SITE CERTIFICATION
APPLICATION

THE CEDAR BAY COGENERATION PROJECT

VOLUME 1

Submitted by AES/Cedar Bay Inc.

CEDAR BAY COGENERATION PROJECT

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PREFACE

PURPOSE

This Site Certification Application (SCA) is being submitted by AES Cedar Bay, Inc. (AES-CB), and Seminole Kraft Corporation for the Cedar Bay Cogeneration Project.

This SCA is intended to serve the following purposes.

- Site Certification Application for the Cedar Bay Cogeneration Project including all state and local permits for the construction and operation of the facilities; Section 401 water quality certification; and certification of compliance with the Florida Coastal Zone Management Program. 3
- Application to the US Environmental Protection Agency for a permit to discharge under the Clean Water Act National Pollutant Discharge Elimination System (NPDES) Program. This SCA also serves as the applicants' Environmental Information Document (EID) in compliance with the requirements of the National Environmental Policy Act (NEPA).

Summary of the major section headings:

1. Need for Power.
2. Site and Vicinity Characterization.
3. Plant and Directly Associated Facilities.
4. Effects of Site Preparation, and Plant and Associated Facility Construction.
5. Effects of Plant Operation.
6. Transmission Lines and Other Linear Facilities.
7. Economic and Social Effects of Plant Construction and Operation.
8. Site and Design Alternatives.
9. Coordination.

10. Appendices.

The pertinent applicant information follows the Preface.

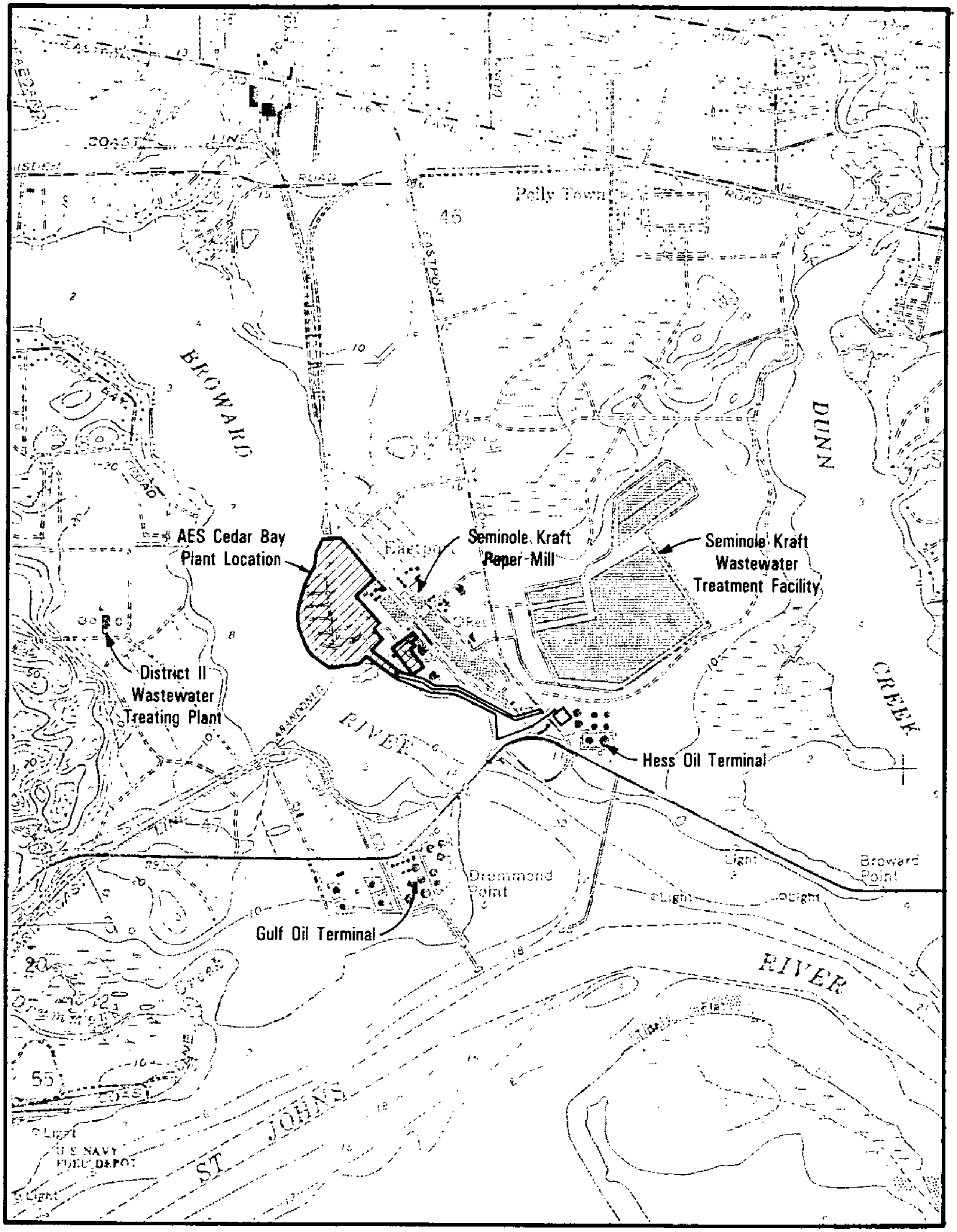
PROJECT INFORMATION

The AES Cedar Bay Cogeneration Project is an integrated power complex to be built on an existing industrial site in Jacksonville, Florida (Figure A). The cogeneration plant will produce 225 MW of electricity for sale to Florida Power and Light Company (FP&L) as well as process steam for sale to the adjacent Seminole Kraft Corporation paper mill. The project also includes installation of a new kraft recovery boiler system required to modernize the paper mill (Figure B).

The proposed cogeneration plant will burn fuel made up of approximately 96 percent coal and 4 percent bark in three circulating fluidized bed (CFB) boilers. These technically advanced boilers produce steam at 1,800 pounds per square inch gauge (psig) for a new double automatic extraction condensing turbine generator. This process will generate 225 MW as well as 640,000 lb/h of 175 psig and 75 psig process steam for the mill. These boilers will be owned and operated by AES-CB (Figure C).

The new kraft black liquor recovery boiler (KRB) system, owned and operated by Seminole Kraft, will burn black liquor solids, and produce 1,250 psig steam, replacing the three existing recovery boilers. A new automatic extraction condensing turbine generator will generate 42 MW of electric power for internal mill consumption as well as 600 psig and 175 psig steam for the kraft mill processes. The existing multiple effect evaporators and smelt dissolving tanks will also be replaced as a part of this project.

Offsets from the elimination and replacement of old equipment with higher pollution levels at the mill will minimize the project's environmental impacts. Eight existing boilers at the mill will be shut down; three oil-fired and two bark-fired power boilers and three kraft recovery boilers. The new CFB boilers will replace the power boilers process steam generation and the old kraft recovery boilers will be replaced with a modern low-odor unit.



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SITE LOCATION

Figure A

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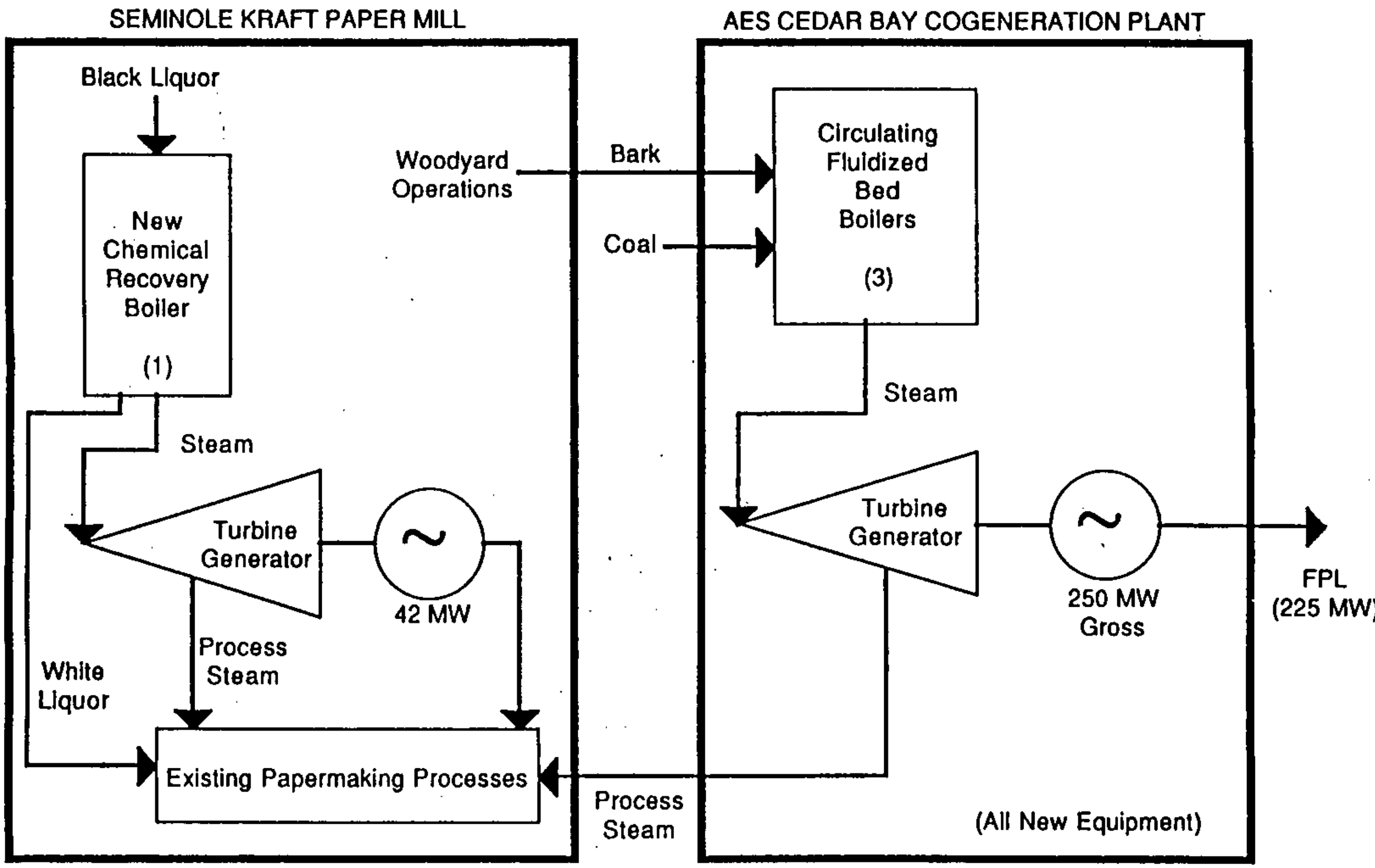
Figure B

AES Cedar Bay Cogeneration Project, Jacksonville, Florida



Note : Seminole Kraft does not currently sell any of their electricity, and has no plans to do so in the future. Approximately 10% of AES Cedar Bay's gross generation will be consumed internally to run the plant equipment.

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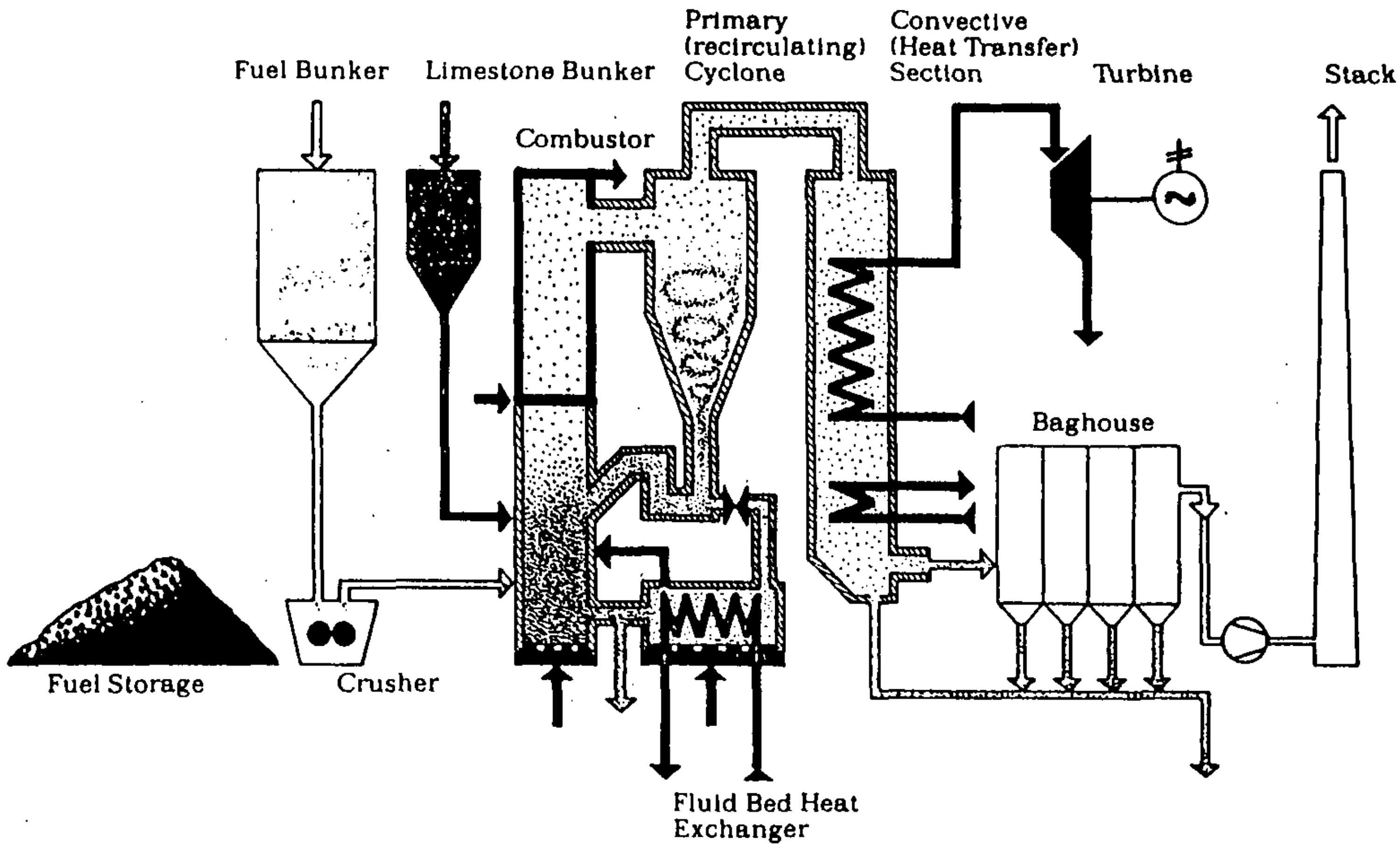
Figure C

Typical Flow Chart for a Circulating Fluidized Bed Boiler System



PROJECT IMPACTS

Air

By shutting down old equipment at the paper mill, utilization of modern technology, and installation of stacks consistent with good engineering practices, the project will result in numerous benefits to the environment. Improvements will be observed in both the net annual emissions (the total amount of emissions from the project in one year), and in ambient impacts (the effects of the emissions on air quality). These improvements include reductions in the ambient concentration of sulfur dioxide (SO_2), particulate matter, volatile organic compounds (VOC), and total reduced sulfur (TRS), an odor-producing sulfur compound. Specific impacts include the following.

- SO_2--Maximum potential annual emissions will be lower than representative emissions from existing mill sources. In addition, maximum ambient impacts will be dramatically reduced as a result of this project. 3
- TRS--Odor causing emissions will be reduced by more than 70 percent from the current KRB's permitted emissions.
- Total Suspended Particulates (TSP)--Emissions will be significantly lower. Ambient impacts will also be significantly reduced. 3
- Particulate Matter Less Than 10 um (PM-10)--Emissions and ambient impacts will be reduced.
- VOC--Emissions will be reduced. Ambient impacts will be significantly reduced.
- NO_x--Emissions will increase, but will be well within the New Source Performance Standards. Ambient impacts will be significantly below applicable air quality standards.
- CO--Emissions will increase, but net ambient impacts will be significantly below applicable air quality standards.

Air emission control features on the new equipment will include the following.

- Circulating Fluidized Bed Boilers.
  - Limestone injection for SO_2 reduction.

- -- Baghouses for particulate reduction.
- -- Low combustion temperature control for NO_x reduction.

- Kraft Recovery Boiler.
  - -- Electrostatic precipitators for particulate control.
  - -- Noncontact black liquor evaporators for TRS control.
- Smelt Dissolving Tanks.
  - -- Liquid contact scrubber for particulate and TRS control.

Water Use

As a result of the installation of a cooling tower, the Cedar Bay project will eliminate the use of Broward River water. The existing mill requires approximately 30,000 gallons per minute (gpm) of Broward River water in a once-through turbine condenser cooling system.

Ground water consumption at the site will be increased from the current average mill consumption of 19.5 million gallons per day (mgd) up to 26.5 mgd. The increase is required for the cooling tower, power cycle, and other miscellaneous plant uses. Ground water quality will be unaffected by this increase.

The project's total water use will be about 58 percent lower than that of Seminole Kraft at present. | 1

Land

The project site has been used for industrial purposes since the 1950s, before the paper mill was built. As a result of industrial activity and fill, the land has already been extensively disturbed. The site is | 3 zoned heavy industrial (IH) and is designated for continued IH use in the Jacksonville Planning Department's 2010 North District Plan. | 3

A biophysical assessment of the site concluded that the proposed plant site is not inhabited by any endangered species. However, a gopher tortoise habitat appears to exist on land adjacent to the CSX railyard, north of the site. The gopher tortoise has been categorized as a species of special concern by the Florida Committee of Rare and Endangered Plants and

Animals. In the event that additional rail spurs need to be constructed, affected tortoises could be relocated to the large adjacent habitat without adverse impacts to the tortoises moved or to the remainder of the population.

There are no archaeological, historic, or cultural sites present on the proposed project site or in the immediate vicinity that are expected to be impacted by the project's construction or operation.

Fuel

Coal will be delivered by rail, by essentially the same railroad access presently serving the papermill. The existing railroad track system will be extended to accommodate coal delivery to the cogeneration site. This expansion is discussed in Section 6.3. 3

Environmental impacts from fuel handling will be minimized. Conveyors will be designed to minimize spillage. Transfer points will be enclosed and dust will be controlled by fabric filter type dust collectors. Coal and limestone pile and site runoff will be collected and treated before use or discharge to the St. Johns River to ensure compliance with water quality standards.

Wastewater and Solid Waste

Due to the elimination of once-through cooling water at the site, thermal loading of the St. Johns River is expected to be reduced by 90 percent or more. Cooling tower blowdown contributes 633 gpm to the discharge. Total wastewater discharge from the site will be reduced by 70 percent. Discharge will be through the mill's existing discharge structure.

The volume of wastewater generated from sources other than cooling tower blowdown will remain essentially equal to that of the current operation. Wastewater will be treated in the existing Seminole Kraft treatment system and will meet all applicable standards. No impacts are expected from the wastewater since the loading to the existing treatment system will not be increased.

Ash from the combustion process will be pelletized by AES-CB and disposed out of state by the coal supplier. This material is also potentially marketable in the engineering materials industry. This ash is not a hazardous material, and impacts on the environment are expected to be minimal.

Trash and other solid waste will be disposed of at an approved facility. A licensed contractor will be responsible for treatment and disposal of boiler cleaning wastes.

Socioeconomic

During the peak year of construction, an average of over 630 jobs will be created by the project. The net direct employment effect will be the creation of 58 full-time positions for the operating life of the plant. A consent decree between Seminole Kraft, the Florida Department of Environmental Regulation, and the Jacksonville Bio-Environmental Services Division exists requiring compliance by the mill with the TRS New Source Performance Standards by November of 1992. The Cedar Bay Cogeneration Project will provide the new KRB, allowing Seminole Kraft to continue operation in compliance with these standards. In effect, the project significantly contributes to the continued viability of the paper mill.

Need for Power

Electricity demand in Florida is growing rapidly. In April 1987, the Florida Public Service Commission (FPSC) stated that needs for additional generating capacity of 220 MW, 740 MW, and 815 MW exists in years 1993, 1994, and 1995, respectively. FPSC staff has indicated that recent data show that capacity above this amount will be needed.

The FPSC has designated a coal-fired plant as the state-wide avoided unit and strongly supports reductions in Florida's dependence on oil and gas in the electric industry. Ratepayers will also benefit because the price of electricity sold to FP&L is below the state-wide avoided unit cost. In addition, construction of the plant will be privately funded, eliminating ratepayer investment risk.

Preliminary meetings with the FPSC staff indicate support for the AES Cedar Bay Project, due to its use of advanced clean coal technology, the environmental benefits, and the attractive price of the electricity generated.

SCHEDULE

The Cedar Bay Cogeneration Project major milestones follow.

• Power Purchase Agreement	
-- Signed	May 1988
-- FPSC Approval	April 1989
• Permit Applications Submitted	November 1988
• Permitting Complete	November 1989
• Financing Complete	December 1989 2
• Construction Begins	January 1990
• Construction Complete	
-- Recovery Boiler	June 1992
-- Power Boilers	July 1992

Applied Energy Services, Inc.

AES Cedar Bay, Inc. is a wholly owned subsidiary of Applied Energy Services, Inc., a privately held corporation that builds, owns, and operates cogeneration facilities that sell steam and electricity to industrial and utility customers. AES currently operates three facilities--in Texas, Pennsylvania, and California--with a combined capacity of 350 MW. Two more plants, representing an additional 500 MW of capacity, are under construction in Oklahoma and Connecticut. Several other projects are in advanced stages of development. To date, AES has raised over $1.2 billion from private sources to finance its projects.

AES' objective is to be a long-term, low cost, reliable supplier of energy. The company concentrates on innovative coal-burning technology and superior plant operations.

Seminole Kraft Corporation

Seminole Kraft Corporation is a privately held corporation which owns and operates the Seminole Kraft paper mill. The mill produces unbleached linerboard and kraft paper and has been in operation under Seminole Kraft since April 1987. Stone Container Corporation owns 60 percent of Seminole 3
Kraft's common stock, has management responsibility for the mill and buys all of the mill's output. After a 33-year operating record, the mill ceased operation in October 1985 and was purchased by Seminole Kraft in October 1986. Substantial expenditures were made to rehabilitate and modernize the mill prior to startup in April 1987. The mill currently employs over 350 people.

APPLICANT INFORMATION

Applicants' Official Names

AES Cedar Bay, Inc.	Seminole Kraft Corporation

Address

1925 North Lynn Street Arlington, Virginia 22209	9469 Eastport Road Jacksonville, Florida 32218-0998

Address of Official Headquarters

Same as address	Same as address

Business Entity (corporation, partnership, cooperative)

Corporation	Corporation

Names, Owners, etc.

Applied Energy Services, Inc.	Seminole Kraft Corporation

Name and Title of Chief Executive Officer

Roger Sant--Chief Executive Officer	Roger Stone—President and Chairman

Name, Address, and Telephone Number of Official Representative Responsible for Obtaining Certification

Jeffrey V. Swain	Larry A. Stanley	2
1001 North 19th Street	9469 Eastport Road	3
Suite 2000	Jacksonville, Florida 32218-0998	
Arlington, Virginia 22209	(904) 751-6400	
(703) 522-0073		

Site Location (County)

Duval County

Nearest Incorporated City

Jacksonville

Latitude and Longitude

30 degrees, 25 minutes, 21 seconds north latitude 3

81 degrees, 36 minutes, 23 seconds west longitude

UTMs

Section, Township, and Range

Section 46, Township 1S, Range 27E

Location of any Directly Associated Transmission Facilities (Counties)

Duval

Nameplate Generating Capacity

256 MW Fluidized Bed Boiler Plant 43 MW Kraft Recovery Boiler

Capacity of Proposed Additions and Ultimate Site Capacity (where applicable)

Total of 299 MW nameplate additions; no ultimate site capacity request.

Remarks: (Additional information that will help identify the applicant)

AES Cedar Bay, Inc., is a wholly owned subsidiary of Applied Energy Services, Inc., of Arlington, Virginia.

Seminole Kraft Corporation is a privately held corporation. Stone Container Corporation of Chicago, Illinois, owns 49 percent interest in Seminole Kraft Corporation.

ACRONYMS AND ABBREVIATIONS

AAQS	Ambient Air Quality Standards
AES-CB	AES Cedar Bay, Inc.
AFBC	Atmospheric fluidized bed combustion
AQCS	Air Quality Control System
AREA	American Railroad Engineering Association
BACT	Best Available Control Technology
BB	Bark boiler
BOD	Biochemical oxygen demand
BTU	British thermal unit
Btu/h	British thermal units per hour
CFB	Circulating fluidized bed
cfs	Cubic feet per second
CO	Carbon monoxide
COD	Chemical oxygen demand
dBA	Decibels (A-weighted)
EPA	Environmental Protection Agency
EPRI	Electric Power Research Institute
ERM	Environmental Resources Management - South, Inc.
F	Degrees Fahrenheit
FAC	Florida Administrative Code
FCG	Florida Electric Power Coordinating Group
FCREPA	Florida Committee on Rare & Endangered Plants & Animals
FDA	Florida Department of Agriculture
FDER	Florida Department of Environmental Regulation
FGD	Flue gas desulfurization
FGFWFC	Florida Game and Fresh Water Fish Commission
FNAI	Florida Natural Areas Inventory
FPL	Florida Power & Light
FPSC	Florida Public Service Commission
F.S.	Florida Statutes
GEP	Good Engineering Practice
gpd	Gallons per day

gpm	Gallons per minute
gr/dscf	Grains per dry standard cubic foot
GWH	Gigawatt hours
HgA	Mercury, absolute
HRSG	Heat recovery steam generator
IGCC	Integrated gas combined cycle
IH	Heavy Industrial District
ISCST	Industrial Source Complex Short-Term
IW	Waterfront Industrial District
JEA	Jacksonville Electric Authority
kg	Kilograms
km	Kilometers
KRB	Kraft recovery boiler
LAER	Lowest achievable emission rate
lb/h	Pounds per hour
lb/MBtu	Pounds per million British thermal units
LETCO	Law Engineering and Testing Company
LOLP	Loss of load probability
LTRS	Long term reserve shutdown
m	Meters
MBtu/h	Million British thermal units per hour
MEE	Multiple effect evaporators
mgd	Million gallons per day
mg/l	Milligrams per liter
mg/m^3	Milligrams per cubic meter
mm	Millimeters
msl	Mean sea level
m/s	Meters per second
m/sec	Meters per second
MW	Megawatts
MWh	Megawatt hour
NEMA	National Electrical Manufacturers Association
NML	Noise monitoring location

NO_x	Nitrogen oxides
NPDES	National Pollutant Discharge Elimination System
NSPS	New Source Performance Standards
NWS	National Weather Service
OR	Open Rural District
PB	Power boiler
PC	Pulverized coal
pCi/l	Picocuries per liter
PM_{10}	Particulate matter less than 10 microns
ppm	Parts per million
ppmvd	Parts per million by volume dry
PSC	Florida Public Service Commission
PSD	Prevention of Significant Deterioration
psig	Pounds per square inch, gauge
PTPLU-2	Screening level point source dispersion model
SACTI	Seasonal/annual cooling tower impact
SCA	Site Certification Application
scfm	Standard cubic feet per minute
SCR	Selective catalytic reduction
SCS	Soil Conservation Service
SDT	Smelt dissolving tank
SIP	State Implementation Plan
SJRPP	St. John's River Power Park
SK	Seminole-Kraft
SO_2	Sulfur dioxide
STP	Sewage treatment plant
TDS	Total dissolved solids
TECO	Tampa Electric Company
TOC	Total organic carbon
tpy	Tons per year
TRS	Total reduced sulfur
TSP	Total suspended particulate
TSS	Total suspended solids

ug/m^3	Micrograms per cubic meter
UNAMAP	User's Network for the Applied Modeling of Air Pollution
UPS	Unit Power Sales
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
UTM	Universal Transverse Mercator
VOC	Volatile organic compounds

SITE CERTIFICATION
APPLICATION

THE CEDAR BAY COGENERATION PROJECT

VOLUME 2

Submitted by AES/Cedar Bay Inc.

2.0 SITE AND VICINITY CHARACTERIZATION

2.1 SITE AND ASSOCIATED FACILITIES DELINEATION

This section provides information concerning the geographic location of the proposed site. This section also provides maps showing the area, communities in the vicinity, adjacent properties, and existing and proposed uses of the site.

2.1.1 Site Location

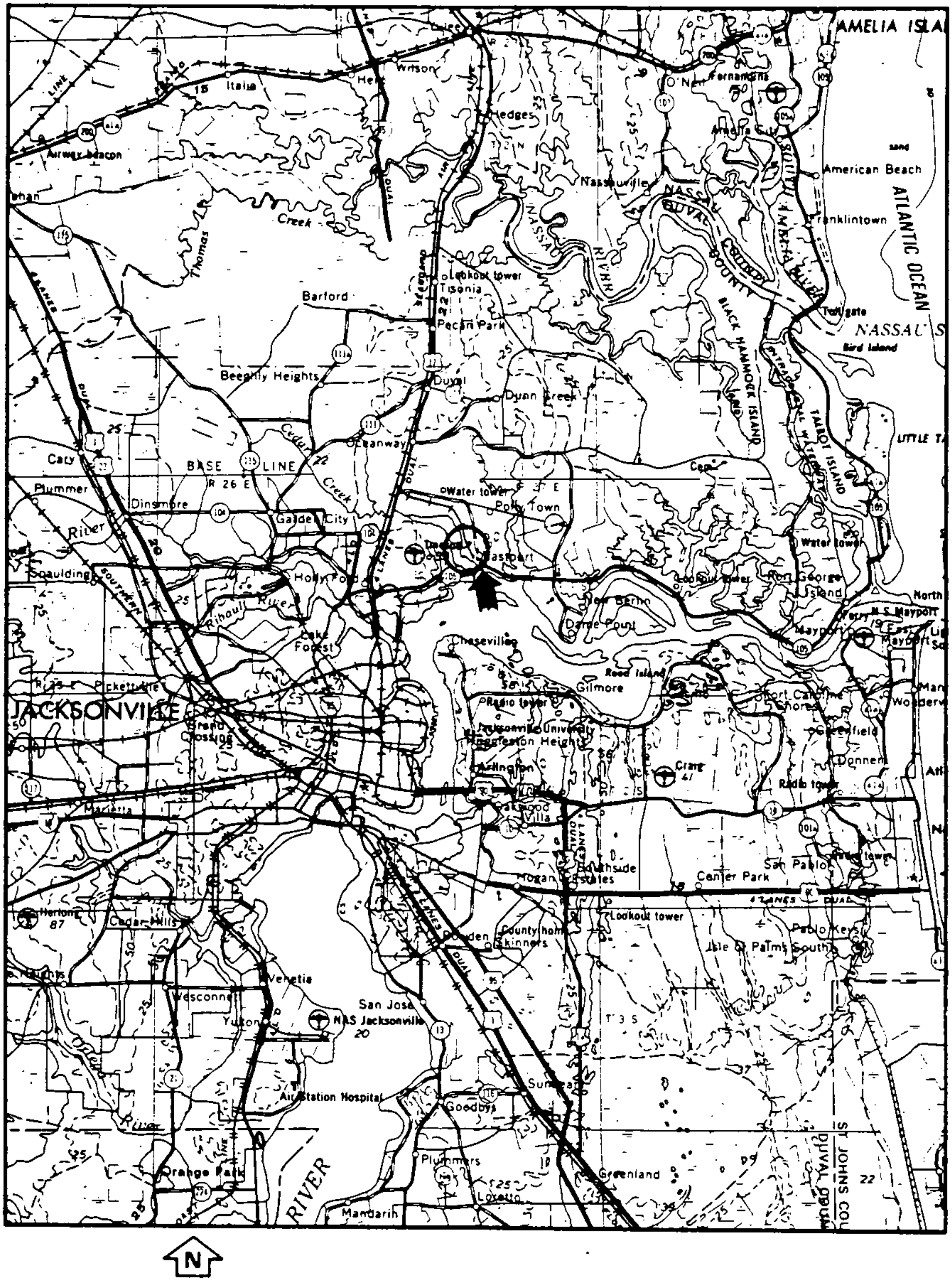
The Cedar Bay Cogeneration Project site is located in Duval County, Florida. The geographic coordinates of the cogeneration plant chimney are approximately 30 degrees 25 minutes 21 seconds north latitude and 81 degrees 36 minutes 24 seconds west longitude. The geographic coordinates of the kraft recovery complex chimney are approximately 30 degrees 25 minutes 24 seconds north latitude and 81 degrees 36 minutes 25 seconds west longitude. The site is located in Section 46, Range 27 East, Township 1 South. This section is shown on the USGS 7-1/2 minute series, Eastport, Florida, Quadrangle. The site location relative to the Jacksonville, Florida, area is shown on Figures 2.1-1 and 2.1-2. The cross-hatched area on Figure 2.1-2 indicates the existing Seminole Kraft paper mill property boundaries. The owners of property abutting or adjacent to the Seminole Kraft Mill are Zion Jacksonville Limited Partnership, Champion International Corp., and Amerada Hess Corporation.

2.1.2 Site Modification

The total existing mill site consists of 425 acres. The new facilities will occupy approximately 28 of these acres. The location of the new facilities on the site relative to adjacent properties and the existing mill is shown on Figure 2.1-3. All property adjacent to the cogeneration plant is owned by Seminole Kraft.

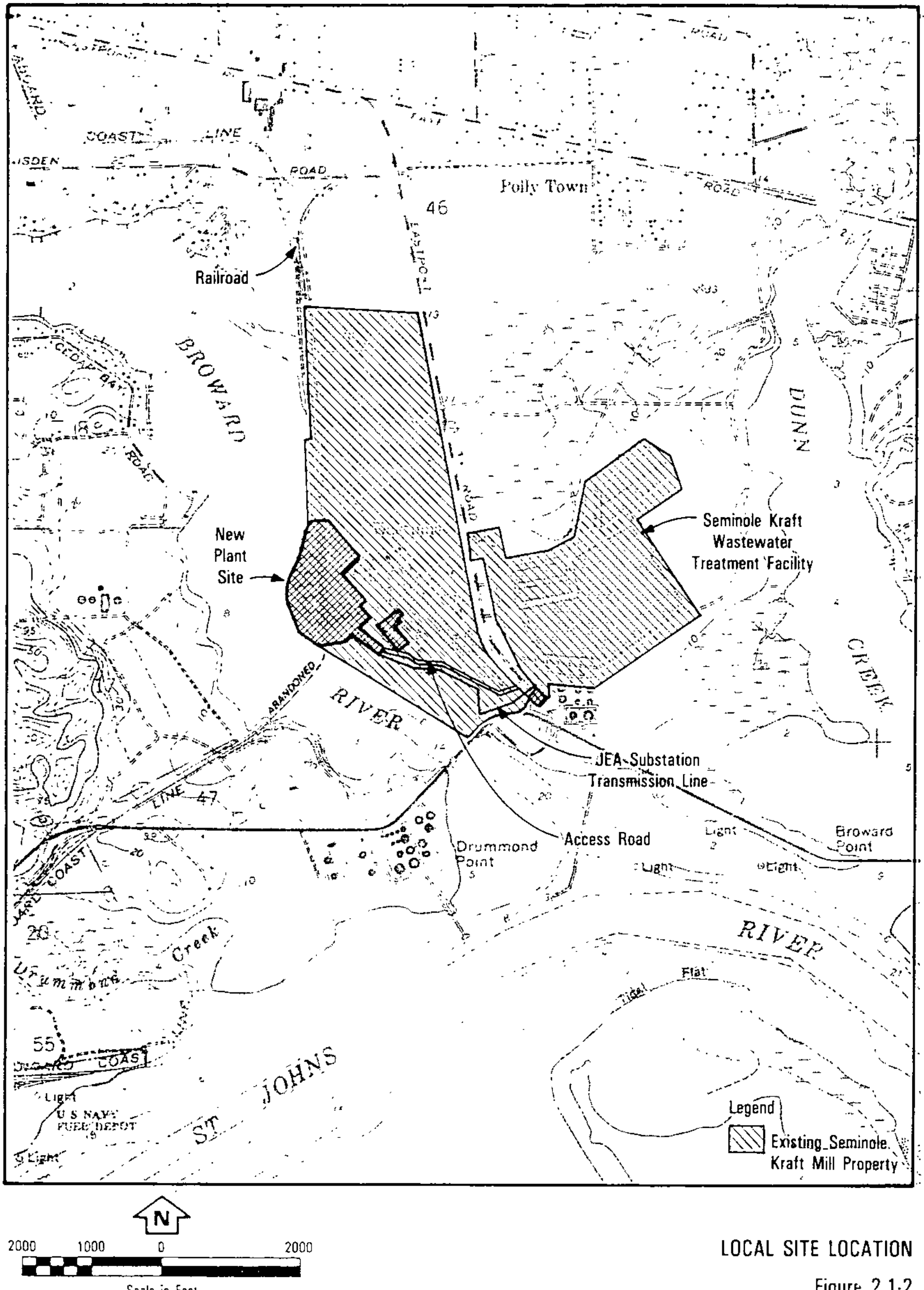
2.1.3 Existing and Proposed Uses

Presently, most of the overall site is occupied by the Seminole Kraft paper mill. The eastern portion of the overall site is occupied by the wastewater treatment facilities for the paper mill. The western portion is



REGIONAL SITE LOCATION

Figure 2.1-1



LOCAL SITE LOCATION

Figure 2.1-2

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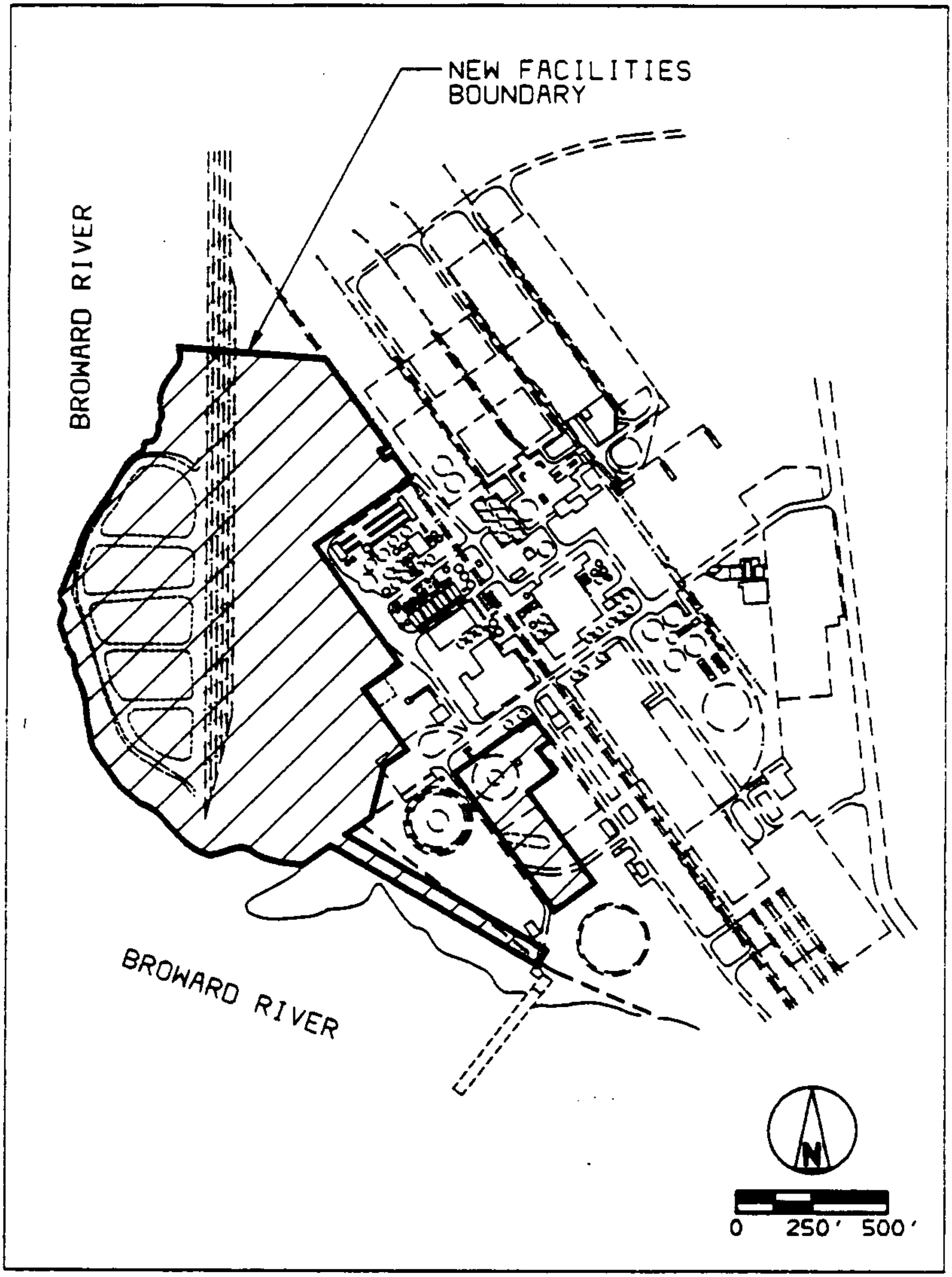

NEW FACILITIES LOCATION

Figure 2.1-3

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occupied by the mill facilities, wood storage yard, and lime mud settling
ponds and storage areas. The new cogeneration project will be located west 2
of the existing mill power plant and east of the Broward River. The area
to be occupied by the cogeneration plant is currently used for storage of
lime mud from the mill and construction debris. An oil tank is located in
the vicinity of the proposed kraft recovery boiler facilities. A rail yard 2
is located on the west side of the site. No other proposed uses for the
site are known. Site preparation is described in Subsection 4.1.4.

2.1.4 100-Year Flood Zone

A 1.5-acre area in the southwestern portion of the site is within the
100-year flood zone, as shown on Figure 2.1-4. A portion of the railroad 2
for the new cogeneration plant will be located in the 1.5-acre area currently in the 100-year base flood plain. The base flood elevation is 7 feet national geodetic vertical datum. Proposed flood protection measures are described in Subsection 4.1.3.

2.2 SOCIO-POLITICAL ENVIRONMENT

2.2.1 Governmental Jurisdictions

The proposed cogeneration facility site and the area within a 5-mile radius of the site are within the city limits of Jacksonville, Florida, which encompasses most of Duval County.

Figure 2.2-1 shows the 1-, 2-, 3-, 4-, and 5-mile radii centered on the cogeneration facility chimney. As shown on the map, the proposed site property adjoins the Broward River to the west, is less than 1 mile from the St. Johns River to the south, and is a little more than 1 mile from Dunn Creek to the east.

Two historic sites are shown on Figure 2.2-1 within the 5-mile radius of the site. Approximately 3-1/2 miles to the southeast of the site is the Yellow Bluff Fort on New Berlin Road. Approximately 3 miles southwest of the site is the Napoleon Bonaparte Broward home. A government area, the US Navy Fuel Depot, is just over 2 miles southwest of the facility site. A

3.0 THE PLANT AND DIRECTLY ASSOCIATED FACILITIES

3.1 BACKGROUND

The proposed Cedar Bay Cogeneration Plant and paper mill kraft recovery boiler complex, together with their supporting equipment and facilities, are shown on Figure 3.1-1.

The cogeneration plant consists of a single steam turbine-driven electrical generator with steam supplied by three circulating fluidized bed boilers. A large quantity of steam is extracted from the turbine and transported to Seminole Kraft for use as process steam. Three boilers are proposed for the following reasons.

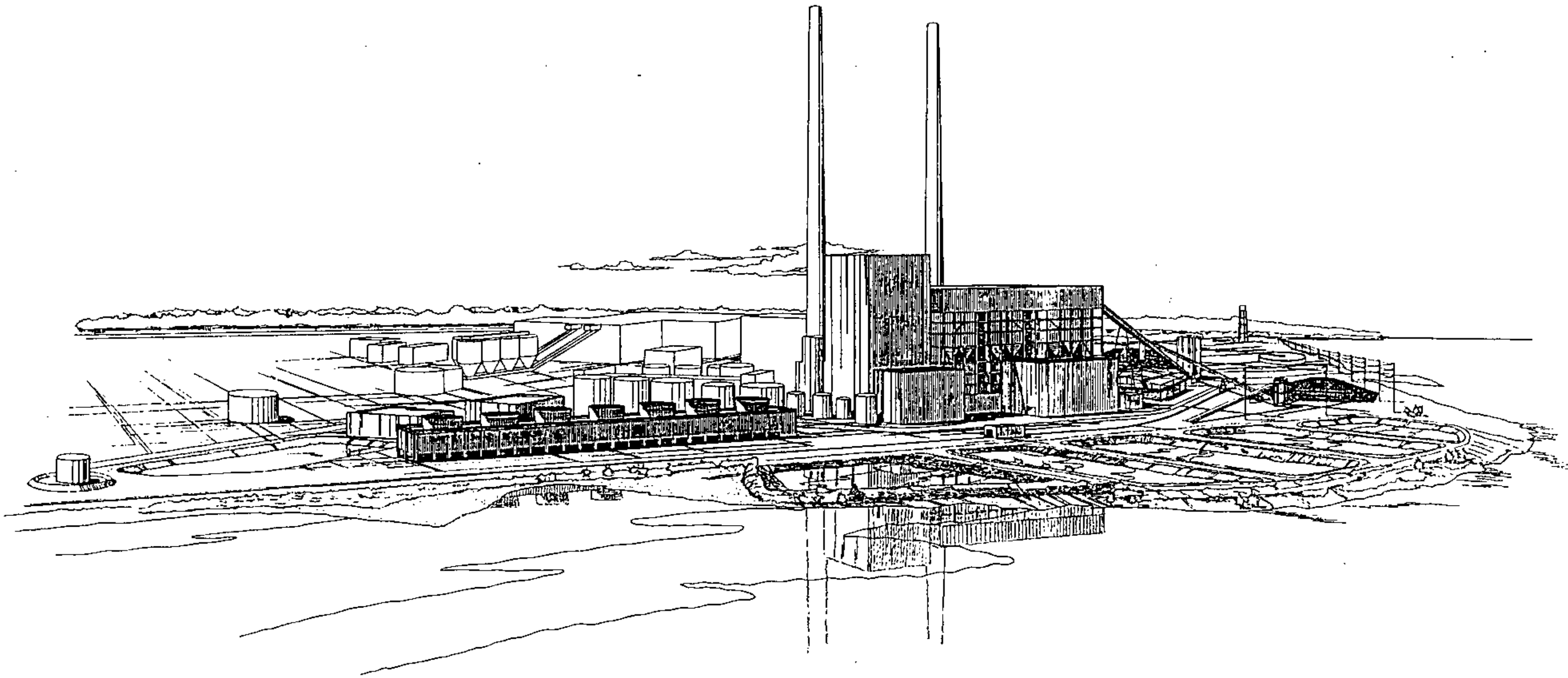
- Boilers with the capacity of the one-third capacity size have been designed and successfully operated. Boilers of the half-capacity or full capacity size would require design extrapolation and would be more subject to development problems.
- Three boilers will enhance availability of the plant. The loss of one boiler will reduce plant capacity by less than one third.

Flue gas desulfurization will be accomplished in the fluidized bed boilers. Separate fabric filters will be provided for each boiler to remove particulates from the flue gas stream. The selection of fabric filters is discussed in Section 3.4. 3

Cycle heat rejection is planned to be accomplished with rectangular, wooden, mechanical draft cooling towers as discussed in Subsection 8.2.1. The cogeneration cooling towers will be sized to also reject the heat from the kraft recovery boiler complex turbine exhaust and evaporator/ concentrator condenser. Well water will be used for cooling tower makeup, as discussed in Subsection 3.5.1.

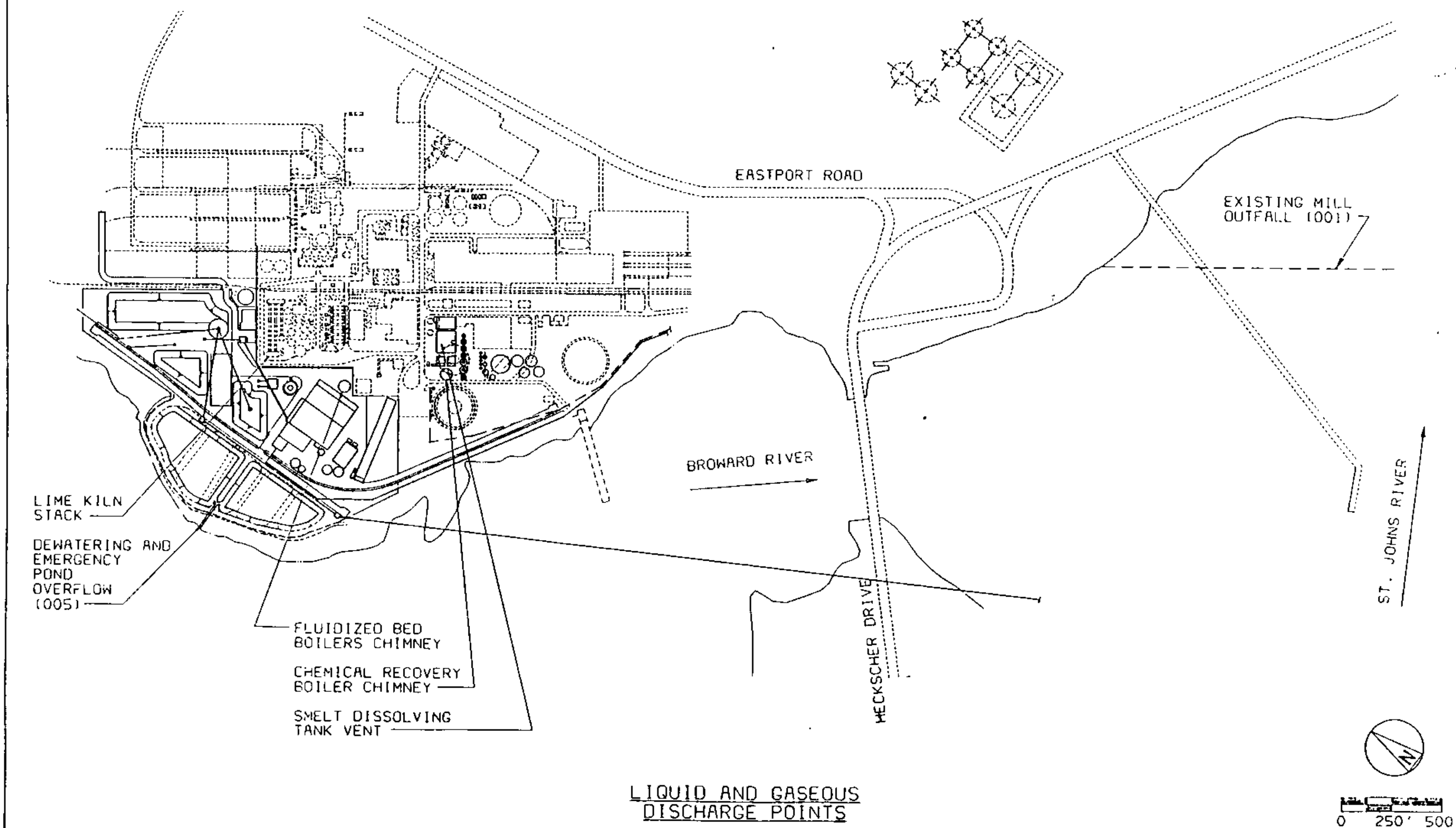
The steam cycle equipment (condenser, condensate pumps, boiler feed pumps, deaerator, feedwater heaters, and piping and valves) will be typical of central electric generating stations.

The kraft recovery boiler complex includes a kraft recovery boiler sized to recover the chemicals from the black liquor produced in the



PROPOSED CEDAR BAY COGENERATION
PLANT AND PAPER MILL KRAFT
RECOVERY BOILER COMPLEX

Figure 3.1-1



LIQUID AND GASEOUS
DISCHARGE POINTS

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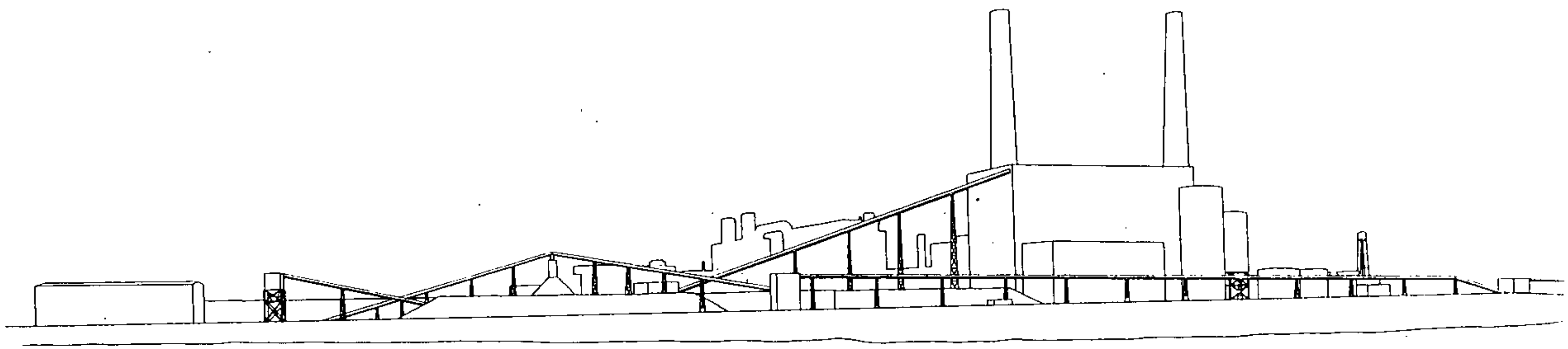
Amendment 2

LIQUID AND GASEOUS DISCHARGE POIN

Figure 3



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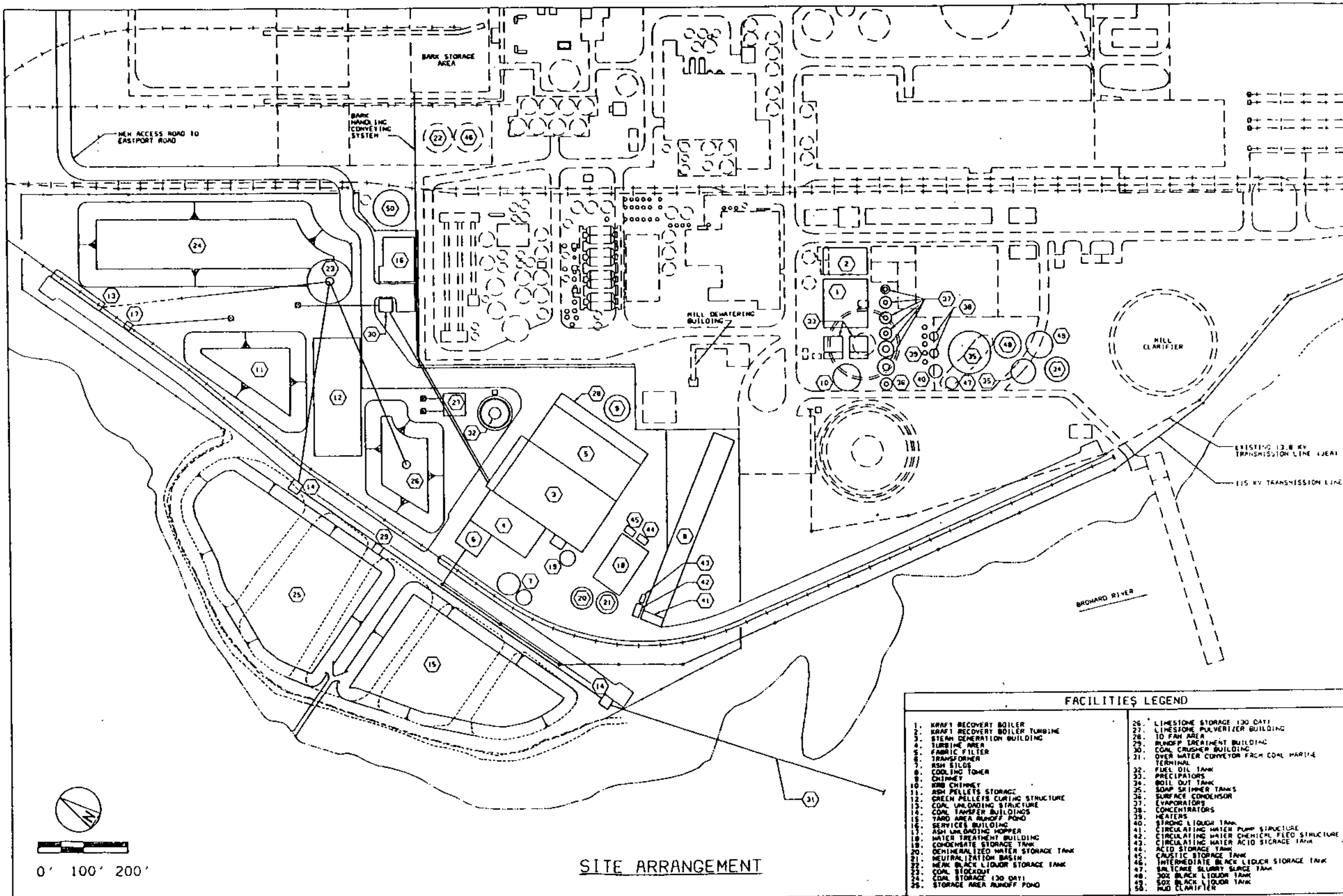
GENERAL PLANT PROFI
LOOKING EAST SOUTHEAS

Figure 3.2



FACILITIES LEGEND

1. KRAFT RECOVERY BOILER
2. KRAFT RECOVERY BOILER TURBINE
3. STEAM GENERATION BUILDING
4. TURBINE AREA
5. FABRIC FILTER
6. TRANSFORMER
7. ASH SILOS
8. COOLING TOWER
9. CHIMNEY
10. KRB CHIMNEY
11. ASH PELLETS STORAGE
12. GREEN PELLETS CURING STRUCTURE
13. COAL UNLOADING STRUCTURE
14. COAL TANSFER BUILDINGS
15. YARD AREA RUNOFF POND
16. SERVICES BUILDING
17. ASH UNLOADING HOPPER
18. WATER TREATMENT BUILDING
19. CONDENSATE STORAGE TANK
20. DEMINERALIZED WATER STORAGE TANK
21. NEUTRALIZATION BASIN
22. WEAK BLACK LIQUOR STORAGE TANK
23. COAL STOCKOUT
24. COAL STORAGE (30 DAY)
25. STORAGE AREA RUNOFF POND
26. LIMESTONE STORAGE (30 DAY)
27. LIMESTONE PULVERIZER BUILDING
28. ID FAN AREA
29. RUNOFF TREATMENT BUILDING
30. COAL CRUSHER BUILDING
31. OVER WATER CONVEYOR FROM COAL MARINE TERMINAL
32. FUEL OIL TANK
33. PRECIPATORS
34. BOIL OUT TANK
35. SOAP SKIMMER TANKS
36. SURFACE CONDENSOR
37. EVAPORATORS
38. CONCENTRATORS
39. HEATERS
40. STRONG LIQUOR TANK
41. CIRCULATING WATER PUMP STRUCTURE
42. CIRCULATING WATER CHEMICAL FEED STRUCTURE
43. CIRCULATING WATER ACID STORAGE TANK
44. ACID STORAGE TANK
45. CAUSTIC STORAGE TANK
46. INTERMEDIATE BLACK LIQUOR STORAGE TANK
47. SALTCAKE SLURRY SURGE TANK
48. 30% BLACK LIQUOR TANK
49. 50% BLACK LIQUOR TANK
50. MUD CLARIFIER

SITE ARRANGEMENT

Figure 3.2-1

Amendment 1
021089
Amendment 2

pulping operation of the Seminole Kraft paper mill. The complex also includes a steam turbine-driven generator sized to generate electric power requirements for the paper mill. Wet bottom electrostatic precipitators are provided for the kraft recovery boiler as discussed in Section 3.4.

3.2 SITE LAYOUT

Figure 3.2-1 shows the proposed layout for the cogeneration project, chemical recovery boiler, and associated facilities. The new facilities will occupy all of the 28-acre portion of the site between the mill, lime settling ponds, and the Broward River.

A general plant profile of the new facilities is shown on Figure 3.2-2. This profile is based on the elevations of the various facilities as viewed from the west looking east. The elevations and dimensions shown on Figure 3.2-2 are preliminary and may change as detailed engineering design proceeds.

Figure 3.2-3 shows the existing and proposed new release points for liquid and gaseous wastes. Wastewaters will be treated and discharged using the existing outfall into the St. Johns River, as discussed in Sections 3.5 and 3.6. Surface runoff from the fuel, limestone, and ash storage areas will be collected in the Fuel Area Runoff Pond as discussed in Section 3.8. The water will be treated as required and discharged via the existing Seminole Kraft treatment system. The surface runoff from other areas will be collected in the Yard Area Runoff Pond, detained, and released via the existing outfall as discussed in Section 3.8.

The primary new gaseous waste discharge points are the two chimneys for the fluidized bed boilers and the chemical recovery boiler, and the vent from the smelt dissolving tank. The amount of gaseous waste and impacts are discussed in Sections 3.4 and 5.6.

3.3 FUEL

3.3.1 Fuel Types and Qualities

The primary fuel for the Cedar Bay Cogeneration Plant will be coal. Although the coal supply contract for the plant has not been finalized, it is anticipated that bituminous coal will be used. It is also anticipated that the coal supply may change in the future with the renegotiation of coal supply contracts. To provide the necessary design flexibility to accommodate the use of coals with a wide range of properties, a generalized design-basis coal has been selected for use with the steam generators and particulate removal system. Designing these major components to handle this coal will provide the overall system design flexibility to burn other coals with similar properties. Properties of the design-basis coal are shown in Table 3.3-1.

The three steam generators will also be designed to burn wood waste, consisting primarily of bark, in conjunction with the primary fuel. Wood waste will be provided from the adjacent Seminole Kraft pulp and paper mill. Transport, storage, and firing equipment for wood waste combustion, however, will be provided for only two of the three steam generators. Each steam generator will be capable of firing wood waste at a rate equivalent to 10 percent of the total heat input to the steam generator at maximum continuous rating. Within the control range of the steam generator, the wood waste feed rate will be constant, with the load fluctuations handled by adjusting the primary fuel feed rate. Typical properties of wood waste are shown in Table 3.3-2.

The steam generators will be started with No. 2 fuel oil. During periods of low load operation, No. 2 fuel oil will also be used for stabilization. The emergency fire pump, mobile coal handling equipment, and other vehicles will use gasoline or diesel fuel.

3.3.2 Fuel Quantities

Based on the design coal in Table 3.3-1, the coal consumption rate will be 145 tons per hour. At the design capacity factor of 87 percent, the annual coal consumption for the cogeneration plant would be 1,105,000 tons per year.

Based on operation with a combination of design-basis coal and wood waste, the wood waste consumption rate for each steam generator will be approximately 8 tons per hour. The annual wood waste consumption, assuming

TABLE 3.3-1. COAL PROPERTIES

Proximate Analysis	Design-Basis Coal
Moisture, percent (maximum)	15
Ash, percent (maximum)	15
Volatile Matter, percent (minimum)	25
Fixed Carbon, percent (minimum)	45
Higher Heating Value, Btu/lb (minimum)	11,000
Sulfur, percent (maximum)	3.3

TABLE 3.3-2. WOOD WASTE PROPERTIES

Fuel Analysis	Typical
Heating Value, Btu/lb	6,791
Carbon, percent (dry basis)	50.11
Hydrogen, percent (dry basis)	6.08
Nitrogen, percent (dry basis)	0.26
Sulfur, percent (dry basis)	0.012
Chloride, percent (dry basis)	0.061
Oxygen, percent (dry basis)	41.67
Ash, percent (dry basis)	1.804
Moisture (as received)	34.89

the availability of sufficient fuel, would be approximately 66,000 tons per year for each steam generator.

It is estimated that each of the three steam generators will experience 5 cold and 12 hot startups per year during each year of operation. This will require 160,000 gallons of No. 2 fuel oil per year.

3.3.3 Fuel Transportation

The plant is being designed for coal to be delivered to the plant site by unit train railcars, as described in Section 6.3. For 90-car unit trains, 120 trains per year or one train every three days will be required to supply the plant. 3

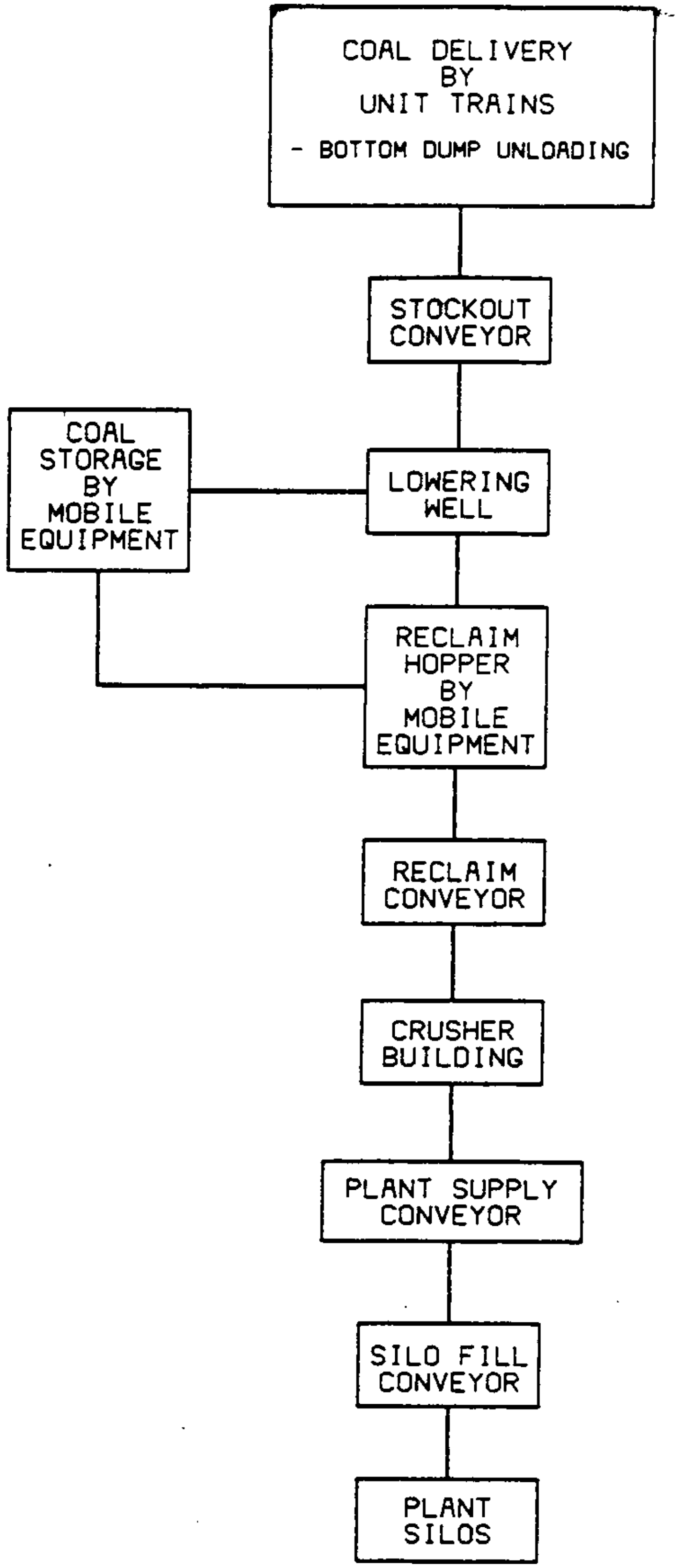
Fuel oil will be shipped to the plant by truck or rail, depending on the supplier.

3.3.4 Coal Handling and Storage

The coal handling system will consist of unloading, stocking, reclaiming, and storing. Figure 3.3-1 shows a schematic of the coal handling process and Figure 3.3-2 shows the layout of the coal handling facilities.

The railcar coal unloading system will employ an enclosed bottom dumping type facility designed for bottom dump railcars. 3

Bottom dump unloading will be accomplished by positioning the bottom dump railcars over the receiving hopper and opening the railcar hopper doors to unload the coal. Cars will be unloaded at a rate of 6 to 15 cars per hour. 3



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COAL HANDLING PROCESS DIAGRAM

Figure 3.3-1

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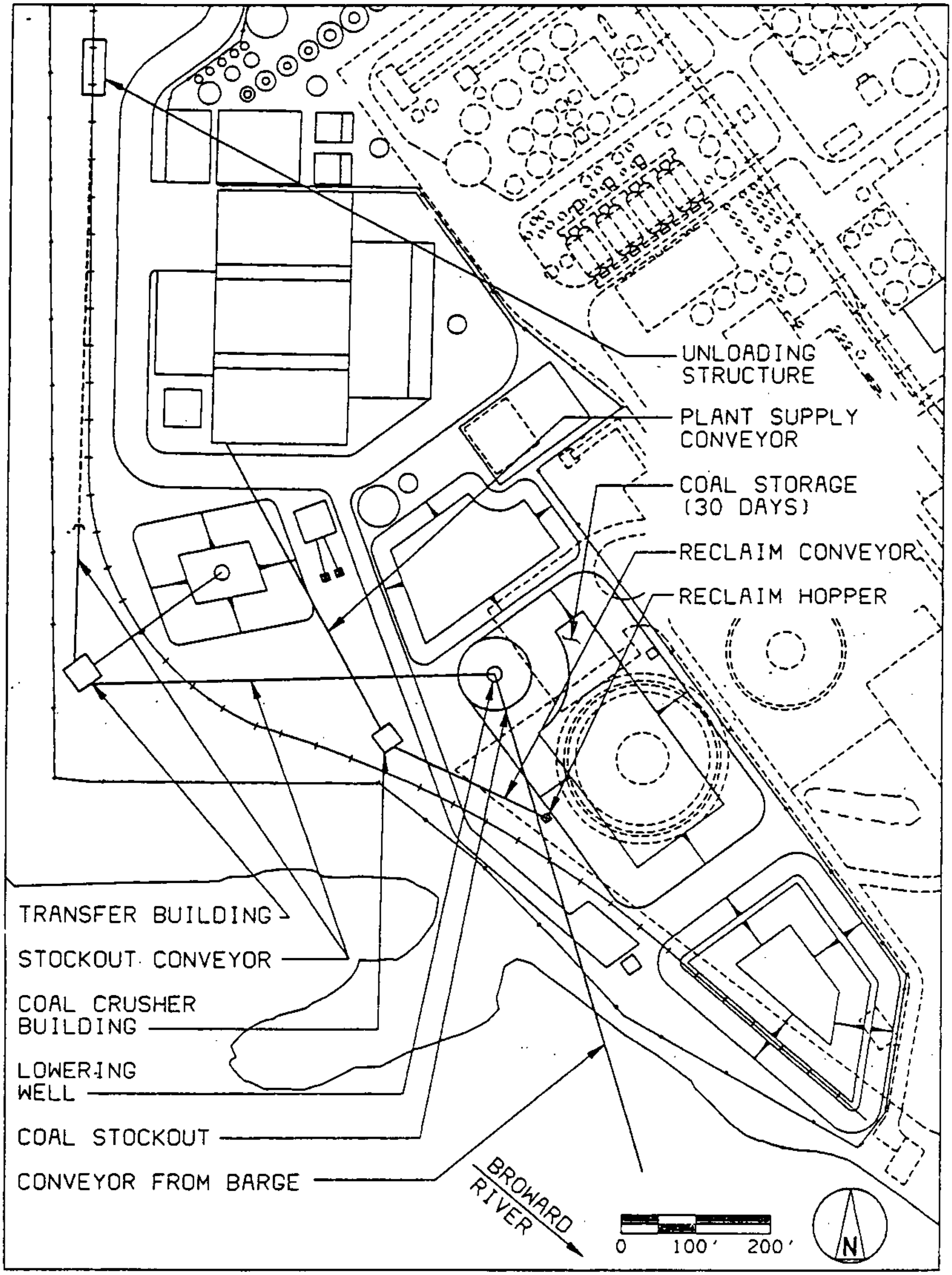

COAL HANDLING SITE PLAN

Figure 3.3-2

Associated rail facilities and car marshalling are described in Section 6.3. 3

The coal stockout system for railcar unloading will consist of a conveyor loaded automatically from the receiving hopper. Coal will be conveyed to the coal storage lowering well which will allow for the discharging of coal through openings in the walls of the concrete structure. Mobile equipment will be used to transfer coal from the lowering well to the coal storage pile or the reclaim system.

The coal and ash storage areas will be lined with a synthetic material 2
placed over a prepared subgrade to minimize seepage of leachate into the ground water.

The coal storage area will consist of approximately 105,000 tons of coal and will be located north of the Steam Generation Building. The coal 2
storage will provide approximately 30 days of coal at the maximum burn rate of the power plant.

The coal reclaim system will consist of either mobile equipment to reclaim and load coal into an above grade hopper or an automatic reclaim system. The reclaim system will supply coal to a conveyor to the Coal Crusher Building. The discharge end of the conveyor will have a magnetic separator to remove tramp iron from the coal stream. The conveyor will also be equipped with a scale to provide inventory control of the coal storage system.

The coal crushing and silo fill system will crush the coal to an acceptable size and transport it by conveyor to the coal silos located in the Steam Generation Building. An as-fired coal sample will be taken prior to distribution of coal to the silos.

Fugitive dust associated with handling of coal will be controlled with enclosures, water sprays, compaction, and bag filter dust collection. Coal conveyors not underground or within enclosed buildings will have covers.

Conveyors will have loading skirts and head pulley enclosures with deck plate. Dust pickup hoods will be located at each material and conveyor transfer point to reduce fugitive dust.

The receiving structure will be provided with an enclosed superstructure. A dust collector will collect dust from the car discharge area inside the enclosure and from the conveying equipment beneath the track hopper.

The stockout lowering well will be a cylinderical concrete structure with rectangular openings staggered around the perimeter. Each opening will be equipped with a flop gate. When the coal reaches the level of an opening, the flop gate will open, allowing the coal to discharge to the pile with a short length of coal free fall. A top cover for the tower will minimize dust emission during coal stockout.

Water sprays will be used as required to reduce fugitive dust from the coal pile and mobile equipment operations. The coal pile will be compacted to reduce fugitive dust.

3.3.5 Fuel Oil Storage and Handling

The fuel oil, as received, will be unloaded and pumped to a storage tank. No. 2 fuel oil will be stored in a 60,000-gallon tank, located north of the main generating facilities. A spill-containment dike will be provided around the tank. Pumps located at the storage tank facility will supply fuel oil to the steam generator igniters in the main plant building.

3.3.6 Alternate Fuel Types

Design provisions have been included to allow the burning of wood waste in conjunction with coal up to a maximum of 10 percent wood on a Btu basis. Wood waste will be pneumatically conveyed from the bark storage area to two live bottom storage bins located at the Steam Generator Building. A drag chain conveyor will distribute the wood waste to the steam generator bark feed chutes.

3.4 AIR EMISSIONS AND CONTROL

3.4.1 Air Emission Types and Sources

The cogeneration project is subject to the permitting requirements of the Prevention of Significant Deterioration (PSD) program. PSD permit requirements apply because the net emissions increase of at least one regulated pollutant exceeds the "significant" levels defined by EPA and FDER. The air quality assessment for all applicable pollutants must meet PSD permit requirements including a Best Available Control Technology (BACT) determination.

Net pollutant emissions are determined by comparing emission rates of the proposed facility against those of the existing Seminole Kraft sources to be replaced. The replaced sources will be three power boilers (PB), two bark boilers (BB), three kraft recovery boilers (KRB), and three smelt dissolving tanks (SDT). An emissions inventory of these sources was compiled for the years 1978 through 1987. Although below the maximum capacity of the mill, the period 1983-1984 was found to be the most representative back-to-back years of normal operataing conditions. The 1979-1980 operating period was originally selected as the most representative operating period in the AES Power Plant Site Certification Application. However, additional examination of the mill's records determined that sharp increases in fuel costs during 1980-1981 had caused the plant to adjust fuel usage to minimize oil consumption and, as a result, reduced pulp production in 1982. 3
Therefore, a period after 1982 is more representative of current operations.

Limited plant operating hours in 1985 and 1987, and a plant shutdown in 1986 preclude the 1985-1987 data from further consideration. The operating conditions in 1983-1984 best represent normal plant operations as evidenced by pulp production rates and fuel oil usage rates. Thus, the 1983-1984 data will be used as representative of the normal operating condition at the existing pulp mill. These rates are shown in Table 3.4-1.

The 1983-1984 emissions are shown in Table 3.4-1a. The total actual emissions of the existing sources have been adjusted to represent the effect of recent control techniques and an imposed particulate emission limit. Specifically, the SDT emissions are adjusted to reflect a reduction

TABLE 3.4-1. PUMP PRODUCTION RATES AT SEMINOLE KRAFT (1979-1988)

Year	Pulp Production tons ADUP	Fuel Oil Burned 10^6 gallons	
1979	464,198	36.5	
1980	478,134	34.4	
1981	441,520	34.5	
1982	345,698	25.7	
1983	410,238	25.5	3
1984	436,032	23.6	
1985	273,614*	14.6	
1986	Mill Shutdown	Mill Shutdown	
1987	281,352*	24.9	
1988	415,904	28.8	

*Operational 9 months in year.

TABLE 3.4-1a. REPRESENTATIVE (1983-1984) EXISTING SEMINOLE KRAFT EMISSIONS (TONS PER YEAR)

Pollutant	PB	BB	KRB	SDT	Total
TSP	180.8	144.2	427.2	122.6	874.8
PM_{10}	128.4	125.5	320.5	109.7	684.1
SO_2	4,294	118.4	1,481	8.6	5,902
NO_x	807.3	393.4	321.1	—	1,522
CO	60.3	545.8	2,327	—	2,933
VOC	9.2	190.8	340.2	—	540.2
TRS	—	—	89.3	8.9	98.2

Legend:
PB = Power boilers (3 total)
BB = Bark boilers (2 total)
KRB = Kraft recovery boilers (3 total) 3
SDT = Smelt dissolving tanks (3 total)
TSP = Total suspended particulate
PM_{10} = Particulate under 10 microns
SO_2 = Sulfur dioxide
NO_x = Nitrogen oxides
CO = Carbon monoxide
VOC = Volatile organic compounds
TRS = Total reduced sulfur
-- = Negligible amount

NOTES:

1. Totals may vary because of rounding.
2. Emissions reflect current operational configuration with adjustments made to actual data as discussed in Subsection 3.4.1.

in total reduced sulfur (TRS) due to the recent replacement of the vent filters in 1988. Also, the TSP emissions were adjusted to reflect the current particulate emission limit for the power boilers (See the Consent Order, Section 10.4.). The limiting standard for particulate emissions was 0.2 lb/MBtu during 1983 and 1984. The current limiting standard is
0.1 lb/MBtu. Since the operation of the mill's power boilers during 1983 3
and 1984 would not reflect operation in compliance with today's standard, the TSP emissions were adjusted. The adjusted emissions were computed by assuming the boilers emitted 0.1 lb/MBtu of TSP for the fuel use rates and
operating hours in 1983 and 1984. The formula for calculation is as fol- 3
lows.

$$TSP\ (tpy) = \frac{ABHI\ (MBtu/yr) \times 0.1\ (lb\ TSP/MBtu)}{2{,}000\ (lb/ton)}$$

where

ABHI = actual boiler heat input for the year (1979 or 1980) based on fuel usage.

For particulates less than 10 microns in diameter (PM_{10}), the emissions are determined according to the percentage of total suspended particulate (TSP) given in EPA's Compilation of Emissions Factors (AP-42).

Short-term air quality modeling is based on the maximum allowable emission rates for the existing Seminole Kraft sources. These emission rates are determined from the available information included in operating permits. For any pollutant not included in the operating permit, the maximum allowable emission rate is calculated using maximum operating conditions (as specified in the permit) and AP-42 emission factors.

Table 3.4-2 summarizes the maximum expected emissions for the proposed facility. The Cedar Bay facility will consist of a cogeneration plant with three coal fired circulating fluidized bed boilers, a kraft recovery boiler, a smelt dissolving tank, a multiple effect evaporator, two limestone dryers, and various material handling operations. Emission estimates for the kraft
recovery boiler, smelt dissolving tank, multiple effect evaporator, and 3
limestone dryers are based on the Cedar Bay facility operating at maximum

TABLE 3.4-2. MAXIMUM EXPECTED EMISSIONS FOR THE CEDAR BAY COGENERATION FACILITY (TONS PER YEAR)*

Pollutant	Cogeneration Plant	Kraft Recovery Boiler	Smelt Dissolving Tank	Limestone Dryers	Multiple Effect Evaporator	Material Handling	Total**
Carbon Monoxide	2,468	2,167	--	1.63	—	--	4,637
Nitrogen Dioxide	4,676	1,618	--	6.54	—	--	6,301
Sulfur Dioxide	4,015	1,486	10	13.8	--	--	5,525
Particulate Matter	260	469	74.9	—	--	8	812
Particulate Matter (PM_{10})	257	351	67	—	--	8	683
Ozone (VOC)	208	248	--	0.06	—	—	456
Lead	91	0.21	--	0.0003	—	—	91.2
Arsenic	154	—	--	0.0002	—	—	154
Asbestos	—	—	--	--	—	—	--
Beryllium	1.5	0.016	--	0.03	—	—	1.5
Mercury	3.4	—	—	--	—	—	3.4
Vinyl Chloride	—	—	—	—	—	—	--
Fluorides	1,122	—	--	0.003	—	—	1,122
Radionuclides	***	—	—	--	—	—	**
Sulfuric Acid Mist	308	13.3	--	0.26	--	—	322
Total Reduced Sulfur	—	32.9	12	--	2	—	47
Polycyclic Organic Matter	30	6.7	--	—	--	—	36.7
Chlorine	0	14.3	1.2	0.022	—	—	607
Barium	1.5	—	--	0.0003	—	—	1.5
Zinc	35	—	--	0.0009	--	—	35
Vanadium	4.5	—	--	0.91	—	—	5.4
Cadmium	1.6	—	--	0.09	—	—	1.7
Nickel	49	—	--	0.13	—	—	49
Cobalt	18	—	--	0.0009	--	—	18
Chromium	33	1.0	0.01	0.0003	--	—	34
Copper	2.6	—	—	0.0009	—	—	2.6
Manganese	397	—	—	0.0009	—	—	397
Hydrogen Sulfide	—	25.1	9.7	—	—	—	34.8
Methyl Mercaptan	—	6.3	3.6	—	—	—	9.9
Hydrogen Chloride	591	0.7	0.06	0.022	—	—	591.8
Phosphorus	1,772	—	—	—	--	—	1,772
Phenol	30	—	—	--	—	—	30
Pyridine	30	—	—	--	—	—	30
Acetaldehyde	30	—	—	—	--	—	30
Acetic Acid	30	—	—	--	—	—	30
Formaldehyde	2.9	—	--	--	--	—	2.9

*Assumes 93 percent capacity factor for the Cogeneration Plant; 100 percent for all other sources.

**Totals may vary because of rounding.

***It is estimated that radionuclide emissions will be approximately 0.15 Ci/year.

— = Negligible amount.

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load for the entire year. The emission estimates for the fluidized bed boilers are based on a capacity factor of 93 percent. 3

Annual emissions listed in Table 3.4-2 are based on the following emission rates.

- Cogeneration plant.
  - -- Sulfur dioxide = 0.31 lb/MBtu (at least 90 percent removal). 3
  - -- Nitrogen oxides = 0.36 lb/MBtu.
  - -- Carbon monoxide = 0.19 lb/MBtu.
  - -- Particulate = 0.02 lb/MBtu.
  - -- VOC = 0.016 lb/MBtu.
- Kraft recovery boiler.
  - -- Sulfur dioxide = 120 ppmvd corrected to 8 percent oxygen. 3
  - -- Nitrogen oxides = 180 ppmvd corrected to 8 percent oxygen.
  - -- Carbon monoxide = 400 ppmvd corrected to 8 percent oxygen.
  - -- Particulate = 0.044 gr/dscf corrected to 8 percent oxygen. 3
  - -- TRS = 5 ppmvd corrected to 8 percent oxygen.
  - -- VOC = 80 ppmvd corrected to 8 percent oxygen.
- Smelt dissolving tank.
  - -- TRS = 0.032 lb/ton black liquor solids.
  - -- Particulate = 0.20 lb/ton black liquor solids. 3

Applicable new source performance standards (NSPS) and Best Available Control Technology (BACT) emissions are given in Table 3.4-2a for comparison. Estimated maximum annual emissions resulting from use of fuel oil (startup, shutdown, flame stabilization) are presented in Table 3.4-2b. 2

The material handling emissions are estimated using AP-42 fugitive dust emission factors and conservative assumptions. The fugitive dust emissions from this project are minimized by numerous dust control methods. These methods vary from wet suppression of the active storage piles (50 percent control) to full enclosure and dust collectors (99 percent control). To conservatively estimate the potential controlled emissions, minimum control efficiencies are assumed for each control method. For example, conveyor covers are reported to control 70 to 90 percent of the fugitive dust generated. Also, dust collectors are generally considered 99 to 99.9 percent efficient. For this project, the lower range control efficiencies, 70 and 99 percent, are assumed for conveyor covers and dust collectors. Table 3.4-3 shows the material consumption during worst-case conditions and typical material characteristics that are assumed.

Table 3.4-5 identifies the fugitive dust sources and their associated
emissions at the Cedar Bay facility. This table shows that the dust con- 3
trol methods limit the fugitive dust emissions to approximately 8.0 tons
per year or 1.8 pounds per hour. The major fugitive dust sources at the
plant are the active coal storage pile (about 2.5 tons per year) and the
coal crusher (about 1.8 tons per year). The fugitive dust from the active
coal storage pile will be controlled by wet suppression to the pile. Con-
trols for the coal crusher include enclosures and dust collection to a
fabric filter baghouse.

TABLE 3.4-2a. EMISSION LIMITS FOR THE CEDAR BAY COGENERATION FACILITY

Pollutant	Circulating Fluidized Bed Boiler		Kraft Recovery Boiler		Smelt Dissolving Tank		Multiple Effects Evaporator	
	NSPS lb/MBtu	BACT lb/MBtu	NSPS lb/MBtu	BACT lb/MBtu	NSPS lb/MBtu	BACT lb/MBtu	NSPS lb/MBtu	BACT lb/MBtu
Carbon Monoxide	NA	0.19	NA	400 ppmvd @ 8% O_2	NA	NA	NA	NA
Nitrogen Dioxide	0.60	0.36	0.4	180 ppmvd @ 8% O_2	NA	NA	NA	NA
Sulfur Dioxide	0.60 70-90% Removal	*	NA	*	NA	NA	NA	NA
Particulate Matter	0.03	*	0.044 gr/dscf	*	0.2 lb/ton BLS	NA	NA	NA
Particulate Matter (PM_{10})	0.03	*	0.044 gr/dscf	NA	0.2 lb/ton BLS	NA	NA	NA
Ozone (VOC)	NA	*	NA	NA	NA	NA	NA	NA
Total Reduced Sulfur	NA	NA	5 ppmvd @ 8% O_2	*	0.033** lb/ton BLS	*	5 ppmvd @ 10% O_2	*

*No BACT required because of emission netting. (Not SO)

**EPA limit; FDER limit is 0.032 lb/ton BLS (0.048 lb/3,000 lb BLS).

NA = Not Applicable.

ppmvd = parts per million dry volume.

dscf = dry standard cubic foot.

BLS = Black Liquor Solids.

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TABLE 3.4-3. FUGITIVE DUST EMISSION ASSUMPTIONS

Operational Parameters*		
Limestone Consumption (22.5 tph)	197,000 tpy	3
Coal Consumption (145 tph)	1,270,000 tpy	
Total Combustion Waste (41.3 tph)	361,800 tpy	3
Bed Ash	72,400 tpy	
Fly Ash	289,400 tpy	
Transfer points drop height, H	varies	
Material Characteristics		
Coal Silt Content, s (AP-42 mean)	6.2 percent	
Coal Surface Moisture, M (AP-42 mean)	6.9 percent	
Limestone Silt Content, s (AP-42 mean)	1.6 percent	
Limestone Moisture Content, M (AP-42 mean)	0.7 percent	
Combustion Waste Silt Content, s (AP-42 mean)	70 percent	
Combustion Waste Moisture Content, M (AP-42 mean)	2.0 percent	
Meteorological Parameters		
Wind Speed, U (mean)	9 mph	
Number of Days With Precipitation >0.01 in., p (mean)	116 days	
Percentage of Time Wind Speed >12 mph, f (mean)	18 percent	

*Assumes 100 percent capacity factor.

TABLE 3.4-4

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TABLE 3.4-5. MATERIALS HANDLING DUST EMISSIONS BASED ON RAIL CAR UNLOADING

No.	Source	Activity	Emission Equation	H	U	s	M	Y	Emission Factor	Use Rate	Uncontrolled Emissions	Control Method	Control Efficiency	Total Controlled Emissions	Point Source Emissions	Area Source Emissions
1	Rail Car Unloading	Bottom Drop (coal)	Batch Drop	10	9	6.2	6.9	148	0.0002 lb/t	1,270,000 ton/yr	0.11 ton/yr	Enclosure & Baghouse	99%	0.00 ton/yr		0.00 lb/hr
2	Belt Feeder	Coal Unloading	Continuous Drop	3	9	6.2	6.9		0.0001 lb/t	1,270,000 ton/yr	0.05 ton/yr	Enclosure & Baghouse	99%	0.00 ton/yr	0.00 lb/hr	
3	Conveyor 1	Coal Conveying	Conveying						0.0034 lb/t	1,270,000 ton/yr	2.16 ton/yr	Partial Underground and Covers	85%	0.32 ton/yr		0.07 lb/hr
4	Active Coal Pile	Coal Stockout (drop tower)	Continuous Drop	40	9	6.2	6.9		0.0010 lb/t	1,270,000 ton/yr	0.66 ton/yr	Drop Tower	75%	0.17 ton/yr		0.04 lb/hr
		Coal Reclaim	Batch Drop	5	9	6.2	6.9	10	0.0002 lb/t	1,270,000 ton/yr	0.13 ton/yr	None	0%	0.13 ton/yr		0.03 lb/hr
		Wind Erosion	Wind Erosion			6.2			8.9343 lb/ac/day	3 acres	4.89 ton/yr	Wet Suppression	50%	2.45 ton/yr		0.56 lb/hr
5	Limestone Pile	Limestone Stockout (truck)	Batch Drop	5	9	1.6	0.7	30	0.0036 lb/t	197,000 ton/yr	0.36 ton/yr	None	0%	0.36 ton/yr		0.08 lb/hr
		Limestone Reclaim	Batch Drop	5	9	1.6	0.7	7	0.0059 lb/t	197,000 ton/yr	0.58 ton/yr	None	0%	0.58 ton/yr		0.13 lb/hr
		Wind Erosion	Wind Erosion			1.6			2.3056 lb/ac/day	0.75 acres	0.32 ton/yr	Wet Suppression	50%	0.16 ton/yr		0.04 lb/hr
6	Coal Crusher Dust Collector	Coal Crushing	Stone Crushing						0.28 lb/t	1,270,000 ton/yr	177.80 ton/yr	Enclosure & Baghouse	99%	1.78 ton/yr	0.41 lb/hr	
7	Pulverizer Vent Dust Collector	Limestone Crushing	Stone Crushing						0.28 lb/t	197,000 ton/yr	27.58 ton/yr	Enclosure & Baghouse	99%	0.28 ton/yr	0.06 lb/hr	
8	Conveyor 2	Coal Conveying	Conveying						0.0034 lb/t	1,270,000 ton/yr	2.16 ton/yr	Covers	70%	0.65 ton/yr		0.15 lb/hr
9	Belt Transfer Structure #1	Coal Belt Transfer	Continuous Drop	3	9	6.2	6.9		0.0001 lb/t	1,270,000 ton/yr	0.05 ton/yr	Enclosure & Baghouse	99%	0.00 ton/yr	0.00 lb/hr	
10	Generation Building	Plant Coal Silo	Continuous Drop	40	9	6.2	6.9		0.0010 lb/ton	1,270,000 ton/yr	0.66 ton/yr	Enclosure & Baghouse	99%	0.01 ton/yr	0.00 lb/hr	
		Plant Limestone Hopper	Continuous Drop	40	9	1.6	0.7		0.0261 lb/ton	197,000 ton/yr	2.57 ton/yr	Enclosure & Baghouse	99%	0.03 ton/yr	0.01 lb/hr	
11	Fly Ash Reinjection Surge Bin	Fly Ash Surge Bin Fill	Continuous Drop	20	9	70	2		0.0699 lb/ton	289,400 ton/yr	10.11 ton/yr	Enclosure & Baghouse	99%	0.10 ton/yr	0.02 lb/hr	
12	Bed Ash Hopper	Bed Ash Hopper Fill	Continuous Drop	20	9	70	2		0.0699 lb/ton	72,400 ton/yr	2.53 ton/yr	Displacement Air Filter	90%	0.25 ton/yr	0.06 lb/hr	
13	Ash Silo Filters	Fly and Bed Ash Silo Fill	Continuous Drop	40	9	70	2		0.1397 lb/ton	361,800 ton/yr	25.27 ton/yr	Enclosure & Baghouse	99%	0.25 ton/yr	0.06 lb/hr	
14	Common Feed Hopper	Common Feed Hopper Fill	Continuous Drop	20	9	70	2		0.0699 lb/ton	361,800 ton/yr	12.64 ton/yr	Enclosure & Baghouse	99%	0.13 ton/yr	0.03 lb/hr	
15	Ash Conditioning Unloader	Combustion Waste Unloading	Continuous Drop	10	9	70	2		0.0349 lb/ton	361,800 ton/yr	6.32 ton/yr	Enclosure & Baghouse	99%	0.06 ton/yr		0.01 lb/hr
													TOTAL	7.69 ton/yr	0.64 lb/hr	1.11 lb/hr
															0.08 g/sec	0.14 g/sec

Parameters
H = material drop height, ft
M = material moisture content, percent
s = material silt content, percent
U = mean wind speed, mph
Y = material silt content, percent

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Table 3.4-6 compares the existing pollutant emissions with the pro-
posed facility's emissions and establishes the net emissions (existing
minus proposed). EPA's significant emission rate criteria are also in-
cluded in Table 3.4-6 to determine pollutant applicability with regards to
PSD permitting requirements. The finalization of a long-term coal contract
has led to the proposed use of coal with a sulfur content reduced from that
presented in the initial SCA. This lower percentage of sulfur will 3
actually reduce the existing facility-wide SO_2 emissions by 377 tons per
year. Table 3.4-6 indicates that sulfur dioxide (SO_2), total suspended
particulate (TSP), total reduced sulfur (TRS), PM_{10}, and volatile organic
compounds (VOC) will "net out" and, therefore, will not be subject to the
requirements of the PSD program (including BACT) or nonattainment review
for TSP and VOC. The other criteria pollutants, carbon monoxide (CO), lead 3
(Pb), and nitrogen oxides (NO_x) will not net out and, therefore, exceed the
applicable pollutant significance levels. These pollutants will require a
BACT determination (Subsection 3.4.3) and an appropriate air quality impact
assessment. The air quality impact assessment is described in Section 5.6.

3.4.2 Air Emission Controls

A circulating fluidized bed boiler (CFB) with limestone injection and
appropriate combustion controls, followed by a fabric filter, will be used
to control NO_x and remove SO_2 and particulate to levels well below New 3
Source Performance Standards. Other criteria and noncriteria pollutants
will be controlled consistent with flue gas desulfurization (FGD) and
particulate removal systems.

Kraft recovery boiler emissions of total reduced sulfur (TRS), SO_2, NO_x, CO, and VOC will be controlled by proper boiler design and combustion controls. Particulate emissions will be controlled by an electrostatic precipitator.

Gas from the smelt dissolving tank will be vented to a wet scrubber for particulate and TRS emission control. The smelt dissolving tank will not emit significant quantities of SO_2, NO_x, and CO.

TABLE 3.4-6. SIGNIFICANT AND NET EMISSION RATES (TONS PER YEAR)

Pollutant	Significant Emission Rates	Existing Emissions	Proposed Maximum Emissions*	Net Emissions	Applicable Pollutant	
Carbon Monoxide	100	2,933	4,637	1,704	Yes	
Nitrogen Oxide	40	1,522	6,301	4,779	Yes	
Sulfur Dioxide	40	5,902	5,525	-377	No	
Particulate Matter	25	875	812	-63	No	3
Particulate Matter (PM_{10})	15	684	683	-1	No	
Ozone (Volatile Organic Compounds)	40	540	456	-84	No	
Lead	0.6	--	91	91	Yes	
Asbestos	0.007	--	<0.007	<0.007	No	
Beryllium	0.0004	--	1.5	1.5	Yes	3
Mercury	0.1	--	3.4	3.4	Yes	
Vinyl Chloride	1.0	--	<1.0	<1.0	No	
Fluorides	3	--	1,122	1,122	Yes	
Sulfuric Acid Mist	7	--	322	322	Yes	
Total Reduced Sulfur	10	98	47	-51	No	3

*Assumes 100 percent capacity factor for Kraft recovery boiler, smelt dissolving tank, limestone dryers, and multiple effects evaporator. Assumes 93 percent capacity factor for cogeneration plant.

3.4.3 Best Available Control Technology Analysis Summary

The following is a summary of results from the BACT analysis. The complete analyses for the cogeneration plant and the Kraft recovery boiler are contained in Sections 10.8 and 10.9.

- The pollutant applicability analysis contained in Subsection 3.4.1 concluded that the criteria pollutants--NO_x, CO, and lead--require a BACT analysis. 3 The noncriteria pollutants--beryllium, mercury, fluoride, and sulfuric acid mist--also require a BACT analysis. 3
- BACT determinations are based on the use of a "top-down" approach.
- NO_x emission limiting techniques of lowering combustion temperatures and excess combustion air are counterproductive relative to CO emissions.

3.4.3.1 Cogeneration Plant.

3

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- CFB boilers have lower NO_x emission levels (0.36 lb/MBtu) as com- 3
pared to pulverized coal fueled boilers. A CFB boiler should be
capable of meeting a CO emission rate of 0.19 lb/MBtu while meet-
ing a NO_x emission limit of 0.36 lb/MBtu. 3
- Selective catalytic reduction (SCR), and selective noncatalytic
reduction (SNCR) NO_x emission control technologies are the only 3
technologies adequately demonstrated to be considered for instal-
lation. Problems presented by the use of these systems include 3
equipment fouling, poor control and distribution of the ammonia
injected, ammonia slip and the subsequent release of ammonia to
the environment, and limited equipment life. Despite limited 3
experience and technical problems, a technical and economic
analysis was performed for thoroughness of analysis.
- Installation of a 90 percent efficient SCR system on a CFB boiler
would result in an incremental NO_x reduction cost of $6,800 per 2 3
ton. Installation of a 60 percent efficient SNCR system would
result in an incremental NO_x reduction cost of $1,400 per ton. 2 3

- Consideration of environmental factors also supports the selection of combustion controls as BACT for NO_x. Use of a SCR or a
SNCR system will result in the emission of various amine compounds formed by the unreacted ammonia exiting these NO_x reduction systems. This represents a potential adverse human health effect, since many amine compounds are known or suspected carcinogens. Therefore, based on economic, energy, and environmental considerations, BACT for NO_x and CO emissions from the cogeneration plant is a CFB boiler with combustion controls to meet an NO_x and CO emission requirement of 0.36 lb/MBtu and 0.19 lb/MBtu, respectively. 3

- BACT regarding applicable noncriteria pollutants is accomplished
as a result of flue gas desulfurization and particulate removal operations. 3

3.4.3.2 Kraft Recovery Boiler.

- Low combustion temperatures and staged combustion inhibit the 3
formation of NO_x in KRB. Manufacturers indicate that current KRB designs can consistently meet a NO_x emission requirement of 180 ppmvd corrected to 8 percent oxygen (approximately 0.34 lb/MBtu) when burning black liquor solids.

- Despite a complete lack of operating experience, a Thermal DeNOx nitrogen oxide reduction system is evaluated for use downstream of the KRB. Differential levelized annual costs result in an incremental NO_x reduction cost of $2,000 per ton. As previously discussed, the consideration of environmental factors also supports the selection of combustion controls as BACT. Therefore, based on economics, energy, and environmental considerations, a NO_x emission limit of 180 ppmvd corrected to 8 percent oxygen represents BACT. 2
- BACT for CO emissions from the KRB is proper boiler design and operation (consistent with previously proposed NO_x and SO_2 emission requirements) to meet a CO emission limit of 400 ppmvd corrected to 8 percent oxygen.

3.4.4 Design Data for Control Equipment

Control equipment design data are included as part of the detailed BACT analyses contained in Sections 10.8 and 10.9.

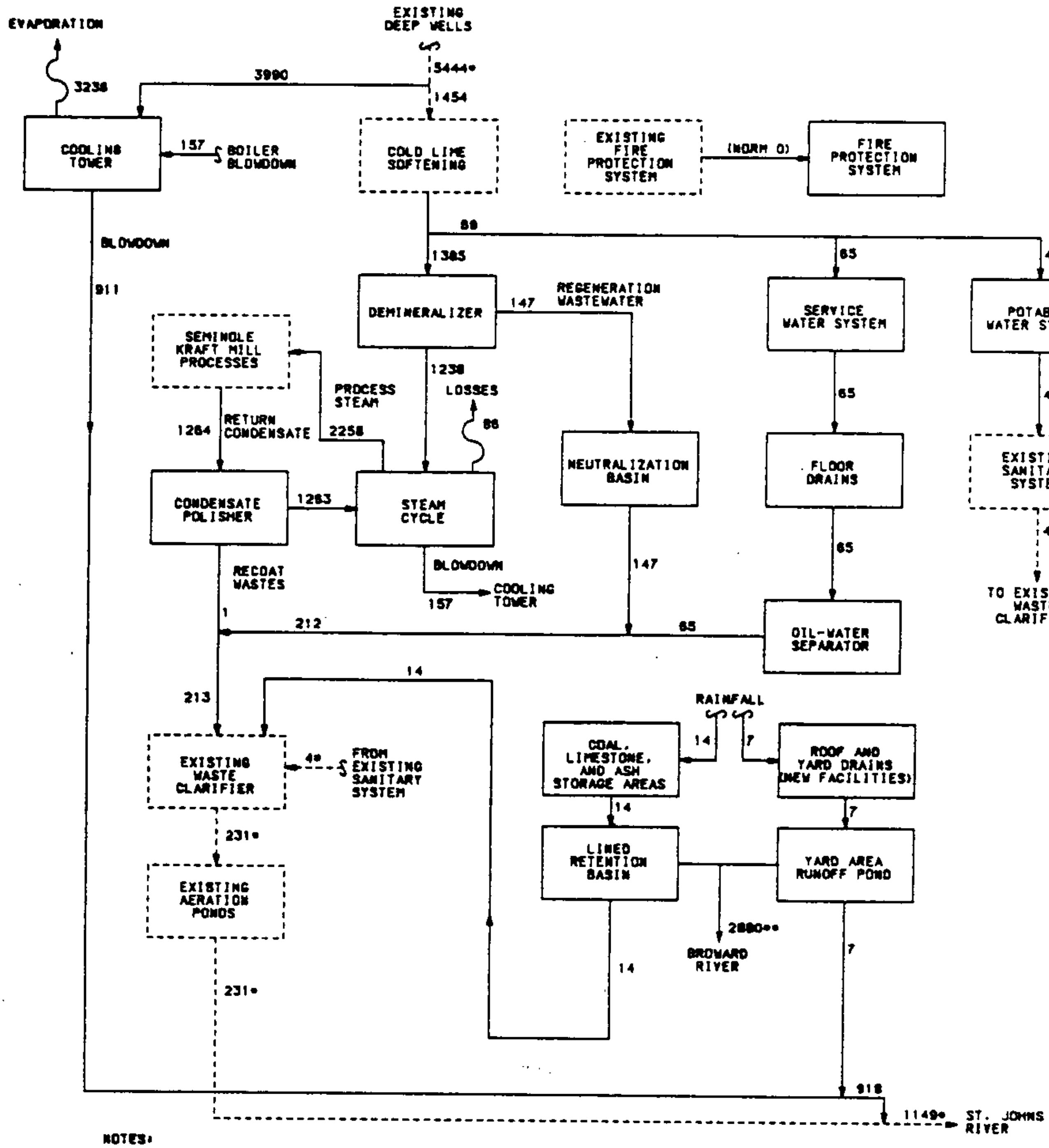
3.4.5 Design Philosophy

In general, air quality control system designs are determined based on conservative design parameters. Parameters are developed to ensure adequate performance to equal or better emission requirements. Where necessary, adequate spares are provided to ensure the operating reliability of the plant. Specific details of the design philosophy can be found in the detailed BACT analyses contained in Sections 10.8 and 10.9.

3.5 PLANT WATER USE

The primary source of water for the Cedar Bay Cogeneration Plant will be ground water from the Floridan aquifer. Most of the water will be used as makeup to the cooling towers. The remainder will be used for potable water, general plant uses, fire water, and makeup to the steam cycle. A water mass balance for average flows based on full load operation is shown on Figure 3.5-1.

The well water will be obtained from the existing Seminole Kraft Cororation well field. Makeup to the cooling towers will be untreated.



NOTES:

1. FLOWS ARE ESTIMATED ANNUAL AVERAGES EXPRESSED IN 1000 GALLONS PER DAY FOR 100 PERCENT LOAD.
2. SOLID LINES REPRESENT NEW EQUIPMENT OR PIPELINES.
3. DASHED LINES REPRESENT EXISTING EQUIPMENT OR PIPELINES.

* AMOUNT OF FLOW ATTRIBUTABLE TO CEDAR BAY COGENERATION PROJECT

** CONSTRUCTION DEWATERING. FLOW WILL OCCUR ONLY DURING CONSTRUCTION.

WATER MASS BALANCE
WELL WATER C. T. MAKEUP

Figure 3.5-1 | 1

Water for all other plant uses will be treated by lime softening and filtration in the existing Seminole Kraft Corporation pretreatment system. The anticipated qualities of the raw and treated well water are shown in Table 3.5-1.

When the Cedar Bay Cogeneration Plant goes into service, the existing Seminole Kraft Corporation power boilers, bark boilers, and kraft recovery boilers will be taken out of service. As a result, the existing once-through cooling system will no longer discharge 30,000 gallons per minute of heated water to the St. Johns River.

3.5.1 Heat Dissipation System (Cooling Tower)

The major use of water by the proposed project will be for heat dissipation. Plant waste heat will be rejected to the atmosphere in a circulating water system using mechanical draft cooling towers. The rejection of waste heat from the steam cycle requires the evaporation of large amounts of water which must be replaced by makeup. To maintain the cooling tower water quality, blowdown is required to remove dissolved solids. Makeup is also required to replace blowdown losses. The majority of the makeup will be well water. Boiler blowdown will be routed to the cooling tower to supply a small portion of the makeup.

3.5.1.1 System Design. The circulating water system consists of a power cycle condenser, kraft recovery cycle condenser, evaporator condenser, cooling towers, circulating water pumps, and supply and return circulating water piping.

The condensers will be single pressure, single shell, surface condensers. The condensers will be designed to operate under maximum conditions under the parameters listed in Table 3.5-2.

In addition to the surface condenser, an auxiliary cooling system for equipment cooling will be located in the Generation Building. This system consists of two water-to-water heat exchangers and receives cooling water from the circulating water system at the rate of approximately 12,500 gpm.

The cooling towers will be rectangular, mechanical draft, counterflow cooling towers. The following are preliminary design conditions for the cooling towers.

TABLE 3.5-1. ANTICIPATED RAW WELL WATER AND TREATED WATER ANALYSES

Constituent	Raw Well Water	Treated Well Water*
Calcium, mg/l as $CaCO_3$	160	35
Magnesium, mg/l as $CaCO_3$	110	99
Sodium, mg/l as $CaCO_3$	42	42
Potassium, mg/l as $CaCO_3$	1	1
M-Alk, mg/l as $CaCO_3$	173	37
Sulfate, mg/l as $CaCO_3$	100	100
Chloride, mg/l as $CaCO_3$	39	39
Nitrate, mg/l as $CaCO_3$	1	1
SiO_2, mg/l as SiO_2	33	33
Iron, mg/l as Fe	0.06	0

*Treatment by cold lime softening.

TABLE 3.5-2. CONDENSER DESIGN PARAMETERS

	Power	Recovery	Evaporator
Condenser Surface Area, sq ft	140,000	35,000	70,000
Circulating Water Flow, gpm	122,500	27,500	28,200
Tube Material	304 SS	304 SS	304 SS
Tubesheet Material	Carbon	Carbon Steel	Carbon Steel Steel
Circulating Water Inlet Temperature, F	93	93	93
Maximum Heat Rejection, Btu/h	950×10^6	195×10^6	280×10^6

- Circulating water flow--200,000 gpm.
- Tower approach--11 F.
- Tower range--16 F.
- Wet-bulb temperature--82 F.
- Relative humidity--76 percent.
- Maximum heat rejection--1,520 by 10^6 Btu/h.

The expected cooling tower evaporation rate at 100 percent load conditions will be approximately 2,250 gpm. The estimated maximum makeup rate for the cooling system at 100 percent load is 2,880 gpm.

The predicted makeup water quality should allow the cooling tower to operate at 4.6 cycles of concentration. The estimated quality of the circulating water is shown in Table 3.5-3. Based on the 4.6 cycles of concentration, maximum blowdown will be approximately 633 gpm. Blowdown will be from the cold side of the cooling tower with a maximum expected temperature of approximately 95 F. Cooling tower blowdown will be discharged via the 1
existing Seminole Kraft discharge pipeline to the St. Johns River. 3

3.5.1.2 Source of Cooling Water. The water for use in the heat dissipation system will be primarily ground water from the Floridan aquifer. The well water will not be treated before use as cooling tower makeup. The expected makeup water quality is shown in Table 3.5-3. Existing Seminole Kraft water supply wells will be used to supply the well water needs of the new facilities. The wells are approximately 1,400 feet deep, and are located on the site as shown on Figure 2.3-23.

A small portion of the makeup will be obtained by routing blowdown water from the boilers to the cooling towers.

3.5.1.3 Dilution System. The circulating water system at the Cedar Bay Cogeneration Plant will not use a dilution system.

3.5.1.4 Blowdown, Screened Organisms, and Trash Disposal. An existing outfall structure located in the St. Johns River is currently used to discharge effluent from the Seminole Kraft mill. Cooling tower blowdown will be discharged to the St. Johns River via this outfall. The location of the outfall structure is shown on Figure 3.2-3.

TABLE 3.5-3. ANTICIPATED RAW WELL WATER AND CIRCULATING WATER ANALYSES

Constituent	Raw Well Water	Circulating Cooling Water*
Calcium, mg/l as $CaCO_3$	160	728
Magnesium, mg/l as $CaCO_3$	110	500
Sodium, mg/l as $CaCO_3$	42	150
Potassium, mg/l as $CaCO_3$	1	5
M-Alk, mg/l as $CaCO_3$	173	100
Sulfate, mg/l as $CaCO_3$	100	1,142
Chloride, mg/l as $CaCO_3$	39	191
SiO_2, mg/l as SiO_2	33	150
Iron, mg/l as Fe	0.06	0.3

*Assumes pH controlled to approximately 7.0 to 7.5 through the addition of sulfuric acid and organic phosphate feed as a scale inhibitor.

Since the Cedar Bay Cogeneration Plant will use only well water as its raw water source, there will be no screened organisms or trash for disposal.

3.5.1.5 Injection Wells. Injection wells will not be used at the Cedar Bay Cogeneration Plant.

3.5.2 Domestic/Sanitary Wastewater

Domestic/sanitary wastewater flow is assumed equivalent to the potable water usage described in Subsection 3.5.3. This wastewater will be treated in the existing Seminole Kraft sanitary system.

3.5.3 Potable Water Systems

Potable water uses at the cogeneration plant will include sanitary water for drinking, washing, and for toilets. Potable water for the plant will be well water treated by the existing Seminole Kraft pretreatment system and then chlorinated prior to use. The annual average expected potable water usage is 4,100 gpd (3 gpm) based on an average plant staff of 75 people and an average potable water requirement of 55 gallons per capita per day.

3.5.4 Process Water Systems

3.5.4.1 Makeup Demineralizer System. Other than cooling water, the major use for water in the new facility will be for demineralized water makeup to the boiler/turbine/condenser cycles. These cycles will produce steam for power generation and Seminole Kraft uses, and will replace the existing Seminole Kraft boilers.

Demineralized makeup water is required to replace water lost to Seminole Kraft process steam uses, boiler blowdown, and miscellaneous steam losses. Blowdown is necessary to maintain a low dissolved solids content in the boilers. Well water, softened and filtered in the Seminole Kraft pretreatment system, will be demineralized in three ion exchange demineralizer trains. Each train will consist of four exchangers: a primary cation exchanger, a primary anion exchanger, a secondary cation exchanger, and a secondary anion exchanger. The demineralizer ion exchange vessels will be regenerated with dilute solutions of sulfuric acid and sodium hydroxide. The resulting regenerant waste streams will be routed to the neutralization basin for pH adjustment and then to the existing Seminole Kraft waste clarifier as described in Subsections 3.6.4 and 3.7.2. The regenerant wastewater is not suitable for reuse because of its high dissolved solids content.

3.5.4.2 Condensate Polishing. A portion of the steam produced for Seminole Kraft uses will be returned as condensate. This condensate will be polished using a powdered resin type condensate polishing system for removal of dissolved and suspended solids before it is returned to storage for use in the steam cycles. The condensate polisher recoat wastewater will consist of condensate quality water containing the spent powdered resin. This wastewater contains high suspended solids, is not suitable for reuse, and will be directed to the existing Seminole Kraft waste clarifier for treatment.

3.5.4.3 Service Water. General water requirements including water seals, cleaning, and flushing will be provided by the service water system. Service water requirements are expected to average 45 gpm and will be supplied from the existing Seminole Kraft pretreatment system.

3.5.4.4 Fire Water. The fire water system will be an extension of the existing Seminole Kraft fire water system.

3.5.4.5 Ash Pelletizing. A maximum of approximately 150 to 160 gpm of
water during an eight-hour period each day will be required to pelletize
the combustion ash before disposal. This results in an average requirement 3
of approximately 75,000 gpd. Project makeup water from the well system
will be used for this purpose.

3.5.4.6 Plant Drains. Separate collection systems will be used to collect chemical wastewater and miscellaneous plant wastewater. Chemical wastewater piping will be constructed of chemical resistant materials and will be routed to the neutralization basin. Miscellaneous floor drains will be directed to an oil separator and then routed to the existing Seminole Kraft waste clarifier.

3.5.4.7 Coal, Limestone, and Ash Area Runoff. Surface runoff from the coal, limestone, and ash storage areas will be collected in the fuel storage area runoff pond as discussed in Section 3.8. The combined runoff will then be routed to the existing Seminole Kraft waste clarifier as described in Subsection 3.6.9.

3.5.4.8 Existing Wastewater Treatment Facility. The Cedar Bay Cogeneration Plant will utilize the Seminole Kraft Corporation's existing wastewater treatment facility for treatment of demineralizer regeneration wastewater, condensate polisher regeneration wastewater, miscellaneous plant drains wastewater, and coal, limestone, and ash area runoff. The existing equipment consists of a clarifier followed by aeration ponds. The facility has a daily average discharge limitation of 7,840 lb/day of BOD_5 and 15,860 lb/day of suspended solids. The discharge pH is limited to between 6.0 and 9.0. Wastewater from the Cedar Bay Cogeneration Plant routed to the wastewater treatment facility is expected to average 231,000 gallons per day of 2
flow, 75 lb/day of suspended solids, and 20 lb/day of BOD_5. The peak flow, which will occur during heavy rainfall periods, is expected to be 624,000 gal- 2
lons per day. Since existing less efficient demineralizers and boilers are being retired, the average Cedar Bay Cogeneration Plant wastewater flow is expected to be offset by a decrease in wastewater from existing facilities.

3.5.5 Water Use Variations

All water requirements discussed in the preceding sections are based on full load operation of the plant. When the plant operates at less than full load, the evaporation rate from the cooling towers, and hence the cooling tower makeup and blowdown rates, decreases proportionately. Since the major use of water for the plant is for cooling tower makeup, a decrease in plant operating capacity would mean a substantial decrease in overall plant water use. Demineralized water makeup requirements will decrease somewhat at less than full operating load, but not to the same degree as the cooling tower needs because a large portion of the makeup is for replacement of steam lost to Seminole Kraft process uses. The balance of plant water uses will be essentially independent of plant operating load.

In the case of prolonged plant shutdown, the cooling system will also be shut down and no makeup will be required. The other water requirements (demineralizer, equipment cleaning, etc.) may increase somewhat.

3.6 CHEMICAL AND BIOCIDE WASTE

The principal uses of chemicals and biocides at the proposed project will be for cooling tower circulating water quality control, steam cycle water quality control, sanitary wastewater treatment, makeup water demineralization, return condensate polishing, chemical cleaning of the boiler and preboiler cycle piping systems, and miscellaneous chemical drains.

3.6.1 Cooling Tower Circulating Water Treatment

The circulating water will be treated with chemicals to protect the system and to prevent excessive scaling and corrosion. Sulfuric acid will be added at the cooling tower basin to reduce alkalinity and to control the scaling tendency of the circulating water system. The estimated maximum use of sulfuric acid will be 5,112 pounds per day based on maximum load conditions and expected water quality. Control of sulfuric acid feed will be in proportion to the makeup water flow with a pH bias. Sulfuric acid reacts with alkalinity present in the well water to produce a circulating water in the desired pH range (7.0 to 8.0). To further inhibit scale deposition, an organic phosphate type scale inhibitor will be automatically fed at the cooling tower basin as a sequestering agent. The estimated maximum use of scale inhibitor based on maximum load conditions is 152 pounds per day as product. Scale inhibitor will be fed automatically on the basis of blowdown flow. The sulfuric acid and organic phosphate will be stored in tanks located in a curbed area beside the cooling towers. The curbed areas will be routed to the neutralization basin.

To prevent biofouling of the circulating water system, intermittent shock chlorination will be used. A chlorine solution will be fed into the circulating pump basin through diffusers. The estimated average usage of chlorine will be 493 pounds per day based on a feed rate of 5 mg/l for a total period of one hour per day.

Dechlorination of the cooling tower blowdown will be practiced to preclude discharge of residual chlorine in excess of discharge limits to the St. Johns River. Sulfur dioxide or sodium sulfite will be fed to the blowdown for dechlorination. The estimated use of sodium sulfite is approximately 2.3 pounds per day. If sulfur dioxide is used, the estimated usage will be approximately 1.1 pounds per day.

3.6.2 Steam Cycle Water Treatment

The steam cycle water will be treated with an oxygen scavenger, such as hydrazine, for dissolved oxygen control and with an amine, such as ammonia, for pH control. Sodium phosphate may also be fed to the cycle. Residual phosphate will react with calcium hardness in the boiler to form a nonadherent precipitate. The oxygen scavenger, amine, and sodium phosphate will be stored in the Generation Building. Estimated maximum usages are 8.6 pounds per day of hydrazine and 17.2 pounds per day of ammonia, based on maximum load conditions. The estimated sodium phosphate usage will be approximately 3.9 pounds per day. Boiler blowdown will be reused by routing to the cooling towers for use as makeup.

3.6.3 Sanitary Wastewater Treatment

The sanitary wastewater produced by the plant will be routed to the existing sanitary facilities at the Seminole Kraft Corporation. The annual average expected flow of sanitary wastewater is 4,100 gpd (3 gpm) based on an average plant staff of 75 people and an average requirement of 55 gallons per capita per day. The average expected biological loading is 5.6 pounds of BOD_5 per day, based on 0.075 pound of BOD_5 per capita per day.

3.6.4 Makeup Water Demineralization

As discussed in Section 3.5.4, the makeup water to the steam cycle will be demineralized using three ion exchanger type demineralizer trains. The demineralizer system will use sulfuric acid for cation resin regeneration and sodium hydroxide for anion resin regeneration. The sulfuric acid and sodium hydroxide will be stored in tanks located in or adjacent to the Water Treatment Building. The use of these chemicals will be on an intermittent basis dependent on demineralizer operation. Based on the maximum plant capacity and makeup requirements, the estimated usage rate for 66 degree Baumé sulfuric acid will be 5,660 pounds per day, and the rate of 100 percent sodium hydroxide will be 4,717 pounds per day. The wastes from this system will be regenerant water containing unreacted sulfuric acid and caustic plus sodium and sulfate salts of the ions removed from the ion exchange resins during regeneration. The estimated regenerant waste flow will average 147,000 gpd based on maximum load conditions. These wastes will be routed to the neutralization basin for pH adjustment and then to the existing Seminole Kraft waste clarifier.

3.6.5 Return Condensate Polishing

A powdered resin type condensate polishing system will be used to remove both suspended and dissolved solids from the process condensate being returned from the Seminole Kraft mill. The wastes from this system will consist of condensate quality water containing the spent powdered resin. The production of these wastes will be on an intermittent basis and will depend on the quality and quantity of the condensate being returned. The estimated wastewater flow will average 730 gpd. This wastewater, which contains high suspended solids, is not suitable for reuse within the water system and will be routed to the existing Seminole Kraft waste clarifier.

3.6.6 Metal Cleaning 2

The steam generator and preboiler cycle piping will be chemically cleaned initially during commissioning and also periodically during the life of the plant. The chemicals used will not be stored onsite and will be administered by means of a temporary system. The chemical cleaning solutions to be used for acid and alkaline cleaning of the boiler will be somewhat dependent on the boiler manufacturer selected. The actual cleaning solutions used must be consistent with the boiler manufacturer's recommendations. Chemicals typically used in boiler and preboiler cleaning include the following.

- Inhibited hydrochloric acid.
- Ammonia bifluoride.

- Hydroxyacetic acid.
- Formic acid.
- Disodium phosphate.
- Trisodium phosphate.
- Soda ash.
- Nonfoaming wetting agents.
- Foam inhibitors.

Wastewaters will consist of the cleaning solutions and material removed during the cleaning process. Since cleaning the metal piping is an 2 infrequent maintenance operation, it does not contribute to the liquid wastes produced by the normal operation of the plant. The preoperational chemical cleaning wastes are estimated to be approximately 180,000 gallons, with subsequent acid cleaning resulting in an estimated additional 105,000 gallons for each cleaning operation. The chemical cleaning contractor will be required to haul offsite and properly dispose of the wastes resulting from chemical cleaning which have metal concentrations in excess of the requirements of 40 CFR Part 423 for new sources. Chemical cleaning wastes that meet the requirements of 40 CFR Part 423 for new sources will be routed to the Seminole Kraft wastewater treatment facility.

Nonchemical metal cleaning wastes will result from periodic washing of the boiler firesides and air preheaters. The frequency of these cleaning operations will be a function of the cleanliness of the equipment and will 2 be determined once the plant is in operation. The air preheater wash water and the boiler fireside wash water will contain dissolved and suspended solids. It is anticipated that both fireside wash water and air preheater wash water will tend to be basic because of the injection of limestone into the fluidized bed boiler and the resulting reaction of sulfur with the limestone to form calcium sulfate. Because the wash waters will not be acidic, the metal content of the wash waters will be minimal. Nonchemical cleaning wastes will be routed to a neutralization basin for pH adjustment and then to the Seminole Kraft wastewater treatment facility.

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3.6.7 Miscellaneous Chemical Drains

Chemical wastewater can result from draining a chemical storage tank, overflowing a chemical tank during a filling operation, or from maintenance operations such as hosing down chemical storage areas. These wastes will be routed to the neutralization basin via the chemical drains system. Flows from the miscellaneous chemical drains will be intermittent and will not normally contribute to the wastewater flows.

3.6.8 Neutralization Basin

A neutralization basin of approximately 150,000 gallons capacity will be provided for treatment of chemical wastes prior to their ultimate disposal. A basin of this capacity will be sufficient to accommodate the wastewaters produced during regeneration of the makeup demineralizer. The neutralization basin will be a reinforced concrete basin lined with chemical resistant membrane, brick, and mortar. A chemical waste mixer, mounted on a walkway spanning the basin, will be provided to hasten pH adjustment of the chemical wastes. Sulfuric acid and sodium hydroxide, as required

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for neutralization, will be available from the makeup demineralizer regeneration equipment. The pH adjusted chemical wastewaters will be transported to the existing Seminole Kraft waste clarifier.

3.6.9 Coal, Limestone, and Ash Storage Areas Runoff Treatment

The runoff water from the coal pile, limestone pile, and ash pelletizer areas will be collected in a lined retention basin as discussed in Section 3.8. The retention basin will allow for settling of suspended solids and flow equalization. Runoff water will then be pumped to the existing Seminole Kraft waste clarifier.

3.7 SOLID AND HAZARDOUS WASTE

3.7.1 Solid Waste

The combustion byproducts generated by the Cedar Bay Cogeneration Project will consist of fly ash and bed ash. This material will be disposed of by the coal supplier at an approved disposal location outside of the state of Florida or sold within the building materials industry. The quantities of waste produced will depend on the properties of the coal and limestone used in the combustion process. The following quantities are based on the typical properties of the design-basis coal.

The fly ash will be collected by a fabric filter. The estimated production of fly ash is 336,000 tons per year. The fly ash will be conveyed by an enclosed vacuum transport system from the fabric filter hoppers to the fly ash storage silo. Bag filters will be employed to control fugitive dust emissions from the ash silo and vacuum system.

Fly ash collected in the air heater hoppers will be conveyed to the fly ash silo by a branch of the fly ash vacuum transport system. Estimated production of air heater hopper ash is 18,000 tons per year.

The bed ash will be conveyed from the boiler ash coolers to the bed ash storage hopper by mechanical ash conveyors. Bed ash from the bed ash storage hopper will be conveyed by vacuum to a bed ash silo. The bed ash production is estimated at 88,000 tons per year.

Two alternatives for ash handling are being considered. The first alternative would consist of discharging dry ash from the silos directly into enclosed haul trucks or railcars. Fugitive dust, potentially generated during the loading process, would be controlled by dust collection systems and water sprays.

Under the second alternative, ash would be conditioned into pellets suitable for outdoor storage. The ash pellets are made by combining and mixing bed ash, fly ash, and water in the proper proportions in ash conditioning and pelletizing machine. The pellets would be conveyed from the pelletizer to a covered "green" pellet storage area where the pellets would be allowed to cure. After curing, the pellets would be moved to the cured pellet storage area for temporary storage before disposal offsite by truck or railcar. Fugitive dust from the pelletizing process would be collected and returned to the silos by a dust collection system.

3.7.2 Hazardous Waste

There will be no hazardous waste generated by the Cedar Bay Cogeneration Project. Demineralizer wastes, which can contain up to 10 percent sulfuric acid (H_2SO_4) or up to 5 percent sodium hydroxide (NaOH), will be routed to the neutralization basin for pH adjustment. The neutralization basin serves as an "elementary neutralization unit" allowing the cogeneration plant an exemption from permitting as a hazardous waste facility. Furthermore, because the demineralizer wastes are not stored prior to pH adjustment, they are not counted as generated hazardous waste, and the plant is therefore not subject to regulation as a hazardous waste generator. Disposal of acidic boiler cleaning wastes will be accomplished by 2
the chemical cleaning contractor as discussed in Subsection 3.6.6. 1

3.8 ONSITE DRAINAGE SYSTEM

Site drainage facilities will be designed in accordance with the requirements of the St. Johns River Water Management District. Channels and piping systems will be sized to carry the flow resulting from a 50-year, 24-hour rainfall. Site runoff facilities will provide storage to satisfy criteria for maintenance of water quality and control of discharge rates.

Runoff from areas of the site not disturbed by construction activities or plant operations will be directed to the natural drainage systems within the area. Runoff from areas of the site disturbed by construction activities or plant operations will be collected in a ditch system and/or catch basin and underground piping system and directed to ponds as described in the following subsections. Drainage systems will be designed for gravity flow wherever site conditions allow. A site arrangement for the new facilities is shown on Figure 3.2-1.

Generally, the drainage in the area of the new facility will be directed away from the structures and routed to either of the two onsite storage ponds as described below. The drainage along the entrance road for the new facilities will follow the existing drainage pattern, to the south and west. Where required, culverts will be placed under the road to allow for these drainage patterns.

The 100-year base flood elevation is approximately 7 feet msl, as determined by the local Flood Insurance Rate Map (see Figure 2.1-4). The southwestern portion of the site is within the 100-year flood plain as shown on Figure 2.1-4. Compacted fill material will be placed within the plant site so that all major plant facilities are located above the 100-year base flood elevation. The grade in the area of the new facilities will vary from approximately Elevation 11 to Elevation 8 (msl). The onsite drainage system will be designed to carry the surface runoff away from the structures and direct the flow into the onsite ponds as described in the following subsections.

3.8.1 Storage Area Runoff Pond

Surface runoff from the coal, limestone, and ash storage areas will be collected and directed into the Storage Area Runoff Pond which is located on the southern portion of the site. The coal storage pile, limestone storage pile, and the ash storage pile will occupy approximately 3 acres, 1 acre, and 1 acre, respectively. The associated facilities for these bulk storage piles will occupy an additional 5 acres. The coal and ash handling areas will be underlain by an impervious synthetic liner. The pond liner will consist of 60 mil (minimum) synthetic liner placed on a prepared subgrade layer creating a stable, highly impermeable liner.

In accordance with National Pollution Discharge Elimination System permit requirements, the Storage Area Runoff Pond will be designed to contain the runoff resulting from a 10-year, 24-hour rainfall event for the entire storage and associated facilities areas, and the direct precipitation on the pond area. Runoff from precipitation exceeding the 10-year, 24-hour event will be detained and directed to the existing outfall to be discharged at a rate which will not exceed the peak rate of discharge from the undeveloped site resulting from a 25-year, 24-hour storm. Flows which exceed that resulting from the 25-year, 24-hour storm event will be piped directly to the existing outfall structure.

Runoff and direct precipitation retained within the Storage Area Runoff Pond will be directed to the Seminole Kraft treatment facilities as described in Subsection 3.6.9. Controlled drawdown of the runoff pond to its normally empty condition will be accomplished through a buried pressure pipeline routed to the runoff treatment facilities.

The Storage Area Runoff Pond will be built early during construction to serve as a construction runoff retention pond. A system of temporary construction ditches and piping will direct the flow to the pond. The construction period will last for approximately 2 years. Yard runoff will be directed to the Yard Area Runoff Pond as soon as it is operational (approximately halfway through the construction period). This sequencing will allow time for the Storage Area Runoff Pond to be cleaned out and the synthetic liner installed prior to the initial delivery of coal. Once the liner is in place, runoff from storage areas will be collected and treated as discussed above.

3.8.2 Yard Area Runoff Pond

Surface runoff from the main plant complex area and yard areas not affected by bulk materials handling will be collected and directed to the Yard Area Runoff Pond. This pond will be located in the northern portion of the new facilities area. The pond will be designed to retain, without direct discharge, the volume of stormwater associated with 0.5 inch of runoff from tributary site areas. The Yard Area Runoff Pond will also be sized to detain the runoff volume resulting from the 25-year, 24-hour storm. This volume will be discharged at a rate not to exceed the maximum rate of discharge from the undeveloped site for the 25-year, 24-hour storm. This controlled drainage will be accomplished through a buried pressure pipe system routed to the existing discharge outfall. Figure 3.2-3 shows the location of the existing outfall. Any flows in excess of the 25-year, 24-hour storm runoff will be piped directly to the existing outfall structure.

3.8.3 Existing Drainage Patterns

Surface runoff from site areas north of the mill dewatering building currently drains to the lime settling ponds located west of the rail spurs. The supernatent from the lowest (northernmost) of these ponds is pumped into the mill sewage collection system. After being routed through the existing clarifier and receiving biological treatment, the runoff is eventually discharged at the outfall structure located in the St. Johns River south of the site.

The site area between the dewatering building and the clarifier would naturally drain to the Broward River, but Seminole Kraft has constructed berms along the river to provide containment for potential oil spills. Therefore, rainfall which lands on this area collects in localized depressions and eventually percolates to the ground water table.

Offsite runoff will not be collected in the onsite drainage system. Swales will be provided to direct runoff which originates in offsite, upgradient areas around the site perimeter and into existing drainage patterns. These swales will be designed to preserve the existing drainage conditions and water quality to the maximum extent possible.

3.9 MATERIALS HANDLING

This section discusses the transportation of construction materials and equipment, limestone, and ash. Roads, railroads, and conveyors will be included. Pollution control measures for storage and laydown areas will be described. Fuel transportation, storage, and handling are discussed in Sections 3.3, 6.2, and 6.3.

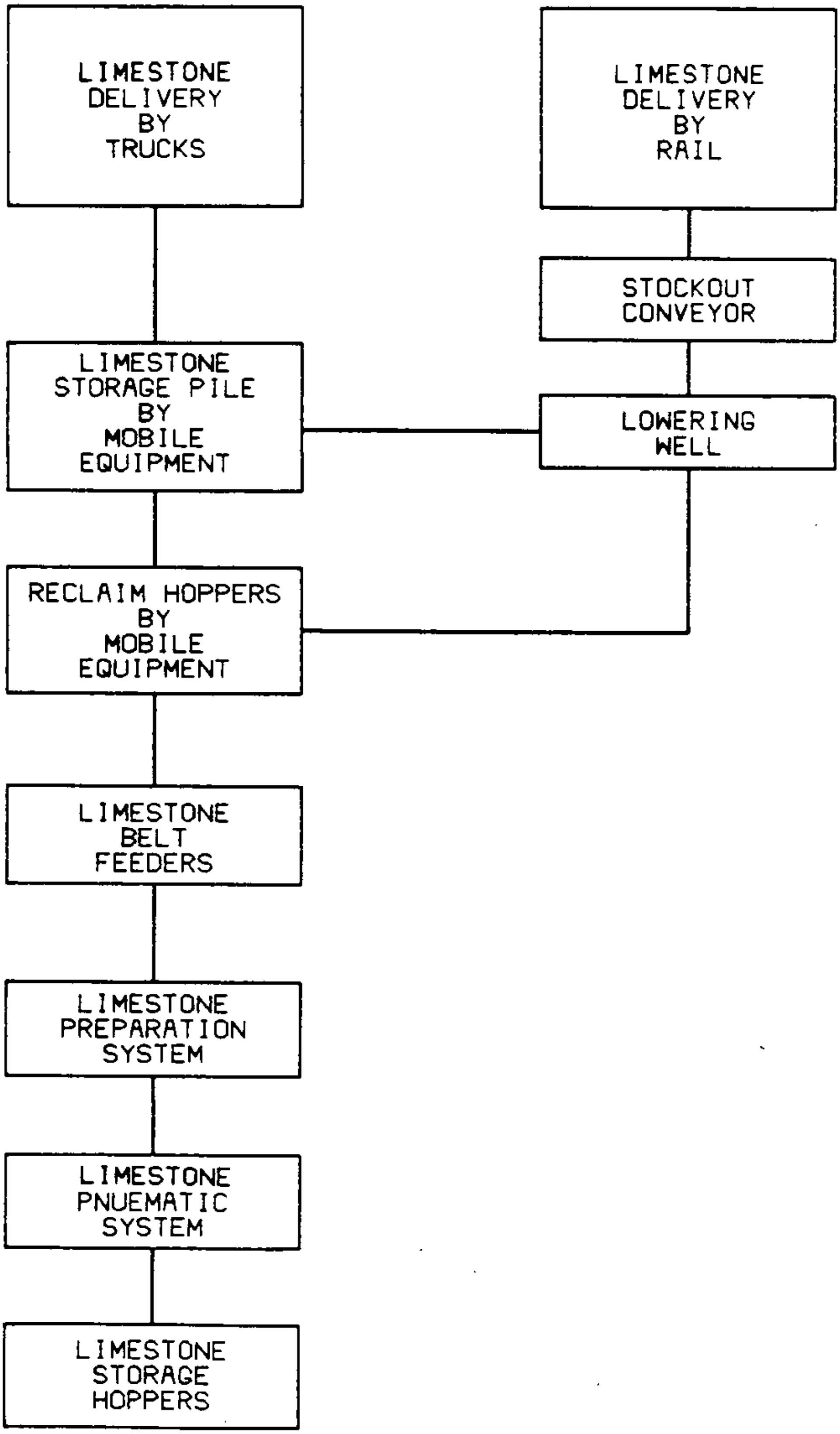
3.9.1 Construction Materials and Equipment

Construction materials and equipment will be delivered to the site by existing roads and railroads. No barge or ship delivery to the site is planned. The paper mill currently uses both modes of transportation for delivery of logs and wood chips and shipment of finished products. No off-site upgrading of road or rail facilities is anticipated for delivery of construction equipment and materials. As shown on Figure 3.2-1, a new access road will be constructed on the mill site to provide access to the construction areas from Eastport Road. Figure 3.2-1 also shows the onsite rail layout for the project.

Construction material laydown areas will be located north of the paper mill wood yard in areas currently used to store lime mud, logs, and debris. The area will be prepared as described in Subsection 4.1.4. Materials will be unloaded, and moved around the site using portable cranes and trucks. Some of the heaviest items such as the generator stator and transformer will require rail delivery and special rigging for onsite handling. Pollution control measures for the laydown areas will include runoff detention ponds to hold precipitation runoff so that suspended sediment can settle out prior to release to natural drainage. Main roads in the laydown areas will be gravel surfaced and treated with dust palliative to reduce dust. Water sprays will also be used, as required, to control dust due to traffic.

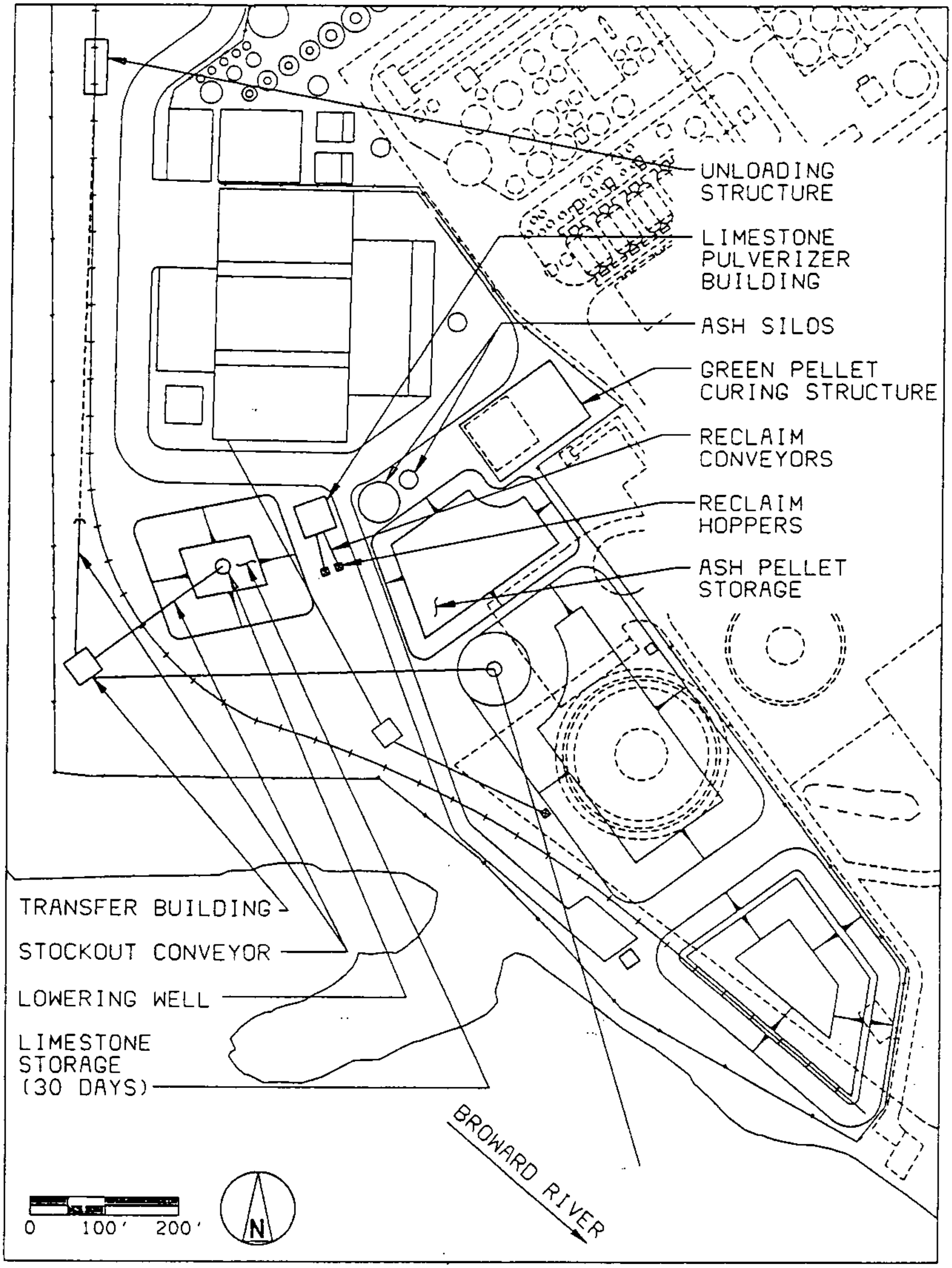
3.9.2 Limestone Handling

The limestone handling system will consist of unloading, stockout, reclaiming, preparation, and limestone storage. Figure 3.9-1 shows a schematic of the limestone handling process. Figure 3.9-2 shows the arrangement of the limestone handling equipment on the site. Based on a maximum short-term coal sulfur content of 3.3 percent, the maximum consumption rate will be 34 tons per hour. Based on the project's long-term average percent 3
sulfur of 1.70 and an annual capacity factor of 87 percent, the maximum annual limestone consumption will be 171,000 tons.



LIMESTONE HANDLING PROCESS DIAGRAM

Figure 3.9-1



LIMESTONE AND ASH HANDLING SITE PLAN

Figure 3.9-2

Limestone will be delivered to the plant site by either trucks or
rail. Truck delivered limestone will be unloaded on the ground adjacent to
the limestone storage pile. Approximately 5,700 30-ton truckloads per year 3
or 110 loads per week would be required. Rail delivered limestone will be
unloaded in the fuel receiving structure described in Section 3.3. The
limestone will then be transported by conveyors to the limestone stockout
pile. About 1,710 railcar loads of limestone will be required per year or 3
33 cars per week.

Limestone will be reclaimed by mobile equipment and loaded into above
grade hoppers. Limestone will be reclaimed from the hopper by belt feeders
and transported to the limestone pulverizers and preparation system. The
limestone preparation system will reduce the limestone to the required
particle size and transport it pneumatically to the limestone storage hop-
pers located in the Steam Generation Building.

The limestone storage area will consist of a maximum of 25,000 tons of 3
limestone and will be located north of the Steam Generation Building. The 2
limestone storage will provide approximately 30 days of limestone at the
maximum usage rate of the steam generators.

Fugitive dust control from the handling of limestone will be accom-
plished by fabric filter dust collectors. The limestone belt conveyors and
feeders will have covers over the belt to control fugitive dust. If lime-
stone is delivered by rail, then a lowering well as described in Sec-
tion 3.3 will be used for limestone stockout. Water sprays will be used as
required to control dust from mobile equipment operations. Precipitation
runoff from the limestone storage area will be collected as described in
Section 3.8.

3.9.3 Ash Handling

Figure 3.9-2 shows the arrangement of the ash handling equipment on
the site. Ash production and handling are described in Section 3.7. Up to
seven days of ash pellet production may be stored onsite. This will amount
to a maximum of about 9,400 tons. The storage area will be lined with a 3
synthetic liner to minimize ground water impacts. The liner will be

protected with a soil cover. Precipitation runoff will be directed to the Storage Area Runoff Pond as described in Section 3.8.

Ash will be removed from the site by either truck or rail. If removed by rail, approximately 3,150 100-ton car loads will be required per year. The weekly rate would be 61 car loads. If removed by 30-ton trucks, up to 10,500 truckloads would be required per year. The maximum weekly rate would be 202 truckloads. 3

Ash will be loaded directly into closed trucks or railcars from the storage silos or ash pellets will be loaded by mobile equipment. A covered conveyor with dust collectors will be used if pellets are loaded into railcars. Water sprays will be used as required to reduce fugitive dust from pellet handling. If ash is loaded out in a dry form, then fabric filter type dust collectors will be used for dust control.

3.9.4 Roads

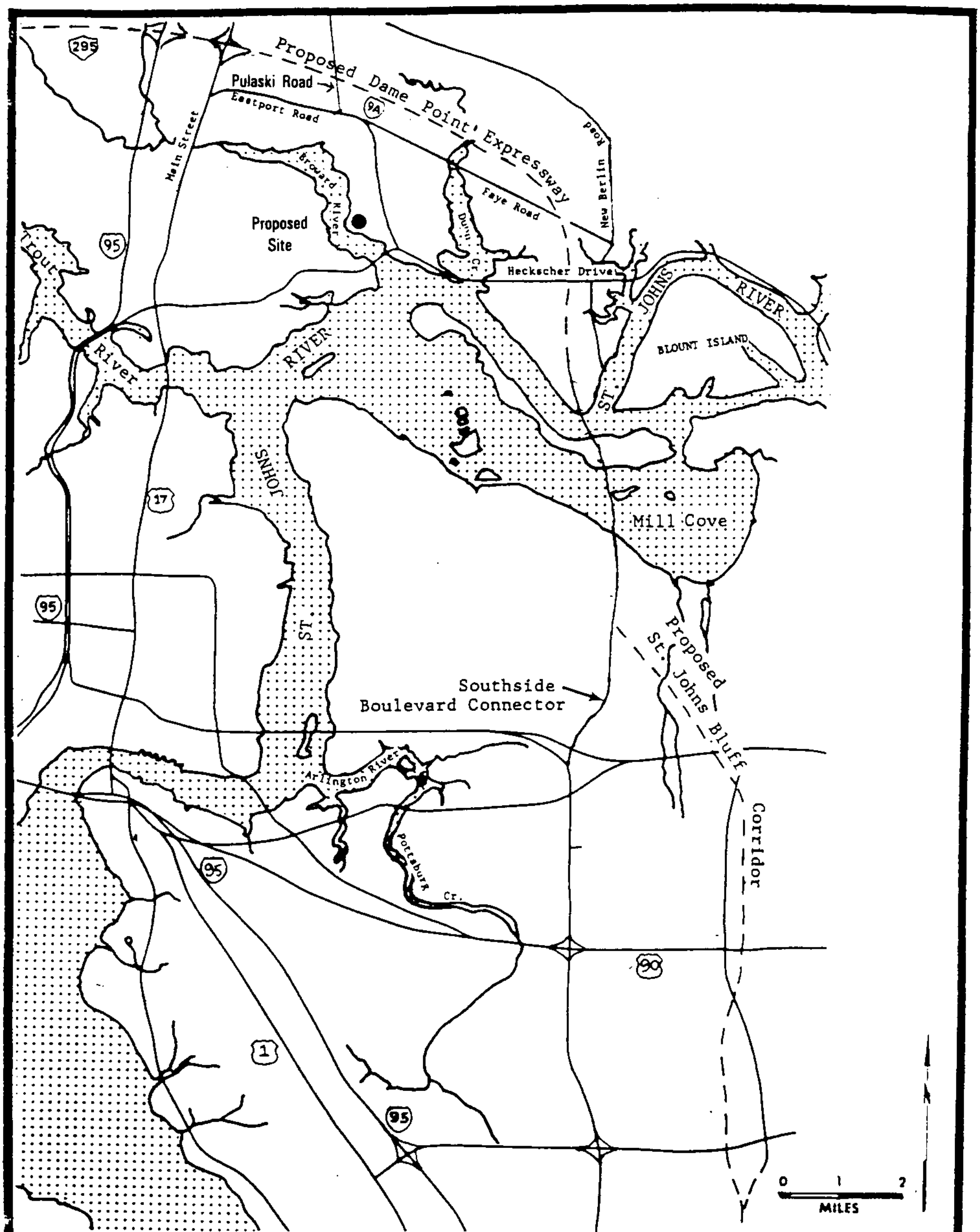
Heavily loaded construction trucks will travel to the site from Interstates 95 and 295 or the Dames Point Bridge to Highway 9A, as shown on Figure 3.9-3. Traffic will then exit to Pulaski Road south to Eastport Road. Heavy construction traffic will avoid Heckscher Drive due to bridge load limits. The state of Florida is currently studying the possibility of upgrading Heckscher Drive. This improvement is not expected to be completed until after construction of the cogeneration project.

Heavily loaded trucks that may be required to haul ash and limestone should be able to use Heckscher Drive after it is upgraded. Trucks could travel east to the Dame Point Bridge or west to Highway 17. These trucks could also use Eastport Road to the north.

The impacts of construction traffic are discussed in Section 4.6. The impacts of ash disposal are discussed in Section 5.4.

3.9.5 Railroads

The CSX Railroad currently serves the mill site. The line that the mill spur branches from is currently used for unit train coal delivery to



MAJOR ROADS IN THE VICINITY
OF THE PROJECT SITE

Figure 3.9-3

the JEA St. Johns Power Park a few miles east of the mill site. Therefore, it should not be necessary to upgrade this line. Section 6.3 discusses modifications to the mill spur that will be required for the cogeneration plant. 3