specified performance standards. The heat input to each boiler is 280.8 million British thermal units per hour (MMBtu/hr), assuming 27 TPH RDF input and an average RDF heating value of 5,200 Btu/lb.

Historic plant operating data are summarized in Table 3.1-2. Combustion train refurbishments were completed in 1989, allowing increased operating hours and therefore greater quantities of RDF to be burned in 1990 and 1991.

3.1.2.8 TURBINE-GENERATORS

Two 38-megawatt (MW) turbine-generators use the steam from the boilers to provide for the in-plant parasitic electric load, and the balance is exported for sale to Florida Power Corporation (FPC), wheeling through the Florida Power & Light Company (FPL) grid. All supporting systems, including cooling towers and condensers, are in place and functioning properly.

Table 3.1-2. Historic DCRRF Plant Operating Data

Year	RDF Burned ^a (tons)	Operating Hours ^a
1986	498,268	19,483
1987	407,736	17,773
1988	358,719	18,092
1989	468,750	19,587
1990	702,652	27,721
1991	749,590	28,569

Note: RDF = refuse-derived fuel.

^a Total of four units.

Sources: Birwelco-Montenay, Inc., 1992.
KBN, 1992.

3.1.2.9 AIR QUALITY CONTROL

Air quality control is achieved by control of combustion conditions and the use of mechanical dust collectors and three-field electrostatic precipitators (ESPs) for control of particulate matter emissions. Two stacks are in place, with each stack serving two units. Additional information concerning the existing air pollution controls is presented in Section 3.4, Air Emissions and Controls.

3.1.2.10 FERROUS RE-SHREDDING

Ferrous material from both the trash processing and garbage processing systems is delivered to a common storage area for processing. The processing cleans and densifies the ferrous material for sale off-site. The material is shredded and then submitted to air classification to separate light combustible material for return to fuel storage.

3.1.2.11 ASH HANDLING

The ash handling system serving the four existing boilers and electrostatic precipitators is described in Section 3.7.1, Solid Waste.

3.1.3 PROPOSED FACILITIES

3.1.3.1 PLANT EXPANSION PROGRAM OBJECTIVES

Dade County proposes to implement a plant expansion program, the objective of which is to increase the MSW processing capability of the plant to 4,500 TPD (1,404,000 TPY) in an environmentally acceptable manner and produce electrical power for export up to the regulated limits. This project is known as the Capital Expansion Project (CEP).

During operation, the amount of material consigned to landfill will be reduced significantly by the enhanced condition of recovered materials, such as ferrous material and aluminum, which will be sold for recycling off-site. Ash may also be recycled off-site. During the expansion program, the plant will continue to operate at its current level of MSW processing, with the ability to increase processing up to the design rate of 4,500 TPD (1,404,000 TPY). Also, an additional 200,000 TPY of yard trash will be processed on-site.

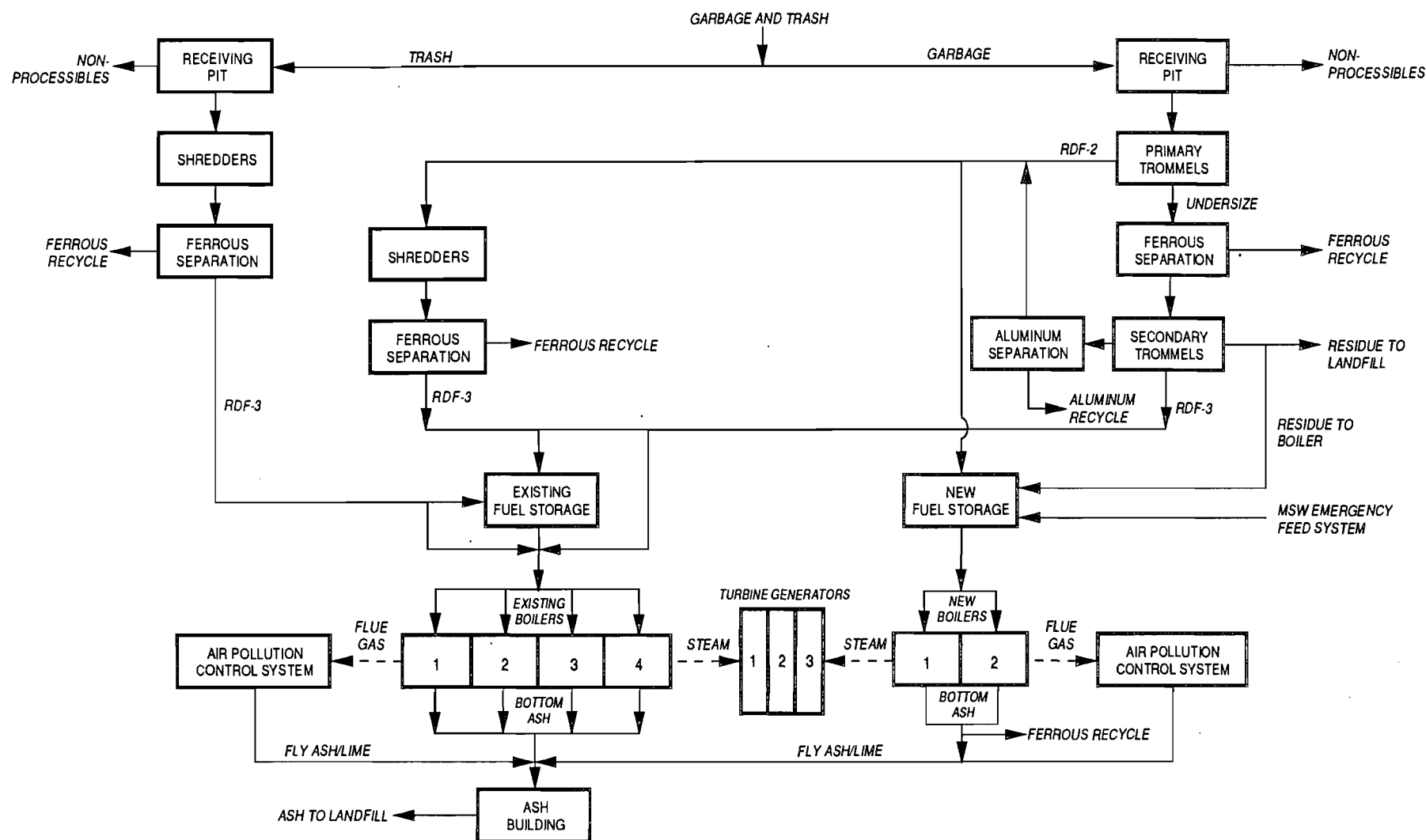
3.1.3.2 EXISTING FACILITIES ALREADY AT EXPANSION CAPACITY

Specific items associated with the CIP are:

1. Propane System--A propane system used for boiler light-off and shutdown was installed with capacity to provide for the two new boilers,
2. Garbage Processing System--The current system, changed during the CIP, can accommodate the additional tonnage to be received after the expansion, i.e., 982,800 TPY of garbage. The general process flow diagram of the expanded facility is presented in Figure 3.1-3. In order to accommodate the two new units, a reversible conveyor will be provided at the outlet end of each line's existing trommels. In one direction, the conveyor delivers RDF-2 to the existing shredding process where it is converted to RDF-3 and fired in the existing units. In the other direction, the conveyor delivers RDF-2 to a new system of belt conveyors to feed the bunker for the new units. This design allows the flexibility to process RDF for either the existing or the new units. Processing of RDF-3 for the existing units will be supplemented by material generated through the trash processing system, as currently is practiced.
3. Trash Receiving and Processing System--Changes to this area during the CIP incorporated adequate storage and handling capacity to accommodate the proposed expansion. Processing capacity included the addition of a third shredder and associated equipment. However, the current system does not have adequate capacity to process the quantity of material required for expansion. This will be achieved by replacing the two existing 20-TPH shredders with 40-TPH shredders. The existing single-drum compression feeders will be replaced with dual-drum compression feeders. All other ancillary equipment is sufficient to support expansion. The general process flow diagram for the trash system after expansion is the same as currently exists (see Figure 3.1-3). The expected annual throughput of the trash system after the CEP will increase to 421,200 TPY from the current requirement of 374,400 TPY.
4. Process Unders Building--Adequate capacity was incorporated into the building during the CIP.

3.1.3.3 ADDITIONAL FACILITIES

The major areas of engineering, procurement, construction, and commissioning associated with the CEP are described in the following sections.



3.1-15

Figure 3.1-3 RDF PROCESS FLOW DIAGRAM FOR EXPANDED DCRRF

**DADE COUNTY RESOURCES RECOVERY FACILITY
CAPITAL EXPANSION PROJECT**

Owner: Dade County
Operator: Montenay Power Corp.

3.1.3.3.1 Water Treatment

Due to the proposed location of the new boilers and associated systems, the on-site water treatment plant will be relocated and additional capacity added.

3.1.3.3.2 Refuse Combustion and Steam Generation

Overhead cranes will be used to transfer the MSW to the grate-feed hoppers. Refuse is admitted to the combustion system through a water-cooled feed chute. The solid waste in the chute also serves as an airlock to prevent the entry of air into the furnace through the feed system. A hydraulically operated damper will be installed and used as necessary to close the chute to eliminate air ingress. The refuse falls by gravity onto a feeding platform from where three refuse ram feeders, arranged side by side, push the fuel onto each of the three grate sections. Each ram feeder consists of upper and lower hydraulically driven rams. Control of cycle times and stroke length permits the feed rate of the fuel to be varied in accordance with the waste composition or as required by demand signals from the steam generators. The control of fuel dosing (lower ram) and fuel feeding (upper ram) is important to the overall combustion process.

Each new combustion train will be capable of firing up to 40 TPH of RDF-2 with a heat input rate of 416 MMBtu/hr (assuming average heating value of RDF of 5,200 Btu/lb). At this design rate, each unit will be capable of producing up to 300,000 lb/hr of steam at 625 psig and 750°F (with fuel heating value from 5,000 to 6,000 Btu/lb).

3.1.3.3.3 Combustion System

The two new combustion units will use a modern combustion system specifically designed for RDF combustion. The combustion system vendor has not yet been selected. The following discussion describes the combustion system for one potential vendor, W+E Environmental Systems (W+E). The combustion system ultimately selected, if different from the W+E design, will provide equivalent performance to the W+E design.

The heart of the combustion system is the grate, which will be arranged in a horizontal position. A W+E double-motion overthrust grate consists of a system of moveable and fixed grate bars. A schematic of the grate system is shown in Figure 3.1-4, and the furnace/boiler system is illustrated in Figure 3.1-5.

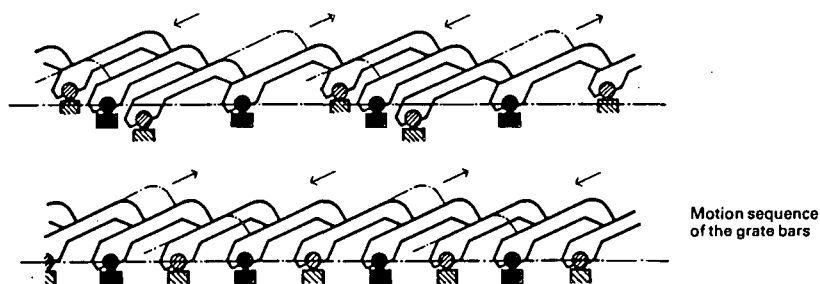
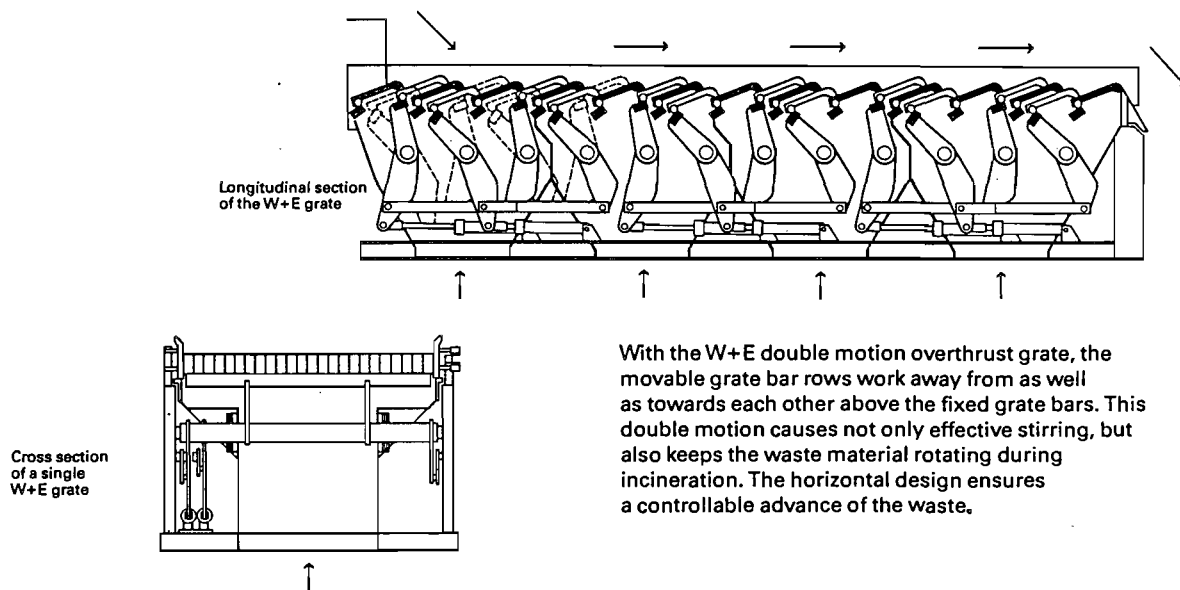
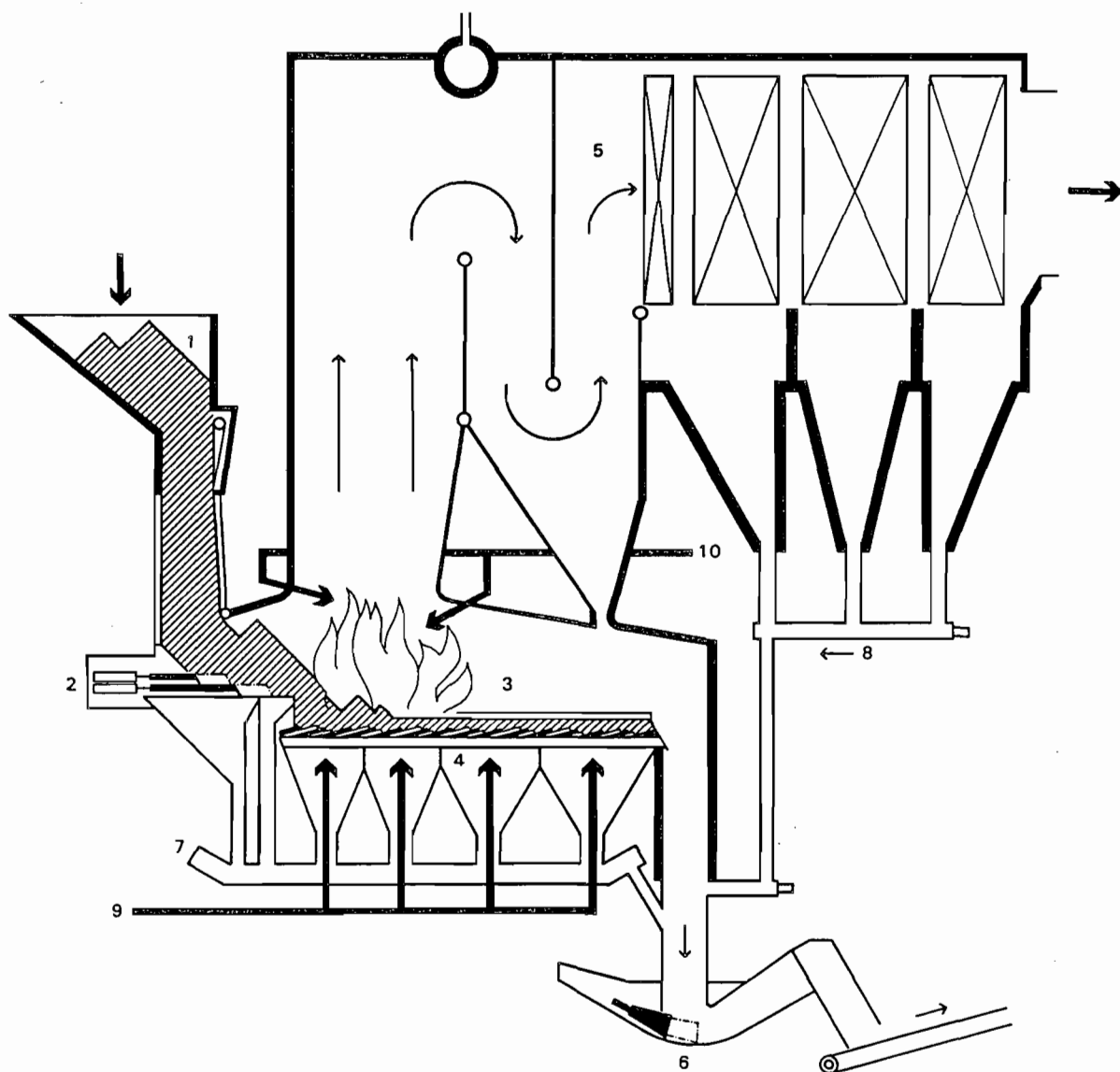


Figure 3.1-4 SCHEMATIC OF W+E GRATE SYSTEM

**DADE COUNTY RESOURCES RECOVERY FACILITY
CAPITAL EXPANSION PROJECT**

Owner: Dade County
Operator: Montenay Power Corp.



- 1 Charging hopper and waste chute
- 2 Feeder
- 3 Combustion chamber
- 4 Grate
- 5 Steam boiler
- 6 Ram discharger
- 7 Grate siftings conveyor
- 8 Fly ash transport system
- 9 Primary air system
- 10 Secondary air system

Figure 3.1-5 W+E FURNACE/BOILER SYSTEM

**DADE COUNTY RESOURCES RECOVERY FACILITY
CAPITAL EXPANSION PROJECT**

Owner: Dade County
Operator: Montenay Power Corp.

A special bearing on the main drive shaft moves the grate bars back and forth in a straight line rather than a circular motion. The drive shafts are driven by hydraulic cylinders which drive the paired movable bar rows. All drive mechanisms are accessible from the outside of the system for inspection and maintenance without requiring shutdown.

Each W+E grate is typically divided into four longitudinal zones: the drying zone, the ignition zone, the combustion zone, and the post-combustion zone. Each of the grate zones is equipped with its own underfire air supply, which can be proportioned based upon fuel heating value and composition. For instance, high-moisture fuel may require a higher drying zone air flow to assist in fuel drying prior to ignition.

The size and throughput capacity for the W+E grate is a function of the grate width (up to 39 bars in parallel) and the grate length (up to five zones). Each grate system proposed for the CEP will consist of 3 grate sections, each with 39 parallel grate bars and 4 underfire air zones.

The horizontal position of the grate and the opposed motion of the grate bars result in a positive forward movement of the waste over the length of the grate, without the excessive tumbling normally associated with inclined grates, yet with enough rolling motion to achieve thorough blending of the waste layer on the grate and good exposure of the waste to the primary air for ignition. Typically, the bottom ash contains less than 3 percent combustible material on a dry basis.

The grate bars are interlocked by a special coupling mechanism and fit loosely onto the grate shafts without any attachments. The couplings and the shaft notches in the grate bars are designed to permit relative motion or rubbing between adjacent interlocked bars. This system has proven extremely successful in avoiding the choking of the underfire air slots in the grate bars, thereby assuring cooling of the bars and equal distribution of primary air to the fuel bed independent of fuel layer thickness.

Typically, incinerator grates are equipped with cooling plates along the side walls to avoid excessive slagging of the furnace walls above the grates. Based upon the good fuel burnout experienced with the W+E grate and the difficulty of controlling the amount of cooling air entering the combustion process, such cooling plates would not be required for the DCRRF units.

Uncontrolled excessive air introduced through the side wall cooling system could possibly impair combustion. Therefore, the W + E grate would be equipped with a single row of closure plates. Each closure plate consists of a three-part assembly that provides a seal between the grate and the furnace side walls and accommodates the downward expansion of the midsupported boiler walls. These closure plates are air cooled by a controlled amount of tertiary air to maintain a safe temperature.

The W + E combustion control system permits essentially full automatic operation of the combustion system, which reduces plant operator requirements. Automatic controls can respond fast enough to avoid any undesirable combustion conditions due to change in fuel composition, fuel caloric value, or steam demand.

Boiler steam flow is used as the control input signal. The refuse ram feeder, the grate, and combustion air are controlled by a programmable controller to maintain safe combustion chamber temperatures and oxygen levels, the main parameters for controlling combustion and avoiding undesirable pollutants.

Primary combustion air to the grate/boiler will be supplied by a primary air fan for each unit. The fans will draw air from the tipping hall. This will maintain the tipping hall/bunker under a slight negative pressure, which provides dust and odor control in these areas.

Primary air enters the combustion system via partitioned grate zones in the W + E design, as described previously. Normally, primary air is preheated in the cooling channel of the grate bars. However, an additional steam-heated air preheater may be supplied in the primary air duct to assist in predrying very wet fuel with low heat content or to preheat cold ambient air.

Secondary combustion air will be supplied to the furnace by a secondary air fan for each unit. These fans draw air from the higher elevations in the boiler building to assist in building ventilation and odor control. To assure even distribution, the air is admitted to the furnace via a relatively large number of nozzles in the front and rear walls of the furnace. High-velocity air is injected into the combustion chamber to assure complete turbulent mixing of volatiles emanating

from the primary combustion on the grate. This process assures complete burnout of all combustibles prior to leaving the furnace and also assures that all environmental requirements regarding destruction efficiency of combustible pollutants are met.

3.1.3.3.4 Steam Generation System

The new DCRRF units will incorporate a typical resource recovery boiler design, such as the W+E design, comprising a furnace, two radiation chambers, and a horizontal convection section that includes the superheater, evaporator, and economizer (refer to Figure 3.1-5). The W+E boiler configuration has evolved over the years to the present design. The design features a horizontal convection section with vertical tubes which are cleaned by mechanical rapping devices and furnace walls which are cleaned by pneumatic rappers.

The larger furnace volume results in significantly less slagging of the furnace walls, which in turn results in better boiler performance and increased operational availability. Also, the three-chamber design increases the gas residence time upstream of the superheater so that sufficient time is available for suspended fly ash particles to burn out prior to impacting on the superheater tubes. This reduces the ash deposits on the superheater tubes and the corrosion associated with such deposits. Also, the radiant heat transfer in the radiation chambers reduces the gas temperature to below the critical temperature at which high-temperature corrosion could occur in the superheater. Moreover, the increased residence time maximizes the destruction of dioxins, furans, and other organic pollutants.

In order to improve the destruction efficiency of toxic substances, the modern furnaces are designed such that a temperature of at least 1,800°F is maintained for a minimum time period of 2 seconds, measured from the grate surface.

Each boiler will be equipped with two auxiliary propane-gas-fired burners. The burners are sized to start up a cold boiler and heat it to 1,600°F at the end of the furnace refractory. Gas firing is maintained until stable MSW combustion is achieved. Thereafter, the burners are shut down and would be restarted only if the control temperature in the furnace falls below 1,600°F.

3.1.3.3.5 Mechanical Piping

Appropriate piping will be provided to enable specified operation of the boiler selected.

3.1.3.3.6 Ash Handling System

The ash handling system for the new units is described in detail in Section 3.7, Solid and Hazardous Waste.

3.1.3.3.7 Cooling Tower/Condenser

An additional cooling tower will be installed to provide capacity for the new turbine condenser and the steam dump condenser. The new system will enable up to 100 percent of the capacity of the new plant steam output and 50 percent of the existing plant steam output to be dumped. Refuse burning can therefore continue if power production and export are not possible.

3.1.3.3.8 Air Quality Control

The air quality control system for the new units will consist of the following elements: a spray dryer absorber/fabric filter system for particulate matter, acid gas, and heavy metal removal; a system for mercury removal; and a de-NO_x system for nitrogen oxide (NO_x) control. The air quality control systems are described further in Section 3.4, Air Emissions and Controls.

A major aspect of the CEP will be the installation of new air pollution control equipment on the existing units. Each unit will be retrofitted with a spray dryer absorber/fabric filter system for particulate matter, acid gas, and heavy metal control. A system for mercury control will also be installed on each existing unit.

3.1.3.3.9 Turbine Generator

A new turbine-generator with a nameplate capacity of up to 65 MW will be added utilizing the steam from the new boilers and will provide for the in-plant electric load for the new combustion trains, with the balance of 52 MW available for sale to a utility. A steam dump condenser will also be installed to allow boiler operation during periods of maintenance on the turbine-generator and to control net electrical export under 80 MW required to retain the qualifying facility status under Public Utilities Regulatory Policies Act (PURPA) regulations.

3.1.3.3.10 Electrical

Electrical switchgear, transformers, and other appropriate equipment and wiring will be provided as necessary to insure functional systems.

3.1.3.3.11 Instrumentation and Controls

Appropriate boiler instrumentation and controls will be provided, compatible with the existing control system.

3.1.3.3.12 Fuel Preparation and Delivery

Changes anticipated to the existing fuel feed system during the CEP are as follows:

1. Trommelled RDF will not be transferred from the new storage pit to the existing units or the existing storage building due to the incompatibility of RDF-2 and RDF-3,
2. The fuel feed system will be improved in order to stabilize the fuel feed to the existing units with RDF-3,
3. The new units fuel feed system will consist of new conveyors extending from the trommel discharge to the new fuel bunker,
4. The units will be fed via a grapple crane/hopper arrangement,
5. An emergency feed system will be installed to feed MSW directly to the new storage pit, and
6. Additional capacity will be provided in the trash processing system as previously described.

A flow diagram of the fuel feed system for the expanded facility is presented in Figure 3.1-3.

3.1.3.3.13 Stacks

The installation of the new air pollution control equipment on the existing units will necessitate the removal of the existing stacks. Two new dual-flue stacks will be constructed, with each stack serving two units. A new stack will also be provided for the two new units. All stacks will be dual-flue, i.e., each pair of units will share a common, dual-flue stack. The height of all the stacks will be 250 feet (ft) above grade.

3.1.3.3.14 Fuel Storage

Additional fuel storage capacity will be provided by constructing a bunker with overhead cranes at the front of the two new units. A total of 3 days fuel storage will be provided for the new units.

3.1.3.3.15 Garbage Receiving Building

The existing garbage receiving building will be expanded to accommodate the additional delivery of up to 500,000 TPY of garbage. The building will be expanded to the south by approximately 50 percent of its current size. The expansion of the pit may require that a third bridge crane be installed to support recasting and delivery of the garbage to the infeed conveyors.

3.1.3.3.16 Weigh Scales

Two additional weigh scales will be installed to handle garbage deliveries, allowing the existing weigh scales to handle trash deliveries. These will be situated directly east of the garbage receiving building. An ash scale will also be added.

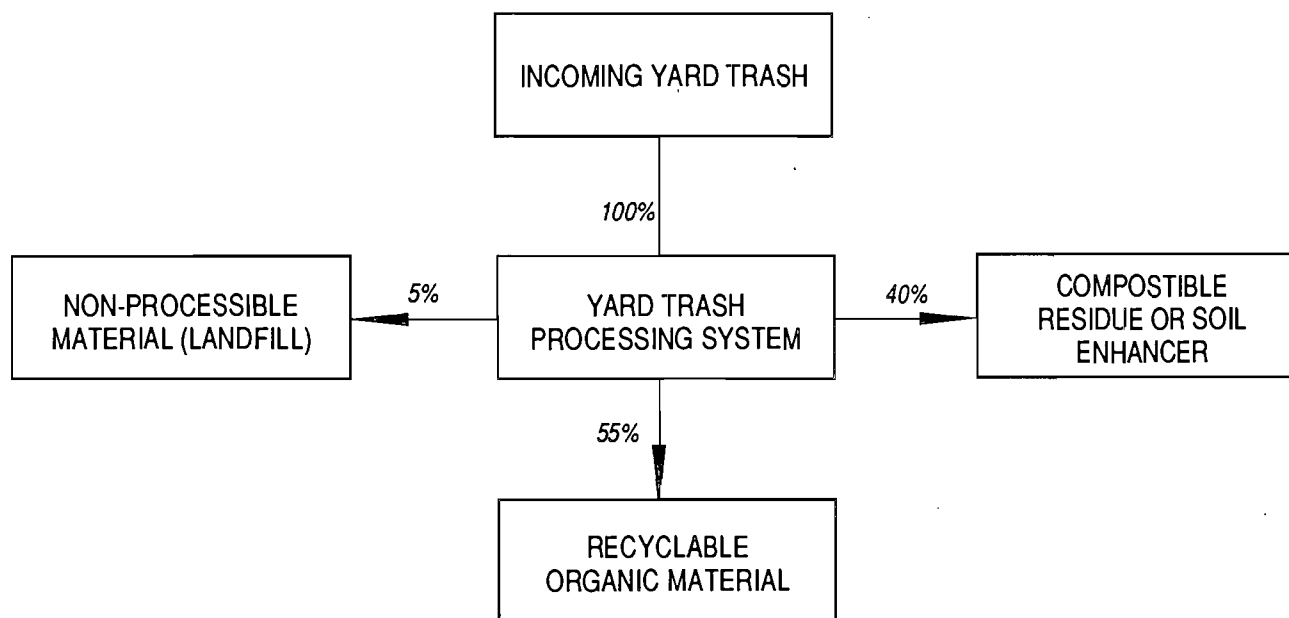
3.1.3.3.17 Yard Trash Processing System

A system for processing yard trash into recyclable products will be constructed at the site. The products of this process will not provide supplemental fuel. All materials produced in the process will be disposed of off-site.

The system will have a capacity of 200,000 TPY and will generate three products as shown in Figure 3.1-6. Yard trash contains approximately 5 percent "contamination" which includes plastics, paper, and metals. These contaminants will be removed and landfilled in order to provide marketable products from the remainder of the material received.

Yard trash also contains a significant amount of noncombustible material (dirt) which will be reduced to a small particle size in the process and can be removed by mechanical screening. A certain amount of combustible organic material will also be reduced in size and removed by mechanical screening. Combined, these materials represent approximately 40 percent of the material received. This product can be used directly for certain applications such as a soil enhancer, or processed further by composting for use in numerous applications. Marketability and demand will determine its ultimate use. Failing its use by third parties, Dade County will use it for one or more applications at county facilities.

The primary product intended from the process is the organic material separated from the other materials and sized in the system. This material will be redistributed in the community as "Metro Mulch," which has proven to be a very successful program for recycling this material. If this



3.1-25

Figure 3.1-6 YARD TRASH PROCESS FLOW DIAGRAM

DADE COUNTY RESOURCES RECOVERY FACILITY
CAPITAL EXPANSION PROJECT

Owner: Dade County
Operator: Montenay Power Corp.

market becomes saturated, the material will be used by Metropolitan Dade County in the maintenance of county property. Several other potential uses for this material such as yard waste compost and fuel for cogeneration facilities, are being investigated.

The yard trash processing system will make use of the existing trash processing facilities initially, until a permanent facility is constructed on the available acreage in the southeastern 40 acres of the site.

Other existing facilities, such as the truck scales and electrical power system, will be used in conjunction with this project.

3.1.4 SCHEDULE

The current construction and operation schedule for the CEP is presented in Figure 3.1-7. The schedule includes the assumption that all permit approvals will be obtained by June 1993, and construction will begin immediately thereafter with equipment orders and site drainage activities. Boiler construction will begin in December 1993 and will be erected by February 1995. The two new units will be erected and commissioned by June 1996.

Upon operation of the two new units, two of the existing units (3 and 4) will be taken off-line, and new air pollution control equipment and stacks will be installed, as described in Section 3.1.3.3.8. The retrofitting will take approximately 8 months. When retrofitting of these two units is completed, the remaining two existing units (1 and 2) will be taken off-line and retrofitted with new air pollution controls. This will also take approximately 8 months. The Capital Expansion Project is projected to complete construction by July 1997, for a 4-year construction period.

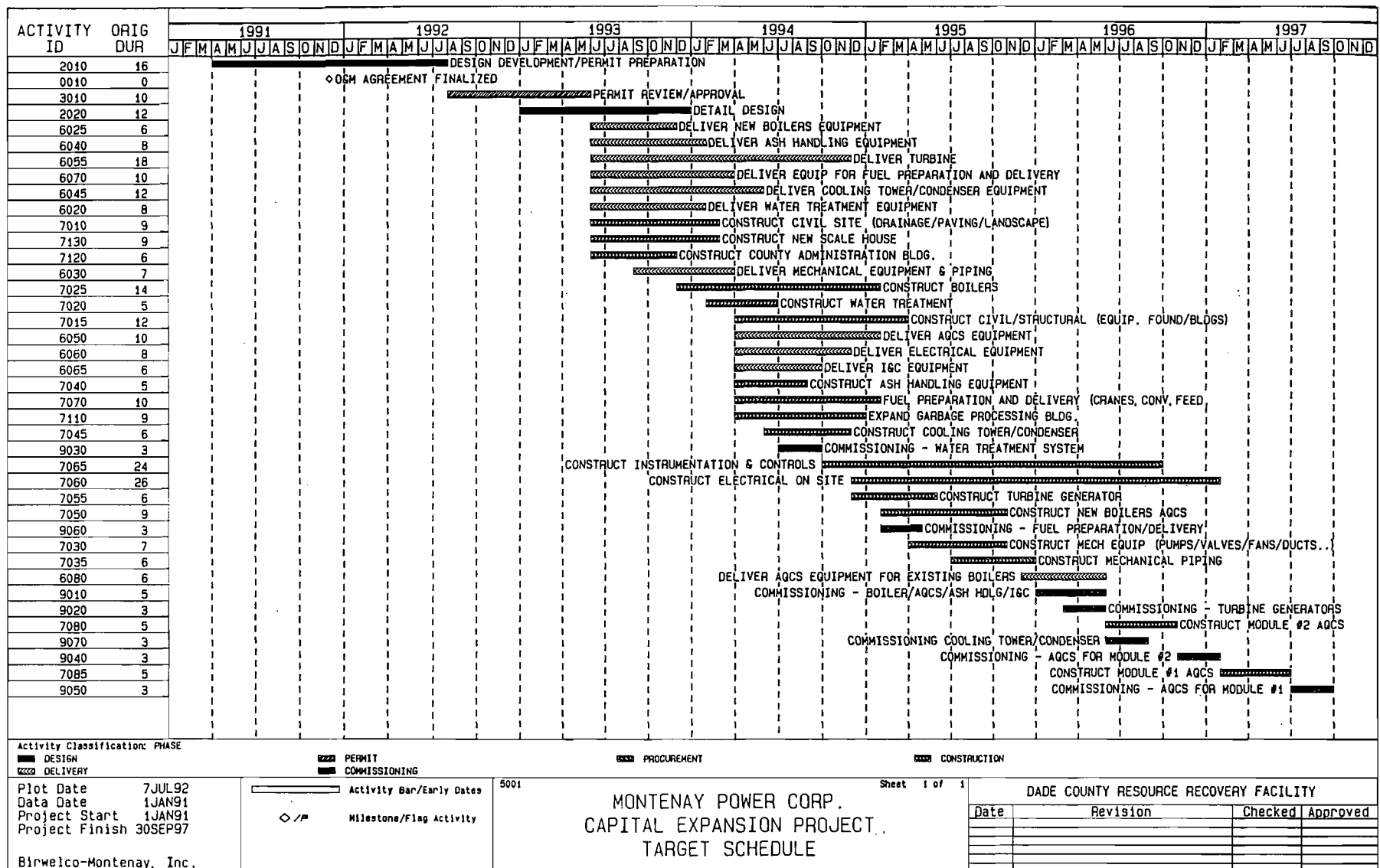


Figure 3.1-7 DCRRF CEP TARGET SCHEDULE

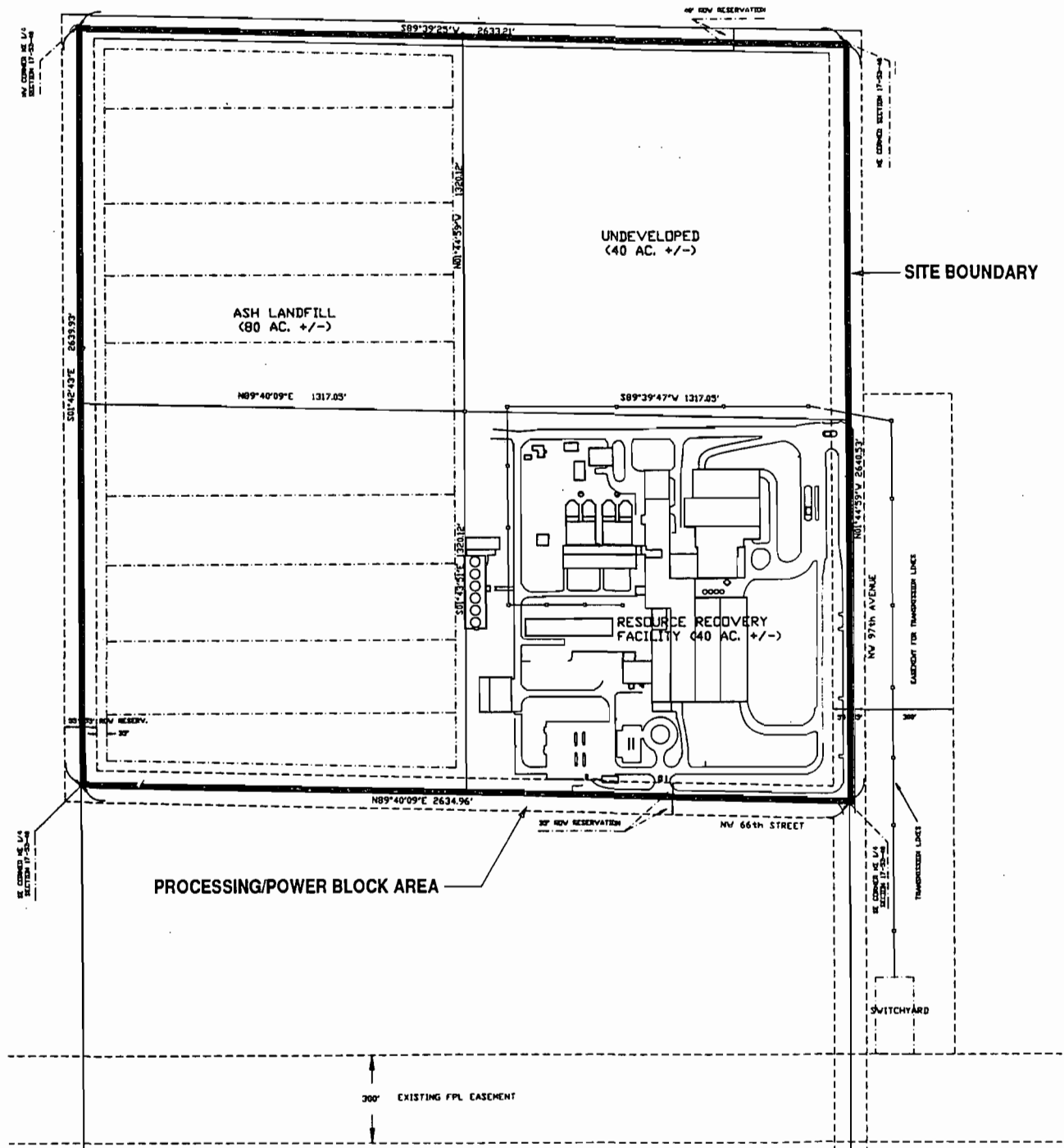
DADE COUNTY RESOURCES RECOVERY FACILITY CAPITAL EXPANSION PROJECT

Owner: Dade County
Operator: Montenay Power Corp.

3.2 SITE LAYOUT

A site plan of DCRRF showing the existing facilities is presented in Figure 3.2-1. The layout of the 40-acre processing/power block area showing the existing facilities is presented in Figure 3.2-2. Site plans of the expanded DCRRF, showing the entire 160-acre site and the 40-acre processing/power block area, are presented in Figures 3.2-3 and 3.2-4. These figures include ash storage areas and new stormwater retention areas, as well as the expanded plant area.

An elevation plan of the expanded facility looking north and south is presented in Figure 3.2-5. An elevation view of the expanded facility looking west and east is presented in Figure 3.2-6. The profile of the existing plant structures is also outlined in these figures.

**LEGAL DESCRIPTION OF SITE:**

NORTHEAST 1/4 SECTION 17, TOWNSHIP 53 SOUTH,
RANGE 40 EAST OF DADE COUNTY, FLORIDA.

ACREAGE WITHIN PROPERTY LINES = 139.6 +/-
ACREAGE WITHIN ROW LINE = 149.8 +/-

LEGAL DESCRIPTION OF FACILITY:

THE SOUTHEAST 1/4 OF THE NORTHEAST 1/4
SECTION 17, TOWNSHIP 53 SOUTH, RANGE 40
EAST OF DADE COUNTY, FLORIDA.

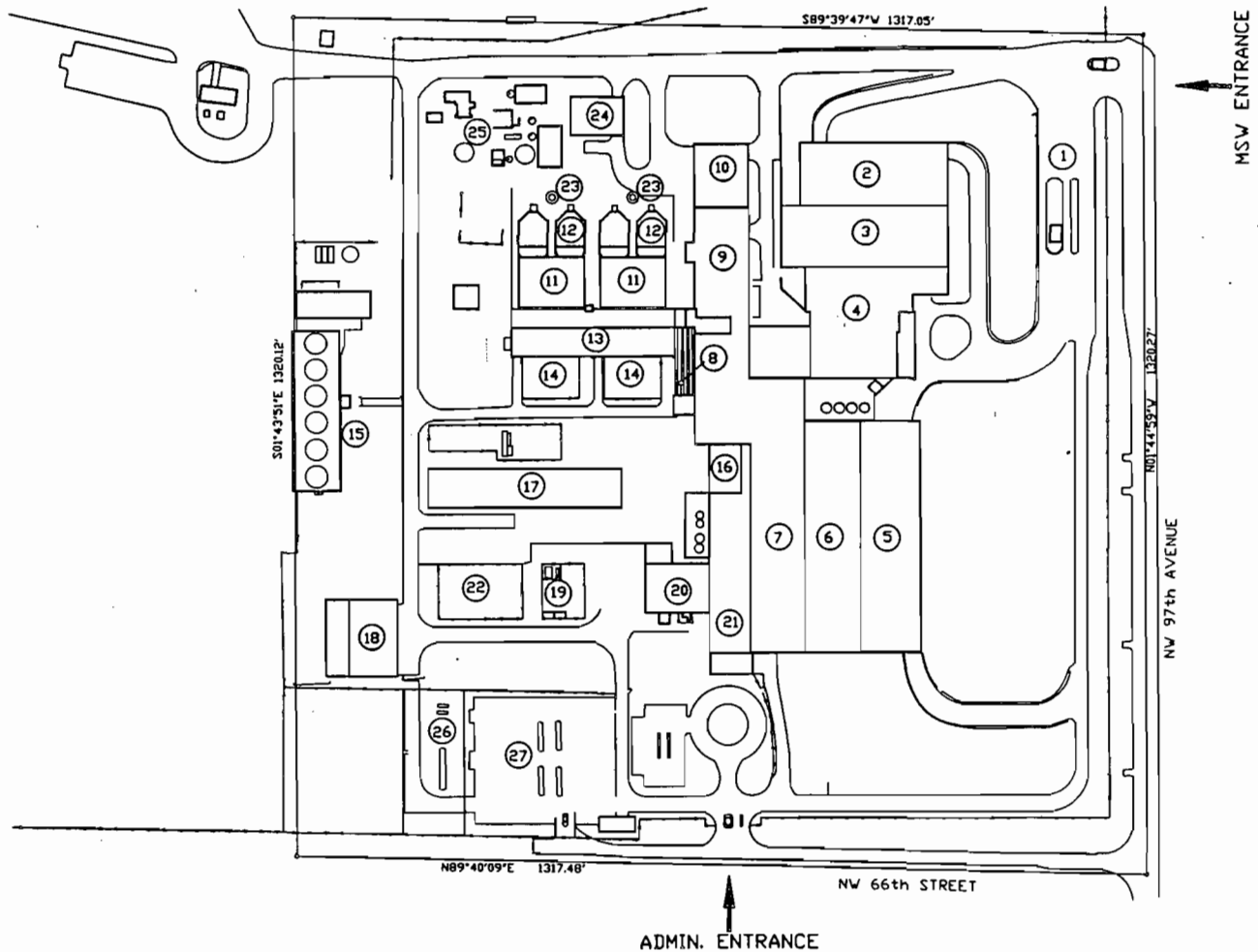
ACREAGE WITHIN PROPERTY LINES = 39.9 +/-
ACREAGE WITHIN ROW LINE = 37.5 +/-



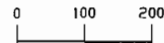
Figure 3.2-1 SITE PLAN OF EXISTING DCRRF

**DADE COUNTY RESOURCES RECOVERY FACILITY
CAPITAL EXPANSION PROJECT**

Owner: Dade County
Operator: Montenay Power Corp.

**LEGEND****EXISTING FACILITIES**

- | | |
|---------------------------------------|------------------------------|
| 1 SCALES | 15 COOLING TOWER |
| 2 TRASH RECEIVING BLDG. | 16 AL/FE BUNKERS |
| 3 TRASH PIT | 17 FERROUS PROCESSING BLDG. |
| 4 TRASH PROCESSING BLDG. | 18 TIRE BUNKER |
| 5 GARBAGE RECEIVING BLDG. | 19 FUEL OIL DEPOT |
| 6 GARBAGE PIT | 20 HEAVY EQUIP. MAINT. BLDG. |
| 7 GARBAGE PROCESSING BLDG. | 21 OFFICES/ADMINIST. BLDG. |
| 8 RDF-3 FUEL FEED | 22 STORE YARD |
| 9 RDF-3 FUEL STORAGE | 23 STACKS (2 EA) |
| 10 PROCESS UNDERS BLDG. | 24 ASH BUILDING |
| 11 BOILERS (4 EA) | 25 WATER TREATMENT PLANT |
| 12 ELECTROSTATIC PRECIPITATORS (4 EA) | 26 PROPANE STORAGE |
| 13 TURBINE HALL | 27 EMPLOYEE PARKING |
| 14 SWITCHYARD | |

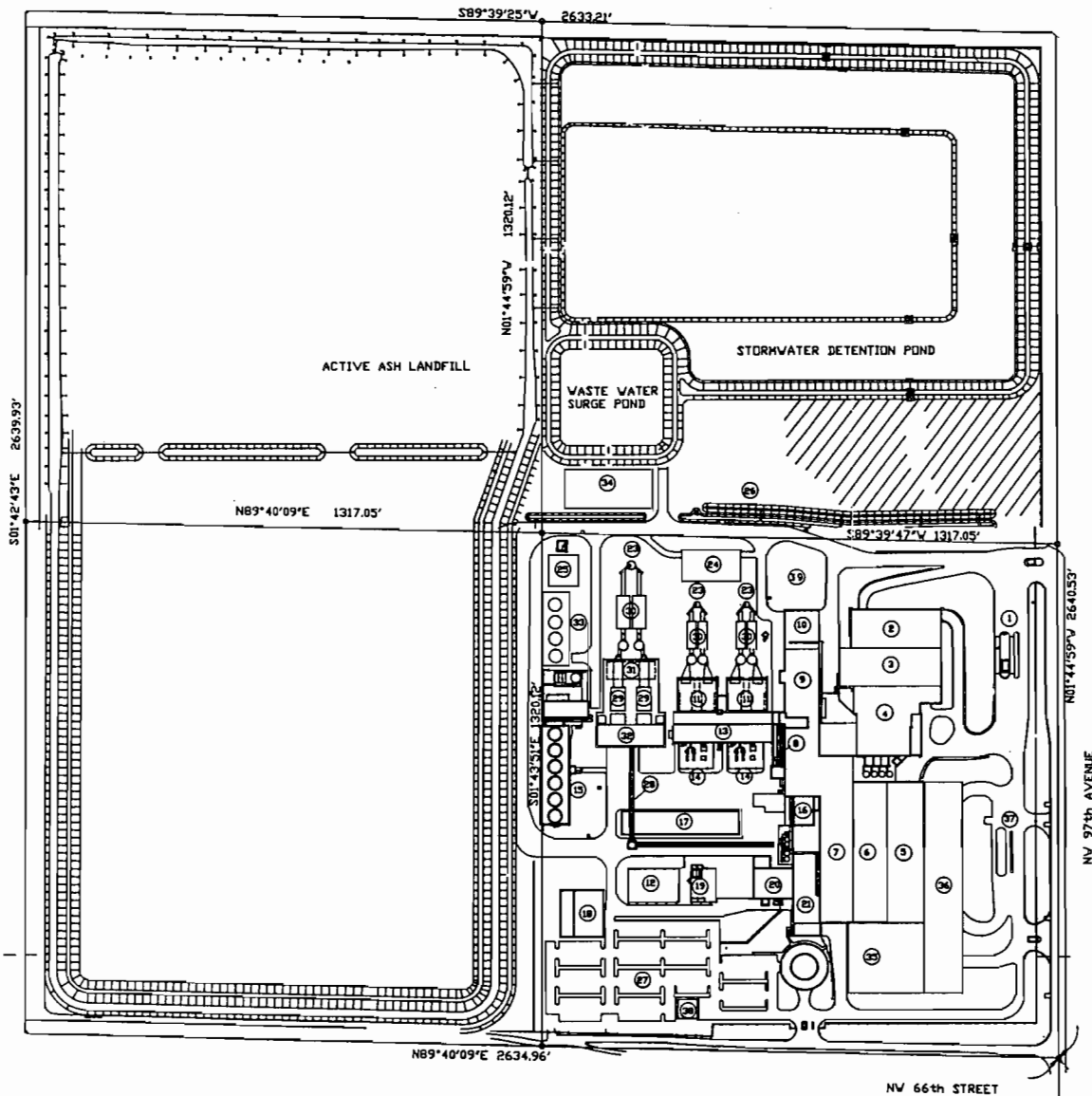
**LEGAL DESCRIPTION OF FACILITY**

THE SOUTHEAST 1/4 OF THE NORTHEAST 1/4
SECTION 17, TOWNSHIP 33 SOUTH, RANGE 40
EAST OF DADE COUNTY, FLORIDA.
CONTAINING APPROXIMATELY 40 ACRES.

Figure 3.2-2 LAYOUT OF EXISTING DCRRF
PROCESSING/POWER BLOCK AREA

**DADE COUNTY RESOURCES RECOVERY FACILITY
CAPITAL EXPANSION PROJECT**

Owner: Dade County
Operator: Montenay Power Corp.

**LEGEND****EXISTING FACILITIES**

- 1 SCALES
- 2 TRASH RECEIVING BLDG.
- 3 TRASH PIT
- 4 TRASH PROCESSING BLDG.
- 5 GARBAGE RECEIVING BLDG.
- 6 GARBAGE PIT
- 7 GARBAGE PROCESSING BLDG.
- 8 RDF-3 FUEL FEED
- 9 RDF-3 FUEL STORAGE
- 10 PROCESS UNDERS BLDG.
- 11 BOILERS (4 EA)
- 12 STORE YARD
- 13 TURBINE HALL
- 14 SWITCHYARD
- 15 COOLING TOWER
- 16 AL/FE BUNKERS
- 17 FERROUS PROCESSING BLDG.
- 18 TIRE BUNKER
- 19 FUEL OIL DEPOT
- 20 HEAVY EQUIP. MAINT. BLDG.
- 21 OFFICES/ADMIN. BLDG.

PROPOSED FACILITIES

- 23 STACKS (3 EA)
- 24 ASH BUILDING
- 25 WATER TREATMENT PLANT
- 26 PROPANE STORAGE
- 27 EMPLOYEE PARKING
- 28 RDF-2 FUEL FEED
- 29 NEW BOILERS (2 EA)
- 30 AGCS (6 EA)
- 31 NEW TURBINE
- 32 RDF-2 STORAGE
- 33 NEW COOLING TOWER
- 34 WASTE WATER TREATMENT PLANT
- 35 GARBAGE PIT EXTENSION
- 36 GARBAGE RECEIVING/TRANSFER EXTENSION
- 37 NEW SCALES
- 38 DADE COUNTY ADMIN. BLDG.
- 39 YARD TRASH PROCESSING SYSTEM

**LEGAL DESCRIPTION OF SITE:**

NORTHEAST 1/4 SECTION 17, TOWNSHIP 33 SOUTH
RANGE 40 EAST OF DADE COUNTY, FLORIDA

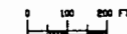


Figure 3.2-3 SITE PLAN OF PROPOSED EXPANDED DCRRF

**DADE COUNTY RESOURCES RECOVERY FACILITY
CAPITAL EXPANSION PROJECT**

Owner: Dade County
Operator: Montenay Power Corp.

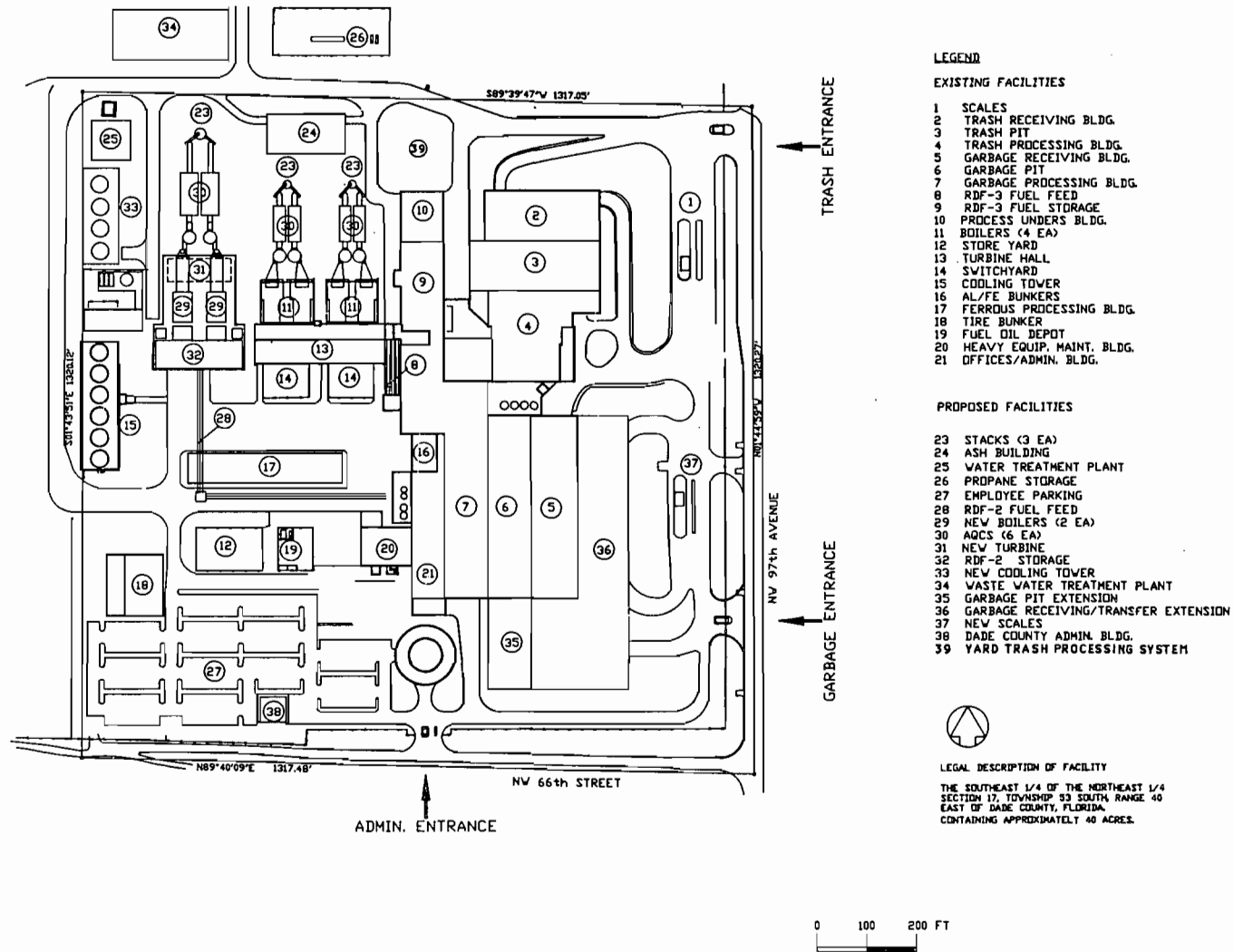
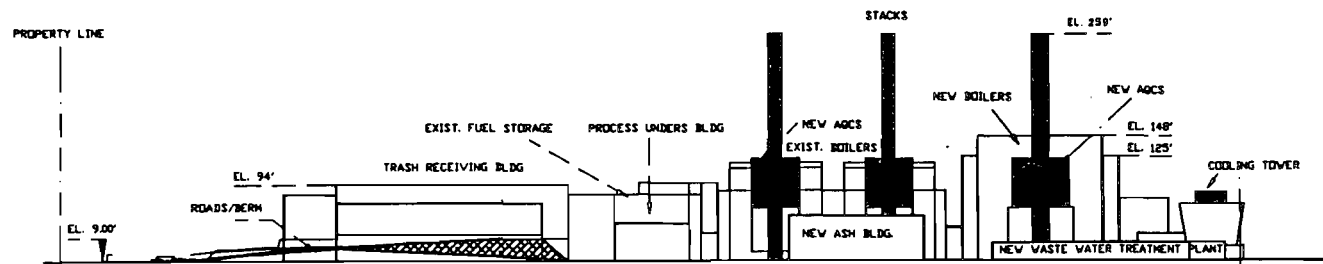


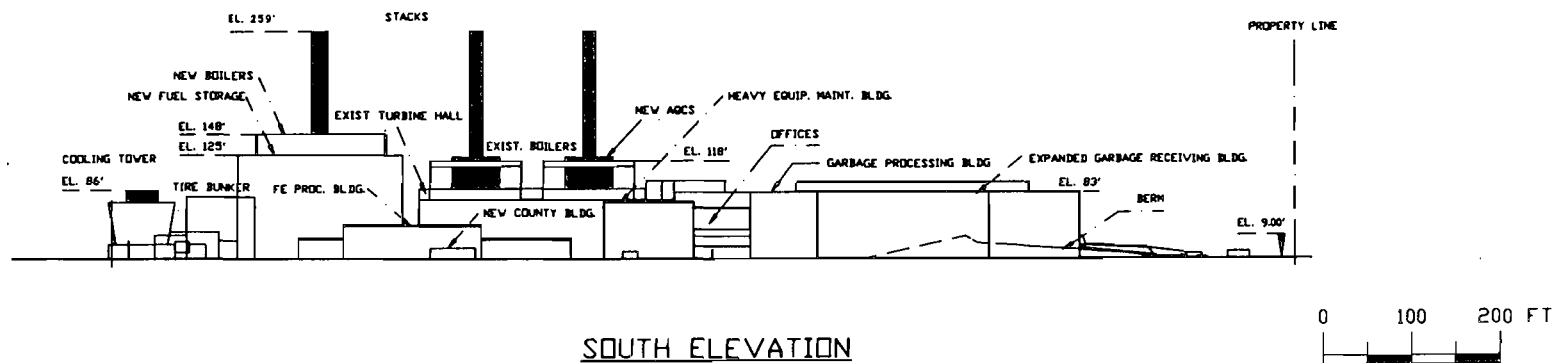
Figure 3.2-4 LAYOUT OF PROPOSED EXPANDED DCRRF
PROCESSING/POWER BLOCK AREA

**DADE COUNTY RESOURCES RECOVERY FACILITY
CAPITAL EXPANSION PROJECT**

Owner: Dade County
Operator: Montenay Power Corp.



NORTH ELEVATION

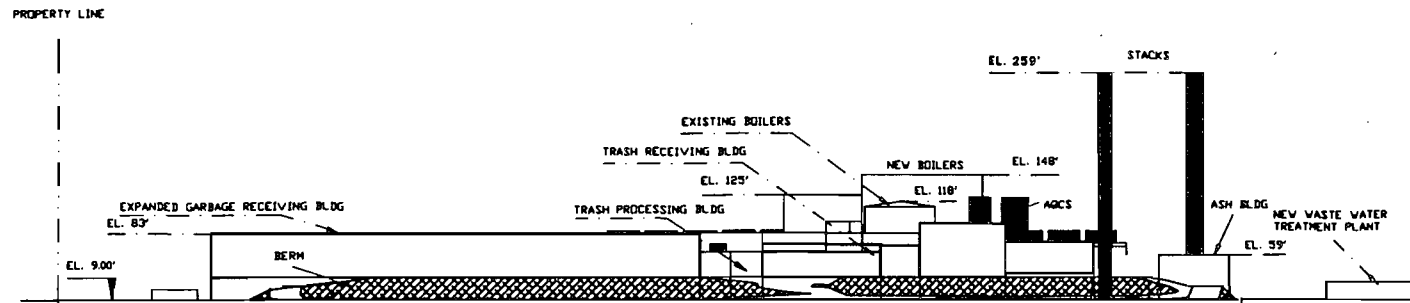


SOUTH ELEVATION

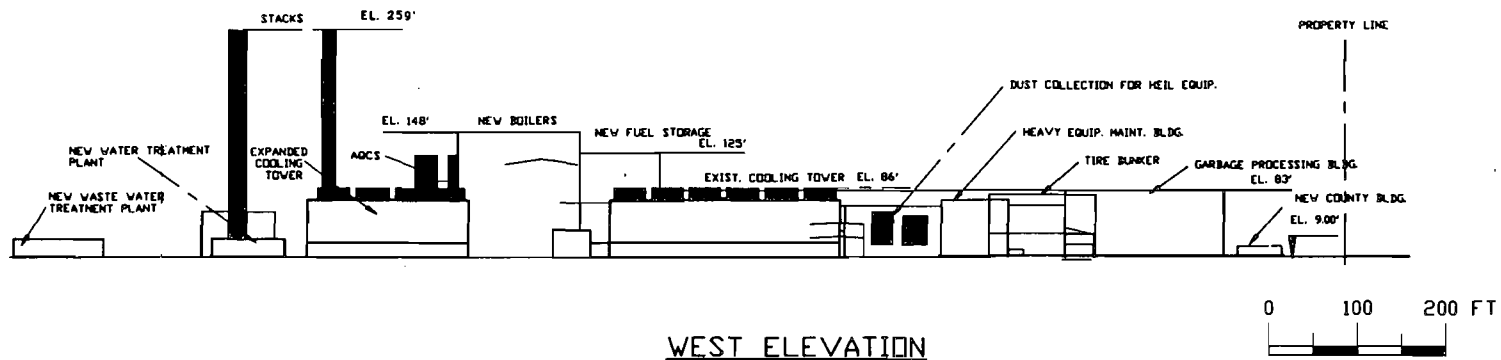
Figure 3.2-5 NORTH-SOUTH PROFILE VIEW OF EXPANDED DCRRF

**DADE COUNTY RESOURCES RECOVERY FACILITY
CAPITAL EXPANSION PROJECT**

Owner: Dade County
Operator: Montenay Power Corp.



EAST ELEVATION



WEST ELEVATION

Figure 3.2-6 EAST-WEST PROFILE VIEW OF EXPANDED DCRRF

**DADE COUNTY RESOURCES RECOVERY FACILITY
CAPITAL EXPANSION PROJECT**

Owner: Dade County
Operator: Montenay Power Corp.

3.3 FUEL

An analysis of RDF-3 fuel samples from DCRRF is summarized in Table 3.3-1. Samples were taken during the boiler efficiency tests during 1988-1989. In addition, composite 1-week samples taken once a month during a recent 13-month period are shown. The fuel analysis reflects the variability of incoming MSW and processed RDF.

Design parameters for RDF-2 fuel for the new units are presented in Table 3.3-2. These parameters are expected averages for the fuel.

As mentioned previously, propane is also used in the units for boiler startup and to insure that minimum acceptable temperature in the boilers is maintained.

Table 3.3-1. Analysis of RDF Fuel Samples From DCRRF

Boiler	Sample	Content (%)								Heating Value (Btu/lb)
		Moisture	Ash	Carbon	Hydrogen	Oxygen	Nitrogen	Sulfur	Chlorine	
1	1B	32.40	9.70	25.60	7.00	56.80	0.70	0.16	—	4,160
1	2B	32.60	17.50	25.90	7.40	48.60	0.40	0.15	—	4,910
1	3B	40.10	11.20	29.50	5.80	53.00	0.41	0.14	—	4,630
1	4B	38.20	12.70	28.20	8.30	50.30	0.39	0.13	—	4,260
1	5B	34.00	14.40	29.30	7.70	47.90	0.53	0.21	—	4,550
1	6B	38.70	14.00	28.00	8.40	48.90	0.55	0.17	—	4,290
1	7B	40.10	9.70	28.00	8.30	53.50	0.32	0.15	—	5,340
1	8B	30.70	20.00	25.40	6.90	47.20	0.38	0.13	—	3,940
2	1B	23.10	18.00	26.10	3.50	28.70	0.30	0.29	—	4,420
2	2B	32.40	6.00	25.10	1.30	34.40	0.42	0.14	—	4,730
2	3B	35.00	13.60	25.10	0.68	25.00	0.45	0.20	—	4,070
2	4B	27.80	13.00	39.10	2.80	16.20	0.80	0.25	—	5,630
2	5B	25.70	16.00	30.70	2.70	23.90	0.70	0.26	—	5,120
3	1B	33.98	11.36	30.10	8.97	48.68	0.53	0.13	0.23	5,332
3	2B	28.02	10.43	34.85	8.84	44.30	1.05	0.19	0.34	6,019
3	3B	31.03	13.56	30.27	8.82	46.34	0.59	0.15	0.27	4,926
3	4B	34.50	10.87	27.64	8.97	51.60	0.56	0.11	0.25	5,571
3	5B	30.69	9.50	29.83	8.84	50.49	0.79	0.13	0.42	5,166
4	1B	31.09	9.00	30.59	7.55	51.85	0.45	0.28	0.28	5,555
4	2B	30.18	7.31	31.86	7.69	52.35	0.29	0.23	0.27	5,587
4	3B	29.30	10.52	35.62	8.69	44.32	0.27	0.30	0.28	5,771
4	4B	31.08	12.57	24.72	7.06	54.82	0.41	0.21	0.21	5,463
C ^a	May 90	24.34	10.43	24.36	8.26	31.06	0.66	0.34	0.55	6,086
C ^a	Jun 90	27.97	19.69	22.45	7.52	49.63	0.26	0.28	0.17	5,504
C ^a	Jul 90	22.05	19.32	18.69	8.74	52.52	0.25	0.06	0.42	5,294
C ^a	Aug 90	33.35	15.41	25.18	7.18	51.58	0.31	0.18	0.16	5,457
C ^a	Sep 90	29.74	12.41	26.08	7.01	53.82	0.35	0.22	0.11	5,129
C ^a	Oct 90	26.15	10.77	39.80	8.28	39.54	0.82	0.61	0.18	5,254
C ^a	Nov 90	26.25	14.90	32.65	6.42	44.88	0.50	0.34	0.31	4,603
C ^a	Dec 90	21.54	7.92	37.33	6.79	47.41	0.30	0.19	0.23	5,946
C ^a	Jan 91	23.69	14.00	29.30	7.30	44.05	0.30	0.38	0.21	5,635
C ^a	Feb 91	24.47	12.21	35.88	7.33	44.13	0.08	0.13	0.24	5,938
C ^a	Mar 91	26.47	9.90	28.40	8.10	52.73	0.41	0.24	0.22	5,934
C ^a	Apr 91	20.65	12.32	36.68	6.00	44.05	0.46	0.29	0.20	6,084
C ^a	May 91	27.15	6.70	31.11	6.70	54.95	0.22	0.13	0.19	6,412
Minimum		20.65	6.00	18.69	0.68	16.20	0.08	0.06	0.11	3,940
Maximum		40.10	20.00	39.80	8.97	56.80	1.05	0.61	0.55	6,412
Mean		29.84	12.48	29.41	6.91	45.41	0.46	0.21	0.26	5,220

Note: All values on as-received basis.

Btu/lb = British thermal units per pound (high heating value).

RDF = refuse-derived fuel.

^a Composite samples taken over a 1-week period during indicated month.

Sources: Birwelco-Montenay, Inc., 1992.

KBN, 1992.

Table 3.3-2. RDF-2 Design Fuel Parameters for Proposed Units

Parameter	Expected Average	Range
Moisture	39%	18-60%
Ash	8%	4-14%
Carbon	26%	17-33%
Hydrogen	8%	7-10%
Oxygen	57%	49-70%
Nitrogen	0.50%	0.10-1.10%
Sulfur	0.25%	0.10-0.43%
Chlorine	0.28%	0.09-0.70%
Heating Value	5,150 Btu/lb	3,200-6,000 Btu/lb

Note: All values are on as-received basis.
Btu/lb = British thermal units per pound.

Sources: Birwelco-Montenay, Inc., 1992.
KBN, 1992.

3.4 AIR EMISSIONS AND CONTROLS

3.4.1 AIR EMISSION TYPES AND SOURCES

The major air emission sources associated with DCRRF are the combustion units, which are the sources of several air pollutants, including particulate matter, sulfur dioxide, hydrogen chloride, metals, and products of combustion. The other air emission sources associated with the facility are exhausts which have baghouse controls, located in the trash processing area, and the lime silos serving the spray dryer absorber acid gas control systems. These are very minor sources of particulate matter.

The ash generated in the boilers is handled in an enclosed system. Bottom ash from the boilers is quenched with water and fed to the main ash conveyor. Fly ash collected in the boiler cyclones and in the fabric filter is transported via an enclosed system and deposited on the main ash conveyor, where it mixes with the wet bottom ash. The combined ash is then transported to the ash building via the enclosed ash conveyor. In the ash building, the ash is loaded into trucks and transported to the on-site ash storage area. Since the ash is handled in a wet or semi-wet state and in enclosed vessels or conveyors, particulate matter emissions are minimal. The ash handling for the proposed units will be conducted in the same manner as the current system.

3.4.2 AIR EMISSION CONTROLS

3.4.2.1 EXISTING FACILITIES

The current air pollution control system at DCRRF consists of boiler combustion controls for control of organic emissions and ESPs for control of particulate matter and metals emissions. An additional third precipitator field was added to the ESPs in 1986 to improve particulate control.

Estimated current air emissions from the existing units are presented in Table 3.4-1. Refer to the PSD permit application, Appendix 10.1.5, for a description of the basis for the emissions.

Current stack parameters are presented in Table 3.4-2, based upon the most recent stack test data.

The Notice of Proposed Construction or Alteration application, as requested by the Federal Aviation Administration (FAA), is contained in Appendix 10.1.7.

Table 3.4-1. Summary of Baseline Emissions for DCRRF

Regulated Pollutant	Annual Emissions (TPY)				Total
	Unit No. 1	Unit No. 2	Unit No. 3	Unit No. 4	
Particulate (TSP)	70.0	49.3	58.6	70.8	248.7
Particulate (PM10)	62.3	43.9	52.1	63.0	221.3
Sulfur Dioxide	385.7	400.9	388.5	399.1	1,574.2
Hydrogen Chloride	422.4	439.1	425.5	437.1	1,724.1
Nitrogen Oxides	383.5	398.6	386.3	396.8	1,565.2
Carbon Monoxide	163.0	169.4	164.2	168.6	665.2
Volatile Organic Compounds	2.9	3.0	2.9	3.0	12.6 ^a
Lead	1.01	1.05	1.02	1.05	4.13
Mercury	0.22	0.23	0.22	0.23	0.90
Beryllium	0.0020	0.0021	0.0020	0.0021	0.0082
Arsenic	0.0129	0.0134	0.0129	0.0133	0.0525
Fluorides	1.47	1.53	1.48	1.52	6.0
Sulfuric Acid Mist	17.7	18.4	17.8	18.3	72.2
Dioxin/Furan ^b	0.00056	0.00050	0.00056	0.00067	0.00229

Note: The following regulated pollutants are not expected in the emissions: total reduced sulfur, asbestos, and vinyl chloride.

PM10 = particulate matter with an aerodynamic diameter less than or equal to 10 micrometers.

TSP = total suspended particulate matter.

TPY = tons per year.

^a Includes 11.8 TPY from Units 1 through 4 and 0.79 TPY from solvent cleaning tanks.

^b As total tetra- through octa-dioxins/furans.

Sources: Birwelco-Montenay, Inc., 1992.
KBN, 1992.

Table 3.4-2. Stack Parameters for Existing and Proposed Units

Parameter	Existing Units (each)	Expanded Facility	
		Existing Retrofitted Units (each)	New Units (each)
Stack Height (ft)	150	250	250
Stack Diameter (ft)	9.00 ^a	8.50 ^b	9.75 ^b
Exhaust Gas Flow (acfm)	190,000	177,200	231,400
Exhaust Gas Velocity (ft/min)	5,973 ^a	3,123 ^b	3,099 ^b
Exhaust Gas Temperature (°F)	370	270	260

Note: Currently, a common stack serves Units 1 and 2, and a common stack serves Units 3 and 4. A dual-flue stack will serve each pair of units in the future (i.e., Units 1 and 2; Units 3 and 4; and Units 5 and 6).

acfm = actual cubic feet per minute.

°F = degrees Fahrenheit.

ft = feet.

ft/min = feet per minute.

^a Value is for common stack.

^b Value is for each flue of the dual-flue stack.

Sources: Birwelco-Montenay, Inc., 1992.
KBN, 1992.

3.4.2.2 EXPANDED FACILITIES

The two new units will be equipped with an air pollution control system consisting of a spray dryer absorber/fabric filter system for particulate matter, acid gas, and heavy metal removal; a mercury removal system; and a thermal de-NO_x system for NO_x control. The system will be designed to meet all federal New Source Performance Standards (NSPS) for municipal waste combustors, as contained in 40 CFR 60, Subpart Ea. Emissions of several pollutants will be limited to levels below the new source performance standards. The NSPS applicable to the new units are presented in Table 3.4-3.

The two new units will be served by a single dual-flue stack (i.e., two flues contained within a common shell). The stack will have a height of 250 ft.

As described previously, once the two new units become operational, the four existing units will be retrofitted with new air pollution control systems. Each system will consist of a spray dryer absorber/fabric filter system to remove particulate matter, acid gas, and heavy metals. The system will be designed to meet all federal emission guidelines for existing municipal waste combustors, as contained in the 40 CFR 60, Subpart Ca. Maximum emissions of several pollutants will be below the emission guidelines. A mercury control system will also be installed on the existing units. The emission guidelines applicable to the existing DCRRF are presented in Table 3.4-4.

Units 1 and 2 at DCRRF are currently served by a common stack which is 150 ft high. Units 3 and 4 also have a 150-ft-high common stack. These stacks will be removed to accommodate the new air pollution control equipment. Two new dual-flue stacks (250 ft high) will be constructed. Each dual-flue stack will serve two units, with one flue per unit.

Maximum emissions of regulated pollutants from the four existing units after the installation of the new pollution control equipment are presented in Table 3.4-5 and Table 3.4-6. Maximum emissions for the two new units are also presented in the table. For the basis of the emissions, see the PSD permit application in Appendix 10.1.5. Stack parameters for the expanded facility are presented in Table 3.4-2.

Table 3.4-3. Summary of NSPS^a Applicable to the New DCRRF Municipal Waste Combustors

Pollutant	Emission Standard ^b	Averaging Time
MWC Metals (as PM)	0.015 gr/dscf	N/A
Opacity	10% opacity	6 minutes
MWC Organics (Dioxin/Furan)	30 ng/dscm (12 gr/billion dscf)	N/A
Sulfur Dioxide	80% reduction or 30 ppmvd ^c	24 hours
Hydrogen Chloride	95% reduction or 25 ppmvd ^c	N/A
Nitrogen Oxides	180 ppmvd	24 hours
Carbon Monoxide	Modular units--50 ppmvd	4 hours
	Mass burn waterwall--100 ppmvd	4 hours
	Mass burn rotary ww--100 ppmvd	24 hours
	Mass burn refractory--100 ppmvd	4 hours
	Fluidized bed--100 ppmvd	4 hours
	RDF stoker--150 ppmvd	24 hours
	Coal/RDF--150 ppmvd	4 hours
Operating Practices	1. Cannot exceed 110% of maximum demonstrated unit load	4 hours
	2. Cannot exceed 30 °F above maximum demonstrated temperature at inlet to PM control device	4 hours

Note: Standards do not apply during periods of startup, shutdown, or malfunction; limited to 3 hours per occurrence.

°F = degrees Fahrenheit.

gr/billion dscf = grains per billion dry standard cubic feet.

gr/dscf = grains per dry standard cubic foot.

MWC = municipal waste combustor.

N/A = not applicable.

ng/dscm = nanograms per dry standard cubic meter.

PM = particulate matter.

ppmvd = parts per million by volume dry.

^a Federal NSPS (40 CFR 60, Subpart Ea), for units > 250 TPD. All limits are at 7% oxygen. Unit capacity based on 4,500 Btu/lb for MSW and 8,500 Btu/lb for medical waste.

^b All limits are at 7% oxygen.

^c Whichever is less stringent.

Source: KBN, 1992.

Table 3.4-4. Federal Emission Guidelines for the Existing DCRRF Municipal Waste Combustors^a

Pollutant	Emission Guideline ^b	Averaging Time
MWC Metals (as PM)	0.015 gr/dscf	N/A
Opacity	10% opacity	6 minutes
MWC Organics (Dioxin/Furan)	60 ng/dscm (24 gr/billion dscf)	N/A
Sulfur Dioxide	70% reduction or 30 ppmvd ^c	24 hours
Hydrogen Chloride	90% reduction or 25 ppmvd ^c	N/A
Carbon Monoxide	Modular units--50 ppmvd	4 hours
	Mass burn waterwall--100 ppmvd	4 hours
	Mass burn rotary ww--250 ppmvd	24 hours
	Mass burn refractory--100 ppmvd	4 hours
	Fluidized bed--100 ppmvd	4 hours
	RDF stoker--200 ppmvd	24 hours
	Coal/RDF--150 ppmvd	4 hours
Operating Practices	1. Cannot exceed 110% of maximum demonstrated unit load	4 hours
	2. Cannot exceed 30°F above maximum demonstrated temperature at inlet to PM control device	4 hours

Note: Guidelines apply to all units constructed before December 20, 1989.

Standards do not apply during periods of startup, shutdown, or malfunction; limited to 3 hours per occurrence.

°F = degrees Fahrenheit.

gr/billion dscf = grains per billion dry standard cubic feet.

gr/dscf = grains per dry standard cubic foot.

MWC = municipal waste combustor.

N/A = not applicable.

ng/dscm = nanograms per dry standard cubic meter.

PM = particulate matter.

ppmvd = parts per million by volume dry.

^a Unit capacity based on 4,500 Btu/lb for MSW and 8,500 Btu/lb for medical waste.

^b All limits are at 7% oxygen.

^c Whichever is less stringent.

Source: KBN, 1992.

Table 3.4-5. Maximum Emissions of Regulated Pollutants From Each Unit After DCRRF Expansion

Regulated Pollutant	Basis	Heat Input Basis ^a (lb/MM Btu)	Maximum Emissions (lb/hr)	Annual Emissions (TPY)
<u>Existing Units (per unit)</u>				
Particulate (TSP)	0.011 gr/dscf @ 7% O ₂	0.0235	6.61	29.0
Particulate (PM10)	100% of PM	0.0235	6.61	29.0
Sulfur Dioxide	3-hr, 150 ppmvd @ 7% O ₂	0.374	105.0	—
	24-hr, 70 ppmvd @ 7% O ₂	0.175	49.0	214.6
Hydrogen Chloride	24-hr, 78 ppmvd @ 7% O ₂	0.109	30.6	134.0
Nitrogen Oxides	0.5 lb/MMBtu	0.50	140.4	615.0
Carbon Monoxide	1-hr, 800 ppmvd @ 7% O ₂	0.870	244.4	—
	24-hr, 200 ppmvd @ 7% O ₂	0.218	61.1	267.6
Volatile Organic Compounds	25 ppmvd @ 7% O ₂	0.0156	4.37	19.14
Lead	0.25 mg/Nm ³	3.63x10 ⁻⁴	0.10	0.45
Mercury	0.075 mg/Nm ³	1.09x10 ⁻⁴	0.031	0.134
Beryllium	0.0003 mg/Nm ³	4.36x10 ⁻⁷	0.00012	0.00054
Arsenic	0.006 mg/Nm ³	8.72x10 ⁻⁶	0.0024	0.0107
Fluorides	0.008 lb/ton	7.69x10 ⁻⁴	0.22	0.95
Sulfuric Acid Mist	3% of sulfur	0.00802	2.3	9.9
Dioxin/Furan ^b	60 ng/Nm ³ @ 7% O ₂	5.59x10 ⁻⁸	1.57x10 ⁻⁵	6.88x10 ⁻⁵
<u>New Units (per unit)</u>				
Particulate (TSP)	0.011 gr/dscf @ 7% O ₂	0.0221	9.2	40.3
Particulate (PM10)	100% of PM	0.0221	9.2	40.3
Sulfur Dioxide	3-hr, 150 ppmvd @ 7% O ₂	0.352	146.4	—
	24-hr, 70 ppmvd @ 7% O ₂	0.164	68.3	299.2
Hydrogen Chloride	24-hr, 41 ppmvd @ 7% O ₂	0.054	22.6	99.0
Nitrogen Oxides	24-hr, 150 ppmvd @ 7% O ₂	0.253	105.1	460.3
Carbon Monoxide	1-hr, 400 ppmvd @ 7% O ₂	0.411	170.8	—
	4-hr, 100 ppmvd @ 7% O ₂	0.103	42.7	187.0
Volatile Organic Compounds	15 ppmvd @ 7% O ₂	0.0088	3.66	16.0
Lead	0.25 mg/Nm ³	3.42x10 ⁻⁴	0.14	0.62
Mercury	0.075 mg/Nm ³	1.03x10 ⁻⁴	0.043	0.187
Beryllium	0.0003 mg/Nm ³	4.11x10 ⁻⁷	0.00017	0.00075
Arsenic	0.006 mg/Nm ³	8.22x10 ⁻⁶	0.0034	0.0150
Fluorides	0.008 lb/ton	7.69x10 ⁻⁴	0.32	1.40
Sulfuric Acid Mist	3% of sulfur	0.0075	3.1	13.7
Dioxin/Furan ^b	2.0 ng/Nm ³ @ 7% O ₂	1.76x10 ⁻⁹	7.33x10 ⁻⁷	3.21x10 ⁻⁶

Note: gr/dscf = grains per dry standard cubic foot.

lb/hr = pounds per hour.

lb/MMBtu = pounds per million British thermal units.

lb/ton = pounds per ton.

mg/Nm³ = milligrams per normal cubic meter.

MMBtu = million British thermal units.

ng/Nm³ = nanograms per normal cubic meter.

PM10 = particulate matter with an aerodynamic diameter less than or equal to 10 micrometers.

ppmvd = parts per million by volume dry.

TPY = tons per year.

TSP = total suspended particulate.

^a Based on heat input of 280.8 MMBtu/hr for existing units and 416.0 MMBtu/hr for new units.^b As total tetra- through octa-dioxins/furans.

Source: KBN, 1992.

Table 3.4-6. Total Maximum Emissions of Regulated Pollutants From DCRRF After Expansion

Regulated Pollutant	Annual Emissions (TPY) Per Unit		Total ^a Annual Emissions (TPY)
	Existing Units	New Units	
Particulate (TSP)	29.0	40.3	196.4
Particulate (PM10)	29.0	40.3	196.4
Sulfur Dioxide	214.6	299.2	1,456.8
Hydrogen Chloride	134.0	99.0	734.1
Nitrogen Oxides	615.0	460.3	3,380.6
Carbon Monoxide	267.6	187.0	1,444.5
Volatile Organic Compounds	19.14	16.0	109.9 ^b
Lead	0.45	0.62	3.04
Mercury	0.134	0.187	0.911
Beryllium	0.00054	0.00075	0.0036
Arsenic	0.0107	0.0150	0.073
Fluorides	0.95	1.40	6.59
Sulfuric Acid Mist	9.9	13.7	66.9
Dioxin/Furan	6.88x10 ⁻⁵	3.21x10 ⁻⁶	2.81x10 ⁻⁴

Note: The following regulated pollutants are not expected in the emissions: total reduced sulfur, asbestos, and vinyl chloride.

PM10 = particulate matter with an aerodynamic diameter less than or equal to 10 micrometers.

TPY = tons per year.

TSP = total suspended particulate.

^a Total of four existing units and two new units.

^b Includes 1.32 TPY from solvent cleaning tanks.

Source: KBN, 1992.

Maximum estimated emissions of non-regulated pollutants from the future DCRRF units are presented in Table 3.4-7. Particulate emissions from the trash processing system baghouses and from the new material handling silos are quantified in the PSD permit application, contained in Appendix 10.1.5. These are all minor sources of particulate emissions.

3.4.3 BEST AVAILABLE CONTROL TECHNOLOGY

Best available control technology (BACT) is required by PSD regulations for major modifications to existing major sources. BACT applies to each pollutant for which there is a significant net emissions increase. The requirement applies only to new sources or to existing sources which are being physically modified. For DCRRF, BACT will apply only to the two new units and only for emissions of NO_x and carbon monoxide (CO).

For control of nitrogen oxides, thermal de-NO_x (ammonia injection) represents BACT and will be employed. BACT for carbon monoxide is good combustion, which will be achieved by the new, modern boilers and the combustion control system. A complete description of the BACT determination is contained in the PSD permit application.

3.4.4 DESIGN DATA FOR CONTROL EQUIPMENT

A simplified flow diagram of the proposed air pollution control system is presented in Figure 3.4-1. Note that the existing units will not have an add-on NO_x control system. A summary of the design data for the air pollution control equipment for the proposed and existing units is presented in Table 3.4-8. Data for the spray dryers and fabric filters are presented, as well as overall system operational data. It is noted that final vendor selection has not yet been made, and final design data may vary somewhat from those shown in Table 3.4-8. However, the selected control equipment will provide performance equivalent to the stated design.

3.4.5 DESIGN PHILOSOPHY

The philosophy for design of the proposed units will begin with the selection of the combustion system and air quality control system. An extensive review of boiler vendors and test data from operating facilities, as well as operating experience at other Montenay-operated facilities, will be performed prior to the selection of the combustion system and air quality control system vendors. Equipment which is best from an overall control viewpoint will be selected.

Table 3.4-7. Total Maximum Emissions of Non-Regulated Pollutants From DCRRF After Expansion

Non-Regulated Pollutant	Basis	Retrofitted Units (each)		New Units (each)		Total ^a Annual Emissions	
		Maximum Emissions (lb/hr)	Annual Emissions (TPY)	Maximum Emissions (lb/hr)	Annual Emissions (TPY)		
Benzo(a)pyrene	1.6x10 ⁻⁵ lb/ton	0.00043	0.0019	0.00064	0.0028	0.00301	0.0132
Cadmium	0.015 mg/Nm ³	0.00612	0.0268	0.00855	0.0374	0.04158	0.1821
Chlorobenzene	1.8x10 ⁻⁵ lb/ton	0.00049	0.0021	0.00072	0.0032	0.00338	0.0148
Chlorophenol	2.0x10 ⁻⁵ lb/ton	0.00054	0.0024	0.00080	0.0035	0.00376	0.0165
Chromium	4.4x10 ⁻⁴ lb/ton	0.01188	0.0520	0.01760	0.0771	0.08272	0.3623
Chromium +6	0.0013 mg/Nm ³	0.00053	0.0023	0.00074	0.0032	0.00360	0.0158
Copper	0.030 mg/Nm ³	0.01224	0.0536	0.01709	0.0749	0.08316	0.3642
Formaldehyde	1.4x10 ⁻⁴ lb/ton	0.00378	0.0166	0.00560	0.0245	0.02632	0.1153
Manganese	1.0x10 ⁻² lb/ton	0.27000	1.1826	0.40000	1.7520	1.88000	8.2344
Molybdenum	0.0030 mg/Nm ³	0.00122	0.0054	0.00171	0.0075	0.00832	0.0364
Nickel	0.0030 mg/Nm ³	0.00122	0.0054	0.00171	0.0075	0.00832	0.0364
Polychlorinated biphenyls	1.8x10 ⁻⁴ lb/ton	0.00486	0.0213	0.00720	0.0315	0.03384	0.1482
Selenium	4.0x10 ⁻⁴ lb/ton	0.01080	0.0473	0.01600	0.0701	0.07520	0.3294

Note: lb/hr = pounds per hour.
 lb/ton = pounds per ton.
 mg/Nm³ = milligrams per normal cubic meter.
 TPY = tons per year.

^a Total of four existing units and two new units.

Source: KBN, 1992.

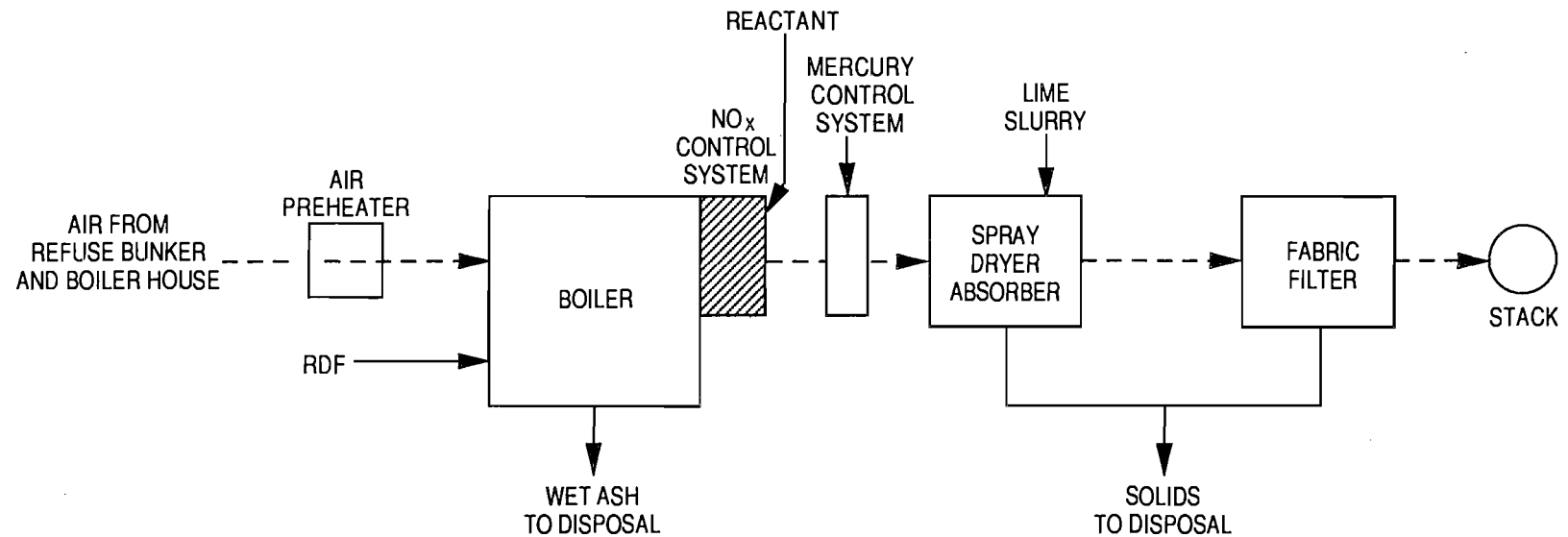


Figure 3.4-1 BOILER/AIR POLLUTION CONTROL EQUIPMENT FLOW DIAGRAM

**DADE COUNTY RESOURCES RECOVERY FACILITY
CAPITAL EXPANSION PROJECT**

*Owner: Dade County
Operator: Montenay Power Corp.*

Table 3.4-8. Summary of Air Quality Control Equipment Design Data

Parameter	Proposed Units (40 TPH RDF each)	Existing Units (27 TPH RDF each)
<u>Spray Dryers</u>		
Flue Gas Inlet Temperature	320°F	482°F
Quench Reactors	30 ft diameter x 112 ft high	27 ft diameter x 104 ft high
Type	Upflow	Upflow
Reagents	Lime or equivalent	Lime or equivalent
Reagent Consumption	1,450 lb/hr (maximum)	1,000 lb/hr (maximum)
<u>Fabric Filters</u>		
Cleaning Mechanism	Pulse Jet or Reverse Air	Pulse Jet or Reverse Air
Number of Modules	10	8
Number of Bags per Module	301	324
Effective Bag Area		
Per Module	7,115 ft ²	7,668 ft ²
Total Baghouse	71,150 ft ²	61,344 ft ²
Air/Cloth Ratio	3.1:1	3.0:1
Material	Fiberglass	Fiberglass
Weight	16 oz/yd ²	16 oz/yd ²
Guaranteed Bag Life	24 months	24 months
Outlet Grain Loading (@ 7% O ₂)	0.011 gr/dscf	0.011 gr/dscf
Flue Gas Outlet Temperature	260°F	270°F
<u>Mercury Control System</u>		
Reactant	Activated carbon or equivalent	Activated carbon or equivalent
<u>NO_x Control System</u>		
Reactant	Ammonia or urea	Not applicable
Injection Point	Boiler	Not applicable
<u>Overall System</u>		
Pressure Drop	10.5 inches w.c.	10.5 inches w.c.
Power Consumption	260 kW	450 kW
Water Consumption	35 gpm	100 gpm

Note: All data are per unit. Actual selected control equipment will be equivalent in performance to stated design but may vary from data shown.

°F = degrees Fahrenheit.

ft² = square feet.

gpm = gallons per minute.

gr/dscf = grains per dry standard cubic feet.

kW = kilowatts.

lb/hr = pounds per hour.

oz/yd² = ounces per square yard.

RDF = refuse-derived fuel.

TPH = tons per hour.

w.c. = water column.

Sources: Birwelco-Montenay, Inc., 1992.

KBN, 1992.

The philosophy behind selection of the air pollution control equipment will be to employ the most modern, proven control system for both the existing and proposed units. This leads to the selection of the spray dryer absorber/fabric filter systems and mercury control system on all six units, as well as the thermal de-NO_x system for NO_x control for the two proposed units. These types of systems have been designated as BACT by EPA (EPA, 1991).

3.5 PLANT WATER USE

3.5.1 WATER BALANCE

Figures 3.5-1 and 3.5-2 present the water use flow diagrams for the normal and peak demands of the expanded facility. Normal operation of the plant is defined as three existing units, each burning 27 TPH of RDF at an annual availability of 90 percent together with the two new units, each burning 40 TPH of RDF at an annual availability of 84 percent. Peak demand for water is required when all six units are firing at their respective design rates, continuously, with the expansion steam turbine shut down and the heat load from the condensed excess steam dissipated by the proposed cooling tower.

Waste heat generated through condensing steam from the facility steam turbines will be rejected using the existing wet mechanical draft crossflow cooling tower for the existing streams and a new wet mechanical draft cooling tower serving the load from the expansion boilers. The circulating water flow rate will be 58,500 gallons per minute (gpm) for the new cooling tower. With a normal inlet temperature of 101°F and outlet temperature of 86°F, the system will dissipate 439 MMBtu/hr of heat. At peak demand load with excess steam being dump condensed, the inlet temperature will increase to 112°F.

The water balance shows that the cooling towers will require an average of 1,964 gpm or 2.83 million gallons per day (mgd). Peak demand will be 2,884 gpm or 4.15 mgd. This water requirement will consist of a combination of well water, boiler blowdown water, and use of stormwater runoff and landfill leachate water. Stormwater and landfill leachate water will be recycled and reused to the maximum extent possible, to conserve water and minimize well water withdrawals.

The average withdrawal of well water will be 964 gpm or 1.39 mgd, with the peak withdrawal being 2,195 gpm or 3.16 mgd. The peak withdrawal rate assumes that no stormwater would be available from the stormwater retention pond which holds non-contaminated stormwater runoff.

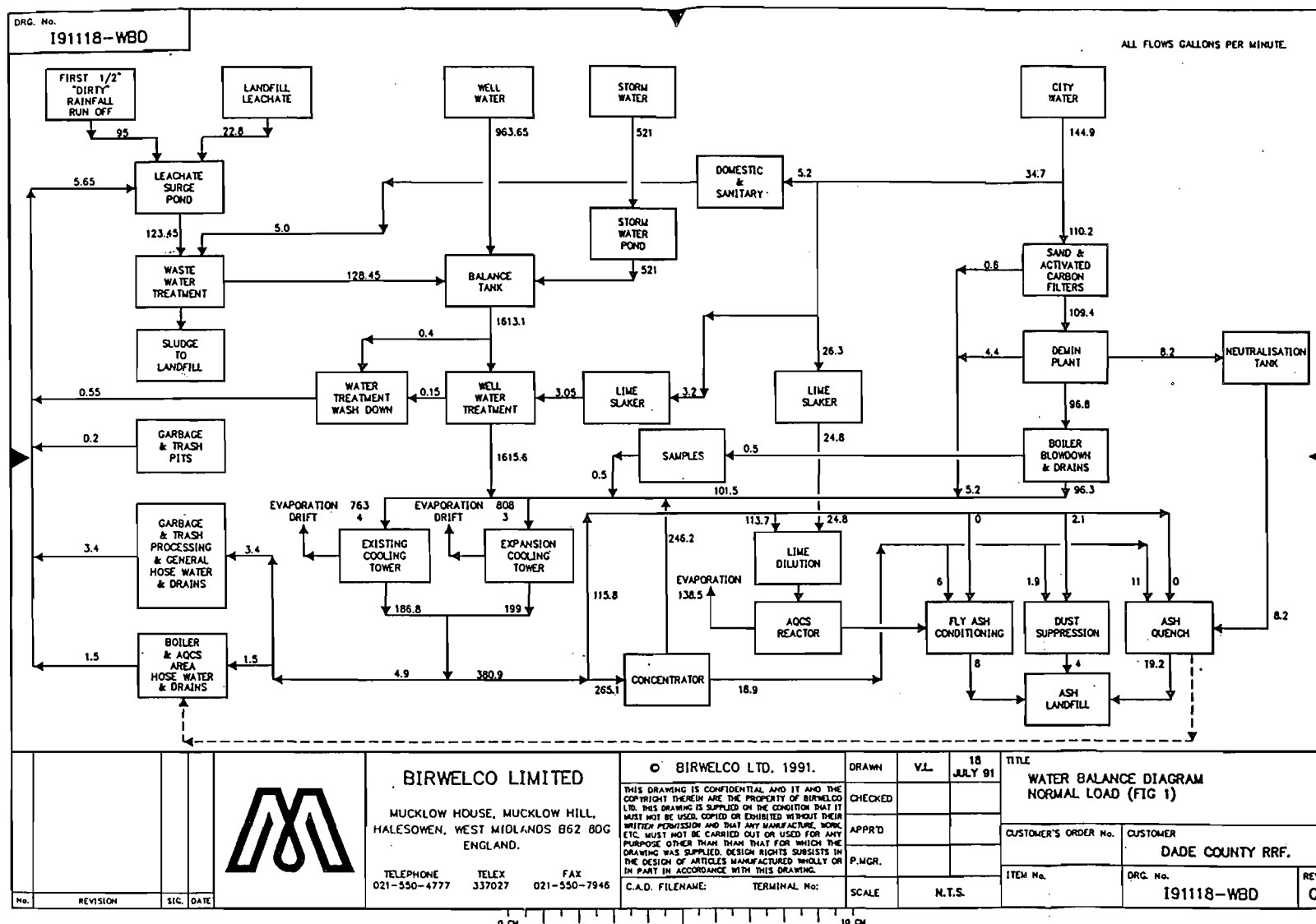


Figure 3.5-1 DCRRF WATER BALANCE DIAGRAM, NORMAL LOAD

DADE COUNTY RESOURCES RECOVERY FACILITY CAPITAL EXPANSION PROJECT

Owner: Dade County
Operator: Montenay Power Corp.

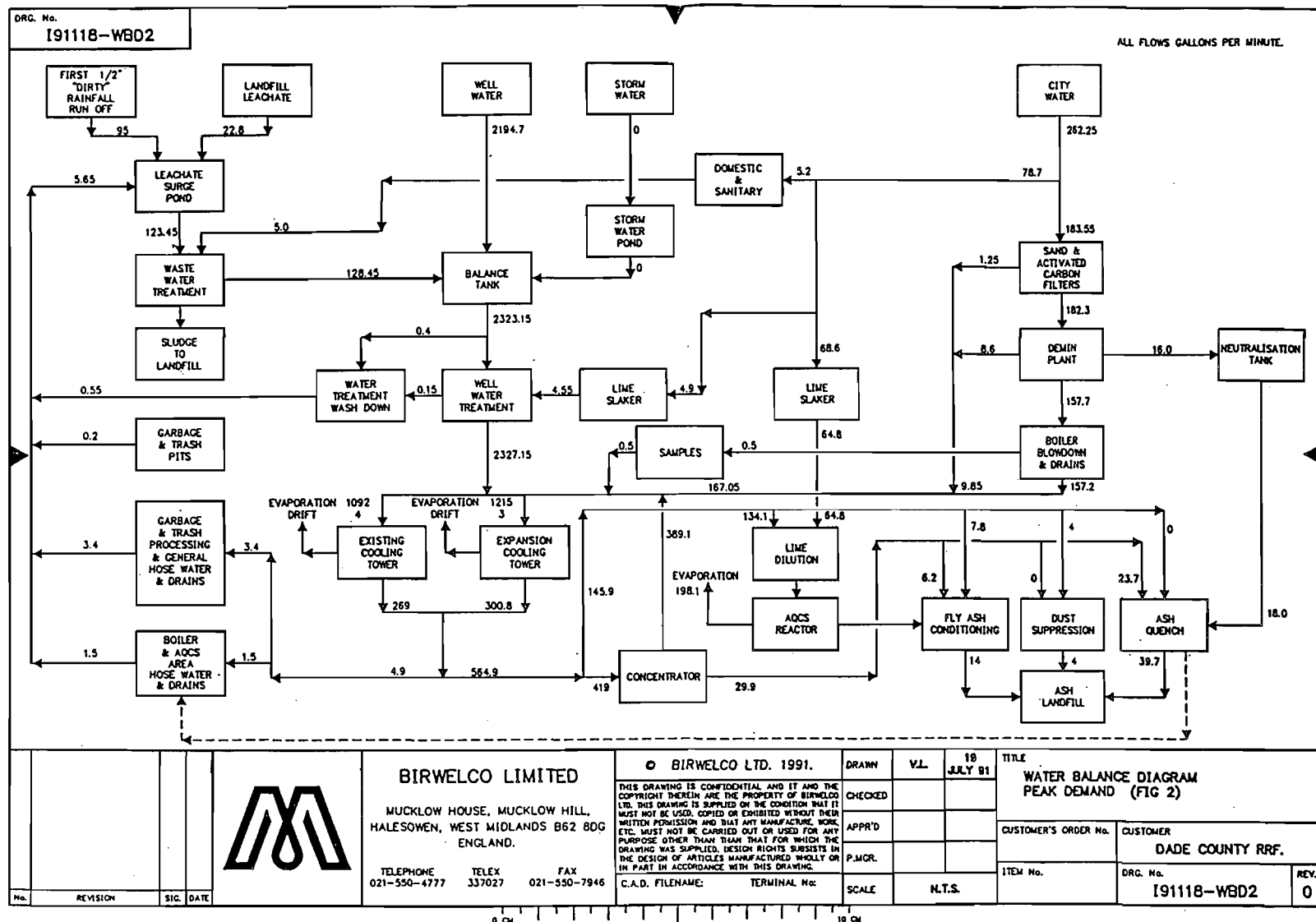


Figure 3.5-2 DCRRF WATER BALANCE DIAGRAM, PEAK LOAD

DADE COUNTY RESOURCES RECOVERY FACILITY CAPITAL EXPANSION PROJECT

Owner: Dade County
Operator: Montenay Power Corp.

The stormwater master plan for the site specifies that runoff from uncontaminated areas will be collected in a retention system designed to control the 25-year, 72-hour storm event for the facility. Water from the retention pond can be withdrawn and used as cooling tower makeup at an average rate of 750,000 gallons per day (gpd).

Given the well-water characteristics presented in Table 3.5-1, the water will be softened prior to use to minimize scaling of the plant cooling equipment surfaces and to increase the cycles of concentration.

Evaporation of water in the cooling tower causes the dissolved solids present in the makeup water to concentrate. To maintain the desired recirculation water quality, a blowdown rate equal to approximately five cycles of concentration is required to prevent further accumulation of solids.

The quality of treated makeup water and recirculation water is shown in Table 3.5-2. The dissolved solid composition of the cooling tower blowdown water contains primarily chloride and sulfate salts of sodium and calcium. The water may be reused directly for dilution of the lime slurry fed to the flue gas spray dryer absorbers and for general plant hose down water. The bulk volume of blowdown water far exceeds the requirements of the remaining applications that can accept blowdown-quality water, these being the ash quench and fly ash conditioning operations.

To meet the design criterion of minimum discharge, the blowdown stream will be concentrated. The brine concentrate from such treatment will be utilized for fly ash conditioning and fly ash quench water. The brine will thereby be absorbed by the ash and go to landfill. The sanitary sewer will be used as a backup disposal option for the brine water. The reclaimed water from the brine concentration process will be reused for cooling tower makeup.

A combination of treated well water, city water, and/or water from the stormwater retention pond will be used as boiler feed water for lime slaking and for the potable and domestic supplies for the facility. An analysis of the city water is presented in Table 3.5-3. The raw water feed for boiler water makeup will be demineralized prior to use.

Table 3.5-1. Well Water Analysis (Typical)

Parameter	Concentration
Total Dissolved Solids	1,548 ppm
Suspended Solids	< 10 ppm
pH	7.3 units
Methyl Orange Alkalinity (as CaCO_3)	303 ppm
Hardness (as CaCO_3)	516 ppm
Specific Conductance	2,090 $\mu\text{mho}/\text{cm}$
Turbidity	0.5 NTU
Calcium (as Ca)	181 ppm
Magnesium (as Mg)	15.5 ppm
Sodium (as Na)	248 ppm
Iron (as Fe)	0.21 ppm
Potassium (as K)	33 ppm
Silica (as SiO_2)	9.7 ppm
Bicarbonate (as HCO_3)	370 ppm
Chloride (as Cl)	278 ppm
Sulfate (as SO_4)	380 ppm
Nitrate (as NO_3)	23 ppm
Nitrite (as NO_3)	< 0.2 ppm
Phosphate, Ortho (as PO_4)	< 0.05 ppm
Sulfite (as SO_3)	< 0.5 ppm

Note: CaCO_3 = calcium carbonate.
NTU = nephelometer turbidity units.
ppm = parts per million.
 $\mu\text{mho}/\text{cm}$ = micromhos per centimeter.

Sources: Birwelco-Montenay, Inc., 1991.
KBN, 1992.

Table 3.5-2. Cooling Tower Makeup and Recirculation Water Quality

Parameter	Concentration	
	Makeup Water	Cooling Tower Recirculation Water
Total Dissolved Solids, ppm	1,057	5,000 - 6,000
Specific Conductance, $\mu\text{mho}/\text{cm}$	1,400 - 1,600	8,000
Hardness (as CaCO_3), ppm	215	1,000 - 1,200
Chloride (as Cl), ppm	278	1,400

Note: CaCO_3 = calcium carbonate.
ppm = parts per million.
 $\mu\text{mho}/\text{cm}$ = micromhos per centimeter.

Sources: Birwelco-Montenay, Inc. 1991.
KBN, 1992.

Table 3.5-3. City Water Analysis

Parameter	Concentration
Total Dissolved Solids	186 ppm
Suspended Solids	< 10 ppm
pH	8.7 units
Phenolphthalein Alkalinity (as CaCO_3)	4 ppm
Methyl Orange Alkalinity (as CaCO_3)	42 ppm
Hardness (as CaCO_3)	69 ppm
Turbidity	0.27 NTU
Calcium (as Ca)	21 ppm
Magnesium (as Mg)	4.3 ppm
Sodium (as Na)	36 ppm
Potassium	1.2 ppm
Silica (as SiO_2)	6.5 ppm
Bicarbonate (as HCO_3)	41 ppm
Carbonate (as CO_3)	4.8 ppm
Chloride (as Cl)	62 ppm
Sulfate (as SO_4)	14 ppm
Nitrate (as NO_3)	< 0.6 ppm
Phosphate, Ortho (as PO_4)	< 0.15 ppm
Sulfite (as SO_3)	< 0.5 ppm

Note: CaCO_3 = calcium carbonate.
NTU = nephelometer turbidity units.
ppm = parts per million.

Sources: Birwelco-Montenay, Inc., 1991.
KBN, 1992.

3.5.2 DOMESTIC/SANITARY WASTEWATER

Sanitary wastes generated from lavatory and shower facilities used by the plant employees and visitors will be:

1. Passed directly to the sanitary sewer system sized to take the daily flow, or
2. Screened, and the effluent biologically treated prior to blending with the bulk treated wastewater effluent. This stream will be chlorinated and blended with the incoming well water for cooling tower makeup. The estimated plant staff will be a maximum of 260 people per day. Given a minimum wastewater generation rate of 30 gallons per capita per day, the minimum sanitary wastewater flow will be 7,800 gpd.

3.5.3 PROCESS WATER TREATMENT

3.5.3.1 COLD LIME SOFTENING

Softening the well water and the reclaimed water sources will be accomplished via a spiractor device. The unit physically resembles an inverted cone with supporting legs. Well water and the treatment chemicals (lime slurry and possibly a small quantity of trisodium phosphate solution) are introduced tangentially at the bottom of the unit. The mixture rises through a suspended bed of catalyst (a fine sand) and is maintained in a fluidized bed by the upward velocity of the water. As the water moves upward, the expanding section area decreases the velocity sufficiently to the point where catalyst is now further suspended. At this point, there is a sharp demarcation between the crystalline bed and stable treated water. The calcium carbonate formed by the softening process precipitates and plates out onto the catalyst, forming a hard, dense, round grain. This "sludge" material is removed when the unit is shut down and can be dewatered to approximately 98 percent solids. A maximum of 11 TPD of sludge will be produced from this process and will be landfilled or burned in the facility units.

3.5.3.2 BOILER FEED WATER DEMINERALIZATION

The city water will be demineralized to produce a water containing very low levels of silica [less than 0.07 part per million (ppm)] and a conductivity of less than 5.0 micromhos per centimeter ($\mu\text{mho/cm}$). The demineralization process will consist of three 2-stage ion exchange trains each with a nominal capacity of 80,000 gpd.

The cation and anion resins contained in the demineralizer will be regenerated by using concentrated caustic (50 percent) and sulfuric acid (93 percent) solutions. Approximately

65 percent or 23,000 gpd maximum of the regenerant flow stream will be passed to a holding tank for neutralization. The effluent from this tank will have a dissolved solids concentration of approximately 10,000 ppm, consisting predominantly of sodium sulfite formed in the neutralization reaction. A sludge may also be formed as solids are precipitated from the regenerant effluent, producing a maximum of 150 pounds per day (lb/day) of carbonate salts. The regenerant effluent will be re-used in the ash quench.

The final rinses from each of the demineralizer ion exchanges will contain very low concentrations of dissolved solids that can be blended with the backwash rinse from the caustic exchanger (essentially city water). This would represent typically 35 percent of the regenerant flow, or 12,500 gpd. The water will be reclaimed and pumped to the cooling tower makeup tank.

Backwash water from the sand filters (if used) and activated carbon filters (for removal of chlorine and organics present in the city water supply) will also be reused as cooling tower makeup. The volumes produced from these units will be approximately 12,600 gallons per week (gal/week) maximum.

Wastewater from boiler blowdown, boiler samples, and drains will be cooled and routed either directly to the cooling tower makeup tank, or upstream of the well water treatment system for blending with the fresh well water feed.

3.5.3.3 WASTEWATER TREATMENT

Processing and boiler area pumps, along with the collected liquor from the garbage pits, will be pumped to the wastewater surge pond. The wastewater surge pond will be constructed primarily to accommodate the high volumes of leachate and contaminated rainwater runoff produced during rainfall events. A constant drawoff rate from the pond will be fed to a wastewater treatment plant, which may encompass a number and range of processes to treat and remove constituents and characteristics of the effluent, which would be undesirable in the final treated water. This water will be reclaimed and used to supplement the well water supply for cooling tower makeup.

The water quality characteristics of the various wastewater streams will be established in the forthcoming design study for the wastewater treatment plant. Completed characterization studies of the ash water have shown the liquor contains levels of calcium hardness, chlorides, sulfates,

zinc, suspended solids, and traces of heavy metals such as lead and arsenic. The final selection of the wastewater treatment process or combination of processes will depend on:

1. The type of constituents (suspended, colloidal, or dissolved), and the biodegradability and toxicity of the organic and inorganic components.
2. The final desired quality, and whether a buildup of undesirable components will restrict the performance and future process capability.
3. The most cost-effective wastewater treatment that can produce water of suitable quality for cooling tower makeup.

3.6 CHEMICAL AND BIOCIDES WASTE

3.6.1 COOLING TOWER BLOWDOWN

The liquid from cooling tower blowdown will be used as previously discussed for general plant hose down and air quality control system lime dilution water and will be concentrated for disposal in the ash quench and fly ash conditioning systems. Cooling tower blowdown will contain the residues of chemical additives used to control corrosion, scaling, and fouling in the cooling water system as well as solids concentrated from the well water and supplemented makeup water streams. A variety of products are used to control cooling tower water quality. These products contain dispersants to inhibit scaling and an azole (or similar) compound to inhibit copper/brass corrosion, and a zinc-based (or similar) anticorrosion treatment.

For control of algae and microorganisms, chlorine is used intermittently to maintain a residual level of 0.4 ppm of free chlorine in the recirculating cooling water. A liquid-bromide chlorine enhancer is also used to improve the performance of the chlorine. Final pH is controlled at 8 to 8.2 by the addition of sulfuric acid.

3.6.2 STEAM GENERATOR METAL CLEANING

The spent liquors from this very infrequent operation will be disposed of in the sanitary sewer.

3.6.3 STEAM GENERATOR BLOWDOWN

The boiler makeup feed water will be conditioned in the steam condensate cycle to remove dissolved oxygen and carbon dioxide by using both steam deaeration and chemical treatment. Diethyl hydroxylamine (DEHA) (or similar additive) is added to each deaerator. Sodium sulfite (or similar additive) is also added to each steam drum to maintain a residual level of 20 to 40 ppm of sulfite in the boiler feed water for oxygen scavenging.

To inhibit scaling on boiler surfaces, trisodium phosphate (or similar additive) is added to each steam drum and, through blowdown, a level of 20 to 60 ppm of phosphate (PO_4) is maintained. A liquid dispersant and turbine defoulant (Morpholine or other additive) is also added to each steam drum.

Typical analysis of the boiler feedwater is shown in Table 3.6-1. Continuous boiler blowdown, sampling, and other boiler drains will serve to maintain this composition. After cooling of the streams, these waters can be blended with makeup water for the cooling towers. Therefore, the dissolved solids will be either disposed of in the concentrated brine fed to the ash quench or removed in the sludge residue from the waste treatment plant.

3.6.4 PROCESS WATER TREATMENT SYSTEM DISCHARGE

The concentrated regeneration liquors from the acidic and alkali rinses of the demineralizer ion exchange cation and anion columns can represent approximately 65 percent of the total regenerant volume. These will be bulked in a neutralization tank, and the effluent, which will contain an excess of hydroxyl ions, will have sulfuric acid added to achieve neutralization. The final liquor containing a dissolved solid concentration of around 10,000 ppm will be added to the ash quench as makeup water. The more dilute fast rinse waters and cation backwash liquor (approximately 12,500 gpd) will be used directly as cooling tower makeup.

Table 3.6-1. Boiler Feed Water Analysis (Typical)

Parameter	Concentration
pH	10 - 10.2
Conductivity	500 - 750 μ mho/cm
Sulfite (SO ₃)	20 - 40 ppm
Silica (SiO ₂)	0.5 - 1.5 ppm
Iron (Fe)	0.05 - 1.5 ppm
Phosphate, Ortho (PO ₄)	20 - 60 ppm

Note: ppm = parts per million.
 μ mho/cm = micromhos per centimeter.

Sources: Birwelco-Montenay, Inc., 1991.
 KBN, 1992.

3.7 SOLID AND HAZARDOUS WASTE

3.7.1 SOLID WASTE

3.7.1.1 EXISTING SYSTEMS

The solid residues created by the existing DCRRF consist of ash from the combustion process and sludge from the water treatment plant. The ash resulting from the combustion of RDF is classified into two types: bottom ash (the heavy ash that falls off the stoker and into the quench tank) and fly ash (the fine ash carried in the flue gas and collected in the boiler ash hoppers, dust collectors, and the ESPs). The handling system for these ashes is described as follows.

Bottom ash, approximately 50 percent by weight of the total ash, is generated at a rate of about 4,500 lb/hr. The bottom ash handling system begins with the collection of the ash that rolls off the stoker. This stoker ash falls into a quench tank and is removed by the submerged collection conveyor (Figure 3.7-1). The stoker ash, now saturated with water, is transferred to the main collection conveyor. The sifting ash, particles of bottom ash that fall through the stoker, is collected in hoppers, transferred to the sifting ash conveyors, and then transferred onto the main collection conveyor. The main collection conveyor transports all bottom ash (stoker and sifting), as well as the fly ash, to the ash building in the wet state.

Fly ash is entrained in the flue gas as it exits the furnace. After passing through the boiler, the flue gas passes through the first of a series of fly ash collection devices. The first devices are an array of mechanical dust collectors. A portion of the fly ash is separated from the flue gas and falls into a hopper. From the hopper, the fly ash is discharged onto the boiler dust collector conveyor. From the boiler dust collector conveyor the ash goes directly onto the main collection conveyor, combines with the saturated bottom ash, and proceeds to the ash building in a wet state.

The main mechanical dust collectors are located downstream of the air pre-heater. Ash removed at this stage is deposited onto the air pre-heater ash collector conveyor, which discharges onto the main ash collector conveyor.

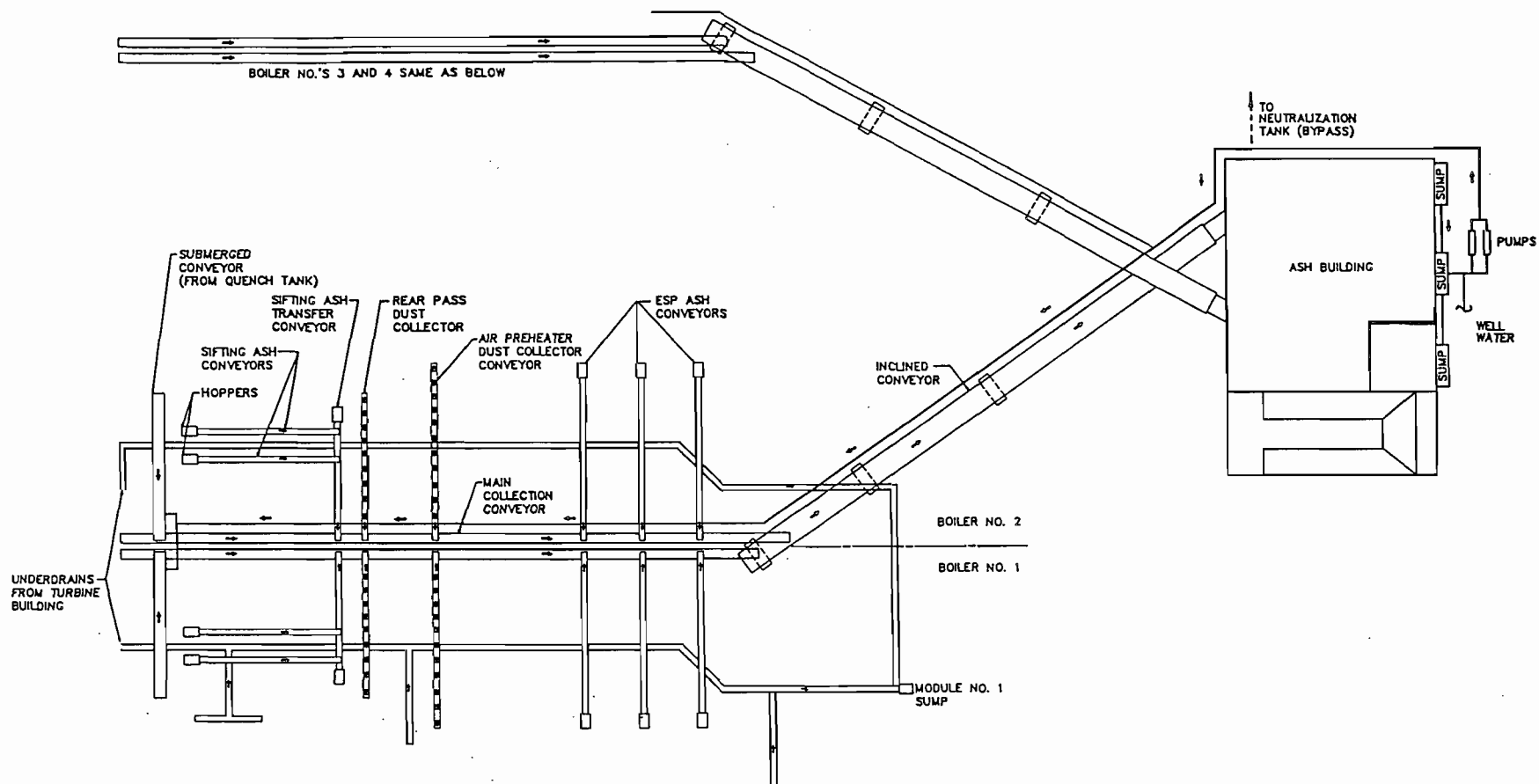


Figure 3.7-1 DCRRF ASH HANDLING SYSTEM PLAN VIEW

DADE COUNTY RESOURCES RECOVERY FACILITY
CAPITAL EXPANSION PROJECT

Owner: Dade County
Operator: Montenay Power Corp.

The last unit of the dust collection system is the ESP, which removes fly ash from the flue gas stream. The ESP ash is deposited onto a conveyor below the ESP; there is one conveyor for each ESP. The ash is then transported by these ESP ash conveyors to the main collection conveyor.

When the main collection conveyor has received all of the bottom and fly ash removed from the boiler and flue gas, respectively, the ash is transferred to the inclined conveyor. There are two inclined conveyors, one serving Units 1 and 2 and the other serving Units 3 and 4. The ash is transported on the inclined conveyors to the ash building. The inclined conveyors also contain a truck loadout bypass chute prior to entering the ash building so that ash can be loaded directly into trucks from the conveyors.

The ash building has been designed to store more than 4 days' worth of ash generation, about 2,000 tons at a density of 65 pounds per cubic foot (lb/ft³). The ash building is equipped with a crane used to distribute ash within the building and to load ash into trucks for transport to the landfill.

The ash building contains a water collection and drain system to remove the water released from the saturated ash. Currently, the amount of water released from the ash is minimal. The water drains into one of three collection sumps prior to being pumped out. Two pumps are used to move this water from the sumps, along a zero discharge recirculation system, back to the quench tanks and the submerged collection conveyors in front of the boilers.

This recirculation system eliminates the need to treat and dispose of the contaminated water. A connection to the well water header is provided at the pumps to supplement the water collected in the sumps as needed.

The ash handling system at DCRRF utilizes enclosed dry conveyors which use single or double chains to pull a series of metal flights which in turn push the material along to the designated transfer points. This system is comparable to most other ash handling conveyor systems used in similar plants throughout the country. The ash handling system has recently undergone an extensive reconstruction and upgrading by the facility operator.

The conveyor system continues to be reviewed through periodic detailed inspections and ongoing monitoring. The purpose of the review is to identify any additional improvements that should be made to the system to eliminate fugitive ash emissions.

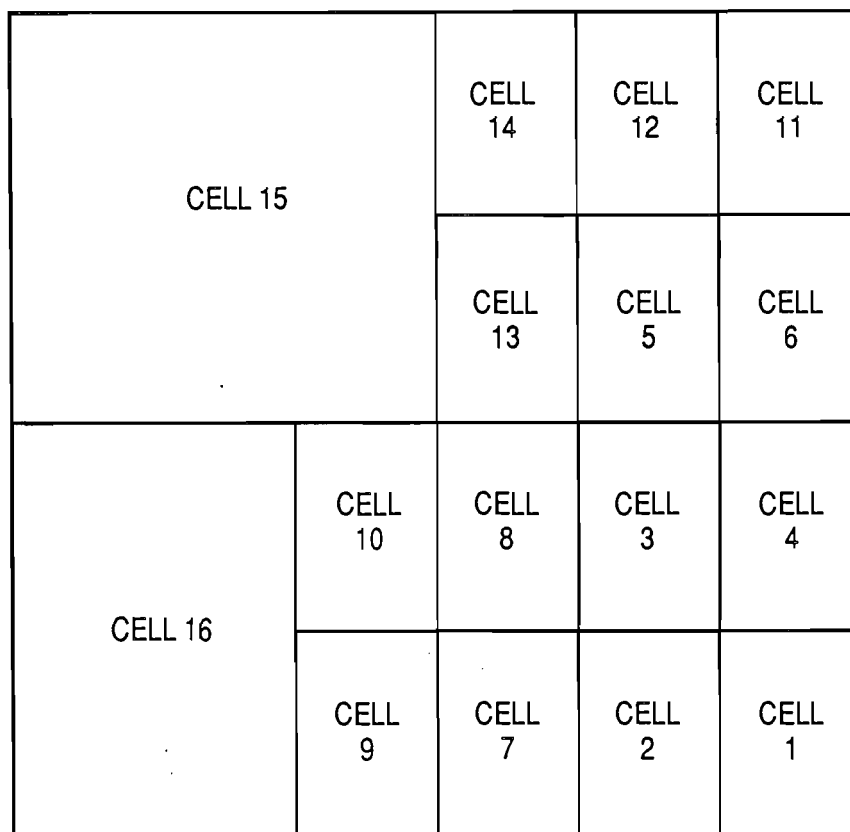
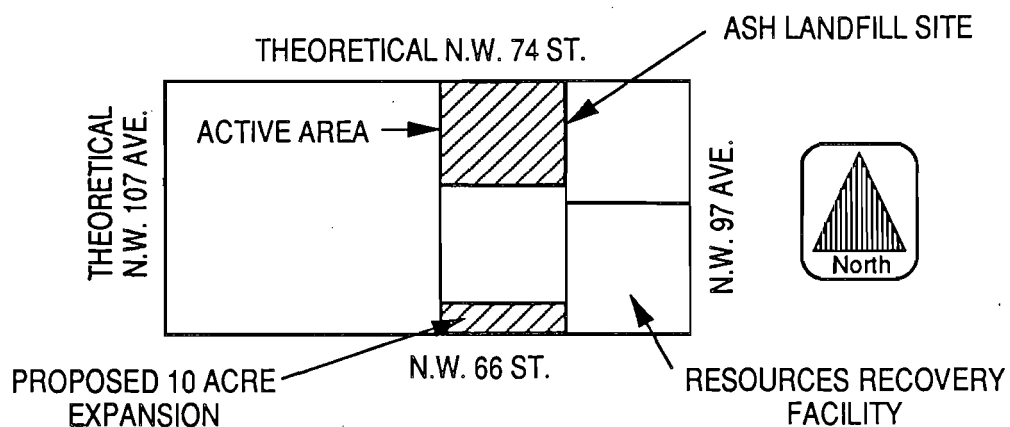
The original site certification for DCRRF allocated 80 acres in the western half of the site for a landfill to wholly support facility operations. An ashfill on this acreage was permitted under the Power Plant Site Certification. Ash is loaded into 20-ton dump trucks and hauled approximately one-quarter mile to the ashfill. The moisture in the ash is usually sufficient to suppress fugitive dust emissions during hauling. However, if the ESP ash content is high, the ash is wetted prior to hauling to minimize fugitive emissions.

To date, approximately 27 of the 80 acres allocated for landfilling have been utilized. The northernmost 40-acre portion of the 80-acre area was subdivided into 16 operational areas or cells, as shown in Figure 3.7-2. Cells 1 through 14 occupy approximately 1 acre per cell, and Cell 15 occupies 7 acres. Cell 16, currently operational, occupies 4 acres. Planning is underway for the construction of an additional 10-acre cell to be located at the south end of the 80-acre tract designated for landfilling. Additional cells will be constructed in the future as needed.

Aerial photographs dated August 1988 show the final peak elevation of the easternmost inactive cells at approximately 80 feet above mean sea level (ft-msl). Final elevations in the westernmost cells are between 43 and 51 ft-msl. The preliminary closure scheme for Cells 1 through 16 calls for a peak elevation of 85 ft-msl.

The design of the ash landfill has changed over the course of operations. The original cells (Cells 1 through 15) were equipped with 30-mil polyvinyl chloride (PVC) membrane liners. Leachate collection was accomplished through a series of 12-inch-diameter corrugated metal pipes which extended into the cell base. Collected leachate was originally transported through the pipes to on-site leachate ponds. However, use of these ponds was eliminated with the construction of a new pump station which is connected to the Metro-Dade sanitary sewer system.

The design of Cell 16 differed from that of the previously constructed cells in a number of ways. The liner material consists of 60-mil high-density polyethylene (HDPE). Leachate is collected by a series of underdrains made of perforated HDPE pipe. The HDPE liner and PVC liners were



ACTIVE AREA

Figure 3.7-2 DCRRF ASH LANDFILL

**DADE COUNTY RESOURCES RECOVERY FACILITY
CAPITAL EXPANSION PROJECT**

Owner: Dade County
Operator: Montenay Power Corp.

overlapped in adjoining cells along the north and east boundaries of Cell 16. An independent leachate collection and transport system, constructed of HDPE pipe, flows to a common catch basin which flows to the on-site lift station.

The proposed design of the additional 10-acre cell calls for lining with clay and HDPE. Leachate will be routed through the cell by an arrangement of goenets and pipes. The pipes will carry leachate out of the cell to a catch basin and gravity sewer system. This sewer system will tie into the on-site lift station.

All runoff from the landfill is currently treated as leachate. Upon closure, all stormwater runoff from the landfill areas will be collected in perimeter ditches and retained on-site. Under original site plans, a 2-acre lined pond was constructed to accommodate stormwater overflow from the perimeter ditches. This pond was removed from the stormwater management system when the leachate collection system was connected to the sanitary sewer.

The 10-acre cell, as shown on Figure 3.7-2, is in the final design phase and has been projected to serve the facility approximately 2 to 3 years. Vacant land remains for further expansion of landfilling operations. Cell 16 will provide disposal capacity for the current operation through late 1992.

Municipal waste combustor (MWC) ash recycling/reuse is being given consistently greater attention as land disposal requirements for this material become more stringent. Reuse/recycling of ash from conventional sources (coal-fired boilers) has been modestly practiced for a number of years. This experience serves as a basis for MWC ash recycling/reuse programs. The following is a discussion of potential MWC ash reuse/recycling options and specific programs under consideration by Dade County Department of Solid Waste Management.

Beneficial uses for recycled MWC ash have focused to-date on construction material applications. MWC ash can be used in roadway construction. MWC ash can be used in various forms in cement and concrete production. Unprocessed fly ash can serve as a partial replacement of cement in concrete production.

MWC ash must be cleaned prior to use as aggregate in the production of Portland cement. This cleaning includes the removal of all ferrous particles and oversized material.

Consideration must be given to the aluminum content of MWC ash used in cement and concrete production, as the cement will react with free aluminum, releasing hydrogen gas, resulting in detrimental volume expansion. Testing of the proposed MWC ash feedstock must be conducted to determine if the presence and concentration of aluminum precludes its use in cement and/or concrete production.

Investigation of the vitrification of MWC residue is ongoing. Vitrification, which immobilizes toxic materials in the residue, is the smelting of MWC ash into a dense, onyx-like substance. Uses for this material might include spinning it into an insulating material similar to rock wool, casting it into architectural tile or block, substituting it for sand as a grit-blasting medium, using it as an aggregate for bituminous concrete, or using it as construction fill material.

Dade County Department of Solid Waste Management is currently involved in negotiations regarding the use of ash generated at DCRRF in cement manufacturing. Under the proposed plan, a contractor would set up an on-site processing facility. Processing would include metals recovery, screening, and measures to prevent resolidification of the processed material. This processing should yield a reduction in volume of approximately 15 percent. The processing contractor or the county would pay cement manufacturers to take possession of the processed ash.

Concerns of the cement manufacturers currently involved in the subject negotiations include: potential for processed ash solidification; aluminum and iron content; potential increased processing equipment maintenance costs due to ash use; and air emissions. In addition, provisions would have to be made for processed ash storage, with particular attention to runoff minimization and containment. Two cement manufacturers have indicated they could accept processed ash.

Another alternative currently under consideration by the Dade County Department of Solid Waste Management is the use of ash in bricks or blocks. The University of Miami is currently investigating this reuse alternative.

Either of the above-mentioned alternatives would reduce the demand on the ash landfill.

3.7.1.2 PROPOSED SYSTEMS

The new units will be fitted with an ash handling system as described below. Bottom ash from the grate falls down a chute into a water bath. It is then pushed by a hydraulic ram up a slope and onto a vibrating conveyor. This conveyor carries ash from the boiler and is fitted with an integral grizzly. This has 6-inch gaps which allows most of the ash to fall onto a drag link elevating conveyor. The ash then passes through a magnetic separator and is combined in the residue storage building with the fly ash and spent lime from the spray dryer absorber/fabric filter system. Objects larger than 6 inches fall off the end of the grizzly and are removed by front loader.

The fly ash collected from the spray dryer absorber/fabric filter system is stored in silos and then combined with the bottom ash as described above or conditioned and stored in a separate enclosure. The fly ash silos will be controlled with a bin vent filter or equivalent.

A similar system will be used on the existing units, except that grizzly scalpers and magnetic separation will not be required due to the nature of the shredded fuel (RDF-3).

3.7.1.3 ASH CHARACTERISTICS

Site-specific analytical data are available for DCRRF because ash and leachate from the ash building are analyzed quarterly for priority pollutant metals in accordance with the ash management regulations. Comprehensive ash analyses were performed for each unit during the acceptance testing periods, from November 1988 to May 1990. Between four to eight hourly composite samples were obtained during the testing period for each unit. Each sample was subjected to the following analyses: percent moisture, percent combustibles, and heavy metals (silver, arsenic, barium, cadmium, chromium, copper, nickel, lead, selenium, and zinc). Both percent moisture and percent combustibles help define the degree of combustion of the influent fuel and thus the efficiency of the combustion process for the particular unit from which the ash is generated.

Table 3.7-1 summarizes the analytical results from the ash samples. Most parameters vary widely within a specific unit test as well as between the various units. The observed range in data is not

Table 3.7-1. Ash Analysis for DCRRF

Parameter	Unit 1 ^a	Unit 2 ^b	Unit 3 ^c	Unit 4 ^d
Moisture, %	16.1-19.9	13.3-19.3	16.0-22.9	22-29
Combustibles, %	1.7-3.5	1.2-2.4	1.3-3.4	7.0-10.6
Arsenic, ppm	6.2-14	<2	<0.4-1.1	0.8-3.5
Barium, ppm	140-260	55-85	163-228	260-340
Cadmium, ppm	8.2-19	13-18	13-16	25-37
Chromium, ppm	55-68	65-78	34-70	48-68
Copper, ppm	210-480	820-3,200	580-1,460	1,220-4,000
Lead, ppm	460-970	810-1,560	994-1,840	1,600-5,100
Nickel, ppm	17-41	89-150	76-124	48-130
Selenium, ppm	<2-4	<1	<0.4-0.7	0.5-0.9
Silver, ppm	2.7-6.4	11-15	<2-2.2	<2
Zinc, ppm	1,110-1,900	2,200-2,600	1,750-2,500	3,900-6,300

Note: ppm = parts per million.

^a Eight samples collected 11/4/88.

^b Five samples collected 5/9/89.

^c Five samples collected 9/1/89.

^d Four samples collected 11/8/89. These values are not representative of true operating conditions of Unit 4 because the unit was not operating properly the time of this test. As a result, these values are not comparable to those for Units 1 through 3. A retest was performed in May 1990, but those results were not presented in units comparable to the data provided in this table.

Sources: Brown and Caldwell, 1991.
KBN, 1992.

unexpected given the variability of ash grab samples. Ash characteristics are extremely dependent upon the influent fuel characteristics and boiler combustion conditions. Influent fuel content will vary depending upon climatic conditions (rainy or dry), fuel processing, use of fresh versus stored fuel and source and composition of the unprocessed solid waste stream.

Zinc, lead, and copper are the predominant heavy metals in the ash samples with concentrations ranging from 500 to 5,000 ppm. Barium, cadmium, chromium, and nickel are generally present in the 50 to 350 ppm range. Silver, arsenic, and selenium are present in the lowest relative concentrations, generally below 2 ppm.

Data are also available for extraction procedure (EP) toxicity testing for the combined ash. The EP toxicity test is designed to simulate the leachate generation potential of a material by exposing it to a mildly acidic solution ($\text{pH} = 5.0$). The toxicity characteristic leachate procedure (TCLP) replaced the EP toxicity test as the standard leachate test in March 1990. In terms of environmental impact, these tests represent the potential metal loading to the off-site environment from the waste leachate, if not controlled (i.e., its toxicity characteristic).

EP toxicity data are available for the previously described boiler compliance testing and additional testing on composite ash samples taken quarterly during a period from July 1989 to July 1990. TCLP data were obtained from ash samples in December 1991. Table 3.7-2 provides a summary of the EP toxicity test data. For comparative purposes, a leachate sample from the ash monofill is also provided in Table 3.7-2. TCLP test results are shown in Table 3.7-3.

As with the total metal data, the EP and TCLP toxicity data also demonstrate wide variability, albeit to a lesser degree than found for the total ash concentrations. In most cases, the EP toxicity test results were below the detectable limit for the particular parameter. In the vast majority of the samples, the leachate concentrations were below the 1.0 ppm level. All TCLP test results were below the criteria EPA has established to define a hazardous waste.

Due to the availability of an EP toxicity test sample and an actual leachate sample from the same time period a comparison of "theoretical" versus "actual" metal content can be made. For all parameters except chromium, the EP toxicity data results for the composite ash are significantly higher than the actual leachate, often in the 0.4 to 1.0 order of magnitude range. Chromium was

Table 3.7-2. EP Toxicity Testing Results for DCRRF Ash

Parameter	Composite Ash (7/89-7/90)	Unit 1 (11/4/88)	Unit 2 (5/9/89)	Unit 3 (9/1/89)	Unit 4 (11/8/89)	Ash Landfill Leachate (11/2/90)
Arsenic	<0.02-0.015	<0.05	<0.05	<0.01	<0.01	0.012
Barium	0.274-1.32	<0.1-0.6	<1.0	<2.5	<2.5	—
Cadmium	<0.001-0.82	0.3-0.6	<0.01-0.5	<0.5-2.5	0.7-1.2	0.04
Chromium	0.005-0.060	<0.05-0.07	<0.05	0.1	<1.0	0.22
Lead	0.001-3.58	0.2-2.2	<0.05-0.7	<1.0-6.3	3.6-59	0.030
Mercury	<0.0002-0.00027	<0.02	<0.02	<0.005-0.004	<0.01	<0.0002
Selenium	<0.0002-0.010	<0.01	<0.01-0.20	<0.01	<0.01	<0.002
Silver	<0.0002-0.0049	<0.05-0.87	<0.05	<0.5	<0.05	<0.002

Note: All results are given in parts per million (ppm).

Sources: Brown and Caldwell, 1991.
KBN, 1992.

Table 3.7-3. TCLP Test Results for DCRRF Ash

Parameter	Ash Test Results (ppm)		EPA Criterion Defining Hazardous Waste ^a (ppm)
	11/2/90	12/12/91	
Arsenic	0.034	0.005	5.0
Barium	0.52	0.6	100.0
Beryllium	—	<0.01	—
Cadmium	0.23	0.36	1.0
Chromium	0.041	<0.05	5.0
Copper	—	0.98	—
Iron	—	0.10	—
Lead	0.13	2.38	5.0
Mercury	<0.002	<0.0002	0.2
Nickel	—	0.29	—
Selenium	0.21	—	1.0
Silver	0.001	3.05	5.0
Vanadium	—	<0.002	—
Zinc	—	14.5	—

^a TCLP test result must exceed its criterion to be defined as hazardous waste.

Sources: Montenay Power Corp., 1992.
40 CFR 261.20.
KBN, 1992.

approximately five times greater in the leachate sample relative to the composite ash samples. While the normal variations present in grab sampling no doubt contribute to these differences, fundamental differences between laboratory and field leaching potential appear to exist.

Based upon the measured pH of the leachate (8.1), the potential for dissolution of metals by leachate is decreased relative to the lower pH value of the EP toxicity test (5.0). This factor would appear to primarily account for the differences in metallic content. Another factor could include redox reactions occurring in the ash monofill.

The ash characteristics after expansion of DCRRF will be affected by several new aspects of the operation. First, the spray dryer absorber/fabric filter control system and mercury control system on each existing and new unit will result in increased heavy metal capture compared to current capture with the ESP systems. These new systems have shown heavy metal capture of 98 percent or greater for all metals except mercury. Second, the addition of lime-based reagent in the air pollution control system will act to reduce the overall metal concentrations in the ash by about 10 percent. Third, for the proposed units, ferrous recovery will be performed on the collected ash. This will remove a large percentage of the metals in the ash. Overall, the metal concentration of the ash generated from DCRRF is not expected to change significantly after expansion.

3.7.1.4 ASH QUANTITIES

An ash mass balance for both the existing and future DCRRF is presented in Table 3.7-4. The mass balance accounts for the expected average ash in the RDF, both current and expected future. The current air quality control system consists of ESPs, and the total ash present in the fuel accounts for the total ash generated. In the case of the future units, the acid gas control system will add additional solids to the ash, resulting in increased ash volume than would otherwise be generated.

The ash mass balance indicates the ash quantity generated by the four existing units is approximately 127,166 TPY, assuming 80 percent plant capacity. With the future two new units and the four retrofitted existing units operating at 80 percent capacity factor, the future total ash quantity generated is estimated at 245,536 TPY.

Table 3.7-4. Predicted Ash Mass Balance for DCRRF

Description	Units	Existing System Using ESP-- Each Existing Unit	Upgraded and Expanded System Using SDA/FF	
			Each Existing Unit	Each New Unit
RFD Into Boiler (design)	TPH	27.0	27.0	40.0
Ash Content of RDF	%	12.5	8.0	8.0
<hr/>				
Ash Into Boiler	lb/hr	9,072	9,072	13,440
Lime Into Scrubber	lb/hr	0	1,000	1,450
Total Ash In	lb/hr	9,072	10,072	14,890
<hr/>				
Bottom Ash ^a	lb/hr	4,536	4,536.0	6,720.0
Fly Ash				
Boiler Dust Collector	lb/hr	454	453.6	672.0
Air Heater Dust Collector	lb/hr	3,022	2,946.8	4,347.5
Scrubber Collector	lb/hr	0	487.2	719.1
ESP or Baghouse	lb/hr	1,046	1,641.8	2,422.2
Stack Emissions	lb/hr	14	6.6	9.2
Total Ash Out	lb/hr	9,072	10,072.0	14,890.0
<hr/>				
Description	Units	Total Four Existing Units ^b	Total Four Retrofitted Units ^b	Total Two New Units ^b
Total Ash Generated	TPD	348.4	386.8	285.9
	TPW	2,438.6	2,707.4	2,001.2
Total Ash Collected	TPD	347.8	386.5	285.7
	TPW	2,434.8	2,705.6	2,000.0
Total Ash Emitted	TPD	0.54	0.3	0.2
	TPW	3.76	1.8	1.2

Note: ESP = electrostatic precipitator.
 lb/hr = pounds per hour.
 RDF = refuse-derived fuel.
 SDA/FF = spray dryer absorber/fabric filter.

TPD = tons per day.
 TPH = tons per hour.
 TPW = tons per week.

^a Grate ash plus sifting ash.

^b Based on 80% capacity factor for all units.

Sources: Brown and Caldwell, 1991.
 KBN, 1992.

3.7.1.5 WATER TREATMENT SLUDGE

Water treatment sludge from the cold lime softening will be landfilled.

3.7.2 HAZARDOUS WASTES

Florida's hazardous waste management program is codified under Chapter 17-730, Florida Administrative Code (F.A.C.), which adopts and incorporates by reference EPA's rules on the identification and listing of hazardous waste which are published in 40 CFR 261. Chapter 17-730, F.A.C., also states that Florida standards applicable to generators and transporters of hazardous waste and to owners and operators of hazardous waste facilities are substantively identical to federal regulations in 40 CFR Parts 262, 263, 264, 265, and 266. Therefore, the federal regulations will be referred to in this chapter as the regulations which must be met.

3.7.2.1 DEFINITION OF HAZARDOUS WASTES

Any solid waste is a hazardous waste if it meets either of the following criteria:

1. It exhibits any of the characteristics of hazardous waste identified in 40 CFR 261 Subpart C, or
2. It is listed in 40 CFR 261 Subpart D.

3.7.2.2 IDENTIFICATION/TREATMENT OF HAZARDOUS WASTES

DCRRF will generate both listed and characteristic hazardous wastes. The hazardous wastes which could be generated at the plant fall into the following categories:

1. Nonthermal wastewaters,
2. Waste oils containing hazardous constituents, and
3. Miscellaneous hazardous wastes.

3.7.2.2.1 Nonthermal Wastewaters

Nonthermal wastewaters is a broad category of various wastewaters resulting from operation of a resources recovery facility. The DCRRF project has been designed so that none of these wastes will be hazardous. Nonhazardous nonthermal wastewaters and treatment strategies are described below.

1. Water and Wastewater Treatment Sludges

Sludges containing water treatment chemicals have the potential to be hazardous due to high pH levels. This type of sludge will not be generated because these treatment chemicals will not be used.

2. Demineralizer Regenerant

The regeneration of the demineralizers is achieved by the addition of regenerating chemicals (e.g., sulfuric acid and sodium hydroxide). The spent sulfuric acid and sodium hydroxide will be neutralized in a totally enclosed tank and pumped to a water treatment facility. This constitutes a totally enclosed treatment facility (TETF) as defined under 40 CFR 260.10. TETFs are exempted from being regulated as hazardous waste treatment units under 40 CFR 265.1(c)(9) and their effluent is considered nonhazardous.

3. Steam Generator Blowdown

This blowdown may contain trace levels of hydrazine (a conditioning chemical), but is typically a high quality wastestream.

4. Metal Cleaning Waste

Nonhazardous steam generator cleaning waste (spent citric acid solution) is presently evaporated in one of the steam generators.

5. Demineralizer Brining Solution

The spent demineralizer brining solution (which is not a regenerant) contains caustic and sodium chloride but is not hazardous.

6. Reverse Osmosis Wastes

None of the reverse osmosis wastestreams will be hazardous.

3.7.2.2.2 Waste Oils Containing Hazardous Constituents

The only waste oils containing hazardous constituents which might be generated on site would be spilled fuel oil containing biocides. Drainage from all such areas is routed to the central wastewater treatment facility. Levels of biocides in these oils are expected to be significantly below hazardous levels.

3.7.2.2.3 Miscellaneous Hazardous Wastes

The waste oil from plant lubrication activities are contained in 55-gallon drums or a waste oil tank. These are disposed monthly by an oil recycling contractor. This material is not hazardous.

Waste cleaning solvents from three parts-cleaning tanks are captured in drums and recycled. A licensed contractor changes the solvent in each tank once every 2 weeks.

3.7.2.3 HAZARDOUS WASTE STANDARD OPERATING PROCEDURES

There are two scenarios for management of hazardous waste intercepted in the incoming MSW at DCRRF. In the case where the waste poses an immediate threat, such as a fuming or bulging drum, the first step is to notify the Metro-Dade Hazmat Unit. The Hazmat Unit will take whatever steps are necessary to protect health and safety, including evacuating the affected area and isolating and/or stabilizing the waste. The Dade County Department of Environmental Resources Management (DERM) will be notified so that an on-site inspection to document the incident can be conducted.

In the case where routine waste is intercepted, the material will be placed in a designated temporary holding area for storage of unacceptable materials. Enviro-haz, the emergency contractor, will be called in to characterize the waste and package and transport it to a permitted hazardous waste facility. The emergency contractor will follow the same procedure for waste that has been stabilized by the Hazmat Unit.

Following is a list of contact people involved in the management of hazardous waste detected at DCRRF:

Hazmat Unit	Captain Ron Sperry	305-596-8559
DERM	Mike Graham	305-322-0121
Enviro-haz	Rick Coleman	407-575-6871

3.8 ON-SITE DRAINAGE SYSTEM

A stormwater management system master plan has been developed which addresses a stormwater system design for the ultimate condition of the expanded DCRRF. The master plan is contained in Appendix 10.7. The major aspects of the system include dry detention swales surrounding the 80-acre ash landfill area and a stormwater retention pond of approximately 21 acres.

For the 40-acre plant site area, runoff from highly contaminated areas will be intercepted and routed to a stormwater surge pond and wastewater treatment plant for pretreatment prior to reuse or discharge to the sanitary sewer. Runoff from moderately contaminated areas will be intercepted by a system of lined swales and pumped to the surge pond for treatment and further reuse. Overflow from this system will be captured by dry detention swales and dry exfiltration trenches. Non-contaminated runoff will be routed to dry exfiltration trenches for disposal.

A daily inspection and maintenance program will be implemented for the stormwater system. The master plan is currently under review by the regulatory agencies, and the final plan will be approved by FDER, the South Florida Water Managment District (SFWMD), and DERM.

3.9 MATERIALS HANDLING

3.9.1 FACILITY CONSTRUCTION PHASE

Roads within the plant vicinity are shown on Figure 3.9-1. Primary plant access for construction traffic will be via NW 97th Avenue which enters the site from the east. A new construction entrance will be provided, located just north of the present truck entrance for waste haulers. Access to NW 97th Avenue will be from NW 58th Street which runs east-west. The main north-south road providing access to NW 58th Street is SR 826 (east of the plant site). Non-construction traffic will gain site access via NW 66th Street, which runs directly south of the site (see Figure 3.9-1).

Construction field offices and construction labor force parking will be to the north of the existing processing/power block area. The construction laydown area is to the west of this area, on land that is currently vacant within the site. The area of major new construction within the existing 40-acre processing/power block area is also shown in Figure 3.9-1. The on-site drainage and water pollution control system for these construction areas is described in Section 3.8.

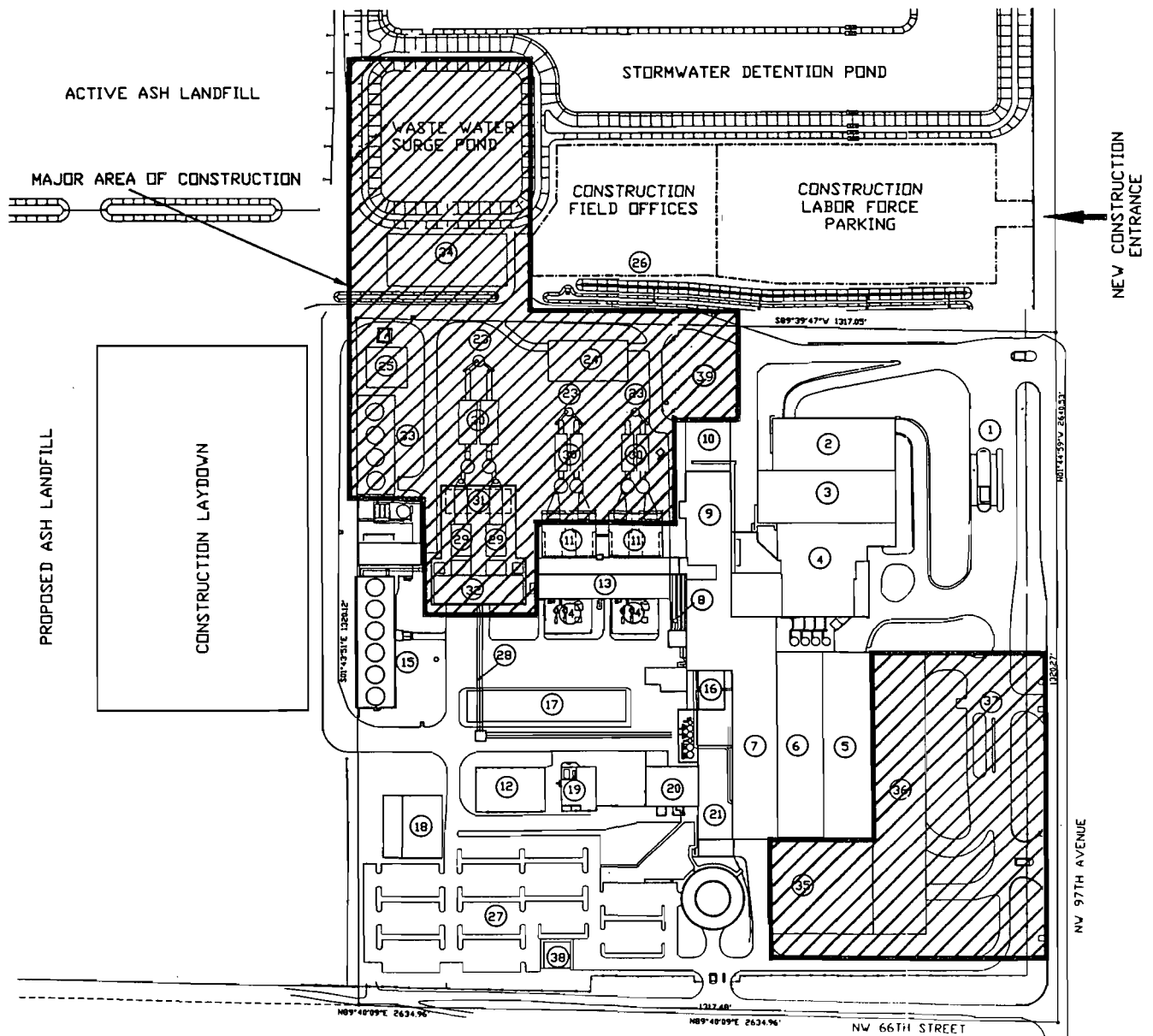
Heavy equipment and components will ultimately be delivered to the site on trucks. The major equipment will consist of two steam generators/boilers, one steam turbine generator, six air quality control system modules (one for each new and existing unit), transformers, and four cooling tower cells. This heavy equipment will most likely be delivered prior to installation and stored temporarily in the 4-acre central construction laydown area (see Figure 3.9-1).

As evidenced by the large volume of heavy-truck traffic now utilizing NW 58th Street and 97th Avenue, the existing roadways are adequate to handle the required construction traffic. The existing roadway system in Dade County should provide no impediment to delivery of equipment to the site.

3.9.2 FACILITY OPERATIONAL PERIOD

During operations, MSW and trash will be delivered to the site by truck. These operations are described in Section 3.1.

Lime for the spray dryer absorber/fabric filter acid gas control system will be brought to the facility by truck and loaded pneumatically into silos. There will be no open storage on the

**LEGEND****EXISTING FACILITIES**

- 1 SCALES
- 2 TRASH RECEIVING BLDG.
- 3 TRASH PIT
- 4 TRASH PROCESSING BLDG.
- 5 GARBAGE RECEIVING BLDG.
- 6 GARBAGE PIT
- 7 GARBAGE PROCESSING BLDG.
- 8 RDF-3 FUEL FEED
- 9 RDF-3 FUEL STORAGE
- 10 PROCESS UNDERS BLDG.
- 11 BOILERS (4 EA)
- 12 STORE YARD
- 13 TURBINE HALL
- 14 SWITCHYARD
- 15 COOLING TOWER
- 16 AL/FE BUNKERS
- 17 FERROUS PROCESSING BLDG.
- 18 TIRE BUNKER
- 19 FUEL OIL DEPOT
- 20 HEAVY EQUIP. MAINT. BLDG.
- 21 OFFICES/ADMIN. BLDG.

PROPOSED EXPANSION

- 23 STACKS (3 EA)
- 24 ASH BUILDING
- 25 WATER TREATMENT PLANT
- 26 PROPANE STORAGE
- 27 EMPLOYEE PARKING
- 28 RDF-2 FUEL FEED
- 29 NEW BOILERS (2 EA)
- 30 AGCS (6 EA)
- 31 NEW TURBINE
- 32 RDF-2 STORAGE
- 33 NEW COOLING TOWER
- 34 WASTE WATER TREATMENT PLANT
- 35 GARBAGE PIT EXTENSION
- 36 GARBAGE RECEIVING/TRANSFER EXTENSION
- 37 NEW SCALES
- 38 DADE COUNTY ADMIN. BLDG.
- 39 YARD TRASH PROCESSING SYSTEM

MAJOR AREA OF CONSTRUCTION



0 100 200 FT

LEGAL DESCRIPTION OF FACILITY

THE SOUTHEAST 1/4 OF THE NORTHEAST 1/4
SECTION 17, TOWNSHIP 33 SOUTH, RANGE 40
EAST OF DADE COUNTY, FLORIDA

Figure 3.9-1 AREA OF PROPOSED CONSTRUCTION

**DADE COUNTY RESOURCES RECOVERY FACILITY
CAPITAL EXPANSION PROJECT**

Owner: Dade County
Operator: Montenay Power Corp.

ground. Solid reactants used in the mercury control system will be handled in a similar manner. Refer to Section 3.4 for further detail.

Ammonia or urea will be used in the NO_x control system. Associated facilities will consist of storage tanks, pumps, and piping.

Ash generated in the boilers and from the spray dryer absorber/fabric filter control system will be transported by enclosed conveyors to an ash storage building. From this point, the ash is loaded into trucks and transported to the on-site ash landfill (refer to Section 3.7.1 for more detail).

3.10 REFERENCES

- Brown and Caldwell Consultants. 1991. Ash Residue Management Plan for the Dade County Resources Recovery Facility. Prepared for Dade County Department of Solid Waste Management. Miami, FL.
- U.S. Environmental Protection Agency (EPA). 1991. BACT/LAER Clearinghouse--A Compilation of Control Technology Determinations (Supplements). Office of Air Quality Planning and Standards. Research Triangle Park, NC.

4.0 ENVIRONMENTAL EFFECTS OF SITE PREPARATION AND PLANT AND ASSOCIATED FACILITIES CONSTRUCTION

4.1 LAND IMPACTS

4.1.1 GENERAL CONSTRUCTION IMPACTS

The portions of the Dade County Resources Recovery Facility (DCRRF) site that will be affected by construction are discussed in Section 3.9 and are shown in Figure 4.1-1. A total of about 22 acres of the existing plant site will be impacted during construction activities. Of this total, 11.5 acres will be used for construction support as follows: construction facilities (2.1 acres), construction laydown area (6.4 acres), and construction parking area (3.0 acres).

The area of actual plant facility construction will encompass approximately 16 acres. Of this, approximately 10 acres will be in the power block area, and approximately 6 acres will be in the area of the existing garbage receiving building. This area is already substantially cleared and graded. Land clearing and grubbing will be required for the construction parking area (approximately 3 acres).

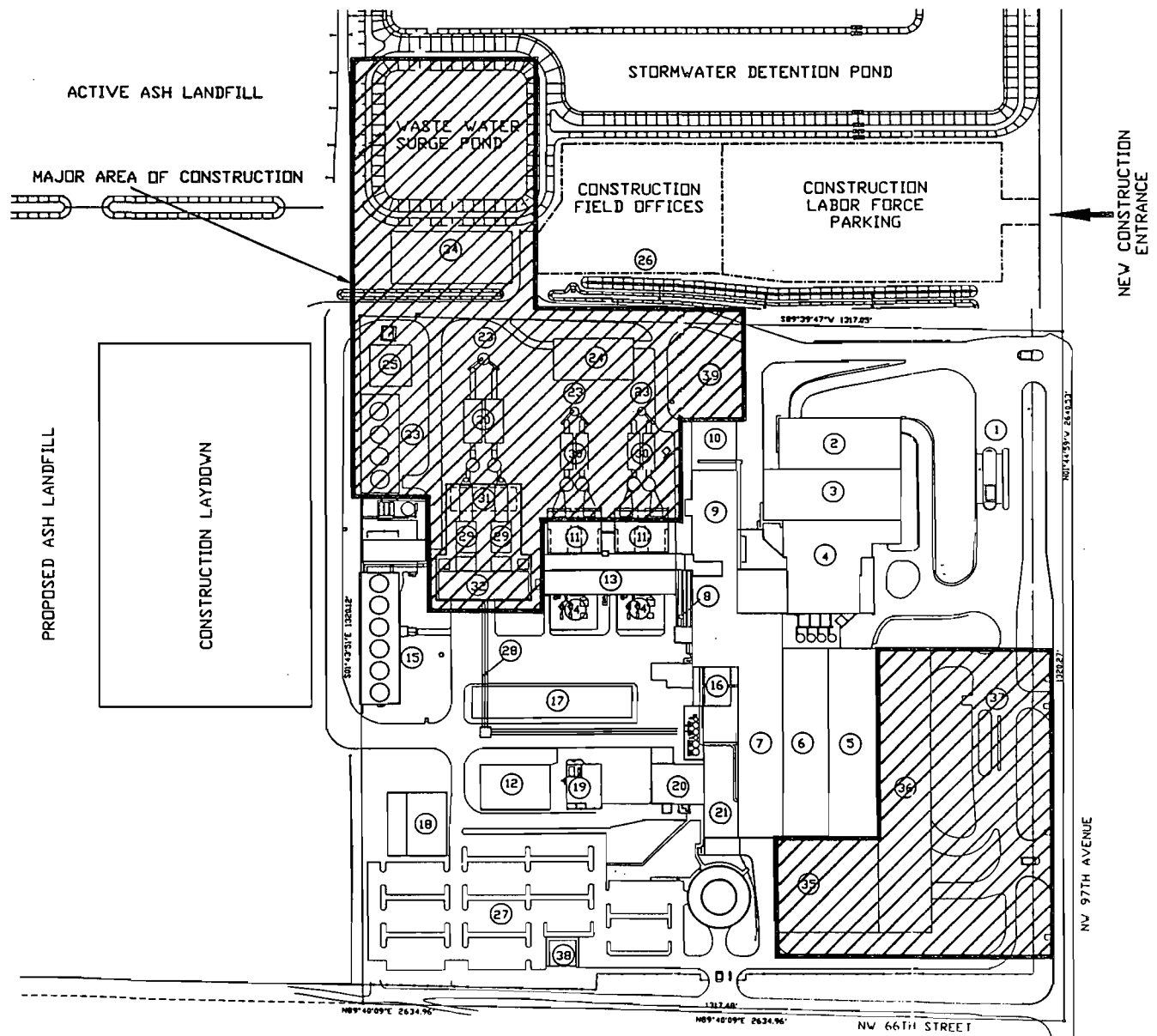
Permanently affected areas will include the power block area, cooling tower and water treatment area, wastewater surge pond, and the area south of the existing garbage receiving building (see Figure 4.1-1). These areas will require minimal clearing because they are within the vicinity of the existing power block and processing facilities which are already substantially clear. The other areas will be cleared as described for the areas affected only by construction.

Construction activities to be conducted, not associated directly with the DCRRF Capital Expansion Project (CEP), include construction of a new stormwater retention pond. This will affect approximately 26 acres in the northeastern quarter of the site. This area will be cleared and grubbed.

There will be no use of explosives during construction of the new units.

The impacts of creating material laydown areas will be minimal. The laydown area was cleared, grubbed, and filled with compacted limestone during construction of the original plant.

There will be a new access road for construction workers and vehicles along NW 97th Avenue, north of the existing receiving gate. There will be no new on-site railroads.

**LEGEND****EXISTING FACILITIES**

- 1 SCALES
- 2 TRASH RECEIVING BLDG.
- 3 TRASH PIT
- 4 TRASH PROCESSING BLDG.
- 5 GARBAGE RECEIVING BLDG.
- 6 GARBAGE PIT
- 7 GARBAGE PROCESSING BLDG.
- 8 RDF-3 FUEL FEED
- 9 RDF-3 FUEL STORAGE
- 10 PROCESS UNDERS BLDG.
- 11 BOILERS (4 EA)
- 12 STORE YARD
- 13 TURBINE HALL
- 14 SWITCHYARD
- 15 COOLING TOWER
- 16 AL/FE BUNKERS
- 17 FERROUS PROCESSING BLDG.
- 18 TIRE BUNKER
- 19 FUEL OIL DEPOT
- 20 HEAVY EQUIP. MAINT. BLDG.
- 21 OFFICES/ADMIN. BLDG.

PROPOSED EXPANSION

- 23 STACKS (3 EA)
- 24 ASH BUILDING
- 25 WATER TREATMENT PLANT
- 26 PROPANE STORAGE
- 27 EMPLOYEE PARKING
- 28 RDF-2 FUEL FEED
- 29 NEW BOILERS (2 EA)
- 30 AQCS (6 EA)
- 31 NEW TURBINE
- 32 RDF-2 STORAGE
- 33 NEW COOLING TOWER
- 34 WASTE WATER TREATMENT PLANT
- 35 GARBAGE PIT EXTENSION
- 36 GARBAGE RECEIVING/TRANSFER EXTENSION
- 37 NEW SCALES
- 38 DADE COUNTY ADMIN. BLDG.
- 39 YARD TRASH PROCESSING SYSTEM

MAJOR AREA OF CONSTRUCTION



0 100 200 FT

LEGAL DESCRIPTION OF FACILITY

THE SOUTHEAST 1/4 OF THE NORTHEAST 1/4
SECTION 17, TOWNSHIP 33 SOUTH, RANGE 40
EAST OF DADE COUNTY, FLORIDA.

Figure 4.1-1 AREA OF PROPOSED CONSTRUCTION

**DADE COUNTY RESOURCES RECOVERY FACILITY
CAPITAL EXPANSION PROJECT**

Owner: Dade County
Operator: Montenay Power Corp.

Construction laydown areas that may be heavily traveled will be stabilized with shell or rock. Other more lightly traveled areas will be seeded with grass to prevent erosion. Fugitive dust generation from traffic and/or excavations will be controlled through the use of water sprinkling during the construction period.

The existing grade is on the order of 3 to 11 feet above mean sea level (ft-msl). Areas within the permanent construction facilities area will be filled to an elevation of approximately 9 ft-msl and graded.

Excavation of soils in the power block area will be required to provide support for the plant foundation, piping, electrical duct banks, and manholes. Pockets of material unsuitable for buildings or heavy equipment foundation are expected to be found in this area. Removal of this material and the unavoidable removal of some adjacent material will be required. A quantity of about 30,000 cubic yards (yd³) has been estimated for removal. Because this material is clean debris, it will be disposed of in an approved landfill.

Foundations required to support heavy loads, such as building columns, steam generators, and electrical generators, will be supported on cast-in-place pilings; therefore, removal of soils below the existing compacted fill layer will not be required. Excavation of soils in the wastewater treatment area may be required depending on the structural capacity of the existing soils and the design of the proposed facility. It is not anticipated that this excavation would extend to below mean sea level. No dewatering is anticipated during foundation installation and construction of the proposed facilities.

Waste materials will be disposed of in accordance with applicable rules and regulations. Construction wastes, such as scrap wood and metal, will be transferred to a specified storage area on the site where they will be separated and stockpiled for salvage. General waste materials (i.e., typical of municipal solid wastes) will be collected in appropriate waste collection containers for processing on-site or disposal at an approved off-site location.

During construction, the construction labor force will use portable chemical toilets. All sanitary sewage will be pumped from the individual toilets as needed and transported to an approved disposal facility by a licensed contractor.

Waste oil from construction vehicles and equipment will be collected in appropriate containers and transported off-site for recycling or disposal at an approved facility. The approved disposal facility will be an existing facility that has been previously permitted for commercial recycling or disposal of waste oils.

Individual contractors will be responsible for handling any hazardous materials required to perform their tasks and hazardous wastes resulting from their use. This responsibility includes the proper off-site disposal of such wastes.

4.1.2 ROADS

There will be no permanent new roads connecting the site to state roads.

4.1.3 FLOOD ZONES

The entire 160-acre area, which includes the DCRRF site, the retention pond, and the existing ash landfill, is within the 100-year floodplain, according to the Flood Insurance Rate Map (community-panel number 125098-0160F, dated November 4, 1987). However, all proposed facilities have been designed and located so that no adverse impact on flood elevations or flows is expected.

4.1.4 TOPOGRAPHY AND SOILS

Soils on much of the 160-acre DCRRF site consist of primarily fill material and have been previously altered (see Section 2.3.1.2). The U.S. Soil Conservation Service (SCS) mapping of the site classifies these soils as "urban". The present grade ranges from 3 to 11 ft-msl, with the exception of the existing ash landfill which rises to approximately 87 ft-msl at its highest point.

Proposed construction activities consist of closure and capping of the ash landfill, construction of new cells within the landfill, construction of a new surface water management system, and construction related to the DCRRF expansion on 40 acres of the 160-acre site. Following ash landfill closure, runoff from the ash landfill will be directed into the retention pond. The top of the landfill cover will be at 85 ft-msl after the completion of landfill closure. Construction related to the plant expansion will include regrading activities associated with the new stormwater system, roadways, and buildings.

The proposed construction plan calls for excavation and filling of a vegetated area of 26.5 acres at the northeast corner of the site during the construction of the retention pond. This area has been determined as wetlands by the U.S. Army Corps of Engineers (USACE). To compensate for the filling of this 26.5-acre area, a 150-ft-wide littoral shelf will be created at the periphery of the proposed retention pond. This area will be planted with suitable wetland vegetation using soils from the existing wetlands. The littoral shelf will be planted at an elevation that will maintain wet conditions for at least 9 months of the year, thereby discouraging the growth of melaleuca.

Excavation for construction of the retention pond will affect 21 acres of the site, and the construction laydown area will affect 6.4 acres. A total excavation volume of 237,115 yd³ is planned for the construction of the retention pond. Of this volume, 72,320 yd³ consists of muck, some of which will be used in construction of the wetland mitigation area. The remaining material can be used as fill for construction of landfill berms and the surface water management system on the remainder of the site. The plan for retention pond construction includes excavating the pond to approximately 20 ft below grade and building a 14-ft-high dike that surrounds the pond. The USACE dredge and fill permit application is included in Appendix 10.1.

Construction activities will affect runoff in several areas of the site; however, no adverse effects are anticipated from this alteration. The existing ash landfill cell will be closed and capped and the proposed retention pond will be completed prior to completion of construction of the facility expansion. Runoff from the ash landfill site will be collected and discharged to the retention pond following landfill closure. This will provide both proper water treatment and required wetland mitigation. Until the wastewater treatment plant is operational, runoff from the 40-acre plant site will be collected and discharged to the sanitary sewer system. Initially, the facility expansion includes construction of two new 10-acre cells within the ash landfill.

Construction-related changes in site topography will not have any adverse effect on aesthetics or viewsheds. Since the elevations after construction will be less than 13 ft-msl in most areas, no significant topographical changes will be observable from off-site locations. Percolation rates will increase temporarily in response to removal of surficial soils.

4.2 IMPACT ON SURFACE WATER BODIES AND USES

4.2.1 IMPACT ASSESSMENT

The proposed surface water management plan calls for no off-site stormwater discharge; therefore, no impacts on off-site surface water bodies are expected. The retention pond for the ash landfill will be finished prior to facility expansion construction activities and is planned for use as a sedimentation and percolation basin during construction. Sediment removal will be performed if necessary after construction is complete.

4.2.2 MEASUREMENT PROGRAMS

Since no off-site discharge of construction stormwater is planned, no measurement or monitoring programs are proposed.

4.3 GROUNDWATER IMPACTS

4.3.1 PHYSICAL AND CHEMICAL IMPACTS OF DEWATERING

Activities associated with site preparation and construction are not expected to produce any significant changes to groundwater quality, quantity, or levels in the site vicinity. No dewatering will be required during the foundation installation and construction of facilities. As a result, no impacts due to dewatering will occur.

4.3.2 MEASUREMENT PROGRAMS

A revised groundwater monitoring program will be established at the site prior to construction. This program will incorporate the following groundwater monitoring programs:

1. The ongoing sampling of existing DCRRF wells surrounding the ash landfill site, and
2. Monitoring described in the contamination assessment plan (CAP) for the 160-acre site as required by the Florida Department of Environmental Regulation (FDER).

The existing ongoing monitoring program provides for quarterly sampling of the DCRRF wells that were established by the Dade County Department of Environmental Resources (DERM). The CAP requires new wells to comply with regulatory monitoring per the settlement agreement between FDER, Dade County, and Montenay Power Corp.

4.4 ECOLOGICAL IMPACTS

4.4.1 IMPACT ASSESSMENT

4.4.1.1 AQUATIC SYSTEMS

At present the aquatic system is comprised of ditches which contain water only in periods of heavy rains. Most of the current ditches within the 25 acres of the vegetated area will be removed. Since the ditches are normally dry and contain water only in periods of heavy rain, fish are nonexistent. The proposed retention ponds on this spot would increase the prospect for aquatic life.

4.4.1.2 TERRESTRIAL SYSTEMS

Approximately 25 acres of melaleuca wetland will be replaced by retention ponds. Mitigation with native wetland plant species is planned for several acres within the retention ponds so that weedy species of vegetation such as melaleuca can be replaced. Eliminating the melaleuca will result in a more viable wetland ecosystem that will enhance the flora of this site.

All water generated on the DCRRF site will be retained on site. Little or no runoff or silting is expected after the initial construction. Stormwater runoff, erosion, and sediment control measures during construction will include seeding and mulching exposed areas, minimizing unnecessary clearing of vegetation, and redirecting stormwater runoff by using dikes, basins, and sediment curtains.

Potential impacts to wildlife communities due to construction activities include the following:

1. Vegetation removal and loss of habitat,
2. Noise,
3. Increased access to wildlife areas,
4. Road traffic, and
5. Change in drainage.

Most of the wildlife habitat has been altered by ditches, dikes, berms, roads, and nearby construction. The current habitat is not very productive. The more mobile animals will be able to escape to surrounding habitats. The melaleuca habitat is neither important nor significant when compared to similar habitats in the project area.

Increased noise from construction equipment may cause a temporary avoidance behavior in area wildlife. This behavior is expected to be minimal since existing wildlife are probably accustomed to the noise from the existing operation.

A temporary increase in road kills may be expected from construction and traffic. Some small animals and reptiles may be killed. No important wildlife species are expected to be affected.

No listed plant species were found within this site so no potentially threatening effects are expected.

The wildlife species present on the site are considered typical of the region. No unique species or habitats, or significant populations of recreationally and commercially important species will be lost during construction.

4.4.2 MEASURING AND MONITORING PROGRAMS

Because of the lack of anticipated ecological impacts no biological monitoring is proposed during the construction period.

4.5 AIR IMPACT

4.5.1 AIR EMISSIONS

Construction activities may result in the generation of fugitive particulate matter (PM) emissions and vehicle exhaust emissions. The two primary construction activities associated with the proposed DCRRF expansion are the existing plant modifications and the excavation of the retention pond. The plant modification involves the modification of the existing units and the addition of the new units.

Because the 40-acre plant area within the site is fully cleared, no land clearing is required. PM emissions from vehicle movement on the paved roads are expected to be minimal. PM emissions from vehicular traffic on the paved site area will be additionally controlled by watering during lengthy periods with no rainfall.

The excavation activities associated with the retention pond include expanding the existing 10-acre pond area to approximately 26.5 acres and extending the berm. PM emissions are expected to occur from the land clearing activities and possibly from the grinding of melaleuca trees. Fugitive PM emissions due to wind erosion are expected to be minimal due to the higher than normal moisture content of the excavated soil.

Vehicle traffic will include heavy-equipment traffic and traffic due to construction workers entering and leaving the DCRRF site. Construction personnel and equipment will enter the site over a paved roadway. The distance from the street to the center of the construction parking area will be approximately 300 feet (ft) on paved areas.

Emissions of fugitive PM from these activities are extremely difficult to quantify because of their variable nature. They are dependent upon a number of factors, including specific activities conducted, level of activity, meteorological conditions, and control measures utilized. Emissions from wind erosion at the plant are not expected to be significant due to the small construction area and the brief time period that the soil will be exposed.

Open burning produces primarily PM emissions, with lesser quantities of nitrogen oxides (NO_x), carbon monoxide (CO), volatile organic compounds (VOCs), and sulfur dioxide (SO_2). If performed, open burning will be conducted in accordance with Chapter 17-5, Florida

Administrative Code (F.A.C.), Open Burning and Frost Protection Fires. Compliance with these requirements will minimize the air emissions and impacts associated with open burning.

4.5.2 CONTROL MEASURES

A number of control measures will be implemented during the construction period in order to minimize air emissions and potential impacts. Clearing of the site or adjoining properties will be kept to a minimum, thereby reducing air emissions due to wind erosion of exposed surfaces. After grading, the untraveled or lightly traveled areas will be vegetated to minimize fugitive PM and wind erosion. Heavily traveled construction laydown areas and unpaved roads will be stabilized with shell or rock. Fugitive dust from highly traveled areas will be controlled by watering on an as-needed basis. All plant entrance roads are currently paved, which minimizes dust emissions from vehicles entering the site.

Open burning, if performed, will be conducted using an air curtain incinerator, and if it does not cause or constitute a hazard to air traffic. Prior to open burning, the Dade County Fire Marshall, Aviation Department, and Department for Environmental Resources Management will be contacted.

4.5.3 POTENTIAL IMPACTS

Potential air quality impacts due to the construction activities will vary depending on the level of activity, the specific operations, site conditions, control measures, and prevailing weather conditions. Because of the type and nature of potential emission sources at the site, the maximum impacts due to construction are expected to occur near the construction activities in areas on or near plant property.

Many of the construction operations, such as land clearing, site filling and grading, and foundation work, will be intermittent and of short duration. Open burning will occur only from 9:00 a.m. to 1 hour before sunset (i.e., during daylight hours). These aspects of the construction activities will act to reduce potential impacts, since better dispersion conditions exist during the daytime as opposed to nighttime.

Based on the intermittent nature of construction activities, the air emission control measures implemented to reduce emissions, and the distance to plant property boundaries from the activities, air impacts off-site are not expected to be adverse due to construction activities or open burning.

Activities that potentially generate fugitive PM emissions will be visually monitored. If fugitive emissions become visible, water spraying will be applied to the affected areas. No ambient air quality monitoring is planned due to the short-term nature and magnitude of such emissions.

4.6 IMPACTS ON HUMAN POPULATIONS

4.6.1 NOISE IMPACTS

The impacts of noise on human populations are dependent upon the proximity of residences to construction activities and the type and extent of noise sources. The nearest residentially zoned area (i.e., receptors) to the proposed facility construction area is located approximately 3,500 ft to the south-southwest at the Doral Country Club (see Figure 2.3-12).

Major noise sources during the construction phase will likely be cranes, bulldozers, heavy-duty trucks, earth graders, front-end loaders, and air compressors/welders. These sources have maximum noise levels ranging from about 70 to 90 A-weighted decibels (dBA) (at 50 ft).

Background and average equivalent sound pressure levels (SPLs) observed during the daytime at the property boundary receptors (refer to Section 2.3.8, Table 2.3-34) are expected to increase slightly during the construction phase of the project. The increase in average equivalent SPLs (L_{eq}) during construction is expected to be small in magnitude; however, noise generated from aircraft takeoffs and landings at the Miami International Airport dominates noise levels in the vicinity of the facility.

The impact evaluation of construction activities was performed using the NOISECALC computer program, developed by the New York State Department of Public Service (NYDPS, 1986) to assist with noise calculations for major power projects. Noise source levels are entered as octave band SPLs. Coordinates, either rectangular or polar, can be specified by the user. All noise sources are assumed to be point sources; line sources can be simulated by several point sources.

Sound propagation is calculated by accounting for hemispherical spreading and three other user-identified attenuation options: atmospheric attenuation, path-specific attenuation, and barrier attenuation. Atmospheric attenuation is calculated using the data specified by the American National Standard Institute Method for the Calculation of the Absorption of Sound by the Atmosphere (ANSI, 1978). Path-specific attenuation can be specified to account for the effects of vegetation, foliage, and wind shadow. Directional source characteristics and reflection can be simulated using path-specific attenuation. Attenuation due to barriers can be specified by giving the coordinates and height of the barrier. Barrier attenuation is calculated by assuming an

infinitely long barrier perpendicular to the source-receptor path. Total and A-weighted SPLs are calculated. Background noise levels can be incorporated into the program and are used to calculate overall SPLs.

NOISECALC was performed to predict the maximum noise levels produced by a combination of likely noise sources with and without background noise levels. Since the schedule for using construction equipment has not been finalized, a conservative estimate of the number and type of construction equipment was assumed to calculate noise levels.

Table 4.6-1 presents a representative list of the major types of construction equipment that will potentially be used and their associated SPLs. For the purpose of the analyses, several combinations of equipment were assumed to operate simultaneously and continuously over a period of at least 1 hour (see Table 4.6-1).

The noise levels resulting from the combination of construction equipment and existing noise sources were input as multiple sources into NOISECALC. Construction noise source octave bands were estimated from U.S. Environmental Protection Agency (EPA), 1971. Appendix 10.5 presents the octave bands used in the analysis. Since it is unlikely that all the equipment would be operating simultaneously and continuously, this assessment is conservative. Background L_{eq} values were used to calculate impacts at each of the property line receptors identified. Atmospheric attenuation was the only option used.

The results of the construction noise impact analysis are presented in Table 4.6-2. The predicted impacts using the background L_{eq} values reflect the construction phase noise levels in combination with existing facility operations as well as aircraft traffic noise. This scenario more realistically represents noise levels that likely will be observed. Figure 4.6-1 represents the locations of the DCRRF property boundary receptors.

Using the background L_{eq} , the maximum calculated impacts during construction are predicted to range from 59.5 dBA at Site K (northwest corner) to 70.8 dBA at Site D (east of the facility). The background L_{eq} values were combined with the estimated SPL impacts due to construction.

Table 4.6-1. Example of Major Construction Equipment and Associated Noise Levels for the DCRRF Expansion Project

Construction Equipment ^a	Noise Level (dBA) per Unit @ 50 ft	Number of Units Operating ^b
Caterpillar Bulldozer	73.4	1
200-Ton Crawler Crane	88.0	1
100-Ton Crawler Crane	83.8	1
Earth Compactor	83.8	1
3/4-yd ³ Front-End Loader	84.0	1
3/4-yd ³ Backhoe	83.8	2
Air Compressor, Gas	76.1	1
Truck	83.5	3
Gas-Driven Welding Unit	78.0	1

^a Includes only major construction noise sources greater than 70 dBA.

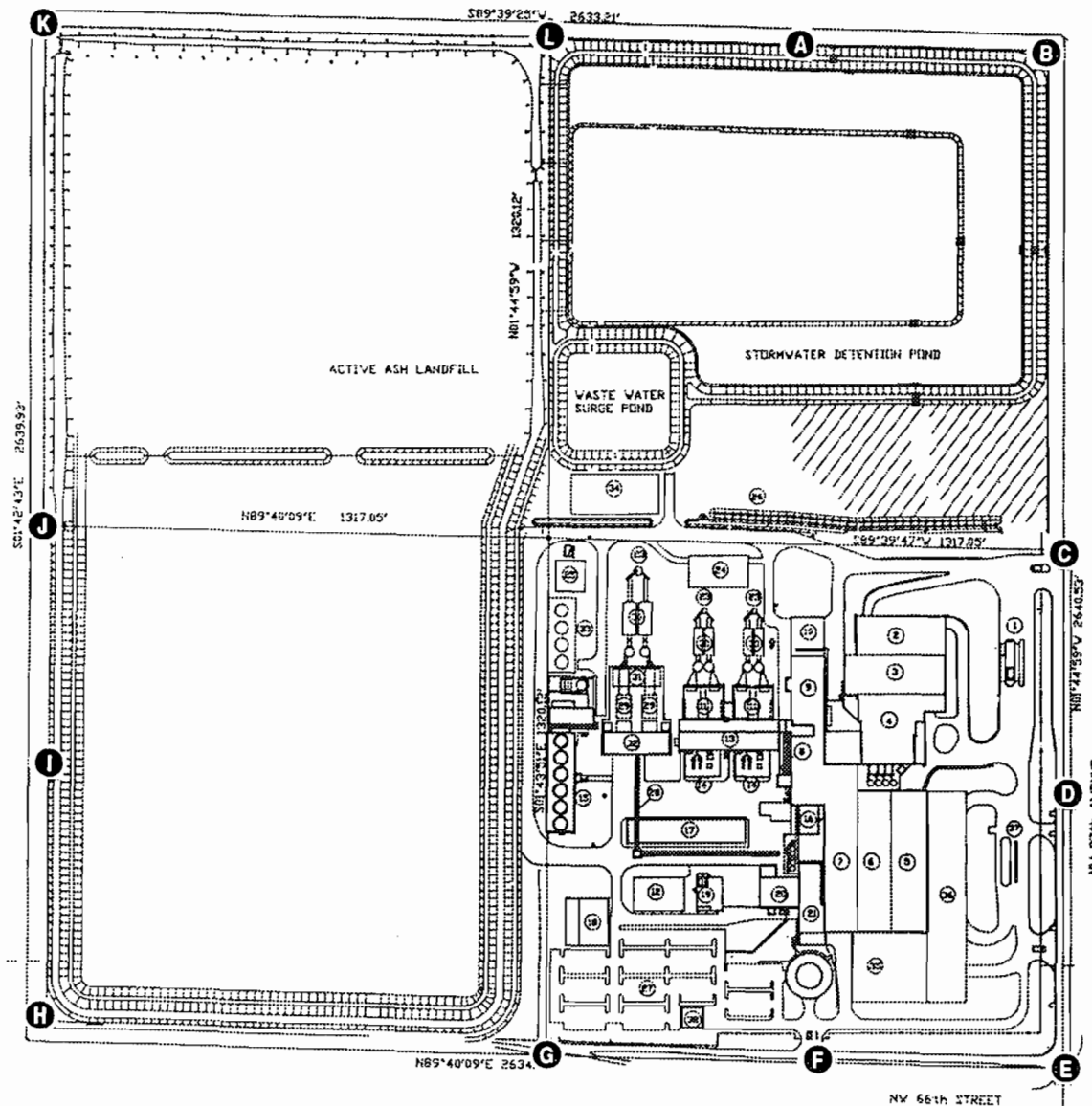
^b Assumed number of each type of equipment operating continuously, during worst-case hour.

Source: KBN, 1992.

Table 4.6-2. Predicted SPLs at DCCRFF Property Boundary Due to Construction Phase of the Project

Site	Predicted SPL From Existing Activities (dBA)	Predicted SPL From Construction Activities (dBA)	Total Predicted SPL (dBA)
A	54.0	62.3	62.9
B	52.2	59.6	60.4
C	60.0	65.9	66.9
D	61.7	70.3	70.8
E	59.4	66.9	67.7
F	65.1	68.3	70.0
G	64.4	65.6	68.0
H	53.4	58.9	60.0
I	55.6	61.8	62.7
J	53.2	60.5	61.2
K	50.8	58.8	59.5
L	53.9	62.8	63.3

Source: KBN, 1992.

**LEGEND****EXISTING FACILITIES**

- 1 SCALES
- 2 TRASH RECEIVING BLDG.
- 3 TRASH PIT
- 4 TRASH PROCESSING BLDG.
- 5 GARBAGE RECEIVING BLDG.
- 6 GARBAGE PIT
- 7 GARBAGE PROCESSING BLDG.
- 8 RDF-3 FUEL FEED
- 9 RDF-3 FUEL STORAGE
- 10 PROCESS UNDERS BLDG.
- 11 BOILERS (4 EA)
- 12 STORE YARD
- 13 TURBINE HALL
- 14 SWITCHYARD
- 15 COOLING TOWER
- 16 AL/FE BUNKERS
- 17 FERROUS PROCESSING BLDG.
- 18 TIRE BUNKER
- 19 FUEL OIL DEPOT
- 20 HEAVY EQUIP. MAINT. BLDG.
- 21 OFFICES/ADMIN. BLDG.

PROPOSED FACILITIES

- 23 STACKS (3 EA)
- 24 ASH BUILDING
- 25 WATER TREATMENT PLANT
- 26 PROPANE STORAGE
- 27 EMPLOYEE PARKING
- 28 RDF-2 FUEL FEED
- 29 NEW BOILERS (2 EA)
- 30 AGCS (6 EA)
- 31 NEW TURBINE
- 32 RDF-2 STORAGE
- 33 NEW COOLING TOWER
- 34 WASTE WATER TREATMENT PLANT
- 35 GARBAGE PIT EXTENSION
- 36 GARBAGE RECEIVING/TRANSFER EXTENSION
- 37 NEW SCALES
- 38 DADE COUNTY ADMIN. BLDG.

A NOISE RECEPTOR**LEGAL DESCRIPTION OF SITE**

NORTHEAST 1/4 SECTION 17, TOWNSHIP 33 SOUTH,
RANGE 40 EAST OF DADE COUNTY, FLORIDA.



Figure 4.6-1 DCRRF PROPERTY LINE NOISE RECEPTOR LOCATIONS

**DADE COUNTY RESOURCES RECOVERY FACILITY
CAPITAL EXPANSION PROJECT**

Owner: Dade County
Operator: Montenay Power Corp.

In contrast to the short-term construction noise, the most overwhelming noise source in terms of maximum noise levels is aircraft noise. The maximum aircraft noise levels far outweigh any other existing noise sources in the project area and would overshadow most, if not all, of the noise emanating from the construction activities.

The potential noise impact of the construction of the new unit was also evaluated against the community noise criteria described in Section 2.3.8.1. The uncorrected community ratings were determined by comparing the predicted octave band noise levels from NOISECALC with the Modified Composite Noise Ratings (CNR) curves (see Figure 2.3-9; the highest noise level within a rating curve establishes the Modified CNR). The uncorrected ratings are "i" for Site D, "h" for Sites C, E, F, and G, "g" for Sites A, B, J, and L, and "f" for Sites H, I, and K. The uncorrected ratings were adjusted for background noise using the calculated SPLs for the existing facility. The corrected ratings are "e" for Sites D and J and "d" for all other sites. The highest rating (i.e., "e") suggests that there would potentially be some community reaction to the construction activities if there were residential units adjacent to the facility. There are no residential areas located within 0.5 mile of the facility.

4.6.2 TRANSPORTATION IMPACTS

The proposed DCRRF expansion will be constructed over a 45-month period beginning in mid-1992 and concluding in commercial operation in early 1996. Construction activities will require an average of 98 construction workers. Manpower requirements will peak in 1993 when an estimated 223 workers will be required on the construction site. To provide a conservative estimate of potential transportation impacts during construction, an analysis was conducted for the peak labor force of 223 workers. This analysis provided a worst-case assessment of the capabilities of the roadways in the project vicinity to provide adequate construction access.

Access to the construction site will be provided by NW 97th Avenue. The most direct access for traffic traveling north or south of the site is the Palmetto Expressway [State Road (SR) 826]. Vehicles will exit the site southbound on NW 97th Avenue and most will travel east on NW 58th Street to the Palmetto Expressway. This traffic can also travel east on NW 58th Street to NW 79th Avenue or NW 87th Avenue and then south to NW 36th Street (see Figure 2.2-7). Vehicle traffic will include equipment and delivery traffic as well as traffic due to construction personnel entering and leaving the site. Equipment and delivery traffic was estimated at one vehicle for every four construction employees.

Transportation impacts on the external roadway system in the vicinity of the project site were evaluated during the peak construction phase. Since this peak construction phase is expected to occur in the third quarter of 1993, the analysis of construction impacts was conducted to reflect 1993 conditions.

During peak construction, an estimated 279 construction-related personnel will be on-site during the average work day. Construction activities were conservatively assumed to occur during one shift Monday through Friday, although multiple shifts are possible. A conservative vehicle occupancy rate of 1.0 person per vehicle was also used, resulting in a maximum 279 vehicles exiting the site during the p.m. peak hour.

To evaluate 1993 traffic conditions, 1993 background (nonconstruction) traffic was first estimated for the transportation impact area. This procedure involved increasing the 1989 existing afternoon peak-hour roadway link volumes by a 4-percent annual growth factor. This growth factor was based on historical growth patterns along the major roadways in Dade County.

Traffic distribution estimates were made by evaluating the following factors:

1. Location of the resident construction labor force in Dade County and the region,
2. Location of transient accommodations for short-term construction employees, and
3. Location of potential supply vendors within Dade County.

Based upon these distribution parameters, construction-related traffic was then added to the 1993 background traffic to obtain a 1993 total (with construction) traffic projection. Improvements programmed by Dade County through 1992 were also taken into consideration.

All construction-related traffic will exit the site onto NW 97th Avenue and then travel east via NW 58th Street to the Palmetto Expressway (SR 826). This will be the most direct route to areas north, south, and east of the site during the initial phase of construction (1992). A turnpike interchange at NW 41st Street is currently under construction and will provide an alternate route to the Palmetto Expressway (SR 826). Construction of the interchange is expected to be complete in late 1992. Because manpower requirements will peak in the third quarter of 1993, the interchange at NW 41st Street was considered in the afternoon peak hour vehicle distribution estimates. This route will provide access for construction employees who live in the populated areas of Broward County and southern Dade County.

Using the background and construction-related traffic estimates and directional distribution, roadway link conditions for 1993 were analyzed. Table 4.6-3 presents the results of this analysis. All roadway links in the vicinity of the project site (except the Palmetto Expressway/SR 826) will operate at Level of Service (LOS) D or better. The Palmetto Expressway will operate at LOS F with or without construction traffic. Because construction traffic on this facility represents approximately 0.4 percent of the LOS D service volume, construction impacts on the Palmetto Expressway will be negligible.

Table 4.6-3. Estimated 1993 Roadway Conditions in the Vicinity of DCRRF

Facility	Location	Direction/ Geometrics	1993 p.m. Peak Hour				LOS
			LOS D p.m. Peak Hour Service Volume	Background Traffic Volume	Construction Traffic Volume	Total Traffic Volume	
NW 58th Street	West of NW 97th Avenue	Eastbound/1L Westbound/1L	1,580	493	112	605	A
NW 58th Street	West of NW 87th Avenue	Eastbound/2L Westbound/2L	2,964	1,019	167	1,186	A
NW 58th Street	East of NW 84th Avenue	Eastbound/2L Westbound/2L	2,964	2,371	84	2,455	B
NW 58th Street	West of NW 72nd Avenue	Eastbound/2L Westbound/2L	2,964	1,422	31	1,453	A
NW 87th Avenue	North of NW 41st Street	Northbound/3L Southbound/3L	4,600	2,537	83	2,620	B
Palmetto Expressway/SR 826	North of NW 58th Street	Northbound/4L Southbound/4L	13,140	13,715	27	13,742	E
Palmetto Expressway/SR 826	North of NW 36th Street	Northbound/4L Southbound/4L	13,140	13,625	26	13,651	E
NW 102nd Avenue	South of NW 58th Street	Northbound/2L Southbound/2L	3,350	--	112	--	--
Florida Turnpike Extension	South of Okeechobee Road	Northbound/2L Southbound/2L	6,250	2,441	112	2,553	B
NW 36th Street	West of NW 87th Avenue	Eastbound/3L Westbound/3L	4,600	1,877	42	1,919	A
NW 41st Street (extension)	West of NW 102nd Avenue	Eastbound/2L Westbound/2L	--	--	112	--	--

Source: KBN, 1992.

4.7 IMPACT ON LANDMARKS AND SENSITIVE AREAS

As stated in Section 2.2.5, Regional Scenic, Cultural and Natural Landmarks, no regional scenic, cultural, or national landmarks are located in the 5-mile study radius.

4.8 IMPACT ON ARCHAEOLOGICAL AND HISTORIC SITES

Since no known archaeological or historic sites exist on the DCRRF site or are likely to exist within the project boundary, no impacts are expected to occur. In the event that an archaeological find is uncovered during the construction period, Birwelco-Montenay, Inc., will stop construction activities in the area directly impacting the archaeological find, and a professional archaeologist will be contacted to evaluate the significance of the find. The Florida Department of State, Division of Historical Resources (DHR) will be contacted with information on the find. Construction activities in the immediate area will continue after DHR review.

4.9 SPECIAL FEATURES

The Capital Expansion Project includes the use of an existing site, as well as existing and upgraded equipment, to provide new electrical generation. From an environmental impact standpoint, the expansion project substantially decreases environmental impacts relative to the construction of new facilities located on undisturbed sites. However, because there are existing facilities, integration of new, upgraded, and expanded facilities will require removal and renovation of some of the existing structures. The structures that will be removed include the air pollution control systems for Units 1 through 4. Some of these structures may contain asbestos which will have to be removed. Any removal of asbestos will be performed pursuant to the following applicable state and federal regulations:

1. FDER:
 - Chapter 17-2.670 National Emission Standards for Hazardous Air Pollutants
2. Florida Department of Professional Regulation (FDPR):
 - 455 Florida Statutes Licensing of Asbestos Consultants and Contractors
3. EPA:
 - 40 CFR 61, Subpart A, NESHAPs General Provisions
4. Occupation Safety and Health Administration (OSHA):
 - 29 CFR Part 1910, Section 1001, and 29 CFR Part 1926 Section 58, Occupational Exposure to Asbestos (tremolite, anthophyllite, and actinolite)
 - 29 CFR Part 1910, Section 134, Respirator Protection
 - 53 Federal Register (FR) 35610, Excursion Limit for Short-Term Exposure to Asbestos
5. U.S. Department of Transportation:
 - 49 CFR Parts 171 and 172, Transportation of Hazardous Materials

Birwelco-Montenay, Inc., will notify the agencies delegated to implement these regulations (i.e., FDER and DERM) prior to any removal of asbestos.

4.10 BENEFITS FROM CONSTRUCTION

The construction phase of the Capital Expansion Project will contribute both short- and long-term economic benefits to the surrounding region. Construction benefits will include the employment of construction workers, increased activity with local businesses catering to the needs of the construction work force, an increase in building materials purchases, and purchase or lease of equipment from businesses within the local economy. During the peak construction year of 1993, the Capital Expansion Project is expected to generate a total of 223 direct basic construction jobs. Chapter 7.0, Economic and Social Effects of Plant Construction and Operation, identifies specific details of the economic benefits generated from this project.

Environmental benefits from the Capital Expansion Project will result from the increased level of air pollution control at the facility. The two new boilers will be equipped with an air pollution control system consisting of a spray dryer/fabric filter system for particulate matter, acid gas, heavy metal, and dioxin/furan removal, a carbon adsorption system for mercury removal, and a thermal de-NO_x system for NO_x control. The system will be designed to meet all federal New Source Performance Standards for Municipal Waste Combustors, as contained in 40 CFR 60, Subpart Ea. Emissions of several pollutants will be limited to levels below the new source performance standards.

As described previously, once the two new boilers become operational, the four existing boilers will be retrofitted with new air pollution control systems. Each system will consist of a spray dryer/fabric filter system for particulate matter, acid gas, heavy metal, and dioxin/furan removal. The system will be designed to meet all federal emission guidelines for existing municipal waste combustors, as contained in 40 CFR 60, Subpart Ca. Maximum emissions of several pollutants will be below the emission guidelines. A mercury control system will also be installed on the existing boilers.

4.11 VARIANCES

No variances are required for the Capital Expansion Project.

4.12 REFERENCES

American National Standards Institute (ANSI). 1978. American National Standard Method for the Calculation of the Absorption of Sound by the Atmosphere. ASA23-1978.

New York State Department of Public Service (NYSDPS). 1986. NOISECALC: A Computer Program for Sound Propagation Calculations. Office of Energy Conservation and Environmental Planning.

U.S. Environmental Protection Agency (EPA). 1971. Noise from Construction Equipment and Operations, Building Equipment, and Home Appliances. Prepared by Bolt, Beranek, and Newman. Washington, DC.

5.0 EFFECTS OF PLANT OPERATION

5.1 EFFECTS OF THE OPERATION OF THE HEAT DISSIPATION SYSTEM

5.1.1 TEMPERATURE EFFECTS ON RECEIVING BODY OF WATER

No temperature effects on receiving bodies are anticipated since there will be no surface water discharge at the Dade County Resources Recovery Facility (DCRRF). Heat dissipation will be accomplished through the use of cooling towers as part of a near-zero-discharge system developed for the site.

5.1.2 EFFECTS ON AQUATIC LIFE

There is no aquatic life on this site so there will be no effect caused by the proposed expansion.

5.1.3 BIOLOGICAL EFFECTS OF MODIFIED CIRCULATION

There is little circulation of water in the melaleuca wetland. The current wetland is supplied by rain. Much of the wetland will be replaced with a water retention pond. There would be no water intakes placed into the pond. Excess water from other parts of the property would be channeled into this pond. Due to planned preventive measures, factors such as scouring, erosion, and deposition of suspended solids are not expected to cause major effects in the retention pond.

5.1.4 OFFSTREAM COOLING

No offstream cooling is proposed at DCRRF; cooling will be accomplished through the use of an additional cooling tower.

5.1.5 MEASUREMENT PROGRAMS

No measurement programs are proposed for the heat dissipation system, since a closed cooling system will be used.

5.2 EFFECTS OF CHEMICAL AND BIOCIDES DISCHARGES

5.2.1 INDUSTRIAL WASTEWATER DISCHARGES

The water system as planned will be a near-zero-discharge system. Maximum recycling and reuse of water on-site will occur. Therefore, only small wastewater quantities from the proposed DCRRF will remain for disposal. The only wastewater discharge will be sanitary wastewater to the sanitary sewer.

As described in Section 3.5.1, numerous processes that call for the reuse of treated and reclaimed water are featured in the DCRRF design. These include:

1. Use of reclaimed water and uncontaminated stormwater from the retention pond for cooling tower makeup,
2. Dilution of lime slurry using cooling tower blowdown, and
3. Use of cooling tower blowdown for general plant hosedown water.

The wastewater that remains after these reuse processes will be converted to a brine concentrate to be used for fly ash conditioning and fly ash quench water, and eventually disposed of with the ash in the on-site landfill. Most of the water used at the plant will be lost via evaporation and drift from cooling towers and the air quality control system spray dryer reactor.

During a shutdown of the wastewater treatment facility for maintenance or due to emergencies, wastewater will be routed to the county sanitary sewer for treatment in the regional treatment plant. The existing sanitary pump station on-site will remain operational for this purpose.

As discussed in Section 3.5, the stormwater management system for the DCRRF site includes independent stormwater systems for the existing and proposed ash landfill areas (approximately 80 acres) and the plant site (approximately 40 acres). The existing ash landfill will be closed and capped prior to the DCRRF expansion; therefore, sizing of the stormwater system assumes maximum impervious area. Runoff from the closed and capped landfill will be collected in dry detention swales for treatment of the first 0.5 inch of runoff, with overflow to a retention pond. The retention pond is sized so that there will be no overflow even during the 100-year, 72-hour storm; therefore, no surface water impacts are anticipated. New ash landfill cells within the 80-acre area will be constructed as part of the facility expansion. Runoff from these new cells

will be routed to the sanitary sewer until closure and capping, when runoff will be directed to the retention pond.

At the plant site, runoff from areas in which trash or garbage comes into contact with rainfall runoff will be treated in the same way as sanitary wastewater. Runoff will be routed to the surge pond for treatment in the wastewater treatment facility and ultimately for reuse in the cooling towers. No runoff of this type will be discharged off-site; therefore, no surface water impacts are anticipated.

Areas in which runoff may occasionally contact trash or garbage includes ramps that lead to the refuse receiving buildings and internal roadways used by solid waste handling vehicles. Contaminated runoff from these areas will be intercepted by a system of lined storage swales. The intercepted contaminated runoff will be pumped to the surge pond for reuse or disposed in the sanitary sewer.

Runoff from roofs, grassed areas, and parking lots will be routed into dry exfiltration trenches. No detrimental effects on shallow groundwater are anticipated from this noncontact stormwater, and much of the recharge capability of the site can be maintained for large storm events.

Overall, the proposed stormwater management system should reduce impacts from stormwater under existing conditions at the site because treatment of the most polluted fractions of runoff will be provided, and recharge capability can be maintained or restored through the use of exfiltration trenches for unpolluted runoff.

5.2.2 COOLING TOWER BLOWDOWN

Use of cooling tower blowdown for plant hosedown water and dilution of lime slurry is described in Section 3.5.1. The remainder of the cooling tower blowdown will be processed in the near-zero-discharge facility (brine concentrator). Because there will be no discharge of cooling tower blowdown off-site, no impacts are anticipated.

5.2.3 MEASUREMENT PROGRAMS

Because DCRRF will be a near-zero-discharge facility, with the only discharge to the sanitary sewer, no measurement programs are proposed.

5.3 IMPACTS ON WATER SUPPLIES

5.3.1 SURFACE WATER

No discharge of industrial wastewaters to surface waters is proposed. The only impacts to surface waters will be from the discharge of stormwater from the 40-acre plant site during storm events in excess of the 100-year, 72-hour storm, when the capacity of exfiltration trenches may be exceeded. Because overflows will be rare, no water quality impacts are anticipated. Design calculations for the landfill retention pond show that overtopping will not occur even during the 100-year, 72-hour storm event.

5.3.2 GROUNDWATER

5.3.2.1 CONSUMPTIVE USE IMPACTS

The present consumptive use of groundwater includes three onsite water supply wells that supply makeup water to the existing cooling tower. The wells provide a total of approximately 325 gallons per minute (gpm) [470,000 gallons per day (gpd)] to the plant under average conditions, with a peak withdrawal rate of approximately 1.4 million gallons per day (mgd). City water is used to supply the existing boilers at the facility because high concentrations of total dissolved solids in the wellwater preclude its use in the boilers. By comparison, the original site certification issued for the DCRRF in 1978 allowed a maximum withdrawal rate of 1.85 mgd.

The average makeup water demand rate for the expanded facility is 2.3 mgd. Under average conditions, 1.39 mgd would be withdrawn from the existing on-site wells to partially meet this demand. The remaining water required by the facility expansion will be provided by a combination of reused city water, treated leachate, and storm water. Under average conditions, 750,000 gallons per day of storm water would be withdrawn from the retention pond for use at the expanded facility. The expanded facility will require a peak withdrawal rate of 3.16 mgd from onsite wells, which would only occur during dry periods when use of water from the stormwater retention pond would not be possible.

As discussed in Section 2.3.2.1., the existing pumpage of wells at DCRRF creates only a limited cone of depression; the 1988 Environmental Science and Engineering, Inc. (ESE) study found that the cone of depression does not extend beyond 1,500 feet (ft) of the pumping well. No additional

impacts to groundwater from pumping are anticipated because the average pumping rate for the expanded facility (1.39 mgd) is expected to remain approximately the same as under existing conditions.

5.3.2.2 RETENTION/PERCOLATION POND IMPACTS

A 1988 site investigation concluded that potential sources of groundwater contamination at the DCRRF site included a low-lying area north of the facility that received stormwater runoff from a former ash load-out and storage area, and breaches in the landfill liner (ESE, 1988). The ash landfill will be closed and capped prior to the DCRRF expansion, and a retention pond will be constructed in the vicinity of the low-lying area to accommodate runoff from the capped landfill. This will result in an improvement in groundwater quality in the area, since the retention area will hold uncontaminated runoff from the capped landfill.

The existing lined pond that formerly stored landfill leachate will be removed and a lined surge pond will be constructed for storage of contaminated stormwater runoff, landfill leachate, and other wastewater streams from DCRRF. No impacts to groundwater quality are anticipated at the proposed surge pond because the liner will prevent infiltration.

As discussed in Section 2.3.2.1, local groundwater elevations and flow directions are predominantly controlled by water levels in canals in the vicinity, which recharge water to the Biscayne aquifer. These controls will not be changed by plant operation, and therefore no changes in groundwater elevation or flow direction will occur compared to existing conditions.

5.3.3 DRINKING WATER

As described in Section 3.5.1, numerous processes that call for the reuse of treated and reclaimed water are featured in the DCRRF plant design. The use of reclaimed water to satisfy many of the water requirements at the expanded plant will reduce the need for water that would otherwise be withdrawn from the Biscayne aquifer. Under plant expansion conditions, domestic and sanitary supply water will be approximately 5.4 gpm or 7,800 gpd. This is a very small quantity and will be supplied from city water [Metro-Dade Water and Sewer Authority Department (WASAD)]. As a result, the existing impacts to the Biscayne aquifer at the site will not increase under proposed operational conditions due to drinking water supply.

5.3.4 LEACHATE AND RUNOFF

Under existing conditions, leachate from the ash landfill is collected and pumped to the Metro-Dade sanitary sewer system. Prior to this practice, leachate was collected from beneath the landfill and diverted into an on-site leachate pond.

Under proposed conditions, the existing lined leachate pond will be removed and replaced with a new lined surge pond to store leachate, first-flush stormwater runoff from all but noncontact areas of the 40-acre plant site, all runoff from full contact areas of the 40-acre plant site, wastewater from processing and boiler area pumps, and collected liquor from garbage and trash pits. Wastewater from these areas will be treated and reused on-site to the maximum extent possible with any excess continuing to be discharged to the sanitary sewer for treatment by WASAD. This will result in a net reduction of discharges to the sanitary sewer. The upgrading of the leachate/surge pond and the storage and treatment of the first-flush stormwater runoff should result in an improvement in groundwater quality on-site compared to existing conditions.

Newly created ash landfill areas that are proposed as part of the expansion will be equipped with leachate/runoff collection systems. Initially, leachate and runoff will be directed to the sanitary sewer system. As landfill cells reach capacity and are closed and capped, runoff will be routed to the retention pond. This pond has been sized to include all landfill areas that may eventually be closed and capped.

5.3.5 MEASUREMENT PROGRAMS

A contamination assessment plan (CAP) has recently been approved for DCRRF as part of a settlement agreement between the Florida Department of Environmental Regulation (FDER), Dade County, and Montenay Power Corp. The CAP sets forth a groundwater monitoring plan for the facility. Relevant portions of the CAP are included in Appendix 10.8. When the contamination assessment is complete, which will be prior to completion of the DCRRF Capital Expansion Project (CEP), an operational monitoring plan will be developed.

5.4 SOLID/HAZARDOUS WASTE DISPOSAL IMPACTS

5.4.1 SOLID WASTE

The systems proposed for the handling and disposal of ash produced by the combustion of refuse-derived fuel (RDF) are described in Section 3.7. The ash will be stored in a fully enclosed ash building designed to accommodate 4 days of ash generation and loaded onto trucks to be disposed of in the on-site ash landfill.

Ash recycling and reuse programs under consideration by Metro-Dade Solid Waste Management include construction material applications (roadway construction, cement and concrete production) and vitrification of ash to produce raw material for insulation, block, fill, or aggregate (see Section 3.7.1). Metro-Dade Solid Waste Management is currently negotiating with a portland cement manufacturer concerning use of DCRRF ash as a raw material in the manufacture of portland cement. These recycling/reuse alternatives would reduce the demand for landfill space.

5.4.2 HAZARDOUS WASTE

The facility is not intended to process hazardous waste. However, hazardous compounds are potentially present in municipal solid waste. The generation of hazardous wastes from the resource recovery process will be minimized through treatment, segregation, and waste minimization practices. Any waste identified as hazardous will be handled according to regulatory requirements and transported off-site for disposal at a licensed hazardous waste facility. Procedures for handling hazardous waste are described in Section 3.7.2. As a result of these procedures, no impacts from hazardous waste disposal are expected.

5.5 SANITARY AND OTHER WASTEWATER DISCHARGES

It is estimated that sanitary facilities at the plant will be used by a maximum of 260 people per day, with an estimated discharge rate of 7,800 gpd of domestic sewage. The proposed means of disposal is by means of an on-site wastewater treatment plant or discharge to WASAD or by primary treatment, disinfection, and blending with well water for cooling tower makeup water. Because cooling tower blowdown will be processed in the near-zero-discharge plant, the latter means of disposal will cause no impacts to water resources. Disposal through a properly designed and maintained wastewater treatment system is also anticipated to cause no impacts to water resources.

5.6 AIR QUALITY IMPACTS

5.6.1 INTRODUCTION

For criteria pollutants, the proposed DCRRF expansion will result in emission reductions for sulfur dioxide (SO₂), particulate matter [PM₁₀ and PM(TSP)], and lead (Pb) and increases for carbon monoxide (CO), nitrogen oxides (NO_x), and volatile organic compounds (VOC). The increases for CO and NO_x will be above specified threshold amounts, which will require that a prevention of significant deterioration (PSD) review be performed for those pollutants under regulations promulgated by FDER and codified in Rule 17-2.500, Florida Administrative Code (F.A.C.). Since the original DCRRF site certification (ESE, 1977), the Everglades National Park Class I area has added additional acreage in the northeastern corner of the park, moving the eastern boundary closer to the DCRRF site. In addition to changes in the Everglades National Park, the proposed expansion will result in the existing retrofitted units' stack heights being increased from 150 to 250 ft. Due to the number of proposed significant changes at DCRRF and at the Everglades National Park, the air quality analysis was expanded to include the impacts for all emitted pollutants. An air quality permit application has been prepared and is included as Appendix 10.1.5. The application provides the technical information and analyses which were employed in the PSD impact analysis. An overview of the analysis presented in the application is provided in this section.

5.6.2 IMPACT ANALYSIS METHODOLOGY

The modeling approach followed U.S. Environmental Protection Agency (EPA) and FDER modeling guidelines for determining compliance with AAQS and allowable PSD increments. For determining compliance with ambient air quality standards (AAQS) and allowable PSD increments for applicable criteria pollutants, modeling credit is not automatically granted for existing stacks whose heights are increased above the de minimis good engineering practice (GEP) stack height of 213 ft (see Appendix 10.1.5., Section 3.4.1.3) Modeling results have, therefore, been provided for two cases:

1. The retrofitted units' stacks at 213 ft, and
2. The retrofitted units' stacks at their actual proposed height of 250 ft.

The Industrial Source Complex (ISC) dispersion model (EPA, 1988a) was used to evaluate the pollutant emissions from DCRRF and other existing major facilities. This model is contained in EPA's User's Network for Applied Modeling of Air Pollution (UNAMAP), Version 6 (EPA,

1988b). The ISC model is applicable to sources located in either flat or rolling terrain where terrain heights do not exceed stack heights. EPA regulatory options were used in the ISC Short-Term (ISCST) model to address maximum impacts. Based on a review of the land use around the DCRRF site, the rural mode was selected based on the limited areas of high-density residential, industrial, and commercial development within a 3-kilometer (km) radius of this site.

Emission inventories were developed which include the expanded DCRRF's six units plus all other major facilities within 50 km of the DCRRF site. The criteria pollutants for which the expanded DCRRF produces a significant impact are SO₂ and NO_x. Therefore, a detailed impact analysis has been performed for these two pollutants. The maximum pollutant impacts from only the expanded DCRRF are presented for all other emitted pollutants. An inventory of all SO₂ and NO_x emitting facilities within 50 km of the DCRRF site is presented in Appendix 10.1.5, Tables 6-2 and 6-3. Data for all other facilities were developed from the FDER's 1991 Air Pollutant Information System (APIS) reports, supplemented by existing source permits and other recent modeling analyses performed in the area. The source parameters acquired for the modeling included the emission rates for each applicable averaging time, the stack height and diameter, and operational parameters of exit gas velocity and temperature.

In order to predict the maximum PSD increment-consumption in the vicinity of the DCRRF site, an emission inventory of all PSD increment-consuming (or increment-expanding) sources was developed. The inventory included DCRRF and all other SO₂ and NO_x increment-consuming (or increment-expanding) sources within 50 km of the DCRRF site. For predicting maximum concentrations at the Everglades National Park, a PSD Class I area, the PSD source emission inventories referred to previously were expanded to include all PSD increment-consuming or increment-expanding sources within 100 km from the Everglades National Park.

Receptor locations used for the modeling were selected in conformance with EPA guidelines. All air quality impacts to be compared to air quality standards were determined using an appropriate receptor spatial coverage and receptor density. The DCRRF site is restricted to public access through fencing and guard gates. In accordance with EPA policy, receptors are not located within this restricted access area.

The modeling analyses include the effects of aerodynamic downwash that may be caused by buildings and structures on the DCRRF site. Each stack was evaluated to determine if it was less

than GEP stack height. If a stack was less than GEP, then building downwash conditions were modeled from that stack. All significant existing and proposed DCRRF buildings or structures, along with their heights (shown in parentheses in feet), were evaluated for their potential to cause downwash from DCRRF's stacks. Based on the building downwash analysis, appropriate building dimensions (i.e., height, length, and width) were incorporated into the modeling analysis for each existing and proposed DCRRF stack. The methods used in this analysis followed those recommended by the EPA and FDER.

Meteorological data used in the ISCST model to determine air quality impacts consisted of a concurrent 5-year period of hourly surface weather observations and twice-daily upper air soundings from the National Weather Service (NWS) stations at Miami International Airport and West Palm Beach, respectively. The 5-year period of meteorological data was from 1982 through 1986. The NWS station at Miami International Airport, located approximately 10 km southeast of the DCRRF site, was selected for use in the study because it is the closest primary weather station to the study area and is most representative of the plant site. The surface observations included wind direction, wind speed, temperature, cloud cover, and cloud ceiling.

Background air quality concentrations for use in the modeling were obtained from existing air quality monitors operating in the vicinity of the DCRRF site. The monitors evaluated are part of the Dade County Ambient Monitoring Network. EPA recommended methods were employed to quantify the background levels for each pollutant and averaging time.

The impact analysis required under PSD review also addressed the impacts of emissions from the proposed project upon air quality related values (AQRVs) of the Everglades National Park Class I area. An impact analysis on AQRVs was performed because the DCRRF site is located within 100 km of the Everglades National Park. Potential visibility impairment due to proposed expansion was also evaluated. Methods recommended in the Workbook For Plume Visual Impact Screening and Analysis (EPA, 1988c) were followed.

The additional impact analysis of the impairment to soils and vegetation that would occur as a result of associated growth in the area was also addressed. To address such impacts, soil and vegetation types in the vicinity of the DCRRF site were identified. A literature review was conducted to identify the most recent data concerning threshold effect levels for the soil and vegetation types. An assessment of the impacts of air emissions on these soil and vegetation types

was then prepared. Effects of growth associated with the project were addressed qualitatively, including impacts due to secondary emissions (i.e., emissions occurring as a result of the general commercial, residential, industrial, and other associated growth).

5.6.3 MODELING RESULTS

Editor's Note: Modeling results are presented in this section for two cases:

1. Retrofitted Units 1-4 at the creditable GEP stack height of 213 ft plus the new stack for Units 5 and 6 at 250 ft; and
2. Retrofitted Units 1-4 at the actual stack height of 250 ft plus the new stack for Units 5 and 6 at 250 ft. In the text, the 250-ft stack case results are presented in brackets.

5.6.3.1 DCRRF ONLY

The maximum impacts for DCRRF only are summarized in Table 5.6-1. As shown, the facility's maximum annual, 3-hour, and 24-hour predicted SO₂ concentrations are 3.5 [2.8], 177 [140], and 49 [30] micrograms per cubic meter ($\mu\text{g}/\text{m}^3$), respectively. The maximum predicted annual nitrogen dioxide (NO₂) concentration is 9.2 [7.0] $\mu\text{g}/\text{m}^3$. The maximum SO₂ and NO_x impacts are above the significant impact levels established by EPA and FDER.

The maximum predicted PM [PM₁₀ and PM(TSP)] annual and 24-hour concentrations are 0.47 [0.38] and 6.6 [3.9] $\mu\text{g}/\text{m}^3$, respectively. The maximum predicted CO 1-hour and 8-hour concentrations are 548 [422] and 78 [44] $\mu\text{g}/\text{m}^3$, respectively. All PM and CO impacts are below the respective significant impact levels except for one 24-hour period for PM, which occurs on the DCRRF plant property boundary, modeled with the retrofitted units' stacks at 213 ft.

The maximum predicted Pb concentration is 0.13 [0.13] $\mu\text{g}/\text{m}^3$, which is well below the AAQS of 1.5 $\mu\text{g}/\text{m}^3$ for this pollutant.

5.6.3.2 AAQS ANALYSIS

The maximum SO₂ and NO₂ AAQS impacts in the vicinity of the expanded DCRRF plant are summarized in Table 5.6-2. The maximum annual, 3-hour, and 24-hour SO₂ concentrations, including appropriate background concentrations, are 17 [17], 290 [290], and 104 [104] $\mu\text{g}/\text{m}^3$, respectively, which are below the respective Dade County AAQS of 25, 350, and 110 $\mu\text{g}/\text{m}^3$. The Dade County AAQS are more stringent than the State of Florida SO₂ AAQS. The maximum

was then prepared. Effects of growth associated with the project were addressed qualitatively, including impacts due to secondary emissions (i.e., emissions occurring as a result of the general commercial, residential, industrial, and other associated growth).

5.6.3 MODELING RESULTS

Editor's Note: Modeling results are presented in this section for two cases:

1. The retrofitted Units 1-4 at the creditable GEP height of 213 ft; and
2. The retrofitted Units 1-4 at the actual stack height of 250 ft. In the text, the 250-ft stack case results are presented in brackets.

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The maximum impacts for DCRRF only are summarized in Table 5.6-1. As shown, the facility's maximum annual, 3-hour, and 24-hour predicted SO₂ concentrations are 3.5 [2.8], 177 [140], and 49 [30] micrograms per cubic meter ($\mu\text{g}/\text{m}^3$), respectively. The maximum predicted annual nitrogen dioxide (NO₂) concentration is 9.2 [7.0] $\mu\text{g}/\text{m}^3$. The maximum SO₂ and NO_x impacts are above the significant impact levels established by EPA and FDER.

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5.6.3.2 AAQS ANALYSIS

The maximum SO₂ and NO₂ AAQS impacts in the vicinity of the expanded DCRRF plant are summarized in Table 5.6-2. The maximum annual, 3-hour, and 24-hour SO₂ concentrations, including appropriate background concentrations, are 17 [17], 290 [290], and 104 [104] $\mu\text{g}/\text{m}^3$, respectively, which are below the respective Dade County AAQS of 25, 350, and 110 $\mu\text{g}/\text{m}^3$. The Dade County AAQS are more stringent than the State of Florida SO₂ AAQS. The maximum

Table 5.6-1. Results of Modeling Analysis of Expanded DCRRF Only

Pollutant	Averaging Period	Maximum Predicted Concentration ^a ($\mu\text{g}/\text{m}^3$)		Significance Level
		Case 1	Case 2	
SO ₂	3-hour ^b	177	140	25
	24-hour ^b	49	30	5
	Annual	3.5	2.8	1
NO ₂	Annual	9.2	7.0	1
PM(TSP)	24-hour ^b	6.6	3.9	5
	Annual	0.47	0.38	1
PM10	24-hour ^b	6.6	3.9	5
	Annual	0.47	0.38	1
CO	1-hour ^b	548	422	2,000
	8-hour ^b	78	44	500
Pb	Calendar quarter ^c	0.13	0.13	NA

Note: NA = Not applicable.

^a Case 1 represents the impacts from the proposed units with stack height at 250 ft and the retrofitted units with stack heights at 213 ft. Case 2 represents the impacts from the proposed units and the retrofitted units, all with stack heights of 250 ft above grade.

^b All short-term concentrations are highest predicted concentrations.

^c Concentration is highest predicted annual value times 4, plus a background concentration of 0.1 $\mu\text{g}/\text{m}^3$. The AAQS for Pb is 1.5 $\mu\text{g}/\text{m}^3$.

Source: KBN, 1992.

Table 5.6-2. Maximum SO₂ and NO₂ Concentrations Compared With AAQS

Averaging Time	Year	Concentration ($\mu\text{g}/\text{m}^3$)			Receptor Location ^a		Worst Day/Period	AAQS ($\mu\text{g}/\text{m}^3$)	
		Total	Modeled	Background	Direction (degrees)	Distance (m)		Florida	Dade County
Sulfur Dioxide									
Retrofitted Units 1-4 Stacks at 213 ft Plus New Units 5 and 6 Stack at 250 ft									
Annual	1986	17	14	3	360	20000	-	60	25
24-Hour ^b	1984	104	95	9	60	20000	345/1	260	110
3-Hour ^b	1985	290	253	37	224	495	258/6	1,300	350
Retrofitted Units 1-4 Stacks at 250 ft Plus New Units 5 and 6 Stack at 250 ft									
Annual	1986	17	14	3	360	20000	-	60	25
24-Hour ^b	1984	104	95	9	60	20000	345/1	260	110
3-Hour ^b	1985	290	253	37	224	495	258/6	1,300	350
Nitrogen Dioxide									
Retrofitted Units 1-4 Stacks at 213 ft Plus New Units 5 and 6 Stack at 250 ft									
Annual	1982	47	14	33	288	486	-	100	NA
Retrofitted Units 1-4 Stacks at 250 ft Plus New Units 5 and 6 Stack at 250 ft									
Annual	1982	44	11	33	288	486	-	100	NA

^aRelative to the location of the proposed Units 5 and 6 stack.^bAll short-term concentrations are highest, second-highest concentrations.

Source: KBN, 1992.

Table 5.6-2. Maximum SO₂ and NO₂ Concentrations Compared With AAQS

Averaging Time	Year	Concentration ($\mu\text{g}/\text{m}^3$)			Receptor Location ^a		Worst Day/Period	AAQS ($\mu\text{g}/\text{m}^3$)	
		Total	Modeled	Background	Direction (degrees)	Distance (m)		Florida	Dade County
Sulfur Dioxide									
Retrofitted Units 1-4 Stacks at 213 ft									
Annual	1986	17	14	3	360	20000	-	60	25
24-Hour ^b	1984	104	95	9	60	20000	345/1	260	110
3-Hour ^b	1985	290	253	37	224	495	258/6	1,300	350
Retrofitted Units 1-4 Stacks at 250 ft									
Annual	1986	17	14	3	360	20000	-	60	25
24-Hour ^b	1984	104	95	9	60	20000	345/1	260	110
3-Hour ^b	1985	290	253	37	224	495	258/6	1,300	350
Nitrogen Dioxide									
Retrofitted Units 1-4 Stacks at 213 ft									
Annual	1982	47	14	33	288	486	-	100	NA
Retrofitted Units 1-4 Stacks at 250 ft									
Annual	1982	44	11	33	288	486	-	100	NA

^aRelative to the location of the proposed Units 5 and 6 stack.

^bAll short-term concentrations are highest, second-highest concentrations.

Source: KBN, 1992.

NO₂ concentration of 47 [44] µg/m³ is in compliance with the State of Florida AAQS of 100 µg/m³. The results indicate that the maximum SO₂ and NO_x concentrations will not exceed the AAQS at any location in the vicinity of DCRRF.

5.6.3.3 PSD CLASS II ANALYSIS

The maximum SO₂ and NO_x PSD increment consumption in the vicinity of the expanded DCRRF plant are summarized in Table 5.6-3. The maximum SO₂ annual, 3-hour, and 24-hour predicted increment consumption of 4.0 [3.3], 163 [121], and 49 [48] µg/m³, respectively, are below the allowable PSD Class II increments of 20, 512, and 91 µg/m³. The maximum NO₂ PSD Class II increment consumed is 6 [7] µg/m³, which is below the allowable increment of 25 µg/m³.

These results indicate that the maximum SO₂ and NO_x PSD Class II increment consumption will not exceed the allowable PSD increments for those pollutants.

5.6.3.4 PSD CLASS I ANALYSIS

The maximum SO₂ and NO_x PSD increment consumption within the Everglades National Park Class I area is summarized in Table 5.6-4. The maximum SO₂ PSD Class I annual, 3-hour, and 24-hour increment consumption is 1.1 [1.0], 22.8 [15.5], and 4.1 [4.1] µg/m³, respectively. These impacts are below the allowable PSD Class I increments of 2, 25, and 5 µg/m³, respectively. The maximum NO₂ PSD Class I increment consumption is 0.64 [0.52] µg/m³, which is below the allowable increment of 2.5 µg/m³. The proposed expansion along with other increment consuming sources will therefore meet all allowable PSD increments in the Class I area.

5.6.3.5 TOXIC IMPACT ANALYSIS

The maximum impacts of regulated and nonregulated toxic air pollutants that will be emitted by DCRRF are summarized in Table 5.6-5. The maximum 8-hour, 24-hour, and annual impact for each pollutant is compared to the respective FDER no-threat level (NTL). As indicated in the table, all toxic pollutant impacts will be below the short-term (i.e., 8-hour and 24-hour) NTL, and all pollutants except dioxin/furan will be below the annual NTL. Maximum predicted deposition rates for non-gaseous pollutants due to the expanded DCRRF only are presented in Table 5.6-6. Maximum predicted air concentrations and deposition rates at the Everglades National Park

Table 5.6-3. Maximum SO₂ and NO₂ Concentrations Compared With PSD Class II Increments

Averaging Time	Year	Concentration ($\mu\text{g}/\text{m}^3$)	Receptor Location ^a		Worst Day/Period	Allowable PSD Increment ($\mu\text{g}/\text{m}^3$)
			Direction (degrees)	Distance (m)		
Sulfur Dioxide						
<u>Retrofitted Units 1-4 Stacks at 213 ft Plus New Units 5 and 6 Stack at 250 ft</u>						
Annual	1982	4.0	288	486	-	20
3-Hour ^b	1983	163	110	400	60/7	512
24-Hour ^b	1985	49	342	4,800	32/1	91
<u>Retrofitted Units 1-4 Stacks at 250 ft Plus New Units 5 and 6 Stack at 250 ft</u>						
Annual	1986	3.3	268	463	-	20
3-Hour ^b	1983	121	110	500	60/7	512
24-Hour ^b	1985	48	342	4,800	32/1	91
Nitrogen Dioxide						
<u>Retrofitted Units 1-4 Stacks at 213 ft Plus New Units 5 and 6 Stack at 250 ft</u>						
Annual	1982	6	246	506	-	25
<u>Retrofitted Units 1-4 Stacks at 250 ft Plus New Units 5 and 6 Stack at 250 ft</u>						
Annual	1986	7	264	465	-	25

^aRelative to the location of the proposed Units 5 and 6 stack.^bAll short-term concentrations are highest, second-highest concentrations.

Source: KBN, 1992.

Table 5.6-3. Maximum SO₂ and NO₂ Concentrations Compared With PSD Class II Increments

Averaging Time	Year	Concentration ($\mu\text{g}/\text{m}^3$)	Receptor Location ^a		Worst Day/Period	Allowable PSD Increment ($\mu\text{g}/\text{m}^3$)
			Direction (degrees)	Distance (m)		
Sulfur Dioxide						
<u>Retrofitted Units 1-4 Stacks at 213 ft</u>						
Annual	1982	4.0	288	486	-	20
3-Hour ^b	1983	163	110	400	60/7	512
24-Hour ^b	1985	49	342	4,800	32/1	91
<u>Retrofitted Units 1-4 Stacks at 250 ft</u>						
Annual	1986	3.3	268	463	-	20
3-Hour ^b	1983	121	110	500	60/7	512
24-Hour ^b	1985	48	342	4,800	32/1	91
Nitrogen Dioxide						
<u>Retrofitted Units 1-4 Stacks at 213 ft</u>						
Annual	1982	6	246	506	-	25
<u>Retrofitted Units 1-4 Stacks at 250 ft</u>						
Annual	1986	7	264	465	-	25

^aRelative to the location of the proposed Units 5 and 6 stack.^bAll short-term concentrations are highest, second-highest concentrations.

Source: KBN, 1992.

Table 5.6-4. Maximum Impacts at Everglades National Park Compared With PSD Class I Increments

Averaging Time	Year	Concentration (µg/m³)	Receptor Location ^a		Allowable Worst Day/Period	PSD Increment (µg/m³)
			X (m)	Y (m)		
Sulfur Dioxide						
<u>Retrofitted Units 1-4 Stacks at 213 ft Plus New Units 5 and 6 Stack at 250 ft</u>						
Annual	1983	1.1	544000	2848600	-	2
24-Hour ^b	1983	4.1	549000	2848600	333/1	5
3-Hour ^b	1983	22.8	549000	2848000	251/7	25
<u>Retrofitted Units 1-4 Stacks at 250 ft Plus New Units 5 and 6 Stack at 250 ft</u>						
Annual	1983	1.0	543000	2848000	-	2
24-Hour ^b	1983	4.1	549000	2848600	333/1	5
3-Hour ^b	1984	15.5	547000	2848600	251/7	25
Nitrogen Dioxide						
<u>Retrofitted Units 1-4 Stacks at 213 ft Plus New Units 5 and 6 Stack at 250 ft</u>						
Annual	1982	0.64	544000	2848600	-	2.5
<u>Retrofitted Units 1-4 Stacks at 250 ft Plus New Units 5 and 6 Stack at 250 ft</u>						
Annual	1982	0.52	543000	2848600	-	2.5

^a UTM coordinates.^b All short-term concentrations are highest, second-highest concentrations.

Source: KBN, 1992.

Table 5.6-4. Maximum Impacts at Everglades National Park Compared With PSD Class I Increments

Averaging Time	Year	Concentration (µg/m³)	Receptor Location ^a		Allowable Worst Day/Period	PSD Increment (µg/m³)
			X (m)	Y (m)		
Sulfur Dioxide						
<u>Retrofitted Units 1-4 Stacks at 213 ft</u>						
Annual	1983	1.1	544000	2848600	-	2
24-Hour ^b	1983	4.1	549000	2848600	333/1	5
3-Hour ^b	1983	22.8	549000	2848000	251/7	25
<u>Retrofitted Units 1-4 Stacks at 250 ft</u>						
Annual	1983	1.0	543000	2848000	-	2
24-Hour ^b	1983	4.1	549000	2848600	333/1	5
3-Hour ^b	1984	15.5	547000	2848600	251/7	25
Nitrogen Dioxide						
<u>Retrofitted Units 1-4 Stacks at 213 ft</u>						
Annual	1982	0.64	544000	2848600	-	2.5
<u>Retrofitted Units 1-4 Stacks at 250 ft</u>						
Annual	1982	0.52	543000	2848600	-	2.5

^a UTM coordinates.^b All short-term concentrations are highest, second-highest concentrations.

Source: KBN, 1992.

Table 5.6-5. Maximum Toxic Pollutant Impacts^a for the Expanded DCRRF

Pollutant	Maximum Emissions (lb/hr)	Concentration ($\mu\text{g}/\text{m}^3$)					
		8-Hr		24-Hr		Annual	
		Impact	NTL	Impact	NTL	Impact ($\times 10^{-5}$)	NTL ($\times 10^{-5}$)
Arsenic (As)	0.0164	0.003	2	0.002	0.48	14	23
Benzo(a)pyrene	0.003	0.0005	NA	0.0003	NA	2.5	30
Beryllium (Be)	0.0082	0.001	0.02	0.001	0.0048	0.7	42
Cadmium (Cd)	0.0416	0.006	0.5	0.005	0.12	35	56
Chlorobenzene	0.0034	0.0005	460	0.0004	110.4	2.9	NA
Chlorophenol	0.00376	0.0006	5	0.0004	1.2	3.2	83
Chromium (metal)	0.083	0.013	5	0.009	1.2	71	1×10^8
Chromium + 6	0.0036	0.0005	0.5	0.0004	0.12	3.1	8.3
Copper	0.083	0.013	1	0.009	0.24	71	NA
Dioxin/Furan	6.4×10^{-5}	1.1×10^{-5}	NA	7.6×10^{-6}	NA	0.052	0.0022
Fluoride (F)	1.52	0.23	25	0.17	6	1,298	NA
Formaldehyde	0.0263	0.004	4.5	0.003	1.08	22	7,700
Hydrogen Chloride ^b	167.6	22	70	16.4	16.8	141,700	700,000
Manganese (Mn)	1.88	0.3	50	0.2	12	1,606	NA
Mercury (Hg)	0.21	0.03	0.5	0.02	0.12	179	30,000
Molybdenum	0.0083	0.001	50	0.0009	12	7	N/A
Nickel (Ni)	0.0083	0.001	0.5	0.0009	0.12	7	420
Polychlorinated Biphenyls (PCBs)	0.034	0.005	5	0.004	1.2	29	83
Selenium (Se)	0.075	0.01	2	0.008	0.48	64	NA
Sulfuric Acid Mist	15.4	2.3	10	1.7	2.38	13,123	NA

Note: NTL = no-threat level.

Highest predicted concentrations ($\mu\text{g}/\text{m}^3$) for a 10 g/s (79.365 lb/hr) emission rate:

Units 1&2

8-Hour = 12.81182

24-Hour = 9.56507

Annual = 0.61269

Units 3&4

8-Hour = 13.54771

24-Hour = 9.35260

Annual = 0.67820

Units 5&6

8-Hour = 10.42988

24-Hour = 7.77730

Annual = 0.72212

^a Maximum concentrations = Unit 1&2 Maximum + Unit 3&4 Maximum + Unit 5&6 Maximum.^b Maximum concentrations determined with ISCST model and Miami meteorological data for 1982 to 1986.

Source: KBN, 1992.

Table 5.6-6. Maximum Predicted Annual Pollutant Deposition Rates for the Expanded DCRRF

Pollutant	Maximum Emission Rate ^a (lb/hr)		Total Facility Emissions (lb/hr)	Annual Deposition (g/m ²)
	Units 1-4	Units 5-6		
PM (TSP, PM10)	6.61	9.20	44.84	1.4
Lead	0.10	0.14	0.68	0.021
Arsenic (As)	0.0024	0.0034	0.0164	5.0x10 ⁻⁴
Beryllium (Be)	0.00012	0.00017	0.00082	2.5x10 ⁻⁵
Cadmium (Cd)	0.0061	0.0086	0.0416	0.0013
Chromium (Cr)	0.012	0.018	0.083	0.0025
Chromium + 6 (Cr)	0.0005	0.0007	0.0036	1.1x10 ⁻⁴
Copper	0.012	0.0171	0.083	0.0025
Dioxin/Furan	1.57x10 ⁻⁵	7.33x10 ⁻⁷	6.4x10 ⁻⁵	1.8x10 ⁻⁶
Fluorides (F)	0.22	0.32	1.52	0.046
Formaldehyde	0.0038	0.0056	0.0263	8.0x10 ⁻⁴
Manganese (Mn)	0.27	0.40	1.88	0.057
Mercury (Hg)	0.031	0.043	0.21	0.0063
Molybdenum	0.0012	0.0017	0.0083	2.5x10 ⁻⁴
Nickel (Ni)	0.0012	0.0017	0.0083	2.5x10 ⁻⁴
Selenium (Se)	0.011	0.016	0.075	0.0023

Note: A generic deposition rate of 1,000 g/hr for each stack produces the following annual deposition rates per stack.

Units 1&2 + Units 3&4 - 0.12107 g/m²

Units 5&6 - 0.07511 g/m².

^a Emission rates are per unit.

Source: KBN, 1992.

18.4
26.44
44.84

Class I area due to the expanded DCRRF are presented in the PSD permit application, Appendix 10.1.5. This information was used to assess impacts to AQRVs in the Everglades National Park.

A previous health risk assessment was performed for the existing DCRRF, with four RDF-fixed boilers operating (Malcolm Pirnie, 1990). The maximum pollutant emission rates, ambient concentrations, and deposition rates reported in this risk assessment are presented in Table 5.6-7. For comparison, the maximum predicted values for the expanded DCRRF, as presented in this PSD report, are also shown in the table. The comparison shows that the maximum ambient concentration for each pollutant will be lower for the expanded facility.

In the case of deposition rates, the Malcolm Pirnie study used a simplified approach to predicting deposition by using predicted ambient concentrations and applying a single deposition velocity to the concentrations. The deposition rates predicted in the current study by the ISCST model are higher than the Malcolm Pirnie study results. In reality, the expanded DCRRF will result in lower emissions for all metals and dioxin/furans, as shown in Table 5.6-7. In addition, control of fine particulate emissions will be much improved by the use of a fabric filter control system versus the current electrostatic precipitators (ESP). As a result, potential deposition impacts should decrease as compared to the present facility.

The Malcolm Pirnie study concluded that the incremental cancer risk associated with exposure to facility emissions, using three plausible exposure models, was approximately 1 additional cancer case per 1,000,000 persons exposed. The expanded facility, due to predicted lower ambient and deposition impacts, should lower this potential risk.

Table 5.6-7. Comparison of Emission Rates and Impacts From Previous Health Risk Assessment

Pollutant	Malcolm Pirnie Risk Assessment (June 1990)			Present Study		
	Emission ^a	Maximum Annual	Maximum	Emission ^a	Maximum Annual	Maximum
	Rate (lb/hr)	Average Impact (10 ⁻⁵ µg/m ³)	Deposition Rate (10 ⁻⁵ g/m ² /yr)	Rate (lb/hr)	Average Impact (10 ⁻⁵ µg/m ³)	Deposition Rate (10 ⁻⁵ g/m ² /yr)
Arsenic	0.029	22	7.7	0.0164	14	50
Beryllium	0.0048	3.7	1.3	0.00082	0.7	2.5
Cadmium	0.056	43	15	0.0416	35	130
Chromium +6	0.0041	3.2	1.1	0.0036	3.1	11
Copper	0.089	68	24.0	0.083	71	250
Lead	2.21	1700	590	0.68	575	750
Mercury	0.25	190	66	0.21	179	630
Molybdenum	0.0097	7.4	2.6	0.0083	7.0	25
Nickel	0.0097	7.4	2.6	0.0083	7.0	25
Dioxins/Furans:						
Total	58.1x10 ⁻⁵	-	-	6.4x10 ⁻⁵	0.052	0.18
ITEF equivalent	1.21x10 ⁻⁵	0.0093	0.0032	0.23x10 ⁻⁵ ^b	0.0019	0.0064

^a Represents annual average emission rate.^b Using a toxic equivalency conversion factor of 0.0357 (1/28).

Source: KBN, 1992.

5.7 NOISE

5.7.1 IMPACTS TO ADJACENT PROPERTIES

5.7.1.1 EXISTING AND PROPOSED NOISE SOURCES

The existing and proposed noise sources and their octave band and overall sound pressure levels (SPLs) are listed in Table 5.7-1. Existing sources include Boilers 1 and 2, Boilers 3 and 4, the turbine hall, the ferrous recovery building, and the four-cell cooling tower. Noise levels of the existing sources were measured using the procedures described in Section 2.3.8.2.

In addition, new equipment will be added which will also emit noise. These new noise sources include the new boilers, turbine generator building, and the new cooling tower (see Table 5.7-1).

5.7.1.2 NOISE IMPACT METHODOLOGY

The impact evaluation of the existing and new noise sources associated with the DCRRF CEP was performed using the NOISECALC computer program, developed by the New York State Department of Public Service (NYDPS, 1986) to assist with noise calculations for major power projects. Noise sources are entered as octave band SPLs. Coordinates, either rectangular or polar, can be specified by the user.

All noise sources are assumed to be point sources; line sources can be simulated by several point sources. Sound propagation is calculated by accounting for hemispherical spreading and three other user-identified attenuation options: atmospheric attenuation, path-specific attenuation, and barrier attenuation. Atmospheric attenuation is calculated using the data specified by the American National Standard Institute (ANSI) Method for the Calculation of the Absorption of Sound by the Atmosphere (ANSI, 1978). Path-specific attenuation can be specified to account for the effects of vegetation, foliage, and wind shadow. Directional source characteristics and reflection can be simulated using path-specific attenuation. Attenuation due to barriers can be specified by giving the coordinates of the barrier. Barrier attenuation is calculated by assuming an infinitely long barrier perpendicular to the source-receptor path. Total and A-weighted SPLs are calculated. Background noise levels are incorporated into the program, whenever possible, and are used to calculate overall SPLs.

NOISECALC was performed to predict the maximum noise levels produced by the proposed and existing noise sources, with and without background noise levels, at the facility's property

Table 5.7-1. SPLs of Proposed and Existing Major Noise Sources at DCRRF

Sources	Octave SPL (dB)										SPL (dB)	SPL(A) (dBA)
	31.5	63	125	250	500	1000	2000	4000	8000	16000		
New Boiler ^a	107.0	106.0	101.0	95.0	94.0	92.0	90.0	90.0	90.0	0.0	110.52	98.44
New Turbine ^a	111.0	117.0	115.0	110.0	106.0	102.0	99.0	91.0	85.0	0.0	120.45	108.45
New Cooling Tower ^a	119.0	122.0	122.0	119.0	116.0	112.0	109.0	106.0	99.0	0.0	127.36	118.21
Boilers 1 & 2 ^b	112.1	116.8	118.9	111.8	103.2	104.0	103.2	100.4	93.0	80.8	112.19	110.78
Boilers 3 & 4 ^b	112.1	116.8	118.9	111.8	103.2	104.0	103.2	100.4	93.0	80.8	112.19	110.78
Turbine Hall ^b	109.0	112.0	112.8	104.8	100.6	100.0	97.9	100.2	94.5	83.0	116.97	106.82
Cooling Tower ^b	114.5	112.4	109.0	103.7	101.4	96.9	93.6	93.1	92.3	83.8	117.62	103.78

^aAll new sources estimated using data provided by the manufacturers and EEI Electric Power Plant Environmental Noise Guide.

^bAll existing major sources measured by KBN.

Source: KBN, 1992.

boundary. Only atmospheric attenuation was assumed. The source data used in the analysis are contained in Table 5.7-1. Background and average L_{eq} levels were input to calculate the maximum SPL impacts at each property boundary receptor.

The receptors selected for the analysis consisted of the 12 locations around the facility's property line (see Figure 4.6-1). These various receptors represent selected points at which the noise generated by the facility's operations exits the property. Although there are no federal or state noise limits regulating the operations of the facility, the noise impacts of the new facility were compared to guidelines issued by EPA.

5.7.1.3 RESULTS

5.7.1.3.1 Comparison to EPA Criteria

The EPA criteria identify recommended ambient noise levels for activity interference [i.e., an average day-night A-weighted SPL (L_{dn}) of 55 A-weighted decibels (dBA)] and hearing loss considerations (i.e., an average 24-hour L_{eq} of 70 dBA). The predicted maximum L_{dn} values, with and without the proposed facility, at the property boundary are presented in Table 5.7-2. Assuming that the background conditions remain constant throughout the day at each of the 12 property line receptors, the maximum calculated L_{dn} increase, due to the new facility, ranges from 3.9 dBA at Site L to 0.8 dBA at Site F. All calculated L_{dn} values exceed the EPA-recommended L_{dn} noise level of 55 dBA.

The maximum calculated average 24-hour L_{eq} values at the property boundary with the operation of the existing and new units are presented in Table 5.7-3. For all the property line receptors, the 24-hour average L_{eq} values are below the recommended hearing loss threshold of 70 dBA.

5.7.1.3.2 Community Noise Criteria

The potential noise impact of DCRRF after expansion was also evaluated against the Community Noise Criteria described in Section 2.3.8.1. The uncorrected community ratings were determined by comparing the predicted octave band noise levels from NOISECALC with the Modified Community Noise Rating (CNR) curves. The uncorrected ratings developed using the impacts of the expanded facility ranged from "h" for Sites F and G, "g" for Sites C, D, and E, "f" for Sites A, B, H, I, J, and L, and "e" for Site K. The uncorrected ratings were adjusted for background noise using the calculated values for the existing facility. The corrected ratings were calculated to

Table 5.7-2. DCRRF Noise Day-Night (L_{dn}) Calculations

	Noise Monitoring Site No.											
	A	B	C	D	E	F	G	H	I	J	K	L
<u>Existing Facility L_{dn}</u>												
Day SPL Value (dBA)	54.0	52.2	60.0	61.7	59.4	65.1	64.4	53.4	55.6	53.2	50.8	53.9
Night SPL Value (dBA)	54.0	52.2	60.0	61.7	59.4	65.1	64.4	53.4	55.6	53.2	50.8	53.9
Calculated L_{dn} Value	60.4	58.6	66.4	68.1	65.8	71.5	70.8	59.8	62.0	59.6	57.2	60.3
<u>Existing and New Facility L_{dn}</u>												
Day SPL Value (dBA)	57.4	55.1	61.9	63.0	60.7	65.9	65.5	56.2	58.9	56.9	54.6	57.8
Night SPL Value (dBA)	57.4	55.1	61.9	63.0	60.7	65.9	65.5	56.2	58.9	56.9	54.6	57.8
Calculated L_{dn} Value	63.8	61.5	68.3	69.4	67.1	72.3	71.9	62.6	65.3	63.3	61.0	64.2

Source: KBN, 1992.

Table 5.7-3. Calculated L_{eq} SPL Values for the Existing and the Expansion Project

Site	L_{eq} (dBA) Existing Facility	L_{eq} (dBA) New + Existing Facility
A	54.0	57.4
B	52.2	55.1
C	60.0	61.9
D	61.7	63.0
E	59.4	60.7
F	65.1	65.9
G	64.4	65.5
H	53.4	56.2
I	55.6	58.9
J	53.2	56.9
K	50.8	54.6
L	53.9	57.8

Source: KBN, 1992.

be "d" for Sites F, G, H, and J and "c" for all of the other sites. The highest rating (i.e., "d") suggests that there would be some sporadic complaints by any community adjacent to the expansion project, although there are no residential communities adjacent to the property boundary.

5.7.2 IMPACTS TO BIOTA

The calculated noise impact with the operation of the DCRRF CEP is not expected to affect the surrounding biota. No sensitive wildlife communities occur near the site.

No adverse impacts to wildlife are anticipated from the operation of the proposed facility. No significant wildlife populations occur on the site. The wildlife in the vicinity of the site (see Section 2.3.6) are acclimated to noise emanating from the existing plant and from other sources. Noise levels off the property from the DCRRF CEP will be similar to current noise levels. No off-site impacts are anticipated.

5.8 CHANGES IN NON-AQUATIC SPECIES POPULATIONS

5.8.1 IMPACTS

5.8.1.1 FLORA

The removal of the majority of the melaleuca wetlands will decrease the amount of this weedy pest and enable other species to compete. There is very little diversity within the existing dense melaleuca stand. The creation of a retention pond will completely change most of the flora on the site. Various aquatic plants will have a chance to colonize. The mitigation planned will add native plant species which will result in a more viable and variable ecosystem. The species composition of the retention pond will be very different when compared to the melaleuca wetland currently on the site.

A shallow shelf will be constructed in the retention pond so that a gradient will be established to create habitat for species adapted to various periods of inundation. The current dominant species, melaleuca, would not be permitted to become established within the retention pond. Recolonizing melaleuca plants will be actively removed and the area will be monitored quarterly or more frequently if necessary to insure no reestablishment. It is proposed to hand-pull melaleuca and to control other weeds such as cat-tail with herbicides.

5.8.1.2 FAUNA

Few animals use the existing melaleuca wetland. The retention pond will probably be used for foraging and resting habitat by wading birds and other avian species as well as mammals. No adverse impacts will occur to fauna utilizing the retention pond.

5.8.2 MONITORING

The only biological monitoring proposed is that weeds, particularly in the mitigation area, be removed on a regular basis. This will allow native species to close their canopy and have a better chance of survival. When a mature ecosystem has developed, maintenance can be reduced.

5.9 OTHER PLANT OPERATION EFFECTS

Construction at the DCRRF site is expected to be complete in early 1996, and the commencement of the plant operation activities will take place immediately thereafter. The analysis of transportation impacts on the external roadway system was conducted to reflect 1996 conditions.

To evaluate 1996 roadway conditions, 1996 background (nonproject) traffic was estimated. The analysis of background traffic was conducted using procedures for construction impacts as described in Section 4.6. Project traffic was then added to the background traffic to obtain a 1996 total traffic projection.

Operational employment for the expansion project has been estimated to add 70 new employees at DCRRF. It is anticipated that the work schedule will be divided into three overlapping shifts per day, with approximately 60 percent of the employees working the daytime shift and the remainder being split equally between the evening shifts. The new yard trash processing system will require 5 personnel per shift for two shifts per day. Based on these data, it was determined that approximately 42 additional employees will be working the normal daytime shift (7:00 a.m. to 4:00 p.m.).

Using a 1-person-per-vehicle occupancy rate, 42 additional vehicles will be exiting the site during the p.m. peak hour due to employees. In addition to traffic generated from additional employees, there will be approximately two additional trucks due to solid waste haulers exiting the site during the p.m. peak hour once the expansion of the facility is operational. The yard trash processing system will generate approximately 45 trucks per day (at 17 tons load weight per truck, 5 days per week operation), or an additional 5 trucks per hour at the peak hour. Therefore, total additional traffic generated during the peak hour due to the proposed expansion is estimated at 49 vehicles.

The main access to/from the site will be from NW 58th Street via NW 97th Avenue. The directional distribution of operational employee traffic consists of one-half of the trips traveling eastward and one-half of the trips traveling westward on NW 58th Street. The distribution was based on employee origin/destination data from the existing DCRRF.

Using background and project traffic estimates and directional distribution, roadway link conditions for 1996 were analyzed. Table 5.9-1 indicates the results of the analysis and shows that all roadway links near the site, except the Palmetto Expressway, will operate at Level of Service (LOS) D or better. The Palmetto Expressway is expected to operate at LOS F in both directions. However, since operational traffic will contribute less than 0.05 percent of LOS D service volume for this link (only seven vehicles), impacts on this roadway will be negligible.

Based on the results of the roadway link and intersection analyses, traffic generated in the vicinity of the site as a result of the DCRRF CEP will have a minimal impact on the adjacent roadway system.

Table 5.9-1. Estimated 1996 Roadway Conditions in the Vicinity of DCRRF

Facility	Location	Direction/ Geometrics	LOS D p.m. Peak Hour Service Volume	1996 p.m. Peak Hour			LOS ^a
				Background Traffic Volume	Operation Traffic Volume	Total Traffic Volume	
NW 58th Street	West of NW 97th Avenue	Eastbound/1L Westbound/1L	1,580	555	20	575	A
NW 58th Street	West of NW 87th Avenue	Eastbound/2L Westbound/2L	2,964	1,146	29	1,175	A
NW 58th Street	East of NW 84th Avenue	Eastbound/2L Westbound/2L	2,964	2,667	14	2,681	B
NW 58th Street	West of NW 72nd Avenue	Eastbound/2L Westbound/2L	2,964	1,623	5	1,628	A
NW 87th Avenue	North of NW 41st Street	Northbound/3L Southbound/3L	4,600	2,744	15	2,759	B
Palmetto Expressway/SR 826	North of NW 58th Street	Northbound/4L Southbound/4L	13,140	15,428	4	15,432	F
Palmetto Expressway/SR 826	North of NW 36th Street	Northbound/4L Southbound/4L	13,140	15,326	5	15,331	F
NW 102nd Avenue	South of NW 58th Street	Northbound/2L Southbound/2L	3,350	--	--	--	--
Florida Turnpike Extension	South of Okeechobee Road	Northbound/2L Southbound/2L	6,250	2,746	20	2,766	B
NW 36th Street	West of NW 87th Avenue	Eastbound/3L Westbound/3L	4,600	2,111	7	2,118	B
NW 41st Street (extension)	West of NW 102nd Avenue	Eastbound/2L Westbound/2L	--	--	20	--	--

^a Based on FDOT Generalized Peak Hour Level of Service Maximum Volumes Tables, January 1989.

Source: KBN, 1992.

5.10 ARCHAEOLOGICAL SITES

The Florida Department of State, Division of Historic Resources (DHR) was contacted and requested to identify any known archaeological sites and determine whether a cultural resource survey was necessary. DHR indicated that no significant archaeological sites are recorded or considered likely to be present within the site (see Appendix 10.4).

It is highly unlikely that any impact to archaeological sites would occur during the operation of the plant since no excavation or earthwork is planned in order to operate the plant. If there is an archaeological find during the operation of the plant, the chance find procedures described in Chapter 4, Section 4.8, Impact on Archaeological and Historical Sites, will be implemented.

5.11 RESOURCES COMMITTED

The major irreversible and irretrievable commitments of state and local resources due to the operation of the two new units are the use of land, the consumptive use of groundwater, and the PSD increment consumption. The latter two effects will only occur for the duration of operation.

The total DCRRF site (160 acres) is zoned for its current use, and the entire land area will be affected by existing activities. In contrast to a new generating and landfill facility constructed on a green-field site, CEP will be significantly more effective in the use of land per ton of refuse handled. Indeed, the project's use of land is, for the most part, a reuse of state and local resources.

The use of water by the project will consist of the condenser cooling flow, the auxiliary cooling water, cleaning and wash flows, and the process water requirements. The process water requirements will be met exclusively by potable water supplied by the city. Of the approximately 1,615 gpm required for the cooling towers, 40 percent (i.e., 638 gpm) will be supplied by water reuse (e.g. storm water and landfill leachate). As such, only 60 percent of the non-process water uses will be supplied by on-site well water.

With respect to air quality, DCRRF consumes PSD increment since the existing facility was constructed after the major source baseline date (January 6, 1975). However, the proposed project will result in a net facility reduction in SO₂, PM [PM(TSP) and PM₁₀], and lead emissions with modest increases in CO and NO_x emissions. As a result, the PSD increments for PM and SO₂ will be expanded as a result of the proposed expansion.

Given the need for the facility, as expressed in Chapter 1.0, the DCRRF CEP effectively utilizes state and local resources. Benefits of the project are presented in Section 7.1.

5.12 VARIANCES

No variances from federal, state, or local regulations are anticipated for the operation of the Capital Expansion Project.

5.13 REFERENCES

- Environmental Science and Engineering, Inc. (ESE). 1977. Application for Certification of Proposed Electrical Power Generating Plant Site. Prepared for Metropolitan Dade County. Submitted to Florida Department of Environmental Regulation, Tallahassee, FL.
- Environmental Science and Engineering, Inc. (ESE). 1988. Hydrogeologic Investigation for the Resource Recovery Dade County Facility. Gainesville, FL.
- U.S. Environmental Protection Agency. 1988a. Industrial Source Complex (ISC) Dispersion Model User's Guide (Second Edition, Revised). EPA Report No. EPA 450/4-88-002a.
- U.S. Environmental Protection Agency. 1988b. EPA's User's Network for Applied Modeling of Air Pollution (UNAMAP), Version 6, Change 3, January 4, 1988. Research Triangle Park, NC.

6.0 TRANSMISSION LINES AND OTHER LINEAR FACILITIES

There will be no new transmission lines associated with the proposed expansion. The existing facility includes a transmission line that ties into a Florida Power & Light Company (FPL) substation located within 0.5 mile of the site. This existing transmission line will be used for the proposed expansion.

**7.0 ECONOMIC AND SOCIAL EFFECTS OF PLANT CONSTRUCTION
AND OPERATION**

This chapter identifies the economic and social effects of construction and operation of the Dade County Resources Recovery Facility (DCRRF) Capital Expansion Project (CEP). The analysis also presents the project benefits and costs to certain affected entities in the area surrounding the DCRRF site, as well as other people and businesses in Dade County, surrounding counties, and the state.

Socioeconomic effects can be classified as either direct or indirect effects. Direct effects are those affecting primarily the owners, operators, and customers of the facility. Indirect costs and benefits affect people and interests in the vicinity of the project who, because of their proximity to the site, may experience changes in their local social and economic environment. These changes are due to increased spending by project construction and operation personnel. Many of these effects are difficult to measure, and qualitative assumptions must be made to assess the relative values of expected costs and benefits.

This chapter is divided into two parts. Section 7.1 deals with socioeconomic benefits and consists of an analysis of the monetary values of the power generated and sold and plant construction and operational expenditures. Section 7.2 addresses temporary and long-term indirect costs associated with construction and operation personnel's use of private and public services in the vicinity of the site. Baseline data to support assumptions and provide the basis for impacts analysis are presented in Section 2.2.

Most of the analysis is conducted on Dade County, which will experience the greatest degree of impact. Impacts to Broward, Monroe, and Palm Beach Counties will also occur, but to a lesser degree.

7.1 SOCIOECONOMIC BENEFITS

The construction of the expanded DCRRF will involve the direct expenditure of about \$231.9 million in capital investments. After full project development, the average annual direct and indirect operating expenditures will be approximately \$3.7 million.

7.1.1 DIRECT SOCIOECONOMIC BENEFITS

7.1.1.1 DIRECT SOLID WASTE DISPOSAL AND ENERGY PRODUCTION

DCRRF will provide a significant direct public benefit by recycling and volume reduction rather than disposing of solid waste in landfills. Approximately 19 million tons of municipal solid waste (MSW) was generated in Florida in 1990. Dade County residents, while accounting for approximately 15 percent of the total population in Florida, generated approximately 3.2 million tons of MSW. The expanded DCRRF will prevent approximately 1 million tons of solid waste per year from reaching county landfills. Secondary benefits of the DCRRF expansion will be realized through the production of electrical energy to be used to meet local and regional energy demand.

7.1.1.2 DIRECT LABOR EXPENDITURES

Table 7.1-1 presents the estimated construction and operation labor expenditures based upon a total project construction labor budget of \$40.9 million and an average annual operation labor budget of \$8.6 million. Construction labor costs were increased annually by approximately 4.5 percent to adjust for escalation due to inflation and salary/wage increases. Based on this construction cost analysis, approximately \$18.1 million will be expended in 1993, the first full year of project construction, and \$22.8 million will be expended during the remaining years of project construction. Defining a man-year as the equivalent of 1 year's employment or 2,080 manhours, the construction phase of this project is estimated to require 223 man-years of labor during the peak year of construction and a total direct requirement of 499 man-years.

Of the total 260 employees at DCRRF, 70 will be the result of the expansion project. Total operational labor costs associated with the expansion only are also shown in Table 7.1-1. At startup in 1996, the total annual operational employee payroll for the 70 additional employees is estimated to be \$4.8 million.

Table 7.1-1. Construction and Operational Phase Labor Requirements and Costs for DCRRF

Year	Construction Labor Force ^a	Construction Labor Cost (millions of dollars)	Expansion Operational Labor Force (man-years)	Operational Labor Cost (millions of dollars)
1992	13	1.01	--	--
1993	223	18.06	--	--
1994	147	12.23	--	--
1995	94	7.79	--	--
1996	22	1.79	70	4.83
1997	--	--	70	5.05
1998	--	--	70	5.27
1999	--	--	70	5.51
2000	--	--	70	5.76
2001	--	--	70	6.02
2002	--	--	70	6.29
2003	--	--	70	6.57
2004	--	--	70	6.87
2005	--	--	70	7.18
2006	--	--	70	7.50
2007	--	--	70	7.84
2008	--	--	70	8.19
2009	--	--	70	8.56
2010	--	--	70	8.94
2011	--	--	70	9.35
2012	--	--	70	9.77
2013	--	--	70	10.21
2014	--	--	70	10.67
2015	--	--	70	11.15
2016	--	--	70	11.65
2017	--	--	70	12.17
2018	--	--	70	12.72
2019	--	--	70	13.29
2020	--	--	70	13.89

Note: Labor costs have been escalated by 4.5 percent per year.
Assumes commercial operation of the plant will begin in 1996.

^a Total construction labor force represents the number of man-years required for construction during any given year.

Source: Birwelco-Montenay, Inc., 1992.
KBN, 1992.

7.1.1.3 DIRECT CAPITAL INVESTMENT EXPENDITURES

Of the total construction budget, the construction costs for the DCRRF expansion project in Florida will be allocated as follows:

<u>Activity</u>	<u>Expenditures</u>
Construction Labor	\$40,900,000
Construction Equipment	171,500,000
Management/Permitting	6,000,000
Engineering	7,000,000
Yard Trash Processing System	3,000,000
Other Costs	<u>3,500,000</u>
TOTAL	231,900,000

These cost estimates are based on 1990 dollars.

7.1.1.4 DIRECT FUEL SUPPLY EXPENDITURES

The DCRRF expansion will require propane for periodically starting the boilers. The estimated cost for propane during the first full year of operation (1997) is expected to be \$300,000.

7.1.1.5 DIRECT OPERATING AND MAINTENANCE EXPENDITURES

Non-labor operating and maintenance (O&M) expenditures to operate DCRRF (exclusive of fuel charges) are projected to cost \$3.7 million in 1996, the first year of commercial operation. The plant's regular payroll is estimated to number 260 employees in 1996, and the total annual wage and salary cost is estimated to be \$17.9 million (1996). Wages and salaries are projected to escalate at an annual rate of approximately 4.5 percent, depending on the year. They are based on current (1991) labor cost levels and recent trends in generating-station personnel costs. Labor costs include fringe benefits and employer's contributions, which typically comprise about 30 percent of total labor costs.

7.1.2 INDIRECT SOCIOECONOMIC BENEFITS

7.1.2.1 EMPLOYMENT

Employment will increase most in Dade County, with increases also projected in Broward, Palm Beach, and Monroe Counties. Employment growth will be due to both construction of the plant and the increased demand for goods and services in the four-county area.

Table 7.1-2 depicts the number of direct and indirect jobs associated with the DCRRF expansion. The projected increase in employment is derived by using economic multipliers developed from

Table 7.1-2. Number of New Jobs Associated With DCRRF for Dade, Palm Beach, Broward, and Monroe Counties

Year	Construction Jobs		Operational Jobs	
	Direct	Indirect	Direct	Indirect
1992	13	1,368	--	--
1993	223	1,968	--	--
1994	147	1,752	--	--
1995	94	1,602	--	--
1996	22	1,393	260	84
Average Annual ^a	--	--	260	144

^aFor 25-year operations period 1996-2020.

Sources: Bureau of Economic Analysis, 1987.
Birwelco-Montenay, Inc., 1992.
KBN, 1992.

the Regional Input/Output Modeling System (RIMS II) of the U.S. Department of Commerce's Bureau of Economic Analysis. Each multiplier represents the number of jobs that would be supplied for a specified industry for each additional \$1 million of output delivered to final demand by a specified industry (in this case, construction). By summing all of the multipliers for all existing industries and multiplying that number by the total capital expenditure for construction, the total employment impact of the project on all the industries is estimated. The total number of jobs (man-years of employment) that would be created for the four-county area by constructing the project is 8,093 (i.e., indirect employment multiplier, 34.9, multiplied by Florida construction expenditures of \$231.9 million). Of this total, the largest number of jobs will be in the construction industry. Several other industries will be affected, including approximately 951 jobs in retail trade and approximately 602 jobs in business services.

The DCRRF expansion will have an impact on the statewide economy. In addition to the 8,093 jobs that will be created in Dade, Broward, Palm Beach, and Monroe Counties, there will be approximately 1,948 jobs created throughout the state during the construction phase of the project.

Once the plant expansion is operational, there will continue to be induced employment due to increased demand from both plant operation and employees and their families. Based on a 25-year projected average annual labor and operating and maintenance expenditures of \$14.5 million, there will be an estimated 144 jobs created and maintained in Dade, Broward, Monroe, and Palm Beach Counties. Because the plant will be located in Dade County and the county's economy is relatively large, it is assumed that the majority of the operation's impacts will have a greater effect on Dade County compared to the other counties within the immediate area and within the state. Most of the employees likely will live in Dade County. Therefore, the project will generate more demand for goods and services in the immediate area than in surrounding counties.

In addition to the estimated 144 jobs created in Dade County and surrounding counties, there will be approximately 22 jobs created elsewhere throughout the state as a result of plant operations.

7.1.2.2 INCOME

Income in Dade County will increase as a result of the DCRRF expansion. First, there will be a total dollar change in output in all industries in Dade County and in surrounding Broward, Palm Beach, and Monroe Counties as a result of the proposed project. For each additional dollar of output delivered to final demand by the project, there are positive monetary impacts on the existing industries in these counties. These impacts are also estimated by using economic

multipliers from the RIMS II model. The total dollar spending in Florida during the construction phase of the project is estimated to be \$231.9 million. This includes construction wages, investments and purchases, and nonwage maintenance expenditures.

By using the RIMS II multiplier for new construction (1.9498), the approximate total dollar impact on the four counties most affected by the construction of the DCRRF expansion project is \$452.1 million for all existing industries combined.

Once construction is complete, the DCRRF expansion will operate with 70 additional employees. The average annual operating wages, based on a 25-year projection with built-in escalation rates for inflation, are estimated to be \$8.61 million. This annual average represents total wage package rates, including any fringe benefits for manual labor and complete payroll wage rates. In addition to these wage rates, the project will incur (based on the same 25-year projection) an annual average of \$5.91 million in operating and maintenance costs. Output generated by other industries will still be positively affected once the plant is in operation. For all industries combined, based on the previously stated average operating expenses in a 25-year projection, the final annual demand change on the industries will be \$14.52 million. Two industries that will be affected most are maintenance and repair construction (which will experience an increase of \$0.85 million in earnings) and real estate (which will experience an increase of \$0.60 million in earnings).

The second way that income will increase in Dade, Broward, Palm Beach, and Monroe Counties is through changes in dollar earnings in existing industries due to the construction of the DCRRF expansion. The total dollar increase in earnings that will occur due to plant construction will be approximately \$153.1 million. This amount is derived by multiplying the total expenditure during the construction period by the RIMS II multiplier of 0.6601. This multiplier represents the sum of all of the changes in earnings for all existing industries in the adjacent counties. Although almost all existing industries will be positively affected in some way, there are several industries which will experience a significant increase in consumer demand. This will be reflected through increased revenues.

The greatest impact will be to the construction industry, which will experience a dollar increase in earnings of \$79.4 million. Other industries that would be greatly affected are retail trade, business services, and health services. Both retail trade and business services industries will each experience increases of more than \$11 million. Health services industry will experience an increase of approximately \$4.8 million.

Total dollar increases in earnings in the southern region of Florida will also increase once the facility expansion is operational. The average increase over the 25-year plant life will be approximately \$3.44 million. This is derived by multiplying the average annual labor and O&M costs (\$14.52 million) by the RIMS II multiplier for earnings (0.2367). Industries experiencing the most significant increase in earnings include utility services, maintenance and repair, construction, and wholesale trade.

7.1.2.3 PUBLIC FINANCE

The DCRRF CEP will be constructed on land owned by Dade County; therefore, ad valorem taxes will not be levied on the facility. Sales tax will be levied on the construction of the electrical generating equipment. The cost of this equipment is estimated to be \$22 million and the current sales tax in Dade County is 6.25 percent; therefore, approximately \$1.4 million in sales tax revenue will be generated by the time the expansion comes on-line in 1996. In addition to the revenue generated by the construction of the electrical generating equipment, there will also be an annual expenditure of \$500,000 (current dollars) for supplies and equipment, generating approximately \$31,000 per year in sales tax revenue throughout the operational life of the plant.

7.2 SOCIOECONOMIC COSTS

This section of Chapter 7 provides an analysis of the socioeconomic costs associated with providing services in Dade County during both the construction phase (Section 7.2.1) and the operational phase (Section 7.2.2) of DCRRF. Construction phase analyses are based upon construction phase labor requirements and the cost to build the addition to the facility. These impacts will occur from mid-1992 to early 1996. Operations analyses are based upon operation labor requirements and costs to operate and maintain the plant. These impacts will occur with plant startup, scheduled for mid-1996 and will continue during plant operation. Impacts to the socioeconomic environment will be similar for both construction and operation, although construction impacts, which are short-term, will be larger due to the larger work force associated with construction.

Based on an analysis of the current economy in Dade and surrounding counties, these costs are anticipated to be minimal. The socioeconomic benefits, primarily generated from property tax revenue and increases in employment and income in the area, will greatly exceed the socioeconomic costs of the project.

7.2.1 TEMPORARY EXTERNAL COSTS

7.2.1.1 CONSTRUCTION PHASE LABOR REQUIREMENTS AND IMPACTS

Approximately 60 percent of the construction work force will originate primarily from outside of the southern region of Florida because of the large industrial component found in central and northeastern areas of the state. The southern region is defined as Dade, Broward, Palm Beach, and Monroe Counties. The remainder of the construction work force is expected to come from inside the region. The average growth for Dade County between 1979 and 1990 has been 30,882 persons per year. This represents a 1.77 percent average annual increase in population.

At peak construction employment of 499, it is estimated that 299 workers will relocate to Dade County or the surrounding counties. Because these workers bring families, a maximum increase in population of 822 persons is anticipated, based on a population-per-household ratio of 2.75 (1990) in Dade County. Based on a yearly incoming population of 30,882 in Dade County, DCRRF expansion project construction workers and their families represent approximately 2 percent of recent average in-migration. This is a conservative estimate because construction employees tend to be young and unmarried, and some employees may settle in the surrounding counties in lieu of Dade County.

7.2.1.2 TEMPORARY SERVICE IMPACTS

7.2.1.2.1 Housing

Relocation of construction-phase personnel to Dade County will increase the demand for housing, both direct and induced. As described in Section 7.2.1.1, during the peak construction years of 1993 and 1994, a maximum of 299 workers are projected to relocate to Dade County. Under worst-case conditions (one employee per dwelling unit and transient accommodations not used), approximately 299 dwelling units will be required in Dade County as a result of the DCRRF CEP.

According to the Housing Element Support Component of the Metro Dade Comprehensive Development Master Plan, there were 771,288 total housing units in Dade County in 1990. This represents an approximately 16 percent increase from the 1980 census counts that identified 665,382 units.

If this trend continues, there will be approximately 21,500 additional dwelling units built by late 1992 to supplement the existing housing stock. The capital expansion project will not cause any significant pressure on the availability of housing in Dade County. No significant impact on real estate values is anticipated due to the minimal housing demand associated with the project, nor are the real estate values of properties surrounding the project site expected to be adversely affected, since the area already comprises a mixture of land uses, including industrial and public utility land uses.

7.2.1.2.2 Education

The increase in employees in Dade County will cause a slight increase in school enrollment. Dade County student enrollment in 1990 was 338,889. This includes 292,411 public school students and 46,478 private school students. With approximately 299 incoming households and a student/household ratio of 0.49 (1990), there will be an anticipated maximum of 147 students enrolling in county schools. This amounts to significantly less than 1 percent of total enrollment and should not impose any additional costs on the county school system. School facilities should not be affected by this increase since the residential locations of new employees will be widely distributed.

7.2.1.2.3 Medical Facilities

There is one hospital, Palmetto General Hospital, within a 5-mile radius of DCRRF. Palmetto General is located in unincorporated Dade County, approximately 3.5 miles northeast of the site. The hospital has a 300-bed capacity and is capable of providing emergency medical service.

7.2.1.2.4 Firefighting Facilities

Construction of the DCRRF CEP will have no major adverse impacts on the demand for firefighting services in Dade County. There will be fire protection equipment at the site as well as the presence of construction personnel trained in fire response procedures. The closest public firefighting facility, Station 17, is located 5 miles east of DCRRF, providing an estimated response time of 5 minutes. The backup facility is Station 28, located approximately 2.25 miles southeast of the plant site. Station 28 has a response time of approximately 6 minutes.

7.2.1.2.5 Police Protection

The Dade County Police Department is currently providing police protection in the vicinity of the proposed expansion site. The area is patrolled by an officer with backup assistance available, if needed. A private security firm is currently being used at the existing site, and protection will be expanded during construction.

7.2.1.2.6 Recreation

Although there are several parks and recreational areas in Dade County, they are not located within a half-mile of the proposed expansion site. The closest facility is Doral Park, located approximately 1 mile southwest of the project site. There are additional parks located south and to the east of the site in Dade County. No adverse effects are expected to these parks as a result of increased use by plant construction workers and their families. Construction-generated noise and fugitive dust will not affect the parks because of the distance of the facilities from the plant site.

7.2.1.2.7 Water Supply

Potable water is currently being provided to DCRRF by the Metro-Dade Water and Sewer Authority Department (WASAD), which has a maximum permitted capacity of 225 million gallons per day (mgd). Current usage is 146.6 mgd. No capacity limitations are expected, nor would the minor temporary water requirements for constructing the plant expansion adversely impact existing water facilities.

7.2.1.2.8 Domestic/Sanitary Wastewater

DCRRF is currently in the process of implementing a plan to construct a near-zero-discharge facility for recycling of domestic/sanitary wastewater on-site. This should reduce pollutant loadings to the sanitary sewer. There are, therefore, no additional impacts expected from the plant expansion. Impacts resulting from construction employees relocating to Dade County are expected to be negligible due to the number of workers relocating and current system capability.

7.2.1.2.9 Solid Waste

Solid wood waste and garbage generated by construction of the facility expansion will be disposed at the existing facility. Other construction debris will be disposed at a private landfill within 1 mile of the existing facility. The volume of solid waste to be taken off-site is not expected to significantly affect the capacity of the private facility.

7.2.2 LONG-TERM EXTERNAL COSTS

7.2.2.1 OPERATION PHASE LABOR REQUIREMENTS AND IMPACTS

When construction of the DCRRF CEP is complete, 70 additional employees will be required to operate the expanded plant. The same assumption that was used to project the number of people that will reside in the county and surrounding areas during construction (see Section 7.2.1.1) has been used to estimate requirements for operational employees. Under that assumption, 60 percent of employees will relocate into Dade County and surrounding counties from other areas outside of anticipated commuting distances. This relocation assumption will result in 42 employees moving into the area. Because the employees will bring their families, the number of new residents is estimated to be 116 persons (2.75×42). Based on a population analysis from 1979 to 1990, the average population increase in Dade County is 30,882 persons per year. Therefore, operational employees and their families would represent less than 1 percent of recent yearly growth.

7.2.2.2 LONG-TERM SERVICE IMPACTS

7.2.2.2.1 Housing

The DCRRF CEP will require 70 additional employees to operate the plant. Assuming 40 percent of the employees will be living in Dade County or surrounding counties at the time of plant startup, only 42 dwelling units will be needed. As previously described in Section 7.2.1.2, the number of existing and projected housing units in the county will be sufficient to assimilate the operational staff's housing needs.

7.2.2.2.2 Education

The impact of the DCRRF CEP on the county school system will be very slight. Based on a student-per-household ratio of 0.49 for 1990, approximately 21 students will enter the school system in 1996 when operation commences. With a total enrollment of 338,889 in 1990, the estimated 21 students entering the system will have almost no effect on the local school system's costs or facilities.

7.2.2.2.3 Medical Facilities

The modest (i.e., approximately 116 people) in-migration resulting from operations will not have any adverse impact on the quality or quantity of medical services offered in Dade County or adjacent counties.

7.2.2.2.4 Firefighting Facilities

The operation of the DCRRF after expansion will have no major adverse impact on the demand for firefighting services in Dade County, since fire protection equipment will be available on-site and plant personnel will be trained in fire protection. If public firefighting service is necessary, it will likely be provided by Station 17, located 5 miles east of DCRRF. Station 17 can provide an emergency response time of 5 minutes. The backup facility is Station 28, located approximately 2.25 miles southeast of the plant site with a response time of approximately 6 minutes.

7.2.2.2.5 Police Protection

Due to proposed security facilities at the site as well as the current police protection in the area provided by the Dade County Police Department, an increase in demand for police services is not expected to result from operation of the DCRRF after expansion.

7.2.2.2.6 Recreation

Because population impacts created by the DCRRF CEP are minimal, no major adverse impact on the facilities or utilization of recreational opportunities is expected to occur as a result of operating the expanded DCRRF.

7.2.2.2.7 Water Supply

Potable water uses at the DCRRF after expansion will include water for drinking, toilets, and general plant cleaning. City water will also be used for boiler makeup water. Potable water for the plant will be supplied by WASAD, which has a maximum permitted capacity of 225 mgd. Current average production by WASAD is 146.6 mgd. The DCRRF CEP will not cause an adverse impact on the available water supply. An average annual usage of 209,000 gpd is expected when the expansion is operational. This volume equates to less than 1 percent of WASAD's current remaining permitted capacity.

7.2.2.2.8 Domestic/Sanitary Wastewater

All domestic and sanitary wastewater generated at DCRRF is currently discharged to the WASAD sanitary sewer system. The maximum permitted capacity for WASAD North District, is 90 mgd. The current average input is 84 mgd.

The DCRRF CEP is being designed as a near-zero-discharge facility. As a result, discharge volumes to WASAD should decrease after expansion, compared to the current discharge. As a result, there will be no adverse effects on sewage collection, treatment, or disposal systems in Dade County from the DCRRF CEP. A benefit that will accrue to WASAD will be the transfer of treated effluent to DCRRF for use as makeup water.

7.2.2.2.9 Solid Waste Disposal

Several types of solid waste will be generated by the expanded DCRRF. The ash that will be generated will be disposed in the on-site landfill. The other type of process solid waste that will be generated is termed "unders," which is a fairly dense, non-combustible fraction that will be disposed at the South Dade landfill. Trash and office waste will be processed at the facility itself.

The total reduction in the volume of MSW received at DCRRF will be approximately 70 percent. This represents a significant decrease in the volume of solid wastes that would otherwise be entering Dade County landfills.

8.0 SITE AND DESIGN ALTERNATIVES

This optional chapter of the Site Certification Application (SCA) is not being submitted as part of the application because it is not anticipated that an environmental impact statement (EIS) under the National Environmental Policy Act (NEPA) would be required for the project.

9.0 COORDINATION

State, regional, and local agencies were contacted to inform these agencies about the Dade County Resources Recovery Facility (DCRRF) Capital Expansion Project (CEP) and solicit their comments. The focus of these meetings and contacts was on the Environmental Licensing Plan of Study (POS). This POS outlined the engineering information, the environmental baseline studies, and the impact analyses that would be used to support this Site Certification Application (SCA). The specific objective of the POS was to achieve agreement with the Florida Department of Environmental Regulation (FDER) and other affected agencies as to scope, quantity, and specificity of information that would be provided in the SCA, as well as the methods to be used in providing such information and the nature of the supporting documents to be included in the application [pursuant to 403.5063 Florida Statutes (F.S.) and Chapter 17-17.041(5), Florida Administrative Code (F.A.C.)]. The POS was submitted to FDER on June 7, 1991. During the implementation of the POS (i.e., the preparation of the SCA), the following agencies were contacted.

U.S. Environmental Protection Agency

July 23, 1991--Letter to Gwen Jacobs, EPA, Research Triangle Park, NC, concerning creditable stack heights for Units 1-4 at DCRRF.

November 21, 1991--Letter from J.A. Harper, Chief, Air Enforcement Branch, EPA Region IV, concerning creditable stack heights for DCRRF.

Florida Department of Environmental Regulation

April 25, 1991--Scoping meeting with FDER in Tallahassee concerning DCRRF expansion and SCA.

State of Florida Division of Historical Resources

October 30, 1991--Meeting with Laura A. Kammerer regarding possible cultural resources in the project area.

South Florida Water Management District

November 18, 1991--Telephone conversation with Susan Coughanour regarding relationship of an existing facility to changed regulations.

Metro-Dade County Planning Department

August 1, 1991--Telephone conversation with Frank Baumann regarding availability of updated land use map.

Dade County Department of Environmental Resources Management

July 15, 1991--Telephone conversation with Mr. Hernandez regarding information on water budget for site area.

Dade County Department of Solid Waste Management

July 31, 1991--Telephone conversation with Marice Lerouge regarding information on design of the landfill.

July 24, 1991--Meeting with Diana Ragbeer regarding trip generation of existing franchised haulers.