

SITE CERTIFICATION
APPLICATION

**THE CEDAR BAY
COGENERATION PROJECT
VOLUME 1**



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Submitted by  Cedar Bay Inc.

Received DER

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AMENDMENT 3--SUMMARY DESCRIPTION OF CHANGES

Amendment 3 provides revisions, corrections, additions, and deletions for the Cedar Bay Cogeneration Project's Site Certification Application submitted to the Florida Department of Environmental Regulation by AES Cedar Bay, Inc., and Seminole Kraft Corporation. The majority of the changes are the direct result of a reduction in the coal sulfur content and the elimination from consideration of the barge and coal conveyor alternative, although some have resulted from the normal evolution of engineering design details. Amendment 3 makes several additional corrections and the following substantive revisions.

1. Deleted from consideration the use of barge and conveyor system for delivery of coal. Coal delivery will be by rail.
2. Deleted the US Army Corps of Engineers' dredge and fill permit application for dredging associated with the coal conveyor.
3. Revised the project site boundary to exclude the small portion of site previously indicated in an area zoned open rural (OR).
4. Added two No. 2 fuel oil fired limestone dryers.
5. Revised period for baseline air pollutant emissions for netting purposes from 1979-1980 to 1983-1984.
6. Revised proposed SO₂ and particulate emissions for the kraft recovery boiler.
7. Revised the average annual sulfur content of coal to be fired from 3.3 percent to 1.7 percent. Short term coal sulfur percentage remains at 3.3 percent.
8. Revised Applicant's (AES Cedar Bay) address within the Application Preface and on appropriate permit application forms.
9. Revised route of plant access road (Figure 2.1-2).
10. Revised limestone and ash quantities due to the change in annual average coal sulfur content.
11. Revised fugitive dust emissions resulting from limestone and ash changes.

12. Revised PSD assessment to show, as a result of reduced sulfur in the coal, that proposed new SO₂ emissions will be fully "netted out" and, therefore, SO₂ emissions will not be subject to PSD requirements, which included an assessment of BACT.
13. Deleted the BACT analysis for SO₂.
14. Revised the projected transportation requirements (truck and rail) for limestone and ash.
15. Noted the submittal to DER of Notices of Variances Sought as Condition of Certification.
16. Revised the "net" ambient impact assessment for SO₂ to demonstrate the additional improvement resulting from reduced sulfur emissions.
17. Deleted discussion of environmental impacts associated with the construction and operation of the barge and coal conveyor system.
18. Deleted the US Coast Guard Bridge Permit Application for the coal conveyor.
19. Revised stack parameters for the kraft recovery boiler (except stack height) to be consistent with more recent information.

AMENDMENT 2--SUMMARY DESCRIPTION OF CHANGES

Amendment 2 provides revisions, corrections, and additions of information for the Cedar Bay Cogeneration Project's Site Certification Application submitted to the Florida Department of Environmental Regulation by AES Cedar Bay, Inc., and Seminole Kraft Corporation. The majority of the changes are the direct result of agency comments, although some have resulted from the normal evolution of engineering design details. Amendment 2 makes several editorial corrections and the following substantive revisions:

- (1) Added an artist's color rendering of the project.
- (2) Revised project schedule of major milestones.
- (3) Added a detailed discussion of recent land use trends in the site vicinity.
- (4) Listed, located, and described neighborhood and municipal parks within 5 miles of the site.
- (5) Added a detailed discussion of present and projected traffic volumes in the site vicinity, as well as potential impacts of construction and operational traffic increases.
- (6) Added Well No. D262 to "List of Wells Within 1 Mile of the Site."
- (7) Added temperature information to "Water Quality Criteria."
- (8) Revised site arrangement. Located kraft recovery boiler (KRB) to southeast of CFB boilers and relocated cooling tower.
- (9) Added the dewatering discharge and emergency overflow for runoff ponds.
- (10) Added synthetic liner to coal and ash storage areas.
- (11) Expanded the list of estimated air emissions from project.
- (12) Added a Best Available Control Technology (BACT) analysis for SO₂ and NO_x emissions from the KRB.
- (13) Revised the description of metal cleaning to include nonchemical cleaning.
- (14) Revised estimated quantities of lime mud to be removed from the site area.
- (15) Added discussion of demolition and intended compliance with applicable requirements regarding asbestos materials.

- (16) Added monitoring program for construction dewatering discharge and Broward River.
- (17) Revised modeling of thermal mixing zone for discharge of cooling tower blowdown into St. Johns River.
- (18) Revised wastewater measurement program to include additional monitoring locations and parameters.
- (19) Added governmental personnel contacted during the preparation of SCA amendments.
- (20) Revised NPDES permit application and DER industrial wastewater application to include a monitoring point for low volume wastes.
- (21) Revised DER air permit applications to include alternate fuels and New Source Performance Standards (NSPS) for the proposed air pollution sources.
- (22) Revised BACT cost estimates to reflect a 100 percent capacity factor.

DIRECTIONS FOR INSERTING AMENDMENT 2, JULY 7, 1989

Remove

Insert

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	Artist's rendering, following title sheet
Contents, pages TC-4 and TC-5, TC-9 and TC-10, TC-12 through TC-20	Contents, pages TC-4 and TC-5, TC-9 and TC-10, TC-12 through TC-20
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4th page through 6th page

20th page through 22nd page (at the
end of the section)

Section 10.6.1, Operate/Construct Air Pollution Sources

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set of 12

Pages 5 and 8 of CFB application's set
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Pages 5 and 8 of kraft recovery
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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.
- 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.

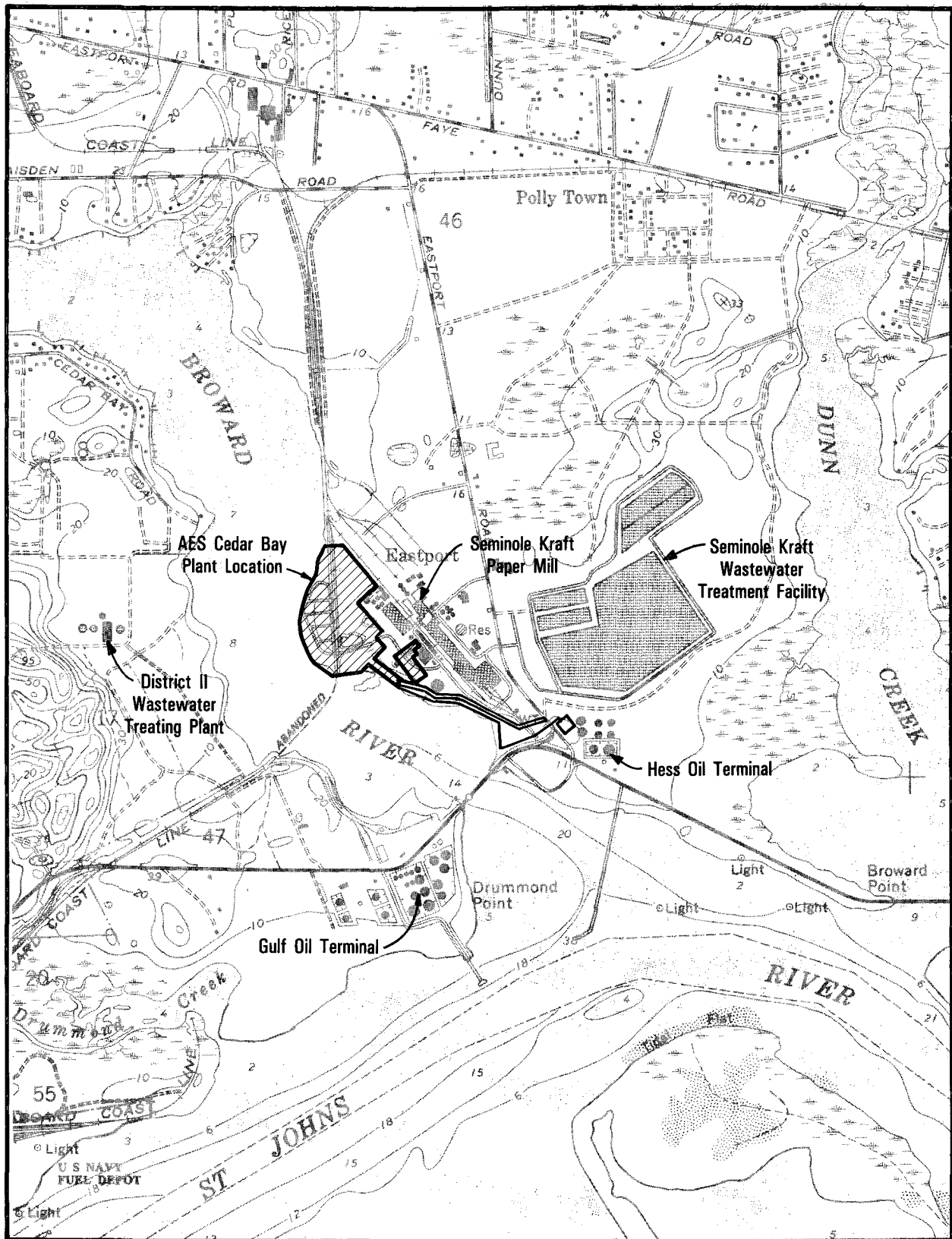
PROJECT INFORMATION

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 (FPL) 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).

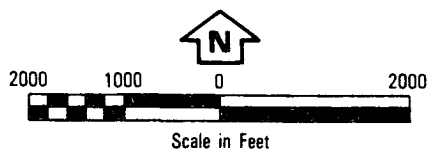
The proposed cogeneration plant will burn fuel made up of approximately 96 percent coal and 4 percent bark in three circulating fluidized bed (CFB) boilers. These technically advanced boilers produce steam at 1,800 pounds per square inch gauge (psig) for a new double automatic extraction condensing turbine 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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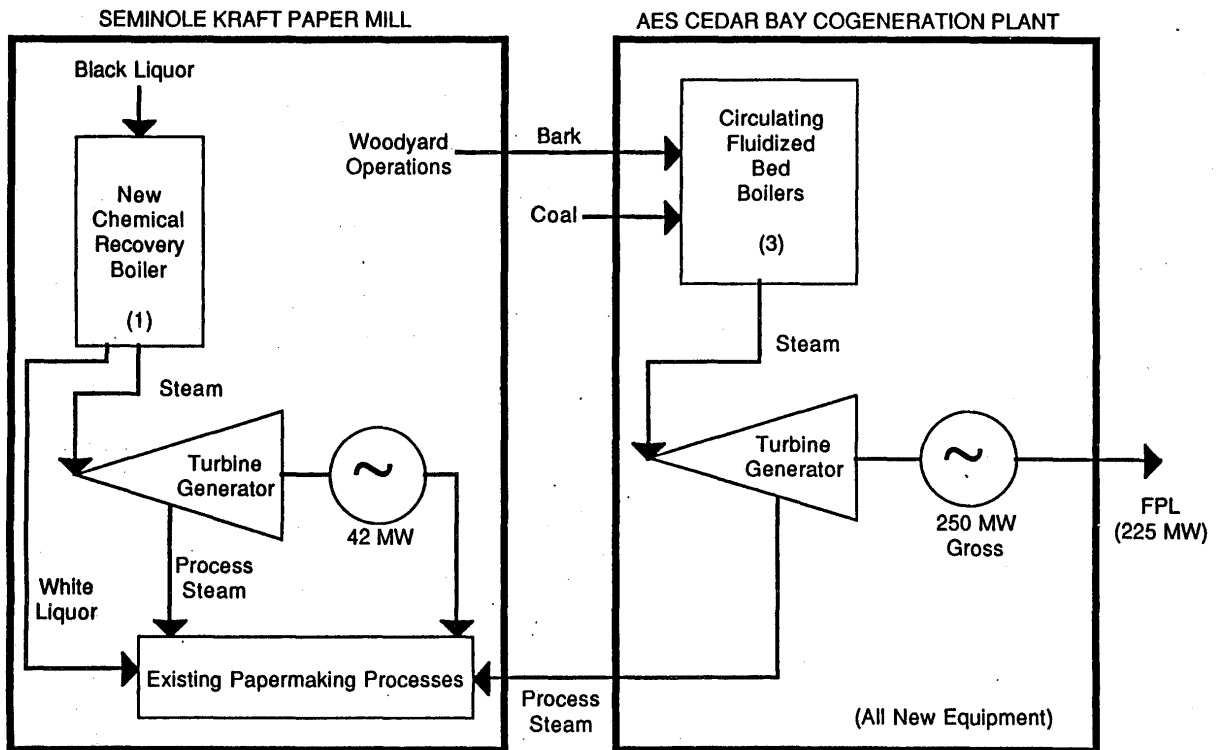
SITE LOCATION

Figure A

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AES Cedar Bay Cogeneration Project, Jacksonville, Florida

Figure B



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.

Typical Flow Chart for a Circulating Fluidized Bed Boiler System

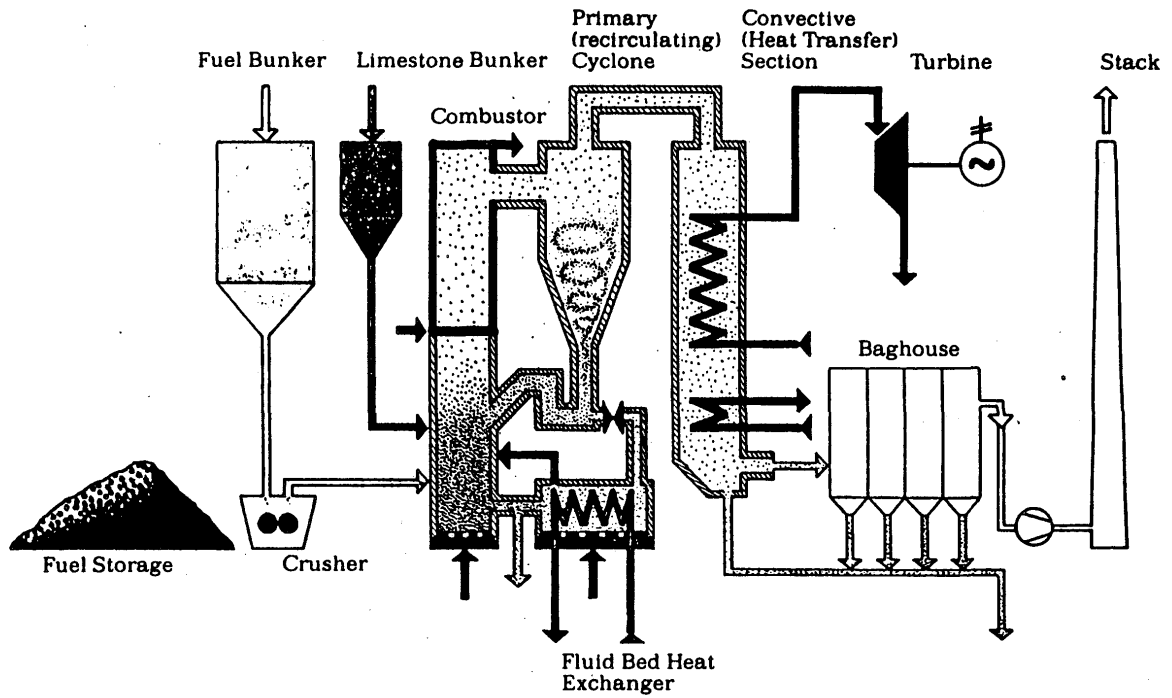


Figure C

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.
- 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.
- Particulate Matter Less Than 10 μm (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.

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 zoned heavy industrial (IH) and is designated for continued IH use in the Jacksonville Planning Department's 2010 North District Plan.

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.

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
- 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 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.

3

APPLICANT INFORMATION

Applicants' Official Names

AES Cedar Bay, Inc.

Seminole Kraft Corporation

Address

1925 North Lynn Street

9469 Eastport Road

Arlington, Virginia 22209

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

1001 North 19th Street

9469 Eastport Road

Suite 2000

Jacksonville, Florida 32218-0998

Arlington, Virginia 22209

(904) 751-6400

(703) 522-0073

JAX (904) 751-1007 xi

Ext 200

2

3

Amendment 2

070789

Amendment 3

101089

Site Location (County)

Duval County

Nearest Incorporated City

Jacksonville

Latitude and Longitude

30 degrees, 25 minutes, 21 seconds north latitude

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/m³

UNAMAP

UPS

USFWS

USGS

UTM

VOC

Micrograms per cubic meter

User's Network for the Applied Modeling of Air
Pollution

Unit Power Sales

U.S. Fish and Wildlife Service

U.S. Geological Survey

Universal Transverse Mercator

Volatile organic compounds

1.0 NEED FOR POWER

1.0 NEED FOR POWER AND THE PROPOSED FACILITIES

1.1 GENERAL

The Applicants propose to construct an integrated cogeneration project in Jacksonville, Florida which will supply approximately 640,000 lb/h of process steam to the Seminole Kraft Corporation paper mill and approximately 225 MW of electricity to Florida Power & Light Co. (FPL). Seminole Kraft also will produce electricity and steam for internal consumption only, from a new chemical recovery boiler and turbine generator that replace existing facilities. This internal power production serves a load that has always been self-served and hence Seminole Kraft will not be selling any of this internally generated power. The chemical recovery boiler and turbine generator will provide approximately 42 MW of electricity and 170,000 lb/h of steam to the Seminole Kraft mill. Figure 1.1-1 shows a flow diagram for the facilities.

This section demonstrates the need for the project as required by Sections 403.501 through 403.517, Florida Statutes (1987), the Florida Electrical Power Plant Siting Act and Section 403.519 Florida Statutes (1987). Section 403.519 requires the Florida Public Service Commission (FPSC) to consider the following criteria in making a determination of need for the project.

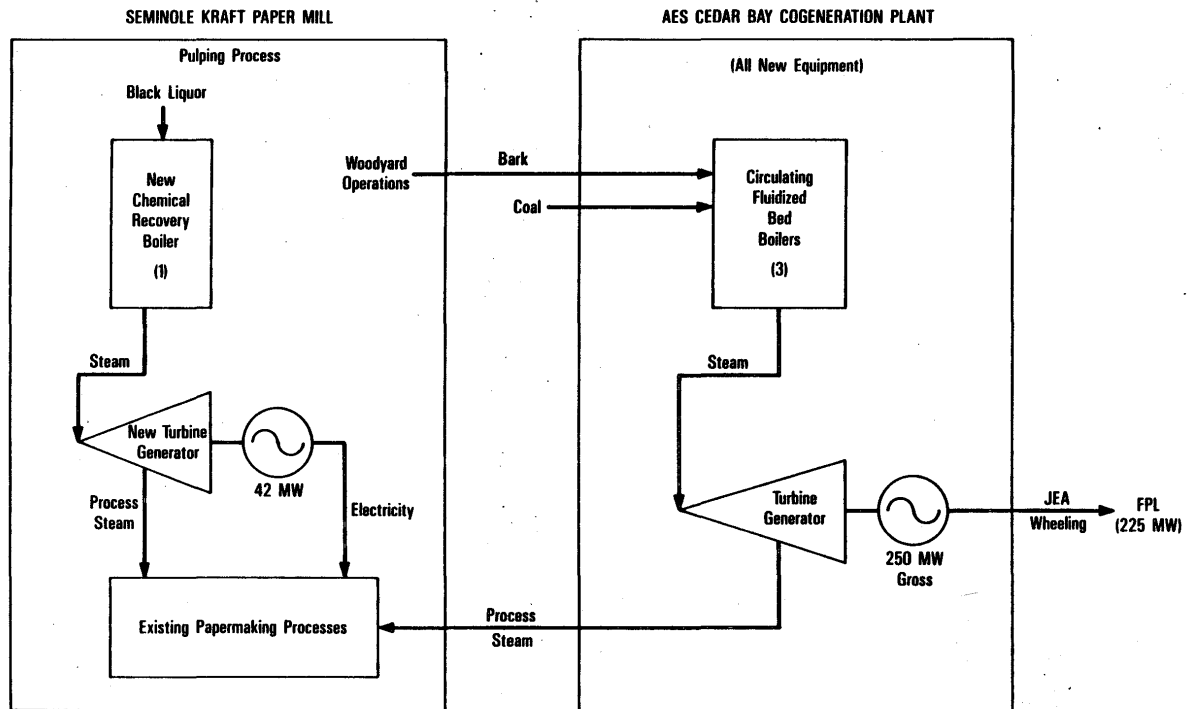
- Need for electric system reliability and integrity.
- Need for adequate electricity at a reasonable cost.
- Whether the proposed plant is the most cost-effective alternative available.
- Conservation measures taken by or reasonably available to the applicant or its members which might mitigate the need for the proposed plant.
- Other matters within its jurisdiction which the FPSC deems relevant.

For the purposes of demonstrating need for the project in this section, only the 225 MW fluidized bed cogeneration facilities are addressed since the generation from the chemical recovery boiler only replaces

AES Cedar Bay Cogeneration Project - Jacksonville, Florida

082488

1-2



- Notes:
1. The mill's energy requirements are currently served by an old system consisting of 3 recovery boilers, 2 bark boilers and 3 oil-fired power boilers. Three old turbine generators supply most of the mill's electricity needs, with the balance provided by JEA.
 2. Seminole Kraft does not presently sell any electricity to JEA, and has no plans to do so in the future.
 3. AES Cedar Bay will not sell any electricity to the Seminole Kraft mill or JEA.
 4. Approximately 10 percent of AES Cedar Bay's gross generation will be consumed internally for auxiliary power to run the fluidized bed plant equipment.

FACILITY FLOW DIAGRAM

Figure 1.1-1

existing internal generation and the 42 MW generation is below the 75 MW threshold in Section 403.506 Florida Statutes (1987).

In the following two orders, the FPSC applied the Section 403.519 criteria to determine the need for generating facilities not owned by electric utilities.

- Florida Crushed Stone--125 MW net, Order No. 11611, February 14, 1983¹.
- Pasco County Waste Resource Recovery Facility--29 MW net, Order No. 17752, June 26, 1987².

The Applicants request that the FPSC take administrative notice of these need determinations as providing guidance on applying the Section 403.519 criteria to the proposed project.

In addition to fulfilling the requirements of Rule 25-22.081 Florida Administrative Code, this chapter will demonstrate the following additional benefits which support the need for the project.

- Energy
 - Provides electricity to help meet increased needs in Florida.
 - Ratepayers benefit from below avoided cost pricing.
 - Project is consistent with Florida's goal to reduce dependence on oil and gas and move towards clean coal technology.
 - Cogeneration of steam and electricity results in higher thermal efficiencies, allowing a reasonable rate of return on capital while maintaining attractive product prices.
- Environmental
 - Significant reduction in total reduced sulfur emissions will improve the odor situation in Jacksonville.
 - Reductions in other air pollutants (SO₂, NO_x, particulate, etc.) due to offsets from existing oil fired boilers which will be shut down.
 - Land conservation due to location on existing industrial site.

- Economic
 - Enhance paper mill's long-term viability and job security.
 - Many direct and indirect economic benefits (jobs, purchases, taxes, etc.).

1.2 GENERAL DESCRIPTION OF UTILITIES AFFECTED

1.2.1 State of Florida

Table 1.2-1 presents the projected load and existing and certified generating capacity for Peninsular Florida from the 1986 Annual Planning Generation Expansion Planning Studies³ for the Avoided Unit Study. Data from the 1986 Annual Planning Hearing is the most recent data that the FPSC has used in issuing an Annual Planning Hearing Order⁴. Florida Electric Power Coordination Group (FCG) Forms 1.1 through 3.3 from the 1986 Annual Planning Hearing Generation Expansion Planning Studies³ are reproduced in Appendix 1A and contain further details on the load and electrical characteristics and generating capability of Peninsular Florida. Table 1.2-2 presents the projected load and existing and certified generating capacity for Peninsular Florida from the 1989 Planning Hearing Generation Expansion Planning Studies⁵ for the Avoided Unit Study.

The 1989 Planning Hearing Generation Expansion Study was filed with the PSC under Docket No. 880004-EU on September 1, 1988 but is not scheduled for hearing until March 6, 1989. FCG studies Forms 1.1 through 3.3 from the 1989 Planning Hearing Generation Expansion Planning Studies⁵ are reproduced in Appendix 1B. Comparing Tables 1.2-1 and 1.2-2 for the winter peak for 1992-93 and net energy for load for 1993 indicates that the projected peak demand and net energy for load have increased 1,632 MW and 17,881 GWH respectively from the 1986 to 1989 Planning Hearing forecasts. Figures 1.2-1 and 1.2-2 show the differences between the 1986 and 1989 forecasts. Appendix 1B contains additional details on the load and electrical characteristics and generating capability of Peninsular Florida for the 1989 Planning Hearing.

Figures 1.2-3 and 1.2-4 are reproduced from the 1986 Annual Planning Hearing 20 Year Plan⁶ showing present existing and planned transmission

TABLE 1.2-1. PENINSULAR FLORIDA LOAD AND GENERATING CAPACITY--1986 ANNUAL PLANNING HEARING

Year	Net Energy For Load GWh	Summer		Year	Winter	
		Peak Demand*	Existing and Certified Capacity		Peak Demand*	Existing and Certified Capacity
		MW	MW		MW	MW
1986	111,843	20,915	27,750	1986-87	24,050	28,777
1987	115,759	21,532	28,298	1987-88	24,516	29,722
1988	119,548	22,135	28,698	1988-89	24,899	30,272
1989	122,883	22,488	29,347	1989-90	25,355	30,370
1990	126,355	23,064	29,432	1990-91	26,106	30,429
1991	129,819	23,812	29,680	1991-92	26,675	30,737
1992	133,109	24,390	29,838	1992-93	27,574	30,819
1993	136,821	25,138	29,974	1993-94	28,433	31,071
1994	140,542	25,730	30,224	1994-95	29,265	31,310
1995	143,857	26,396	30,465	1995-96	29,818	31,525
1996	146,878	26,795	30,454	1996-97	30,391	31,571
1997	149,842	27,198	30,500	1997-98	30,966	31,613
1998	152,816	27,647	30,450	1998-99	31,576	31,565
1999	155,829	28,119	30,450	1999-00	32,207	31,315
2000	158,861	28,624	30,200	2000-01	32,830	31,232
2001	161,836	29,117	30,134	2001-02	33,459	31,222
2002	164,964	29,634	30,124	2002-03	34,094	31,190
2003	168,068	30,145	30,020	2003-04	34,727	31,106
2004	171,260	30,671	30,016	2004-05	35,346	31,106
2005	174,253	31,203	30,016	2005-06	35,999	31,106

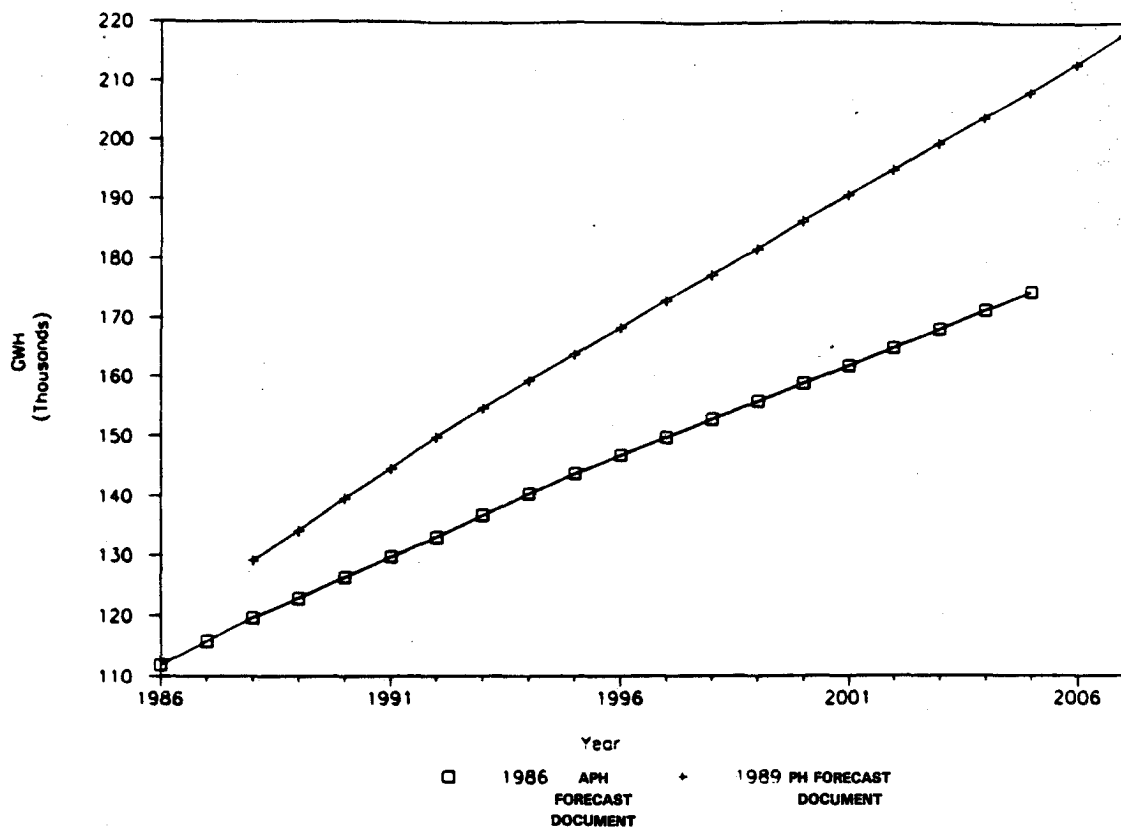
*Coincident Firm Peak Demand.

Source: 1986 Annual Planning Hearing Generation Expansion Planning Studies, Florida Electric Power Coordinating Group, Inc., Forms 1.1 and 2.2.

TABLE 1.2-2. PENINSULAR FLORIDA LOAD AND GENERATING CAPACITY--1989
PLANNING HEARING

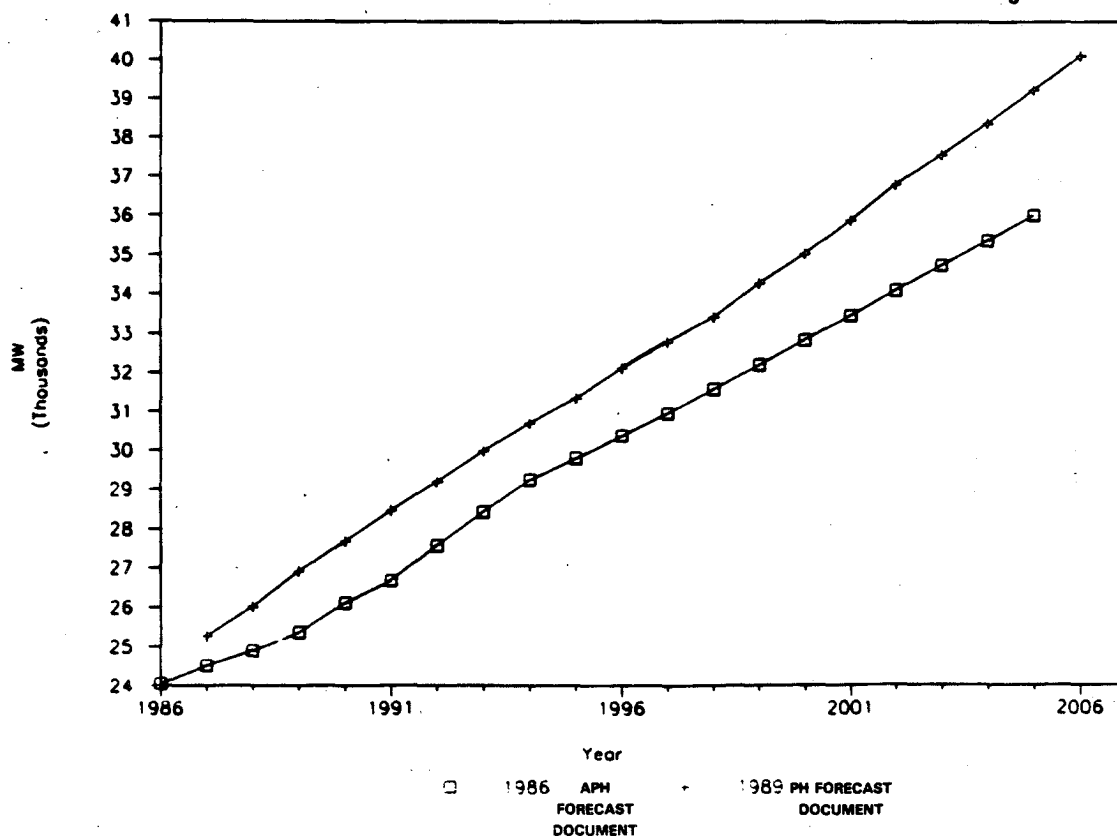
Year	Net Energy For Load GWh	Summer		Year	Winter	
		Net Peak Demand MW	Existing and Certified Capacity MW		Net Peak Demand MW	Existing and Certified Capacity MW
1988	129,163	23,769	29,235	1987-88	25,264	29,460
1989	134,138	24,429	29,694	1988-89	26,019	30,746
1990	139,681	25,179	29,928	1989-90	26,909	31,056
1991	144,695	25,909	30,147	1990-91	27,688	31,225
1992	149,942	26,617	30,400	1991-92	28,470	31,431
1993	154,702	27,267	30,426	1992-93	29,206	31,530
1994	159,410	27,961	30,425	1993-94	30,002	31,593
1995	163,910	28,531	30,671	1994-95	30,711	31,577
1996	168,415	29,106	30,619	1995-96	31,353	31,819
1997	172,946	29,738	30,618	1996-97	32,123	31,785
1998	177,257	30,369	30,581	1997-98	32,798	31,751
1999	181,606	30,977	30,567	1998-99	33,431	31,731
2000	186,341	31,733	30,224	1999-00	34,286	31,480
2001	190,622	32,343	30,162	2000-01	35,030	31,346
2002	195,055	33,059	30,152	2001-02	35,884	31,315
2003	199,554	33,820	30,099	2002-03	36,797	31,247
2004	203,920	34,467	30,099	2003-04	37,564	31,247
2005	208,338	35,127	30,029	2004-05	38,360	31,247
2006	213,161	35,929	30,018	2005-06	39,234	31,165
2007	218,053	36,753	29,936	2006-07	40,111	31,083

Source: 1989 Annual Planning Hearing Generation Expansion Planning
Studies, Florida Electric Power Coordinating Group, Inc.,
Forms 1.1 and 2.2.



PENINSULAR FLORIDA NET ENERGY FOR LOAD

Figure 1.2-1

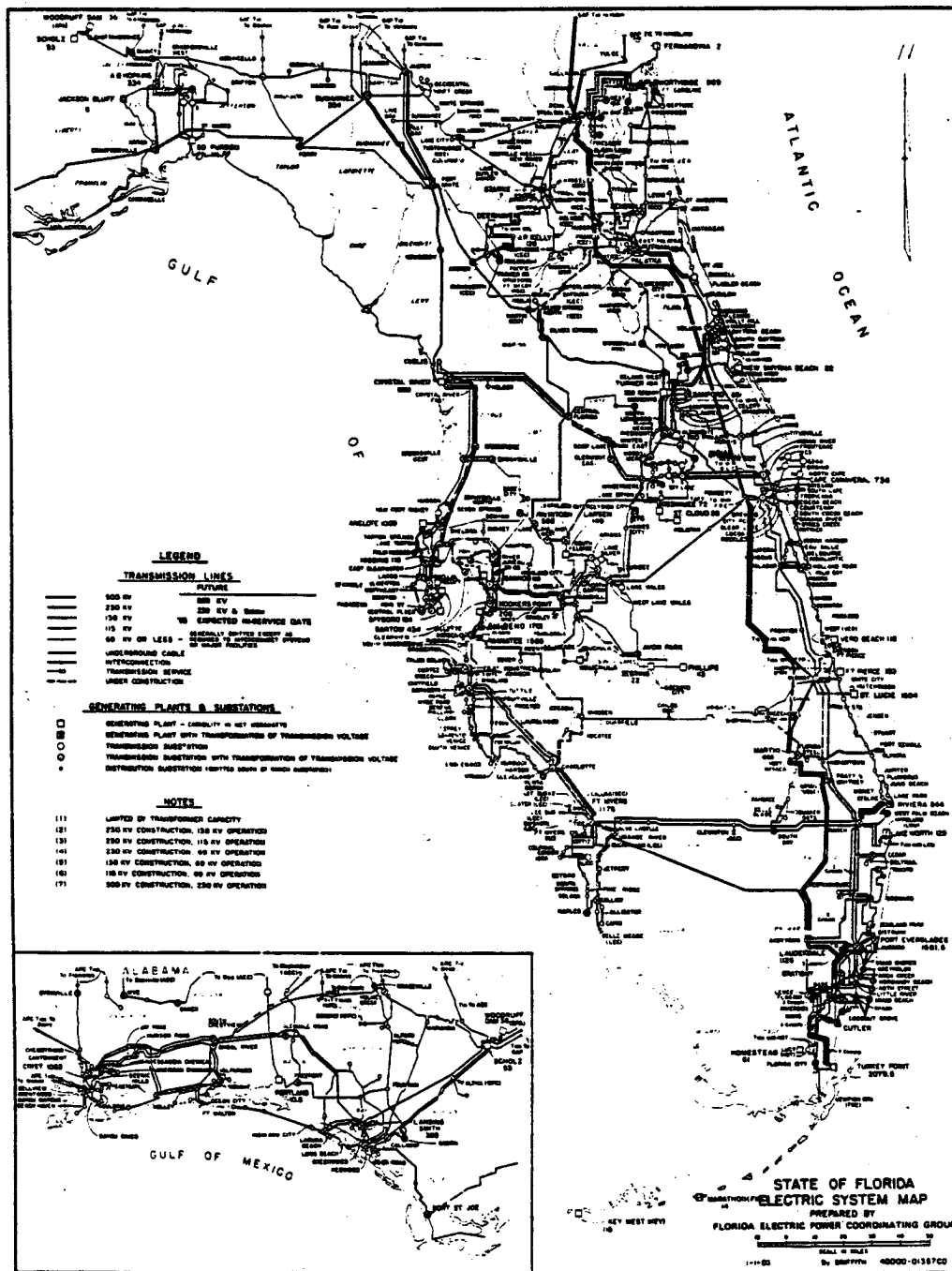


PENINSULAR FLORIDA NET WINTER PEAK DEMAND

Figure 1.2-2

Image Quality

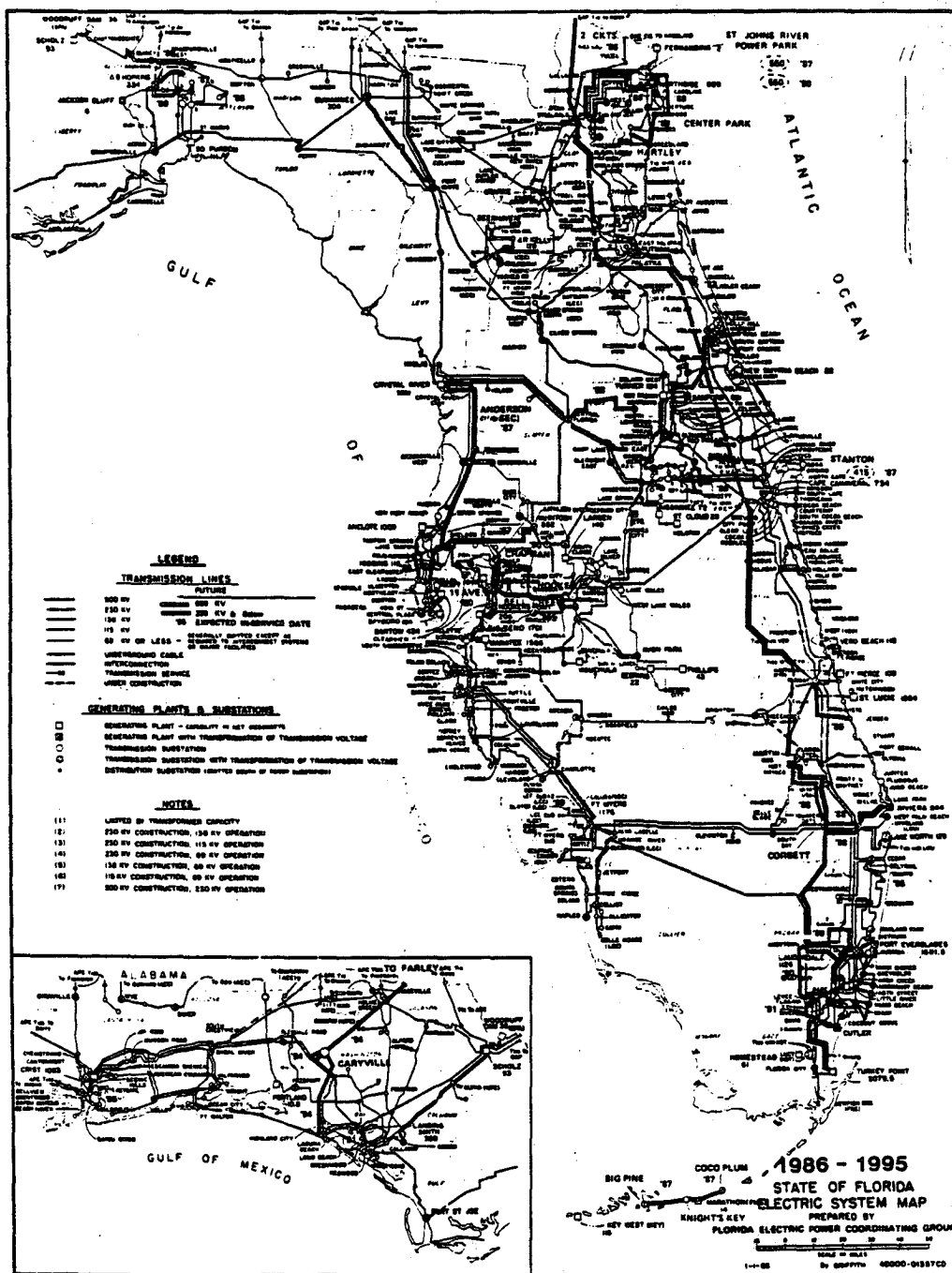
As you review the next group of images, Please note that the original documents were of poor quality.



SOURCE: 1986 ANNUAL PLANNING HEARING 20 YEAR PLAN

STATE OF FLORIDA
ELECTRICAL SYSTEM MAP

Figure 1.2-3



SOURCE: 1986 ANNUAL PLANNING HEARING 20 YEAR PLAN

STATE OF FLORIDA
 ELECTRICAL SYSTEM MAP
 1986-1995

lines and interconnections in Peninsular Florida as required by Rule 25-22.81, Florida Administrative Code.

1.2.2 Florida Power & Light

Table 1.2-3 compares Florida Power & Light's forecast for the 1986 Annual Planning Hearing⁸ with their forecast for the 1989 Planning Hearing⁹. The Applicants request that the FPSC take administrative notice of these filings. The 1989 Planning Hearing Forecast Document contains the same forecast as contained in the Florida Power & Light's Ten Year Power Plant Site Plan⁷ which is reproduced in Appendix 1D. Additional details regarding the forecast are contained in the Forecast Document⁹. Table 1.2-3 indicates that the 1988 forecast for the 1992-93 winter peak demand and 1993 net energy for load have increased 814 MW and 6,792 GWh, respectively over the 1986 forecast. (Graphically, these data are shown on Figures 1.2-5 and 1.2-6).

Florida Power & Light will purchase all capacity and energy produced by the proposed project (net of the Project's internal consumption).

A general description of Florida Power & Light including generating capability and interconnections is presented in Section III of Florida Power & Light Company, Ten Year Power Plant Site Plan 1988-1997, April 1, 1988⁷. Section III is reproduced in Appendix 1C. Florida Power & Light is a major energy producer and distributor in Florida with almost 3 million customers and a transmission/distribution system that connects 397 substations in an integrated network.

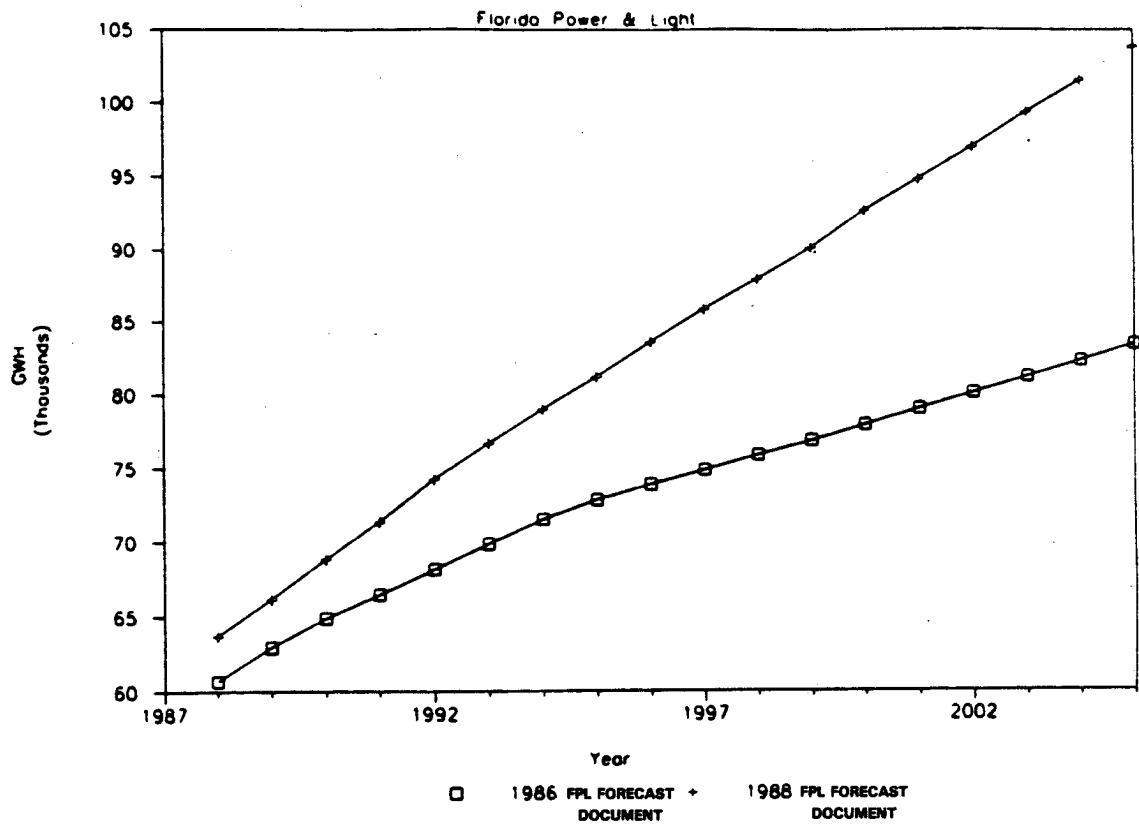
Load and electrical characteristics and future generating capability for Florida Power & Light are presented in Subsections A and B of Section IV of Florida Power & Light Company, Ten Year Power Plant Site Plan 1988-1997, April 1, 1988⁷. Subsections A and B are reproduced in Appendix 1D.

Florida Power & Light is experiencing significant load growth. This load is growing faster than capacity and energy imports from other systems. Thus, beginning in 1992, FPL is planning to add units to its existing generation capacity. FPL is also planning on the development of qualified facilities to help meet the forecasted demand.

TABLE 1.2-3. FLORIDA POWER & LIGHT LOAD PROJECTIONS

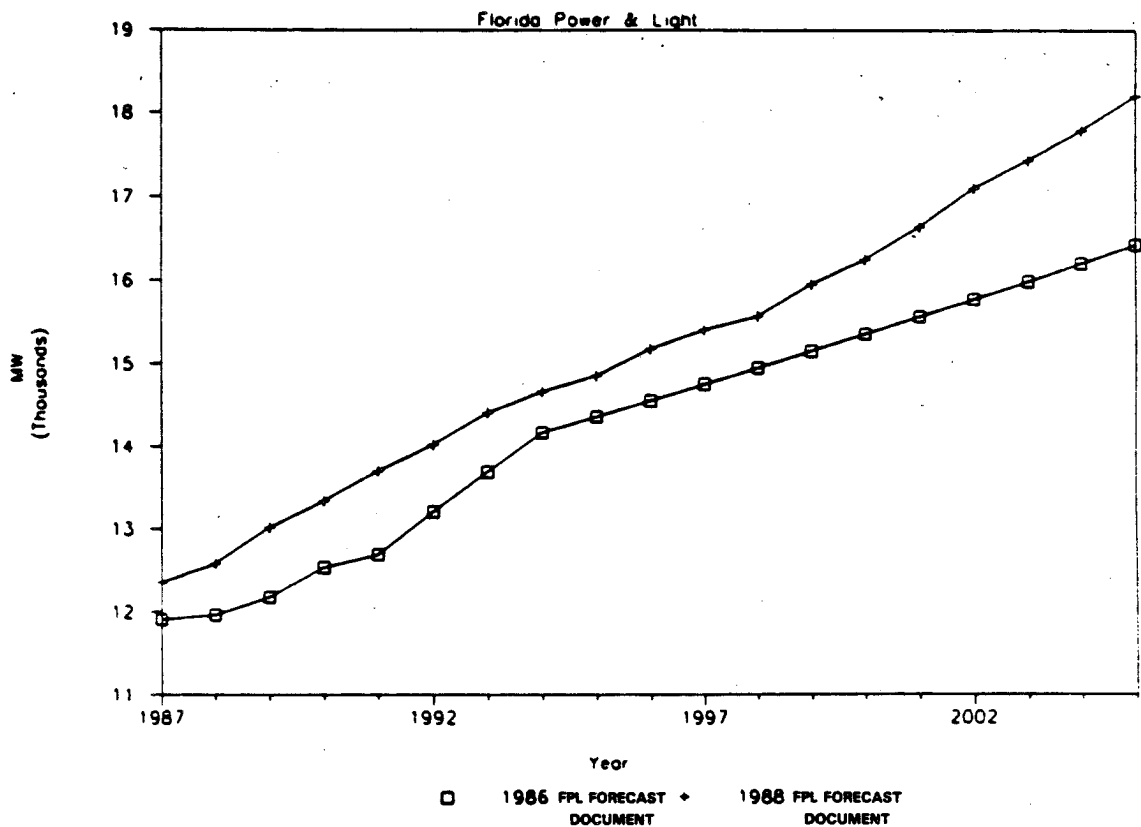
Year	Net Energy For Load		Summer Peak Demand		Year	Winter Peak Demand	
	1986 GWh	1988 GWh	1986 MW	1988 MW		1986 MW	1988 MW
1988	60,677	63,688	11,097	12,058	1987-88	11,912	12,355
1989	62,933	66,181	11,175	12,355	1988-89	11,968	12,580
1990	64,907	68,856	11,467	12,715	1989-90	12,178	13,016
1991	66,475	71,379	11,881	13,069	1990-91	12,532	13,342
1992	68,166	74,246	12,096	13,431	1991-92	12,691	13,710
1993	69,895	76,687	12,603	13,706	1992-93	13,213	14,027
1994	71,534	79,000	13,076	14,025	1993-94	13,695	14,416
1995	72,852	81,171	13,551	14,211	1994-95	14,172	14,668
1996	73,880	83,509	13,734	14,429	1995-96	14,363	14,854
1997	74,876	85,753	13,919	14,682	1996-97	14,556	15,178
1998	75,875	87,882	14,106	14,932	1997-98	14,752	15,403
1999	76,894	90,039	14,296	15,161	1998-99	14,951	15,572
2000	77,979	92,570	14,489	15,535	1999-00	15,153	15,956
2001	79,026	94,742	14,684	15,814	2000-01	15,357	16,253
2002	80,074	96,970	14,882	16,159	2001-02	15,564	16,640
2003	81,151	99,342	15,082	16,559	2002-03	15,773	17,110
2004	82,228	101,570	15,285	16,848	2003-04	15,986	17,437
2005	83,332	103,875	15,491	17,145	2004-05	16,201	17,790
					2005-06	16,419	18,211

Source: Data Column 1986--Florida Power & Light Company's Forecast Document, Docket No. 860004-EU, August 8, 1986, Form 1.1.
 Data Column 1988--Florida Power & Light Company's Forecast Document, Docket No. 880004-EU, July 1, 1988, Form 1.1.



FLORIDA POWER & LIGHT NET ENERGY FOR LOAD

Figure 1.2-5



FLORIDA POWER & LIGHT WINTER PEAK DEMAND

Figure 1.2-6

1.2.3 Jacksonville Electric Authority

The proposed project is located in the service area of the Jacksonville Electric Authority (JEA) and power will be wheeled over JEA's system to FPL. Additionally, 42 MW of electricity generated by the paper mill Chemical Recovery Boiler System will be used onsite by Seminole Kraft. This 42 MW of onsite generation will replace 42 MW of existing onsite generation and will not change the generation or load on the JEA system.

A general description of JEA including generating capability and interconnections is presented in Chapter I of Jacksonville Electric Authority Ten Year Site Plan 1988-1997, dated April 1988¹⁰. Load and electrical characteristics for JEA are presented in Chapter II of JEA's Ten Year Site Plan¹⁰. Future generating capability for JEA is presented in Chapter III of JEA's Ten Year Site Plan¹⁰.

Jacksonville Electric Authority's electrical system is substantially smaller than Florida Power & Light's system and JEA does not need additional generation capacity because of its recent capacity additions. Locating the AES Cedar Bay Project within JEA's service area increases the effective size of the JEA system and hence its stability and reliability.

The only impacts on JEA will be an increase in revenues generated from wheeling the power to Florida Power & Light and the JEA system benefits from voltage and var generation from a location in the middle of JEA's service area.

1.3 GENERAL DESCRIPTION OF THE AES CEDAR BAY PROJECT

1.3.1 Plant Facilities

The AES Cedar Bay cogeneration project is an integrated energy facility which will provide electricity to Florida Power & Light Company (FPL) and process steam to the adjacent Seminole Kraft paper mill. The project also includes installation of a new chemical recovery boiler, turbine generator, and other equipment required to modernize the mill.

Historically, the mill has served approximately 42 MW of its load with its own generation and will continue to do so after installation of the new equipment.

The cogeneration plant will consist of three coal fired circulating fluidized bed boilers, an automatic extraction condensing turbine generator, and associated equipment. Net plant output will be approximately 225 MW while supplying normal steam load (approximately 640,000 lb/h) to the paper mill. Section 3.2 of this document provides a more detailed technical description of the cogeneration plant facilities. None of the power generated with the fluidized bed units will be sold to the mill.

The Cedar Bay project will also include new equipment to modernize the paper mill. The major components include a chemical recovery boiler, a 42 MW turbine generator (for the mill's internal load), concentrator, and multiple effect evaporators. Seminole Kraft will operate and maintain the new mill facilities as part of their mill operation.

A total of eight boilers in the existing facility will be shut down as part of the AES Cedar Bay Project. This old equipment will be replaced by three new coal fired fluidized bed boilers for electric and steam production and one chemical recovery boiler. The amount of steam production (used for internal chemical process applications) with the new equipment will remain approximately the same as with the old equipment.

Seminole Kraft will continue to own all of the plant site, but will lease to AES the land required for the new facilities. AES will operate and maintain only the fluidized bed power plant portion of the facility. AES is committed to close coordination and communication in establishing a well run and efficient production facility. The fluidized bed power plant portion of the facility is capable of independent operation if something were to happen to the paper mill.

The AES Cedar Bay Cogeneration Project Site is located in Duval County at 9469 Eastport Road, Jacksonville, Florida adjacent to the Seminole Kraft paper mill plant site (see Figures 2.1-1, 2.1-2, and 2.1-3). The plant location is north northeast of the center of the City of Jacksonville, approximately 9 miles from the downtown area. The plant site is between the Broward River on the west and Eastport Road on the east.

1.3.2 Overview of Fluidized Bed Technology

Fluidized bed combustion (FBC) has become an accepted technology for coal and other solid fueled power plants in both the industrial and utility markets. Most of the fluidized bed boilers sold in recent years were for industrial or cogeneration use but now FBC is used in the larger scale (100 MW range) utility boiler market. (See Table 1.3-1.) FBC offers lower production costs, simpler emission control and wider fuel flexibility compared to conventional pulverized coal technology.

There are currently 15 large utility-type reheat FBC units either on suppliers' order books or being negotiated. Many more small industrial fluidized plants are in design or are currently under construction.

Fluidized bed technology has become an established, reliable form of combustion for power generation. The history of growth for this industry is shown in Table 1.3-2.

A circulating fluidized bed boiler (CFB) is a coal fired boiler in which crushed coal is burned on a bed of crushed limestone. Figure 1.3-1 shows a typical circulating fluidized bed boiler system. The boiler is designed to create air movement in a vortex (thus the word circulating) in which the movement: (1) allows good contact and mixing between the limestone and coal; and (2) increases the completeness of combustion of the coal. Ash from the combustion process consists of bottom ash, collected from the bed of the boiler, and fly ash which is collected in a baghouse from flue gas prior to the gases being emitted through the plant's stack. Both ashes are dry and nontoxic and may serve a variety of commercial uses.

The limestone is introduced into the boiler for the purpose of stripping sulfur out of the combustion gases prior to emission through the plant's stack. Calcium carbonate in the limestone reacts with sulfur in the combustion gases to form calcium sulfate compounds that (depending upon the amount of limestone added) can trap over 90 percent of the coal's sulfur in the bottom and fly ash. This results in emission rates at or below environmental standards for sulfur dioxide without having to construct expensive wet scrubbers. Furthermore, wet scrubber product is more difficult to dispose of.

TABLE 1.3-1. OPERATING FLUIDIZED BED COMBUSTORS

<u>BFB*</u>	<u>Capacity</u>	<u>MW Equivalent**</u>	
Georgetown	100,000 lb/h	8	
Shamokin	25,000 lb/h	2	
TVA Shawnee Pilot Plant	200,000 lb/h	17	2
Ashland Petroleum	325,000 lb/h	27	
Mid West Solvents	120,000 lb/h	10	
Great Lakes	50,000 lb/h	4	
NSP Black Dog	1,039,000 lb/h	87	
TVA Shawnee Unit 10	160 MW		2
 <u>CFB***</u>			
Colorado Ute	110 MW		
California Portland	325,000 lb/h	27	
General Motors	150,000 lb/h	13	
Kerry Cooperative	200,000 lb/h	17	
Corn Products	49.9 MW		
Scott Paper	650,000 lb/h	54	
New Brunswick	210,000 lb/h	18	
Stadtwerke	595,000 lb/h	50	
Duisbury	90 MW		

*Bubbling Fluidized Bed Boiler.

**Assumes approximately 12,000 lb/h steam flow at 1,250 psig, 950 F required to produce 1 MW.

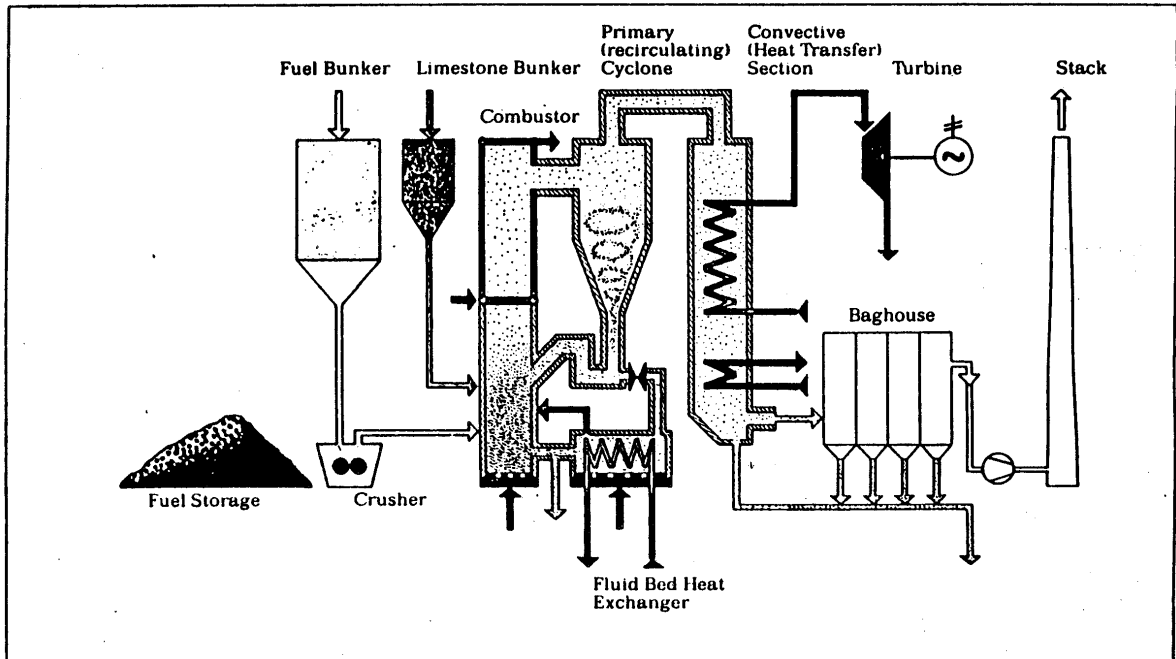
***Circulating Fluidized Bed Boiler.

TABLE 1.3-2. MARKET SHARE OF FLUIDIZED BED BOILERS IN THE COAL FIRED
BOILER MARKET (USA)*

<u>Year</u>	<u>Percent**</u>
1979	2
1980	5
1981	18
1982	3
1983	14
1984	58
1985	53
1986 (Through 9/86)	50

*Source: Power Engineering Magazine, August 1987.

**Based on steaming capacity.



TYPICAL FLOW SHEET FOR CIRCULATING
FLUID BED BOILER SYSTEM

Figure 1.3-1

Circulating fluidized bed boilers are being built and operated in the United States because they have several advantages over conventional boilers. The advantages of CFBs, which were touched on above, are further described below.

- CFBs use state-of-the-art technology to absorb SO_2 in the combustion process, thus eliminating the need for back-end cleanup and disposal of wet sludge.
- CFBs operate at a lower temperature than conventional boilers. Because of the lower combustion temperature, less NO_x is formed during the combustion process than is formed in conventional coal fired plants. CFB emissions are below current EPA standards for NO_x emissions and the technology will likely remain viable even if stricter NO_x emissions standards are put into effect.
- CFBs are capable of firing a wider range of coal types (as well as other fuels) compared to conventional boilers. This allows consideration of a variety of coals and provides a more diverse range of potential suppliers which can in turn lead to a lower price for coal (and thus electricity).
- CFBs produce essentially no ash slag and have significantly lower fouling rates than conventional boilers with scrubbers because CFBs have an operating temperature below the ash fusion temperature.
- CFBs produce a dry, nontoxic ash material that may have excellent characteristics for use as a building material, soil stabilizer, ingredient in cement or concrete. A variety of other uses are also being evaluated.

In summary, circulating fluidized bed boilers offer increased fuel flexibility, are cost-effective and provide attractive environmental benefits relative to conventional coal boilers.

The reliability of utility size CFBs is comparable to that of similarly sized pulverized coal units and, therefore, the proposed units are

suitable to provide additional generating capacity for the FPL system. Reliability predictions and data are documented in the letter from Combustion Engineering, Inc. dated June 24, 1986 reproduced in Appendix 1E and Table 3 of the Pyropower Corporation Paper PCR-118 reproduced in Appendix 1F.

1.3.3 Customers

Electricity produced by the cogeneration facility will be sold to FPL under a 32 year contract which was signed on May 6, 1988. Due to the plant's location, the power will be wheeled through the Jacksonville Electric Authority system to FPL.

AES Cedar Bay will sell process steam to Seminole Kraft Corporation which owns and operates the adjacent paper mill. The mill cuts and chips wood, processes the chipped wood into pulp, and produces unbleached linerboard and kraft paper. Steam deliveries under normal conditions will be approximately 273,000 lb/h at 75 psig and 366,000 lb/h at 175 psig. Stone Container Corporation owns 49 percent of Seminole Kraft and buys all the mill's output.

1.3.4 Fuel Type and Supply Modes

The cogeneration plant's fluidized bed boilers will consume approximately 1,000,000 tons per year of bituminous coal and 100,000 tons per year of limestone (to control sulfur dioxide emissions). The facility will generate about 150,000 tons per year of ash, a waste product of the combustion process. AES has received bids for the supply and disposal of these materials, and is negotiating with the most attractive bidders. The price of the coal will be capped at the price paid by the St. Johns River Power Park Units.

The AES Cedar Bay plant will be able to receive coal from either domestic or international sources. Transportation options are as follows.

- The plant is served by the CSX railroad system, which provides good access to Appalachian coal reserves. Two rail yards, one onsite and another just offsite, will allow for unit train deliveries despite a limited site area.

- Waterborne deliveries are also possible, opening up important foreign fuel supply options. A nearby deep-water oil terminal is available for berthing large vessels. A 1 mile conveyor would bring the coal to the project site.

Because negotiations are still underway, it is impossible to specify which one of these options will be utilized. The final contract is expected to be signed in October 1988. The fuel agreement will be a long-term (20-year), full requirements contract.

Any available bark from the paper mill operations will also be burned in the circulating fluidized bed (CFB) boilers. Because the quantity of bark is expected to be relatively small (approximately 5 percent of the total boiler heat input), benefits from burning the bark would not significantly impact the economic evaluations presented in this chapter.

1.3.5 Approximate Costs

The approximate cost for the AES Cedar Bay Project is \$350 million including interest during construction and owner's costs. Purchase and installation of equipment necessary to modernize the mill will add more than \$100 million to these costs. Due to the competitive nature of the business, detailed studies of the project's economic viability are not available for public review. Project pro formas will, however, be available to selected regulatory authorities on a confidential basis.

1.3.6 Cogeneration Development Experience

Applied Energy Services (AES) has a substantial record of successful accomplishment in the development of cogeneration projects. AES currently has three projects on-line with a total capacity of 355 MW.

Two more plants, with an additional 500 MW of capacity, are presently under construction. Total AES generating capacity, including units operating, under construction, and in development, amounts to 1,800 MW. Table 1.3-3 summarizes AES's experience.

Table 1.3-3

AES FACILITY/ LOCATION	CUSTOMERS	FUEL TYPE	COST Million	STEAM (#/HR)	POWER (MW)	CONST. START	ON LINE
Deepwater Houston, TX	Texas Utilities Lyondell Petrochem.	Petcoke	\$275	30,000	135	December 1983	June 1986
Beaver Valley Monaca, PA	West Penn Power Chemical	Coal	116	145,000	121	September 1985	July 1987
Placerita Newhall, CA	Southern California Edison, TOSCO	Gas	121	250,000	99	July 1986	July 1988
Thames Montville, CT	Northeast Utilities Stone Container	Coal	250	65,000	180	December 1986	November 1989
Shady Point Poteau, OK	Oklahoma G&E AES CO2 Plant	Coal	475	100,000	320	June 1987	January 1991
Riverside Woonsocket, Rhode Island	New England Electric Boston Edison Eastern Utilities Assoc.	Coal	260	50,000	180	1989	1991
Barbers Point Oahu, Hawaii	Hawaiian Electric Chevron	Coal	250	30,000	146	1989	1992
Cedar Bay Jacksonville, FL	Florida Power & Light Stone Container	Coal	480	640,000	225	1990	1992
Petrolia Cumbertand, MD	West Penn Power	Coal	300	30,000	180	1992	1995
TOTAL			\$2781M		1767		

To date, AES has raised over \$1.2 billion to finance five large cogeneration projects. Funds were obtained from various established lending institutions, including the following banks.

- Security Pacific National Bank.
- Union Bank.
- Credit Suisse.
- The Bank of Nova Scotia.
- Standard Chartered Bank.
- The Fuji Bank, Limited.
- The Nippon Credit Bank, Limited.
- Bank of New England, N.A.
- Westpac Banking Corporation.
- Morgan Guaranty Trust Company of New York.
- Chemical Bank.
- Bank of Montreal.
- General Electric Credit Corporation.
- First City National Bank of Houston.
- Westinghouse Credit Corporation.
- Mellon Bank, N.A.
- Swiss Bank Corporation.

Copies of financing announcements from the Wall Street Journal are shown on Figures 1.3-2, 1.3-3, and 1.3-4.

AES currently operates three large cogeneration plants (355 MW total) in Texas, Pennsylvania, and California. These facilities have all demonstrated superior operating performance and are available for inspection, if desired.

1.3.7 Project Schedule

The project schedule forecast is as follows.

Submit Site Certification Application	October 1988
Sign Fuel Supply Contract	October 1988
Sign Prime Contract for Engineering, Procurement, and Construction	April 1989
Receive Certification	October 1989

This announcement appears as a matter of record only

Non-Recourse Project Financing for a 180 Megawatt Cogeneration Facility

\$250,000,000

AES Thames Inc.

a wholly-owned subsidiary of

Applied Energy Services, Inc.

Senior Debt Provided by:

Agent

The Fuji Bank, Limited
New York Branch

Lead Managers

The Fuji Bank, Limited
New York Branch

Bank of New England N.A.

The Bank of Nova Scotia

The Nippon Credit Bank, Limited
New York Branch

Westpac Banking Corporation

Participants

The Chuo Trust & Banking Co., Limited
New York Agency

The Daiwa Bank, Limited
New York Branch

The Hokkaido Tokai Bank, Limited
New York Branch

The Saitama Bank, Ltd.
New York Branch

The Tokai Bank, Limited
New York Branch

Subordinated Debt Provided by:

Marubeni America Corporation

Combustion Engineering, Inc.

CSX Transportation, Inc.

Toshiba International Corporation

The undersigned acted as financial advisor to Applied Energy Services, Inc.

Salomon Brothers Inc

One New York Plaza, New York, New York 10004
Atlanta, Boston, Chicago, Dallas, Los Angeles, San Francisco, Zurich.
Affiliates: Frankfurt, London, Tokyo.
Member of Major Securities and Commodities Exchanges.

AES FINANCING ANNOUNCEMENT

Figure 1.3-2



a wholly owned subsidiary of
APPLIED ENERGY SERVICES, INC.

\$275,000,000

*Non-recourse project financing for the
AES/Deepwater Cogeneration Facility*

Construction financing

MANAGED BY:

MORGAN GUARANTY TRUST COMPANY OF NEW YORK

PLANS PROVIDED BY:

MORGAN GUARANTY TRUST COMPANY OF NEW YORK

CHEMICAL BANK

INTERFIRST BANK DALLAS, N.A.

BANK OF MONTREAL

GENERAL ELECTRIC CREDIT CORPORATION

FIRST CITY NATIONAL BANK OF HOUSTON

WESTINGHOUSE CREDIT CORPORATION

MELLON BANK, N.A.

Permanent financing

LEASE EQUITY COMMITMENT ARRANGED BY:

GENERAL ELECTRIC CREDIT CORPORATION

LEHMAN BROTHERS KUDER LOEB INCORPORATED

LEASE EQUITY COMMITMENT PROVIDED BY:

GENERAL ELECTRIC CREDIT CORPORATION

MFC FINANCIAL SERVICES CORPORATION

WESTINGHOUSE CREDIT CORPORATION

CITIBANK RESOURCE COMPANY

LEASE LEVERAGE COMMITMENT ARRANGED BY:

MORGAN GUARANTY TRUST COMPANY OF NEW YORK

LEASE LEVERAGE COMMITMENT PROVIDED BY:

MORGAN GUARANTY TRUST COMPANY OF NEW YORK

FIRST CITY NATIONAL BANK OF HOUSTON

MELLON BANK, N.A.

CHEMICAL BANK

INTERFIRST BANK DALLAS, N.A.

BANK OF MONTREAL

Morgan Guaranty Trust Company of New York

served as financial advisor and agent

on this project financing

This announcement appears as a matter of record only.

December 28, 1983

\$465,000,000

Project financing

Applied Energy Services, Inc.

Developer and owner of a 300 megawatt coal-fired cogeneration facility
in LeFlore County, Oklahoma



Credit facility provided by:

Agent and Issuer

Security Pacific National Bank

Lead Managers

Security Pacific National Bank Union Bank

Managers

Credit Suisse The Bank of Nova Scotia Standard Chartered Bank

Participants

The Toronto-Dominion Bank

Algemene Bank Nederland N.V.

National Australia Bank, Limited

B.S.F.E. — Banque de la Societe Financiere Europeenne

The Mitsubishi Bank, Ltd.

National Westminster Bank PLC

Banque Nationale de Paris

The undersigned provided financial advice, underwrote construction and term
financing, and arranged and executed the related interest rate swaps, for the project.

Security Pacific Merchant Bank

July 1987

SECURITY PACIFIC NATIONAL BANK

AES FINANCING ANNOUNCEMENT

Figure 1.3-3

This announcement appears as a matter of record only

\$85,000,000

NON-RECOURSE PROJECT FINANCING
BEING PART OF THE
\$116,000,000
FINANCING FOR THE

AS BEAVER VALLEY COGENERATION FACILITY

Developed and Managed By
APPLIED ENERGY SERVICES, INC.

Arranged By
BANK OF MONTREAL

Funds Provided By
BANK OF MONTREAL

FIRST INTERSTATE BANK, LTD. WESTPAC BANKING CORPORATION
B N F E M Group MARINE MIDLAND BANK, N.A.
September Part

BANK OF MONTREAL
Page 10

This announcement appears as a matter of record only

\$120,000,000

Placerita Inc.
a wholly-owned subsidiary of
Applied Energy Services, Inc.

Non-recourse Project Financing
Arranged & Structured by
Swiss Bank Corporation
New York Branch
for the
AES Placerita Cogeneration Facility
in Newhall, California

Senior Debt Provided By
Swiss Bank Corporation **Bank of New England, N.A.**
New York Branch New York Branch
Co-head Manager Co-head Manager

Dresdner Bank, AG
Los Angeles Agency

Subordinated Debt Provided By
BBC Brown Boveri Holding, Inc. **TEORCO**

Agent Bank
Swiss Bank Corporation
New York Branch



AES FINANCING ANNOUNCEMENT

Figure 1.3-4

Financial Closing

November 1989

Commercial Operation

Paper mill equipment

February 1992

Cogeneration plant

July 1992

1.3.8 Internal Benefits of the Project

Applied Energy Services' corporate strategy is to be a low-cost, long-term supplier of electricity and steam. The Cedar Bay project provides an ideal opportunity to serve two customers in need of our products at reasonable rates and with minimal environmental impact. Cogeneration of steam and electricity allows more efficient use of fuel, resulting in a profitable product while still maintaining attractive product prices. Use of coal will insulate our customers from the volatility of oil and gas prices.

Seminole Kraft Corporation, the paper mill operator, will reap many benefits from the project. The mill's long-term economic viability will be enhanced by the availability of low-cost steam; old inefficient oil fired boilers will be shut down, with the boiler output replaced by AES Cedar Bay's coal fired Circulating Fluidized Bed Cogeneration Project. Job security for the 350 mill employees will be strengthened and the area will continue to enjoy the indirect economic benefits (jobs, an annual payroll of \$23,000,000, purchases, taxes, etc.) from the mill.

The new paper mill equipment will replace high maintenance and low efficiency facilities currently at the mill. Most important, perhaps, will be the significant environmental improvements that will result from the project, which are discussed in the following section.

The power generation and steam production facility (electric generation sales to Florida Power & Light and steam sales to Seminole Kraft) is owned and operated separately from the Seminole Kraft facility and can fill the electric power sales commitments even if the paper mill is not operational.

1.3.9 Regional and State Benefits

The electricity produced at the AES Cedar Bay project will provide Florida ratepayers with many benefits.

- The electrical generation will help meet the state's increased power requirements in a time frame that is consistent with current forecasts.
- Ratepayers will benefit from electricity priced below avoided cost without the risks associated with construction of large utility units.
- Capacity payments will be made according to a fixed schedule which protects ratepayers from future risks of runaway inflation and fuel price shocks.
- Energy payments will be made according to a formula with fixed multipliers and tied to relatively stable coal pricing.
- The project is consistent with Florida's goal to reduce dependence on oil and gas and move towards clean coal technology.

The project will also result in numerous environmental improvements relative to the existing situation.

- A significant reduction in total reduced sulfur emissions will improve the odor situation in the City of Jacksonville.
- Ambient emissions of all pollutants (sulfur dioxide, particulate matter, etc.) will be reduced due to the project's modern technology and taller stacks.
- Thermal impacts on the St. Johns River from cooling water discharge will be greatly reduced.
- Land will be conserved by constructing the plant on a site that has already been disturbed by previous industrial use.

1.4 NEED FOR AES CEDAR BAY PROJECT

1.4.1 Statewide Need

FPSC Order 17480 dated April 30, 1987⁴ designates a 1995, 500 MW avoided coal unit as the statewide avoided unit under the terms of the standard offer. Under the PSC's Rule 25-17.083, Florida Administrative Code, qualifying facilities are entitled to provide capacity and receive capacity payments as early as seven years prior to the anticipated in service date for the avoided unit, if they meet certain criteria.

The AES Cedar Bay Project, as a qualifying facility, meets the specified criteria with a commercial operation date in July 1992 and capacity payments beginning in January 1993. Order 17480 also establishes a subscription limit of 500 MW. The AES Cedar Bay Project falls well within the subscription limit since only 11 MW of contracts have been approved under Order 17480 through July 1, 1988.

The AES Cedar Bay Project is entirely consistent with the PSC's designation of a coal unit as the avoided unit since it will burn coal. Furthermore, the AES Cedar Bay Project is more efficient with a net plant heat rate associated with the electrical production of approximately 8,200 Btu/kWh compared to the PSC's avoided unit heat rate of 9,790 Btu/kWh. This superior heat rate results from the more efficient nature of the co-generation facility. Low pressure steam is utilized in chemical processes of the paper mill doing useful work, instead of being wasted in cooling tower heat rejection.

The need for additional capacity in the state beginning in 1993 was noted by the PSC in Order No. 17480⁴, page 8: "We agree that the State needs additional capacity starting in 1993." This need is further documented on page 32 of the 1986 Annual Planning Hearing Generation Expansion Planning Studies³, page 32 which indicates that capacity is required in 1993.

Increased growth forecasts in the 1989 Planning Hearing Generation Expansion Planning Studies⁵ (page 6), indicate that capacity additions are required in 1992. The following summarize the capacity needs identified in the 1986 and 1989 avoided unit studies.

<u>1986 Study</u> <u>Additional</u> <u>Generation</u> <u>Requirements</u>		<u>1989 Study</u> <u>Additional</u> <u>Generation</u> <u>Requirements</u>	
		1992	660 MW
1993	220 MW	1993	1,100 MW
1994	740 MW	1994	735 MW
1995	815 MW	1995	<u>1,090</u> MW
1996	<u>800</u> MW		
	2,575 MW		3,585 MW

While the 1986 study indicates a capacity need in 1993 approximately equal to the AES Cedar Bay generating capacity, the 1989 study indicates a need by 1993 for over seven times as much capacity as is available from AES Cedar Bay.

Table 1.4-1 compares the total winter capacity in Peninsular Florida with coincident winter firm peak demand as presented in the 1986 Annual Planning Hearing⁶. Total capacity consists of existing and certified installed capacity, contracted firm interchange, and contracted firm QF export to grid. Table 1.4-1, based on the 1986 Annual Planning Hearing projections, indicates that the 1992-93 reserve is only 19 percent and drops to 14 percent in 1993-94. The 1986 Annual Planning Hearing Generation Expansion Planning Studies³ Avoided Unit Study, page 34 indicates that capacity additions are necessary in 1993 to maintain a 0.1 day per year Loss of Load Probability (LOLP).

Table 1.4-2 compares the total winter capacity on Peninsular Florida with coincident winter firm peak demand as presented in the 1989 Planning Hearing 20 Year Plan¹¹ in the same manner as Table 1.4-1. Based on the 1989 Planning Hearing projections, the reserve margin for 1992-93 shown on Table 1.4-2 is only 16 percent and drops to 12 percent in 1993-94. The 1989 Planning Hearing Generation Expansion Studies⁵ Avoided Unit Study indicates that capacity must be added in 1992 to maintain the 0.1 day per year LOLP criteria.

Historical and forecasted summer and winter peaks, net energy for load, and load factors for Peninsular Florida are presented in the 1986 Annual Planning Hearing, Generation Expansion Planning Studies³ (see pages 1 to 5, FCG Studies Form 1.1, reproduced in Appendix 1A). Historical and forecasted number of customers are presented in the 1986 Annual Planning Hearing 20-Year Plan⁶ Form 5.2. Similar statistics based on information for the 1989 Planning Hearing are contained on the same forms^{5,11}.

The 1986 Annual Planning Hearing, Generation Expansion Planning Studies³, FCG Studies Form 1.1, indicates that the average load factor for Peninsular Florida is projected to increase to 56.1 percent from a historical figure of 55.6 percent. The increasing load factor implies a need for additional baseload capacity such as that supplied by AES Cedar Bay.

TABLE 1.4-1. PENINSULAR FLORIDA SUMMARY OF CAPACITY, DEMAND, AND RESERVE MARGIN AT TIME OF WINTER PEAK AVOIDED UNIT
UNIT STUDY--1986 ANNUAL PLANNING HEARING

<u>Year</u>	<u>Existing and Certified Installed Capacity MW</u>	<u>Contracted Firm Interchange MW</u>	<u>Contracted Firm OF Export To Grid MW</u>	<u>Total Capacity MW</u>	<u>Coincident Firm Peak Demand MW</u>	<u>Reserve Margin percent</u>
1986-87	28,777	2,227	29	31,033	24,050	29
1987-88	29,722	2,400	67	32,189	24,516	31
1988-89	30,272	2,400	67	32,739	24,899	31
1989-90	30,370	2,400	67	32,837	25,355	30
1990-91	30,429	2,400	67	32,896	26,106	26
1991-92	30,737	2,400	67	33,204	26,675	24
1992-93	30,819	2,000	67	32,886	27,574	19
1993-94	31,071	1,200	67	32,338	28,433	14
1994-95	31,310	600	67	31,977	29,265	9
1995-96	31,525	0	67	31,592	29,818	6
1996-97	31,571	0	67	31,638	30,391	4
1997-98	31,613	0	67	31,680	30,966	2
1998-99	31,565	0	67	31,632	31,576	0
1999-00	31,315	0	67	31,382	32,207	-3
2000-01	31,232	0	67	31,299	32,830	-5
2001-02	31,222	0	67	31,289	33,459	-6
2002-03	31,190	0	67	31,257	34,094	-8
2003-04	31,106	0	67	31,173	34,727	-10
2004-05	31,106	0	67	31,173	35,346	-12
2005-06	31,106	0	67	31,173	35,999	-13

SOURCE: 1986 Annual Planning Hearing 20 Year Plan, Florida Electric Power Coordinating Group, Inc., FCG Forms 6.4, 6.5, and 8.1.

TABLE 1.4-2. PENINSULAR FLORIDA SUMMARY OF CAPACITY, DEMAND, AND RESERVE MARGIN AT TIME OF WINTER PEAK AVOIDED UNIT
UNIT STUDY--1989 ANNUAL PLANNING HEARING

Year	Existing and Certified Installed Capacity MW	Contracted Firm Interchange MW	Contracted Firm OF Export To Grid MW	Total Capacity MW	Coincident Firm Peak Demand MW	Reserve Margin percent
1987-88	29,460	2,400	62	31,922	25,264	26
1988-89	30,746	2,400	182	33,328	26,019	28
1989-90	31,056	2,400	277	33,733	26,910	25
1990-91	31,225	2,400	339	33,964	27,689	23
1991-92	31,431	2,400	339	34,170	28,470	20
1992-93	31,530	2,000	339	33,869	29,206	16
1993-94	31,593	1,700	339	33,632	30,002	12
1994-95	31,577	1,450	339	33,366	30,711	9
1995-96	31,819	1,200	339	33,358	31,353	6
1996-97	31,785	1,200	339	33,324	32,123	4
1997-98	31,751	1,200	339	33,290	32,798	2
1998-99	31,731	1,200	339	33,270	33,431	0
1999-00	31,480	1,200	339	33,019	34,286	-4
2000-01	31,346	1,200	339	32,885	35,030	-6
2001-02	31,315	1,200	339	32,854	35,884	-8
2002-03	31,247	1,200	339	32,786	36,797	-11
2003-04	31,247	1,200	339	32,786	37,564	-13
2004-05	31,247	1,200	339	32,786	38,360	-15
2005-06	31,165	1,200	339	32,704	39,234	-17
2006-07	31,083	1,200	339	32,622	40,111	-19

SOURCE: 1989 Annual Planning Hearing 20 Year Plan, Florida Electric Power Coordinating Group, Inc., FCG Forms 6.4, 6.5, and 8.1.

Models used to project peak demand and energy for Peninsular Florida utilities are presented in the 1986 Annual Planning Hearing, Forecast Document¹².

The Peninsular Florida forecast was developed through an aggregation methodology which totaled the individual peninsular utility projections. This technique was chosen over a statewide forecast model in order to take advantage of the expertise of the individual utility forecasters. Individual utilities also are able to model and account for service territory specifics which may be overlooked in a state model forecast. Finally, a statewide model forecast would be difficult to disaggregate into individual utility forecasts.

The AES Cedar Bay Project will significantly contribute to the PSC's goal of reducing oil consumption. The AES Cedar Bay Project will reduce statewide oil consumption approximately 2.2 million barrels per year (based on the assumptions in Table 1.4-3) by displacing future oil consumption.

Additional oil backout from the shutdown of the oil fired boilers for site generated steam will result from the approval of the AES Cedar Bay Project. The annual consumption of oil in these existing boilers is approximately 0.8 million barrels per year.

In addition to reducing oil consumption, the AES Cedar Bay Project has the advantage of an effective heat rate for the electrical production of approximately 8,200 Btu/kWh which is a significantly better heat rate than can be obtained in any other coal burning technology. This lower heat rate implies lower air and thermal emissions, as well as lower Seminole Kraft pollution offsets than can be achieved through the separate production of electricity and steam.

The use of coal by the AES Cedar Bay Project is another factor supporting the need for the project. Using coal insulates the state's rate-payers from potential volatility in fuel prices that are historically linked to oil and gas pricing. Coal historically has been more stable and there is an abundant US supply. The use of coal also allows fuel to be obtained domestically, thus assuring the supply of electricity in the event of foreign supply interruptions.

TABLE 1.4-3. OIL BACKOUT ASSUMPTIONS

AES Cedar Bay Net Electrical Output: 225 MW

AES Cedar Bay Capacity Factor: 70 percent

Heat Rate of Backed Out Oil Units: 10 MBtu/MWh

Heating Value of Oil: 0.151 MBtu/gal

Barrel Size: 42 gal.

Another factor contributing to the statewide need for the AES Cedar Bay Project is the term of the contract. The 32-year term beginning in 1993 assures that the project will continue to provide its benefits to the state for a period consistent with the equipment lifetime. The contract also provides protection for ratepayers of Florida Power & Light and the state (in the form of utility takeover of the project) in the event that the project fails to perform or performs at a reduced level.

The AES Cedar Bay Project meets the need requirements of PSC Order 17480⁴ and PSC Rules 25-17.080 through 25-17.091, Florida Administrative Code. Under Rule 25-17.082, Florida Administrative Code, a utility such as Florida Power & Light is obligated to purchase capacity and energy from a qualifying facility such as AES Cedar Bay. Rule 25-17.083, Florida Administrative Code, allows Florida Power & Light to negotiate a contract with AES Cedar Bay for firm capacity and energy. PSC Order 17480 demonstrates that the firm energy and capacity from facilities such as the AES Cedar Bay Project will defer additional capacity construction from a statewide perspective.

Although the need requirement of PSC Order 17480 and PSC Rules 25-17.080 through 25-17.091, Florida Administrative Code, are met by the AES Cedar Bay Project, the project is also needed by FPL as demonstrated in the following paragraphs.

1.4.2 Florida Power & Light Need

Florida Power & Light's need for capacity from the AES Cedar Bay Project is demonstrated in Appendix 1D which is a reproduction of Subsections A and B of Section IV of Florida Power & Light Ten Year Site Plan 1988-1997⁷. Appendix 1D indicates that Florida Power & Light has included the addition of 230 MW of capacity from qualifying facilities in 1993 in their capacity plans, which exceeds the capacity from AES Cedar Bay. Even with Florida Power & Light's planned qualifying facility capacity, purchased power, load control, and planned capacity additions, Florida Power & Light's installed reserve margin is only 2.8 percent in 1993. The total FPL reserve including all planned qualifying facility capacity other than AES Cedar Bay is 14 percent.

Florida Power & Light's historical and forecasted summer and winter peaks, number of customers, net energy for load, and load factors are presented in Appendix 1D. In 1993, Florida Power & Light's summer peak demand is projected to increase by 391 MW which is well above the capacity of the AES Cedar Bay Project. Florida Power & Light's average load factor is projected to increase from an average of 58.6 percent historically to 61.6 percent by 1993. The increase in energy requirements corresponding to the increase in load factor is sufficient to require all of the energy from the AES Cedar Bay Project. As the load factor increases, baseload requirements such as those supplied by AES Cedar Bay also increase. Florida Power & Light's load forecast model is also presented in Appendix 1D.

The AES Cedar Bay Project will afford Florida Power & Light the same benefits it affords the state including oil backout, lower heat rate, reduced emissions, long-term contract, and protection against nonperformance or reduced performance. The State of Florida is facing a growing electrical demand that results from population and economic growth. Florida Power & Light is experiencing a substantial share of this growth in its service territory. AES Cedar Bay will meet this need with low cost, reliable power located within Florida's boundaries. AES Cedar Bay will coordinate its maintenance scheduling with Florida Power & Light. AES Cedar Bay will also provide Florida Power & Light with capacity and energy above its committed capacity level up to unit capabilities upon request from Florida Power & Light to meet system requirements.

1.5 MAJOR GENERATING ALTERNATIVES

1.5.1 AES Cedar Bay Contract Relative to the Standard Offer

The 1993 cumulative present worth of the capacity payments for the AES Cedar Bay contract throughout the contract term for capacity payments at 70 percent capacity factor from 1993 through 2024 is significantly less than the standard offer (based on the standard offer discount rate of 10.72 percent and other standard offer terms.)

Unit energy cost payments for the AES Cedar Bay contract will be less than 100 percent of the lesser of an hour-by-hour comparison of (a) the fuel component of FPL's as-available avoided energy cost and (b) the fuel cost of generation at the St. Johns River Power Park. The weighted average delivered coal cost for 1987 for the St. Johns River Power Park Plant was \$1.59/MBtu compared to \$1.78/MBtu for the Big Bend Plant¹³. Coal costs for St. Johns River Power Park and Big Bend 4 should be similar through time. Any cost advantage should go to St. Johns River Park since it has both rail and water transportation capabilities. Details of the AES Cedar Bay Contract can be made available in a confidential filing.

1.5.2 Generating Unit Alternatives

Generating units evaluated and assumptions used in the evaluations are those presented in the 1986 Annual Planning Hearing, Generation Expansion Planning Studies³. The following 23 feasible generation alternatives were evaluated.

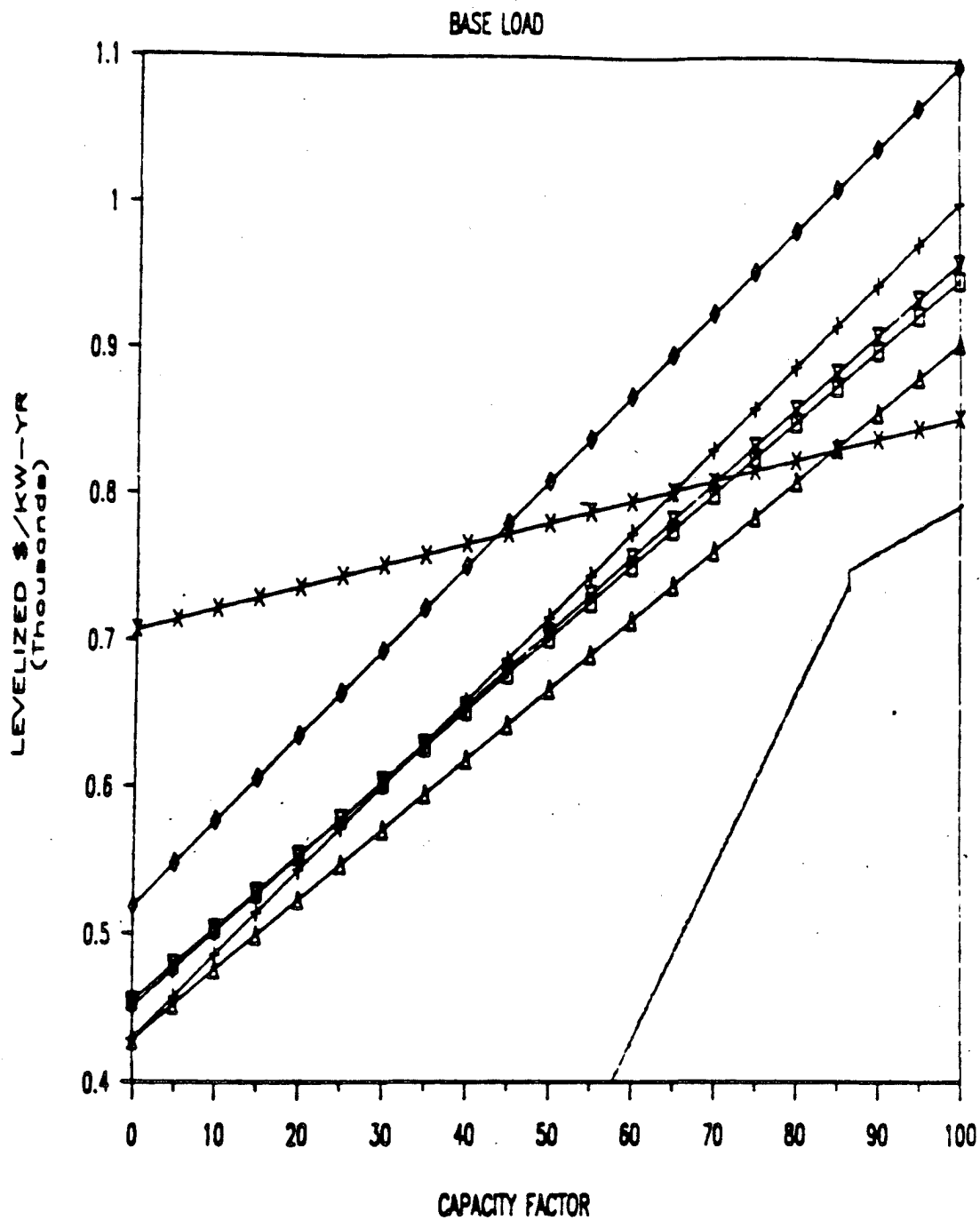
<u>Baseload</u>	<u>Intermediate</u>	<u>Peaking</u>
Nuclear	Standard Steam	Solar
Advanced	Oil	Photovoltaic
Standard	Residual	Central Receiver
	Distillate	
Pulverized Coal:	Wood	Combustion Turbine:
Subcritical		Oil
Supercritical	Combined Cycle	Residual
Solid Solvent	Oil	Distillate
	Residual	
Fluidized Bed Coal:	Distillate	Lead Acid Batteries
Atmospheric		
Bubbling Bed	Slow Speed Diesel	Compressed Air Storage
Circulating		
Pressurized	Advanced Fuel Cells	
Coal Gasified Combined Cycle		
British Gas Corp. Slagger		
Texaco		

This list was revised for the 1989 Annual Planning Hearing Generation Expansion Planning Studies⁵ to the following 20 generation alternatives.

<u>Baseload</u>	<u>Intermediate</u>	<u>Peaking</u>
500 MW Subcritical Coal (Conventional Coal)	500 MW Conventional Steam--Residual Fuel	75 MW Conventional Combustion Turbine-- Distillate Fuel
500 MW Supercritical Coal	500 MW Conventional Steam--Distillate/ Gas Fuel	130 MW Advanced Combustion Turbine-- Distillate Fuel
500 MW Atmospheric Fluidized Bed	220 MW Conventional Combined Cycle--Gas/ Distillate Fuel	
250 MW Pressurized Bubbling Fluidized Bed	390 MW Advanced Combined Cycle--Gas/ Distillate Fuel	150 MW Solar Central Receiver--Wet Cool
250 MW Pressurized Circulating Fluidized Bed	24 MW Wood Fueled Steam	5 MW Solar Photovoltaic
500 MW Gasification Combined Cycle	10 MW First Genera- tion Fuel Cells	
600 MW Advanced Gasi- fication Combined Cycle	2 MW Advanced Fuel Cells	
500 MW Gasification Fuel Cell Combined Cycle	20 MW Slow Speed Diesel	

Figures 1.5-1 through 1.5-4 present the screening curves from the 1986 Annual Planning Hearing Generation Expansion Planning Studies³ with the cost for capacity and energy from the AES Cedar Bay Project plotted for comparison. The AES Cedar Bay Project costs are levelized using the same assumptions as in the 1986 Annual Planning Hearing Generation Expansion Studies for high sulfur coal with the discounts as contained in the AES Cedar Bay sales contract. Figures 1.5-1 through 1.5-4 do not include consideration of time periods when avoided energy costs are below the discounted St. Johns River Power Park costs and, as such, total costs shown for AES Cedar Bay may be less than those shown on Figures 1.5-1 through 1.5-4.

The 1989 Planning Hearing Generation Expansion Studies⁵ present up-dated assumptions. Figures 1.5-5 through 1.5-8 present the 1989 Planning



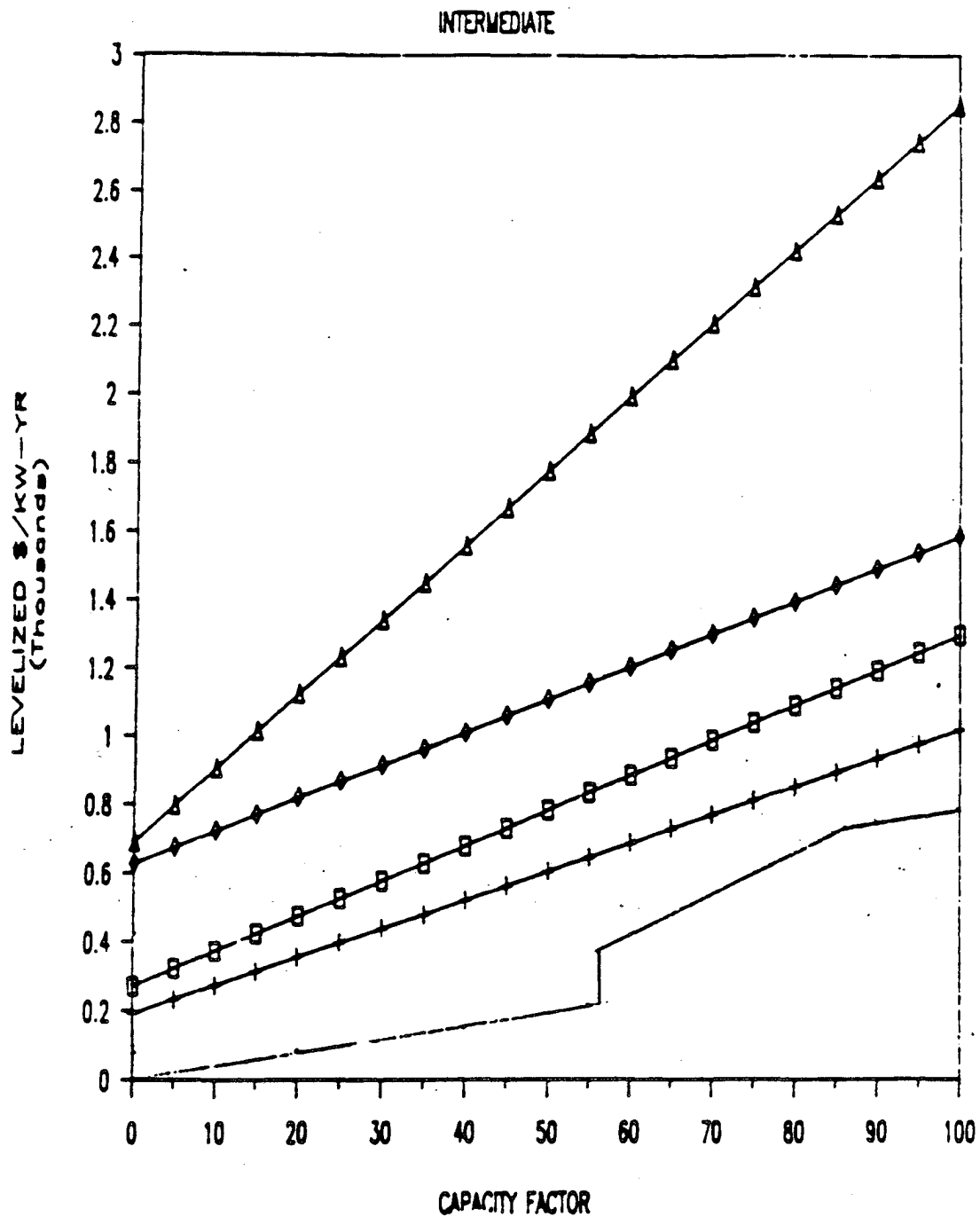
□ SUPERCRITICAL COAL
 + ATM FLUID BED
 ◇ BUBB FLUID BED

△ BGC COMB. CYCLE
 X ADVANCED NUCLEAR
 ▽ SUBCRITICAL COAL

— AES

COMPARISON OF TECHNOLOGIES (BASE LOAD)
 1986 ANNUAL PLANNING HEARING

Figure 1.5-1



□ STD. STEAM
RESID. OIL

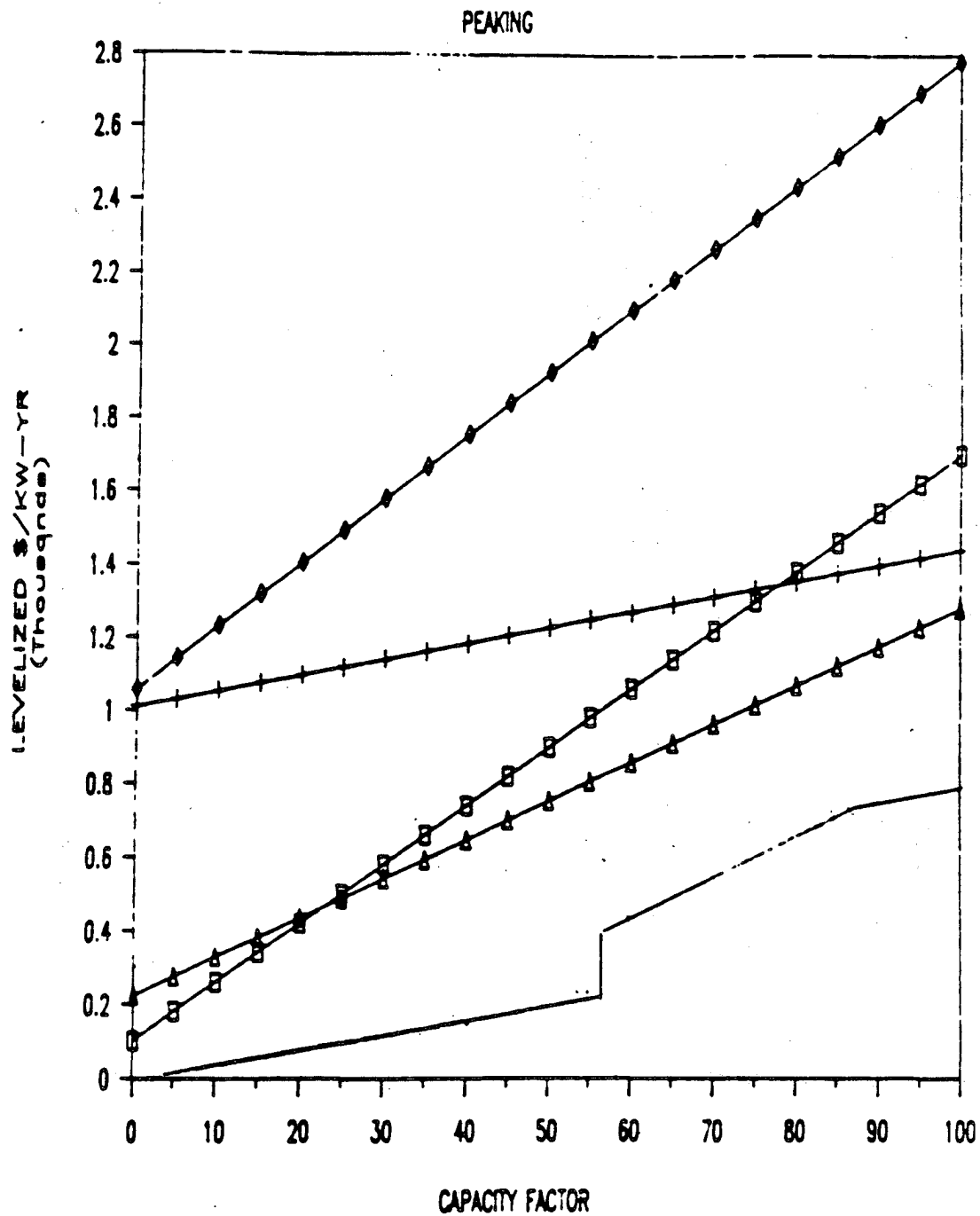
+ COMBINED
CYCLE

◇ FUEL
CELLS

△ . WOOD

— AES

COMPARISON OF TECHNOLOGIES (INTERMEDIATE)
1986 ANNUAL PLANNING HEARING



□ COMBUSTION
TURBINE

+ SOLAR CENT.
RECEIVER

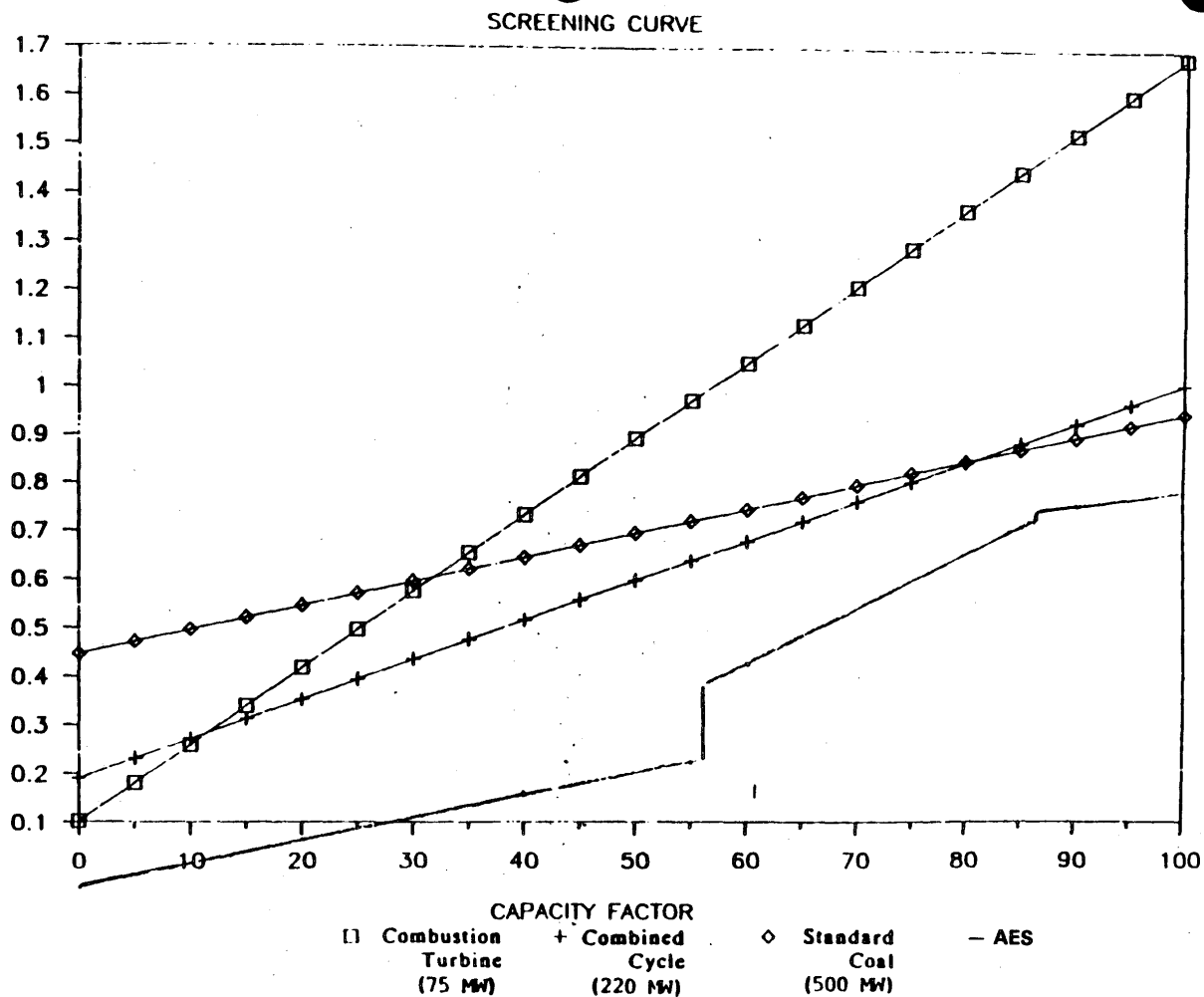
◇ LEAD ACID
BATTERIES

△ COMPRESSED
AIR

— AES

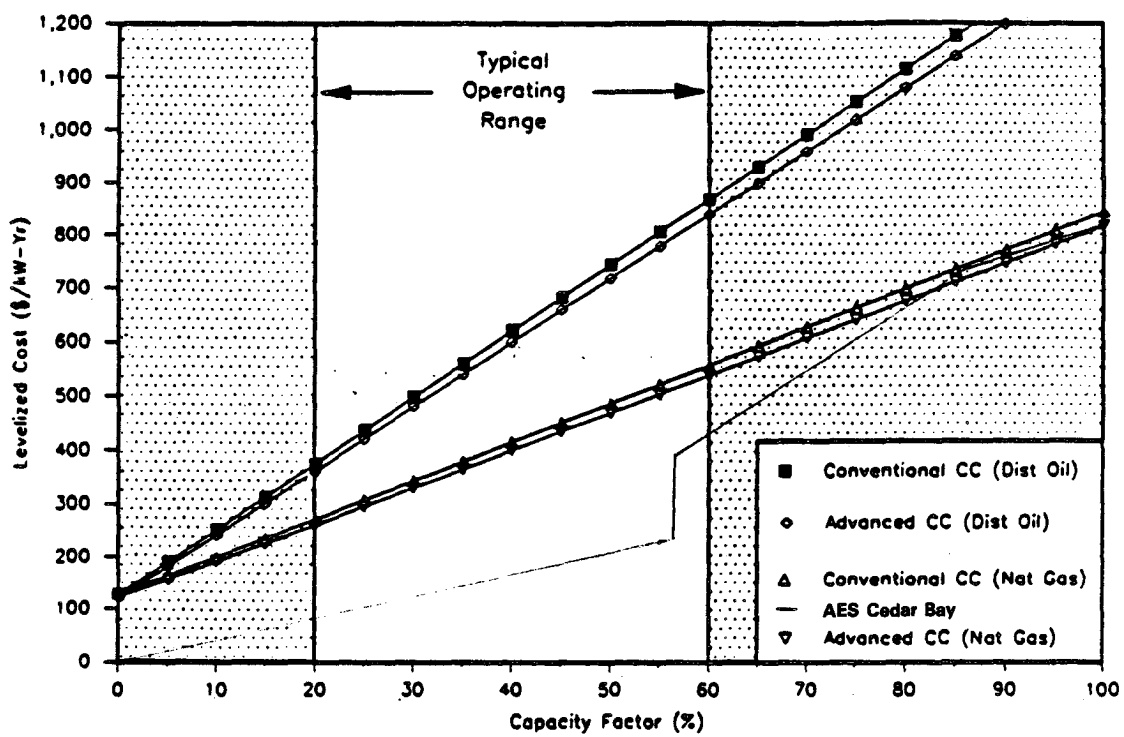
COMPARISON OF TECHNOLOGIES (PEAKING)
1986 ANNUAL PLANNING HEARING

Figure 1.5-3

LEVELIZED \$/KW-YR
(Thousands)

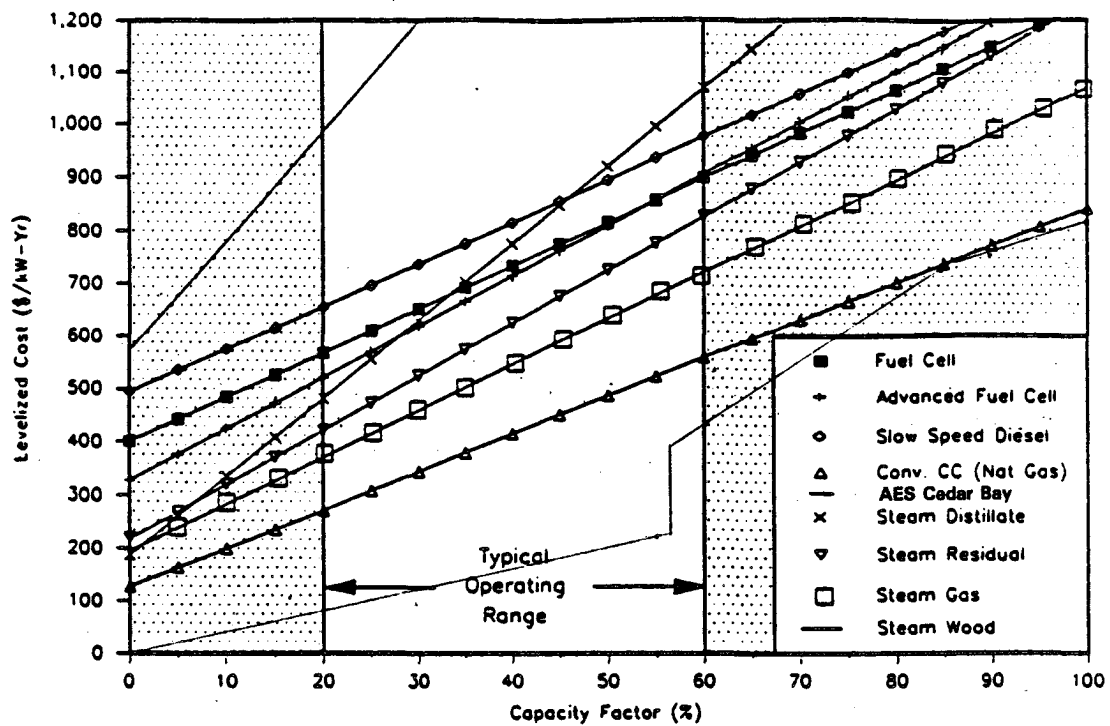
COMPARISON OF TECHNOLOGIES (SCREENING CURVES)
1986 ANNUAL PLANNING HEARING

Figure 1.5-4



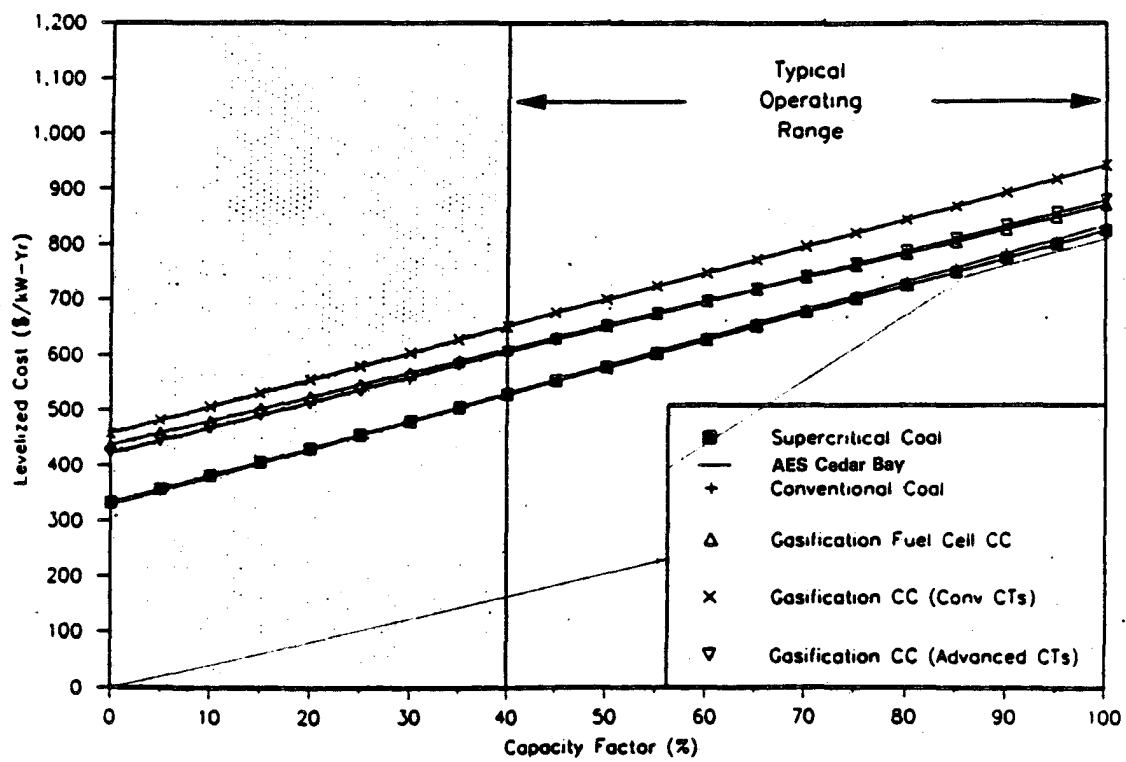
COMBINED CYCLE SCREENING CURVES
1989 PLANNING HEARING

Figure 1.5-5



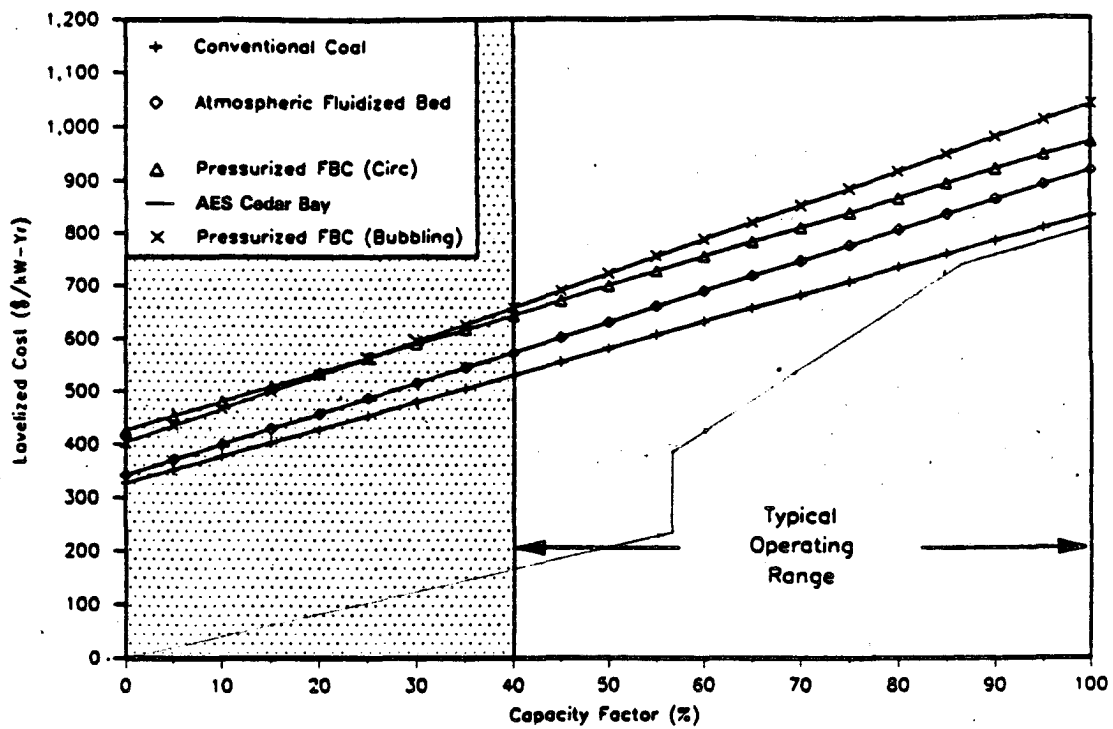
INTERMEDIATE UNIT SCREENING CURVES
1989 PLANNING HEARING

Figure 1.5-6



BASE LOAD TECHNOLOGY SCREENING CURVES
1989 PLANNING HEARING

Figure 1.5-7



BASE LOAD TECHNOLOGY SCREENING CURVES
1989 PLANNING HEARING

Figure 1.5-8

Hearing Generation Expansion Studies screening curves plotted with the cost for AES Cedar Bay.

Florida Power & Light was also required to conduct an economic evaluation as part of the 1986 Annual Planning Hearing¹⁴. Figures 1.5-9 through 1.5-11 present the results of Florida Power & Light's screening evaluation compared to the cost for AES Cedar Bay using the same assumptions used by Florida Power & Light.

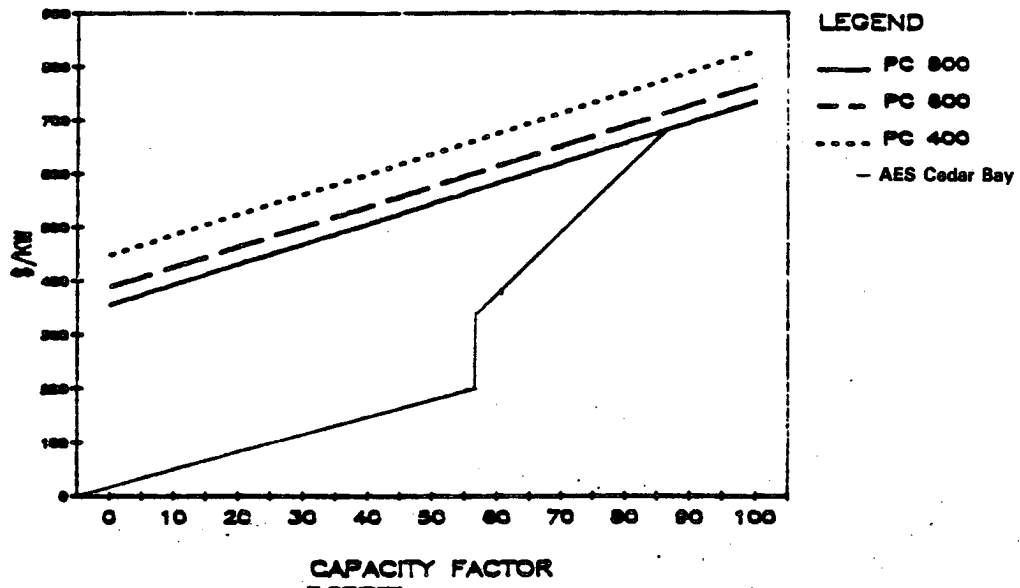
When the AES Cedar Bay Project is compared with FPL's next unit avoided cost (a combined cycle unit for the 1986 Generation Expansion Plan), the Cedar Bay Project competes favorably with the combined cycle units shown in the Florida Power & Light's screening curves in Figure 1.5-11. These curves indicate that below 80 percent capacity factor, AES Cedar Bay is the most cost-effective. Above 80 percent capacity factor, the combined cycle is only slightly more cost-effective, but this advantage lessens as capacity factor rises towards 100 percent. The AES Cedar Bay costs include the standard offer's 20 percent discount in computing the AES capacity costs. AES Cedar Bay would be the most cost-effective, for all capacity factor values, if this discount were not in effect.

When the FPL Generation Expansion Planning Document for the 1989 Planning Hearing¹⁵ (filed on September 30, 1988) is considered, the AES Cedar Bay Project retains its cost-effective posture compared to other technologies, especially the combined cycle option, which is FPL's avoided unit. Figures 1.5-12 and 1.5-13 illustrate this screening curve comparison.

It is clear that the costs for the AES Cedar Bay Project are less than the costs for the alternatives and the AES Cedar Bay Project is the lowest cost alternative.

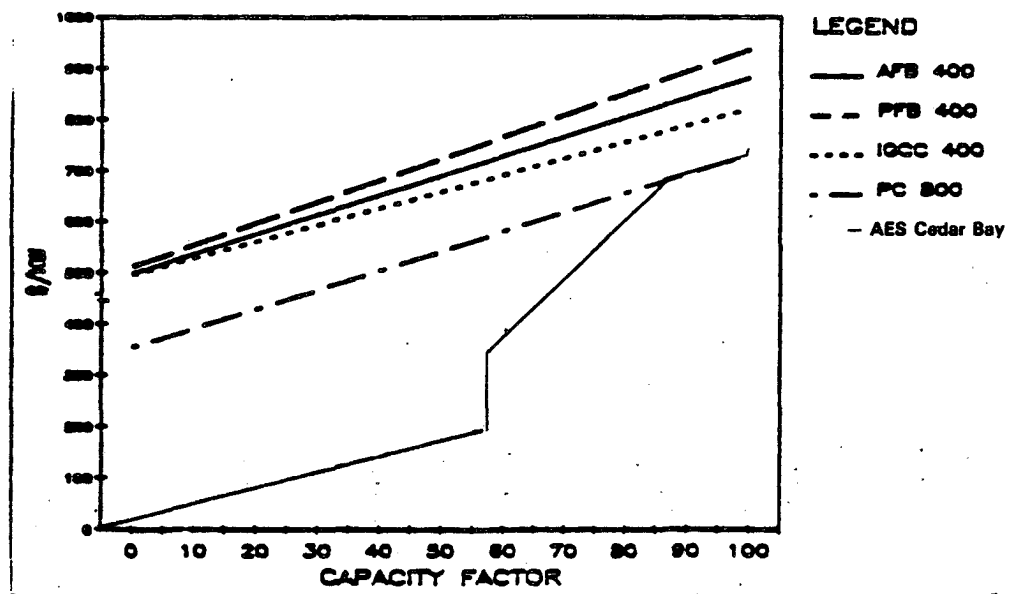
1.5.3 Purchases

Since Peninsular Florida needs additional capacity as discussed in Subsection 1.4.1, purchases between utilities in Peninsular Florida are not appropriate. Purchases from the Southern Company could, however, be an appropriate alternative for a limited time period. Florida Power & Light,



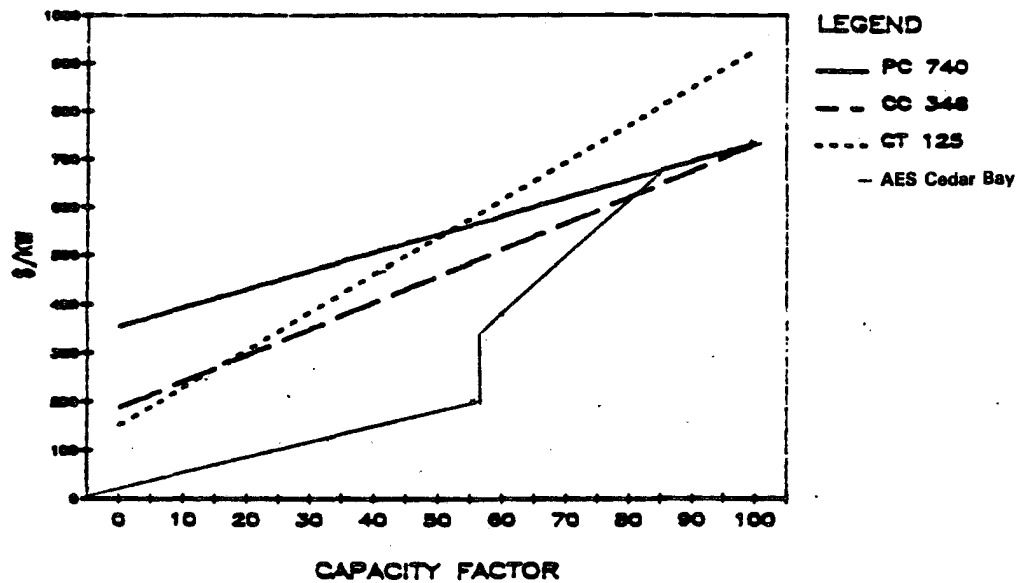
FLORIDA POWER & LIGHT SCREENING CURVE ANALYSIS
 1995 COMMERCIAL OPERATION (PULVERIZED COAL OPTIONS)
 1986 ANNUAL PLANNING HEARING

Figure 1.5-9



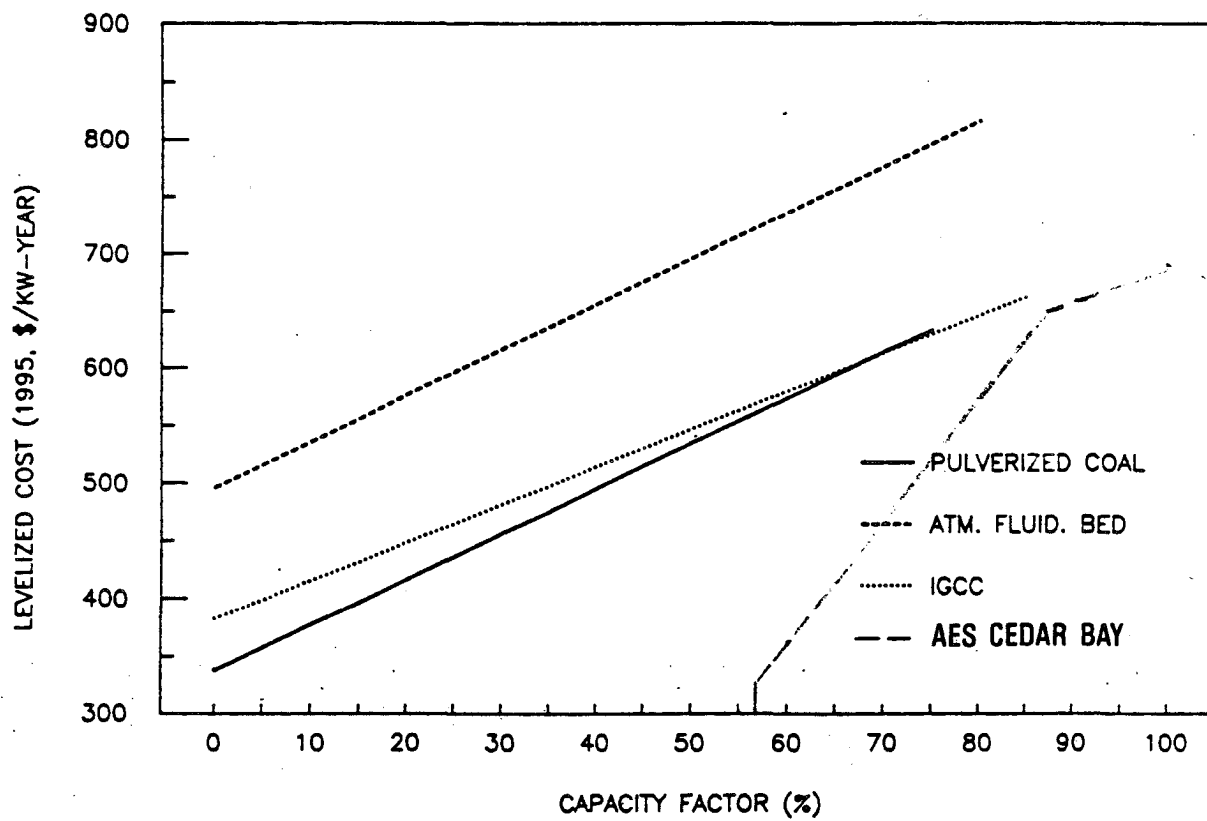
FLORIDA POWER & LIGHT SCREENING CURVE ANALYSIS
 1995 COMMERCIAL OPERATION (ADVANCED COAL OPTIONS)
 1986 ANNUAL PLANNING HEARING

Figure 1.5-10



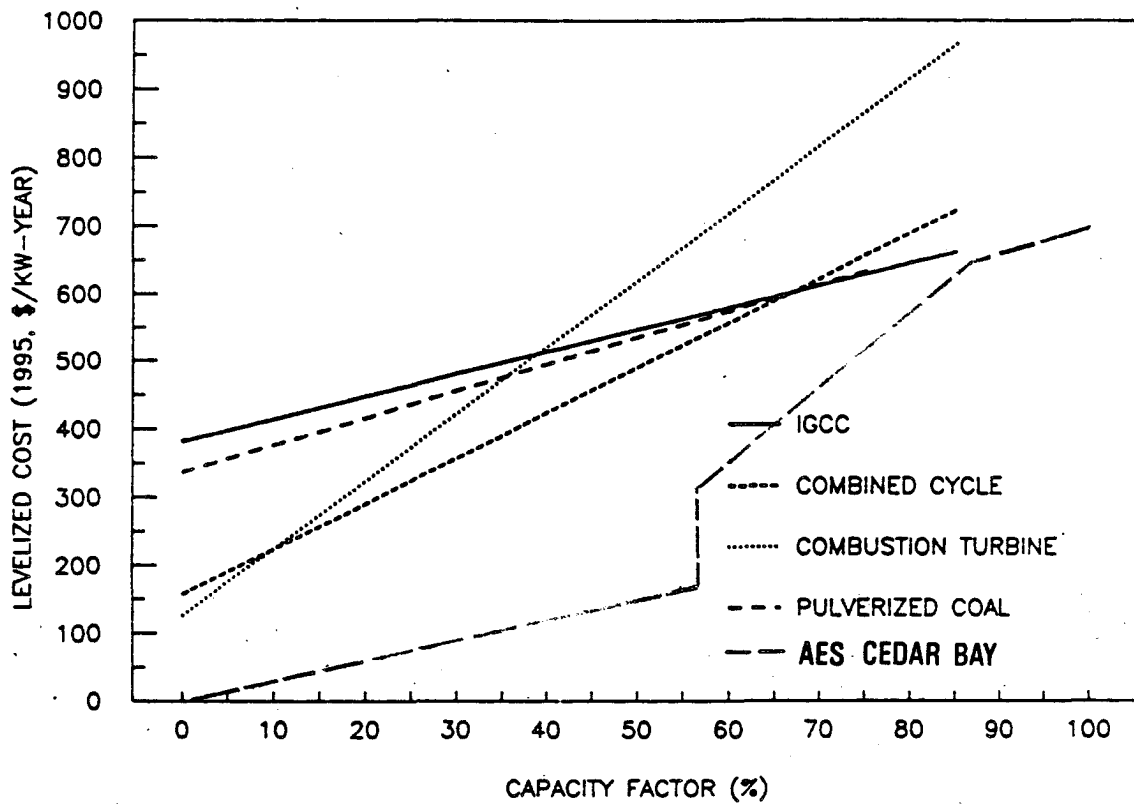
FLORIDA POWER & LIGHT SCREENING CURVE ANALYSIS
 1995 COMMERCIAL OPERATION (CC AND CT ON GAS)
 1996 ANNUAL PLANNING HEARING

Figure 1.5-11



FLORIDA POWER & LIGHT
COMPARISON OF TECHNOLOGIES (COAL OPTIONS)
1989 PLANNING HEARINGS

Figure 1.5-12



FLORIDA POWER & LIGHT
COMPARISON OF TECHNOLOGIES (CC AND CT ON GAS)
1989 PLANNING HEARINGS

Figure 1.5-13

Jacksonville Electric Authority, and Florida Power Corporation have recently contracted with Southern Company for purchased power. This purchased power is discussed on page 22 of the 1989 Planning Hearing Generation Expansion Planning Studies⁵ and is already considered as a part of the state's capacity.

Discussions with Southern Company indicate that some additional power may be available up through the year 2003 subject to the ability for it to be wheeled. Southern Company has indicated that, earlier than 1993, additional power cannot be imported over the transmission system. Since the AES Cedar Bay contract extends to 2024, the shorter term purchases from Southern Company are not appropriate as an alternative to AES Cedar Bay.

1.6 DISCUSSION OF VIABLE NONGENERATING ALTERNATIVES

PSC Rules 25-17.001 through 25-17.065, Florida Administrative Code, require each utility in the State to implement conservation programs to meet the prescribed conservation goals in a cost-effective manner. A discussion of the viable nongenerating alternatives and an evaluation of the nature and extent of the reductions in the growth rates of peak demand and energy consumption are presented in the 1986 Annual Planning Hearing Forecast Document and 20 Year Plan^{12,6}. A discussion of the extent of the reduction in the growth rate of oil consumption is presented in the 1986 Annual Planning Hearing Generation Expansion Planning Study³.

The inherent increased efficiency of the cogeneration process leads to a significant conservation of fuel and reduces air and thermal emissions. The conservation was duly noted by the PSC in Rule 25-17.001, Florida Administrative Code, which requires all utilities to "aggressively integrate nontraditional sources of power generation into the various utility service areas to the extent cost effective, including planning site development to facilitate development of potential cogenerators near generating units." The FPSC also stated on Page 2 of the Florida Crushed Stone Need Order¹ that "cogeneration appears to be a cost effective conservation measure".

1.7 EVALUATION OF THE ADVERSE CONSEQUENCES IF THE PROPOSED PLANT IS NOT ADDED

If the Project is delayed, Peninsular Florida's reserve margin will drop below 15 percent in 1993 and FPL's reserve margin will drop to 14 percent. The delay or cancellation will thus result in reduced reliability, increased consumption of oil and/or gas (with higher production costs), or increased purchases of power (if available). Peninsular Florida and FPL would also lose the benefit of capacity and energy priced below the avoided costs shown in the Standard Offer.

A number of severe adverse consequences will occur if the proposed project is delayed or not approved. One of the most immediate adverse consequences is that delay in licensing will place the July 1992 commercial operation date in jeopardy. Seminole Kraft is acutely aware of the odor problems that its facility is creating for its neighbors. Seminole Kraft and the Mayor of Jacksonville are therefore very anxious to correct this problem as quickly as possible and the AES Cedar Bay Project offers an expedient way to accomplish the task.

Seminole Kraft is also under a Department of Environmental Regulation (DER) Consent Order to demonstrate compliance with the total reduced sulfur (TRS) emission limiting standards by November 1992. Failure to comply with the schedule and terms of the Consent Order can result in fines of up to \$10,000 per day for Seminole Kraft. Any delay in licensing which jeopardizes the ability to demonstrate compliance by the November 1992 deadline will undoubtedly result in actions by Seminole Kraft to obtain compliance in another manner, thus eliminating the steam sales for AES Cedar Bay. These steam sales for cogeneration lower the net heat rate for the electrical production approximately 18 percent. The current licensing schedule for the project as shown in Subsection 1.3.7 is very stringent to allow for completion of the project within the time frame allowed by the DER Consent Order. The project will produce many environmental benefits. Failure to complete the project on schedule will delay these benefits. Compliance with the total reduced sulfur (TRS) emission limits will greatly reduce the odor problems associated with the plant and thus have a significant positive effect on the local environment.

Delaying or cancelling the project will have negative effects on the workforce and tax base. There are currently 363 employees at the Seminole Kraft paper mill where continued employment security depends upon the economic viability of the paper production facility. The Project will provide a net increase of 58 new jobs for plant operation. Delay or cancellation would have a significant negative impact on the construction workforce and the resulting spin-off jobs.

A further consequence of delay or cancellation is the increasing difficulty and expense of maintaining and operating the existing Seminole Kraft oil fired boilers which have neared the end of their useful life and have low reliability. Seminole Kraft is struggling to remain economically competitive, and does not have the extensive capital resources necessary to replace these boilers.

1.8 REFERENCES

- (1) Docket No. 820460-EU, Order No. 11611, February 14, 1983. In re: Petition of Florida Crushed Stone Company for Determination of Need for a Coal Fired Cogeneration Electrical Power Plant.
- (2) Docket No. 870193-EG, Order No. 17752, June 26, 1987. In re: Petition of Pasco County for determination of need for a solid waste-fired cogeneration power plant.
- (3) 1986 Annual Planning Hearing, Generation Expansion Planning Studies, Florida Electric Power Coordinating Group, Inc., Order #15915, Docket #860004-EU.
- (4) Annual Hearings on Load Forecasts, Generating Expansion Plans and Cogeneration Prices for Peninsular and Northwest Florida, Order 17480, Docket No. 860004-EU and 860004-EU-A, April 30, 1987.
- (5) 1989 Planning Hearing Generation Expansion Planning Studies, Florida Electric Power Coordinating Group, Inc., Docket No. 880004-EU.
- (6) 1986 Annual Planning Hearing 20 Year Plan, Florida Electric Power Coordinating Group, Inc., Order No. 15915, Docket No. 860004-EU.
- (7) Florida Power & Light, Ten Year Power Plant Site Plan 1988-1997, April 1, 1988.

- (8) Florida Power & Light Company's Forecast Document, Docket No. 860004-EU, August 8, 1986.
- (9) Florida Power & Light Company Forecast Document, Docket No. 880004-EU, July 1, 1988.
- (10) Jacksonville Electric Authority Ten Year Site Plan 1988-1997, April 1988.
- (11) 1989 Planning Hearing, 20 Year Plan, Florida Electric Power Coordinating Group, Inc.
- (12) 1986 Annual Planning Hearing, Forecast Document, Florida Electric Power Coordinating Group, Inc.
- (13) Electric Power Quarterly, Energy Information Administration, January-December, 1987.
- (14) Before The Florida Public Service Commission, Docket No. 860004-EU, Florida Power & Light Company's Generation Expansion Planning Document Subpart No. 1 of 2, September 19, 1986, In re: Annual Hearings on Load Forecasts, Generation Expansion Plan and Cogeneration Prices.
- (15) Before the Florida Public Service Commission, Docket No. 880004-EU, Florida Power & Light Company's Generation Expansion Planning Document, September 30, 1988, In re: 1989 Planning Hearing on Load Forecasts, Generation Expansion Plan and Cogeneration Prices.

APPENDIX 1A
FORMS 1.1 THROUGH 3.3
1986 ANNUAL PLANNING HEARING
GENERATION EXPANSION PLANNING STUDIES
FLORIDA ELECTRIC POWER COORDINATING
GROUP, INC.

PERIODEAL FLORIDA HISTORY AND FORECAST:
LONG RANGE PLANNING STUDY
AS USED IN 1986 APN STUDIES

PCB STUDIES FORM 1.1
PAGE 1 OF 5
ORDER NO. 13915
PROJECT NO. 840004-E9

218

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
YEAR	SUMMER PEAK DEMAND - MW					YEAR	WINTER PEAK DEMAND - MW					YEAR	NET ENERGY FOR LOAD OWN	LOAD FACTOR
	TOTAL	INTER- RUPTIBLE LOAD	LOAD MANAGE- MENT	DEMAND REDUCTION DUE TO OF'S	NET UTILITY DEMAND		TOTAL	INTER- RUPTIBLE LOAD	LOAD MANAGE- MENT	DEMAND REDUCTION DUE TO OF'S	NET UTILITY DEMAND			
1976	14576	351			14225	1976/77	17467	432			17035	1976	75383	59.54%
1977	15277	398			14879	1977/78	17228	361			16867	1977	80928	54.23%
1978	16815	385			15638	1978/79	17725	362			17363	1978	86382	58.41%
1979	16458	373			16085	1979/80	19584	942			18642	1979	88481	58.17%
1980	18188	458			17630	1980/81	21611	488		3	21128	1980	93664	56.15%
1981	18732	429		8	18383	1981/82	21695	267	8	15	21413	1981	96621	57.22%
1982	18317	389	1	28	17987	1982/83	18947	341	39	58	18517	1982	95223	58.76%
1983	20149	378	52	72	19647	1983/84	20786	343	123	76	20244	1983	100154	58.19%
1984	19911	422	99	73	19317	1984/85	24496	476	221	76	23923	1984	104844	58.67%
1985	21998	486	159	114	21231	1985/86	25285	542	327	125	24291	1985	112778	49.64%
1976-85 1 AAGR	4.68%	3.68%			4.55%	1 AAGR	4.28%	2.55%			4.82%	1 AAGR	4.39%	
1986	21843	534	233	163	20915	1986/87	25258	581	444	183	24050	1986	111843	57.56%
1987	22687	591	339	225	21532	1987/88	26810	621	638	235	24516	1987	115759	54.95%
1988	23484	654	464	231	22135	1988/89	26449	633	859	238	24899	1988	119548	55.67%
1989	24128	695	598	347	22488	1989/90	27451	687	1057	352	25335	1989	122883	56.34%
1990	24854	728	786	356	23844	1990/91	28348	729	1151	362	26186	1990	126335	56.89%
1991	25731	778	773	376	23812	1991/92	29845	772	1235	383	26675	1991	129819	56.77%
1992	26484	812	847	435	24398	1992/93	30186	815	1355	442	27574	1992	133189	56.96%
1993	27396	854	938	446	25138	1993/94	31234	867	1482	452	28433	1993	136821	56.64%
1994	28174	986	1084	454	25738	1994/95	32247	919	1682	461	29265	1994	140542	56.43%
1995	29821	959	1282	464	26396	1995/96	32982	971	1722	471	29818	1995	143857	56.11%
1986-95 1 AAGR	3.21%	6.72%	28.88%	12.33%	2.62%	1 AAGR	3.81%	5.87%	16.25%	11.88%	2.42%	1 AAGR	2.84%	
1996	29488	1018	1328	483	26795	1996/97	33722	1021	1821	489	30391	1996	146878	56.23%
1997	30149	1061	1416	494	27198	1997/98	34414	1052	1895	501	30966	1997	149842	56.28%
1998	30728	1092	1486	583	27447	1998/99	35125	1082	1956	511	31576	1998	152816	56.34%
1999	31294	1122	1548	513	28119	1999/00	35841	1112	2081	521	32207	1999	155829	56.34%
2000	31888	1153	1579	532	28624	2000/01	36539	1143	2026	548	32838	2000	158861	56.31%
2001	32458	1183	1595	543	29117	2001/02	37236	1173	2054	558	33459	2001	161836	56.27%
2002	33089	1214	1618	551	29634	2002/03	37948	1204	2088	562	34094	2002	164964	56.28%
2003	33579	1244	1628	562	30145	2003/04	38637	1234	2186	578	34727	2003	168048	56.27%
2004	34168	1275	1644	578	30671	2004/05	39321	1263	2132	588	35346	2004	171248	56.38%
2005	34748	1385	1668	572	31283	2005/06	40031	1294	2158	588	35999	2005	174253	56.28%
1996-05 1 AAGR	1.79%	2.89%	2.38%	1.98%	1.71%	1 AAGR	1.92%	2.67%	1.98%	1.91%	1.98%	1 AAGR	1.92%	
1986-85 1 AAGR	2.47%	4.82%	18.89%	6.83%	2.13%	1 AAGR	2.45%	4.58%	8.48%	6.26%	2.15%	1 AAGR	2.36%	

NOTE: COLUMN (2) = SUM OF COLUMNS (3), (4), (5), (6). COLUMN (8) = SUM OF COLUMNS (9), (10), (11), (12).
COLUMN (5) & (11) ARE OF LOAD SERVED BY OF GENERATION.

PENINSULAR FLORIDA
HISTORY AND FORECAST: HIGH CASE
AS USED IN 1986 APH STUDIES

FCB STUDIES FORM 1.1
PAGE 2 OF 3
ORDER NO. 15915
DOCKET NO. 060004-EU

(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(110)	(111)	(112)	(113)	(114)	(115)
SUMMER PEAK DEMAND - MW						WINTER PEAK DEMAND - MW						NET ENERGY FOR LOAD GWH		
YEAR	TOTAL	INTER- RUPTIBLE LOAD	LOAD MANAGE- MENT	DEMAND REDUCTION DUE TO OF'S	NET UTILITY DEMAND	YEAR	TOTAL	INTER- RUPTIBLE LOAD	LOAD MANAGE- MENT	DEMAND REDUCTION DUE TO OF'S	NET UTILITY DEMAND	YEAR	NET ENERGY FOR LOAD GWH	% LOAD FACTOR
1976	14576	351			14225	1976/77	17467	432			17035	1976	75383	59.54%
1977	15277	390			14887	1977/78	17228	361			16867	1977	80928	54.23%
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1979	16458	373			16085	1979/80	19584	542			19042	1979	88481	58.17%
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1981	18732	429			18303	1981/82	21695	267		3	21413	1981	96621	52.22%
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1984	19911	422	99	73	19317	1984/85	26696	476	221	76	25923	1984	104844	58.67%
1985	21998	486	159	114	21231	1985/86	25285	542	327	125	24291	1985	112770	49.66%
1976-85 % AAGR	4.68%	3.68%			4.55%	% AAGR	4.28%	2.55%			4.02%	% AAGR	4.59%	
1986	22477	537	233	163	21544	1986/87	26211	585	445	183	24998	1986	114527	53.82%
1987	23634	596	348	225	22473	1987/88	27296	628	638	235	25795	1987	129589	59.14%
1988	24776	662	465	231	23418	1988/89	28158	662	868	238	26398	1988	124853	55.25%
1989	25666	785	599	347	24015	1989/90	29297	698	1086	352	27161	1989	129588	56.88%
1990	26745	741	722	356	24926	1990/91	30474	742	1186	362	28184	1990	134681	56.57%
1991	27985	785	793	376	25951	1991/92	31449	786	1276	383	29084	1991	139347	56.44%
1992	28934	838	878	435	26799	1992/93	32911	832	1481	442	30236	1992	143844	56.61%
1993	30166	874	985	446	27861	1993/94	34286	886	1535	452	31413	1993	148961	56.24%
1994	31272	929	1113	454	28776	1994/95	35635	939	1659	461	32576	1994	154284	56.84%
1995	32484	985	*1236	464	29799	1995/96	36723	993	1785	471	33474	1995	159866	55.74%
1986-95 % AAGR	4.18%	6.97%	28.37%	12.33%	3.67%	% AAGR	3.82%	6.86%	16.49%	11.88%	3.38%	% AAGR	3.72%	
1996	33393	1038	1357	483	30515	1996/97	37886	1045	1898	489	34382	1996	163658	55.81%
1997	34284	1092	1457	494	31241	1997/98	38838	1078	1972	581	35279	1997	168242	55.86%
1998	35174	1125	1531	583	32015	1998/99	39896	1118	2039	511	36236	1998	172841	55.93%
1999	36878	1157	1589	513	32819	1999/00	40982	1141	2070	521	37238	1999	177538	55.95%
2000	37826	1191	1631	532	33672	2000/01	42045	1174	2123	548	38288	2000	182389	55.98%
2001	37927	1223	1651	543	34518	2001/02	43118	1285	2157	558	39286	2001	187887	55.87%
2002	38842	1257	1678	551	35364	2002/03	44210	1298	2188	562	40222	2002	191861	55.86%
2003	39774	1298	1698	562	36232	2003/04	45386	1269	2218	578	41249	2003	196769	55.85%
2004	40724	1323	1789	578	37122	2004/05	46398	1388	2258	588	42268	2004	201826	55.85%
2005	41683	1356	1728	572	38027	2005/06	47343	1333	2288	588	43158	2005	206715	55.83%
1996-05 % AAGR	2.49%	3.81%	2.72%	1.98%	2.48%	% AAGR	2.53%	2.74%	2.11%	1.91%	2.56%	% AAGR	2.43%	
1986-05 % AAGR	3.38%	5.88%	11.12%	6.83%	3.84%		3.16%	4.43%	8.98%	6.26%	2.91%		3.16%	

NOTE: COLUMN (2) = SUM OF COLUMNS (3), (4), (5), (6). COLUMN (8) = SUM OF COLUMNS (9), (10), (11), (12).

PENINSULAR FLORIDA
HISTORY AND FORECAST: LOW CASE
AS USED IN 1986 APH STUDIES

PCB STUDIES FORM 1.1
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(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
SUMMER PEAK DEMAND - MW						WINTER PEAK DEMAND - MW						NET ENERGY FOR LOAD GWH		
YEAR	DEMAND				YEAR	DEMAND				YEAR	LOAD FACTOR			
	INTER- TOTAL RUPTIBLE LOAD	LOAD MANAGE- MENT	REDUCTION DUE TO OF'S	NET UTILITY DEMAND		INTER- TOTAL RUPTIBLE LOAD	LOAD MANAGE- MENT	REDUCTION DUE TO OF'S	NET UTILITY DEMAND					
1976	14576	351		14225	1976/77	17467	432		17035	1976	75383	59.54%		
1977	15277	398		14879	1977/78	17228	361		16867	1977	80928	54.23%		
1978	16815	385		16430	1978/79	17725	362		17363	1978	86382	58.41%		
1979	16458	373		16085	1979/80	19584	542		19042	1979	88481	58.17%		
1980	18108	458		17658	1980/81	21611	488	3	21120	1980	93664	56.15%		
1981	18732	429		18383	1981/82	21695	267	8	21413	1981	96621	52.22%		
1982	18317	389	1	17987	1982/83	18947	341	39	18517	1982	95223	58.76%		
1983	20149	378	52	19647	1983/84	20786	343	123	20244	1983	100154	58.19%		
1984	19911	422	99	19317	1984/85	26696	476	221	25923	1984	104844	58.67%		
1985	21998	486	159	21231	1985/86	25285	542	327	24291	1985	112778	49.66%		
1976-85 % AAGR	4.68%	3.68%		4.55%	% AAGR	4.20%	2.55%		4.82%	% AAGR	4.59%			
1986	21383	531	233	20376	1986/87	24538	576	444	23335	1986	109244	51.34%		
1987	21848	585	348	20698	1987/88	25848	614	637	23554	1987	111454	54.52%		
1988	22338	646	464	20899	1988/89	25418	644	851	23685	1988	113641	55.08%		
1989	22785	684	592	21082	1989/90	25934	676	1025	23881	1989	115369	55.68%		
1990	23136	715	688	21377	1990/91	26552	716	1113	24361	1990	117211	56.83%		
1991	23697	754	751	21816	1991/92	26978	756	1192	24639	1991	119872	55.89%		
1992	24897	793	822	22047	1992/93	27784	798	1384	25248	1992	128658	55.98%		
1993	24637	833	929	22429	1993/94	28296	847	1426	25571	1993	122574	55.44%		
1994	25843	882	1049	22658	1994/95	29139	897	1548	26241	1994	124587	55.58%		
1995	25499	932	1163	22938	1995/96	29588	947	1654	26516	1995	126824	54.82%		
1986-95 % AAGR	2.82%	6.45%	19.58%	12.33%	% AAGR	2.18%	5.68%	15.75%	11.88%	% AAGR	1.68%			
1996	25887	988	1288	23864	1996/97	29952	995	1747	26721	1996	127434	54.95%		
1997	26882	1028	1373	23187	1997/98	30288	1024	1817	26946	1997	129126	55.16%		
1998	26343	1056	1439	23345	1998/99	30631	1052	1872	27196	1998	130592	55.32%		
1999	26681	1084	1498	23514	1999/00	30977	1080	1911	27465	1999	132831	55.42%		
2000	26876	1112	1526	23786	2000/01	31279	1109	1932	27698	2000	133475	55.48%		
2001	27896	1148	1539	23874	2001/02	31584	1137	1953	27944	2001	134692	55.51%		
2002	27321	1168	1552	24058	2002/03	31889	1166	1973	28188	2002	136831	55.57%		
2003	27536	1195	1565	24214	2003/04	32172	1194	1992	28416	2003	137298	55.68%		
2004	27754	1224	1579	24381	2004/05	32446	1221	2013	28632	2004	138681	55.68%		
2005	27963	1251	1591	24549	2005/06	32898	1249	2032	29037	2005	139679	55.69%		
1996-05 % AAGR	0.98%	2.75%	2.45%	1.98%	% AAGR	1.85%	2.56%	1.69%	1.91%	% AAGR	1.81%			
1986-05 % AAGR	1.44%	4.61%	18.64%	6.83%	% AAGR	1.56%	4.16%	8.33%	6.26%	% AAGR	1.38%			

NOTE: COLUMN (2) = SUM OF COLUMNS (3), (4), (5), (6). COLUMN (8) = SUM OF COLUMNS (9), (10), (11), (12).
COLUMN (5) & (11) ARE OF LOAD SERVED BY OF GENERATION.

PENINSULAR FLORIDA HISTORY AND FORECAST:
 AVOIDED UNIT STUDY
 AS USED IN 1986 APH STUDIES

FCS STUDIES FORM 1.1
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(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
SUMMER PEAK DEMAND - MW						WINTER PEAK DEMAND - MW					
YEAR	TOTAL	INTER- RUPTIBLE LOAD	LOAD MANAGE- MENT	DEMAND REDUCTION DUE TO OF'S	NET UTILITY DEMAND	YEAR	TOTAL	INTER- RUPTIBLE LOAD	LOAD MANAGE- MENT	DEMAND REDUCTION DUE TO OF'S	NET UTILITY DEMAND
1976	14576	351			14225	1976/77	17467	432			17035
1977	15277	390			14887	1977/78	17220	361			16859
1978	16813	305			16508	1978/79	17725	362			17363
1979	16458	373			16085	1979/80	19584	542			19042
1980	18188	458			17730	1980/81	21611	488		3	21120
1981	18732	429	0	0	18303	1981/82	21675	267	0	15	21413
1982	18317	389	1	20	17907	1982/83	18947	341	39	50	18517
1983	20149	378	52	72	19647	1983/84	20786	343	123	76	20244
1984	19911	422	99	73	19317	1984/85	26696	476	221	76	25923
1985	21998	486	159	114	21251	1985/86	25285	542	327	125	24291
1976-85 1 AAGR	4.48%	3.68%			4.35%	1 AAGR	4.28%	2.55%			4.02%
1986	21848	534	233	127	20954	1986/87	25264	581	444	146	24093
1987	22675	591	339	144	21601	1987/88	26814	621	438	148	26007
1988	23486	634	464	145	22223	1988/89	26457	653	839	152	24993
1989	24854	717	598	163	22978	1989/90	27358	687	1837	166	25448
1990	24774	758	784	164	23154	1990/91	28266	729	1151	166	26220
1991	25651	792	773	164	23922	1991/92	29821	772	1235	166	26848
1992	26482	834	847	164	24937	1992/93	30893	815	1355	166	27757
1993	27313	876	958	164	25315	1993/94	31139	867	1482	166	28624
1994	28991	928	1084	164	25915	1994/95	32153	919	1682	166	29466
1995	28937	981	1282	164	26590	1995/96	32897	971	1722	166	30038
1986-95 1 AAGR	3.17%	6.99%	20.80%	2.00%	2.48%	1 AAGR	2.90%	5.87%	16.25%	1.44%	2.48%
1996	29525	1032	1328	164	27009	1996/97	33638	1021	1821	166	30622
1997	30884	1093	1416	164	27421	1997/98	34317	1052	1875	166	31284
1998	30641	1114	1486	164	27077	1998/99	35828	1082	1956	166	31824
1999	31288	1144	1548	164	28360	1999/00	35753	1112	2001	166	32474
2000	31882	1175	1579	164	28984	2000/01	36442	1143	2026	166	33187
2001	32358	1205	1595	164	29384	2001/02	37137	1173	2054	166	33744
2002	32921	1236	1618	164	29911	2002/03	37759	1204	2080	166	34389
2003	33491	1266	1628	164	30453	2003/04	38536	1234	2186	166	35038
2004	34071	1297	1644	164	30964	2004/05	39228	1263	2132	166	35659
2005	34659	1327	1668	164	31508	2005/06	39948	1294	2158	166	36322
1996-05 1 AAGR	1.80%	2.83%	2.38%	0.80%	1.73%	1 AAGR	1.93%	2.67%	1.98%	0.80%	1.91%
1986-05 1 AAGR	2.46%	4.91%	18.89%	1.35%	2.17%	1 AAGR	2.44%	4.38%	8.68%	0.68%	2.18%

(13)	(14)	(15)
YEAR	NET ENERGY FOR LOAD GWH	1 LOAD FACTOR
1976	75383	59.54%
1977	80928	54.23%
1978	86382	58.41%
1979	88481	58.17%
1980	93664	56.15%
1981	96621	52.22%
1982	95223	58.76%
1983	100154	58.19%
1984	104844	58.67%
1985	112778	49.64%
1 AAGR	4.59%	
1986	112157	52.71%
1987	116282	55.18%
1988	128211	55.77%
1989	123442	56.48%
1990	127289	57.84%
1991	138798	56.75%
1992	134466	57.17%
1993	138235	56.85%
1994	142863	56.63%
1995	145376	56.32%
1 AAGR	2.92%	
1996	148511	56.44%
1997	151531	56.49%
1998	154551	56.54%
1999	157623	56.54%
2000	160772	56.52%
2001	163883	56.48%
2002	166977	56.49%
2003	170139	56.61%
2004	173386	56.58%
2005	176432	56.48%
1 AAGR	1.93%	
1 AAGR	2.41%	

PENINSULAR FLORIDA
HISTORY AND FORECAST:
NO PLANNED AND PROPOSED OF SCENARIO ADJUSTED FOR NO UTILITY INDUCED CONSERVATION
AS USED IN 1986 APH STUDIES

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(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
SUMMER PEAK DEMAND - MW						WINTER PEAK DEMAND - MW						NET ENERGY FOR LOAD GWH		
YEAR	DEMAND				YEAR	DEMAND				YEAR	LOAD FACTOR			
	TOTAL RUPTIBLE LOAD	LOAD MANAGEMENT	REDUCTION DUE TO OF'S	NET UTILITY DEMAND		TOTAL RUPTIBLE LOAD	LOAD MANAGEMENT	REDUCTION DUE TO OF'S	NET UTILITY DEMAND					
1976	14576	351		14225	1976/77	17467	432		17035	1976	75383	59.54%		
1977	15277	398		14879	1977/78	17228	361		16867	1977	80920	54.23%		
1978	16815	385		15630	1978/79	17725	362		17363	1978	86382	58.41%		
1979	16458	373		16085	1979/80	19584	542		19042	1979	88481	58.17%		
1980	18108	458		17650	1980/81	21611	488		21128	1980	93664	56.15%		
1981	18732	429	0	18303	1981/82	21695	267	0	21413	1981	96621	52.22%		
1982	18317	389	1	17987	1982/83	18947	341	39	18517	1982	95223	58.76%		
1983	20149	378	52	19647	1983/84	20786	343	123	20244	1983	100154	58.19%		
1984	19911	422	99	19317	1984/85	26696	476	221	25923	1984	104044	58.67%		
1985	21998	486	159	21231	1985/86	25285	542	327	24291	1985	112770	49.66%		
1976-85 1 AAGR	4.68%	3.68%		4.55%	1 AAGR	2.55%			4.02%	1 AAGR	4.59%			
1986	21977	534	159	21157	1986/87	25449	581	327	24395	1986	112589	52.91%		
1987	23801	591	159	22107	1987/88	26343	621	327	25247	1987	117258	54.87%		
1988	23963	654	159	23805	1988/89	27267	653	327	26135	1988	121656	55.81%		
1989	24772	717	159	23733	1989/90	28137	687	327	26957	1989	125633	54.88%		
1990	25668	750	159	24587	1990/91	29185	729	327	27883	1990	129617	54.89%		
1991	26573	792	159	25458	1991/92	30028	772	327	28755	1991	133299	54.57%		
1992	27456	834	159	26299	1992/93	31141	815	327	29833	1992	137117	54.43%		
1993	28400	876	159	27201	1993/94	32238	867	327	30878	1993	140966	53.94%		
1994	29211	928	159	27968	1994/95	33384	919	327	31892	1994	144889	53.54%		
1995	30093	981	159	28789	1995/96	34883	971	327	32619	1995	148268	53.87%		
1986-95 1 AAGR	3.55%	4.99%	0.00%	2.88%	1 AAGR	3.38%	5.07%	0.00%	1.44%	1 AAGR	3.11%			
1996	30788	1032	159	29353	1996/97	34854	1021	327	33348	1996	151468	53.81%		
1997	31294	1083	159	29888	1997/98	35578	1052	327	34033	1997	154568	52.92%		
1998	31888	1114	159	30443	1998/99	36325	1082	327	34758	1998	157645	52.88%		
1999	32477	1144	159	31018	1999/00	37091	1112	327	35486	1999	160881	52.82%		
2000	33098	1175	159	31688	2000/01	37817	1143	327	36181	2000	164024	52.77%		
2001	33676	1205	159	32148	2001/02	38558	1173	327	36884	2001	167131	52.73%		
2002	34281	1236	159	32722	2002/03	39292	1204	327	37595	2002	170388	52.73%		
2003	34888	1266	159	33291	2003/04	40049	1234	327	38322	2003	173617	52.72%		
2004	35493	1297	159	33873	2004/05	40752	1263	327	38996	2004	176943	52.71%		
2005	36111	1327	159	34461	2005/06	41512	1294	327	39725	2005	180067	52.71%		
1996-05 1 AAGR	1.82%	2.83%	0.00%	1.00%	1 AAGR	1.96%	2.67%	0.00%	1.97%	1 AAGR	1.94%			
1986-05 1 AAGR	2.65%	4.91%	0.00%	1.35%	1 AAGR	2.61%	4.38%	0.00%	2.60%	1 AAGR	2.58%			

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PENINSULAR FLORIDA
FUELS FORECAST (1986-2006)
As Used in the 1986 APN Studies
Base Case Oil and Gas Prices

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Residual Oil (By Sulfur Content)

Year	Less than 0.7%			0.7% - 2.0%			Greater than 2.0%			Distillate			Natural Gas	
	\$/BBL	Cents/ MMBTU	Escalation %	\$/BBL	Cents/ MMBTU	Escalation %	\$/BBL	Cents/ MMBTU	Escalation %	\$/BBL	Cents/ MMBTU	Escalation %	Cents/ MMBTU	Escalation %
1986	15.49	245.8	NA	14.79	234.8	NA	13.70	217.4	NA	20.72	357.2	NA	198.7	NA
1987	13.19	209.4	-14.8	12.60	200.0	-14.8	11.67	185.2	-14.8	17.65	304.3	-14.8	172.1	-13.4
1988	14.05	223.0	6.5	13.42	213.1	6.5	12.43	197.3	6.5	18.80	324.1	6.5	180.3	4.8
1989	15.08	239.3	7.3	14.40	228.6	7.3	13.33	211.7	7.3	20.17	347.8	7.3	191.7	6.3
1990	16.39	260.1	8.7	15.66	248.5	8.7	14.50	230.1	8.7	21.93	378.0	8.7	205.9	7.4
1991	18.06	286.7	10.2	17.25	273.8	10.2	15.97	253.5	10.2	24.16	416.6	10.2	226.5	10.0
1992	19.70	312.8	9.1	18.82	298.8	9.1	17.43	276.6	9.1	26.36	454.5	9.1	248.7	9.8
1993	21.34	338.7	8.3	20.38	323.6	8.3	18.87	299.6	8.3	28.55	492.2	8.3	272.0	9.4
1994	23.79	377.7	11.5	22.73	360.8	11.5	21.04	334.0	11.5	31.83	548.8	11.5	304.1	11.8
1995	26.67	423.4	12.1	25.48	404.4	12.1	23.59	374.4	12.1	35.68	615.2	12.1	341.8	12.4
1996	30.35	481.8	13.8	28.99	460.2	13.8	26.85	426.1	13.8	40.61	700.1	13.8	384.6	12.5
1997	35.27	559.8	16.2	33.69	534.8	16.2	31.19	495.2	16.2	47.19	813.6	16.2	439.2	14.2
1998	41.02	651.1	16.3	39.18	622.0	16.3	36.28	575.9	16.3	54.88	946.2	16.3	502.4	14.4
1999	47.58	755.3	16.0	45.45	721.5	16.0	42.08	668.0	16.0	63.66	1,097.6	16.0	574.8	14.4
2000	54.96	872.3	15.5	52.50	833.3	15.5	48.61	771.5	15.5	73.53	1,267.7	15.5	657.0	14.3
2001	61.50	976.1	11.9	58.74	932.5	11.9	54.39	863.4	11.9	82.28	1,418.5	11.9	731.9	11.4
2002	70.11	1,112.8	14.0	66.97	1,063.0	14.0	62.01	984.2	14.0	93.79	1,617.1	14.0	828.5	13.2
2003	77.47	1,223.6	10.5	74.00	1,174.6	10.5	68.52	1,087.6	10.5	103.64	1,786.9	10.5	913.8	10.3
2004	84.83	1,345.5	9.5	81.03	1,286.2	9.5	75.03	1,190.9	9.5	113.49	1,956.7	9.5	1,000.6	9.5
2005	92.21	1,463.6	8.7	88.08	1,398.1	8.7	81.55	1,294.5	8.7	123.36	2,126.9	8.7	1,088.7	8.8
2006 & Beyond	101.24	1,607.0	9.8	96.71	1,535.1	9.8	89.55	1,421.4	9.8	135.45	2,335.4	9.8	1,194.3	9.7

NOTE: Heat Content Residual Oil 6.3 MMBTU/BBL
Heat Content Distillate * 5.8 MMBTU/BBL

PENINSULAR FLORIDA
FUELS FORECAST (1986-2006)
As Used in the 1986 AFH Studies
Low Oil and Gas Prices

FCG FORM 1.2
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Residual Oil (By Sulfur Content)

Year	Less than 0.7%			0.7% - 2.0%			Greater than 2.0%			Distillate			Natural Gas	
	\$/BBL	Cents/ MMBTU	Escalation %	\$/BBL	Cents/ MMBTU	Escalation %	\$/BBL	Cents/ MMBTU	Escalation %	\$/BBL	Cents/ MMBTU	Escalation %	Cents/ MMBTU	Escalation %
1986	10.27	163.0	NA	10.00	158.7	NA	9.55	151.6	NA	13.10	225.9	NA	157.1	NA
1987	9.50	150.8	-7.5	9.25	146.9	-7.5	8.84	140.3	-7.4	12.13	209.1	-7.4	150.5	-4.2
1988	9.84	156.2	3.6	9.59	152.2	3.6	9.16	145.4	3.6	12.57	216.7	3.6	156.8	4.2
1989	10.32	163.9	4.9	10.05	159.6	4.9	9.61	152.5	4.9	13.18	227.3	4.9	164.9	5.2
1990	11.03	175.0	6.8	10.74	170.5	6.8	10.26	162.9	6.8	14.08	242.7	6.8	176.0	6.8
1991	11.92	189.2	8.1	11.61	184.2	8.1	11.09	176.0	8.1	15.32	264.1	8.8	189.9	7.9
1992	13.04	207.0	9.4	12.70	201.6	9.4	12.13	192.5	9.4	16.87	290.8	10.1	207.4	9.2
1993	14.07	223.3	7.9	13.70	217.4	7.9	13.08	207.6	7.8	18.31	315.7	8.6	224.1	8.1
1994	15.66	248.6	11.3	15.25	242.0	11.3	14.56	231.1	11.3	20.52	353.8	12.1	249.4	11.3
1995	17.03	270.4	8.8	16.58	263.2	8.7	15.83	251.3	8.7	22.46	387.3	9.5	272.3	9.2
1996	19.17	304.3	12.6	18.66	296.2	12.5	17.81	282.7	12.5	25.44	438.7	13.3	307.1	12.8
1997	21.21	336.7	10.7	20.65	327.7	10.6	19.70	312.7	10.6	28.34	488.5	11.4	341.8	11.3
1998	23.97	380.4	13.0	23.32	370.2	13.0	22.24	353.1	12.9	32.22	555.5	13.7	388.3	13.6
1999	26.55	421.4	10.8	25.83	410.0	10.8	24.64	391.0	10.7	35.93	619.4	11.5	433.8	11.7
2000	29.96	475.6	12.9	29.15	462.7	12.8	27.79	441.1	12.8	40.81	703.6	13.6	493.9	13.8
2001	32.87	521.8	9.7	31.97	507.5	9.7	30.48	483.8	9.7	45.06	777.0	10.4	547.7	10.9
2002	36.56	580.4	11.2	35.56	564.5	11.2	33.90	538.0	11.2	50.45	869.9	12.0	616.0	12.5
2003	39.94	633.9	9.2	38.84	616.6	9.2	37.02	587.6	9.2	55.48	956.5	10.0	675.3	9.6
2004	44.13	700.5	10.5	42.92	681.3	10.5	40.90	649.2	10.5	61.71	1,063.9	11.2	749.3	11.0
2005	47.87	759.9	8.5	46.55	738.9	8.5	44.36	704.1	8.5	67.37	1,161.6	9.2	816.7	9.0
2006 & Beyond	52.00	825.3	8.6	50.56	802.6	8.6	48.07	763.0	8.4	73.65	1,269.9	9.3	889.8	8.9

NOTE: Heat Content Residual Oil 6.3 MMBtu/BBL
Heat Content Distillate 5.8 MMBtu/BBL

PENINSULAR FLORIDA
FUELS FORECAST (1986-2006)
As Used in the 1986 APH Studies
High Oil and Gas Prices

Residual Oil (By Sulfur Content)

Year	Less than 0.7%			0.7% - 2.0%			Greater than 2.0%			Distillate			Natural Gas	
	\$/BBL	Cents/ MMBTU	Escalation %	\$/BBL	Cents/ MMBTU	Escalation %	\$/BBL	Cents/ MMBTU	Escalation %	\$/BBL	Cents/ MMBTU	Escalation %	Cents/ MMBTU	Escalation %
1986	17.63	279.9	NA	17.15	272.2	NA	16.34	259.4	NA	24.20	417.2	NA	242.3	NA
1987	17.86	283.5	1.3	17.37	275.7	1.3	16.55	262.7	1.3	24.51	422.5	1.3	244.5	0.9
1988	19.24	305.5	7.8	18.71	297.1	7.8	17.83	283.1	7.7	26.41	455.3	7.8	260.0	6.3
1989	20.85	331.0	8.3	20.28	321.8	8.3	19.32	306.6	8.3	28.61	493.3	8.3	278.0	6.9
1990	22.67	359.8	8.7	22.04	349.9	8.7	21.00	333.3	8.7	31.11	536.3	8.7	298.5	7.3
1991	24.69	391.9	8.9	24.01	381.1	8.9	22.87	363.0	8.9	34.54	595.4	11.0	321.1	7.6
1992	27.18	431.4	10.1	26.43	419.5	10.1	25.17	399.5	10.0	38.31	660.5	10.9	349.1	8.7
1993	29.90	474.6	10.0	29.07	461.4	10.0	27.68	439.4	10.0	42.48	732.4	10.9	379.8	8.8
1994	32.76	520.0	9.6	31.85	505.5	9.6	30.33	481.4	9.6	47.45	818.0	11.7	412.0	8.5
1995	36.21	574.7	10.5	35.20	558.7	10.5	33.51	532.0	10.5	52.85	911.2	11.4	450.9	9.4
1996	40.41	641.5	11.6	39.28	623.5	11.6	37.40	593.6	11.6	59.45	1,024.9	12.5	498.5	10.6
1997	44.62	708.3	10.4	43.37	688.4	10.4	41.29	655.4	10.4	66.92	1,153.8	12.6	546.1	9.6
1998	50.39	799.8	12.9	48.97	777.3	12.9	46.61	739.9	12.9	76.16	1,313.0	13.8	611.7	12.0
1999	56.35	894.4	11.8	54.76	869.2	11.8	52.12	827.3	11.8	85.82	1,479.7	12.7	679.4	11.1
2000	62.62	994.0	11.1	60.86	966.0	11.1	57.92	919.3	11.1	97.26	1,677.0	13.3	750.7	10.5
2001	69.61	1,104.8	11.1	67.64	1,073.6	11.1	64.36	1,021.6	11.1	108.93	1,878.2	12.0	830.1	10.6
2002	77.88	1,236.1	11.9	75.67	1,201.2	11.9	72.00	1,142.9	11.9	122.81	2,117.3	12.7	924.2	11.3
2003	85.43	1,356.0	9.7	83.01	1,317.6	9.7	78.98	1,253.6	9.7	137.38	2,368.7	11.9	1,010.0	9.3
2004	94.53	1,500.5	10.7	91.85	1,458.0	10.7	87.38	1,387.0	10.6	153.16	2,640.7	11.5	1,113.7	10.3
2005	104.25	1,654.7	10.3	101.29	1,607.7	10.3	96.35	1,529.4	10.3	170.16	2,933.8	11.1	1,224.3	9.9
2006 & Beyond	114.85	1,823.1	10.2	111.73	1,773.5	10.3	105.98	1,682.1	10.0	188.59	3,251.5	10.8	1,344.1	9.8

NOTE: Heat Content Residual Oil 6.3 MMBtu/BBL
Heat Content Distillate 5.8 MMBtu/BBL

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PENINSULAR FLORIDA
FUELS FORECAST (1986-2005)
As Used in the 1986 APH Studies
High, Medium and Low Sulphur Coal Prices

YEAR	Low Sulphur Coal Less than 1.0%		Medium Sulphur Coal 1.0 - 2.0%		High Sulphur Coal Greater than 2.0%		Escalation Minemouth Transportation	
	\$/TON	c/MBTU	\$/TON	c/MBTU	\$/TON	c/MBTU	%	%
1986	46.56	194	43.92	183	42.48	177		
1987	46.80	195	44.16	184	42.72	178	-0.9	2.6
1988	47.52	198	45.12	188	43.68	182	0.6	4.0
1989	48.72	203	46.08	192	44.64	186	0.7	4.6
1990	50.16	209	47.52	198	46.08	192	2.0	5.0
1991	52.80	220	49.92	208	48.48	202	4.4	5.5
1992	55.44	231	52.56	219	50.88	212	4.8	5.9
1993	58.32	243	55.44	231	53.76	224	4.7	6.2
1994	61.92	258	58.80	245	56.88	237	6.0	6.3
1995	66.00	275	62.40	260	60.48	252	6.0	6.6
1996	70.08	292	66.48	277	64.56	269	6.4	6.7
1997	75.12	313	71.28	297	69.12	288	7.3	7.0
1998	80.64	336	76.56	319	74.16	309	7.5	7.1
1999	86.64	361	82.08	342	79.44	331	7.2	7.2
2000	93.36	389	88.32	368	85.68	357	8.2	7.4
2001	100.80	420	95.52	398	92.40	385	8.6	7.1
2002	108.96	454	102.96	429	99.84	416	8.5	7.3
2003	117.84	491	111.60	465	108.24	451	9.2	7.1
2004	127.44	531	120.72	503	116.88	487	9.0	6.9
2005	138.24	576	130.80	545	126.72	528	9.6	6.8

NOTE: HEAT CONTENT OF COAL : 24.0 MBTU/TON

PENINSULAR FLORIDA

FUELS FORECAST (1986 - 2006)
As Used in the 1986 APH Studies

Year	Nuclear		Firm Purchases	
	Cents/ MMBTU	Escalation %	\$/MWh	Escalation %
1986	65.0	NA	3.40	NA
1987	65.0	0.0	3.52	3.5
1988	65.0	0.0	3.65	3.7
1989	68.0	4.6	3.90	6.9
1990	70.0	2.9	4.01	2.8
1991	74.0	5.7	4.16	3.7
1992	78.0	5.4	4.48	7.7
1993	82.0	5.1	4.71	5.1
1994	85.0	3.7	4.94	4.9
1995	90.0	5.9	5.31	7.5
1996	93.0	3.3		
1997	96.0	3.2		
1998	99.0	3.1		
1999	103.0	4.0		
2000	109.0	5.8		
2001	115.0	5.5		
2002	122.0	6.1		
2003	127.0	4.1		
2004	136.0	7.1		
2005	144.0	5.9		
2006 & Beyond	154.9	7.6		

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Economic Assumptions (Peninsular Florida)*
Base Case

° AFUDC RATE

10.14%

° CAPITALIZATION RATIOS

Debt 47%
Preferred 9%
Equity 44%

° RATE OF RETURN

Debt 11%
Preferred 10%
Equity 15%

° INCOME TAX RATE

State 5.5%
Federal 46%
Effective 48.97%

° OTHER TAX RATE

1.5%

° DISCOUNT RATE

10.14%

° TAX DEPRECIATION LIFE

15 Years

° INVESTMENT TAX CREDIT

8%

*Based on IOU data.

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Economic Assumptions (Peninsular Florida)*
Case 2

° AFUDC RATE

10.14%

° CAPITALIZATION RATIOS

Debt 47%
Preferred 9%
Equity 44%

° DISCOUNT RATE

10.14%

° RATE OF RETURN

Debt 11%
Preferred 10%
Equity 15%

° TAX DEPRECIATION LIFE

15 Years

° INCOME TAX RATE

State 5.5%
Federal 46%
Effective 48.97%

° INVESTMENT TAX CREDIT

8%

° OTHER TAX RATE

1.5%

*Based on IOU data.

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Economic Escalation Assumptions (Peninsular Florida)

Year	General Inflation %	Plant Construction Cost %	Fixed O & M Cost %	Variable O & M Cost %
1986	2.7	3.7	2.7	2.7
1987	2.8	3.8	2.8	2.8
1988	4.2	5.2	4.2	4.2
1989	4.6	5.6	4.6	4.6
1990	4.7	5.7	4.7	4.7
1991	5.2	6.2	5.2	5.2
1992	5.3	6.3	5.3	5.3
1993	5.4	6.4	5.4	5.4
1994	5.5	6.5	5.5	5.5
1995	5.5	6.5	5.5	5.5
1996	5.5	6.5	5.5	5.5
1997	5.5	6.5	5.5	5.5
1998	5.5	6.5	5.5	5.5
1999	5.6	6.6	5.6	5.6
2000	5.7	6.7	5.7	5.7
2001	5.8	6.8	5.8	5.8
2002	5.8	6.8	5.8	5.8
2003	5.8	6.8	5.8	5.8
2004	5.7	6.7	5.7	5.7
2005	5.6	6.6	5.6	5.6
2006 & Beyond	5.6	6.6	5.6	5.6

SOURCE: DRI Spring 1986 Long Term Review

PROPOSED UNIT ADDITIONS

Plant Name (Type): Coal
Net Capacity (MW): 500
Book Life (Yrs): 30

Installed Cost (In-Service Year 1993)

Total Installed Cost (\$/KW)*:	<u>1942.6</u>
Direct Construction Cost (\$/KW-86):	<u>1147.0</u>
AFUDC Amount (\$/KW):	<u>412.8</u>
Escalation (\$/KW):	<u>382.8</u>
Fixed O & M (\$/KW-yr)	<u>26.6</u>
Variable O & M (\$/MWH):	<u>5.9</u>

K Factor** 1.7283

* Total Installed Cost = Direct Construction Cost + AFUDC + Escalation

**K Factor Developed on Form 3.2

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PROPOSED UNIT ADDITIONS

Plant Name (Type): Combined Cycle
Net Capacity (MW): 220
Book Life (Yrs): 30

Installed Cost (In-Service Year 1993)

Total Installed Cost (\$/KW)*:	<u>825.7</u>
Direct Construction Cost (\$/KW-86):	<u>544.0</u>
AFUDC Amount (\$/KW):	<u>134.8</u>
Escalation (\$/KW):	<u>146.9</u>
Fixed O & M (\$/KW-yr)	<u>11.6</u>
Variable O & M (\$/MWH):	<u>3.0</u>

K Factor** 1.6886

* Total Installed Cost = Direct Construction Cost + AFUDC + Escalation

**K Factor Developed on Form 3.2

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PROPOSED UNIT ADDITIONS

Plant Name (Type): Combustion Turbine
Net Capacity (MW): 75
Book Life (Yrs): 20

Installed Cost (In-Service Year 1993)

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Total Installed Cost (\$/KW)*: 454.7
Direct Construction Cost (\$/KW-86): 306.0
AFUDC Amount (\$/KW): 52.9
Escalation (\$/KW): 95.8
Fixed O & M (\$/KW-yr) 0.7
Variable O & M (\$/MWH): 6.6

K Factor** 1.6530

* Total Installed Cost = Direct Construction Cost + AFUDC + Escalation

**K Factor Developed on Form 3.2

**SUMMARY OF NEW UNIT ADDITIONS
CASE: LONG RANGE PLANNING STUDY**

(1)	(2)	(3)	(4)	(5)	(6)
			Construction	Net	
	Unit		Start	Capability	
<u>Year</u>	<u>Type</u>	<u>Fuel</u>	<u>Mo/Yr</u>	<u>Summer</u>	<u>Winter</u>
				<u>(MW)</u>	<u>(MW)</u>
1994	CC	oil/gas	1/90	220	220
1994	CT	oil	1/91	75	75
1995	CC	oil/gas	1/91	220	220
1995	CT(7)	oil	1/92	525	525
1996	CC(2)	oil/gas	1/92	440	440
1996	CT(3)	oil	1/93	225	225
1997	COAL	coal(hs)	1/88	500	500
1997	CT	oil	1/94	75	75

Note: Number in Brackets after unit type indicates the number of that type unit installed per year.

**SUMMARY OF NEW UNIT ADDITIONS
CASE: AVOIDED UNIT STUDY**

(1)	(2)	(3)	(4) Construction Start Mo/Yr	(5) Net Capability Summer (MW)	(6) Winter (MW)
<u>Year</u>	<u>Unit Type</u>	<u>Fuel</u>			
1993	CC	oil/gas	1/89	220	220
1994	CC(2)	oil/gas	1/90	440	440
1994	CT(4)	oil	1/91	300	300
1995	CC(2)	oil/gas	1/91	440	440
1995	CT(5)	oil	1/92	375	375
1996	COAL	coal(hs)	1/87	500	500
1996	CT(4)	oil	1/93	300	300

NOTE: Number in brackets after unit type indicates the number of that type unit installed per year.

SUMMARY OF CAPACITY, DEMAND AND RESERVE MARGIN
AT TIME OF SUMMER PEAK
LONG RANGE PLANNING STUDY

FCG STUDIES FORM 2.2
PAGE 1 OF 3
ORDER NO. 15915
DOCKET NO. 860004-EU

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
YEAR	INSTALLED CAPACITY		CONTRACTED FIRM INTERCHANGE (PEN. IMPORT) (MW)	PROJECTED FIRM NET TO GRID FROM OF (MW)	TOTAL AVAILABLE CAPACITY (MW)	COINCIDENT FIRM PEAK DEMAND (MW)	RESERVE MARGIN		ANNUAL ASSISTED LOLP **
	*EXISTING & CERTIFIED	STUDY PROPOSED PLANS					(MW)	% OF PEAK	
1986	2775C	0	2825	35	29810	28915	8895	43%	0.006
1987	28298	0	2500	54	30852	21532	9320	43%	0.003
1988	28698	0	2400	200	31298	22135	9163	41%	0.005
1989	29347	0	2400	288	31955	22488	9467	42%	0.002
1990	29460	0	2400	245	32185	23064	9841	39%	0.002
1991	29838	0	2400	246	32484	23812	8672	36%	0.009
1992	30689	0	2200	576	33465	24390	9875	37%	0.007
1993	30591	0	1100	627	32318	25138	7180	29%	0.037
1994	30577	295	500	628	32000	25730	6270	24%	0.098
1995	30554	1040	0	649	32243	26396	5847	22%	0.100
1996	30580	1785	0	698	32895	26795	6100	23%	0.090
1997	30580	2280	0	701	33481	27198	6283	23%	0.094
1998	30450	2810	0	722	33982	27647	6335	23%	
1999	30450	3605	0	743	34798	28119	6679	24%	
2000	30200	4135	0	754	35089	28624	6465	23%	
2001	30134	4930	0	775	35839	29117	6722	23%	
2002	30124	5460	0	796	36380	29634	6746	23%	
2003	30020	5990	0	807	36817	30145	6672	22%	
2004	30016	6520	0	808	37344	30671	6673	22%	
2005	30016	6785	0	834	37635	31203	6432	21%	

NOTE:

COLUMN (5) IS THE CUMULATIVE SUM OF COLUMNS (3) & (4) OF FCG AGGREGATE FORMS 6.4 & 6.5 PAGE II BY YEAR.

* FOR STUDY PURPOSES TURNER P1-2 ARE BROUGHT BACK IN 1/90; TURNER P3-4 ARE BROUGHT BACK IN 1/91; HIGGINS P1-4 ARE BROUGHT BACK IN 10/91; AVON PARK 2, P1-2, PORT ST. JOE P1, RIO PINAR P1, NORTHSIDE 2, CUTLER 5-6, RIVIERA 2, KENNEDY 8 AND SOUTHSIDE 3 ARE BROUGHT BACK IN 1/92.

** LOLP IS NOT SHOWN BEYOND 1997, SINCE UNIT ADDITION TYPES WERE NOT IDENTIFIED BEYOND 1997.

SUMMARY OF CAPACITY, DEMAND AND RESERVE MARGIN
AT TIME OF WINTER PEAK
LONG RANGE PLANNING STUDY

FCB STUDIES FORM 2.2
PAGE 2 OF 3
ORDER NO. 15915
DOCKET NO. 860004-EU

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
YEAR	INSTALLED CAPACITY		CONTRACTED FIRM INTERCHANGE (PEN. IMPORT) (MW)	PROJECTED FIRM NET TO GRID FROM OF (MW)	TOTAL AVAILABLE CAPACITY (MW)	COINCIDENT FIRM PEAK DEMAND (MW)	RESERVE MARGIN		ANNUAL ASSISTED LOLP **
	*EXISTING & CERTIFIED	STUDY PROPOSED PLANS					(MW)	% OF PEAK	
1986 - 87	28777	0	2227	35	31039	24050	6989	29%	0.006
1987 - 88	29722	0	2400	54	32176	24516	7660	31%	0.003
1988 - 89	30272	0	2400	200	32872	24899	7973	32%	0.005
1989 - 90	30370	0	2400	200	32970	25355	7623	30%	0.002
1990 - 91	30463	0	2400	245	33108	26106	7002	27%	0.002
1991 - 92	30921	0	2400	246	33567	26675	6892	26%	0.009
1992 - 93	31711	0	2000	576	34287	27574	6713	24%	0.007
1993 - 94	31697	0	1200	627	33524	28433	5091	18%	0.037
1994 - 95	31674	295	600	628	33197	29265	3932	13%	0.098
1995 - 96	31619	1040	0	649	33308	29818	3490	12%	0.100
1996 - 97	31619	1705	0	690	34014	30391	3623	12%	0.090
1997 - 98	31613	2280	0	701	34594	30966	3628	12%	0.094
1998 - 99	31565	2810	0	722	35097	31576	3521	11%	
1999 - 00	31315	3605	0	743	35663	32207	3456	11%	
2000 - 01	31232	4135	0	754	36121	32830	3291	10%	
2001 - 02	31222	4930	0	775	36927	33459	3468	10%	
2002 - 03	31191	5460	0	796	37447	34094	3353	10%	
2003 - 04	31106	5990	0	807	37903	34727	3176	9%	
2004 - 05	31106	6520	0	808	38434	35346	3088	9%	
2005 - 06	31106	6785	0	834	38725	35999	2726	8%	

NOTE:

- COLUMN (5) IS THE CUMULATIVE SUM OF COLUMNS (3) & (4) OF FCB AGGREGATE FORMS 6.4 & 6.5 PAGE III BY YEAR.
- * FOR STUDY PURPOSES TURNER P1-2 ARE BROUGHT BACK IN 1/90; TURNER P3-4 ARE BROUGHT BACK IN 1/91; HIGGINS P1-4 ARE BROUGHT BACK IN 10/91; AVON PARK 2, P1-2, PORT ST. JOE P1, RIO PINAR P1, NORTHSIDE 2, CUTLER 5-6, RIVIERA 2, KENNEDY 8 AND SOUTHSIDE 3 ARE BROUGHT BACK IN 1/92.
- ** LOLP IS NOT SHOWN BEYOND 1997, SINCE UNIT ADDITION TYPES WERE NOT IDENTIFIED BEYOND 1997.

SUMMARY OF CAPACITY, DEMAND AND RESERVE MARGIN

FCB STUDIES FORM 2.2

PAGE 3 OF 3

ORDER NO. 15915

DOCKET NO. 860004-EU

LONG RANGE PLANNING STUDY

(1)	(2)	(3)	(4)	(5)	(6)
RESERVE MARGIN					
YEAR	(MW)	% OF PEAK	ANNUAL ASSISTED LOLP	ANNUAL ASSISTED LOLH	ANNUAL ASSISTED EUE
1986	8895	43%	0.006	0.015	0.01
1987	9320	43%	0.003	0.008	0.00
1988	9163	41%	0.005	0.013	0.01
1989	9467	42%	0.002	0.004	0.00
1990	9841	39%	0.002	0.005	0.00
1991	8672	36%	0.009	0.024	0.01
1992	9875	37%	0.007	0.017	0.01
1993	7180	29%	0.037	0.095	0.06
1994	6270	24%	0.098	0.240	0.16
1995	5847	22%	0.100	0.240	0.16
1996	6100	23%	0.090	0.200	0.13
1997	6283	23%	0.094	0.210	0.14
1998	6335	23%			
1999	6679	24%			
2000	6465	23%			
2001	6722	23%			
2002	6746	23%			
2003	6672	22%			
2004	6673	22%			
2005	6432	21%			

SUMMARY OF CAPACITY, DEMAND AND RESERVE MARGIN
AT TIME OF SUMMER PEAK
AVOIDED UNIT STUDY

FCB STUDIES FORM 2.2
PAGE 1 OF 3
ORDER NO. 15915
DOCKET NO. 860004-EU

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
YEAR	INSTALLED CAPACITY		CONTRACTED FIRM INTERCHANGE (PEN. IMPORT) (MW)	PROJECTED FIRM NET TO GRID FROM OF (MW)	TOTAL AVAILABLE CAPACITY (MW)	COINCIDENT FIRM PEAK DEMAND (MW)	RESERVE MARGIN		ANNUAL ASSISTED LOLP
	*EXISTING & CERTIFIED	STUDY PROPOSED PLANS					(MW)	% OF PEAK	
1986	27750	0	2025	35	29810	20915	8895	43%	0.007
1987	28290	0	2500	54	30852	21532	9320	43%	0.004
1988	28690	0	2400	200	31290	22135	9163	41%	0.011
1989	29347	0	2400	208	31955	22400	9467	42%	0.004
1990	29460	0	2400	245	32105	23064	9041	39%	0.006
1991	29838	0	2400	246	32404	23012	8672	36%	0.027
1992	30689	0	2200	576	33465	24390	9075	37%	0.022
1993	30591	220	1100	627	32530	25130	7400	29%	0.070
1994	30577	960	500	628	32665	25730	6935	27%	0.094
1995	30554	1775	0	649	32978	26396	6582	25%	0.089
1996	30500	2575	0	690	33765	26795	6970	26%	0.094
1997	30500	3105	0	701	34306	27190	7100	26%	
1998	30450	3635	0	722	34807	27647	7160	26%	
1999	30450	4430	0	743	35623	28119	7504	27%	
2000	30200	4960	0	754	35914	28624	7290	25%	
2001	30134	5755	0	775	36684	29117	7547	26%	
2002	30124	6285	0	796	37205	29634	7571	26%	
2003	30020	6815	0	807	37642	30145	7497	25%	
2004	30016	7345	0	808	38169	30671	7498	24%	
2005	30016	7875	0	834	38725	31203	7522	24%	

NOTE:

COLUMN (5) IS THE CUMULATIVE SUM OF COLUMNS (3) & (4) OF FCB AGGREGATE FORMS 6.4 & 6.5 PAGE 11 BY YEAR.

* FOR STUDY PURPOSES TURNER P1-2 ARE BROUGHT BACK IN 1/90; TURNER P3-4 ARE BROUGHT BACK IN 1/91; HIGGINS P1-4 ARE BROUGHT BACK IN 10/91;
AVON PARK 2, P1-2, PORT ST. JOE P1, RIO PINAR P1, NORTHSIDE 2, CUTLER 5-6, RIVIERA 2, KENNEDY 8 AND SOUTHSIDE 3 ARE BROUGHT BACK IN 1/92.

** LOLP IS NOT SHOWN BEYOND 1997, SINCE UNIT ADDITION TYPES WERE NOT IDENTIFIED BEYOND 1997.

SUMMARY OF CAPACITY, DEMAND AND RESERVE MARGIN
AT TIME OF WINTER PEAK
AVOIDED UNIT STUDY

FCG STUDIES FORM 2.2
PAGE 2 OF 3
ORDER NO. 15915
DOCKET NO. 860004-EU

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
YEAR	INSTALLED CAPACITY		CONTRACTED FIRM INTERCHANGE (PEN. IMPORT) (MW)	PROJECTED FIRM NET TO GRID FROM OF (MW)	TOTAL AVAILABLE CAPACITY (MW)	COINCIDENT FIRM PEAK DEMAND (MW)	RESERVE MARGIN		ANNUAL ASSISTED LOLP
	EXISTING & CERTIFIED	STUDY PROPOSED PLANS					(MW)	% OF PEAK	
1986 - 87	28777	0	2227	35	31839	24850	6989	29%	0.007
1987 - 88	29722	0	2400	54	32176	24516	7660	31%	0.004
1988 - 89	30272	0	2400	200	32872	24899	7973	32%	0.011
1989 - 90	30370	0	2400	200	32978	25355	7623	30%	0.004
1990 - 91	30463	0	2400	245	33108	26106	7002	27%	0.006
1991 - 92	30921	0	2400	246	33567	26675	6892	26%	0.027
1992 - 93	31711	0	2000	576	34287	27574	6713	24%	0.022
1993 - 94	31697	220	1200	627	33744	28433	5311	19%	0.078
1994 - 95	31674	960	600	628	33862	29265	4597	16%	0.094
1995 - 96	31619	1775	0	649	34043	29810	4225	14%	0.089
1996 - 97	31619	2575	0	690	34804	30391	4493	15%	0.094
1997 - 98	31613	3105	0	701	35419	30966	4453	14%	
1998 - 99	31565	3635	0	722	35922	31576	4346	14%	
1999 - 00	31315	4430	0	743	36488	32207	4281	13%	
2000 - 01	31232	4960	0	754	36946	32830	4116	13%	
2001 - 02	31222	5755	0	775	37752	33459	4293	13%	
2002 - 03	31191	6285	0	796	38272	34094	4178	12%	
2003 - 04	31106	6815	0	807	38728	34727	4001	12%	
2004 - 05	31106	7345	0	808	39259	35346	3913	11%	
2005 - 06	31106	7875	0	834	39815	35999	3816	11%	

NOTE:

COLUMN (5) IS THE CUMULATIVE SUM OF COLUMNS (3) & (4) OF FCG AGGREGATE FORMS 6.4 & 6.5 PAGE III BY YEAR.

- * FOR STUDY PURPOSES TURNER P1-2 ARE BROUGHT BACK IN 1/90; TURNER P3-4 ARE BROUGHT BACK IN 1/91; HIGGINS P1-4 ARE BROUGHT BACK IN 10/91; AVON PARK 2, P1-2, PORT ST. JOE P1, RIO PINAR P1, NORTHSIDE 2, CUTLER 5-6, RIVIERA 2, KENNEDY 8 AND SOUTHSIDE 3 ARE BROUGHT BACK IN 1/92.
- ** LOLP IS NOT SHOWN BEYOND 1997, SINCE UNIT ADDITION TYPES WERE NOT IDENTIFIED BEYOND 1997.

SUMMARY OF CAPACITY, DEMAND AND RESERVE MARGIN

AVOIDED UNIT CASE

FCB STUDIES FORM 2.2

PAGE 3 OF 3

ORDER NO. 15915

DOCKET NO. 860004-EU

(1)	(2)	(3)	(4)	(5)	(6)
RESERVE MARGIN					
YEAR	(MW)	% OF PEAK	ANNUAL ASSISTED LOLP	ANNUAL ASSISTED LOLH	ANNUAL ASSISTED EUE
1986	8895	43%	0.007	0.017	0.01
1987	9320	43%	0.004	0.011	0.01
1988	9163	41%	0.011	0.030	0.02
1989	9467	42%	0.004	0.013	0.01
1990	9041	39%	0.006	0.021	0.01
1991	8672	36%	0.027	0.087	0.06
1992	9075	37%	0.022	0.073	0.05
1993	7400	29%	0.078	0.250	0.18
1994	6935	27%	0.094	0.280	0.20
1995	6582	25%	0.089	0.270	0.18
1996	6970	26%	0.094	0.260	0.17
1997	7109	26%			
1998	7165	26%			
1999	7581	27%			
2000	7290	25%			
2001	7547	26%			
2002	7571	26%			
2003	7497	25%			
2004	7498	24%			
2005	7522	24%			

		-----ACTUAL-----		1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
INTERCHANGE	GWH	16826	22063	4535	4794	4785	4749	4790	5058	5066	10164	11311	12763	10247	6969		
NUCLEAR	GWH	23944	23396	25014	24504	20294	26662	25900	27099	27748	24555	28248	26662	25991	26879		
COAL	GWH	27506	37134	43140	36819	42720	49506	52002	52645	52963	54262	54474	54385	54568	57755		
HO - TOT	GWH	19047	13419	21416	20941	20934	19093	19750	20772	22527	22969	22296	25074	31379	33543		
STEAM	GWH	10083	13283	21291	20818	20908	19090	19600	20609	22422	22904	21373	23136	27418	29323		
CC	GWH	49	3	122	110	23	0	58	74	93	37	869	1775	3693	3024		
CT	GWH	58	73	3	5	3	3	4	9	12	28	54	163	268	396		
DIESEL	GWH	57	60	0	0	0	0	0	0	0	0	0	0	0	0		
LO - TOT	GWH	205	302	9	29	20	7	12	20	39	113	132	90	140	204		
STEAM	GWH	17	9	0	0	0	0	0	0	0	0	0	0	0	0		
CC	GWH	3	7	0	0	0	0	0	0	0	0	0	0	0	0		
CT	GWH	162	263	7	27	10	6	10	24	33	97	114	78	130	100		
DIESEL	GWH	23	23	2	2	2	1	2	4	6	16	10	12	10	24		
NG - TOT	GWH	16161	15141	16000	19146	19160	18620	18919	19117	19565	19364	18579	19216	18637	18400		
STEAM	GWH	14345	12808	14037	17017	16991	16631	16743	17025	17504	17332	15766	15610	13425	13247		
CC	GWH	1578	2033	1962	2129	2167	1987	2175	2091	2059	2024	2799	3591	5203	5227		
CT	GWH	60	93	1	0	2	2	1	1	2	0	14	7	9	6		
DIESEL	GWH	170	127	0	0	0	0	0	0	0	0	0	0	0	0		
ALT - TOT	GWH	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
STEAM	GWH	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
CC	GWH	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
CT	GWH	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
DIESEL	GWH	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
HYDRO	GWH	203	215	220	220	220	220	220	220	220	220	220	220	220	220		
COG & SPP	GWH	600	750	1402	2007	3396	4007	4647	4861	4962	5191	5263	5420	5669	5773		
OTHER	GWH	344	350	11	11	11	11	11	11	11	11	11	11	11	11		
NEL	GWH	104044	112770	111043	115759	119540	122003	126355	129019	133109	136057	140542	143057	146070	149042		

		-----ACTUAL-----		1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
INTERCHANGE	%			15.4%	19.6%	4.1%	4.1%	4.8%	3.9%	3.8%	3.9%	3.8%	7.4%	8.8%	8.9%	7.8%	4.7%
NUCLEAR	%			23.8%	28.7%	22.4%	21.2%	23.7%	21.7%	28.5%	28.9%	28.8%	17.9%	20.1%	18.5%	17.7%	17.9%
COAL	%			26.4%	32.9%	38.6%	31.1%	35.7%	48.3%	41.2%	48.6%	39.8%	39.6%	38.8%	37.8%	37.2%	38.5%
HO - TOT	%			18.3%	11.9%	19.1%	25.8%	17.5%	15.5%	15.6%	16.8%	16.9%	16.8%	15.9%	17.4%	21.4%	22.4%
STEAM	%			18.1%	11.8%	19.8%	24.9%	17.5%	15.5%	15.6%	15.9%	16.8%	16.7%	15.2%	16.1%	18.7%	19.6%
CC	%			.8%	.8%	8.1%	8.1%	.8%	8.8%	.8%	8.1%	8.1%	.8%	8.6%	1.2%	2.5%	2.6%
CT	%			8.1%	8.1%	.8%	.8%	.8%	.8%	.8%	.8%	.8%	.8%	.8%	8.1%	8.2%	8.3%
DIESEL	%			8.1%	8.1%	8.8%	8.8%	8.8%	8.8%	8.8%	8.8%	8.8%	8.8%	8.8%	8.8%	8.8%	8.8%
LO - TOT	%			8.2%	8.3%	.8%	.8%	.8%	.8%	.8%	.8%	.8%	8.1%	8.1%	8.1%	8.1%	8.1%
STEAM	%			.8%	.8%	8.8%	8.8%	8.8%	8.8%	8.8%	8.8%	8.8%	8.8%	8.8%	8.8%	8.8%	8.8%
CC	%			.8%	.8%	8.8%	8.8%	8.8%	8.8%	8.8%	8.8%	8.8%	8.8%	8.8%	8.8%	8.8%	8.8%
CT	%			8.2%	8.2%	.8%	.8%	.8%	.8%	.8%	.8%	.8%	8.1%	8.1%	8.1%	8.1%	8.1%
DIESEL	%			.8%	.8%	.8%	.8%	.8%	.8%	.8%	.8%	.8%	.8%	.8%	.8%	.8%	.8%
NG - TOT	%			15.5%	13.4%	14.3%	16.5%	16.8%	15.2%	15.8%	14.7%	14.7%	14.1%	13.2%	13.4%	12.7%	12.3%
STEAM	%			13.8%	11.4%	12.6%	14.7%	14.2%	13.5%	13.3%	13.1%	13.2%	12.7%	11.2%	10.9%	9.1%	8.8%
CC	%			1.5%	1.8%	1.8%	1.8%	1.8%	1.6%	1.7%	1.6%	1.5%	1.5%	2.8%	2.5%	3.5%	3.5%
CT	%			8.1%	8.1%	.8%	8.8%	.8%	.8%	.8%	.8%	.8%	.8%	.8%	.8%	.8%	.8%
DIESEL	%			8.2%	8.1%	8.8%	8.8%	8.8%	8.8%	8.8%	8.8%	8.8%	8.8%	8.8%	8.8%	8.8%	8.8%
ALT - TOT	%			8.8%	8.8%	8.8%	8.8%	8.8%	8.8%	8.8%	8.8%	8.8%	8.8%	8.8%	8.8%	8.8%	8.8%
STEAM	%			8.8%	8.8%	8.8%	8.8%	8.8%	8.8%	8.8%	8.8%	8.8%	8.8%	8.8%	8.8%	8.8%	8.8%
CC	%			8.8%	8.8%	8.8%	8.8%	8.8%	8.8%	8.8%	8.8%	8.8%	8.8%	8.8%	8.8%	8.8%	8.8%
CT	%			8.8%	8.8%	8.8%	8.8%	8.8%	8.8%	8.8%	8.8%	8.8%	8.8%	8.8%	8.8%	8.8%	8.8%
DIESEL	%			8.8%	8.8%	8.8%	8.8%	8.8%	8.8%	8.8%	8.8%	8.8%	8.8%	8.8%	8.8%	8.8%	8.8%
HYDRO	%			8.2%	8.2%	8.2%	8.2%	8.2%	8.2%	8.2%	8.2%	8.2%	8.2%	8.2%	8.2%	8.2%	8.2%
COB & SPP	%			8.6%	8.7%	1.3%	1.8%	2.8%	3.3%	3.7%	3.7%	3.7%	3.8%	3.7%	3.8%	3.9%	3.9%
OTHER	%			8.3%	8.3%	.8%	.8%	.8%	.8%	.8%	.8%	.8%	.8%	.8%	.8%	.8%	.8%
NEL	%			188.8%	188.8%	188.8%	188.8%	188.8%	188.8%	188.8%	188.8%	188.8%	188.8%	188.8%	188.8%	188.8%	188.8%

HISTORY AND FORECAST: FUEL REQUIREMENTS

FCB STUDIES FORM 2.5
ORDER NO. 15915
DOCKET NO. 860004-EU

		-----ACTUAL-----		1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
NUCLEAR	10E12 BTU	194	216	267	261	302	284	276	289	296	262	301	284	277	287		
COAL	10E3 TON	11500	14227	17774	14602	17398	20282	21367	21631	21764	22312	22401	22305	22456	23745		
NO - TOT	10E3 BBL	31504	22419	32721	44002	31945	29083	30253	31946	34743	35568	34670	30930	40405	51826		
STEAM	10E3 BBL	30805	22180	32514	43700	31893	29077	30145	31795	34551	35422	33373	36227	42081	45839		
CC	10E3 BBL	76	5	200	209	42	0	90	126	159	66	1167	2396	5017	5239		
CT	10E3 BBL	536	154	7	13	10	6	10	25	33	80	130	307	507	748		
DIESEL	10E3 BBL	87	80	0	0	0	0	0	0	0	0	0	0	0	0		
LO - TOT	10E3 BBL	1151	1462	62	104	96	80	91	147	177	344	393	206	431	571		
STEAM	10E3 BBL	183	194	42	44	55	66	68	84	90	85	87	79	87	94		
CC	10E3 BBL	3	11	0	0	0	0	0	0	0	0	0	0	0	0		
CT	10E3 BBL	445	704	17	54	36	12	20	54	75	225	269	182	308	420		
DIESEL	10E3 BBL	520	553	3	6	5	2	3	9	12	34	37	25	36	49		
NG - TOT	10E6 CF	172598	165089	150256	108804	190130	105010	100247	191026	195516	194082	106000	193010	105073	104230		
STEAM	10E6 CF	153523	141603	139456	160430	169208	165911	167070	170611	175392	175090	160343	159706	130554	136582		
CC	10E6 CF	15757	20107	10792	20370	20905	19002	21156	20407	20090	19670	26320	33112	47170	47542		
CT	10E6 CF	1243	1432	0	4	25	25	13	0	26	114	217	112	149	106		
DIESEL	10E6 CF	2075	1067	0	0	0	0	0	0	0	0	0	0	0	0		
ALT - TOT	10E9 BTU	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
STEAM	10E9 BTU	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
CC	10E9 BTU	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
CT	10E9 BTU	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
DIESEL	10E9 BTU	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
OTHER																	
CON	10E6 BTU	500	505	0	0	0	0	0	0	0	0	0	0	0	0		
RDF	10E6 BTU	26000	70400	06500	05200	06400	06400	06400	06400	06400	06400	06400	06400	06400	06400		
REFUSE	10E6 BTU	10200	54200	31209	31209	31209	31209	31209	31209	31209	31209	31209	31209	31209	31209		
AVERAGE ANNUAL																	
NET FOSSIL HR	BTU/KWH	10201	9844	9741	9620	9679	9721	9746	9772	9770	9800	9820	9814	9704	9700		

**Financial Assumptions
for the Development of K Factor**

Unit: Coal

o CAPITALIZATION RATIOS

Debt	<u>47</u> %
Preferred	<u>9</u> %
Equity	<u>44</u> %

CONSTRUCTION SPENDING CURVE

Year	% Construction Expenditures*
-8	.5%
-7	.5%
-6	1.1%
-5	1.3%
-4	5.6%
-3	25.0%
-2	29.0%
-1	23.0%
0	14.0%

o RATE OF RETURN

Debt	<u>11</u> %
Preferred	<u>10</u> %
Equity	<u>15</u> %

Tax Rate	48.97%
AFUDC	10.14%
Discount Rate	10.14%
Book Life	30 Year
Investment Tax Credit Life	30 Year
Start Year	
Construction In-Service Year	1987 Year
	1996 Year

*To be applied to direct construction costs.

**Financial Assumptions
for the Development of K Factor**

Unit: Combined Cycle

CAPITALIZATION RATIOS

Debt	47 %
Preferred	9 %
Equity	44 %

CONSTRUCTION SPENDING CURVE

Year	% Construction Expenditures*
-8	— %
-7	— %
-6	— %
-5	— %
-4	— %
-3	5.0%
-2	39.0%
-1	41.0%
0	15.0%

RATE OF RETURN

Debt	11 %
Preferred	10 %
Equity	15 %

*To be applied to direct construction costs.

Tax Rate	48.97%
AFUDC	10.14%
Discount Rate	10.14%
Book Life	30 Year
Investment Tax Credit Life	30 Year
Start Year	
Construction	1989 Year
In-Service Year	1993 Year

**Financial Assumptions
for the Development of K Factor**

Unit: Combustion Turbine

CAPITALIZATION RATIOS

Debt	47 %
Preferred	9 %
Equity	44 %

CONSTRUCTION SPENDING CURVE

Year	% Construction Expenditures*
-8	%
-7	%
-6	%
-5	%
-4	%
-3	%
-2	2.0%
-1	73.0%
0	25.0%

RATE OF RETURN

Debt	11 %
Preferred	10 %
Equity	15 %

*To be applied to direct construction costs.

Tax Rate	48.97%
AFUDC	10.14%
Discount Rate	10.14%
Book Life	20 Year
Investment Tax Credit Life	20 Year
Start Year	
Construction In-Service Year	1990 Year
	1993 Year

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FIXED CHARGE CALCULATIONS FOR
DEVELOPMENT OF K FACTOR

PENINSULAR FLORIDA

UNIT : COAL 500MW

(THOUSANDS OF DOLLARS)

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
YEAR	CALENDAR YEAR	ELECTRIC PLANT IN-SERVICE	DEBT	PREFERRED	EQUITY	TAXES	TAX CREDIT	TOTAL DEBT PREFERRED EQUITY & TAXES	STRAIGHT LINE DEPRECIATION	TOTAL FIXED CHARGES	PRESENT WORTH FIXED CHARGES	CUMULATIVE PRESENT WORTH FIXED CHARGES
1	1993	883347	45669	7950	58301	92521	12192	204441	31777	236218	236218	236218
2	1994	829179	42869	7463	54726	76677	24383	181734	31777	213511	193854	430072
3	1995	778669	40257	7008	51392	73042	20726	171699	31777	203476	167735	597806
4	1996	731816	37835	6586	48300	69670	17068	162391	31777	194167	145325	743132
5	1997	688620	35602	6198	45449	66561	13411	153809	31777	185585	126114	869246
6	1998	645424	33368	5809	42598	63452	13411	145227	31777	177004	109209	978455
7	1999	605886	31324	5453	39988	60606	9753	137372	31777	169149	94754	1073209
8	2000	566348	29280	5097	37379	57761	9753	129517	31777	161293	82036	1155244
9	2001	526810	27236	4741	34769	54915	9753	121662	31777	153438	70856	1226099
10	2002	487272	25192	4385	32160	52069	9753	113807	31777	145583	61039	1287138
11	2003	447734	23148	4030	29550	49224	9753	105951	31777	137728	52429	1339567
12	2004	408196	21104	3674	26941	46378	9753	98096	31777	129873	44888	1384454
13	2005	368657	19060	3318	24331	43532	9753	90241	31777	122018	38290	1422744
14	2006	329119	17015	2962	21722	40687	9753	82386	31777	114163	32527	1455270
15	2007	289581	14971	2606	19112	37841	9753	74531	31777	106308	27500	1482770
16	2008	271988	14062	2448	17951	36575	-12192	71036	31777	102812	24148	1506917
17	2009	254395	13152	2290	16790	35309	-12192	67540	31777	99317	21179	1528096
18	2010	236801	12243	2131	15629	34042	-12192	64045	31777	95822	18553	1546648
19	2011	219208	11333	1973	14468	32776	-12192	60550	31777	92326	16230	1562878
20	2012	201615	10423	1815	13307	31510	-12192	57055	31777	88831	14178	1577056
21	2013	184022	9514	1656	12145	30244	-12192	53559	31777	85336	12366	1589422
22	2014	166428	8604	1498	10984	28977	-12192	50064	31777	81841	10768	1600189
23	2015	148835	7695	1340	9823	27711	-12192	46569	31777	78345	9359	1609547
24	2016	131242	6785	1181	8662	26445	-12192	43073	31777	74850	8118	1617665
25	2017	113649	5876	1023	7501	25179	-12192	39578	31777	71355	7027	1624691
26	2018	96055	4966	864	6340	23913	-12192	36083	31777	67859	6067	1630758
27	2019	78462	4056	706	5178	22646	-12192	32587	31777	64364	5225	1635982
28	2020	60869	3147	548	4017	21380	-12192	29092	31777	60869	4486	1640468
29	2021	43276	2237	389	2856	20114	-12192	25597	31777	57374	3839	1644307
30	2022	25682	1328	231	1695	18848	-12192	22102	31777	53878	3274	1647590

VALUE OF "K" 1.7283 = TOTAL CUMULATIVE PRESENT WORTH FIXED CHARGE/TOTAL INSTALLED COST.

FIXED CHARGE CALCULATIONS FOR
DEVELOPMENT OF K FACTOR

PENINSULAR FLORIDA

UNIT : CC 220MW

(THOUSANDS OF DOLLARS)

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
YEAR	CALENDAR YEAR	ELECTRIC PLANT IN-SERVICE	DEBT	PREFERRED	EQUITY	TAXES	TAX CREDIT	TOTAL DEBT PREFERRED EQUITY & TAXES	STRAIGHT LINE DEPRECIATION	TOTAL FIXED CHARGES	PRESENT WORTH FIXED CHARGES	CUMULATIVE PRESENT WORTH FIXED CHARGES
1	1993	167417.	8655.	1507.	11050.	17359.	2481.	38571.	6055.	44626.	44626.	44626.
2	1994	156805.	8107.	1411.	10349.	14164.	4963.	34032.	6055.	40087.	36396.	81022.
3	1995	146937.	7597.	1322.	9698.	13454.	4218.	32071.	6055.	38126.	31429.	112452.
4	1996	137814.	7125.	1240.	9096.	12798.	3474.	30259.	6055.	36314.	27179.	139631.
5	1997	129435.	6692.	1165.	8543.	12195.	2729.	28594.	6055.	34649.	23546.	163177.
6	1998	121055.	6259.	1089.	7990.	11591.	2729.	26929.	6055.	32984.	20351.	183527.
7	1999	113421.	5864.	1021.	7486.	11042.	1985.	25412.	6055.	31467.	17628.	201155.
8	2000	105786.	5469.	952.	6982.	10492.	1985.	23896.	6055.	29951.	15233.	216388.
9	2001	98151.	5074.	883.	6478.	9943.	1985.	22379.	6055.	28434.	13130.	229519.
10	2002	90516.	4680.	815.	5974.	9393.	1985.	20862.	6055.	26917.	11286.	240804.
11	2003	82881.	4285.	746.	5470.	8844.	1985.	19345.	6055.	25400.	9669.	250473.
12	2004	75217.	3890.	677.	4966.	8294.	1985.	17828.	6055.	23883.	8255.	258728.
13	2005	67612.	3496.	609.	4462.	7745.	1985.	16311.	6055.	22367.	7019.	265747.
14	2006	59977.	3101.	540.	3958.	7195.	1985.	14795.	6055.	20850.	5940.	271687.
15	2007	52342.	2706.	471.	3455.	6646.	1985.	13278.	6055.	19333.	5001.	276688.
16	2008	49174.	2542.	443.	3245.	6418.	-2481.	12648.	6055.	18703.	4393.	281081.
17	2009	46005.	2378.	414.	3036.	6190.	-2481.	12019.	6055.	18074.	3854.	284935.
18	2010	42837.	2215.	386.	2827.	5962.	-2481.	11389.	6055.	17444.	3378.	288313.
19	2011	39668.	2051.	357.	2618.	5734.	-2481.	10760.	6055.	16815.	2956.	291269.
20	2012	36500.	1887.	328.	2409.	5506.	-2481.	10130.	6055.	16185.	2583.	293852.
21	2013	33331.	1723.	300.	2200.	5278.	-2481.	9501.	6055.	15556.	2254.	296106.
22	2014	30163.	1559.	271.	1991.	5050.	-2481.	8871.	6055.	14926.	1964.	298070.
23	2015	26994.	1396.	243.	1782.	4822.	-2481.	8242.	6055.	14297.	1708.	299778.
24	2016	23826.	1232.	214.	1573.	4594.	-2481.	7612.	6055.	13667.	1482.	301260.
25	2017	20657.	1068.	186.	1363.	4366.	-2481.	6983.	6055.	13038.	1284.	302544.
26	2018	17489.	904.	157.	1154.	4138.	-2481.	6353.	6055.	12408.	1109.	303654.
27	2019	14320.	740.	129.	945.	3909.	-2481.	5724.	6055.	11779.	956.	304610.
28	2020	11152.	577.	100.	736.	3681.	-2481.	5094.	6055.	11149.	822.	305431.
29	2021	7983.	413.	72.	527.	3453.	-2481.	4465.	6055.	10520.	704.	306135.
30	2022	4815.	249.	43.	318.	3225.	-2481.	3835.	6055.	9890.	601.	306736.

VALUE OF "K" 1.6886 = TOTAL CUMULATIVE PRESENT WORTH FIXED CHARGE/TOTAL INSTALLED COST.

FIXED CHARGE CALCULATIONS FOR
DEVELOPMENT OF K FACTOR

PENINSULAR FLORIDA

UNIT : CT 75MW

(THOUSANDS OF DOLLARS)

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
YEAR	CALENDAR YEAR	ELECTRIC PLANT IN-SERVICE	DEBT	PREFERRED	EQUITY	TAXES	TAX CREDIT	TOTAL DEBT PREFERRED EQUITY & TAXES	STRAIGHT LINE DEPRECIATION	TOTAL FIXED CHARGES	PRESENT WORTH FIXED CHARGES	CUMULATIVE PRESENT WORTH FIXED CHARGES
1	1993	31444.	1626.	283.	2075.	3452.	369.	7436.	1705.	9141.	9141.	9141.
2	1994	29122.	1506.	262.	1922.	2561.	738.	6251.	1705.	7956.	7224.	16365.
3	1995	26947.	1393.	243.	1778.	2405.	590.	5819.	1705.	7524.	6203.	22567.
4	1996	24919.	1288.	224.	1645.	2259.	443.	5416.	1705.	7121.	5330.	27898.
5	1997	23039.	1191.	207.	1521.	2124.	295.	5043.	1705.	6748.	4586.	32483.
6	1998	21160.	1094.	190.	1397.	1988.	295.	4669.	1705.	6375.	3933.	36416.
7	1999	19427.	1004.	175.	1282.	1864.	148.	4325.	1705.	6030.	3378.	39794.
8	2000	17695.	915.	159.	1168.	1739.	148.	3981.	1705.	5686.	2892.	42686.
9	2001	15963.	825.	144.	1054.	1614.	148.	3637.	1705.	5342.	2467.	45153.
10	2002	14231.	736.	128.	939.	1490.	148.	3293.	1705.	4998.	2096.	47249.
11	2003	12498.	646.	112.	825.	1365.	148.	2949.	1705.	4654.	1772.	49020.
12	2004	10766.	557.	97.	711.	1240.	148.	2604.	1705.	4310.	1490.	50510.
13	2005	9034.	467.	81.	596.	1116.	148.	2260.	1705.	3966.	1244.	51754.
14	2006	7302.	378.	66.	482.	991.	148.	1916.	1705.	3621.	1032.	52786.
15	2007	5570.	288.	50.	368.	866.	148.	1572.	1705.	3277.	848.	53634.
16	2008	4723.	244.	43.	312.	805.	-738.	1404.	1705.	3109.	730.	54364.
17	2009	3876.	200.	35.	256.	744.	-738.	1236.	1705.	2941.	627.	54991.
18	2010	3030.	157.	27.	200.	684.	-738.	1067.	1705.	2773.	537.	55528.
19	2011	2183.	113.	20.	144.	623.	-738.	899.	1705.	2604.	458.	55986.
20	2012	1336.	69.	12.	88.	562.	-738.	731.	1705.	2436.	389.	56375.

VALUE OF "K" 1.6530 = TOTAL CUMULATIVE PRESENT WORTH FIXED CHARGE/TOTAL INSTALLED COST.

Summary of Firm Energy And Capacity Payments
To Supply Side Qualifying Facilities

Unit Type: Combined Cycle

<u>Year</u>	<u>Avoided Capital Cost \$/KW-Mo</u>	<u>Avoided O&M Cost \$/KW-Mo</u>	<u>Total Avoided Capacity Cost \$/KW-Mo</u>	<u>Avoided Unit Fuel Cost ¢/KWH</u>
1993	4.766	1.481	6.247	2.59
1994	5.082	1.564	6.646	2.90
1995	5.419	1.652	7.071	3.25
1996	5.778	1.745	7.523	3.68
1997	6.161	1.843	8.004	4.24
1998	6.570	1.947	8.517	5.21
1999	7.005	2.057	9.062	5.65
2000	7.470	2.173	9.643	6.50
2001	7.965	2.295	10.260	7.25
2002	8.493	2.424	10.917	8.24

Summary of Firm Energy And Capacity Payments
To Supply Side Qualifying Facilities

Unit Type: Coal

<u>Year</u>	<u>Avoided Capital Cost \$/KW-Mo</u>	<u>Avoided O&M Cost \$/KW-Mo</u>	<u>Total Avoided Capacity Cost \$/KW-Mo</u>	<u>Avoided Unit Fuel Cost ¢/KWH</u>
1993	11.459	4.014	15.473	2.18
1994	12.218	4.240	16.458	2.32
1995	13.028	4.479	17.507	2.47
1996	13.892	4.731	18.623	2.62
1997	14.813	4.997	19.810	2.81
1998	15.795	5.278	21.073	3.02
1999	16.843	5.576	22.419	3.24
2000	17.959	5.890	23.849	3.49
2001	19.150	6.221	25.371	3.77
2002	20.420	6.571	26.991	4.06

Summary of Firm Energy and Capacity Payments
To Supply Side Qualifying Facilities

Unit Type: Combustion Turbine

<u>Year</u>	<u>Avoided Capital Cost \$/KW-Mo</u>	<u>Avoided O&M Cost \$/KW-Mo</u>	<u>Total Avoided Capacity Cost \$/KW-Mo</u>	<u>Avoided Unit Fuel Cost ¢/KWH</u>
1993	3.349	0.192	3.541	3.97
1994	3.571	0.203	3.774	4.42
1995	3.808	0.215	4.023	4.96
1996	4.061	0.227	4.288	5.64
1997	4.330	0.240	4.570	6.55
1998	4.617	0.253	4.870	7.63
1999	4.923	0.267	5.190	8.85
2000	5.249	0.282	5.531	10.21
2001	5.597	0.298	5.895	11.43
2002	5.969	0.315	6.284	13.03

APPENDIX 1B
FORMS 1.1 THROUGH 3.3
1989 PLANNING HEARING
GENERATION EXPANSION PLANNING STUDIES
FLORIDA ELECTRIC POWER COORDINATING
GROUP, INC.

Image Quality

As you review the next group of images, Please note that the original documents were of poor quality.

FCG STUDIES FORM 1.1
DOCKET NO. 880004-EU
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NOTE: COLUMN (2) = SUM (3) THROUGH (6). COLUMN (8) = SUM (9) THROUGH (12)
COLUMN (5) & (11) ARE OF LOAD SERVED BY OF GENERATION.

PENINSULA FLORIDA
HISTORY AND FORECAST
LOW CASE

FCG STUDIES FORM 1.1
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(1)	(2)	(3) SUMMER PEAK DEMAND - (MW)			(6)	(7)	(8)	(9) WINTER PEAK DEMAND - (MW)			(12)	(13)	(14) ENERGY		(15)
YEAR	TOTAL (MW)	INTER- RUPTIBLE LOAD (MW)	LOAD MANAGEMENT (MW)	OF LOAD* (MW)	NET DEMAND (MW)	YEAR	TOTAL (MW)	INTER- RUPTIBLE LOAD (MW)	LOAD MANAGEMENT (MW)	OF LOAD* (MW)	NET DEMAND (MW)	YEAR	NET ENERGY FOR LOAD (GWH)	LOAD FACTOR (%)	
1978	16043	385	0	0	15658	1977 /78	17047	361	0	0	16686	1978	86302	59.04%	
1979	16486	373	0	0	16113	1978 /79	17539	362	0	0	17177	1979	88481	58.80%	
1980	18163	458	0	0	17705	1979 /80	19409	542	0	0	18867	1980	93664	56.67%	
1981	18798	429	0	0	18369	1980 /81	21611	488	0	3	21120	1981	96621	52.22%	
1982	18497	319	1	15	18162	1981 /82	21755	267	0	12	21476	1982	95223	50.62%	
1983	20291	378	43	80	19790	1982 /83	18732	341	28	45	18318	1983	100154	57.77%	
1984	20164	454	84	81	19545	1983 /84	20762	343	107	80	20232	1984	104044	58.70%	
1985	21995	503	126	105	21261	1984 /85	25976	489	146	105	25236	1985	112770	51.01%	
1986	23226	328	157	178	22563	1985 /86	26666	357	259	130	25920	1986	116865	51.47%	
1987	25088	511	349	180	24048	1986 /87	23231	358	290	175	22408	1987	124599	59.15%	
78-87 AAGR	5.09%				4.88%		3.50%				3.33%		4.16%		
148	1988	24180	513	394	23064	1987 /88	25955	411	564	203	24776	1988	126392	58.23%	
	1989	24658	519	472	23360	1988 /89	26651	409	752	294	25196	1989	129561	58.70%	
	1990	25215	547	574	23735	1989 /90	27363	423	884	368	25689	1990	132780	59.00%	
	1991	25726	577	661	24105	1990 /91	27979	440	1034	391	26114	1991	135960	59.43%	
	1992	26267	606	807	24463	1991 /92	28590	457	1180	399	26553	1992	139400	59.93%	
	1993	26747	622	967	24759	1992 /93	29218	471	1399	408	26941	1993	142338	60.31%	
	1994	27274	645	1123	25100	1993 /94	29887	488	1592	414	27393	1994	145208	60.51%	
	1995	27639	669	1269	25288	1994 /95	30379	508	1730	422	27719	1995	147676	60.82%	
	1996	28019	694	1391	25495	1995 /96	30896	529	1913	448	28006	1996	150229	61.24%	
	1997	28436	714	1539	25735	1996 /97	31442	550	2047	457	28388	1997	152716	61.41%	
88-97 AAGR	1.82%				1.22%		2.15%				1.52%		2.12%		
	1998	28832	740	1658	25980	1997 /98	31918	570	2201	465	28682	1998	155084	61.72%	
	1999	29117	765	1716	26174	1998 /99	32298	593	2327	473	28905	1999	157265	62.11%	
	2000	29528	788	1753	26509	1999 / 0	32822	615	2381	489	29338	2000	159854	62.20%	
	2001	29791	811	1777	26718	2000 / 1	33224	637	2419	496	29672	2001	162056	62.35%	
	2002	30152	835	1789	27039	2001 / 2	33737	657	2453	501	30126	2002	164488	62.33%	
	2003	30519	860	1799	27363	2002 / 3	34247	679	2472	508	30588	2003	166759	62.24%	
	2004	30769	880	1808	27579	2003 / 4	34624	701	2491	513	30920	2004	168882	62.35%	
	2005	31051	902	1817	27824	2004 / 5	35039	720	2508	519	31292	2005	171148	62.44%	
	2006	31394	923	1827	28132	2005 / 6	35475	737	2526	523	31689	2006	173464	62.49%	
	2007	31733	941	1837	28439	2006 / 7	35886	756	2545	527	32058	2007	175749	62.58%	
98-07 AAGR	1.07%				1.01%		1.31%				1.24%		1.40%		
88-07 AAGR	1.44%				1.11%		1.72%				1.37%		1.75%		

NOTE: COLUMN (2) = SUM (3) THROUGH (6). COLUMN (8) = SUM (9) THROUGH (12).
COLUMN (5) & (11) ARE OF LOAD SERVED BY OF GENERATION.

PENINSULA FLORIDA
HISTORY AND FORECAST
HIGH CASE

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(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
		SUMMER PEAK DEMAND (MW)						WINTER PEAK DEMAND (MW)					ENERGY	
		INTER- RUPTIBLE LOAD (MW)	LOAD MANAGEMENT (MW)	OF LOAD* (MW)	NET DEMAND (MW)			INTER- RUPTIBLE LOAD (MW)	LOAD MANAGEMENT (MW)	OF LOAD* (MW)	NET DEMAND (MW)		NET ENERGY FOR LOAD (GWH)	LOAD FACTOR (%)
YEAR	TOTAL (MW)					YEAR	TOTAL (MW)					YEAR		
1978	16043	385	0	0	15658	1977 /78	17047	361	0	0	16686	1978	86302	59.04%
1979	16486	373	0	0	16113	1978 /79	17539	362	0	0	17177	1979	88481	58.80%
1980	18163	458	0	0	17705	1979 /80	19409	542	0	0	18867	1980	93664	56.67%
1981	18798	429	0	0	18369	1980 /81	21611	488	0	3	21120	1981	96621	52.22%
1982	18497	319	1	15	18162	1981 /82	21755	267	0	12	21476	1982	95223	50.62%
1983	20291	378	43	80	19790	1982 /83	18732	341	28	45	18318	1983	100154	57.77%
1984	20164	454	84	81	19545	1983 /84	20762	343	107	80	20232	1984	104044	58.70%
1985	21995	503	126	105	21261	1984 /85	25976	489	146	105	25236	1985	112770	51.01%
1986	23226	328	157	178	22563	1985 /86	26666	357	259	130	25920	1986	116865	51.47%
1987	25088	511	349	180	24048	1986 /87	23231	358	290	175	22408	1987	124599	59.15%
78-87 AAGR	5.09%				4.88%		3.50%				3.33%		4.16%	
1988	25780	519	394	210	24657	1987 /88	26943	419	563	205	25756	1988	131892	58.46%
1989	26931	531	473	310	25616	1988 /89	28347	420	751	297	26879	1989	138559	58.85%
1990	28146	566	575	364	26641	1989 /90	29777	440	884	373	28080	1990	145355	59.09%
1991	29266	602	663	391	27610	1990 /91	31033	463	1040	397	29133	1991	151698	59.44%
1992	30433	637	812	400	28584	1991 /92	32301	485	1189	409	30217	1992	158411	59.84%
1993	31590	660	982	412	29536	1992 /93	33629	503	1416	421	31290	1993	164833	60.14%
1994	32782	689	1163	422	30509	1993 /94	35018	528	1645	431	32414	1994	171080	60.25%
1995	33836	718	1329	434	31356	1994 /95	36250	552	1843	443	33413	1995	177205	60.54%
1996	34893	749	1461	464	32220	1995 /96	37477	577	2052	473	34374	1996	183373	60.90%
1997	36018	776	1619	477	33145	1996 /97	38779	603	2206	487	35483	1997	189506	60.97%
8-97 AAGR	3.79%				3.34%		4.13%				3.62%		4.11%	
1998	37139	803	1748	488	34100	1997 /98	40005	626	2380	499	36499	1998	195524	61.15%
1999	38156	830	1812	502	35011	1998 /99	41155	650	2522	513	37469	1999	201507	61.39%
2000	39344	855	1858	524	36107	1999 / 0	42498	673	2591	535	38698	2000	208055	61.37%
2001	40331	880	1889	538	37025	2000 / 1	43688	697	2646	549	39796	2001	214032	61.40%
2002	41436	905	1909	549	38073	2001 / 2	45005	718	2696	560	41031	2002	220296	61.29%
2003	42592	931	1926	564	39171	2002 / 3	46372	742	2729	575	42326	2003	226753	61.16%
2004	43622	953	1941	576	40151	2003 / 4	47589	765	2762	587	43475	2004	232725	61.11%
2005	44668	977	1957	590	41143	2004 / 5	48840	784	2793	601	44661	2005	239032	61.10%
2006	45907	999	1974	602	42332	2005 / 6	50200	804	2824	614	45958	2006	245939	61.09%
2007	47188	1020	1991	615	43562	2006 / 7	51583	825	2857	626	47275	2007	253095	61.12%
07 AAGR	2.70%				2.76%		2.86%				2.92%		2.91%	
07 AAGR	3.25%				3.04%		3.48%				3.25%		3.49%	

NOTE: COLUMN (2) = SUM (3) THROUGH (6). COLUMN (8) = SUM (9) THROUGH (12).
COLUMN (5) & (11) ARE OF LOAD SERVED BY OF GENERATION.

PENINSULA FLORIDA
HISTORY AND FORECAST
AVOIDED UNIT CASE

FLG STUDIES FORM 1.1
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(1)	(2)	(3) SUMMER PEAK DEMAND - (MW)			(6)	(7)	(8)	(9) WINTER PEAK DEMAND - (MW)			(12)	(13)	(14) ENERGY		(15)
YEAR	TOTAL (MW)	INTER- RUPTIBLE LOAD (MW)	LOAD MANAGEMENT (MW)	OF LOAD* (MW)	NET DEMAND (MW)	YEAR	TOTAL (MW)	INTER- RUPTIBLE LOAD (MW)	LOAD MANAGEMENT (MW)	OF LOAD* (MW)	NET DEMAND (MW)	YEAR	NET ENERGY FOR LOAD (GWH)	LOAD FACTOR (%)	
1978	16043	385	0	0	15658	1977 /78	17047	361	0	0	16686	1978	86302	59.04%	
1979	16486	373	0	0	16113	1978 /79	17539	362	0	0	17177	1979	88481	58.80%	
1980	18163	458	0	0	17705	1979 /80	19409	542	0	0	18867	1980	93664	56.67%	
1981	18798	429	0	0	18369	1980 /81	21611	488	0	3	21120	1981	96621	52.22%	
1982	18497	319	1	15	18162	1981 /82	21755	267	0	12	21476	1982	95223	50.62%	
1983	20291	378	43	80	19790	1982 /83	18732	341	28	45	18318	1983	100154	57.77%	
1984	20164	454	84	81	19545	1983 /84	20762	343	107	80	20232	1984	104044	58.70%	
1985	21995	503	126	105	21261	1984 /85	25976	489	146	105	25236	1985	112770	51.01%	
1986	23226	328	157	178	22563	1985 /86	26666	357	259	130	25920	1986	116865	51.47%	
1987	25088	511	349	180	24048	1986 /87	23231	358	290	175	22408	1987	124599	59.15%	
78-87 AAGR	5.09%				4.88%		3.50%				3.33%		4.16%		
150															
1988	24889	517	394	209	23769	1987 /88	26448	417	563	204	25264	1988	129163	58.36%	
1989	25698	526	473	270	24429	1988 /89	27460	415	749	277	26019	1989	134138	58.85%	
1990	26610	582	574	275	25179	1989 /90	28532	457	883	282	26909	1990	139681	59.26%	
1991	27461	615	662	275	25909	1990 /91	29484	477	1037	282	27688	1991	144695	59.66%	
1992	28350	647	810	275	26617	1991 /92	30434	496	1186	282	28470	1992	149942	60.12%	
1993	29187	666	978	275	27267	1992 /93	31411	512	1411	282	29206	1993	154702	60.47%	
1994	30075	692	1147	275	27961	1993 /94	32452	533	1635	282	30002	1994	159410	60.65%	
1995	30823	718	1299	275	28531	1994 /95	33343	555	1794	282	30711	1995	163910	60.93%	
1996	31551	746	1424	275	29106	1995 /96	34197	577	1985	282	31353	1996	168415	61.32%	
1997	32359	769	1577	275	29738	1996 /97	35131	600	2127	282	32123	1997	172946	61.46%	
88-97 AAGR	2.96%				2.52%		3.21%				2.70%		3.30%		
1998	33140	795	1701	275	30369	1997 /98	35993	622	2291	282	32798	1998	177257	61.70%	
1999	33836	821	1763	275	30977	1998 /99	36783	645	2425	282	33431	1999	181606	62.01%	
2000	34658	845	1805	275	31733	1999 / 0	37723	668	2487	282	34286	2000	186341	62.04%	
2001	35320	869	1833	275	32343	2000 / 1	38538	690	2535	282	35030	2001	190622	62.12%	
2002	36076	893	1849	275	33059	2001 / 2	39454	711	2577	282	35884	2002	195055	62.05%	
2003	36876	918	1863	275	33820	2002 / 3	40418	734	2605	282	36797	2003	199554	61.91%	
2004	37558	940	1876	275	34467	2003 / 4	41234	756	2633	282	37564	2004	203920	61.97%	
2005	38254	962	1890	275	35127	2004 / 5	42073	775	2656	282	38360	2005	208338	62.00%	
2006	39089	983	1902	275	35929	2005 / 6	42990	794	2681	282	39234	2006	213161	62.02%	
2007	39946	1003	1915	275	36753	2006 / 7	43912	813	2707	282	40111	2007	218053	62.06%	
98-07 AAGR	2.10%				2.14%		2.23%				2.26%		2.33%		
88-07 AAGR	2.52%				2.32%		2.70%				2.46%		2.79%		

NOTE: COLUMN (2) = SUM (3) THROUGH (6). COLUMN (8) = SUM (9) THROUGH (12).
COLUMN (5) & (11) ARE OF LOAD SERVED BY OF GENERATION.

FUELS FORECAST (1988 - 2007)
(AVERAGE 1988 BASE PRICE AS OF MARCH 1, 1988)
BASE CASE OIL AND GAS PRICES

YEAR	RESIDUAL OIL (BY SULFUR CONTENT)									DISTILLATE OIL			NATURAL GAS	
	LESS THAN 0.7 %			0.7 - 2.0 %			GREATER THAN 2.0 %			\$/BBL	c/MBTU	ESCALATION %	c/MBTU	ESCALATION %
	\$/BBL	c/MBTU	ESCALATION %	\$/BBL	c/MBTU	ESCALATION %	\$/BBL	c/MBTU	ESCALATION %					
1988	17.81	283	0.00	17.06	271	0.00	15.82	251	0.00	23.37	403	0.00	205	0.00
1989	19.05	302	6.96	18.25	290	6.95	16.92	269	6.94	25.11	433	7.43	220	7.76
1990	20.37	323	6.94	19.51	310	6.94	18.09	287	6.92	26.97	465	7.41	238	8.04
1991	22.02	350	8.13	21.10	335	8.12	19.55	310	8.10	29.29	505	8.62	258	8.41
1992	24.21	384	9.92	23.19	368	9.91	21.49	341	9.88	32.35	558	10.44	292	11.04
1993	26.91	427	11.16	25.77	409	11.14	23.87	379	11.12	36.13	623	11.69	330	12.98
1994	29.84	474	10.89	28.57	454	10.87	26.46	420	10.85	40.25	694	11.41	372	12.92
1995	33.03	524	10.69	31.62	502	10.68	29.28	465	10.66	44.76	772	11.20	420	12.90
1996	36.49	579	10.48	34.93	554	10.47	32.34	513	10.45	49.68	856	10.98	468	11.41
1997	40.24	639	10.29	38.52	611	10.28	35.66	566	10.27	55.02	949	10.76	520	11.09
1998	44.20	702	9.85	42.31	672	9.84	39.17	622	9.83	60.70	1047	10.32	575	10.48
1999	47.56	755	7.59	45.52	723	7.58	42.14	669	7.58	65.57	1131	8.02	622	8.24
2000	51.13	812	7.51	48.94	777	7.51	45.30	719	7.50	70.78	1220	7.94	687	10.34
2001	54.62	867	6.83	52.28	830	6.83	48.39	768	6.83	75.91	1309	7.26	736	7.20
2002	58.35	926	6.83	55.85	887	6.83	51.69	821	6.82	81.42	1404	7.25	788	7.10
2003	62.20	987	6.59	59.53	945	6.59	55.10	875	6.59	87.13	1502	7.01	851	7.98
2004	66.21	1051	6.45	63.37	1006	6.45	58.65	931	6.45	93.11	1605	6.86	909	6.75
2005	70.35	1117	6.25	67.33	1069	6.25	62.31	989	6.24	99.30	1712	6.66	978	7.64
2006	74.61	1184	6.06	71.41	1134	6.06	66.09	1049	6.06	105.73	1823	6.47	1041	6.39
2007	79.02	1254	5.91	75.63	1201	5.91	69.99	1111	5.91	112.40	1938	6.31	1106	6.24
2008 & BEYOND	83.58	1327	5.76	79.99	1270	5.76	74.03	1175	5.76	119.32	2057	6.16	1185	7.15

NOTE: HEAT CONTENT RESIDUAL OIL : 6.30 MBTU / BBL
HEAT CONTENT DISTILLATE : 5.80 MBTU / BBL

PENINSULAR FLORIDA

FOG STUDIES FORM 1.2

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FUELS FORECAST (1988 - 2007)
(AVERAGE 1988 BASE PRICE AS OF MARCH 1, 1988)
LOW CASE OIL AND GAS PRICES

YEAR	RESIDUAL OIL (BY SULFUR CONTENT)									DISTILLATE OIL			NATURAL GAS	
	LESS THAN 0.7 %			0.7 - 2.0 %			GREATER THAN 2.0 %			\$/BBL	c/HBTU	ESCALATION %	c/HBTU	ESCALATION %
	\$/BBL	c/HBTU	ESCALATION %	\$/BBL	c/HBTU	ESCALATION %	\$/BBL	c/HBTU	ESCALATION %					
1988	14.60	232	0.00	14.04	223	0.00	13.10	208	0.00	18.01	311	0.00	192	0.00
1989	15.17	241	3.90	14.59	232	3.91	13.61	216	3.91	18.78	324	4.28	201	4.48
1990	15.78	250	4.00	15.17	241	4.00	14.16	225	4.01	19.60	338	4.38	212	5.72
1991	16.39	260	3.90	15.76	250	3.90	14.71	233	3.91	20.44	352	4.27	222	4.70
1992	17.26	274	5.27	16.59	263	5.27	15.48	246	5.27	21.60	372	5.66	236	6.17
1993	18.25	290	5.77	17.55	279	5.77	16.38	260	5.77	22.93	393	6.17	252	6.85
1994	19.33	307	5.87	18.58	295	5.87	17.34	275	5.86	24.37	420	6.26	269	6.85
1995	20.51	326	6.13	19.72	313	6.13	18.40	292	6.12	25.96	448	6.53	291	8.02
1996	21.84	347	6.49	21.00	333	6.49	19.59	311	6.48	27.74	478	6.89	312	7.37
1997	23.32	370	6.75	22.42	356	6.75	20.91	332	6.75	29.72	512	7.13	342	9.49
1998	24.89	395	6.73	23.93	380	6.73	22.32	354	6.73	31.04	549	7.12	367	7.52
1999	26.56	422	6.72	25.53	405	6.71	23.82	378	6.71	34.10	588	7.11	395	7.58
2000	28.33	450	6.68	27.24	432	6.68	25.41	403	6.67	36.51	630	7.07	430	8.70
2001	30.23	480	6.69	29.06	461	6.69	27.11	430	6.68	39.10	674	7.09	467	8.72
2002	32.25	512	6.68	31.00	492	6.68	28.92	459	6.67	41.87	722	7.08	504	7.78
2003	34.54	548	7.12	33.21	527	7.12	30.97	492	7.11	45.03	776	7.53	551	9.32
2004	36.99	587	7.09	35.56	564	7.09	33.16	526	7.08	48.40	835	7.50	607	10.18
2005	39.65	629	7.18	38.11	605	7.17	35.54	564	7.17	52.08	898	7.59	658	8.47
2006	42.48	674	7.15	40.83	648	7.14	38.08	604	7.13	56.01	966	7.56	720	9.48
2007	45.51	722	7.12	43.74	694	7.12	40.78	647	7.11	60.23	1038	7.53	781	8.48
2008 & BEYOND	48.73	773	7.08	46.83	743	7.07	43.66	693	7.07	64.73	1116	7.48	854	9.28

NOTE: HEAT CONTENT RESIDUAL OIL : 6.30 HBTU / BBL
HEAT CONTENT DISTILLATE : 5.80 HBTU / BBL

PENINSULAR FLORIDA

FUELS FORECAST (1988 - 2007)
(AVERAGE 1988 BASE PRICE AS OF MARCH 1, 1988)
HIGH CASE OIL AND GAS PRICES

FGL STUDIES FORM 1.2
PAGE 3 OF 7

YEAR	RESIDUAL OIL (BY SULFUR CONTENT)									DISTILLATE OIL			NATURAL GAS	
	LESS THAN 0.7 %			0.7 - 2.0 %			GREATER THAN 2.0 %			\$/BBL	c/MBTU	ESCALATION %	c/MBTU	ESCALATION %
	\$/BBL	c/MBTU	ESCALATION %	\$/BBL	c/MBTU	ESCALATION %	\$/BBL	c/MBTU	ESCALATION %					
1988	19.58	311	0.00	18.73	297	0.00	17.30	275	0.00	26.10	450	0.00	225	0.00
1989	21.38	339	9.18	20.44	324	9.16	18.88	300	9.12	28.69	495	9.92	247	9.96
1990	23.36	371	9.28	22.33	354	9.26	20.62	327	9.22	31.56	544	10.01	272	10.13
1991	25.49	405	9.10	24.36	387	9.09	22.49	357	9.05	34.67	598	9.84	296	8.77
1992	27.99	444	9.80	26.75	425	9.78	24.68	392	9.75	38.32	661	10.54	332	12.07
1993	30.79	489	10.01	29.42	467	10.00	27.14	431	9.96	42.44	732	10.75	368	11.03
1994	33.82	537	9.85	32.31	513	9.83	29.80	473	9.80	46.93	809	10.58	409	10.94
1995	37.11	589	9.72	35.45	563	9.71	32.68	519	9.68	51.83	894	10.45	453	10.87
1996	40.66	645	9.54	38.83	616	9.53	35.78	568	9.50	57.14	985	10.26	496	9.49
1997	44.49	706	9.44	42.49	674	9.43	39.15	621	9.41	62.94	1085	10.13	549	10.61
1998	48.61	772	9.24	46.41	737	9.23	42.76	679	9.21	69.19	1193	9.93	600	9.23
1999	52.97	841	8.97	50.56	803	8.95	46.57	739	8.93	75.87	1308	9.66	654	9.02
2000	57.56	914	8.67	54.94	872	8.66	50.60	803	8.63	82.97	1430	9.35	719	9.98
2001	62.32	989	8.27	59.48	944	8.26	54.76	869	8.24	90.39	1559	8.95	779	8.41
2002	67.35	1069	8.07	64.28	1020	8.06	59.17	939	8.04	98.30	1695	8.75	853	9.43
2003	72.61	1153	7.81	69.29	1100	7.80	63.77	1012	7.78	106.63	1839	8.48	931	9.18
2004	78.04	1239	7.48	74.46	1182	7.47	68.52	1088	7.45	115.32	1988	8.14	1003	7.69
2005	83.65	1328	7.18	79.80	1267	7.17	73.42	1165	7.15	124.36	2144	7.84	1089	8.57
2006	89.39	1419	6.87	85.28	1354	6.86	78.44	1245	6.84	133.71	2305	7.52	1166	7.11
2007	95.29	1512	6.59	90.89	1443	6.58	83.59	1327	6.56	143.38	2472	7.23	1259	7.98
2008 & BEYOND	101.32	1608	6.34	96.64	1534	6.33	88.87	1413	6.31	153.37	2644	6.97	1342	6.59

NOTE: HEAT CONTENT RESIDUAL OIL : 6.30 MBTU / BBL
HEAT CONTENT DISTILLATE : 5.80 MBTU / BBL

PERMISSIBLE FLUCTUATION
 FUEL PRICE FORECAST (1980 - 2001)
 (AVERAGE 1980 BASE PRICE AS OF MARCH 1, 1980)
 BASE CASE COAL PRICES

YEAR	\$/TON	c/HBTU	%	ESCALATION	LOW SULFUR COAL LESS THAN 1.0 %	\$/TON	c/HBTU	%	ESCALATION	MEDIUM SULFUR COAL 1.0 - 2.0 %	\$/TON	c/HBTU	%	ESCALATION	HIGH SULFUR COAL GREATER THAN 2.0 %	\$/TON	c/HBTU	%	ESCALATION
1980	47.10	186	0.00	0.00	44.53	186	0.00	0.00	43.86	179	0.00	0.00	0.00	42.79	179	0.00	0.00	0.00	0.00
1981	49.20	205	4.45	4.45	46.51	194	4.45	4.45	44.76	187	4.45	4.45	4.45	44.03	185	4.45	4.45	4.45	4.45
1982	51.46	214	4.61	4.61	48.65	203	4.61	4.61	46.03	193	4.61	4.61	4.61	45.07	194	4.61	4.61	4.61	4.61
1983	53.93	225	4.80	4.80	50.99	212	4.80	4.80	48.07	204	4.80	4.80	4.80	47.00	204	4.80	4.80	4.80	4.80
1984	56.57	236	5.16	5.16	53.92	225	5.16	5.16	51.00	216	5.16	5.16	5.16	49.92	216	5.16	5.16	5.16	5.16
1985	59.30	252	6.10	6.10	57.36	239	6.10	6.10	55.12	230	6.10	6.10	6.10	52.76	230	6.10	6.10	6.10	6.10
1986	62.16	268	6.31	6.31	60.68	254	6.31	6.31	58.58	244	6.31	6.31	6.31	55.90	244	6.31	6.31	6.31	6.31
1987	65.16	284	6.45	6.45	64.01	270	6.45	6.45	62.37	260	6.45	6.45	6.45	60.50	260	6.45	6.45	6.45	6.45
1988	68.30	305	6.62	6.62	67.09	288	6.62	6.62	65.50	277	6.62	6.62	6.62	63.92	277	6.62	6.62	6.62	6.62
1989	71.59	325	6.65	6.65	70.69	307	6.65	6.65	69.02	295	6.65	6.65	6.65	67.45	295	6.65	6.65	6.65	6.65
1990	75.04	346	6.67	6.67	74.60	327	6.67	6.67	72.65	315	6.67	6.67	6.67	71.07	315	6.67	6.67	6.67	6.67
1991	78.66	368	6.76	6.76	78.50	348	6.76	6.76	76.37	335	6.76	6.76	6.76	74.92	335	6.76	6.76	6.76	6.76
1992	82.36	391	6.78	6.78	82.35	370	6.78	6.78	80.42	356	6.78	6.78	6.78	78.92	356	6.78	6.78	6.78	6.78
1993	86.14	415	6.11	6.11	86.17	392	6.11	6.11	84.19	378	6.11	6.11	6.11	82.19	378	6.11	6.11	6.11	6.11
1994	90.01	440	6.13	6.13	90.04	416	6.13	6.13	88.19	401	6.13	6.13	6.13	86.19	401	6.13	6.13	6.13	6.13
1995	93.96	468	6.17	6.17	93.99	442	6.17	6.17	91.92	426	6.17	6.17	6.17	89.92	426	6.17	6.17	6.17	6.17
1996	98.00	496	6.17	6.17	98.03	469	6.17	6.17	95.92	452	6.17	6.17	6.17	93.92	452	6.17	6.17	6.17	6.17
1997	102.12	527	6.16	6.16	102.15	498	6.16	6.16	98.92	480	6.16	6.16	6.16	96.92	480	6.16	6.16	6.16	6.16
1998	106.32	560	6.17	6.17	106.35	529	6.17	6.17	102.92	509	6.17	6.17	6.17	100.92	509	6.17	6.17	6.17	6.17
1999	110.60	596	6.18	6.18	110.63	562	6.18	6.18	106.92	541	6.18	6.18	6.18	104.92	541	6.18	6.18	6.18	6.18
2000	114.97	631	6.22	6.22	114.99	597	6.22	6.22	110.94	576	6.22	6.22	6.22	108.94	576	6.22	6.22	6.22	6.22
2001	119.40	668	6.20	6.20	119.42	632	6.20	6.20	114.92	611	6.20	6.20	6.20	112.92	611	6.20	6.20	6.20	6.20
2002	123.89	707	6.19	6.19	123.91	667	6.19	6.19	118.92	646	6.19	6.19	6.19	116.92	646	6.19	6.19	6.19	6.19
2003	128.44	748	6.16	6.16	128.46	702	6.16	6.16	122.92	681	6.16	6.16	6.16	120.92	681	6.16	6.16	6.16	6.16
2004	133.05	791	6.16	6.16	133.07	737	6.16	6.16	126.92	716	6.16	6.16	6.16	124.92	716	6.16	6.16	6.16	6.16
2005	137.72	836	6.16	6.16	137.74	772	6.16	6.16	130.92	751	6.16	6.16	6.16	128.92	751	6.16	6.16	6.16	6.16
2006	142.45	882	6.17	6.17	142.47	807	6.17	6.17	134.92	796	6.17	6.17	6.17	132.92	796	6.17	6.17	6.17	6.17
2007	147.24	929	6.17	6.17	147.26	842	6.17	6.17	138.92	831	6.17	6.17	6.17	136.92	831	6.17	6.17	6.17	6.17
2008 & BEYOND	152.08	976	6.22	6.22	152.10	877	6.22	6.22	142.92	866	6.22	6.22	6.22	140.92	866	6.22	6.22	6.22	6.22

YEAR	LOW SULFUR COAL LESS THAN 1.0 % SULFUR	MEDIUM SULFUR COAL 1.0 - 2.0 % SULFUR	HIGH SULFUR COAL GREATER THAN 2.0 % SULFUR
1988	41.54	41.16	39.61
1989	44.98	42.52	40.93
1990	46.46	44.13	42.48
1991	48.45	45.81	44.09
1992	50.73	47.96	46.16
1993	53.22	50.10	48.49
1994	56.09	52.03	51.06
1995	59.16	55.03	53.81
1996	62.47	59.06	56.86
1997	66.04	62.44	60.09
1998	69.89	66.08	63.60
1999	73.96	69.92	67.30
2000	78.29	74.02	71.24
2001	83.05	78.31	75.56
2002	88.01	82.71	80.76
2003	93.19	88.29	86.97
2004	99.15	93.74	92.22
2005	105.29	99.54	98.81
2006	111.84	105.74	105.77
2007	118.87	112.38	110.16
2008 & BEYOND	126.17	119.47	116.99

NOTE: HEAT CONTENT OF COAL : 14,000 BTU / TON

PULPES FORECAST (1988 - 2007)
(AVERAGE 1988 BASE PRICE AS OF MARCH 1, 1988)
LOW CASE COAL PRICES

PENNSYLVANIA FLORIDA
FUELS FORECAST (1988 - 2001)
(AVERAGE 1988 BASE PRICE AS OF MARCH 1, 1988)
HIGH CASE COAL PRICES

YEAR	LOW SULFUR COAL LESS THAN 1.0 % \$/TON c/MBTU	ESCALATION %	MEDIUM SULFUR COAL 1.0 - 2.0 % \$/TON c/MBTU	ESCALATION %	HIGH SULFUR COAL GREATER THAN 2.0 % \$/TON c/MBTU	ESCALATION %
1988	49.20	0.00	46.50	194	44.84	187
1989	51.91	5.36	49.08	204	47.24	197
1990	54.83	5.63	51.84	216	49.89	208
1991	57.90	5.60	54.74	228	52.49	220
1992	61.62	6.42	58.26	243	56.07	234
1993	65.72	6.67	62.14	259	59.81	249
1994	70.22	6.83	66.19	277	63.90	266
1995	75.11	6.96	71.01	296	68.24	285
1996	80.10	7.02	75.99	317	72.14	305
1997	85.05	7.05	81.35	339	76.10	326
1998	90.19	7.14	87.14	363	80.89	350
1999	95.71	7.06	93.12	389	86.02	374
2000	105.69	7.07	99.92	416	96.17	401
2001	113.01	6.93	106.84	445	102.83	428
2002	120.80	6.89	114.21	476	109.92	458
2003	129.15	6.91	122.10	509	117.32	490
2004	138.03	6.87	130.50	544	125.60	523
2005	147.47	6.84	139.42	581	134.18	559
2006	157.51	6.81	148.91	620	143.32	597
2007	168.23	6.81	159.05	663	153.08	638
2008 & BEYOND	179.68	6.81	169.87	708	163.50	681

NOTE: HEAT CONTENT OF COAL : 26.00 MBTU / TON

PENINSULAR FLORIDA
 FUELS FORECAST (1988 - 2007)
 AS OF MARCH 1, 1988

POG STUDIES FORM 1-2
 PAGE 1 OF 1

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NUCLEAR			FIRM PURCHASES		
YEAR	c/MBTU	ESCALATION %	\$/MBtu	ESCALATION %	
1988	65.00	0.00	20.41	0.00	
1989	67.73	4.20	21.32	4.45	
1990	70.64	4.30	22.30	4.61	
1991	73.61	4.20	23.37	4.80	
1992	77.22	4.90	24.72	5.76	
1993	81.15	5.09	26.25	6.19	
1994	85.37	5.10	27.90	6.31	
1995	89.50	5.31	29.70	6.45	
1996	94.66	5.79	31.67	6.62	
1997	99.68	5.30	33.77	6.65	
1998	104.96	5.30	36.03	6.67	
1999	110.42	5.20	38.27	6.26	
2000	116.16	5.20	40.68	6.28	
2001	122.09	5.11	43.16	6.11	
2002	128.32	5.10	45.81	6.13	
2003	134.86	5.10	48.63	6.17	
2004	141.76	5.10	51.64	6.17	
2005	148.97	5.10	54.82	6.16	
2006	156.56	5.09	58.20	6.17	
2007	164.55	5.10	61.80	6.19	
2008 & BEYOND	173.94	5.10	65.64	6.22	

PENINSULAR FLORIDA

ECONOMIC ASSUMPTIONS

CASE: LONG RANGE PLANNING STUDY

AFUDC RATE:

11.82 %

CAPITALIZATION RATIOS:

DEBT	44 %
PREFERRED	9 %
EQUITY	47 %

RATE OF RETURN:

DEBT	9.9 %
PREFERRED	8.8 %
EQUITY	14.2 %

INCOME TAX RATE:

STATE	5.5 %
FEDERAL	34 %
EFFECTIVE	37.63 %

OTHER TAX RATE:

1.5 %

DISCOUNT RATE:

10.18 %

TAX DEPRECIATION LIFE:

20 YEARS

PENINSULAR FLORIDA

ECONOMIC ASSUMPTIONS

CASE: AVOIDED UNIT STUDY

AFUDC RATE:

11.82 %

CAPITALIZATION RATIOS:

DEBT	44 %
PREFERRED	9 %
EQUITY	47 %

RATE OF RETURN:

DEBT	9.9 %
PREFERRED	8.8 %
EQUITY	14.2 %

INCOME TAX RATE:

STATE	5.5 %
FEDERAL	34 %
EFFECTIVE	37.63 %

OTHER TAX RATE:

1.5 %

DISCOUNT RATE:

10.18 %

TAX DEPRECIATION LIFE:

20 YEARS

PENINSULAR FLORIDA

ECONOMIC ESCALATION ASSUMPTIONS

YEAR	GENERAL INFLATION %	PLANT CONSTRUCTION COST %	FIXED O & M COST %	VARIABLE O & M COST %
-----	-----	-----	-----	-----
1988	4.2	3.8	4.4	4.4
1989	4.2	4.0	4.3	4.3
1990	4.3	4.4	4.3	4.3
1991	4.2	4.8	4.3	4.3
1992	4.9	5.1	5.1	5.1
1993	5.1	5.5	5.3	5.3
1994	5.2	5.6	5.4	5.4
1995	5.3	5.6	5.5	5.5
1996	5.3	5.8	5.6	5.6
1997	5.3	5.7	5.6	5.6
1998	5.3	5.6	5.6	5.6
1999	5.2	5.5	5.5	5.5
2000	5.2	5.5	5.5	5.5
2001	5.1	5.4	5.5	5.5
2002	5.1	5.5	5.5	5.5
2003	5.1	5.6	5.5	5.5
2004	5.1	5.7	5.5	5.5
2005	5.1	5.6	5.4	5.4
2006	5.1	5.6	5.4	5.4
2007	5.1	5.6	5.4	5.4
2008 & BEYOND	5.1	5.6	5.4	5.4

SOURCE : I.O.U.'s AVERAGE ASSUMPTIONS

FCG STUDIES FORM 1.4

"AVOIDED UNIT"

PLANT NAME (TYPE): COMB CYCLE
NET CAPACITY (MW): 220.0
BOOK LIFE (YEARS): 30.0

INSTALLED COST (IN-SERVICE YEAR 1992.)

TOTAL INSTALLED COST (\$/KW):	643.5
DIRECT CONSTRUCTION COST (\$/KW-BB):	470.0
AFUDC AMOUNT (\$/KW):	120.8
ESCALATION (\$/KW):	52.7
FIXED O & M (\$/KW-YR) 1992:	8.94
VARIABLE O & M (\$/MWH) 1992:	2.27
ASSUMED CAPACITY FACTOR (%):	90.30

K FACTOR ** 1.4499

* TOTAL INSTALLED COST=DIRECT CONSTRUCTION COST + AFUDC + ESCALATION

** K FACTOR DEVELOPED ON FORM 3.2

UNIT TYPE: COMB TURB.

PLANT NAME (TYPE): COMB TURB.
NET CAPACITY (MW): 75.0
BOOK LIFE (YEARS): 20.0

INSTALLED COST (IN-SERVICE YEAR 1992.)

TOTAL INSTALLED COST (\$/KW)*:	373.0
DIRECT CONSTRUCTION COST (\$/KW-88):	283.0
AFUDC AMOUNT (\$/KW) :	49.9
ESCALATION (\$/KW) :	40.1
FIXED O & M (\$/KW-YR) 1992.:	0.60
VARIABLE O & M (\$/MWH) 1992.:	5.37
ASSUMED CAPACITY FACTOR (%):	10.00

K FACTOR ** 1.4310

* TOTAL INSTALLED COST=DIRECT CONSTRUCTION COST + AFUDC + ESCALATION

** K FACTOR DEVELOPED ON FORM 3.2

UNIT TYPE: COMB CYCLE

PLANT NAME (TYPE): COMB CYCLE
NET CAPACITY (MW): 220.0
BOOK LIFE (YEARS): 30.0

INSTALLED COST (IN-SERVICE YEAR 1992.)

TOTAL INSTALLED COST (\$/KW)**:	643.5
DIRECT CONSTRUCTION COST (\$/KW-88):	470.0
AFUDC AMOUNT (\$/KW):	120.8
ESCALATION (\$/KW):	52.7
FIXED O & M (\$/KW-YR) 1992.:	8.94
VARIABLE O & M (\$/MWH) 1992.:	2.27
ASSUMED CAPACITY FACTOR (%):	90.30

K FACTOR ** 1.4499

* TOTAL INSTALLED COST=DIRECT CONSTRUCTION COST + AFUDC + ESCALATION

** K FACTOR DEVELOPED ON FORM 3.2

UNIT TYPE: - COAL -

PLANT NAME (TYPE): - COAL -
NET CAPACITY (MW): 500.0
BOOK LIFE (YEARS): 30.0

INSTALLED COST (IN-SERVICE YEAR 1995.)

TOTAL INSTALLED COST (\$/KW)*:	1663.4
DIRECT CONSTRUCTION COST (\$/KW-88):	1023.0
AFUDC AMOUNT (\$/KW) :	371.3
ESCALATION (\$/KW) :	269.1
FIXED O & M (\$/KW-YR) 1995.:	29.74
VARIABLE O & M (\$/MWH) 1995.:	6.42
ASSUMED CAPACITY FACTOR (%):	71.20

K FACTOR ** 1.4499

* TOTAL INSTALLED COST=DIRECT CONSTRUCTION COST + AFUDC + ESCALATION

** K FACTOR DEVELOPED ON FORM 3.2

UTILITY: PENINSULAR FLORIDA
SUMMARY OF NEW UNIT ADDITIONS
AVOIDED UNIT CASE

(1)	(2)	(3)	(4)	(5)	(6)
				NET CAPABILITY	
			CONSTRUCTION		
			START	SUMMER	WINTER
			MO/YR	(MW)	(MW)
YEAR	UNIT TYPE	FUEL			
1992	CC(3)	GAS/OIL	1/1988	660	660
1993	CC(5)	GAS/OIL	1/1989	1100	1100
1994	CC(3)	GAS/OIL	1/1990	660	660
1994	CT	OIL	1/1991	75	75
1995	COAL	COAL	1/1986	500	500
1995	CC(2)	GAS/OIL	1/1991	440	440
1995	CT(2)	OIL	1/1992	150	150

NOTE: NUMBER IN BRACKETS AFTER UNIT TYPE INDICATES
THE NUMBER OF THAT TYPE OF UNIT INSTALLED PER YEAR.

UTILITY: PENINSULAR FLORIDA
SUMMARY OF NEW UNIT ADDITIONS
LONG RANGE PLANNING STUDY

(1)	(2)	(3)	(4)	(5)	(6)
			CONSTRUCTION	NET CAPABILITY	
			START	SUMMER	WINTER
YEAR	UNIT TYPE	FUEL	MO/YR	(MW)	(MW)
1992	CC	GAS/OIL	1/1988	220	220
1993	CC(4)	GAS/OIL	1/1989	880	880
1993	CT(2)	OIL	1/1990	150	150
1994	CC(4)	GAS/OIL	1/1990	880	880
1995	CC(3)	GAS/OIL	1/1991	660	660
1995	CT(3)	OIL	1/1992	225	225

NOTE: NUMBER IN BRACKETS AFTER UNIT TYPE INDICATES
THE NUMBER OF THAT TYPE OF UNIT INSTALLED PER YEAR.

UTILITY: PENINSULAR FLORIDA
 SUMMARY OF CAPACITY, DEMAND, AND RESERVE MARGIN
 AT TIME OF SUMMER PEAK
 LONG RANGE PLANNING STUDY

FCG STUDIES FORM 2.2
 PAGE 1 OF 2

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
YEAR	INSTALLED CAPACITY		CONTRACTED FIRM INTERCHANGE (MW)	PROJECTED FIRM NET TO GRID FROM QF (MW)	TOTAL AVAILABLE CAPACITY (MW)	COINCIDENT FIRM PEAK DEMAND (MW)	RESERVE MARGIN		ANNUAL ISOLATED LOLP	ANNUAL ISOLATED LOLM	ANNUAL ISOLATED EUE	ANNUAL ASSISTED LOLP	ANNUAL ASSISTED LOLM	ANNUAL ASSISTED EUE
	EXISTING & CERTIFIED	GENERIC ADDITIONS					(MW)	% OF PEAK						
1986	29235	0	2400	182	31817	23769	8048	34	0.200	0.810	0.644	0.017	0.052	0.045
1989	29694	0	2400	192	32286	24391	7895	32	0.306	1.456	0.806	0.021	0.073	0.071
1990	29928	0	2400	375	32703	25120	7583	30	0.492	2.488	1.441	0.041	0.159	0.163
1991	30147	0	2400	389	32936	25824	7112	28	0.718	3.777	2.275	0.081	0.302	0.324
1992	30400	220	2400	539	33559	26524	7035	27	0.812	4.423	2.725	0.094	0.396	0.461
1993	30426	1250	1500	770	33946	27165	6781	25	0.540	3.332	1.862	0.099	0.527	0.448
1994	30425	2130	1250	801	34606	27851	6755	24	0.366	2.344	1.259	0.089	0.450	0.323
1995	30671	3015	1200	822	35708	28411	7297	26	0.317	1.788	0.948	0.094	0.401	0.269
1996	30619	3735	1200	863	36417	28959	7458	26	0.270	1.621	0.970	0.091	0.483	0.320
1997	30618	4605	1200	874	37297	29580	7717	26	0.258	1.705	0.923	0.084	0.468	0.317
1998	30581	5400	1200	895	38076	30203	7873	26	0.226	1.472	0.798	0.073	0.408	0.277
1999	30567	5930	1200	926	38623	30800	7823	25	0.277	1.827	1.006	0.094	0.495	0.346
2000	30124	6990	1200	947	39161	31538	7823	25	0.212	1.688	1.066	0.088	0.583	0.412
2001	30162	7785	1200	963	40110	32139	7971	25	0.203	1.881	1.080	0.099	0.616	0.441
2002	30152	8845	1200	994	41191	32846	8345	25	0.158	1.413	0.823	0.077	0.530	0.375
2003	30099	9905	1200	1015	42219	33597	8622	26	0.134	1.183	0.704	0.076	0.472	0.339
2004	30099	10700	1200	1036	43035	34236	8799	26	0.136	1.180	0.724	0.077	0.490	0.363
2005	30029	11495	1200	1057	43781	34886	8895	25	0.144	1.201	0.755	0.078	0.510	0.388
2006	30018	12555	1200	1068	44841	35680	9161	26	0.125	1.005	0.637	0.075	0.442	0.336
2007	29936	13350	1200	1079	45565	36497	9068	25	0.153	1.327	0.876	0.091	0.610	0.486

NOTE: COLUMN (5) IS THE SUM OF COLUMNS (3) OF INDIVIDUAL UTILITY FORMS 6.4 & 6.5, PAGE 2, BY YEAR.

UTILITY: PENINSULAR FLORIDA

POG STUDIES FORM 2.2
PAGE 2 OF 2

SUMMARY OF CAPACITY, DEMAND, AND RESERVE MARGIN
AT TIME OF WINTER PEAK
LONG RANGE PLANNING STUDY

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
YEAR	INSTALLED CAPACITY		CONTRACTED FIRM INTERCHANGE (MW)	PROJECTED FIRM NET TO GRID FROM QF (MW)	TOTAL AVAILABLE CAPACITY (MW)	COINCIDENT FIRM PEAK DEMAND (MW)	RESERVE MARGIN	
	EXISTING & CERTIFIED	GENERIC ADDITIONS					(MW)	% OF PEAK
1987 / 88	29460	0	2400	62	31922	25264	6658	26
1988 / 89	30746	0	2400	182	33328	26000	7328	28
1989 / 90	31056	0	2400	247	33703	26847	6856	26
1990 / 91	31225	0	2400	387	34012	27602	6410	23
1991 / 92	31431	220	2400	399	34450	28374	6076	21
1992 / 93	31530	1250	2000	729	35509	29100	6409	22
1993 / 94	31593	2130	1700	780	36203	29888	6315	21
1994 / 95	31577	3015	1450	811	36853	30587	6266	20
1995 / 96	31819	3735	1200	832	37586	31202	6384	20
1996 / 97	31785	4605	1200	873	38463	31961	6502	20
1997 / 98	31751	5400	1200	884	39235	32626	6609	20
1998 / 99	31731	5930	1200	915	39776	33248	6528	20
1999 / 0	31480	6990	1200	946	40616	34084	6532	19
2000 / 1	31346	7785	1200	967	41298	34819	6479	19
2001 / 2	31315	8845	1200	983	42343	35665	6678	19
2002 / 3	31247	9905	1200	1014	43366	36567	6799	19
2003 / 4	31247	10700	1200	1035	44182	37326	6856	18
2004 / 5	31247	11495	1200	1056	44998	38112	6886	18
2005 / 6	31165	12555	1200	1077	45997	38978	7019	18
2006 / 7	31083	13350	1200	1088	46721	39847	6874	17

NOTE: COLUMN (5) IS THE SUM OF COLUMNS (4) OF INDIVIDUAL UTILITY FORMS 6.4 & 6.5, PAGE 2, BY YEAR.

UTILITY: PENINSULAR FLORIDA

FCG STUDIES FORM 2.2

PAGE 1 OF 2

SUMMARY OF CAPACITY, DEMAND, AND RESERVE MARGIN
AT TIME OF SUMMER PEAK
AVOIDED UNIT STUDY

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
YEAR	INSTALLED CAPACITY		CONTRACTED FIRM INTERCHANGE (MW)	PROJECTED FIRM NET TO GRID FROM QF (MW)	TOTAL AVAILABLE CAPACITY (MW)	COINCIDENT FIRM PEAK DEMAND (MW)	RESERVE MARGIN		ANNUAL ISOLATED LOLP	ANNUAL ISOLATED LOLM	ANNUAL ISOLATED RUE	ANNUAL ASSISTED LOLP	ANNUAL ASSISTED LOLM	ANNUAL ASSISTED RUE
	EXISTING & CERTIFIED	GENERIC ADDITIONS					(MW)	% OF PEAK						
1988	29135	0	2400	172	31807	23769	8038	34	0.202	0.820	0.450	0.017	0.052	0.045
1989	29694	0	2400	172	32266	24429	7837	32	0.326	1.560	0.868	0.022	0.080	0.078
1990	29928	0	2400	323	32651	25179	7472	30	0.548	2.776	1.627	0.049	0.187	0.197
1991	30147	0	2400	323	32870	25909	6961	27	0.812	4.288	2.616	0.091	0.361	0.396
1992	30400	440	2400	323	33783	26617	7166	27	0.643	3.515	2.107	0.067	0.275	0.303
1993	30426	1760	1500	323	34009	27267	6742	25	0.487	2.697	1.485	0.081	0.405	0.335
1994	30425	2495	1250	323	34493	27961	6532	23	0.440	2.484	1.338	0.099	0.480	0.347
1995	30671	3585	1200	323	35779	28531	7248	25	0.331	1.829	0.969	0.095	0.410	0.275
1996	30619	4645	1200	323	36787	29106	7681	26	0.234	1.370	0.715	0.077	0.351	0.228
1997	30618	5440	1200	323	37581	29738	7843	26	0.231	1.321	0.701	0.074	0.352	0.233
1998	30581	5970	1200	323	38074	30369	7705	25	0.302	1.737	0.947	0.098	0.484	0.330
1999	30567	6765	1200	323	38855	30977	7878	25	0.268	1.546	0.838	0.093	0.409	0.281
2000	30724	7825	1200	323	39572	31733	7839	25	0.213	1.678	0.935	0.088	0.508	0.353
2001	30162	8620	1200	323	40305	32343	7962	25	0.210	1.723	0.978	0.097	0.555	0.392
2002	30152	9680	1200	323	41355	33059	8296	25	0.170	1.349	0.777	0.078	0.499	0.348
2003	30099	10740	1200	323	42362	33820	8542	25	0.148	1.166	0.687	0.084	0.459	0.326
2004	30099	11535	1200	323	43157	34467	8690	25	0.154	1.196	0.726	0.088	0.490	0.360
2005	30029	12330	1200	323	43882	35127	8755	25	0.168	1.255	0.783	0.096	0.527	0.400
2006	30018	13390	1200	323	44931	35929	9002	25	0.147	1.063	0.670	0.087	0.463	0.352
2007	29936	14450	1200	323	45909	36753	9156	25	0.131	1.017	0.651	0.074	0.455	0.350

NOTE: COLUMN (5) IS THE SUM OF COLUMNS (3) OF INDIVIDUAL UTILITY FORMS 6.4 & 6.5, PAGE 2, BY YEAR.

UTILITY: PENINSULAR FLORIDA

SUMMARY OF CAPACITY, DEMAND, AND RESERVE MARGIN
AT TIME OF WINTER PEAK
AVOIDED UNIT STUDY

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
YEAR	EXISTING & ADDED CAPACITY	CONTRACTED FIRM INTERCHANGE	FIRM DEMAND FROM GRID	KEY TO GRID AVAILABLE FIRM PEAK	TOTAL COINCIDENT DEMAND	RESERVE MARGIN	(NM)	% OF PEAK
1987/88	29,600	0	2,400	62	31,922	25,264	6,658	26
1988/89	30,456	0	2,400	172	33,318	26,019	7,299	28
1989/90	31,056	0	2,400	323	33,779	26,910	6,869	26
1990/91	31,225	0	2,400	323	33,948	27,689	6,259	23
1991/92	31,931	660	2,400	323	34,816	28,470	6,346	22
1992/93	31,930	1,760	2,000	323	35,613	29,206	6,407	22
1993/94	31,993	2,495	1,700	323	36,111	30,002	6,109	20
1994/95	31,977	3,585	1,450	323	36,935	30,711	6,224	20
1995/96	31,819	4,645	1,200	323	37,687	31,353	6,334	21
1996/97	31,785	5,460	1,200	323	38,748	32,123	6,625	21
1997/98	31,751	5,970	1,200	323	39,746	32,798	6,948	20
1998/99	31,731	6,765	1,200	323	40,019	33,431	6,588	20
1999/00	31,680	7,825	1,200	323	40,828	34,286	6,542	19
2000/01	31,546	8,620	1,200	323	41,489	35,050	6,439	18
2001/02	31,315	9,680	1,200	323	42,518	35,884	6,634	18
2002/03	31,247	10,740	1,200	323	43,510	36,797	6,713	18
2003/04	31,247	11,535	1,200	323	44,305	37,564	6,741	18
2004/05	31,247	12,330	1,200	323	45,100	38,360	6,740	18
2005/06	31,165	13,190	1,200	323	46,078	39,234	6,844	17
2006/07	31,083	14,450	1,200	323	47,056	40,113	6,943	17

NOTE: COLUMN (5) IS THE SUM OF COLUMNS (4) OF INDIVIDUAL UTILITY FORMS 6.4 & 6.5, PAGE 2, BY YEAR.

FORECAST: INTERCHANGE AND GENERATION BY FUEL TYPE - GWH
(LONG RANGE PLANNING STUDY)

		--- ACTUAL ---		1988	1989	1990	1991	1992	1993	1994	1995
		1986	1987								
INTERCHNG	GWH	14066	18668	15179	16797	18568	19317	19826	19788	19274	19687
NUCLEAR	GWH	23563	18664	27062	26038	24753	26323	26673	23856	27022	26038
COAL	GWH	32117	47015	52978	55955	56796	56738	57162	57893	57523	57687
HO - TOT	GWH	29175	21038	10749	11222	14345	16182	18452	22899	23922	27426
STEAM	GWH	29175	21038	10585	11027	14069	15885	18108	22560	23606	27130
CC	GWH	0	0	146	176	221	227	235	245	244	220
CT	GWH	0	0	17	19	54	70	110	94	72	76
DIESEL	GWH	0	0	0	0	0	0	0	0	0	0
LO - TOT	GWH	374	304	51	59	111	152	284	277	431	1035
STEAM	GWH	0	0	0	0	0	0	0	0	0	0
CC	GWH	0	5	3	4	6	6	9	10	220	821
CT	GWH	374	299	38	43	88	128	247	236	185	188
DIESEL	GWH	0	0	10	12	18	19	29	32	26	26
NG - TOT	GWH	17020	16853	20661	20851	20610	20959	20950	23086	24091	24634
STEAM	GWH	14057	14146	18349	18503	18302	18626	17012	13310	8762	6353
CC	GWH	2515	2515	2270	2267	2199	2214	3803	9727	15300	18265
CT	GWH	448	192	41	81	110	119	134	49	29	17
DIESEL	GWH	0	0	0	0	0	0	0	0	0	0
HYDRO	GWH	224	215	244	244	244	244	244	244	244	244
COG & SPP	GWH	327	2477	2208	2783	3621	3988	5501	5752	5948	6144
OTHER	GWH	0	0	0	0	0	0	0	0	0	0
NEL	GWH	116866	125234	129132	133949	139049	143905	149094	153796	158456	162897

FORECAST: INTERCHANGE AND GENERATION BY FUEL TYPE - % OF GWH
(LONG RANGE PLANNING STUDY)

		-----ACTUAL-----									
		1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
INTERCHNG	%	12.04	14.91	11.75	12.54	13.35	13.42	13.30	12.87	12.16	12.09
NUCLEAR	%	20.16	14.90	20.96	19.44	17.80	18.29	17.89	15.51	17.05	15.98
COAL	%	27.48	37.54	41.03	41.77	40.85	39.43	38.34	37.64	36.30	35.41
HO - TOT	%	24.96	16.80	8.32	8.38	10.32	11.24	12.38	14.89	15.10	16.84
STEAM	%	24.96	16.80	8.20	8.23	10.12	11.04	12.15	14.67	14.90	16.65
CC	%	0.00	0.00	0.11	0.13	0.16	0.16	0.16	0.16	0.15	0.13
CT	%	0.00	0.00	0.01	0.01	0.04	0.05	0.07	0.06	0.05	0.05
DIESEL	%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LO - TOT	%	0.32	0.24	0.04	0.04	0.08	0.11	0.19	0.18	0.27	0.64
STEAM	%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CC	%	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.14	0.50
CT	%	0.32	0.24	0.03	0.03	0.06	0.09	0.17	0.15	0.12	0.12
DIESEL	%	0.00	0.00	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.02
NG - TOT	%	14.56	13.46	16.00	15.57	14.82	14.56	14.05	15.01	15.20	15.12
STEAM	%	12.03	11.30	14.21	13.81	13.16	12.94	11.41	8.65	5.53	3.90
CC	%	2.15	2.01	1.76	1.69	1.58	1.54	2.55	6.32	9.66	11.21
CT	%	0.38	0.15	0.03	0.06	0.08	0.08	0.09	0.03	0.02	0.01
DIESEL	%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
HYDRO	%	0.19	0.17	0.19	0.18	0.18	0.17	0.16	0.16	0.15	0.15
COG & SPP	%	0.28	1.98	1.71	2.08	2.60	2.77	3.69	3.74	3.75	3.77
OTHER	%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NEL	%	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

HISTORY AND FORECAST FUEL REQUIREMENTS
(LONG RANGE PLANNING STUDY)--- ACTUAL ---
1986 1987

			1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
NUCLEAR	10E12 BTU	0	0	293	282	268	286	289	259	293	282	
COAL	10E3 TON	0	0	21479	22626	22978	22964	23136	23413	23269	23339	
HO - TOT	10E3 BBL	0	0	17221	17980	23091	26057	29921	37120	38841	44237	
STEAM	10E3 BBL	0	0	16968	17678	22631	25544	29286	36515	38297	43717	
CC	10E3 BBL	0	0	202	244	305	313	324	338	337	304	
CT	10E3 BBL	0	0	51	58	155	200	311	267	207	216	
DIESEL	10E3 BBL	0	0	0	0	0	0	0	0	0	0	
LO - TOT	10E3 BBL	0	0	198	222	369	489	840	774	966	1934	
STEAM	10E3 BBL	0	0	74	76	83	83	91	77	77	80	
CC	10E3 BBL	0	0	6	8	10	11	16	19	358	1320	
CT	10E3 BBL	0	0	98	114	237	354	670	610	477	478	
DIESEL	10E3 BBL	0	0	21	25	39	41	63	68	55	56	
NG - TOT	10E6 CF	0	0	207331	209805	207708	211518	209564	220079	219956	219947	
STEAM	10E6 CF	0	0	184649	186401	184501	187959	172331	134607	88298	64299	
CC	10E6 CF	0	0	22060	22041	21408	21578	34977	84747	131237	155435	
CT	10E6 CF	0	0	622	1362	1799	1981	2256	725	421	212	
DIESEL	10E6 CF	0	0	0	0	0	0	0	0	0	0	
OTHER	10E6 BTU	0	0	0	0	0	0	0	0	0	0	
AVERAGE ANNUAL NET FOSSIL HR BTU/KWH		0	0	9859	9847	9871	9887	9894	9796	9708	9658	

PENINSULAR FLORIDA

FCG STUDIES FORM 3.1

PAGE 1 OF 3

FINANCIAL ASSUMPTIONS
FOR THE DEVELOPMENT OF K FACTOR
UNIT: COMBUSTION TURBINE

CAPITALIZATION RATIOS:

DEBT: 44 %
PREFERRED: 9 %
EQUITY: 47 %

RATE OF RETURN:

DEBT: 9.9 %
PREFERRED: 8.8 %
EQUITY: 14.2 %

TAX RATE: 37.63 %
AFUDC: 11.82 %
DISCOUNT RATE: 10.18 %
BOOK LIFE: 20 YEAR
START YEAR FOR
CONSTRUCTION: 1989
IN-SERVICE YEAR: 1992

CONSTRUCTION SPENDING CURVE

YEAR	% CONSTRUCTION EXPENDITURES *
-8	0 %
-7	0 %
-6	0 %
-5	0 %
-4	0 %
-3	2 %
-2	73 %
-1	25 %
0	0 %

* To be applied to direct construction costs.

PENINSULAR FLORIDA

FCG STUDIES FORM 3.1

PAGE 2 OF 3

FINANCIAL ASSUMPTIONS
FOR THE DEVELOPMENT OF K FACTOR
UNIT: COMBINED CYCLE

CAPITALIZATION RATIOS:

DEBT: 44 %
PREFERRED: 9 %
EQUITY: 47 %

RATE OF RETURN:

DEBT: 9.9 %
PREFERRED: 8.8 %
EQUITY: 14.2 %

TAX RATE: 37.63 %
AFUDC: 11.82 %
DISCOUNT RATE: 10.18 %
BOOK LIFE: 30 YEAR
START YEAR FOR
CONSTRUCTION: 1988
IN-SERVICE YEAR: 1992

CONSTRUCTION SPENDING CURVE

YEAR	% CONSTRUCTION EXPENDITURES *
-8	0 %
-7	0 %
-6	0 %
-5	0 %
-4	5 %
-3	39 %
-2	41 %
-1	15 %
0	0 %

* To be applied to direct construction costs.

PENINSULAR FLORIDA

FCG STUDIES FORM 3.1

PAGE 3 OF 3

FINANCIAL ASSUMPTIONS

FOR THE DEVELOPMENT OF K FACTOR

UNIT: COAL

CAPITALIZATION RATIOS:

DEBT:	44	%
PREFERRED:	9	%
EQUITY:	47	%

RATE OF RETURN:

DEBT:	9.9	%
PREFERRED:	8.8	%
EQUITY:	14.2	%
TAX RATE:	37.63	%
AFUDC:	11.82	%
DISCOUNT RATE:	10.18	%
BOOK LIFE:	30	YEAR
START YEAR FOR CONSTRUCTION:	1988	
IN-SERVICE YEAR:	1995	

CONSTRUCTION SPENDING CURVE

YEAR	% CONSTRUCTION EXPENDITURES *
-8	0 %
-7	1 %
-6	1 %
-5	2 %
-4	20 %
-3	35 %
-2	25 %
-1	16 %
0	0 %

* NOTE: Seven year construction period used because of the 1988 study start date.

PENINSULAR FLORIDA
FIXED CHARGE CALCULATIONS FOR DEVELOPMENT OF K FACTOR
UNIT TYPE: COMB TURB.
(THOUSANDS OF DOLLARS)

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
YEAR	CALENDAR YEAR	ELECTRIC PLANT IN SERVICE	DEBT	PREFERRED	EQUITY	TAXES	TAX CREDIT	TOTAL DEBT PREFERRED EQUITY & TAXES	STRAIGHT LINE DEPRECIATION	TOTAL FIXED CHARGES	PRESENT WORTH FIXED CHARGES	CUMULATIVE PRESENT WORTH FIXED CHARGES
1	1992	27345.	1191.	217.	1825.	1651.	-132.	4884.	1399.	6283.	5703.	5703.
2	1993	25895.	1128.	205.	1728.	1586.	234.	4647.	1399.	6046.	4981.	10683.
3	1994	24291.	1058.	192.	1621.	1514.	177.	4386.	1399.	5784.	4325.	15008.
4	1995	22741.	991.	180.	1518.	1444.	124.	4133.	1399.	5531.	3753.	18761.
5	1996	21243.	925.	168.	1418.	1377.	75.	3888.	1399.	5287.	3256.	22017.
6	1997	19792.	862.	157.	1321.	1311.	29.	3651.	1399.	5050.	2823.	24840.
7	1998	18384.	801.	146.	1227.	1248.	-12.	3421.	1399.	4820.	2445.	27285.
8	1999	17016.	741.	135.	1136.	1186.	-51.	3198.	1399.	4597.	2117.	29402.
9	2000	15671.	683.	124.	1046.	1126.	-57.	2978.	1399.	4377.	1829.	31231.
10	2001	14329.	624.	113.	956.	1065.	-57.	2759.	1399.	4158.	1577.	32808.
11	2002	12987.	566.	103.	867.	1005.	-57.	2540.	1399.	3939.	1356.	34164.
12	2003	11645.	507.	92.	777.	944.	-57.	2321.	1399.	3720.	1162.	35326.
13	2004	10302.	449.	82.	688.	884.	-57.	2102.	1399.	3501.	993.	36319.
14	2005	8960.	390.	71.	598.	823.	-57.	1883.	1399.	3282.	845.	37164.
15	2006	7618.	332.	60.	508.	763.	-57.	1663.	1399.	3062.	715.	37879.
16	2007	6276.	273.	50.	419.	702.	-57.	1444.	1399.	2843.	603.	38482.
17	2008	4934.	215.	39.	329.	642.	-57.	1225.	1399.	2624.	505.	38987.
18	2009	3592.	156.	28.	240.	581.	-57.	1006.	1399.	2405.	420.	39407.
19	2010	2250.	98.	18.	150.	521.	-57.	787.	1399.	2186.	346.	39753.
20	2011	908.	40.	7.	61.	461.	-57.	568.	1399.	1967.	283.	40036.

VALUE OF "K" 1.4310 = TOTAL CUMULATIVE PRESENT WORTH FIXED CHARGE/TOTAL INSTALLED COST.

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PENINSULAR FLORIDA
FIXED CHARGE CALCULATIONS FOR DEVELOPMENT OF K FACTOR
UNIT TYPE: COMB CYCLE
(THOUSANDS OF DOLLARS)

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
YEAR	CALENDAR YEAR	ELECTRIC PLANT IN-SERVICE	DEBT	PREFERRED	EQUITY	TAXES	TAX CREDIT	TOTAL DEBT PREFERRED EQUITY & TAXES	STRAIGHT LINE DEPRECIATION	TOTAL FIXED CHARGES	PRESENT WORTH FIXED CHARGES	CUMULATIVE PRESENT WORTH FIXED CHARGES
1	1992	139110.	6060.	1102.	9284.	8390.	222.	24835.	4719.	29555.	26824.	26824.
2	1993	133244.	5804.	1055.	8893.	8126.	2071.	23878.	4719.	28597.	23557.	50381.
3	1994	126598.	5515.	1003.	8449.	7826.	1783.	22793.	4719.	27512.	20569.	70950.
4	1995	120229.	5237.	952.	8024.	7539.	1517.	21753.	4719.	26472.	17963.	88913.
5	1996	114118.	4971.	904.	7616.	7264.	1266.	20755.	4719.	25475.	15689.	104602.
6	1997	108247.	4715.	857.	7224.	7000.	1037.	19797.	4719.	24516.	13704.	118306.
7	1998	102594.	4469.	813.	6847.	6745.	829.	18874.	4719.	23593.	11969.	130275.
8	1999	97144.	4232.	769.	6483.	6500.	632.	17984.	4719.	22703.	10454.	140728.
9	2000	91809.	3999.	727.	6127.	6259.	600.	17113.	4719.	21832.	9124.	149852.
10	2001	86489.	3767.	685.	5772.	6020.	600.	16244.	4719.	20964.	7951.	157803.
11	2002	81169.	3536.	643.	5417.	5780.	600.	15376.	4719.	20095.	6918.	164721.
12	2003	75850.	3304.	601.	5062.	5540.	600.	14507.	4719.	19227.	6007.	170728.
13	2004	70530.	3072.	559.	4707.	5301.	600.	13639.	4719.	18358.	5206.	175934.
14	2005	65210.	2841.	516.	4352.	5061.	600.	12770.	4719.	17490.	4501.	180436.
15	2006	59891.	2609.	474.	3997.	4821.	600.	11902.	4719.	16621.	3883.	184318.
16	2007	54571.	2377.	432.	3642.	4582.	600.	11033.	4719.	15753.	3340.	187658.
17	2008	49252.	2145.	390.	3287.	4342.	600.	10165.	4719.	14884.	2864.	190522.
18	2009	43932.	1914.	348.	2932.	4103.	600.	9296.	4719.	14016.	2448.	192969.
19	2010	38612.	1682.	306.	2577.	3863.	600.	8428.	4719.	13147.	2084.	195053.
20	2011	33293.	1450.	264.	2222.	3623.	600.	7559.	4719.	12279.	1766.	196820.
21	2012	28562.	1244.	226.	1906.	3410.	-577.	6787.	4719.	11506.	1502.	198322.
22	2013	25019.	1090.	198.	1670.	3251.	-1776.	6208.	4719.	10928.	1295.	199617.
23	2014	22076.	962.	175.	1473.	3118.	-1776.	5728.	4719.	10447.	1124.	200741.
24	2015	19132.	833.	152.	1277.	2986.	-1776.	5247.	4719.	9967.	973.	201714.
25	2016	16189.	705.	128.	1080.	2853.	-1776.	4767.	4719.	9486.	840.	202554.
26	2017	13245.	577.	105.	884.	2720.	-1776.	4286.	4719.	9006.	724.	203278.
27	2018	10302.	449.	82.	688.	2588.	-1776.	3806.	4719.	8525.	622.	203900.
28	2019	7358.	321.	58.	491.	2455.	-1776.	3325.	4719.	8044.	533.	204433.
29	2020	4415.	192.	35.	295.	2323.	-1776.	2844.	4719.	7564.	455.	204888.
30	2021	1471.	64.	12.	98.	2190.	-1776.	2364.	4719.	7083.	387.	205274.

VALUE OF "K" 1.4499 = TOTAL CUMULATIVE PRESENT WORTH FIXED CHARGE/TOTAL INSTALLED COST.

PENINSULAR FLORIDA
FIXED CHARGE CALCULATIONS FOR DEVELOPMENT OF K FACTOR
UNIT TYPE: - COAL -
(THOUSANDS OF DOLLARS)

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
YEAR	CALENDAR YEAR	ELECTRIC PLANT IN-SERVICE	DEBT	PREFERRED	EQUITY	TAXES	TAX CREDIT	TOTAL DEBT PREFERRED EQUITY & TAXES	STRAIGHT LINE DEPRECIATION	TOTAL FIXED CHARGES	PRESENT WORTH FIXED CHARGES	CUMULATIVE PRESENT WORTH FIXED CHARGES
1	1995	817208.	35598.	6472.	54540.	49287.	1304.	145897.	27724.	173621.	157580.	157580.
2	1996	782750.	34097.	6199.	52241.	47735.	12164.	140271.	27724.	167995.	138386.	295965.
3	1997	743706.	32396.	5890.	49635.	45976.	10474.	133897.	27724.	161621.	120834.	416800.
4	1998	706290.	30766.	5594.	47138.	44291.	8909.	127788.	27724.	155512.	105525.	522324.
5	1999	670392.	29202.	5310.	44742.	42674.	7438.	121927.	27724.	149651.	92165.	614490.
6	2000	635903.	27700.	5036.	42440.	41120.	6093.	116296.	27724.	144020.	80502.	694992.
7	2001	602696.	26253.	4773.	40224.	39624.	4872.	110875.	27724.	138599.	70314.	765306.
8	2002	570679.	24859.	4520.	38087.	38182.	3714.	105648.	27724.	133372.	61411.	826716.
9	2003	539335.	23493.	4272.	35995.	36770.	3526.	100530.	27724.	128254.	53598.	880314.
10	2004	508084.	22132.	4024.	33910.	35362.	3526.	95428.	27724.	123152.	46711.	927025.
11	2005	476834.	20771.	3777.	31824.	33955.	3526.	90326.	27724.	118050.	40638.	967663.
12	2006	445584.	19410.	3529.	29738.	32547.	3526.	85224.	27724.	112948.	35290.	1002953.
13	2007	414333.	18048.	3282.	27653.	31139.	3526.	80122.	27724.	107846.	30582.	1033535.
14	2008	383083.	16687.	3034.	25567.	29732.	3526.	75020.	27724.	102744.	26444.	1059978.
15	2009	351832.	15326.	2787.	23481.	28324.	3526.	69918.	27724.	97642.	22808.	1082796.
16	2010	320582.	13965.	2539.	21396.	26916.	3526.	64816.	27724.	92540.	19619.	1102405.
17	2011	289332.	12603.	2292.	19310.	25509.	3526.	59713.	27724.	87438.	16825.	1119229.
18	2012	258081.	11242.	2044.	17224.	24101.	3526.	54611.	27724.	82335.	14379.	1133608.
19	2013	226831.	9881.	1796.	15139.	22693.	3526.	49509.	27724.	77233.	12242.	1145850.
20	2014	195581.	8519.	1549.	13053.	21286.	3526.	44407.	27724.	72131.	10377.	1156227.
21	2015	167789.	7309.	1329.	11198.	20034.	-3391.	39870.	27724.	67594.	8826.	1165052.
22	2016	146976.	6402.	1164.	9809.	19096.	-10433.	36472.	27724.	64196.	7608.	1172659.
23	2017	129684.	5649.	1027.	8655.	18217.	-10433.	33649.	27724.	61373.	6601.	1179260.
24	2018	112393.	4896.	890.	7501.	17539.	-10433.	30826.	27724.	58550.	5716.	1184975.
25	2019	95101.	4143.	753.	6347.	16760.	-10433.	28003.	27724.	55727.	4937.	1189912.
26	2020	77810.	3389.	616.	5193.	15981.	-10433.	25179.	27724.	52903.	4254.	1194166.
27	2021	60518.	2636.	479.	4039.	15202.	-10433.	22356.	27724.	50080.	3655.	1197821.
28	2022	43227.	1883.	342.	2885.	14423.	-10433.	19533.	27724.	47257.	3130.	1200951.
29	2023	25935.	1130.	205.	1731.	13644.	-10433.	16710.	27724.	44434.	2671.	1203622.
30	2024	8644.	377.	68.	577.	12865.	-10433.	13887.	27724.	41611.	2271.	1205892.

VALUE OF "K" = 1.4499 = TOTAL CUMULATIVE PRESENT WORTH FIXED CHARGE/TOTAL INSTALLED COST.

PENINSULAR FLORIDA

SUMMARY OF FIRM ENERGY AND CAPACITY PAYMENTS
TO SUPPLY SIDE QUALIFYING FACILITIES

BASED ON UNIT TYPE: COMB TURB.

YEAR	AVOIDED CAPITAL COST \$/KW-MO	AVOIDED O & M COST \$/KW-MO	TOTAL AVOIDED CAPACITY COST \$/KW-MO	AVOIDED UNIT FUEL COST C/KWH
1992	2.599	0.338	2.937	7.700
1993	2.743	0.356	3.099	8.597
1994	2.895	0.376	3.270	9.577
1995	3.055	0.396	3.451	10.654
1996	3.224	0.418	3.642	11.813
1997	3.402	0.441	3.843	13.096
1998	3.590	0.465	4.055	14.449
1999	3.788	0.490	4.279	15.608
2000	3.998	0.517	4.515	16.836
2001	4.219	0.545	4.764	18.064

08T

PENINSULAR FLORIDA

SUMMARY OF FIRM ENERGY AND CAPACITY PAYMENTS
TO SUPPLY SIDE QUALIFYING FACILITIES

BASED ON UNIT TYPE: COMB CYCLE

YEAR	AVOIDED CAPITAL COST \$/KW-MO	AVOIDED O & M COST \$/KW-MO	TOTAL AVOIDED CAPACITY COST \$/KW-MO	AVOIDED UNIT FUEL COST C/KWH
1992	3.617	1.714	5.332	2.451
1993	3.817	1.808	5.625	2.770
1994	4.029	1.907	5.935	3.123
1995	4.251	2.011	6.262	3.525
1996	4.486	2.121	6.607	3.928
1997	4.735	2.236	6.971	4.365
1998	4.996	2.358	7.355	4.827
1999	5.273	2.487	7.760	5.221
2000	5.564	2.623	8.187	5.767
2001	5.872	2.766	8.638	6.178

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PENINSULAR FLORIDA

SUMMARY OF FIRM ENERGY AND CAPACITY PAYMENTS
TO SUPPLY SIDE QUALIFYING FACILITIES

BASED ON UNIT TYPE: - COAL -

YEAR	AVOIDED CAPITAL COST \$/KW-MO	AVOIDED O & M COST \$/KW-MO	TOTAL AVOIDED CAPACITY COST \$/KW-MO	AVOIDED UNIT FUEL COST C/KWH
1995	9.290	4.457	13.747	2.545
1996	9.809	4.704	14.513	2.712
1997	10.358	4.964	15.321	2.888
1998	10.937	5.238	16.175	3.084
1999	11.548	5.528	17.076	3.280
2000	12.194	5.833	18.027	3.485
2001	12.875	6.156	19.031	3.701
2002	13.595	6.496	20.091	3.926
2003	14.355	6.856	21.211	4.171
2004	15.157	7.235	22.392	4.425

APPENDIX 1C
SECTION III
FLORIDA POWER & LIGHT COMPANY
TEN YEAR
POWER PLANT SITE PLAN
1988-1997
APRIL 1, 1988

III. DESCRIPTION OF EXISTING FACILITIES

As of December 31, 1987, Florida Power & Light Company served a total of 2,906,829 customer accounts in thirty-five counties. The Company's service area contains approximately 27,650 square miles with a population of approximately 5.6 million.

The existing system, indicating service boundaries, generating plants, substations, and transmission lines, is shown on the following map entitled "Substation and Transmission System of Florida Power & Light Company."

The existing Florida Power & Light Company generating capability is comprised of twelve generating facilities distributed geographically around its service territory. One of these facilities, the Cutler Plant, is currently on Long Term Reserve Shutdown (LTRS) status, but is expected to return to service in 1988. The current generating facilities consist of four nuclear steam units, twenty-four fossil steam units, forty-eight gas turbines, two diesel installations, and two combined cycle units (see FPL Form 1A, Pages 1, 2, and 3 for further information). FPL Forms 1B and 1C report land use, investment, and environmental data for these existing generating facilities. A list of abbreviations used in the FPL forms is given in Exhibit 3.

The bulk transmission system is composed of 953^{1/} circuit miles of 500 KV and 2,290 miles of 230 KV lines. The underlying network is composed of 1,398 miles of 138 KV, 606 miles of 115 KV, and 273 miles of 69 KV transmission lines. Integration of the generation, transmission and distribution system is achieved through FPL's 397 substations.

^{1/} This includes 75 miles of 500 KV lines (two 37-1/2 mile lines) between Duval Substation and the Florida-Georgia State line which are jointly owned with the JEA.

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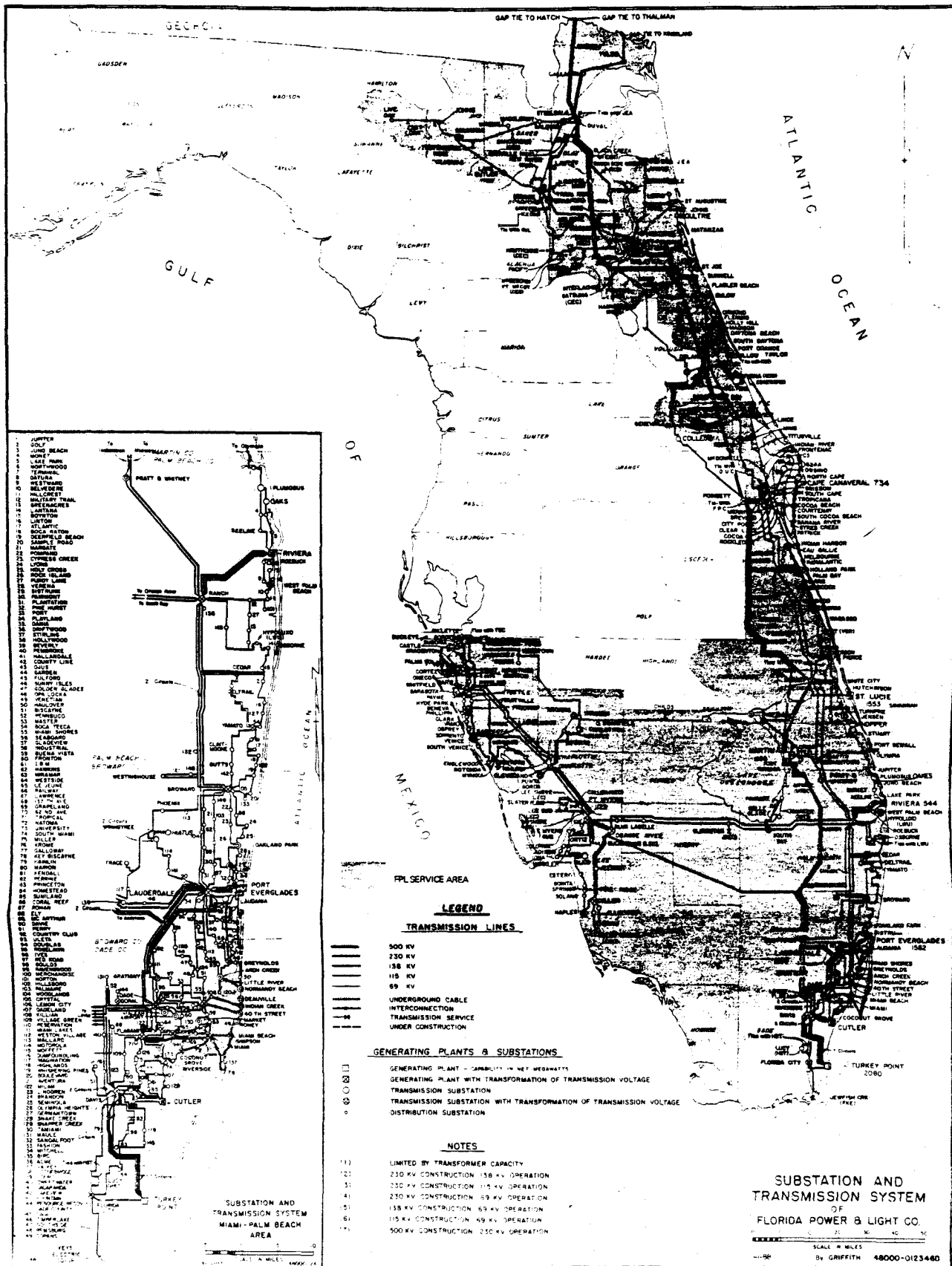


Exhibit 3

Florida Power & Light Company List Of Abbreviations Used In FPL Forms

<u>Reference</u>	<u>Abbreviation</u>	<u>Definition</u>
Unit Type	N	Nuclear
	FS	Fossil Steam
	D	Diesel
	CT	Combustion Turbine
	CC	Combined Cycle
Fuel Type	N	Nuclear
	NG	Natural Gas
	HO	Heavy Oil (#4, #5, & #6)
	LO	Light Oil (#1, #2, or Kerosene)
	C	Coal
	No	None
Fuel Transportation	TK	Truck
	RR	Railroad
	PL	Pipeline
	B	Barge
	S	Ship
	No	None
	Unk	Unknown
Air Pollution Control Strategy (Flue Gas Cleaning)	MC	Mechanical Collectors
	CSCF	Controlled Sulfur Content of Fuel
	FGR	Flue Gas Recirculation
	N/A	Not Applicable
	ESP	Electrostatic Precipitators
	FGD	Flue Gas Desulfurization
	LNB	Low No _x Burners

Exhibit 3

Florida Power & Light Company List Of Abbreviations Used In FPL Forms

<u>Reference</u>	<u>Abbreviation</u>	<u>Definition</u>
Cooling Method (Type)	OTF	Once Through - Fresh
	OTS	Once Through - Saline
	CP	Cooling Pond
	CAN	Canals
	WCTM	Wet Cooling Tower - Mechanical Draft
	MCC-S	Modified Closed Cycle - Saline
Unit/Site Status	PO	Potential Site
	P	Planned Unit
	V	Under Construction - more than 50% Complete
	U	Under Construction - less than 50% Complete
	M	Generating unit in deactivated shutdown status
	S	Generating unit returned to service from deactivated shutdown status
	PC	Plant Conversion
	A	Generating Unit Capability Increased (Rerated or Relicensed)

FLORIDA POWER & LIGHT COMPANY

FPL FORM 1A
PAGE 1 OF 4

EXISTING GENERATING FACILITIES
AS OF DECEMBER 31, 1987

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Plant Name	Unit No.	Location	Unit Type	Fuel		Commercial In-Service Month/Year	Expected Retirement Month/Year	Gen. Max. Nameplate KW	Net Capability		Fuel Transport		Alt. Fuel Days
				Pri.	Alt.				Summer MW	Winter MW	Pri.	Alt.	
Turkey Point		Dade County 27/578/40E						2,337,790	2,080.0	2,130.0			
	1		FS	NG	HO	4/67	Unknown	402,050	367.0	370.0	PL	WA	---
	2		FS	NG	HO	4/68	Unknown	402,050	367.0	370.0	PL	WA	---
	3		N	N	HO	12/72	Unknown	759,970	666.0	688.0	TK	NO	---
	4		N	N	HO	9/73	Unknown	759,970	666.0	688.0	TK	NO	---
	1-5		D	LO	NO	4/68	Unknown	13,750	14.0	14.0	TK	NO	---
Lauderdale		Broward County 30/508/42E						1,133,972	1,126.0	1,248.0			
	4		FS	NG	HO	9/57	Unknown	156,250	137.0	138.0	PL	TK	---
	5		FS	NG	HO	4/58	Unknown	156,250	137.0	138.0	PL	TK	---
	1-12		CT	NG	LO	8/70	Unknown	410,736	426.0	486.0	PL	PL	---
	13-24		CT	NG	LO	8/72	Unknown	410,736	426.0	486.0	PL	PL	---
Port Everglades		City of Hollywood 23/508/42E						1,679,086	1,582.0	1,648.0			
	1		FS	NG	HO	6/60	Unknown	225,250	204.0	205.0	PL	WA	---
	2		FS	NG	HO	4/61	Unknown	225,250	204.0	205.0	PL	WA	---
	3		FS	NG	HO	7/64	Unknown	402,050	367.0	369.0	PL	WA	---
	4		FS	NG	HO	4/65	Unknown	402,050	367.0	369.0	PL	WA	---
	1-12		CT	NG	LO	8/71	Unknown	410,736	426.0	486.0	PL	WA	---
	1-5		D	LO	NO	4/68	Unknown	13,750	14.0	14.0	PL	WA	---

EXISTING GENERATING FACILITIES
AS OF DECEMBER 31, 1987 (Cont.)

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Plant Name	Unit No.	Location	Unit Type	Fuel		Commercial In-Service Month/Year	Expected Retirement Month/Year	Gen. Max. Nameplate KW	Net Capability		Fuel Transport		Alt. Fuel Days
				Pri.	Alt.				Summer MW	Winter MW	Pri.	Alt.	
Riviera		City of Riviera Beach 33/42S/43E						620,840	544.0	548.0			
	3		FS	NG	HO	6/62	Unknown	310,420	272.0	274.0	PL	WA	---
	4		FS	NG	HO	3/63	Unknown	310,420	272.0	274.0	PL	WA	---
Martin		Martin County 29/39S/38E						1,726,600	1,566.0	1,580.0			
	1		FS	HO	NG	12/80	Unknown	863,300	783.0	790.0	PL	PL	---
	2		FS	HO	NG	6/81	Unknown	863,300	783.0	790.0	PL	PL	---
St. Lucie		St. Lucie County 16/36S/41E						1,700,000	1,553.0	1,579.0			
	1		N	N	No	12/76	Unknown	850,000	839.0	853.0	TK	No	---
	2 1/		N	N	No	8/83	Unknown	850,000	714.0	726.0	TK	No	---
Cape Canaveral		Brevard County 19/24S/36F						804,100	734.0	740.0			
	1		FS	NG	HO	4/65	Unknown	402,050	367.0	370.0	PL	WA	---
	2		FS	NG	HO	5/69	Unknown	402,050	367.0	370.0	PL	WA	---
Sanford		Volusia County 16/19S/30E						1,028,450	861.0	871.0			
	3		FS	NG	HO	5/59	Unknown	156,250	137.0	139.0	PL	WA	---
	4		FS	HO	No	7/72	Unknown	436,100	362.0	366.0	WA	No	---
	5		FS	HO	No	6/73	Unknown	436,100	362.0	366.0	WA	No	---

1/ Total capability is 839/853 MW. Capabilities shown represent the company's share of the unit and exclude the Orlando Utilities Commission (OUC) and Florida Municipal Power Agency (FMPA) combined portion of 14.89551%.

EXISTING GENERATING FACILITIES
AS OF DECEMBER 31, 1987 (Cont.)

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Plant Name	Unit No.	Location	Unit Type	Fuel		Commercial In-Service Month/Year	Expected Retirement Month/Year	Gen. Max. Nameplate KW	Net Capability		Fuel Transport		Alt. Fuel Days
				Pri.	Alt.				Summer MW	Winter MW	Pri.	Alt.	
Putnam		Putnam County 16/108/27E						580,000	472.0	504.0			
	1		CC	NG	LO	4/78	Unknown	290,000	236.0	252.0	PL	WA	---
	2		CC	NG	LO	8/77	Unknown	290,000	236.0	252.0	PL	WA	---
Ft. Myers		Lee County 35/438/25E						1,302,300	1,122.0	1,264.0			
	1		FS	NO	No	11/58	Unknown	156,250	137.0	138.0	WA	No	---
	2		FS	NO	No	7/69	Unknown	402,050	367.0	370.0	WA	No	---
	1-12		CT	LO	No	5/74	Unknown	744,000	618.0	756.0	WA	No	---
Manatee		Manatee County 18/338/20E						1,726,600	1,566.0	1,580.0			
	1		FS	NO	No	10/76	Unknown	863,300	783.0	790.0	PL	No	---
	2		FS	NO	No	12/77	Unknown	863,300	783.0	790.0	PL	No	---
St. Johns River Power Park		Duval County 12/15/28E (RPC4)						665,146	125.0	125.0			
	1 2/		C	C	No	3/87	Unknown	665,146	125.0	125.0	RR	No	---
TOTAL SYSTEM AS OF DECEMBER 31, 1987 =									13,331.0	13,817.0			

2/ The net capability ratings represent Florida Power & Light Company's share of St. Johns River Park Unit No 1, excluding Jacksonville Electric Authority (JEA) share of 80%.

FLORIDA POWER & LIGHT COMPANY

FPL FORM 1A
PAGE 4 OF 4

EXISTING GENERATING FACILITIES ON LONG-TERM RESERVE SHUTDOWN (LTRS)
AS OF DECEMBER 31, 1987

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Plant Name	Unit No.	Location	Unit Type	Fuel		Commercial In-Service Month/Year	Expected Retirement Month/Year	Gen.Max. Nameplate KW	Net Capability		Fuel Transport		Alt. Fuel Days
				Pri.	Alt.				Summer MW	Winter MW	Pri.	Alt.	
Cutler		Dade County 24/558/40E						236,500	197.0	199.0			
	5 3/		FS	NG	NO	11/54	Unknown	75,000	67.0	68.0	PL	B	---
	6 3/		FS	NG	NO	7/55	Unknown	161,500	130.0	131.0	PL	B	---
Riviera		City of Riviera Beach 33/428/43E						75,000	69.0	71.0			
	2 3/		FS	NG	NO	11/53	Unknown	75,000	69.0	71.0	PL	S	---
TOTAL CAPACITY ON LONG-TERM RESERVE SHUTDOWN AS OF DECEMBER 31, 1987 =									266.0	270.0			

3/ Cutler Units Nos 5&6 and Riviera Unit No. 2 (Total Combined Capacity of 266/270MW) are currently on Long Term Reserve Shutdown (LTRS).

EXISTING GENERATING FACILITIES
LAND USE AND INVESTMENT 1/
AS OF DECEMBER 31, 1987

(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Land Area		Plant Capital Investment 2/			
Plant Name	Total Acres	In-Use Acres	Land In \$1000	Site Improvements In \$1000	Building & Equipment In \$1000	Total In \$1000
Turkey Point	12,372.1	12,372.1	10,507.8	182,425.6	703,129.3	896,062.7
Cutler 3/	86.2	86.2	71.6	5,003.0	26,278.7	31,353.3
Lauderdale	392.3	392.3	422.7	12,729.6	98,163.6	111,315.9
Port Everglades	92.8	92.8	305.7	17,861.7	156,928.0	175,095.4
Riviera 3/	21.7	21.7	152.2	6,928.4	57,153.5	64,234.1
Martin	11,267.4	9,542.4	8,525.0	251,138.4	426,693.6	686,357.0
St. Lucie	1,131.7	1,131.7	2,444.9	631,947.6	1,410,806.0	2,045,198.5
Cape Canaveral	81.6	81.6	729.2	10,518.0	61,462.9	72,710.1
Sanford	1,725.4	1,708.7	2,051.2	25,667.0	110,269.0	137,987.2
Putnam	120.2	120.2	38.0	16,170.6	99,527.3	115,735.9
Ft. Myers	460.0	356.5	1,026.6	26,313.9	92,261.3	119,601.8
Manatee	8,091.6	8,091.6	3,861.5	89,757.9	271,899.6	365,519.0
St. Johns River Power Park	----- 4/	----- 4/	1,161.8	28,910.5	159,635.2	189,707.5

1/ Accounting and reporting practices of FPL are subject to regulation by and in accordance with standard Florida Public Service Commission (FPSC) practices and Federal Energy Regulatory Commission (FERC) Code of Federal Regulations.

2/ Source: FERC Form No. 1, pages 402 and 403, lines 14 through 17. Classified by FERC Electric Plant Accounts as follows: Land - 312,982,930; Site Improvements - 1,305,372,168; Building & Equipment - Other Production Plant accounts. Plant Capital Investment is net of Additions, Retirements and Adjustments.

3/ Includes totals for Cutler Units Nos. 5 and 6 and Riviera Unit No. 2 which are currently on Long Term Reserve Shutdown (LTRS).

4/ See Jacksonville Electric Authority 1988 Ten Year Site Plan.

EXISTING GENERATING FACILITIES
 ENVIRONMENTAL CONSIDERATIONS FOR STEAM GENERATING UNITS
 AS OF DECEMBER 31, 1987

(1)	(2)	(3)	(4)	(5)	(6)
Plant Name	Unit No.	Flue Gas Cleaning			Cooling Type
		Particulate	SOx	NOx	
Turkey Point	1	MC	CSCF	1/	CAN
	2	MC	CSCF	1/	CAN
	3	N/A	N/A	N/A	CAN
	4	N/A	N/A	N/A	CAN
Cutler	5 2/	MC	CSCF	1/	OTS
	6 2/	MC	CSCF	1/	OTS
Lauderdale	4	CSCF	CSCF	1/	OTS
	5	CSCF	CSCF	1/	OTS
Port Everglades	1	MC	CSCF	1/	OTS
	2	MC	CSCF	1/	OTS
	3	MC	CSCF	1/	OTS
	4	MC	CSCF	1/	OTS
Riviera	2 2/	MC	CSCF	1/	OTS
	3	MC	CSCF	1/	OTS
	4	MC	CSCF	1/	OTS

1/ No State or Federal NOx emission standards applicable.

2/ Cutler Units Nos. 5 and 6 and Riviera Unit No. 2 are currently on Long Term Reserve Shutdown (LTRS), although the Cutler Units will be reactivated by mid 1988.

EXISTING GENERATING FACILITIES
 ENVIRONMENTAL CONSIDERATIONS FOR STEAM GENERATING UNITS (Cont.)
 AS OF DECEMBER 31, 1987

(1) Plant Name	(2) Unit No.	(3) Flue Gas Cleaning			(6) Cooling Type
		(4) Particulate	SOx	NOx	
Martin	1	MC	CSCF	FGR	CP
	2	MC	CSCF	FGR	CP
St. Lucie	1	N/A	N/A	N/A	OTS
	2	N/A	N/A	N/A	OTS
Cape Canaveral	1	MC	CSCF	1/	OTS
	2	MC	CSCF	1/	OTS
Sanford	3	CSCF	CSCF	1/	OTS
	4	MC	CSCF	1/	CP
	5	MC	CSCF	1/	CP
Putnam	1	CSCF	CSCF	1/	WCTM
	2	CSCF	CSCF	1/	WCTM
Ft. Myers	1	CSCF	CSCF	1/	OTS
	2	MC	CSCF	1/	OTS
Manatee	1	MC	CSCF	FGR	CP
	2	MC	CSCF	FGR	CP
St. Johns River Power Park	1	ESP	FGD	LNB	MCC-S

1/ No State or Federal NOx emission standards applicable.

APPENDIX 1D
SUBSECTIONS A AND B
SECTION IV
FLORIDA POWER & LIGHT COMPANY
TEN YEAR
POWER PLANT SITE PLAN
1988-1997
APRIL 1, 1988

IV. THE PLAN

The following is a discussion of the composite plan supported by the reasoning which led to its development. In the interest of ease in presentation, this plan is subdivided into three parts: "The Load Forecast," "The Power Supply Plan" and "The Sites."

A. The Load Forecast

The load forecast portion of the plan is presented in six sections. The first two sections contain a description of the basic statistical methodology used in the development of the present net energy and peak load forecasts, respectively. Section three contains a description of how the effects of conservation on FPL's expected growth are modeled. Section four is a summary of the principal assumptions used in the preparation of the peak load and energy forecasts. Section five is a discussion of load management programs and section six contains a summary of the peak load and net energy forecasts.

1. The Energy Forecast Model

The economy of FPL's service area is composed of the tourist, construction, agricultural, service, and manufacturing sectors. To adequately forecast the energy requirements for the area, this unique mix has to be recognized.

In order to more accurately evaluate and project the patterns of growth for the coming years, separate forecasting equations were used for the following classes of customers: Residential, Commercial, Industrial, Resale, Street and Highway Lighting and Other Public Authority Sales. The Railroads and Railways class employs no explicit forecasting equation. Forecasts are based on specific information about the class.

Residential Sales

Residential sales are forecasted by using the Residential End Use Energy Planning Model (REEPS) developed by EPRI. REEPS incorporates FPL's Home Energy Survey data to forecast energy demand by analyzing various price, cost and energy decisions involved in purchasing household appliances.

Typical input requirements used in REEPS are the price of electricity, weather variables, appliance type and household characteristics such as income, age of head of household, household size, tenure status, number of rooms, building type, as well as housing vintage. REEPS output is FPL's residential sales forecast which is generated into five categories: 1) annual energy consumption by major fuel and end use, 2) appliance market penetrations in new housing, 3) replacements of appliances in existing dwellings, 4) new appliance installations in existing dwellings and 5) relative operating efficiencies of appliances.

It is expected that residential conservation programs will have a pronounced effect on residential consumption in the future; therefore, REEPS model output is calibrated to reflect the customers' response to FPL's conservation programs. However, increasing population in FPL's service territory will result in a projected net increase of 3.4% per year in residential sales during the forecast period of 1988-1997.

Commercial Sales

An end use model is used to forecast commercial energy (KWH) sales. Some of the end uses modeled include air conditioning, water heating, and lighting. Building types identified consist of restaurants, offices, and colleges, among others.

The model views energy demand as a product of three factors. These factors are: 1) commercial floor space by building type, 2) energy

requirements for specific end uses and building types, and 3) the utilization of energy using equipment.

Each of these factors is modeled in the following manner. Future additions to floor space are modeled using employee per square foot relationships, combined with specific employment forecasts of various industries. Energy requirements by end use are based on United States Department of Energy (Region 4) data adjusted for certain costs and technology parameters. Finally, equipment utilization is a function of operating costs and equipment efficiency.

The above factors, along with information on end use energy market shares, combine to produce a commercial sales forecast. Over the forecast period of 1988-1997, commercial sales are projected to grow at 3.4% percent per year.

Industrial Sales

FPL's total industrial sales are forecast by using a regression model which contains FPL service area population and Florida manufacturing employment as explanatory variables.

Since most of FPL's industrial customers are in goods producing (manufacturing) industries, the level of employment in Florida's manufacturing sectors tends to be highly correlated with the amount of electricity industrial customers will use. FPL's service area population is also an important factor in explaining electricity usage by this customer class, since many industrial customers are enterprises which produce goods which are marketed and sold to individuals and businesses residing or located in FPL's service area. Currently, it is projected that sales to this class will increase at 2.1% percent per year during the forecast period 1988-1997.

Resale (Wholesale) Sales

The long term forecast of resale sales is comprised of three categories: 1) sales to Seminole Electric Cooperative, Inc. (Seminole), 2) sales to wholesale full requirements customers other than Seminole, and 3) sales to partial requirements customers. The forecast of sales to Seminole is based on regression analysis, state space modeling, and load duration curve analysis. The forecast of sales to full requirements customers other than Seminole results from regression analysis. The forecast of sales to partial requirements customers is based on short term estimates from the customers and historical usage patterns.

Street and Highway Lighting Sales

Street and highway lighting sales are forecast by using the street and highway customers and the FPL population forecasts as explanatory variables. Thus, growth in total sales for this class is largely a function of customer growth. Use per street light customer has shifted downward as a result of replacing mercury vapor and incandescent lights with the more efficient high pressure sodium vapor lamps. These offsetting factors yield an increase of 4.8% percent per year for sales to this class during the forecast period.

Other Public Authority Sales

"Other" sales are electricity sales to governmental accounts such as military bases, sport fields, and sports coliseums. Since the Sports Field Service (OS-2) rate class within this customer revenue class has been "closed" by public law, electricity sales to this customer class are expected to increase only slightly over the forecast horizon. Specifically, total Other Public Authority sales have been projected to increase by 2.4% percent per year during the forecast period.

Railroads and Railways

This classification includes railroads and interurban and street railways, for general railroad use. Dade County's Metrorail is included in this class.

2. The Peak Load Models

Summer Peak Model

Annual Summer Peak demands are forecast with a "use per customer" multiple regression model, which contains the real average price of electricity, real per capita income and a weather term multiplied by the stock of air conditioning appliances as explanatory variables. The real price of electricity is included in the model to reflect customer response to price changes and price levels during very warm weather conditions.

Real per capita income is included in the model since it serves as an indicator of the economic prosperity of an area. This, of course, will have both direct and indirect impacts on electricity consumption.

A weather term, which is summer maximum temperature squared multiplied by FPL service area air conditioning saturation, is also used in the model since wide fluctuations in summer peak demand which occur on a year-to-year basis are usually caused by varying weather conditions, rather than by changes in economic or demographic conditions. Additionally, a time varying parameter on the appliance stock of air conditioning is included to capture the improved appliance efficiencies.

The output of the use per customer model is multiplied by the number of FPL summer customers to obtain the total peak forecast values.

Winter Peak Model

A multiple regression model, which contains a price term, a weather term, and an appliance saturation term as explanatory variables, was

used to produce the long term winter peak use per customer forecast. Likewise, a term is included to capture increased appliance efficiency through time.

A composite variable comprising electric heating saturation and a price term is included in the model. The price variable is included in the model in order to account for variations in a customer's peak electricity consumption that may result from changing prices. An appliance saturation variable (electric heating saturation) is included in the model because cold weather winter peaks are primarily the result of customers' utilization of electric space heating equipment. Finally, a weather term (minimum temperature) is used in the model to account for fluctuations in winter peak that occur because of variations in weather.

The output value of the use per customer model is multiplied by the number of FPL winter customers to obtain the total winter peak demand forecast.

3. Conservation Modeling

The regression techniques previously described are used to derive equations that forecast long term energy sales and peak demand. The resultant coefficients are based solely on history and cannot predict the effects of future technological advancements or changes in consumer lifestyle. In order to have a realistic forecast, these anticipated changes must be estimated separately.

Currently, six conservation areas are included in the long term forecast. These are: 1) commercial/industrial lighting incentive program, 2) swimming pool pump "timer" program, 3) commercial/industrial customers' audit program, 4) home energy loss prevention program, 5) customer incentive programs and 6) street light conservation program. Following is a brief overview of these programs.

Commercial/Industrial Lighting Incentive Program

This is an incentive program, which began in mid-1984, designed to encourage demand and non-demand commercial/industrial customers to replace their fluorescent lamps with reduced wattage energy efficient lamps.

Residential Pool Usage Moderation Program (Pool Pump Timer)

The Residential Pool Pump Program was developed by FPL for the purpose of lowering both the annual energy usage (KWH) and peak demand requirements (KW) of residential customers who own swimming pools.

FPL began offering pool audits to its residential customers in June 1981. The auditors place timing devices on swimming pool pumps. The timers shut off the pool pumps during the time of the day when the system normally experiences its peak demand; furthermore, they reduce the number of hours of daily operation of most swimming pool pumps, while still maintaining pool cleanliness.

Commercial/Industrial Customer Audit Program

This is an energy audit program designed to assist commercial/industrial customers in making their facilities more energy efficient through the installation of conservation measures and the implementation of conservation practices.

Each year, FPL offers energy audits to small (peak demand of 20 KW or less), medium (21 through 499 KW peak demand), and large (peak demand of 500 KW or more) commercial/industrial customers. The savings for each customer are commensurate with its size.

Customer Incentive Programs

In an effort to induce customers to upgrade the thermal efficiency of their dwellings and/or to purchase more energy efficient appliances, FPL has initiated incentive programs in each of the following areas: 1) home energy loss prevention, 2) window film treatment, 3) water heating and 4) residential ceiling insulation.

Street Light Program

FPL is currently engaged in a program to convert its incandescent and mercury vapor street lights to the more efficient high pressure sodium vapor lamps while still maintaining comparable illumination levels.

Total Conservation Effects

The cumulative effects of the previously described eight conservation programs are estimated to produce the following reductions to the summer peak forecast over the next ten years:

<u>Year</u>	<u>Summer Peak Demand Reduction (MW)</u>
1988	321.1
1989	363.4
1990	402.7
1991	402.7
1992	402.7
1993	402.7
1994	402.7
1995	402.7
1996	402.7
1997	402.7

4. Principal Assumptions

In this section, the assumptions used in the preparation of the peak load and net energy forecasts are developed:

Population and Customer Growth

Population in the Florida Power & Light Company service area will continue to grow throughout the period of 1988 to 1997, but at a somewhat lower rate than in the past.

The growth is primarily the result of in-migration concentrated in the 25 to 44 and over 65 age groups. Three forecasted factors help to explain this. First, the growing job opportunities in Florida attract a large population of the baby boomers, who fall into the 25-44 age group. Second, Florida will continue to remain an appealing place to retire. Third, the total fertility rate for the United States has fallen to 1.8 children per woman as of 1981. This, of course, limits the growth in population of the 25 and under age groups.

Historically, the number of Florida Power & Light Company customers has grown at a rate faster than the population. From 1976 to 1986, total customers increased at an average annual rate of 4.3 percent. Residential customers, who currently represent about 89 percent of total customers, have accounted for most of this increase. In 1950, there were 4.2 people for every residential customer. By 1985, this ratio had dropped to 2.25 and is projected to be 2.11 by 1996. Factors which contribute to this reduced ratio are the a) lower birth rates, b) increase in percentage of elderly, c) decrease in extended families, d) tendency of more people to remain single longer and live at home and e) increase in divorce.

Price

The price forecast considers the results of the previously described load forecast and the planned resource additions. The revenue required to support the power supply plan is calculated and then converted to the real price per kilowatt-hour.

Historically, the real average price per kilowatt-hour for FPL's customers fell at an average annual rate of 3.4 percent from 1965 through 1973. However, from 1977 through 1987, the real price increased at an average annual rate of 0.3% percent. This variation was caused by several coinciding unusual circumstances which caused the cost of operating an electric utility to increase at a rate faster than inflation. The real price of electricity is expected to decrease .9 percent per year during the period from 1987 to 1997.

Economic Growth

The impact of Florida's economic growth upon the short term retail (jurisdictional) net energy forecast and the long term sales and customer forecasts is incorporated into the model by the inclusion of such economic variables as Florida total real income, Florida manufacturing employment, Florida total (non-agricultural) employment and the number of housing starts in the State.

Through 1997, Florida real personal income is forecasted to grow at a compound average annual rate ranging from a low of 1.7 percent to a high of 4.9 percent. Florida manufacturing employment and Florida total (non-agricultural) employment are expected to grow at compound average annual rates ranging from 0.8 to 3.1 percent and from 1.7 to 3.9 percent respectively, during the 1987 to 1997 time period. Housing starts in the state are predicted to occur at an annual number ranging from an average low of 130,000 to an average high of 207,000 through 1997.

Underlying the growth in Florida's real income, employment and other economic indicators will be the influx of new residents into the State. Although Florida's population is expected to grow at a somewhat slower rate in the future, the immigration of new residents will continue to

boost the State's economy through two channels. First, the population growth resulting from immigration will increase the demand for goods and services consumed in the State. Second, Florida's labor force will expand as new residents enter the State. A larger labor force, in turn, should increase the State's productive capacity.

While immigration has traditionally played the major role in Florida's economic growth, there are also signs that the State's economy is expanding in new directions. For example, the concentration of high tech manufacturing firms around the "Space Belt" is forecasted to continue growing in the future. Many of these firms can be expected to benefit from the increased emphasis on defense spending. In general, the growth of "high tech" manufacturing should help offset Florida's traditional reliance on tourism and agriculture.

Air Conditioning Saturation

Air conditioning saturation in the FPL service area is currently estimated to be 92.5 percent. This saturation is expected to continue to increase slowly to 94.5 percent by 1997.

Heating Saturation

The number of customers using electricity to heat their homes and apartments is expected to grow as the availability of natural gas is expected to remain at or near current levels through the reporting period. The saturation of electric heat is expected to increase from the current level of 87% percent to 90.8 percent in 1998.

Weather

The forecasts of cooling degree days, heating degree days, summer peak day maximum temperature and winter peak day minimum temperature are average values over the prior twenty years.

5. Load Management

FPL is implementing, as part of its Energy Management Plan, voluntary load management programs characterized by direct FPL control of customer equipment. These programs are aimed at reducing peak load growth by reducing usage during on-peak periods. The effects of all of FPL's load control programs are treated as "supply side" alternatives since FPL will exercise direct control over the effects of these programs. Thus, the effects of these programs are not accounted for in the load forecast.

6. Summary

The result of employing the previously described comprehensive approach to load forecasting has yielded a banded forecast of peak load and net energy. The forecast of Summer Peak Load projects an annual growth rate in the 1987 through 1997 period ranging from 1.6 to 3.6 percent (Exhibit 4). The forecast of Winter Peak Load ranges from a low annual growth rate of 1.7 percent to a high annual growth rate of 3.8 percent (Exhibit 5). The forecast of Net Energy for Load (NEL) ranges from a low annual rate of 2.1 percent to a high annual rate of 4.2 percent over the 1987 through 1997 period (Exhibit 6). The most likely forecast of peak load and net energy is provided in FPL Forms 2, 4, and 5 and Graph 1. Graphs 2A and 2B show: 1) the historical generating capability and peak load for the Summer and Winter periods and 2) the forecast of Summer and Winter Peak Load with the current expansion plan, as described in Section IV-B, "The Power Supply Plan."

EXHIBIT 4
FLORIDA POWER & LIGHT
SUMMER PEAK LOAD FORECAST

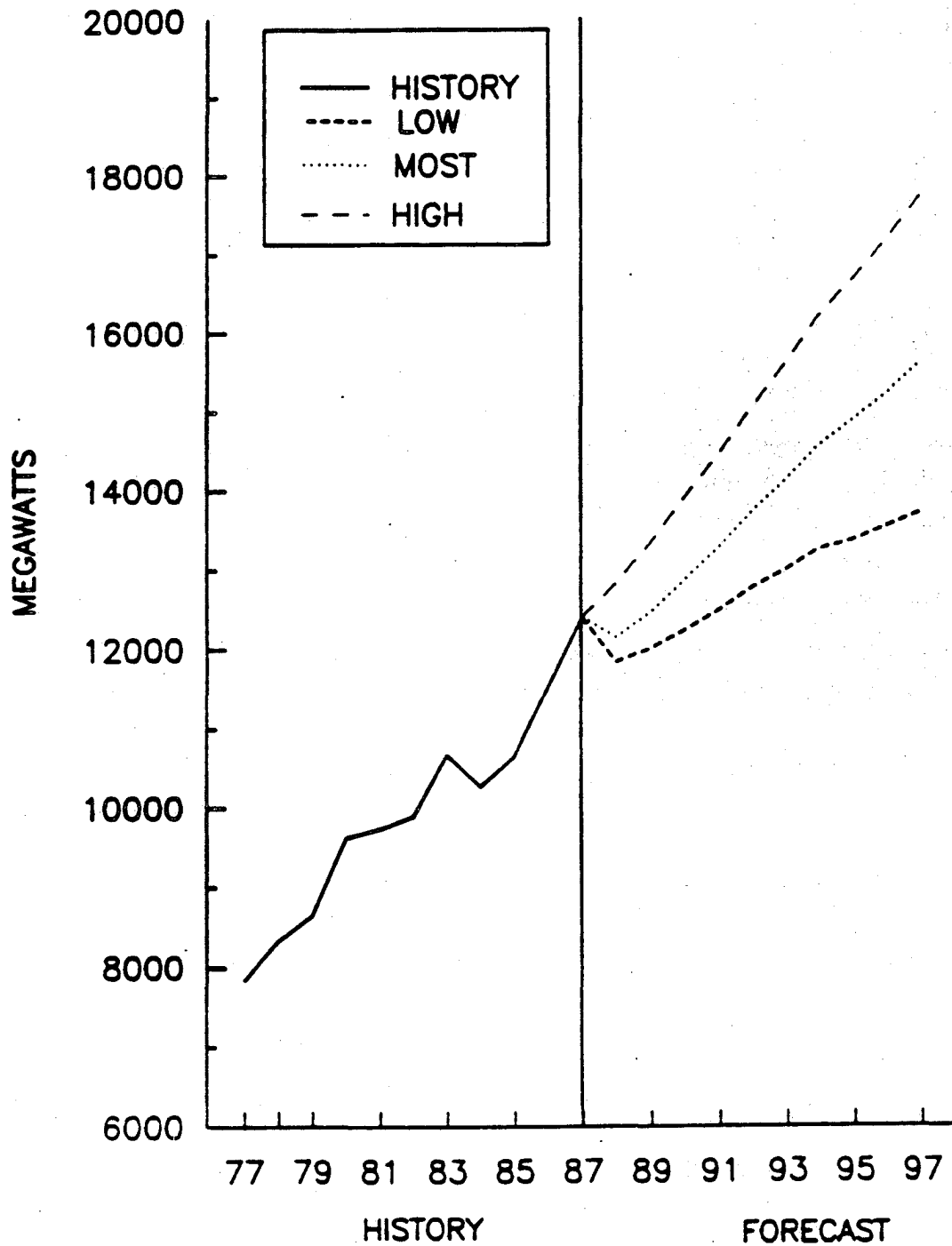


EXHIBIT 5

FLORIDA POWER LIGHT WINTER PEAK LOAD FORECAST

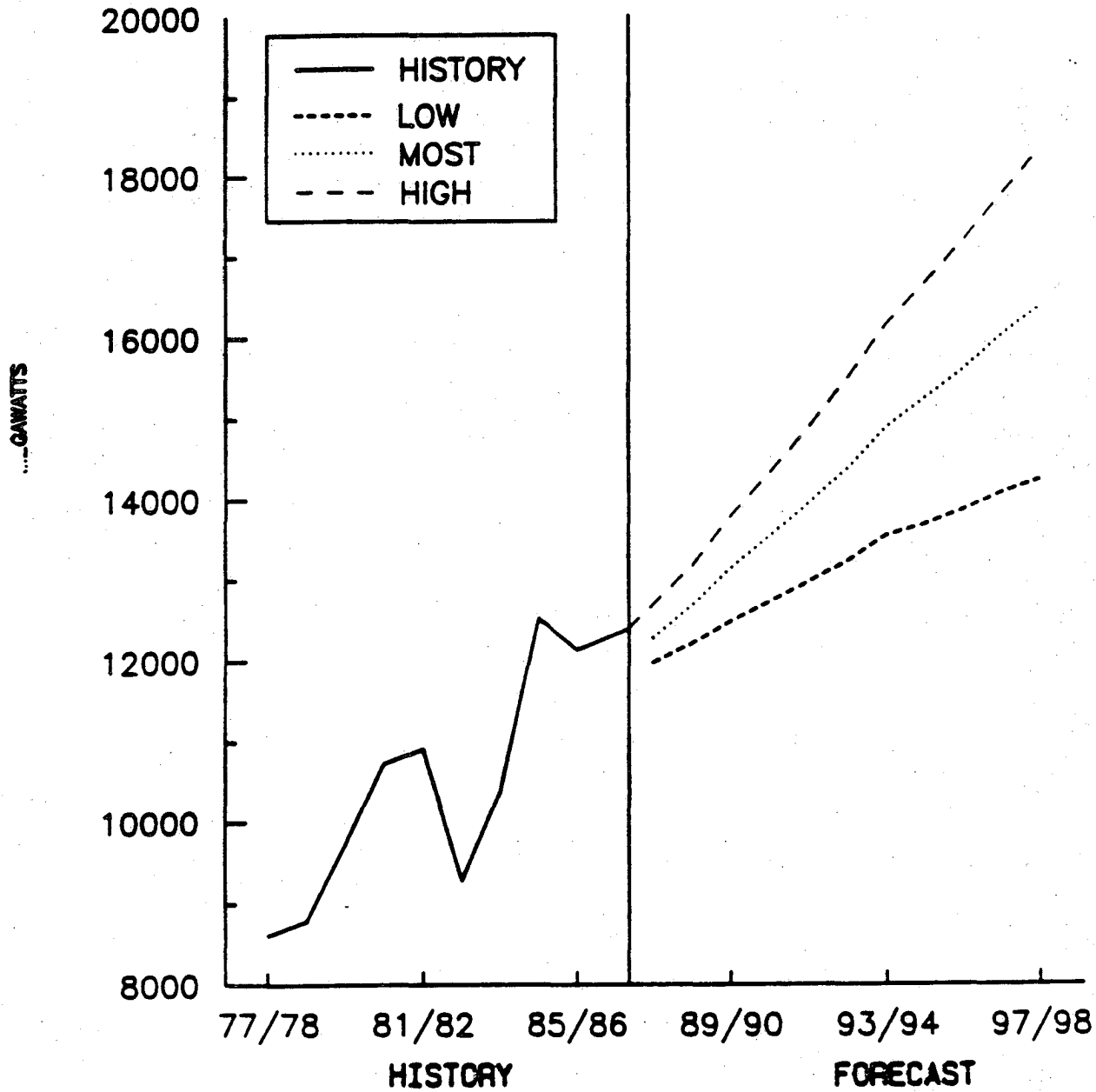
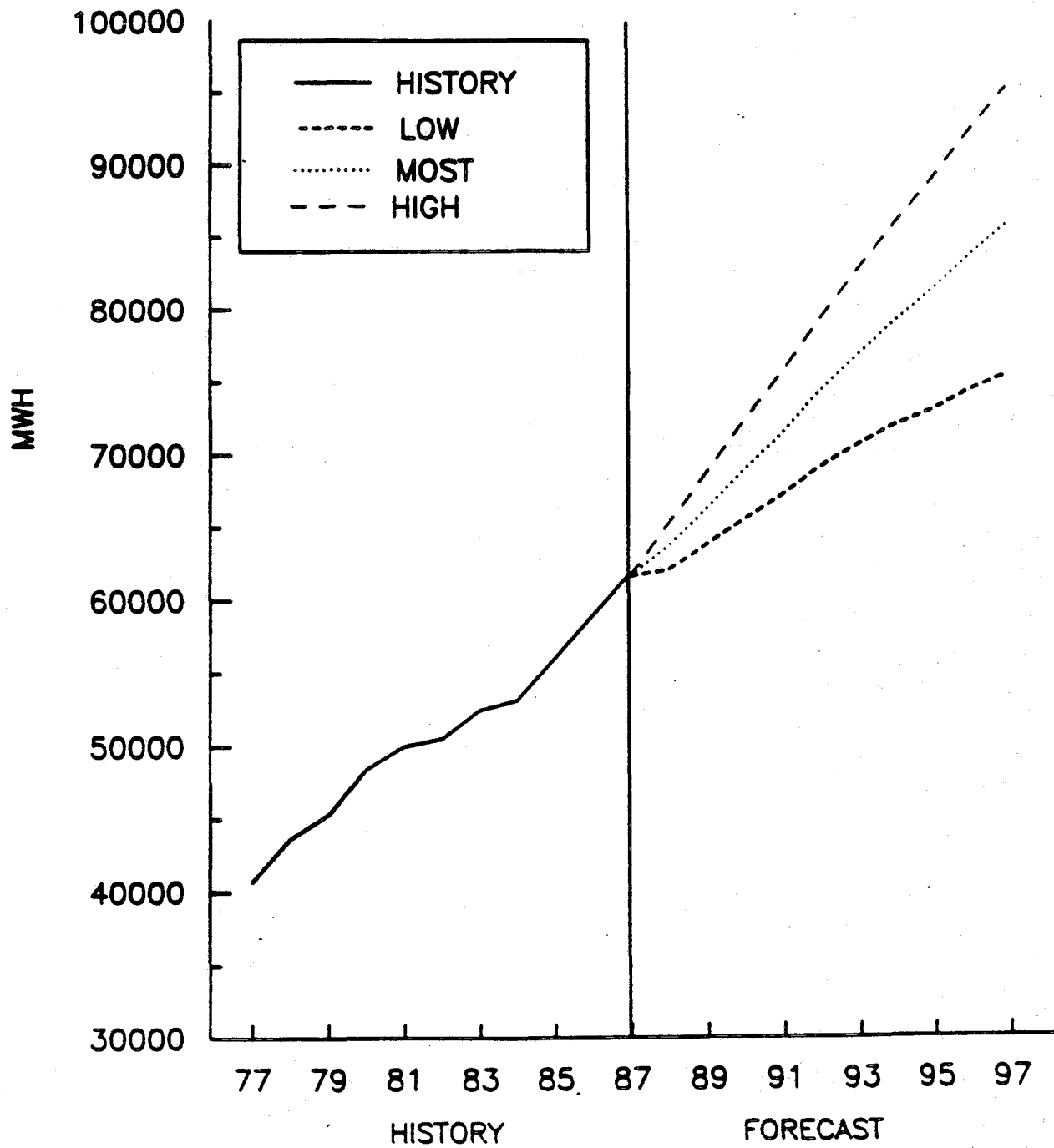


EXHIBIT 6

FLORIDA POWER & LIGHT

NET ENERGY FOR LOAD



HISTORY AND FORECAST OF ENERGY CONSUMPTION AND NUMBER OF CUSTOMERS BY CUSTOMER CLASS

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
			Rural & Residential 1/				Commercial 1/	
				3/ Average No. of Customers	Average KWH Consumption Per Customer		2/ Average No. of Customers	Average KWH Consumption Per Customer
Year	Population 1/	Members per Household	GWH			GWH		
1978	4,242,056	2.41	20,736	1,758,838	11,790	13,748	192,850	71,289
1979	4,402,354	2.37	21,060	1,854,884	11,354	14,374	202,673	70,922
1980	4,553,449	2.33	22,432	1,955,240	11,473	15,089	212,956	70,855
1981	4,770,489	2.33	22,932	2,044,623	11,216	15,578	223,399	69,732
1982	4,893,954	2.32	22,702	2,110,357	10,757	16,745	232,912	71,894
1983	4,982,368	2.30	23,324	2,170,686	10,745	17,423	243,269	71,620
1984	5,110,379	2.27	23,636	2,246,834	10,520	18,397	256,304	71,778
1985	5,252,701	2.25	25,573	2,329,677	10,977	19,734	268,780	73,421
1986	5,405,716	2.23	27,188	2,419,769	11,236	21,078	283,540	74,337
1987	5,588,313 4/	2.22	28,330	2,519,694	11,243	22,372	299,634	74,664
1988	5,778,291	2.20	29,645	2,620,589	11,312	23,415	313,653	74,653
1989	5,975,987	2.19	30,832	2,724,345	11,317	24,443	326,512	74,861
1990	6,181,754	2.18	32,133	2,832,210	11,346	25,415	342,552	74,193
1991	6,347,523	2.17	33,332	2,925,103	11,395	26,304	356,830	73,716
1992	6,518,352	2.16	34,575	3,021,328	11,444	27,488	372,367	73,819
1993	6,694,410	2.14	35,650	3,121,014	11,423	28,417	386,491	73,678
1994	6,875,871	2.13	36,759	3,224,292	11,401	29,311	401,877	72,936
1995	7,062,917	2.12	37,946	3,331,302	11,391	29,938	417,120	71,774
1996	7,228,577	2.11	39,172	3,429,304	11,423	30,671	430,656	71,220
1997	7,398,535	2.10	40,155	3,530,386	11,374	31,533	444,624	70,920

1/ Population represents only the areas served by Florida Power & Light.

2/ These forecasted values reflect the Most Likely of three economic scenarios and are to be used only where a singular forecast is required.

3/ Average number of customers for the year.

4/ Estimate

HISTORY AND FORECAST OF ENERGY CONSUMPTION AND NUMBER OF CUSTOMERS BY CUSTOMER CLASS (con't)

(1)	(10)	(11) Industrial 1/	(12)	(13)	(14)	(15)	(16)
		2/		1/	1/	1/	1/ 3/
Year	GWH	Average No. of Customers	Average KWH Consumption Per Customer	Railroads and Railways GWH	Street & Highway Lighting GWH	Other Sales to Ultimate Consumers GWH	Total Sales to Ultimate Consumers GWH
1978	2,993	13,799	216,900	--	343	478	38,298
1979	3,147	14,837	212,105	--	358	463	39,403
1980	3,348	14,734	227,230	--	372	463	41,705
1981	3,467	14,923	232,326	--	382	484	42,844
1982	3,449	12,530	275,259	--	379	514	43,790
1983	3,544	13,333	265,807	--	335	518	45,144
1984	3,707	14,892	248,926	13	321	538	46,612
1985	3,885	16,426	236,344	53	308	576	50,130
1986	3,999	17,372	230,227	73	303	594	53,236
1987	3,962	17,826	222,272	78	303	602	55,647
1988	4,098	18,316	223,748	81	320	609	58,169
1989	4,214	18,316	230,066	82	342	616	60,529
1990	4,262	18,995	224,380	82	366	630	62,888
1991	4,402	20,430	215,472	82	383	652	65,155
1992	4,530	21,973	206,163	83	401	673	67,749
1993	4,615	23,206	198,883	83	418	690	69,933
1994	4,699	24,067	195,243	83	437	713	72,003
1995	4,790	24,959	191,922	84	456	718	73,933
1996	4,886	25,885	188,756	84	473	730	76,016
1997	4,987	26,844	185,784	84	490	753	78,003

1/ These forecasted values reflect the Most Likely of three economic scenarios and are to be used only where a singular forecast is required.

2/ Average number of customers for the year.

3/ GWH = Column 4 + Column 7 + Column 10 + Column 13 + Column 14 + Column 15

HISTORY AND FORECAST OF ENERGY CONSUMPTION AND NUMBER OF CUSTOMERS BY CUSTOMER CLASS (Cont.)

(1) Year	(17) Sales for Resale 1/ GWh	(18) Utility Use & Losses 1/ GWh	(19) Net 1/ 3/ Energy for Load GWh	(20) Other Customers 1/ 2/	(21) Total Average No. of Customers 1/ 4/
1978	2,304	3,104	43,706	1,877	1,967,364
1979	2,563	3,376	45,342	1,946	2,074,340
1980	3,003	3,762	48,450	2,055	2,184,985
1981	3,419	3,760	50,023	2,257	2,285,202
1982	3,283	3,459	50,532	2,385	2,358,184
1983	3,445	3,911	52,500	2,417	2,429,705
1984	2,739	3,798	53,149	2,507	2,520,537
1985	1,304	4,564	55,998	2,673	2,617,556
1986	1,040	3,990	58,266	2,874	2,723,555
1987	944	5,025	61,616	3,060	2,840,214
1988	858	4,461	63,688	3,245	2,955,803
1989	886	4,766	66,181	3,423	3,072,596
1990	927	5,041	68,856	3,602	3,197,359
1991	1,004	5,220	71,379	3,822	3,306,185
1992	1,067	5,430	74,244	4,045	3,419,713
1993	1,145	5,609	76,687	4,273	3,534,984
1994	1,220	5,777	79,000	4,512	3,654,748
1995	1,302	5,936	81,171	4,744	3,778,125
1996	1,386	6,107	83,509	4,964	3,890,809
1997	1,480	6,270	85,753	5,185	4,007,039

1/ These forecasted values reflect the Most Likely of three economic scenarios and are to be used only where a singular forecast is required.

2/ Average number of customers for the year.

3/ GWh = Column 16 + Column 17 + Column 18

4/ Total = Column 5 + Column 8 + Column 11 + Column 20

HISTORY AND FORECAST OF SEASONAL PEAK DEMAND AND ANNUAL NET ENERGY FOR LOAD

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	1/ Summer Peak Demand - MW					Annual Net Energy for Load GWh			2/ Load Factor %
Year	Firm					3/			
	Retail	Wholesale	Total	Interrupt.	Total	Retail	Wholesale	Total	
1978	7,812	533	8,345	0	8,345	41,402	2,304	43,706	59.8
1979	8,201	449	8,650	0	8,650	42,779	2,563	45,342	59.8
1980	9,052	571	9,623	0	9,623	45,447	3,003	48,450	57.3
1981	9,099	639	9,738	0	9,738	46,604	3,419	50,023	58.6
1982	9,202	660	9,893	0	9,893	47,133	3,399	50,532	58.3
1983	9,994	682	10,676	0	10,676	48,925	3,575	52,500	56.1
1984	9,680	590	10,270	0	10,270	50,306	2,842	53,149	58.9
1985	10,410	244	10,654	0	10,654	54,662	1,335	55,998	60.0
1986	10,862	160	11,022	0	11,022	57,181	1,085	58,266	60.3
1987	12,180	214	12,394	0	12,394	60,668	968	61,616	56.8
1988	11,922	217	12,139	0	12,139	62,794	894	63,688	59.7
1989	12,205	252	12,457	0	12,457	65,256	925	66,181	60.6
1990	12,585	282	12,867	0	12,867	67,888	968	68,856	61.1
1991	12,948	325	13,273	0	13,273	70,331	1,048	71,379	61.4
1992	13,355	371	13,726	0	13,726	73,133	1,113	74,246	61.6
1993	13,698	419	14,117	0	14,117	75,493	1,194	76,687	62.0
1994	14,106	458	14,564	0	14,564	77,728	1,272	79,000	61.9
1995	14,380	497	14,877	0	14,877	79,815	1,356	81,171	62.3
1996	14,681	535	15,216	0	15,216	82,065	1,444	83,509	62.5
1997	15,031	574	15,605	0	15,605	84,211	1,542	85,753	62.7

- 1/ These forecasted values reflect the Most Likely of three economic scenarios and are to be used only where a singular forecast is required. Assumes normal weather conditions. Extreme hot or cold weather could cause actual loads to significantly exceed these projections.
- 2/ Based on Summer Peak.
- 3/ Values for the years 1978-1981 represent wholesale sales and not wholesale net energy.

HISTORY AND FORECAST OF SEASONAL PEAK DEMAND AND ANNUAL NET ENERGY FOR LOAD

(1)	(2)	(3)	(4)	(5)	(6)
				1/	
				Winter Peak Demand - MW	
			Firm		
Year	Retail	Wholesale	Total	Interrupt.	Total
1978/79	8,199	592	8,791	0	8,791
1979/80	9,151	581	9,732	0	9,732
1980/81	9,996	744	10,738	567 2/	11,305 3/
1981/82	10,107	812	10,919	426 2/	11,345
1982/83	8,554	726	9,280	0	9,280
1983/84	9,532	852	10,384	666 2/	11,050
1984/85	12,060	473	12,533	0	12,533
1985/86	11,703	436	12,139	0	12,139
1986/87	10,546	233	10,779	0	10,779
1987/88	11,993	379	12,372	0	12,372
1988/89	12,258	417	12,675	0	12,675
1989/90	12,692	447	13,139	0	13,139
1990/91	13,017	515	13,532	0	13,532
1991/92	13,368	570	13,938	0	13,938
1992/93	13,743	630	14,373	0	14,373
1993/94	14,203	679	14,882	0	14,882
1994/95	14,508	727	15,235	0	15,235
1995/96	14,816	773	15,589	0	15,589
1996/97	15,196	821	16,017	0	16,017
1997/98	15,504	871	16,375	0	16,375

1/ These forecasted values reflect the Most Likely of three economic scenarios and are to be used only where a singular forecast is required. Assumes normal weather conditions. Extreme cold weather could cause actual loads to significantly exceed these projections.

2/ Total unserved load.

3/ Official Peak was 10,738 MW at 9-10 a.m. with an unserved load of 567 MW. The 7-8 a.m. peak was 10,267 MW with an unserved load of 1,095 MW for a total demand of 11,360 MW.

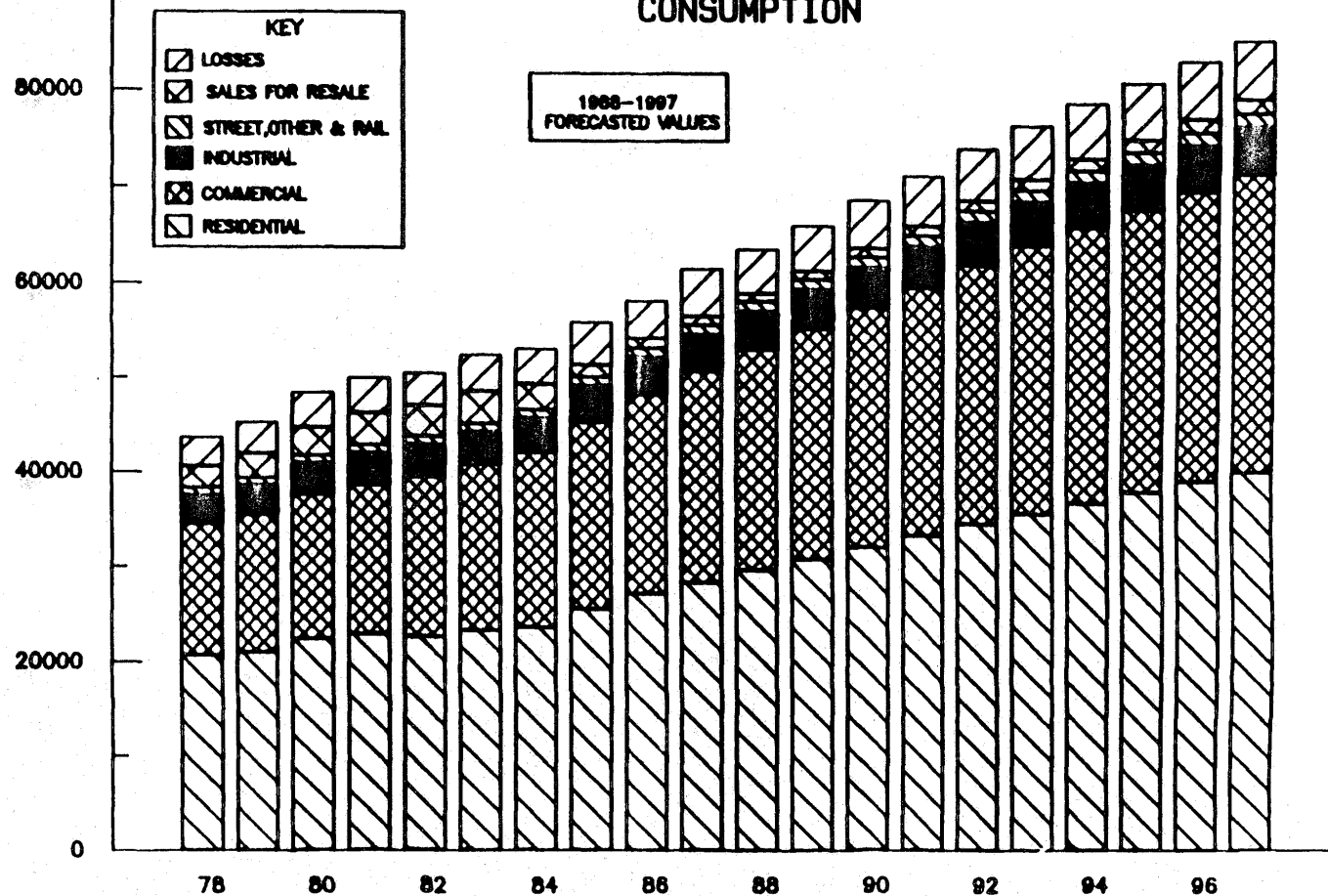
PREVIOUS YEAR ACTUAL AND TWO-YEAR FORECAST OF PEAK DEMAND
AND NET ENERGY FOR LOAD BY MONTH

(1)	(2)	(3)	1/	(4)	(5)	(6)	(7)
	Actual			Forecast			
	1987			1988		1989	
Month	Peak Demand MW	NEL GWH		Peak Demand MW	NEL GWH	Peak Demand MW	NEL GWH
JAN	10,779	4,659		12,372 2/	5,086	12,675	5,147
FEB	10,571	4,052		11,515 2/	4,210	11,886	4,318
MAR	8,117	4,411		9,256	4,508	9,553	4,774
APR	8,699	4,459		9,066	4,754	9,303	4,972
MAY	9,495	4,934		10,184	5,070	10,451	5,271
JUN	11,490	6,036		11,600	6,154	11,904	6,403
JUL	11,914	6,139		12,044	6,295	12,359	6,581
AUG	12,394	6,648		12,139	6,596	12,457	6,844
SEP	12,273	6,266		11,894	6,268	12,205	6,286
OCT	10,311	4,836		10,784	5,328	11,067	5,712
NOV	9,667	4,758		9,873	4,781	10,234	4,956
DEC	9,376	4,417		10,799	4,638	11,194	4,916
TOTALS		61,616			63,668		66,181

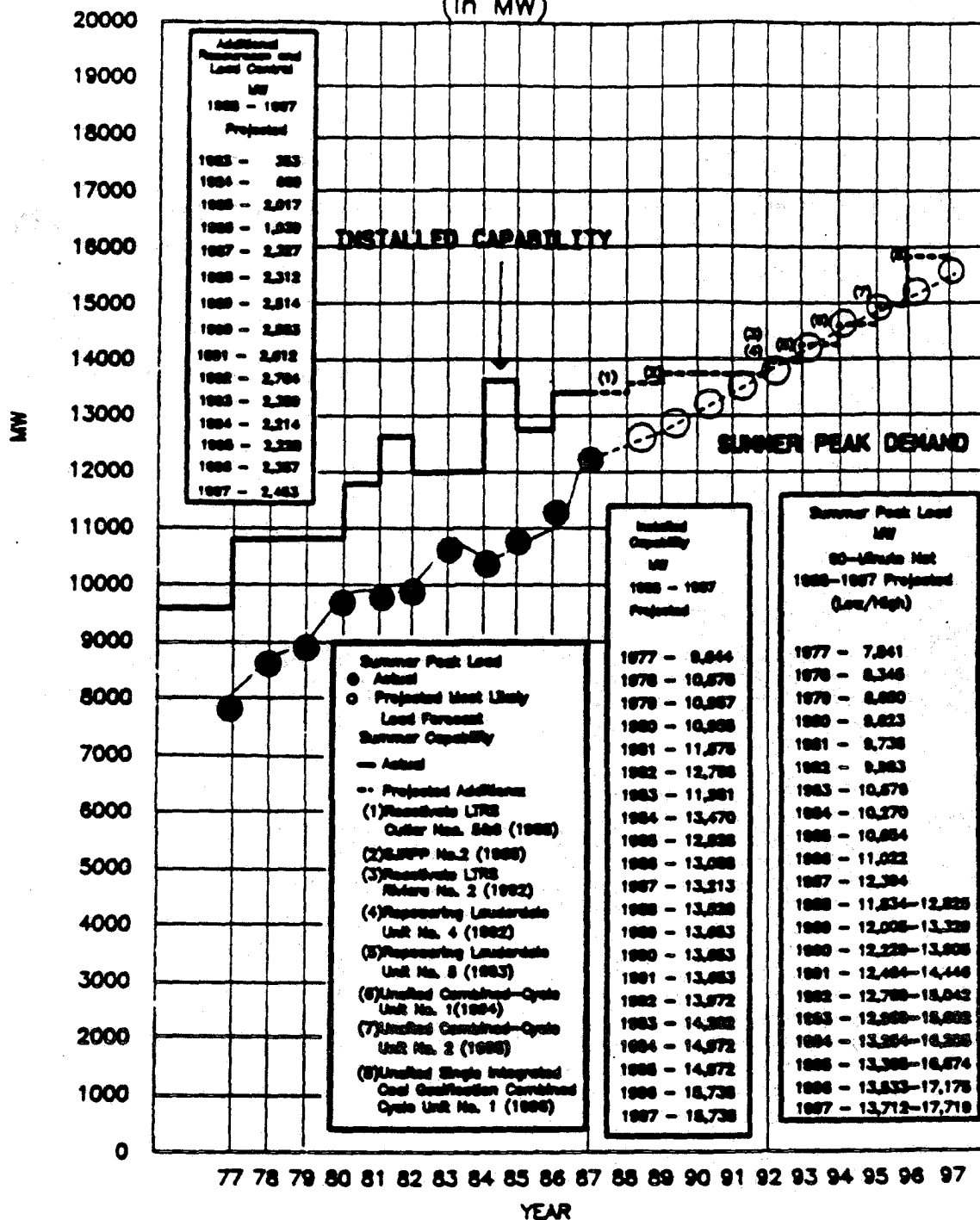
- 1/ These forecasted values reflect the Most Likely of three economic scenarios and are to be used only where a singular forecast is required. Assumes normal weather conditions. Extreme warm or cold weather could cause actual loads to significantly exceed these projections.
- 2/ Actual.

FLORIDA POWER & LIGHT CO.
ENERGY
CONSUMPTION

-03-



INSTALLED CAPABILITY AND SUMMER PEAK LOAD SUMMER OF 1977 - 1997 (In MW)



* Includes unit power purchases of 353 MW (1983), 660 MW (1984), 1,718 MW (1985), 1,725 MW (1986), 2,033 MW (1987), 2,000 MW (1988-92), 1,250 MW (1993), 850 MW (1994) and 700 MW (1995-97) of coal fired generation from the Southern Companies. Also includes unit power purchases of 299 MW (1985), 214 MW (1986) and 107 MW (1987) from Tampa Electric Company, Big Bend Coal Unit No. 4 and purchases from the St. Johns River Power Park of 187 MW (1987-88) and 374 MW (1989-1997). Remaining amounts represent a forecast of capacity expected to be available for purchase on a contracted firm basis from Qualifying Facilities and expected demand reductions due to control of customer loads. The load control MW are treated as a reduction to peak demand rather than a supply resource in the expansion plan.

B. The Power Supply Plan

The power supply plan is a product of the load forecasting and power supply planning processes. The power supply plan is presented in five sections. The first section is an update of the status of various major generation related projects since the Company's last filing of April 1, 1987. Section Two contains a summary of the specific components and alternatives which comprise the power supply plan. Section Three describes some of the important assumptions underlying the plan. Section Four is a discussion of the specific power supply coordination activities and reviews which influence the power supply plan. Section Five contains a summary of the power supply plan, reserve margins, energy mix and fuel requirements for the ten year period.

1. Update Of The Previous Year's Activities

On August 7, 1987, the Summer Peak load reached 12,394 MW, an increase of 12.45% over the previous year. The recent Winter Peak load was 12,372 MW which occurred on January 28, 1988. The highest overall peak ever recorded by FPL was 12,533 MW, which occurred on January 22, 1985.

During 1987, the Company's resources provided 61,616 GWH to serve its customer requirements, an increase of 5.75% over 1986. Nuclear power from Turkey Point Units Nos. 3 and 4 and St. Lucie Units Nos. 1 and 2 produced 23.2 percent of this energy and permitted the savings of approximately 23 million barrels of oil. During 1987, Net Interchange and Purchased Power provided 34.4 percent of this energy, primarily from coal fired units in the Southern Companies and permitted savings of an additional 34 million barrels of oil. The remaining 42.4 percent was produced by oil, natural gas and coal fired units with 20.5 percent (20.0 million barrels) from oil, 20.7 percent (133,494 million cubic feet) from natural gas and 1.2 percent (275,927 tons) from coal.

Interchange and purchased power remains an important part of FPL's fuel mix. In 1987, FPL continued to purchase firm capacity from the Southern Companies under the terms of a Unit Power Sales (UPS) agreement reached in 1981. Total capacity entitlements under this agreement amounted to 2,033 MW in 1987. UPS entitlements increased to 2,050 MW in January, 1987.

FPL also purchased firm coal fired capacity from Tampa Electric Company's (TECO) Big Bend Unit No. 4 under the terms of an agreement which became effective April 1, 1985. During 1987, FPL received up to 107 MW from this unit. The contract expired at the end of 1987.

Three of FPL's fossil fired generating units remained on Long Term Reserve Shutdown (LTRS) status. The units on LTRS, Cutler Units Nos. 5 and 6 and Riviera Unit No. 2, have a combined summer capability of 266 MW (see Form 1A, Page 3).

Due to the large increase in summer load growth observed in 1987, FPL has decided to reactivate Cutler Units Nos. 5 and 6 in June, 1988. Riviera Unit No. 2, rated at 69 MW, will remain in LTRS status.

2. The Plan Components And Alternatives

FPL has relied primarily on a combination of oil, natural gas and nuclear energy to generate electricity. In 1987, coal was added to the fuel mix providing added security to Florida's energy needs through the diversification of energy sources. The discussion that follows reflects FPL's current coal fired generation projects and the additional resources which comprise the power supply plan. The resulting energy mix by fuel type for the next ten years is shown in Exhibit 7.

Units Under Construction

In an effort to satisfy its generation capacity requirements and to further reduce its dependence on oil fired generation, FPL has negotiated ownership and operating agreements with JEA for the joint construction and operation of two coal fired generating units at the St. Johns River Power Park (SJRPP). This joint venture project is under construction in Northeast Florida and FPL will be receiving up to 50 percent of the output through a combination of joint ownership and long term unit power purchases.

FPL and JEA received final regulatory approval for SJRPP Units Nos. 1 and 2 in late 1982 and construction on the project commenced in December 1982. Unit No. 1 went into commercial operation on March 27, 1987. Unit No. 2 is scheduled for August, 1988.

Expansion Plan

During 1987, FPL conducted a study to evaluate FPL's future capacity needs beyond the coal fired projects which are currently under construction. After all of the projected effects from conservation and load management were accounted for and units currently on LTRS were returned to service, it was found that FPL's power supply would be capacity deficient by 2,716 MW through 1997 based on meeting load and required reserves.

Exhibit 7
Florida Power & Light Company
Energy By Fuel Type
(1982-1997)

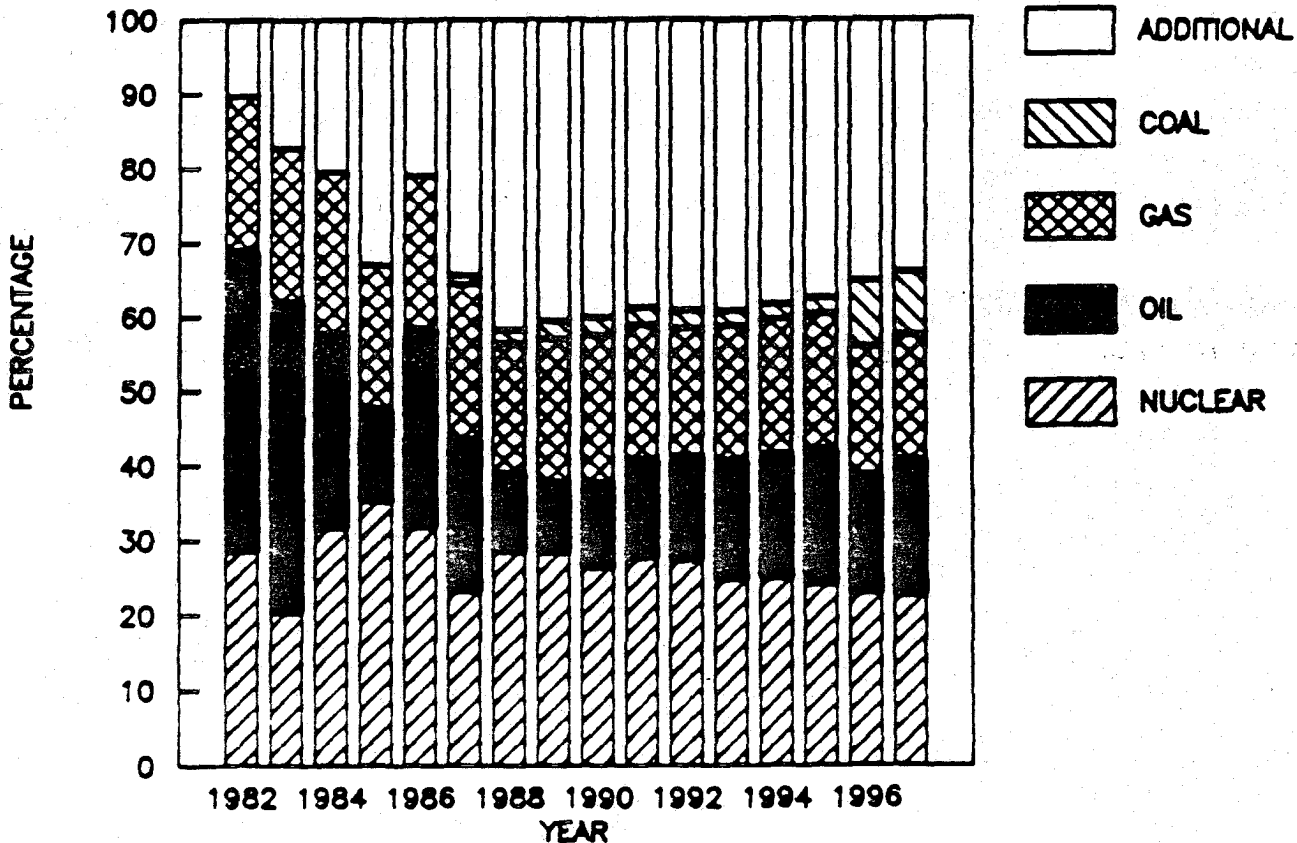
(In Percent of Total GWH)

<u>YEAR</u>	<u>NUCLEAR</u>	<u>OIL</u>	<u>GAS</u>	<u>COAL</u>	<u>ADDITIONAL</u> ^{1/} <u>RESOURCES</u>
1982 ^{2/}	28.5	40.6	20.6	----	10.3
1983 ^{2/}	20.3	41.8	20.6	----	17.3
1984 ^{2/}	31.6	26.2	21.7	----	20.5
1985 ^{2/}	35.2	12.6	19.2	----	33.0
1986 ^{2/}	31.7	26.8	20.5	----	21.0
1987 ^{2/}	23.2	20.5	20.7	1.2	34.4
1988	28.5	10.6	17.3	1.8	41.8
1989	28.3	9.6	19.1	2.4	40.6
1990	26.3	11.6	19.6	2.4	40.1
1991	27.6	13.3	18.0	2.3	38.8
1992	27.3	14.0	17.1	2.4	39.2
1993	24.7	16.1	17.9	2.0	39.3
1994	24.9	16.7	18.0	2.0	38.4
1995	24.1	18.2	18.1	2.1	37.5
1996	22.9	15.9	17.1	8.9	35.2
1997	22.6	18.2	16.7	8.5	34.0

1/ Includes Net Interchange and Purchased Power

2/ Actual

FLORIDA POWER LIGHT ENERGY BY FUEL TYPE
1982 THROUGH 1997



The selection process for the type of new capacity was made through a comprehensive study, considering not only commercially existing supply technologies, but also emerging technologies that may prove to be feasible in the future. The total list included pulverized coal, combined cycle, combustion turbine, integrated gasified combined cycle (IGCC), fluidized bed combustion, fuel cell and photovoltaic cell, power purchase and nuclear technologies.

The IGCC unit converts coal into a combustible gaseous fuel for consumption in a combined cycle system. The fluidized bed combustion unit burns coal particles which are suspended in a bed of forced air. Both of these technologies are currently approaching commercialization. The selection study, shown on the following page, is based on dual reliability targets of reserve margin and LOLP and concluded that a plan consisting of repowering Lauderdale Unit Nos. 4 and 5, followed by combined cycle, IGCC units and power purchase, best meets the needs of FPL customers.

In repowering, the existing boilers are replaced with combustion turbines and heat recovery steam generators (HRSG's) in a combined cycle configuration with the existing steam turbine. Repowering, therefore, allows use of the existing steam turbine, associated electric generator and existing condenser cooling system.

The combined cycle technology has many advantages: relatively low investment requirements, phased construction, high operating efficiency and fuel flexibility (natural gas, fuel oil or coal derived gas). The units can be designed and sited such that further flexibility in fuel could be achieved through the addition of a gasification process which utilizes coal as its primary fuel source. The construction of an IGCC can proceed in distinct phases, i.e., combustion turbines followed by the steam cycle and depending on economics, the gasifier.

Florida Power & Light Company
Requirements For New Capacity

<u>Year</u>		
1992	Repower Lauderdale No. 4 <u>1/</u>	250 MW
1993	Repower Lauderdale No. 5 <u>1/</u>	230 MW
	Unit Power Purchase From Southern Company <u>2/</u>	250 MW
1994	Combined Cycle No. 1	385 MW
	Unit Power Purchase From Southern Company <u>2/</u>	100 MW
1995	Combined Cycle No. 2	385 MW
	Unit Power Purchase From Southern Company <u>2/</u>	350 MW
1996	Integrated Gasified Combined Cycle No. 1	<u>766</u> MW
	Total	2,716 MW

1/ Repowering consists of adding two combustion turbines (125 MW net each) to each Lauderdale unit and converting to combined cycle operation. The steam cycle conversion results in a loss of capability of approximately 10 MW for a total increase in each unit of 240 MW. Repowering of Lauderdale Unit No. 4 will begin in 1992 and be completed in 1993.

2/ A letter of intent to purchase a total of 700 MW from Southern Company has been signed by both parties.

In 1986, FPL was awarded a major contract from the Electric Power Research Institute to perform more detailed site specific studies on integrated coal gasification combined cycle units.

The study will continue in 1988 and represents a commitment by FPL to actively pursue new technologies in an effort to provide a flexible, reliable supply of power.

3. Assumptions Influencing The Expansion Plan

The development of a power supply plan is not simply a matter of selecting which new generating capacity option will be built. In addition to the option of building new capacity, other supply sources must be considered, such as future purchased power contracts. The advent of cogeneration and small power producers will also contribute significantly to meet the future demand for power. These, as well as cost effective "demand side" options such as load management, must also be integrated into the plan.

After consideration of alternatives to new capacity, any new generating units must be evaluated in light of concerns over future fuel availability and prices. Since the FPL expansion plan is based on combined cycle units which will burn natural gas, the fuel issue will be addressed first.

Natural Gas Outlook

Natural gas is expected to play an important role in FPL's power supply plan for the next ten years. In spite of the fact that purchases under the firm gas supply contract with the Amoco Production Company are scheduled to expire in 1988, total natural gas availability to FPL is expected to increase in the 1988 to 1989 period as a result of Florida Gas Transmission Company's (FGT) completion in 1987, of a 100 MMCF per day pipeline capacity expansion coupled with the availability of

interruptible natural gas and remain higher than previous levels throughout the ten year period. This is based on the assumption that FGT will complete the 100 MMCF per day pipeline expansion in 1989 to make total capacity 925 MMCF per day.

Several other factors contribute to this outlook of increased availability of natural gas for FPL. The most important factor is that there is expected to be a general deliverability surplus of natural gas in the national market, including increased supplies from Canada, until at least the early 1990's. In addition, as a result of the increased availability and use of coal fired power within Florida, other electric utilities' demand for natural gas has not increased significantly, thus allowing FPL to utilize a portion of interruptible natural gas supplies transported into the state through the pipeline.

Projected Oil Consumption

FPL remains committed to the goals of the Florida Energy Efficiency and Conservation Act of 1980 (FEECA). The projected ten year oil usage projected by FPL is shown in Exhibit 8. Total consumption is projected to remain below 1986-87 levels through 1997.

Purchased Power Projections

Purchased power offers an alternative to constructing new capacity and may provide fuel diversity as well, as evidenced by the current agreement FPL has with the Southern Companies. The history and projections of current capacity entitlements from Southern Company through 1995, when the agreement expires, are shown in Exhibit 9.

FPL continues to pursue cost effective purchased power options as a source of supply to meet future needs. A letter of intent has been signed to extend the purchase power agreement with Southern Company through

2010 at a level of approximately 700 MW. FPL is also evaluating a proposal from Middle South Utilities, Inc. for the construction of two 800 MW class coal fired units in the Bahamas.

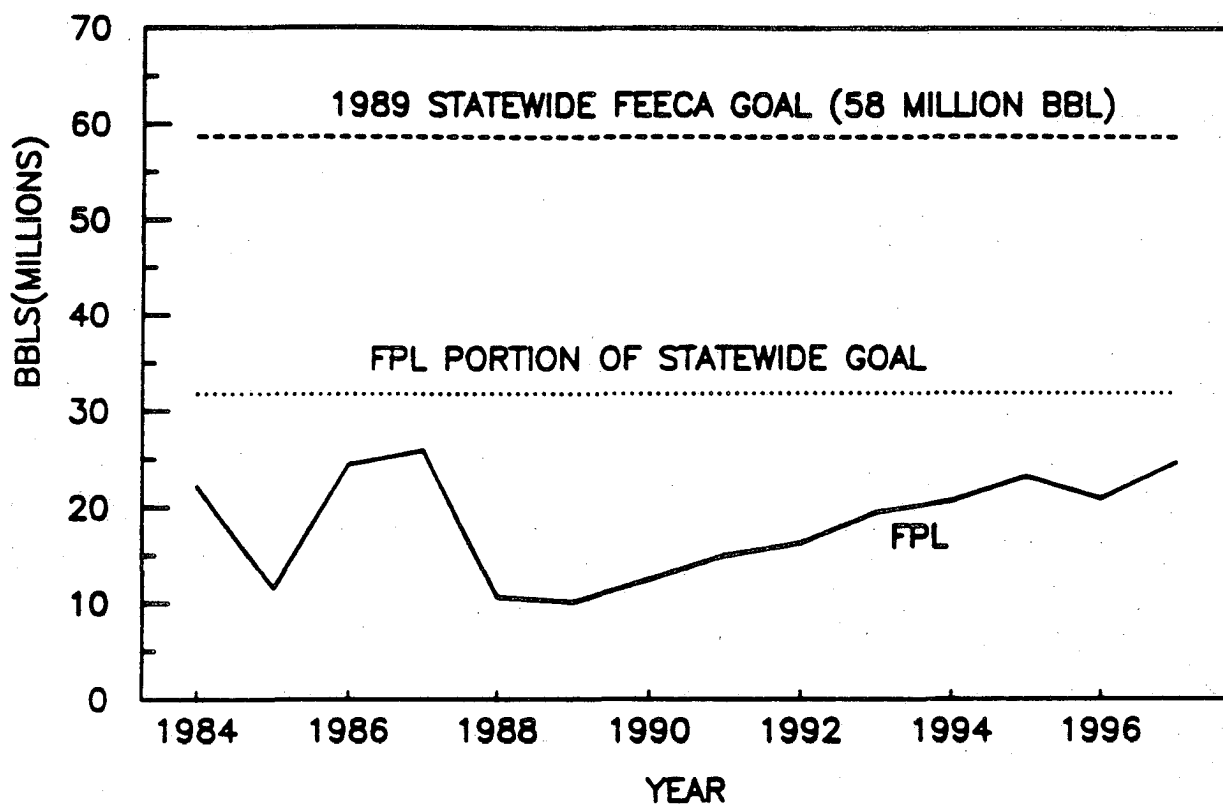
Cogeneration And Small Power Production (Qualifying Facilities)

At FPL, the Cogeneration and Small Power Production Program is an important part of the Company's Energy Management Plan. The objective of this program is to promote the installation of these types of facilities to supplement FPL resources available to meet its capacity and energy requirements. During 1987, FPL purchased 221,064 MWH from three small power producers and two cogenerators.

A cogeneration facility is one that produces electrical energy and steam or other energy, such as heat, which is used for industrial, commercial, heating or cooling purposes. A small power production facility is one that is 80 MW or less and that produces electrical energy using, as a primary energy source, biomass, waste, renewable resources, geothermal resources or any combination thereof.

EXHIBIT 8

FPL ACTUAL AND PROJECTED OIL USAGE VERSUS FEECA GOALS



The FPL portion of the FEECA statewide goal is based on the 1980 FPL usage as a fraction of total state consumption. Specific goals were not set for individual utilities. The above graph assumes extension of the 1989 goal of fifty-eight million barrels per year.

Exhibit 9

**FPL Capacity Entitlements^{1/}
From Southern Company
(In MW)**

<u>Year</u>	<u>Schedule "E"</u>		<u>UPS</u>		<u>Total</u>	
	<u>Winter</u>	<u>Summer</u>	<u>Winter</u>	<u>Summer</u>	<u>Winter</u>	<u>Summer</u>
1983	300	300	353	353	653	653
1984	300	300	663	660	963	960
1985	300	300	1722	1718	2022	2018
1986	300	300	1727	1725	2027	2025
1987 ^{2/}	0	0	2033	2033	2033	2033
1988	0	0	2050	2048	2050	2048
1989	0	0	2000	2000	2000	2000
1990	0	0	2000	2000	2000	2000
1991	0	0	2000	2000	2000	2000
1992	0	0	2000	2000	2000	2000
1993	0	0	1667	1250	1667	1250
1994	0	0	1250	850	1250	850
1995	0	0	850	700	850	700

1983 Winter = Winter 1982-83

^{1/} Totals reflect capacity entitlements resulting from the signed letter of intent between FPL and Southern Company. If an agreement is reached, FPL would be entitled to 250 MW (beginning in the summer of 1993), 350 MW (summer of 1994) and 700 MW (summer of 1995 through 2010).

^{2/} Values for 1983-87 are actuals.

FPL has contracted with the U.S. Sugar Corporation (USSC) for the purchase of energy from two facilities located in Clewiston and Bryant, Florida. These purchases take place during the November to March sugar cane grinding season. The estimated energy received from the two USSC facilities is approximately 50,000 MWH per year (this represents the equivalent of approximately 6 MW and 17 MW of generating capacity respectively from the two facilities). USSC uses the bagasse by-products of the grinding process as the primary fuel for the generation of steam for electrical generation. These purchase agreements provide that deliveries from the facilities are subject to availability.

In January, 1982, FPL interconnected with the Dade County Waste Resource Recovery Facility, which has an installed generating capacity of 77 MW. This energy is received on an as-available basis.

During 1984, FPL entered into a contract with the Florida Crushed Stone Company, a rock/aggregate/cement/lime manufacturer, (located near Brooksville, Florida) for the purchase of the electric output from their proposed 110 MW cogeneration facility. This facility will become operational in 1988, with deliveries expected to commence by the summer of 1988.

During 1985, FPL entered into a contract with the Royster Company for the purchase of approximately 8 MW from their proposed cogeneration facility. This facility is located near Mulberry, Florida, in Tampa Electric Company's service area. Deliveries started in early 1986, on an as-available, basis with firm deliveries of 8 MW expected to commence in 1992.

During 1986, FPL interconnected with the Dade County Downtown Government Center Facility, which has an annual average power output of 19 MW (30 MW maximum). This power is received on an as available basis.

Current information supports incorporating approximately 770 MW (summer) and 4,798,100 MWH of purchased power from Qualifying Facilities into FPL's power supply plans during the next ten years. Exhibit 10 lists the expected annual contribution of capacity and energy from Qualifying Facilities through 1997.

Residential Load Control

Direct utility load control is one technique used to reduce peak demand for electricity (it is not expected to provide significant energy reductions). FPL's residential load control program, the "On Call Program," offers incentive payments in the form of credits on the monthly bill to residential customers who volunteer to FPL to remotely control their central electric air conditioning and heating systems, conventional electric water heaters and pool pumps. The program is now being implemented in selected portions of Dade County. An expansion of the program into the rest of the FPL system is planned to begin in 1989. Load control will be implemented with FPL's new Load Management System (LMS), a bi-directional communication system which utilizes existing power lines for the transmission of control signals.

Data from past load control experimental studies conducted by FPL and by load control results from other utilities indicate that peak demand reductions can be accomplished. The estimated peak demand reduction due to the residential load control program is approximately 600 MW in 1997. Further demand reduction capability is expected in later years.

Exhibit 10
Capacity And Energy Contributions
From Qualifying Facilities

<u>Year</u>	<u>Firm Cumulative Summer (MW)</u>	<u>Firm Cumulative Winter (MW)</u>	<u>Cumulative^{1/} Annual Energy (MWH)</u>
1988	110.0	110.0	878,700
1989	110.0	160.6	1,244,100
1990	160.6	160.6	2,108,900
1991	160.6	160.6	2,108,900
1992	268.6	448.6	3,205,000
1993	498.6	498.6	4,224,400
1994	649.7	649.7	4,368,900
1995	719.7	719.7	4,491,500
1996	759.7	759.7	4,736,800
1997	769.7	769.7	4,798,100

1988 Winter = Winter 1988-1989

^{1/} Includes As Available (non-firm) energy purchases from Qualifying Facilities

Commercial And Industrial Load Control

FPL also plans to offer load control to its commercial and industrial customer classes. Both demand billed customers (i.e., demand exceeding 20 KW) and non-demand billed customers (i.e., demand is less than 20 KW) will be eventually eligible for such an offering. In 1987, the Florida Public Service Commission approved FPL's petition to implement a trial project involving load control of a relatively small number of FPL's largest commercial/industrial customers. The trial is scheduled to begin in April, 1988 and to last for approximately three years. FPL will use the data gathered during the trial to develop and implement a full load control program for these customers which should begin immediately after the conclusion of the trial. In addition, load control programs for the rest of FPL's commercial/industrial customers will be developed.

4. Coordinated Power Supply Planning Studies

FPL firmly supports coordinated power supply planning studies among the electric utilities in the State, individually and through the FCG. FPL believes that well coordinated planning results in benefits for its own rate payers as well as the rest of Florida. Several coordinated power supply planning studies have been conducted in past years: the "Power Broker Study" and the "Expanded Broker Project," a study entitled "Alternatives Available to Reduce Oil Consumption by Florida's Electric Utilities," the "Peninsular Florida Economic Oil Displacement Study," the "Peninsular Florida Coal-by-Wire Study" and the "Cost Effective Oil Backout Study", which included the participation of the Tennessee Valley Authority and Southern Company Services, Inc.

FPSC Annual Planning Hearings

FPL has actively participated in the FPSC Conservation Planning and Load Forecast and Annual Planning Hearing (APH) activities. The basic purpose of these activities is to assist the FPSC in developing planning related data and also to assist it in the development of prices for capacity and energy from cogeneration facilities from a statewide perspective. Special committees composed of utility representatives, including FPL members, were formed by the FCG to assist in the APH process. In 1986, FPL also filed the results of its own individual utility generation planning process with the FPSC, as a part of the Annual Planning Hearing.

5. Summary

The result of employing the comprehensive approach to load forecasting and demand reduction planning, power supply planning, transmission planning and site selection has yielded a power supply plan which is expected to provide reliable continuous service in a cost effective manner to FPL's customers. It will also further diversify both FPL's generation technology and fuel mix. FPL's currently planned facility

additions and reserve margins, for Summer and Winter Peak load periods through 1997, are shown in FPL Forms 6, 7A and 7B. The FPL system fuel mix by fuel type and fuel requirements through 1997 are shown in FPL Forms 3A and 3B.

FLORIDA POWER & LIGHT COMPANY

FPL Form 6
Page 1 of 2

PLANNED AND PROSPECTIVE GENERATING FACILITY ADDITIONS AND CHANGES 1/

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Plant Name	Unit No.	Location	Unit Type	Fuel		Const. Start No./Yr.	Commercial In-Service No./Yr.	Gen. Max. Nameplate KW	Net Capability		Fuel Transport.		Status
				Pri.	Alt.				Summer MW	Winter MW	Pri.	Alt.	
St. Johns River Power Park 2/	2	Duval County 12/18/28E	FS	C	No 3/	12/82	1988	665,146	125.0	125.0	RR	NO	V
Lauderdale	4	Broward County 30/506/42E	CC	NG	LO	1990	1992	860,000	754.0	756.0	PL	UNK	P 4/
	5					1990	1993	430,000	377.0	378.0			P
Unsalted Combined Cycle Units		Unknown						880,000	770.0	856.0			
	1		CC	NG	LO	1990	1994	440,000	385.0	428.0	PL	Unk	P
	2		CC	NG	LO	1991	1995	440,000	385.0	428.0	PL	Unk	P
Integrated Coal Gasification Combined Cycle								880,000	766.0	845.0			
	1	Unknown	IGCC	C	Unk	1990	1996	880,000	766.0	845.0	RR	Unk	P
Outler		Dade County 24/558/40E						236,500	197.0	199.0			
	5		FS	NG	NO	-----	1988	75,000	67.0	68.0	PL	S	S
	6		FS	NG	NO	-----	1988	161,500	130.0	131.0	PL	S	S
Riviera		City of Riviera Beach 33/428/43E						75,000	69.0	71.0			
	2		FS	NG	NO	-----	1992	75,000	69.0	71.0	PL	S	S

1/ Includes only those facilities which are subject to certification under the Florida Electrical Power Plant Siting Act which are projected to be in service during the Site Plan reporting period.

2/ Joint JEA/FPL Units - Through a combination of joint unit ownership and long-term power purchases, FPL's share of the output from each unit is 50% of the total capacity. The output illustrated in this Table is the 20% of firm capacity which will be owned by FPL.

3/ The units will have the capability of future conversion to liquid fuels, gas and refuse derived solid fuels.

4/ The ratings shown for Lauderdale Units 4&5 represent the total capacity after repowering and conversion to combined cycle.

PLANNED AND PROSPECTIVE GENERATING FACILITY ADDITIONS AND CHANGES (Cont.) 1/

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Plant Name	Unit No.	Location	Unit Type	Fuel		Const. Start No./Yr.	Commercial In-Service No./Yr.	Gen. Max. Nameplate KW	Net Capability		Fuel Transport.		Status
				Pri.	Alt.				Summer MW	Winter MW	Pri.	Alt.	
Martin 2/ (PR)	-	Martin County 29/398/38E (RPC10)	--	--	--	----	---- 3/	-----	----	----	--	--	--
South Dade 2/ (PO)	-	Dade County 29/588/40E (RPC11)	--	--	--	----	---- 3/	-----	----	----	--	--	--
DeSoto 2/ (PO)	-	DeSoto County 25/368/25E (RPC 7)	--	--	--	----	---- 3/	-----	----	----	--	--	--

1/ Includes only those facilities which are subject to certification under the Florida Electrical Power Plant Siting Act which are projected to be in service during the Site Plan reporting period.

2/ FPL has property held for future use (FERC Account 105) for the following sites as of December 31, 1986: Martin, 1,725 acres (\$1,017,541), South Dade, 9,923 acres (\$8,521,294) and DeSoto, 13,454 acres (\$9,566,899). For additional information, see FERC Form No. 1, page 214, "Electric Plant Held for Future Use".

3/ These sites will be considered along with FPL's existing plant and substation sites in determining an appropriate location for the designated combined cycle and IGCC units or future, unspecified, generating units whose in-service dates are beyond the reporting period.

FORECAST OF CAPABILITY, DEMAND, AND SCHEDULED MAINTENANCE
AT TIME OF SUMMER PEAK

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Year	Total Installed 1/ Capability MW	Firm Peak 2/ Demand MW	Installed Margin Before Maintenance 3/ MW % of Peak		Additional Resources				Scheduled Maintenance MW	Total Installed Margin After Maintenance MW % of Peak 6	
			MW	% of Peak	Firm Import MW	Qualifying Facilities MW	Load 4/ Control MW	Total MW		MW 5/	% of Peak 6
1988	13,528	12,139	1,404	11.6	2,187	110	15	2,297	839	565	4.7
1989	13,653	12,457	1,226	9.9	2,374	110	30	2,484	0	1,226	9.9
1990	13,653	12,867	834	6.5	2,374	161	48	2,535	0	834	6.5
1991	13,653	13,273	457	3.5	2,374	161	77	2,535	0	457	3.5
1992	13,972	13,726	387	2.8	2,374	269	141	2,643	0	387	2.8
1993	14,202	14,117	321	2.3	1,624	499	236	2,123	0	321	2.3
1994	14,587	14,564	363	2.6	1,224	650	340	1,874	0	363	2.6
1995	14,972	14,877	529	3.7	1,074	720	434	1,794	0	529	3.7
1996	15,738	15,216	1,045	7.1	1,074	760	523	1,834	0	1,045	7.1
1997	15,738	15,605	742	4.9	1,074	770	609	1,844	0	742	4.9

- 1/ Capability additions and changes projected to be in-service by August 1st are considered to be available to meet Summer peak loads which are forecast to occur during August of the year indicated. All values are Summer net MW.
- 2/ These forecasted values reflect the Most Likely of three economic scenarios and are to be used only where a singular forecast is required.
- 3/ The installed margin is calculated as Installed Capability less peak demand after load control. MW = Column 2 - (Column 3 - Column 8).
- 4/ The MW shown are for the residential load control program only. They are not included in total additional resources but modify the peak load upon which margin calculations are based.
- 5/ MW = Column 2 - (Column 3 - Column 8) - Column 10
- 6/ % = (Column 11) * (100) / (Column 3 - Column 8)

FORECAST OF CAPABILITY, DEMAND, AND SCHEDULED MAINTENANCE
AT TIME OF WINTER PEAK

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Year	Total Installed 1/ Capability MW	Firm Peak 2/ Demand MW	Installed Margin Before Maintenance 3/		Additional Resources				Scheduled Maintenance MW	Total Installed Margin After Maintenance	
			MW	% of Peak	Firm Import MW	Qualifying Facilities MW	Load 4/ Control MW	Total MW		MW 5/	% of Peak 6/
1988/89	14,141	12,675	1,341	10.6	2,374	110	22	2,484	277	1,211	9.6
1989/90	14,141	13,139	1,002	7.6	2,374	161	36	2,535	277	761	5.8
1990/91	14,141	13,532	609	4.5	2,374	161	58	2,535	0	667	5.0
1991/92	14,212	13,938	274	2.0	2,374	161	96	2,535	0	370	2.7
1992/93	14,462	14,373	89	0.6	2,041	449	183	2,490	1,159	(887)	(6.3)
1993/94	14,942	14,882	60	0.4	1,624	499	285	2,123	644	(299)	(2.0)
1994/95	15,427	15,235	192	1.3	1,224	650	387	1,874	790	(211)	(1.4)
1995/96	16,162	15,589	573	3.7	1,074	720	474	1,794	688	359	2.4
1996/97	16,929	16,017	912	5.7	1,074	760	561	1,834	0	1,473	9.5
1997/98	16,929	16,375	554	3.5	1,074	770	646	1,844	0	1,200	7.6

1/ Capability additions and changes projected to be in-service by January 1st are considered to be available to meet Winter peak loads which are forecast to occur during January of the second year indicated. All values are Winter net MW.

2/ These forecasted values reflect the Most Likely of three economic scenarios and are to be used only where a singular forecast is required.

3/ The installed margin is calculated as Installed Capability less peak demand after load control. MW = Column 2 - (Column 3 - Column 8).

4/ The MW shown are for the residential load control program only. They are not included in total additional resources but modify the peak load upon which margin calculations are based.

5/ MW = Column 2 - (Column 3 - Column 8) - Column 10

6/ % = (Column 11) * (100) / (Column 3 - Column 8)

FLORIDA POWER & LIGHT COMPANY

ENERGY SOURCES

			ACTUAL 1/					
Energy Sources			1986	1987	1988	1989	1990	1991
(1)	Annual Energy Interchange	2/ GWH	12,007	20,995	25,795	25,648	25,564	25,634
(2)	Nuclear	GWH	18,473	14,267	18,137	18,718	18,121	19,684
(3)	Coal	GWH	6	745	1,130	1,597	1,659	1,650
(4)	Residual - TOTAL	GWH	15,570	12,626	6,721	6,372	7,955	9,467
(5)	Steam	GWH	15,569	12,626	6,721	6,372	7,955	9,467
(6)	CC	GWH	1	----	----	----	----	----
(7)	Distillate - TOTAL	GWH	50	30	19	10	6	18
(8)	CC	GWH	----- 4/	5	14	3	3	0
(9)	CT	GWH	50	25	5	7	3	18
(10)	Natural Gas - TOTAL	GWH	11,944	12,729	10,996	12,615	13,478	12,848
(11)	Steam	GWH	9,670	10,571	8,345	9,629	10,335	9,726
(12)	CC	GWH	2,252	2,043	2,651	2,985	3,143	3,122
(13)	CT	GWH	22	115	----- 4/	1	1	1
(14)	Other 3/	GWH	216	223	880	1,241	2,102	2,097
(15)	Net Energy For Load	GWH	58,266	61,615	63,688	66,181	68,856	71,379

1/ Sources: FERC Form No. 1, page 401, lines 3 through 18 and pages 402 and 403, lines 12, 38 and 39. FPL Operating Records.

2/ The projected figures are based on estimated energy purchases from the Southern Companies and include economy energy transactions.

3/ Represents a forecast of energy expected to be available from Qualifying Facilities.

4/ Less than 0.5 GWH.

FLORIDA POWER & LIGHT COMPANY

ENERGY SOURCES (Cont.)

Energy Sources			1992	1993	1994	1995	1996	1997
(1)	Annual Energy Interchange	1/ GJM	25,911	25,844	25,976	26,010	26,654	26,391
(2)	Nuclear	GJM	20,288	18,972	19,677	19,566	19,112	19,345
(3)	Coal	GJM	1,748	1,561	1,596	1,682	7,426	7,285
(4)	Residual - TOTAL	GJM	10,374	12,182	13,023	14,569	13,082	15,412
(5)	Steam	GJM	10,374	12,182	13,023	14,569	13,082	15,412
(6)	CC	GJM	-----	-----	-----	---	-----	-----
(7)	Distillate - TOTAL	GJM	18	156	147	165	198	224
(8)	CC	GJM	3	94	20	68	102	159
(9)	CT	GJM	15	62	127	97	96	65
(10)	Natural Gas - TOTAL	GJM	12,719	13,765	14,234	14,682	14,301	14,312
(11)	Steam	GJM	9,602	11,095	8,696	7,632	7,303	7,220
(12)	CC	GJM	3,097	2,678	5,496	7,048	6,995	7,091
(13)	CT	GJM	20		44	2	3	1
(14)	Other 2/	GJM	3,213	4,218	4,360	4,493	4,750	4,795
(15)	Net Energy For Load	GJM	74,244	76,687	79,800	81,171	83,509	85,753

1/ The projected figures are based on estimated energy purchases from the Southern Companies and include economy energy transactions.

2/ Represents a forecast of energy expected to be available from Qualifying facilities.

FLORIDA POWER & LIGHT COMPANY

FUEL REQUIREMENTS 1/

Fuel Requirements			Actual 2/		1986	1987	1988	1989	1990	1991
			1986	1987						
(1)	Nuclear	Trillion BTU	202	157	197	204	197	214		
(2)	Coal	1000 TON	55	276	444	626	651	648		
(3)	Residual - TOTAL	1000 BBL	24,370	19,992	10,559	10,031	12,521	14,859		
(4)	Steam	1000 BBL	24,370	19,992	10,559	10,031	12,521	14,859		
(5)	CC	1000 BBL	0	----	----	----	----	----		
(6)	Distillate - TOTAL	1000 BBL	129	74	44	25	13	45		
(7)	CC	1000 BBL	2	7	31	7	4	1		
(8)	CT	1000 BBL	127	67	13	18	9	44		
(9)	Natural Gas - TOTAL	1000 MCF	122,969	133,494	113,505	130,197	139,072	132,480		
(10)	Steam	1000 MCF	100,870	111,400	86,601	100,077	107,436	101,249		
(11)	CC	1000 MCF	21,409	20,094	26,096	30,110	31,619	31,414		
(12)	CT	1000 MCF	690	2	7	10	16	17		
(13)	Annual Avg. Fossil Net H.R.	BTU/KWH	10,104	10,279	9,883	9,859	9,863	9,867		

1/ Reflects fuel requirements for FPL only.

2/ Sources: FERC Form No. 1, pages 402 and 403, lines 12, 38 and 39. FPL Operating Records.

FLORIDA POWER & LIGHT COMPANY

FUEL REQUIREMENTS (Cont.) 1/

Fuel Requirements			1992	1993	1994	1995	1996	1997
(1)	Nuclear	Trillion BTU	221	207	214	213	208	211
(2)	Coal	1000 TON	685	612	626	659	2,613	2,560
(3)	Residual - TOTAL	1000 BBL	16,273	19,164	20,342	22,825	20,467	24,163
(4)	Steam	1000 BBL	16,273	19,164	20,342	22,825	20,467	24,163
(5)	CC	1000 BBL	-----	-----	-----	-----	-----	-----
(6)	Distillate - TOTAL	1000 BBL	39	332	357	360	412	441
(7)	CC	1000 BBL		177	37	115	170	277
(8)	CT	1000 BBL	39	155	320	245	242	165
(9)	Natural Gas - TOTAL	1000 MCF	131,528	130,913	130,769	129,269	125,545	125,281
(10)	Steam	1000 MCF	100,049	104,147	80,684	69,965	66,651	65,586
(11)	CC	1000 MCF	31,201	26,760	49,271	59,274	58,845	59,686
(12)	CT	1000 MCF	278	6	814	30	49	14
(13)	Annual Avg. Fossil Net H.R.	BTU/KWH	9,871	9,538	9,385	9,249	9,209	9,252

1/ Reflects fuel requirements for FPL only.

APPENDIX 1D
SUBSECTIONS A AND B
SECTION IV
FLORIDA POWER & LIGHT COMPANY
TEN YEAR
POWER PLANT SITE PLAN
1988-1997
APRIL 1, 1988

IV. THE PLAN

The following is a discussion of the composite plan supported by the reasoning which led to its development. In the interest of ease in presentation, this plan is subdivided into three parts: "The Load Forecast," "The Power Supply Plan" and "The Sites."

A. The Load Forecast

The load forecast portion of the plan is presented in six sections. The first two sections contain a description of the basic statistical methodology used in the development of the present net energy and peak load forecasts, respectively. Section three contains a description of how the effects of conservation on FPL's expected growth are modeled. Section four is a summary of the principal assumptions used in the preparation of the peak load and energy forecasts. Section five is a discussion of load management programs and section six contains a summary of the peak load and net energy forecasts.

1. The Energy Forecast Model

The economy of FPL's service area is composed of the tourist, construction, agricultural, service, and manufacturing sectors. To adequately forecast the energy requirements for the area, this unique mix has to be recognized.

In order to more accurately evaluate and project the patterns of growth for the coming years, separate forecasting equations were used for the following classes of customers: Residential, Commercial, Industrial, Resale, Street and Highway Lighting and Other Public Authority Sales. The Railroads and Railways class employs no explicit forecasting equation. Forecasts are based on specific information about the class.

Residential Sales

Residential sales are forecasted by using the Residential End Use Energy Planning Model (REEPS) developed by EPRI. REEPS incorporates FPL's Home Energy Survey data to forecast energy demand by analyzing various price, cost and energy decisions involved in purchasing household appliances.

Typical input requirements used in REEPS are the price of electricity, weather variables, appliance type and household characteristics such as income, age of head of household, household size, tenure status, number of rooms, building type, as well as housing vintage. REEPS output is FPL's residential sales forecast which is generated into five categories: 1) annual energy consumption by major fuel and end use, 2) appliance market penetrations in new housing, 3) replacements of appliances in existing dwellings, 4) new appliance installations in existing dwellings and 5) relative operating efficiencies of appliances.

It is expected that residential conservation programs will have a pronounced effect on residential consumption in the future; therefore, REEPS model output is calibrated to reflect the customers' response to FPL's conservation programs. However, increasing population in FPL's service territory will result in a projected net increase of 3.4% per year in residential sales during the forecast period of 1988-1997.

Commercial Sales

An end use model is used to forecast commercial energy (KWH) sales. Some of the end uses modeled include air conditioning, water heating, and lighting. Building types identified consist of restaurants, offices, and colleges, among others.

The model views energy demand as a product of three factors. These factors are: 1) commercial floor space by building type, 2) energy

requirements for specific end uses and building types, and 3) the utilization of energy using equipment.

Each of these factors is modeled in the following manner. Future additions to floor space are modeled using employee per square foot relationships, combined with specific employment forecasts of various industries. Energy requirements by end use are based on United States Department of Energy (Region 4) data adjusted for certain costs and technology parameters. Finally, equipment utilization is a function of operating costs and equipment efficiency.

The above factors, along with information on end use energy market shares, combine to produce a commercial sales forecast. Over the forecast period of 1988-1997, commercial sales are projected to grow at 3.4% percent per year.

Industrial Sales

FPL's total industrial sales are forecast by using a regression model which contains FPL service area population and Florida manufacturing employment as explanatory variables.

Since most of FPL's industrial customers are in goods producing (manufacturing) industries, the level of employment in Florida's manufacturing sectors tends to be highly correlated with the amount of electricity industrial customers will use. FPL's service area population is also an important factor in explaining electricity usage by this customer class, since many industrial customers are enterprises which produce goods which are marketed and sold to individuals and businesses residing or located in FPL's service area. Currently, it is projected that sales to this class will increase at 2.1% percent per year during the forecast period 1988-1997.

Resale (Wholesale) Sales

The long term forecast of resale sales is comprised of three categories: 1) sales to Seminole Electric Cooperative, Inc. (Seminole), 2) sales to wholesale full requirements customers other than Seminole, and 3) sales to partial requirements customers. The forecast of sales to Seminole is based on regression analysis, state space modeling, and load duration curve analysis. The forecast of sales to full requirements customers other than Seminole results from regression analysis. The forecast of sales to partial requirements customers is based on short term estimates from the customers and historical usage patterns.

Street and Highway Lighting Sales

Street and highway lighting sales are forecast by using the street and highway customers and the FPL population forecasts as explanatory variables. Thus, growth in total sales for this class is largely a function of customer growth. Use per street light customer has shifted downward as a result of replacing mercury vapor and incandescent lights with the more efficient high pressure sodium vapor lamps. These offsetting factors yield an increase of 4.8% percent per year for sales to this class during the forecast period.

Other Public Authority Sales

"Other" sales are electricity sales to governmental accounts such as military bases, sport fields, and sports coliseums. Since the Sports Field Service (OS-2) rate class within this customer revenue class has been "closed" by public law, electricity sales to this customer class are expected to increase only slightly over the forecast horizon. Specifically, total Other Public Authority sales have been projected to increase by 2.4% percent per year during the forecast period.

Railroads and Railways

This classification includes railroads and interurban and street railways, for general railroad use. Dade County's Metrorail is included in this class.

2. The Peak Load Models

Summer Peak Model

Annual Summer Peak demands are forecast with a "use per customer" multiple regression model, which contains the real average price of electricity, real per capita income and a weather term multiplied by the stock of air conditioning appliances as explanatory variables. The real price of electricity is included in the model to reflect customer response to price changes and price levels during very warm weather conditions.

Real per capita income is included in the model since it serves as an indicator of the economic prosperity of an area. This, of course, will have both direct and indirect impacts on electricity consumption.

A weather term, which is summer maximum temperature squared multiplied by FPL service area air conditioning saturation, is also used in the model since wide fluctuations in summer peak demand which occur on a year-to-year basis are usually caused by varying weather conditions, rather than by changes in economic or demographic conditions. Additionally, a time varying parameter on the appliance stock of air conditioning is included to capture the improved appliance efficiencies.

The output of the use per customer model is multiplied by the number of FPL summer customers to obtain the total peak forecast values.

Winter Peak Model

A multiple regression model, which contains a price term, a weather term, and an appliance saturation term as explanatory variables, was

used to produce the long term winter peak use per customer forecast. Likewise, a term is included to capture increased appliance efficiency through time.

A composite variable comprising electric heating saturation and a price term is included in the model. The price variable is included in the model in order to account for variations in a customer's peak electricity consumption that may result from changing prices. An appliance saturation variable (electric heating saturation) is included in the model because cold weather winter peaks are primarily the result of customers' utilization of electric space heating equipment. Finally, a weather term (minimum temperature) is used in the model to account for fluctuations in winter peak that occur because of variations in weather.

The output value of the use per customer model is multiplied by the number of FPL winter customers to obtain the total winter peak demand forecast.

3. Conservation Modeling

The regression techniques previously described are used to derive equations that forecast long term energy sales and peak demand. The resultant coefficients are based solely on history and cannot predict the effects of future technological advancements or changes in consumer lifestyle. In order to have a realistic forecast, these anticipated changes must be estimated separately.

Currently, six conservation areas are included in the long term forecast. These are: 1) commercial/industrial lighting incentive program, 2) swimming pool pump "timer" program, 3) commercial/industrial customers' audit program, 4) home energy loss prevention program, 5) customer incentive programs and 6) street light conservation program. Following is a brief overview of these programs.

Commercial/Industrial Lighting Incentive Program

This is an incentive program, which began in mid-1984, designed to encourage demand and non-demand commercial/industrial customers to replace their fluorescent lamps with reduced wattage energy efficient lamps.

Residential Pool Usage Moderation Program (Pool Pump Timer)

The Residential Pool Pump Program was developed by FPL for the purpose of lowering both the annual energy usage (KWH) and peak demand requirements (KW) of residential customers who own swimming pools.

FPL began offering pool audits to its residential customers in June 1981. The auditors place timing devices on swimming pool pumps. The timers shut off the pool pumps during the time of the day when the system normally experiences its peak demand; furthermore, they reduce the number of hours of daily operation of most swimming pool pumps, while still maintaining pool cleanliness.

Commercial/Industrial Customer Audit Program

This is an energy audit program designed to assist commercial/industrial customers in making their facilities more energy efficient through the installation of conservation measures and the implementation of conservation practices.

Each year, FPL offers energy audits to small (peak demand of 20 KW or less), medium (21 through 499 KW peak demand), and large (peak demand of 500 KW or more) commercial/industrial customers. The savings for each customer are commensurate with its size.

Customer Incentive Programs

In an effort to induce customers to upgrade the thermal efficiency of their dwellings and/or to purchase more energy efficient appliances, FPL has initiated incentive programs in each of the following areas: 1) home energy loss prevention, 2) window film treatment, 3) water heating and 4) residential ceiling insulation.

Street Light Program

FPL is currently engaged in a program to convert its incandescent and mercury vapor street lights to the more efficient high pressure sodium vapor lamps while still maintaining comparable illumination levels.

Total Conservation Effects

The cumulative effects of the previously described eight conservation programs are estimated to produce the following reductions to the summer peak forecast over the next ten years:

<u>Year</u>	<u>Summer Peak Demand Reduction (MW)</u>
1988	321.1
1989	363.4
1990	402.7
1991	402.7
1992	402.7
1993	402.7
1994	402.7
1995	402.7
1996	402.7
1997	402.7

4. Principal Assumptions

In this section, the assumptions used in the preparation of the peak load and net energy forecasts are developed:

Population and Customer Growth

Population in the Florida Power & Light Company service area will continue to grow throughout the period of 1988 to 1997, but at a somewhat lower rate than in the past.

The growth is primarily the result of in-migration concentrated in the 25 to 44 and over 65 age groups. Three forecasted factors help to explain this. First, the growing job opportunities in Florida attract a large population of the baby boomers, who fall into the 25-44 age group. Second, Florida will continue to remain an appealing place to retire. Third, the total fertility rate for the United States has fallen to 1.8 children per woman as of 1981. This, of course, limits the growth in population of the 25 and under age groups.

Historically, the number of Florida Power & Light Company customers has grown at a rate faster than the population. From 1976 to 1986, total customers increased at an average annual rate of 4.3 percent. Residential customers, who currently represent about 89 percent of total customers, have accounted for most of this increase. In 1950, there were 4.2 people for every residential customer. By 1985, this ratio had dropped to 2.25 and is projected to be 2.11 by 1996. Factors which contribute to this reduced ratio are the a) lower birth rates, b) increase in percentage of elderly, c) decrease in extended families, d) tendency of more people to remain single longer and live at home and e) increase in divorce.

Price

The price forecast considers the results of the previously described load forecast and the planned resource additions. The revenue required to support the power supply plan is calculated and then converted to the real price per kilowatt-hour.

Historically, the real average price per kilowatt-hour for FPL's customers fell at an average annual rate of 3.4 percent from 1965 through 1973. However, from 1977 through 1987, the real price increased at an average annual rate of 0.3% percent. This variation was caused by several coinciding unusual circumstances which caused the cost of operating an electric utility to increase at a rate faster than inflation. The real price of electricity is expected to decrease .9 percent per year during the period from 1987 to 1997.

Economic Growth

The impact of Florida's economic growth upon the short term retail (jurisdictional) net energy forecast and the long term sales and customer forecasts is incorporated into the model by the inclusion of such economic variables as Florida total real income, Florida manufacturing employment, Florida total (non-agricultural) employment and the number of housing starts in the State.

Through 1997, Florida real personal income is forecasted to grow at a compound average annual rate ranging from a low of 1.7 percent to a high of 4.9 percent. Florida manufacturing employment and Florida total (non-agricultural) employment are expected to grow at compound average annual rates ranging from 0.8 to 3.1 percent and from 1.7 to 3.9 percent respectively, during the 1987 to 1997 time period. Housing starts in the state are predicted to occur at an annual number ranging from an average low of 130,000 to an average high of 207,000 through 1997.

Underlying the growth in Florida's real income, employment and other economic indicators will be the influx of new residents into the State. Although Florida's population is expected to grow at a somewhat slower rate in the future, the immigration of new residents will continue to

boost the State's economy through two channels. First, the population growth resulting from immigration will increase the demand for goods and services consumed in the State. Second, Florida's labor force will expand as new residents enter the State. A larger labor force, in turn, should increase the State's productive capacity.

While Immigration has traditionally played the major role in Florida's economic growth, there are also signs that the State's economy is expanding in new directions. For example, the concentration of high tech manufacturing firms around the "Space Belt" is forecasted to continue growing in the future. Many of these firms can be expected to benefit from the increased emphasis on defense spending. In general, the growth of "high tech" manufacturing should help offset Florida's traditional reliance on tourism and agriculture.

Air Conditioning Saturation

Air conditioning saturation in the FPL service area is currently estimated to be 92.5 percent. This saturation is expected to continue to increase slowly to 94.5 percent by 1997.

Heating Saturation

The number of customers using electricity to heat their homes and apartments is expected to grow as the availability of natural gas is expected to remain at or near current levels through the reporting period. The saturation of electric heat is expected to increase from the current level of 87% percent to 90.8 percent in 1998.

Weather

The forecasts of cooling degree days, heating degree days, summer peak day maximum temperature and winter peak day minimum temperature are average values over the prior twenty years.

5. Load Management

FPL is implementing, as part of its Energy Management Plan, voluntary load management programs characterized by direct FPL control of customer equipment. These programs are aimed at reducing peak load growth by reducing usage during on-peak periods. The effects of all of FPL's load control programs are treated as "supply side" alternatives since FPL will exercise direct control over the effects of these programs. Thus, the effects of these programs are not accounted for in the load forecast.

6. Summary

The result of employing the previously described comprehensive approach to load forecasting has yielded a banded forecast of peak load and net energy. The forecast of Summer Peak Load projects an annual growth rate in the 1987 through 1997 period ranging from 1.6 to 3.6 percent (Exhibit 4). The forecast of Winter Peak Load ranges from a low annual growth rate of 1.7 percent to a high annual growth rate of 3.8 percent (Exhibit 5). The forecast of Net Energy for Load (NEL) ranges from a low annual rate of 2.1 percent to a high annual rate of 4.2 percent over the 1987 through 1997 period (Exhibit 6). The most likely forecast of peak load and net energy is provided in FPL Forms 2, 4, and 5 and Graph 1. Graphs 2A and 2B show: 1) the historical generating capability and peak load for the Summer and Winter periods and 2) the forecast of Summer and Winter Peak Load with the current expansion plan, as described in Section IV-B, "The Power Supply Plan."

EXHIBIT 4
FLORIDA POWER & LIGHT
SUMMER PEAK LOAD FORECAST

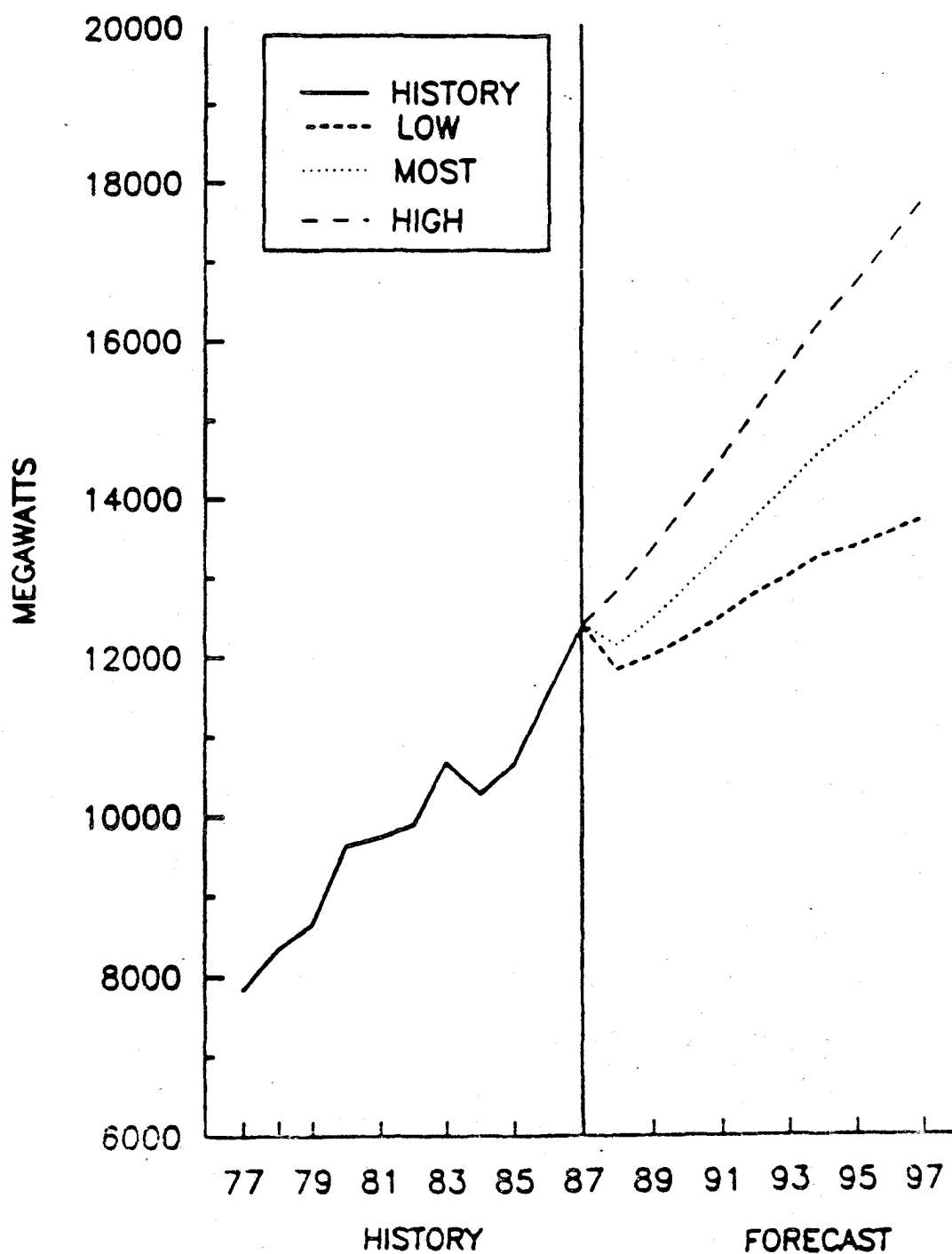


EXHIBIT 5

FLORIDA POWER LIGHT WINTER PEAK LOAD FORECAST

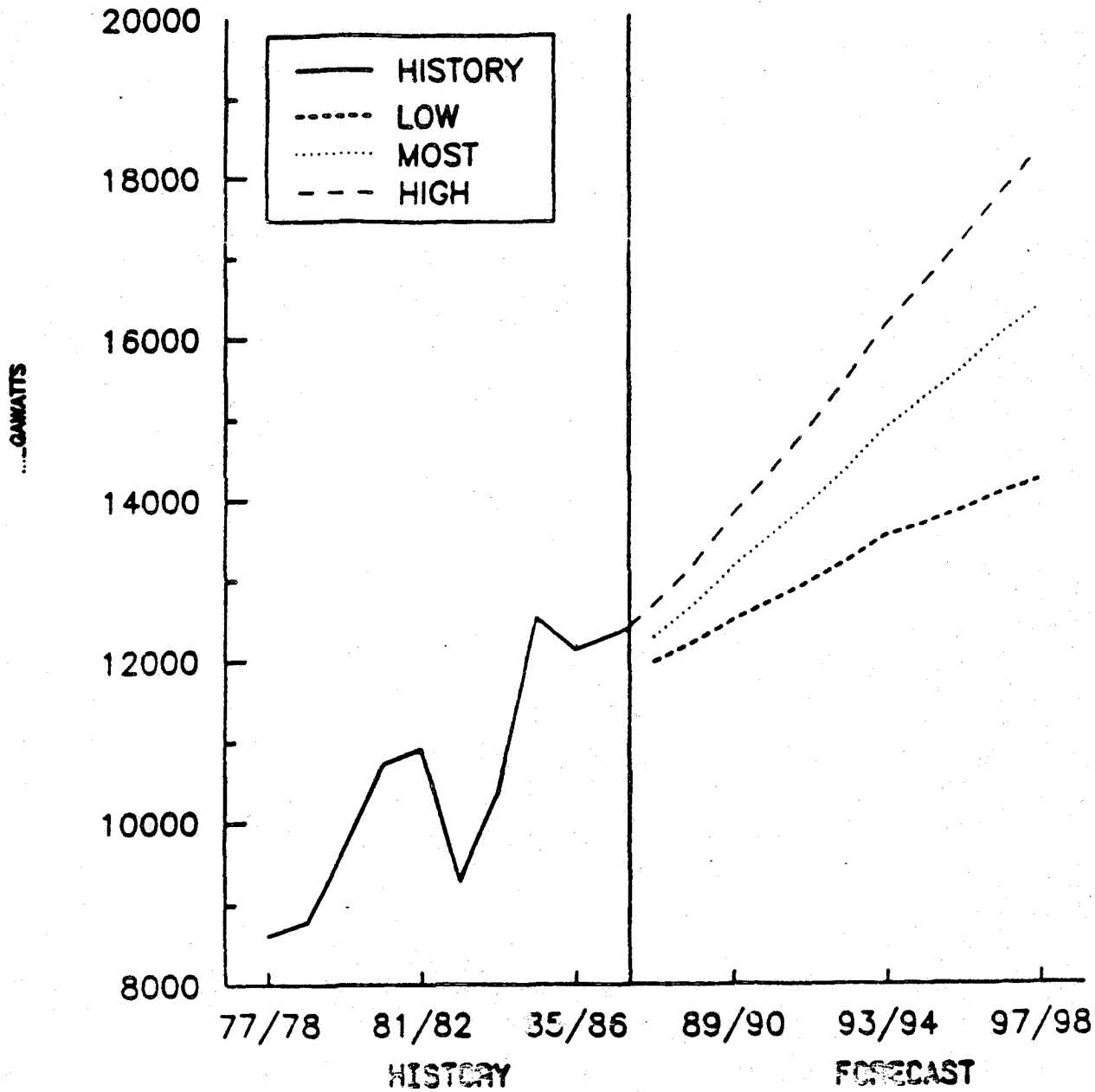
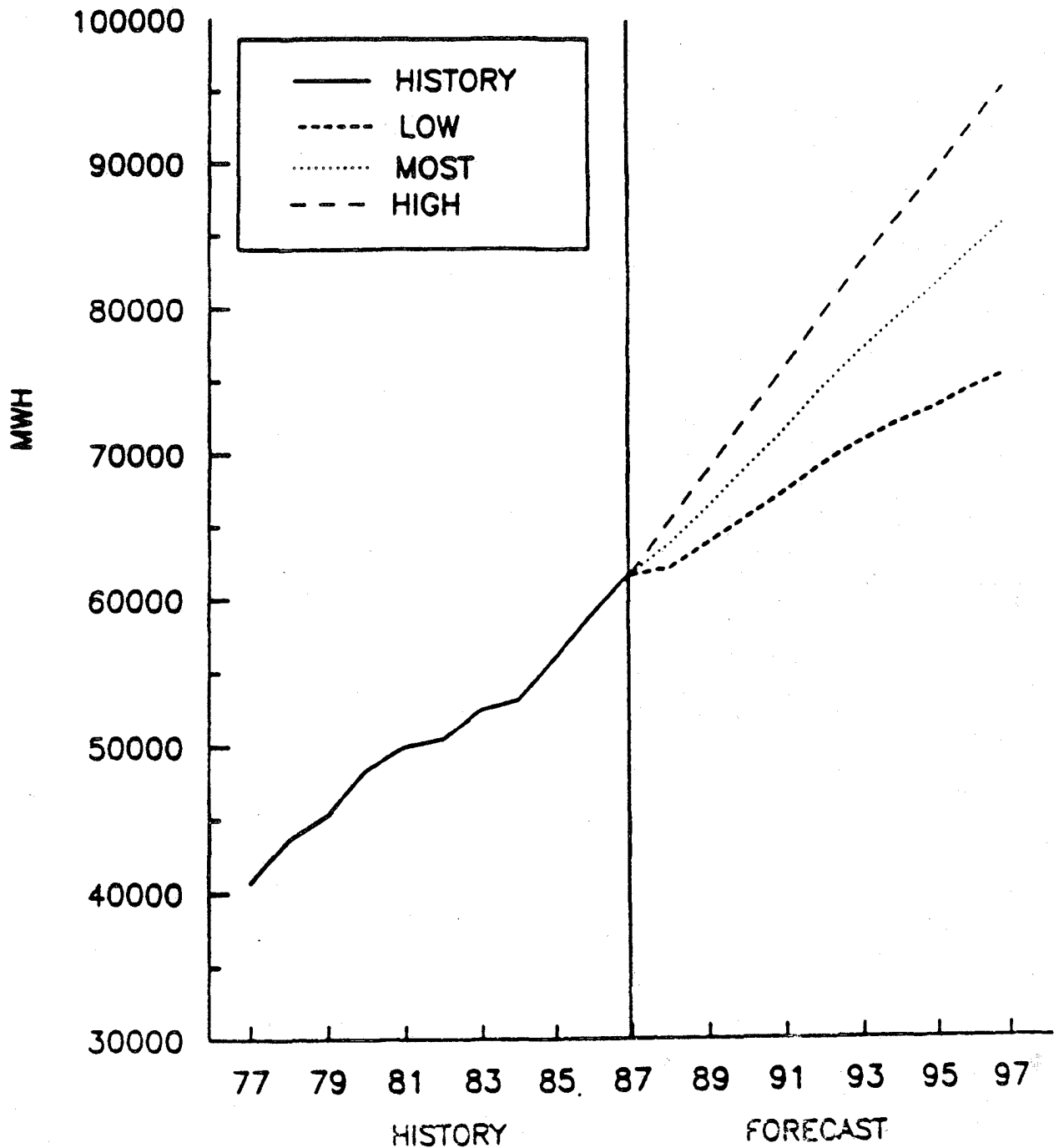


EXHIBIT 6

FLORIDA POWER & LIGHT

NET ENERGY FOR LOAD



HISTORY AND FORECAST OF ENERGY CONSUMPTION AND NUMBER OF CUSTOMERS BY CUSTOMER CLASS

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
			Rural & Residential 1/				Commercial 1/	
				3/			2/	
Year	Population 1/	Members per Household	G/M	Average No. of Customers	Average KWH Consumption Per Customer	G/M	Average No. of Customers	Average KWH Consumption Per Customer
1978	4,242,056	2.41	20,736	1,758,838	11,790	13,748	192,850	71,289
1979	4,402,354	2.37	21,060	1,854,884	11,354	14,374	202,673	70,922
1980	4,553,449	2.33	22,432	1,955,240	11,473	15,089	212,956	70,855
1981	4,770,489	2.33	22,932	2,044,623	11,216	15,578	223,399	69,732
1982	4,893,954	2.32	22,702	2,110,357	10,757	16,745	232,912	71,894
1983	4,982,368	2.30	23,324	2,170,686	10,745	17,423	243,269	71,620
1984	5,110,379	2.27	23,636	2,246,834	10,520	18,397	256,304	71,778
1985	5,252,701	2.25	25,573	2,329,677	10,977	19,734	268,780	73,421
1986	5,405,716	2.23	27,188	2,419,769	11,236	21,078	283,540	74,337
1987	5,568,313 4/	2.22	28,330	2,519,694	11,243	22,372	299,634	74,664
1988	5,778,291	2.20	29,645	2,620,589	11,312	23,415	313,653	74,653
1989	5,975,987	2.19	30,832	2,724,345	11,317	24,443	326,512	74,861
1990	6,181,754	2.18	32,133	2,832,210	11,346	25,415	342,552	74,193
1991	6,347,523	2.17	33,332	2,925,103	11,395	26,304	356,830	73,716
1992	6,518,352	2.16	34,575	3,021,328	11,444	27,488	372,367	73,819
1993	6,694,410	2.14	35,650	3,121,014	11,423	28,417	386,491	73,678
1994	6,875,671	2.13	36,759	3,224,292	11,481	29,311	401,877	72,936
1995	7,062,917	2.12	37,946	3,331,302	11,391	29,938	417,120	71,774
1996	7,228,577	2.11	39,172	3,429,304	11,423	30,671	430,656	71,220
1997	7,398,535	2.10	40,155	3,530,386	11,374	31,533	444,624	70,920

1/ Population represents only the areas served by Florida Power & Light.

2/ These forecasted values reflect the Most Likely of three economic scenarios and are to be used only where a singular forecast is required.

3/ Average number of customers for the year.

4/ Estimate

HISTORY AND FORECAST OF ENERGY CONSUMPTION AND NUMBER OF CUSTOMERS BY CUSTOMER CLASS (con't)

(1)	(10)	(11) Industrial 1/	(12)	(13)	(14)	(15)	(16)
		2/		1/	1/	1/	1/ 3/
Year	GWH	Average No. of Customers	Average KWH Consumption Per Customer	Railroads and Railways GWH	Street & Highway Lighting GWH	Other Sales to Ultimate Consumers GWH	Total Sales to Ultimate Consumers GWH
1978	2,993	13,799	216,900	--	343	478	38,298
1979	3,147	14,837	212,105	--	358	463	39,403
1980	3,348	14,734	227,230	--	372	463	41,705
1981	3,467	14,923	232,326	--	382	484	42,844
1982	3,449	12,530	275,259	--	379	514	43,790
1983	3,544	13,333	265,007	--	335	518	45,144
1984	3,707	14,892	248,926	13	321	538	46,612
1985	3,865	16,426	234,544	53	308	576	50,130
1986	3,999	17,372	230,227	73	363	594	53,234
1987	3,962	17,826	222,272	78	383	602	55,647
1988	4,098	18,316	223,748	81	320	609	58,169
1989	4,214	18,316	230,046	82	342	616	60,529
1990	4,262	18,995	224,380	82	346	630	62,808
1991	4,402	20,430	215,472	82	383	652	65,155
1992	4,530	21,973	206,163	83	401	673	67,749
1993	4,615	23,206	198,603	83	418	690	69,933
1994	4,699	24,867	195,243	83	437	713	72,003
1995	4,790	24,959	191,922	84	456	718	73,933
1996	4,886	25,885	186,756	84	473	730	76,016
1997	4,987	26,844	185,784	84	490	733	78,003

1/ These forecasted values reflect the Most Likely of three economic scenarios and are to be used only where a singular forecast is required.

2/ Average number of customers for the year.

3/ GWH = Column 4 + Column 7 + Column 10 + Column 13 + Column 14 + Column 15

HISTORY AND FORECAST OF ENERGY CONSUMPTION AND NUMBER OF CUSTOMERS BY CUSTOMER CLASS (Cont.)

(1) Year	(17) Sales for Resale 1/ GWh	(18) Utility Use & Losses 1/ GWh	(19) Net 1/ 3/ Energy for Load GWh	(20) Other Customers 1/ 2/	(21) Total Average No. of Customers 1/ 4/
1978	2,304	3,104	43,706	1,877	1,967,364
1979	2,543	3,376	45,342	1,946	2,074,340
1980	3,083	3,742	48,450	2,055	2,184,905
1981	3,419	3,760	50,023	2,257	2,285,202
1982	3,283	3,459	50,332	2,365	2,358,184
1983	3,445	3,911	52,500	2,417	2,429,705
1984	2,739	3,798	53,149	2,507	2,520,537
1985	1,304	4,564	55,998	2,673	2,617,554
1986	1,040	3,998	58,266	2,874	2,723,555
1987	944	3,825	61,616	3,060	2,840,214
1988	858	4,641	63,608	3,245	2,955,803
1989	806	4,766	66,181	3,423	3,072,596
1990	927	5,041	68,856	3,602	3,197,359
1991	1,004	5,220	71,379	3,822	3,306,165
1992	1,047	5,438	74,246	4,045	3,419,713
1993	1,145	5,609	76,687	4,273	3,534,984
1994	1,220	5,777	79,000	4,512	3,654,748
1995	1,302	5,936	81,171	4,744	3,778,125
1996	1,386	6,107	83,509	4,964	3,890,609
1997	1,480	6,270	85,753	5,185	4,007,039

1/ These forecasted values reflect the Most Likely of three economic scenarios and are to be used only where a singular forecast is required.

2/ Average number of customers for the year.

3/ GWh = Column 16 + Column 17 + Column 18

4/ Total = Column 5 + Column 8 + Column 11 + Column 20

HISTORY AND FORECAST OF SEASONAL PEAK DEMAND AND ANNUAL NET ENERGY FOR LOAD

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	1/ Summer Peak Demand - MW					1/ Annual Net Energy for Load GWh			
	Firm			Interrupt.	Total	3/ Total			2/ Load Factor %
Year	Retail	Wholesale	Total			Retail	Wholesale	Total	
1978	7,812	533	8,345	0	8,345	41,402	2,304	43,706	59.8
1979	8,201	449	8,650	0	8,650	42,779	2,343	45,122	59.8
1980	9,052	571	9,623	0	9,623	45,447	3,003	48,450	57.3
1981	9,099	639	9,738	0	9,738	46,604	3,419	50,023	58.6
1982	9,202	660	9,893	0	9,893	47,133	3,399	50,532	58.3
1983	9,994	682	10,676	0	10,676	48,925	3,375	52,300	56.1
1984	9,680	590	10,270	0	10,270	50,306	2,842	53,148	58.9
1985	10,410	244	10,654	0	10,654	54,642	1,335	55,977	60.0
1986	10,842	140	11,022	0	11,022	57,181	1,045	58,226	60.3
1987	12,180	214	12,394	0	12,394	60,648	948	61,596	56.8
1988	11,922	217	12,139	0	12,139	62,794	894	63,688	59.7
1989	12,205	252	12,457	0	12,457	65,256	925	66,181	60.6
1990	12,585	282	12,867	0	12,867	67,088	968	68,056	61.1
1991	12,948	325	13,273	0	13,273	70,331	1,048	71,379	61.4
1992	13,355	371	13,726	0	13,726	73,133	1,113	74,246	61.6
1993	13,698	419	14,117	0	14,117	75,493	1,194	76,687	62.0
1994	14,106	458	14,564	0	14,564	77,728	1,272	79,000	61.9
1995	14,380	497	14,877	0	14,877	79,815	1,356	81,171	62.3
1996	14,681	535	15,216	0	15,216	82,065	1,444	83,509	62.5
1997	15,031	574	15,605	0	15,605	84,211	1,542	85,753	62.7

1/ These forecasted values reflect the Most Likely of three economic scenarios and are to be used only where a singular forecast is required. Assume normal weather conditions. Extreme hot or cold weather could cause actual loads to significantly exceed these projections.

2/ Based on Summer Peak.

3/ Values for the years 1978-1981 represent wholesale sales and not wholesale net energy.

HISTORY AND FORECAST OF SEASONAL PEAK DEMAND AND ANNUAL NET ENERGY FOR LOAD

(1)	(2)	(3)	(4)	(5)	(6)
				1/	
				Winter Peak Demand - MW	
Year	Firm				
	Retail	Wholesale	Total	Interrupt.	Total
1978/79	8,199	592	8,791	0	8,791
1979/80	9,151	581	9,732	0	9,732
1980/81	9,994	744	10,738	567 2/	11,305 3/
1981/82	10,187	812	10,919	426 2/	11,345
1982/83	8,554	726	9,280	0	9,280
1983/84	9,532	852	10,384	666 2/	11,050
1984/85	12,060	473	12,533	0	12,533
1985/86	11,703	436	12,139	0	12,139
1986/87	10,546	233	10,779	0	10,779
1987/88	11,993	379	12,372	0	12,372
1988/89	12,258	417	12,675	0	12,675
1989/90	12,692	447	13,139	0	13,139
1990/91	13,017	515	13,532	0	13,532
1991/92	13,368	570	13,938	0	13,938
1992/93	13,743	630	14,373	0	14,373
1993/94	14,203	679	14,882	0	14,882
1994/95	14,508	727	15,235	0	15,235
1995/96	14,816	773	15,589	0	15,589
1996/97	15,196	821	16,017	0	16,017
1997/98	15,504	871	16,375	0	16,375

1/ These forecasted values reflect the Most Likely of three economic scenarios and are to be used only where a singular forecast is required. Assumes normal weather conditions. Extreme cold weather could cause actual loads to significantly exceed these projections.

2/ Total unserved load.

3/ Official Peak was 10,738 MW at 9-10 a.m. with an unserved load of 567 MW. The 7-8 a.m. peak was 10,267 MW with an unserved load of 1,093 MW for a total demand of 11,360 MW.

PREVIOUS YEAR ACTUAL AND TWO-YEAR FORECAST OF PEAK DEMAND
AND NET ENERGY FOR LOAD BY MONTH

(1)	(2)	(3)	1/	(4)	(5)	(6)	(7)
	Actual				Forecast		
	1987				1988		1989
Month	Peak Demand MW	NET GWH		Peak Demand MW	NET GWH	Peak Demand MW	NET GWH
JAN	10,779	4,659		12,372 2/	5,086	12,675	5,147
FEB	10,571	4,052		11,515 2/	4,210	11,086	4,318
MAR	8,117	4,411		9,256	4,508	9,553	4,774
APR	8,699	4,459		9,066	4,754	9,303	4,972
MAY	9,495	4,954		10,184	5,070	10,451	5,271
JUN	11,498	6,056		11,600	6,154	11,904	6,403
JUL	11,914	6,139		12,044	6,295	12,359	6,581
AUG	12,394	6,648		12,139	6,596	12,457	6,844
SEP	12,273	6,266		11,894	6,268	12,205	6,286
OCT	10,311	4,836		10,784	5,328	11,067	5,712
NOV	9,667	4,758		9,673	4,781	10,234	4,956
DEC	9,376	4,417		10,799	4,658	11,194	4,916
TOTALS		61,616			63,668		66,181

- 1/ These forecasted values reflect the Most Likely of three economic scenarios and are to be used only where a singular forecast is required. Assumes normal weather conditions. Extreme warm or cold weather could cause actual loads to significantly exceed these projections.
- 2/ Actual.

100000

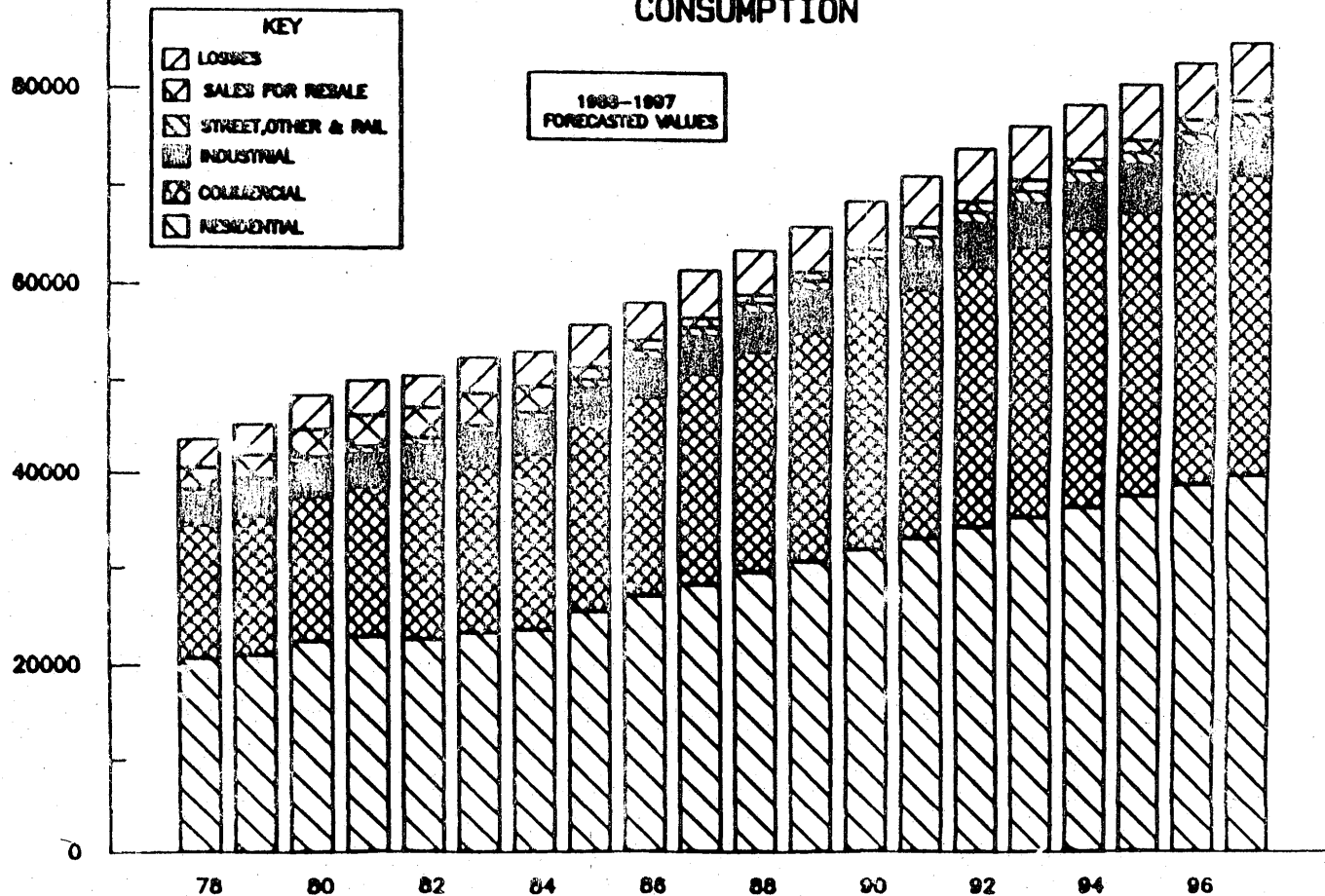
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GRAPH-1

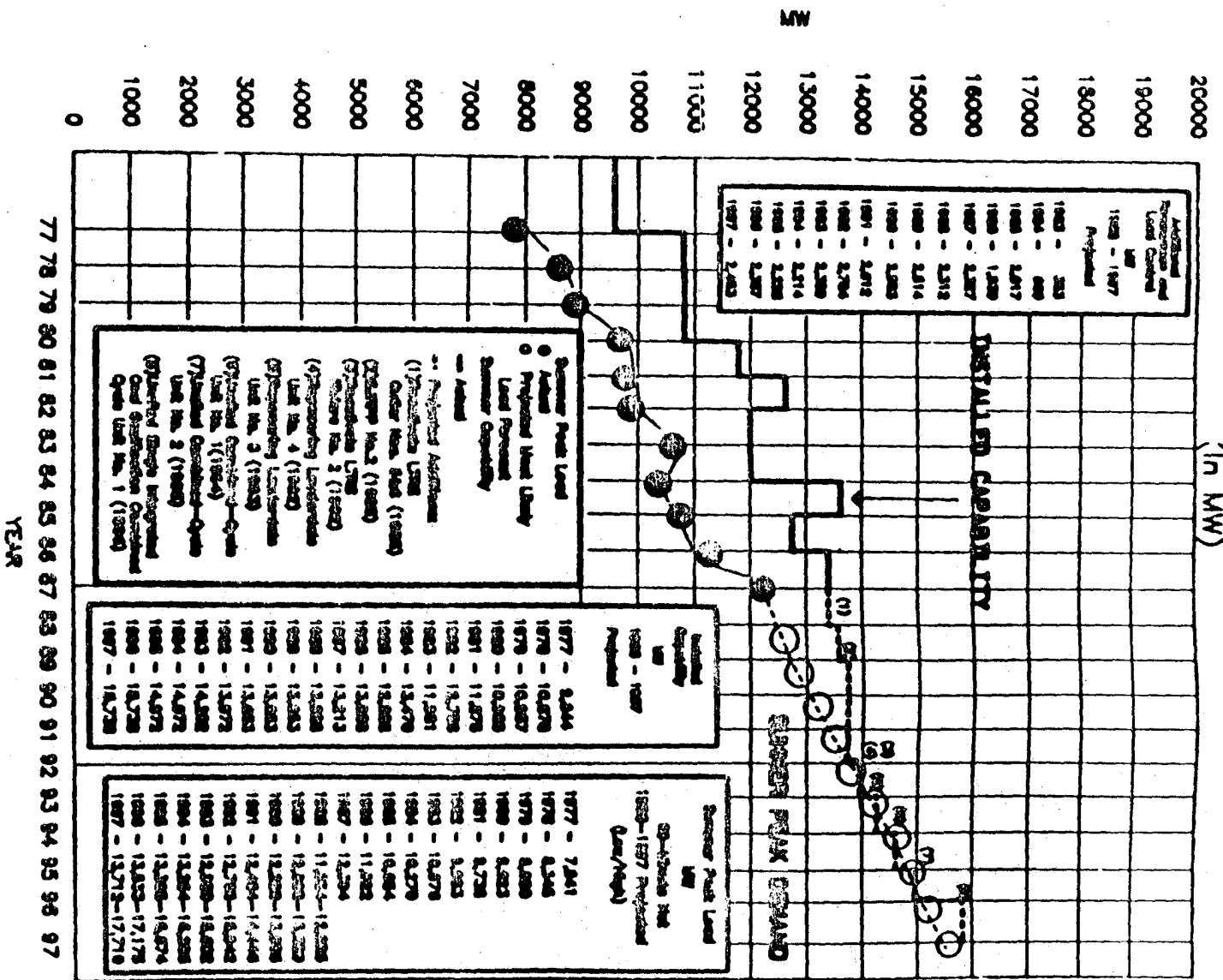
FLORIDA POWER & LIGHT CO.

ENERGY
CONSUMPTION

-03-



INSTALLED CAPABILITY AND SUMMER PEAK LOAD SUMMER OF 1977 - 1997



* Includes unit power purchases of 353 MW (1983), 660 MW (1984), 1,718 MW (1985), 1,725 MW (1986), 2,033 MW (1987), 2,000 MW (1988-92), 1,250 MW (1993), 850 MW (1994) and 700 MW (1995-97) of coal fired generation from the Southern Company. Also includes unit power purchases of 259 MW (1985), 214 MW (1986) and 107 MW (1987) from Tampa Electric Company, Big Bend Coal Unit No. 4 and purchases from the St. Johns River Power Plant of 187 MW (1987-88) and 374 MW (1989-1997). Remaining amounts represent a forecast of capacity expected to be available for purchases on a contracted firm basis from Qualifying Facilities and expected demand reductions due to control of customer loads. The load control MW are tracked as a reduction to peak demand rather than a supply resource in the expansion plan.

B. The Power Supply Plan

The power supply plan is a product of the load forecasting and power supply planning processes. The power supply plan is presented in five sections. The first section is an update of the status of various major generation related projects since the Company's last filing of April 1, 1987. Section Two contains a summary of the specific components and alternatives which comprise the power supply plan. Section Three describes some of the important assumptions underlying the plan. Section Four is a discussion of the specific power supply coordination activities and reviews which influence the power supply plan. Section Five contains a summary of the power supply plan, reserve margins, energy mix and fuel requirements for the ten year period.

1. Update Of The Previous Year's Activities

On August 7, 1987, the Summer Peak load reached 12,394 MW, an increase of 12.45% over the previous year. The recent Winter Peak load was 12,372 MW which occurred on January 28, 1988. The highest overall peak ever recorded by FPL was 12,533 MW, which occurred on January 22, 1985.

During 1987, the Company's resources provided 61,616 GWH to serve its customer requirements, an increase of 5.75% over 1986. Nuclear power from Turkey Point Units Nos. 3 and 4 and St. Lucie Units Nos. 1 and 2 produced 23.2 percent of this energy and permitted the savings of approximately 23 million barrels of oil. During 1987, Net Interchange and Purchased Power provided 34.4 percent of this energy, primarily from coal fired units in the Southern Companies and permitted savings of an additional 34 million barrels of oil. The remaining 42.4 percent was produced by oil, natural gas and coal fired units with 20.5 percent (20.0 million barrels) from oil, 20.7 percent (133,494 million cubic feet) from natural gas and 1.2 percent (275,927 tons) from coal.

Interchange and purchased power remains an important part of FPL's fuel mix. In 1987, FPL continued to purchase firm capacity from the Southern Companies under the terms of a Unit Power Sales (UPS) agreement reached in 1981. Total capacity entitlements under this agreement amounted to 2,033 MW in 1987. UPS entitlements increased to 2,050 MW in January, 1987.

FPL also purchased firm coal fired capacity from Tampa Electric Company's (TECO) Big Bend Unit No. 4 under the terms of an agreement which became effective April 1, 1985. During 1987, FPL received up to 107 MW from this unit. The contract expired at the end of 1987.

Three of FPL's fossil fired generating units remained on Long Term Reserve Shutdown (LTRS) status. The units on LTRS, Cutler Units Nos. 5 and 6 and Riviera Unit No. 2, have a combined summer capability of 266 MW (see Form 1A, Page 3).

Due to the large increase in summer load growth observed in 1987, FPL has decided to reactivate Cutler Units Nos. 5 and 6 in June, 1988. Riviera Unit No. 2, rated at 69 MW, will remain in LTRS status.

2. The Plan Components And Alternatives

FPL has relied primarily on a combination of oil, natural gas and nuclear energy to generate electricity. In 1987, coal was added to the fuel mix providing added security to Florida's energy needs through the diversification of energy sources. The discussion that follows reflects FPL's current coal fired generation projects and the additional resources which comprise the power supply plan. The resulting energy mix by fuel type for the next ten years is shown in Exhibit 7.

Units Under Construction

In an effort to satisfy its generation capacity requirements and to further reduce its dependence on oil fired generation, FPL has negotiated ownership and operating agreements with JEA for the joint construction and operation of two coal fired generating units at the St. Johns River Power Park (SJRPP). This joint venture project is under construction in Northeast Florida and FPL will be receiving up to 50 percent of the output through a combination of joint ownership and long term unit power purchases.

FPL and JEA received final regulatory approval for SJRPP Units Nos. 1 and 2 in late 1982 and construction on the project commenced in December 1982. Unit No. 1 went into commercial operation on March 27, 1987. Unit No. 2 is scheduled for August, 1988.

Expansion Plan

During 1987, FPL conducted a study to evaluate FPL's future capacity needs beyond the coal fired projects which are currently under construction. After all of the projected effects from conservation and load management were accounted for and units currently on LTRS were returned to service, it was found that FPL's power supply would be capacity deficient by 2,716 MW through 1997 based on meeting load and required reserves.

Exhibit 7
Florida Power & Light Company
Energy By Fuel Type
(1982-1997)

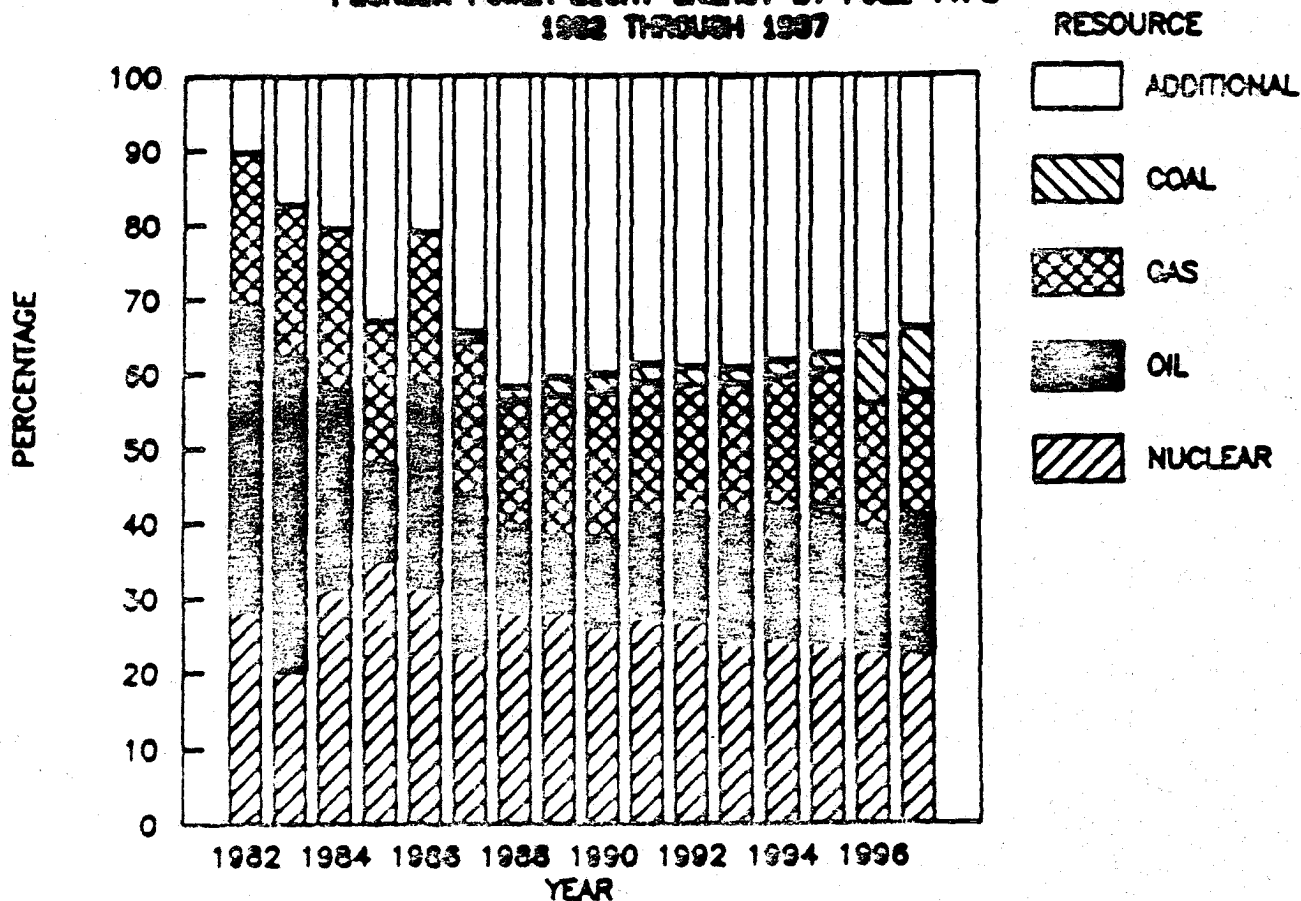
(In Percent of Total GWH)

<u>YEAR</u>	<u>NUCLEAR</u>	<u>OIL</u>	<u>GAS</u>	<u>COAL</u>	<u>ADDITIONAL</u> ^{1/} <u>RESOURCES</u>
1982 ^{2/}	28.5	40.8	20.8	---	10.3
1983 ^{2/}	20.3	41.8	20.6	---	17.3
1984 ^{2/}	31.6	26.2	21.7	---	20.5
1985 ^{2/}	35.2	12.6	19.2	---	33.0
1986 ^{2/}	31.7	26.8	20.5	---	21.0
1987 ^{2/}	23.2	20.5	20.7	1.2	34.4
1988	28.5	10.6	17.3	1.8	41.8
1989	28.3	9.6	19.1	2.4	40.8
1990	26.3	11.6	19.8	2.4	40.1
1991	27.6	13.3	18.0	2.3	38.8
1992	27.3	14.0	17.1	2.4	39.2
1993	24.7	16.1	17.9	2.0	39.3
1994	24.9	16.7	18.0	2.0	38.4
1995	24.1	16.2	18.1	2.1	37.5
1996	22.9	15.9	17.1	8.9	35.2
1997	22.6	16.2	16.7	8.5	34.0

1/ Includes Net Interchange and Purchased Power

2/ Actual

FLORIDA POWER LIGHT ENERGY BY FUEL TYPE
1982 THROUGH 1997



The selection process for the type of new capacity was made through a comprehensive study, considering not only commercially existing supply technologies, but also emerging technologies that may prove to be feasible in the future. The total list included pulverized coal, combined cycle, combustion turbine, integrated gasified combined cycle (IGCC), fluidized bed combustion, fuel cell and photovoltaic cell, power purchase and nuclear technologies.

The IGCC unit converts coal into a combustible gaseous fuel for consumption in a combined cycle system. The fluidized bed combustion unit burns coal particles which are suspended in a bed of forced air. Both of these technologies are currently approaching commercialization. The selection study, shown on the following page, is based on dual reliability targets of reserve margin and LOLP and concluded that a plan consisting of repowering Lauderdale Unit Nos. 4 and 5, followed by combined cycle, IGCC units and power purchase, best meets the needs of FPL customers.

In repowering, the existing boilers are replaced with combustion turbines and heat recovery steam generators (HRSG's) in a combined cycle configuration with the existing steam turbine. Repowering, therefore, allows use of the existing steam turbine, associated electric generator and existing condenser cooling system.

The combined cycle technology has many advantages: relatively low investment requirements, phased construction, high operating efficiency and fuel flexibility (natural gas, fuel oil or coal derived gas). The units can be designed and sited such that further flexibility in fuel could be achieved through the addition of a gasification process which utilizes coal as its primary fuel source. The construction of an IGCC can proceed in distinct phases, i.e., combustion turbines followed by the steam cycle and depending on economics, the gasifier.

Florida Power & Light Company
Requirements For New Capacity

<u>Year</u>		
1992	Repower Lauderdale No. 4 <u>1/</u>	250 MW
1993	Repower Lauderdale No. 5 <u>1/</u>	230 MW
	Unit Power Purchase From Southern Company <u>2/</u>	250 MW
1994	Combined Cycle No. 1	385 MW
	Unit Power Purchase From Southern Company <u>2/</u>	100 MW
1995	Combined Cycle No. 2	385 MW
	Unit Power Purchase From Southern Company <u>2/</u>	350 MW
1996	Integrated Gasified Combined Cycle No. 1	<u>766</u> MW
	Total	2,716 MW

1/ Repowering consists of adding two combustion turbines (125 MW net each) to each Lauderdale unit and converting to combined cycle operation. The steam cycle conversion results in a loss of capability of approximately 10 MW for a total increase in each unit of 240 MW. Repowering of Lauderdale Unit No. 4 will begin in 1992 and be completed in 1993.

2/ A letter of intent to purchase a total of 700 MW from Southern Company has been signed by both parties.

In 1986, FPL was awarded a major contract from the Electric Power Research Institute to perform more detailed site specific studies on integrated coal gasification combined cycle units.

The study will continue in 1988 and represents a commitment by FPL to actively pursue new technologies in an effort to provide a flexible, reliable supply of power.

3. Assumptions Influencing The Expansion Plan

The development of a power supply plan is not simply a matter of selecting which new generating capacity option will be built. In addition to the option of building new capacity, other supply sources must be considered, such as future purchased power contracts. The advent of cogeneration and small power producers will also contribute significantly to meet the future demand for power. These, as well as cost effective "demand side" options such as load management, must also be integrated into the plan.

After consideration of alternatives to new capacity, any new generating units must be evaluated in light of concerns over future fuel availability and prices. Since the FPL expansion plan is based on combined cycle units which will burn natural gas, the fuel issue will be addressed first.

Natural Gas Outlook

Natural gas is expected to play an important role in FPL's power supply plan for the next ten years. In spite of the fact that purchases under the firm gas supply contract with the Amoco Production Company are scheduled to expire in 1988, total natural gas availability to FPL is expected to increase in the 1988 to 1989 period as a result of Florida Gas Transmission Company's (FGT) completion in 1987, of a 100 MMCF per day pipeline capacity expansion coupled with the availability of

interruptible natural gas and remain higher than previous levels throughout the ten year period. This is based on the assumption that FGT will complete the 100 MMCF per day pipeline expansion in 1989 to make total capacity 925 MMCF per day.

Several other factors contribute to this outlook of increased availability of natural gas for FPL. The most important factor is that there is expected to be a general deliverability surplus of natural gas in the national market, including increased supplies from Canada, until at least the early 1990's. In addition, as a result of the increased availability and use of coal fired power within Florida, other electric utilities' demand for natural gas has not increased significantly, thus allowing FPL to utilize a portion of interruptible natural gas supplies transported into the state through the pipeline.

Projected Oil Consumption

FPL remains committed to the goals of the Florida Energy Efficiency and Conservation Act of 1980 (FEECA). The projected ten year oil usage projected by FPL is shown in Exhibit 8. Total consumption is projected to remain below 1986-87 levels through 1997.

Purchased Power Projections

Purchased power offers an alternative to constructing new capacity and may provide fuel diversity as well, as evidenced by the current agreement FPL has with the Southern Companies. The history and projections of current capacity entitlements from Southern Company through 1995, when the agreement expires, are shown in Exhibit 9.

FPL continues to pursue cost effective purchased power options as a source of supply to meet future needs. A letter of intent has been signed to extend the purchase power agreement with Southern Company through

2010 at a level of approximately 700 MW. FPL is also evaluating a proposal from Middle South Utilities, Inc. for the construction of two 800 MW class coal fired units in the Bahamas.

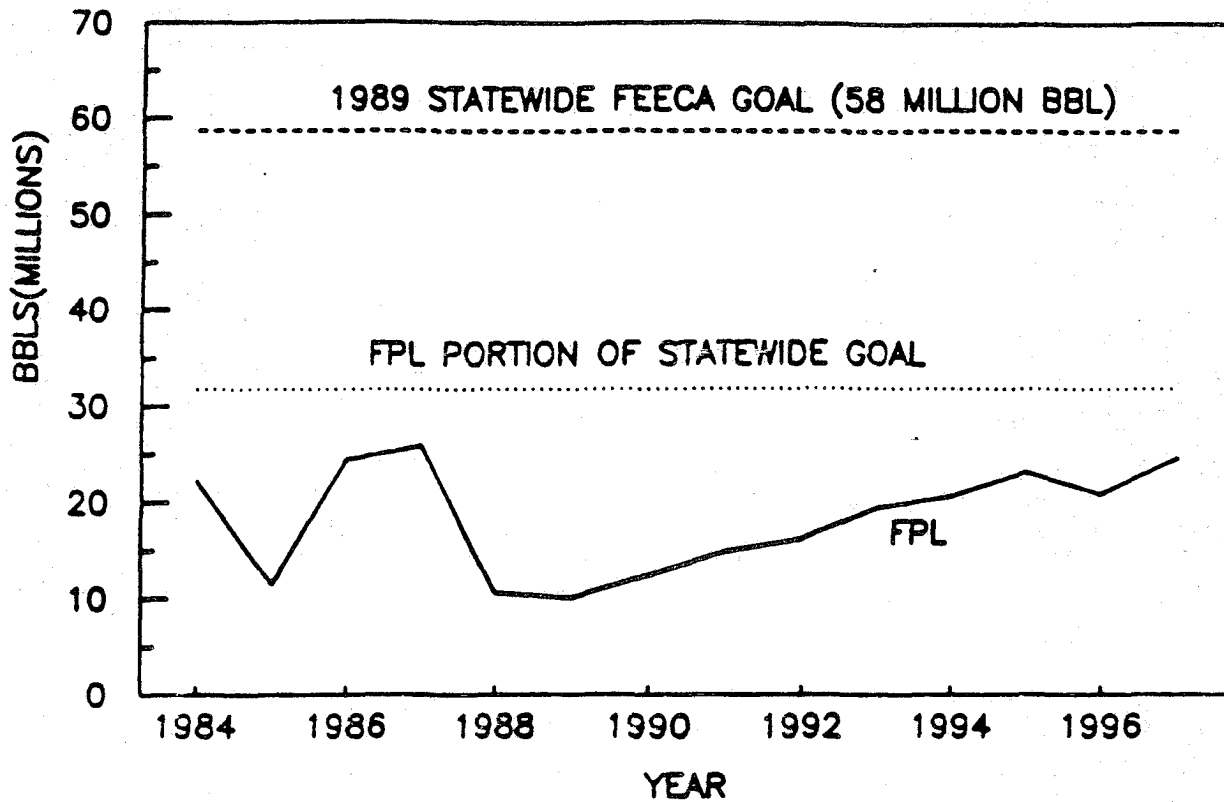
Cogeneration And Small Power Production (Qualifying Facilities)

At FPL, the Cogeneration and Small Power Production Program is an important part of the Company's Energy Management Plan. The objective of this program is to promote the installation of these types of facilities to supplement FPL resources available to meet its capacity and energy requirements. During 1987, FPL purchased 221,064 MWH from three small power producers and two cogenerators.

A cogeneration facility is one that produces electrical energy and steam or other energy, such as heat, which is used for industrial, commercial, heating or cooling purposes. A small power production facility is one that is 80 MW or less and that produces electrical energy using, as a primary energy source, biomass, waste, renewable resources, geothermal resources or any combination thereof.

EXHIBIT 8

FPL ACTUAL AND PROJECTED OIL USAGE VERSUS FEECA GOALS



The FPL portion of the FEECA statewide goal is based on the 1980 FPL usage as a fraction of total state consumption. Specific goals were not set for individual utilities. The above graph assumes extension of the 1989 goal of fifty-eight million barrels per year.

Exhibit 9

**FPL Capacity Entitlements^{1/}
From Southern Company
(in MW)**

<u>Year</u>	<u>Schedule "E"</u>		<u>UPS</u>		<u>Total</u>	
	<u>Winter</u>	<u>Summer</u>	<u>Winter</u>	<u>Summer</u>	<u>Winter</u>	<u>Summer</u>
1983	300	300	353	353	653	653
1984	300	300	663	660	963	960
1985	300	300	1722	1718	2022	2018
1986	300	300	1727	1725	2027	2025
1987 ^{2/}	0	0	2033	2033	2033	2033
1988	0	0	2050	2048	2050	2048
1989	0	0	2000	2000	2000	2000
1990	0	0	2000	2000	2000	2000
1991	0	0	2000	2000	2000	2000
1992	0	0	2000	2000	2000	2000
1993	0	0	1667	1250	1667	1250
1994	0	0	1250	850	1250	850
1995	0	0	850	700	850	700

1983 Winter = Winter 1982-83

^{1/} Totals reflect capacity entitlements resulting from the signed letter of intent between FPL and Southern Company. If an agreement is reached, FPL would be entitled to 250 MW (beginning in the summer of 1993), 350 MW (summer of 1994) and 700 MW (summer of 1995 through 2010).

^{2/} Values for 1983-87 are actuals.

FPL has contracted with the U.S. Sugar Corporation (USSC) for the purchase of energy from two facilities located in Clewiston and Bryant, Florida. These purchases take place during the November to March sugar cane grinding season. The estimated energy received from the two USSC facilities is approximately 50,000 MWH per year (this represents the equivalent of approximately 6 MW and 17 MW of generating capacity respectively from the two facilities). USSC uses the bagasse by-products of the grinding process as the primary fuel for the generation of steam for electrical generation. These purchase agreements provide that deliveries from the facilities are subject to availability.

In January, 1982, FPL interconnected with the Dade County Waste Resource Recovery Facility, which has an installed generating capacity of 77 MW. This energy is received on an as-available basis.

During 1984, FPL entered into a contract with the Florida Crushed Stone Company, a rock/aggregate/cement/lime manufacturer, (located near Brooksville, Florida) for the purchase of the electric output from their proposed 110 MW cogeneration facility. This facility will become operational in 1988, with deliveries expected to commence by the summer of 1988.

During 1985, FPL entered into a contract with the Royster Company for the purchase of approximately 8 MW from their proposed cogeneration facility. This facility is located near Mulberry, Florida, in Tampa Electric Company's service area. Deliveries started in early 1986, on an as-available, basis with firm deliveries of 8 MW expected to commence in 1992.

During 1986, FPL interconnected with the Dade County Downtown Government Center Facility, which has an annual average power output of 19 MW (30 MW maximum). This power is received on an as available basis.

Current information supports incorporating approximately 770 MW (summer) and 4,798,100 MWH of purchased power from Qualifying Facilities into FPL's power supply plans during the next ten years. Exhibit 10 lists the expected annual contribution of capacity and energy from Qualifying Facilities through 1997.

Residential Load Control

Direct utility load control is one technique used to reduce peak demand for electricity (it is not expected to provide significant energy reductions). FPL's residential load control program, the "On Call Program," offers incentive payments in the form of credits on the monthly bill to residential customers who volunteer to FPL to remotely control their central electric air conditioning and heating systems, conventional electric water heaters and pool pumps. The program is now being implemented in selected portions of Dade County. An expansion of the program into the rest of the FPL system is planned to begin in 1989. Load control will be implemented with FPL's new Load Management System (LMS), a bi-directional communication system which utilizes existing power lines for the transmission of control signals.

Data from past load control experimental studies conducted by FPL and by load control results from other utilities indicate that peak demand reductions can be accomplished. The estimated peak demand reduction due to the residential load control program is approximately 600 MW in 1997. Further demand reduction capability is expected in later years.

Exhibit 10
Capacity And Energy Contributions
From Qualifying Facilities

<u>Year</u>	<u>Firm Cumulative Summer (MW)</u>	<u>Firm Cumulative Winter (MW)</u>	<u>Cumulative^{1/} Annual Energy (MWH)</u>
1988	110.0	110.0	878,700
1989	110.0	160.6	1,244,100
1990	160.6	160.6	2,108,900
1991	160.6	160.6	2,108,900
1992	268.6	448.6	3,205,000
1993	498.6	498.6	4,224,400
1994	649.7	649.7	4,368,900
1995	719.7	719.7	4,491,500
1996	759.7	759.7	4,736,800
1997	769.7	769.7	4,798,100

1988 Winter = Winter 1988-1989

^{1/} Includes As Available (non-firm) energy purchases from Qualifying Facilities

Commercial And Industrial Load Control

FPL also plans to offer load control to its commercial and industrial customer classes. Both demand billed customers (i.e., demand exceeding 20 KW) and non-demand billed customers (i.e., demand is less than 20 KW) will be eventually eligible for such an offering. In 1987, the Florida Public Service Commission approved FPL's petition to implement a trial project involving load control of a relatively small number of FPL's largest commercial/industrial customers. The trial is scheduled to begin in April, 1988 and to last for approximately three years. FPL will use the data gathered during the trial to develop and implement a full load control program for these customers which should begin immediately after the conclusion of the trial. In addition, load control programs for the rest of FPL's commercial/industrial customers will be developed.

4. Coordinated Power Supply Planning Studies

FPL firmly supports coordinated power supply planning studies among the electric utilities in the State, individually and through the FCG. FPL believes that well coordinated planning results in benefits for its own rate payers as well as the rest of Florida. Several coordinated power supply planning studies have been conducted in past years: the "Power Broker Study" and the "Expanded Broker Project," a study entitled "Alternatives Available to Reduce Oil Consumption by Florida's Electric Utilities," the "Peninsular Florida Economic Oil Displacement Study," the "Peninsular Florida Coal-by-Wire Study" and the "Cost Effective Oil Backout Study", which included the participation of the Tennessee Valley Authority and Southern Company Services, Inc.

FPSC Annual Planning Hearings

FPL has actively participated in the FPSC Conservation Planning and Load Forecast and Annual Planning Hearing (APH) activities. The basic purpose of these activities is to assist the FPSC in developing planning related data and also to assist it in the development of prices for capacity and energy from cogeneration facilities from a statewide perspective. Special committees composed of utility representatives, including FPL members, were formed by the FCG to assist in the APH process. In 1986, FPL also filed the results of its own individual utility generation planning process with the FPSC, as a part of the Annual Planning Hearing.

5. Summary

The result of employing the comprehensive approach to load forecasting and demand reduction planning, power supply planning, transmission planning and site selection has yielded a power supply plan which is expected to provide reliable continuous service in a cost effective manner to FPL's customers. It will also further diversify both FPL's generation technology and fuel mix. FPL's currently planned facility

additions and reserve margins, for Summer and Winter Peak load periods through 1997, are shown in FPL Forms 6, 7A and 7B. The FPL system fuel mix by fuel type and fuel requirements through 1997 are shown in FPL Forms 3A and 3B.

FLORIDA POWER & LIGHT COMPANY

FPL Form 6
Page 1 of 2

PLANNED AND PROSPECTIVE GENERATING FACILITY ADDITIONS AND CHANGES 1/

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Plant Name	Unit No.	Location	Unit Type	Fuel		Const. Start No./Yr.	Commercial In-Service No./Yr.	Gen. Max. Nameplate KW	Net Capability		Fuel Transport.		Status
				Pri.	Alt.				Summer MW	Winter MW	Pri.	Alt.	
St. Johns River Power Plant 2/		Duval County 12/18/88						665,146	125.0	125.0			
	2		FS	C	No 3/	12/82	1988	665,146	125.0	125.0	RR	NO	V
Lauderdale		Broward County 30/500/428						860,000	754.0	754.0			
	4												
	5		CC	NG	LO	1990	1992	430,000	377.0	378.0	PL	UNK	P 4/
			CC	NG	LO	1990	1993	430,000	377.0	378.0	PL	UNK	P
Unsalted Combined Cycle Units		Unknown						800,000	770.0	854.0			
	1		CC	NG	LO	1990	1994	440,000	385.0	428.0	PL	Unk	P
	2		CC	NG	LO	1991	1995	440,000	385.0	428.0	PL	Unk	P
Integrated Coal Gasification Combined Cycle		Unknown						800,000	766.0	845.0			
	1		IGCC	C	Unk	1990	1994	800,000	766.0	845.0	RR	Unk	P
Oxley		Bade County 24/558/408						236,500	197.0	199.0			
	5		FS	NG	NO	-----	1986	75,000	67.0	68.0	PL	S	S
	6		FS	NG	NO	-----	1986	161,500	130.0	131.0	PL	S	S
Rivers		City of Riviera Beach 33/428/438						75,000	69.0	71.0			
	2		FS	NG	NO	-----	1992	75,000	69.0	71.0	PL	S	S

- 1/ Includes only those facilities which are subject to certification under the Florida Electrical Power Plant Siting Act which are projected to be in service during the Site Plan reporting period.
- 2/ Joint JEA/FPL Units - Through a combination of joint unit ownership and long-term power purchases, FPL's share of the output from each unit is 50% of the total capacity. The output illustrated in this Table is the 20% of firm capacity which will be owned by FPL.
- 3/ The units will have the capability of future conversion to liquid fuels, gas and refuse derived solid fuels.

4/ The Lauderdale Units 4/5 represent the total capacity after repowering and conversion to combined cycle.

PLANNED AND PROSPECTIVE GENERATING FACILITY ADDITIONS AND CHANGES (Cont.) 1/

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Plant Name	Unit No.	Location	Unit Type	Fuel		Const. Start Mo./Yr.	Commercial In-Service Mo./Yr.	Gen. Max. Nameplate KW	Net Capability		Fuel Transport.		Status
				Pri.	Alt.				Summer MW	Winter MW	Pri.	Alt.	
Martin 2/ (PH)	-	Martin County 29/398/38E (RPC10)	--	--	--	----	---- 3/	-----	----	----	--	--	--
South Dade 2/ (PO)	-	Dade County 29/586/40E (RPC11)	--	--	--	----	---- 3/	-----	----	----	--	--	--
Dade 2/ (PO)	-	Dade County 25/344/25E (RPC 7)	--	--	--	----	---- 3/	-----	----	----	--	--	--

1/ Includes only those facilities which are subject to certification under the Florida Electrical Power Plant Siting Act which are projected to be in service during the Site Plan reporting period.

2/ FPL has property held for future use (FERC Account 105) for the following sites as of December 31, 1986: Martin, 1,725 acres (81,017,541), South Dade, 9,923 acres (88,321,294) and Dade, 13,454 acres (89,566,899). For additional information, see FERC Form No. 1, page 214, "Electric Plant Held for Future Use".

3/ These sites will be considered along with FPL's existing plant and substation sites in determining an appropriate location for the designated combined cycle and IACC units or future, unspecified, generating units whose in-service dates are beyond the reporting period.

FORECAST OF CAPABILITY, DEMAND, AND SCHEDULED MAINTENANCE
AT TIME OF SUMMER PEAK

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Year	Total Installed 1/ Capability MW	Firm Peak 2/ Demand MW	Installed Margin Before Maintenance 3/ MW % of Peak		Additional Resources				Scheduled Maintenance MW	Total Installed Margin After Maintenance	
			MW	% of Peak	Firm Import MW	Qualifying Facilities MW	Load 4/ Control MW	Total MW		MW 5/	% of Peak 6
1988	13,528	12,139	1,404	11.6	2,167	110	15	2,297	839	565	4.7
1989	13,653	12,457	1,226	9.9	2,374	110	30	2,484	0	1,226	9.9
1990	13,653	12,867	834	6.5	2,374	161	48	2,535	0	834	6.5
1991	13,653	13,273	457	3.5	2,374	161	77	2,535	0	457	3.5
1992	13,972	13,726	387	2.8	2,374	269	141	2,643	0	387	2.8
1993	14,262	14,117	321	2.3	1,424	499	234	2,123	0	321	2.3
1994	14,587	14,344	363	2.6	1,224	650	348	1,874	0	363	2.6
1995	14,972	14,877	529	3.7	1,074	720	434	1,794	0	529	3.7
1996	15,738	15,216	1,045	7.1	1,074	760	523	1,834	0	1,045	7.1
1997	15,738	15,605	742	4.9	1,074	770	609	1,844	0	742	4.9

- 1/ Capability additions and changes projected to be in-service by August 1st are considered to be available to meet Summer peak loads which are forecast to occur during August of the year indicated. All values are Summer net MW.
- 2/ These forecasted values reflect the Most Likely of three economic scenarios and are to be used only where a singular forecast is required.
- 3/ The installed margin is calculated as Installed Capability less peak demand after load control. MW = Column 2 - (Column 3 - Column 8).
- 4/ The MW shown are for the residential load control program only. They are not included in total additional resources but modify the peak load upon which margin calculations are based.
- 5/ MW = Column 2 - (Column 3 - Column 8) - Column 10
- 6/ % = (Column 11) * (100) / (Column 3 - Column 8)

FORECAST OF CAPABILITY, DEMAND, AND SCHEDULED MAINTENANCE
AT TIME OF WINTER PEAK

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Year	Total Installed 1/ Capability MW	Firm Peak 2/ Demand MW	Installed Margin Before Maintenance 3/ MW % of Peak		Additional Resources				Scheduled Maintenance MW	Total Installed Margin After Maintenance	
			MW	% of Peak	Firm Import MW	Qualifying Facilities MW	Load 4/ Control MW	Total MW		MW 5/	% of Peak 6/
1988/89	14,141	12,675	1,341	10.6	2,374	110	22	2,484	277	1,211	9.6
1989/90	14,141	13,139	1,082	7.6	2,374	161	36	2,535	277	761	5.8
1990/91	14,141	13,532	609	4.3	2,374	161	58	2,535	0	667	5.0
1991/92	14,212	13,958	274	2.0	2,374	161	96	2,535	0	370	2.7
1992/93	14,442	14,373	89	0.6	2,041	449	183	2,490	1,159	(887)	(6.3)
1993/94	14,942	14,862	60	0.4	1,424	499	285	2,123	644	(299)	(2.0)
1994/95	15,427	15,235	192	1.3	1,224	650	387	1,674	790	(211)	(1.4)
1995/96	16,162	15,589	573	3.7	1,074	720	474	1,794	608	359	2.4
1996/97	16,929	16,017	912	5.7	1,074	768	561	1,834	0	1,473	9.5
1997/98	16,929	16,375	554	3.5	1,074	770	646	1,844	0	1,200	7.6

- 1/ Capability additions and changes projected to be in-service by January 1st are considered to be available to meet Winter peak loads which are forecast to occur during January of the second year indicated. All values are Winter net MW.
- 2/ These forecasted values reflect the Most Likely of three economic scenarios and are to be used only where a singular forecast is required.
- 3/ The installed margin is calculated as Installed Capability less peak demand after load control. MW = Column 2 - (Column 3 - Column 8).
- 4/ The load shown are for the residential load control program only. They are not included in total additional resources but modify the peak load upon which margin calculations are based.
- 5/ MW = Column 2 - (Column 3 - Column 8) - Column 10
- 6/ % = (Column 11) * (100) / (Column 3 - Column 8)

FLORIDA POWER & LIGHT COMPANY

ENERGY SOURCES

Energy Sources		ACTUAL 1/					
		1986	1987	1988	1989	1990	1991
(1) Annual Energy Interchange	2/ GJM	12,007	20,995	25,795	25,648	25,564	25,634
(2) Nuclear	GJM	18,473	14,267	18,137	18,718	18,121	19,684
(3) Coal	GJM	4	745	1,130	1,597	1,659	1,650
(4) Residual - TOTAL	GJM	15,570	12,626	6,721	6,372	7,955	9,467
(5) Steam	GJM	15,569	12,626	6,721	6,372	7,955	9,467
(6) CC	GJM	1	----	----	----	----	----
(7) Distillate - TOTAL	GJM	50	30	19	10	6	18
(8) CC	GJM	----- 4/	5	14	3	3	0
(9) CT	GJM	50	25	5	7	3	18
(10) Natural Gas - TOTAL	GJM	11,944	12,729	10,996	12,415	13,478	12,848
(11) Steam	GJM	9,470	10,571	8,345	9,429	10,335	9,726
(12) CC	GJM	2,252	2,043	2,651	2,985	3,143	3,122
(13) CT	GJM	22	115	----- 4/	1	1	1
(14) Other 3/	GJM	216	223	800	1,241	2,102	2,097
(15) Net Energy For Load	GJM	58,266	61,615	63,688	64,181	68,856	71,379

1/ Sources: FERC Form No. 1, page 401, lines 3 through 18 and pages 402 and 403, lines 12, 38 and 39. FPL Operating Records.

2/ The projected figures are based on estimated energy purchases from the Southern Companies and include economy energy transactions.

3/ Represents a forecast of energy expected to be available from Qualifying facilities.

4/ Less than 0.5 GJM.

FLORIDA POWER & LIGHT COMPANY

ENERGY SOURCES (Cont.)

Energy Sources			1992	1993	1994	1995	1996	1997
(1)	Annual Energy Interchange	1/ GWH	25,910	25,855	25,976	26,010	26,654	26,391
(2)	Nuclear	GWH	20,288	19,972	19,677	19,546	19,132	19,343
(3)	Coal	GWH	1,748	1,561	1,596	1,682	7,426	7,285
(4)	Residual - TOTAL	GWH	10,374	12,182	13,023	14,569	13,082	15,412
(5)	Steam	GWH	10,374	12,182	13,023	14,569	13,082	15,412
(6)	CC	GWH	----	----	----	---	----	----
(7)	Distillate - TOTAL	GWH	18	156	147	145	198	224
(8)	CC	GWH	3	94	20	68	102	159
(9)	CT	GWH	15	62	127	97	96	65
(10)	Natural Gas - TOTAL	GWH	12,719	13,765	14,236	14,682	14,301	14,312
(11)	Steam	GWH	9,402	11,095	8,606	7,632	7,303	7,220
(12)	CC	GWH	3,097	2,670	5,496	7,048	6,995	7,091
(13)	CT	GWH	20		44	2	3	1
(14)	Other 2/	GWH	3,213	4,218	4,360	4,493	4,750	4,795
(15)	Net Energy For Load	GWH	74,346	76,687	79,600	81,171	83,509	85,753

1/ The projected figures are based on estimated energy purchases from the Southern Companies and include economy energy transactions.

2/ Represents a forecast of energy expected to be available from Qualifying Facilities.

FLORIDA POWER & LIGHT COMPANY

FUEL REQUIREMENTS 1/

Fuel Requirements			Actual 2/					
			1986	1987	1988	1989	1990	1991
(1) Nuclear	Trillion BTU		282	157	197	204	197	214
(2) Coal	1000 TON		35	276	444	626	651	648
(3) Residual	- TOTAL	1000 BBL	24,370	19,992	10,539	10,831	12,521	14,859
(4)	Steam	1000 BBL	24,370	19,992	10,539	10,831	12,521	14,859
(5)	CC	1000 BBL	0	----	----	----	----	----
(6) Distillate	- TOTAL	1000 BBL	129	74	44	25	13	45
(7)	CC	1000 BBL	2	7	31	7	4	1
(8)	CT	1000 BBL	127	67	13	18	9	44
(9) Natural Gas	- TOTAL	1000 MCF	122,969	133,494	113,505	130,197	139,072	132,680
(10)	Steam	1000 MCF	100,870	111,468	86,401	100,077	107,436	101,349
(11)	CC	1000 MCF	21,409	20,094	26,884	30,110	31,619	31,414
(12)	CT	1000 MCF	690	2	7	10	16	17
(13) Annual Avg. Fossil Net H.R.	BTU/1000		10,104	10,279	9,063	9,859	9,843	9,847

1/ Reflects fuel requirements for FPL only.

2/ Sources: FPL Form No. 1, pages 462 and 463, lines 12, 38 and 39. FPL Operating Records.

FLORIDA POWER & LIGHT COMPANY

FUEL REQUIREMENTS (Cont.) 1/

Fuel Requirements			1992	1993	1994	1995	1996	1997
(1) Nuclear		Trillion BTU	221	207	214	213	208	211
(2) Coal		1000 TON	685	612	626	659	2,613	2,560
(3) Residual	- TOTAL	1000 BBL	16,273	19,164	20,342	22,825	20,467	24,163
(4)	Steam	1000 BBL	16,273	19,164	20,342	22,825	20,467	24,163
(5)	CC	1000 BBL	-----	-----	-----	-----	-----	-----
(6) Distillate	- TOTAL	1000 BBL	39	332	357	360	412	441
(7)	CC	1000 BBL		177	37	115	170	277
(8)	CT	1000 BBL	39	155	320	245	242	165
(9) Natural Gas	- TOTAL	1000 MCF	131,528	130,913	130,769	129,269	125,545	125,281
(10)	Steam	1000 MCF	100,049	104,147	80,684	69,965	44,451	65,586
(11)	CC	1000 MCF	31,201	26,760	49,271	59,274	58,845	59,687
(12)	CT	1000 MCF	278	6	814	30	49	14
(13) Annual Avg. Fossil Net H.R.		BTU/KWH	9,871	9,538	9,385	9,249	9,209	9,252

1/ Reflects fuel requirements for FPL only.

COMBUSTION ENGINEERING

June 24, 1986

Mr. Ben Jackson
Black & Veatch
Engineers-Architects
1500 Meadow Lake Parkway
P.O. Box 8405
Kansas City, MO 64114

Reference: Circulating Fluidized Bed Boilers
Availability/Reliability

Dear Mr. Jackson:

As we discussed previously, it is expected that CFB boiler availability and reliability will equal or exceed that of comparably sized pulverized coal fired units. This is due, principally, to four factors:

1. Little, if any, slagging.
2. Elimination of wet/dry scrubbing systems.
3. Minimal number of fuel feed systems.
4. Improved capability, at minimal cost, for redundant systems critical to unit operation.

We sincerely believe that CFB boiler systems will achieve availabilities in the 97% - 98% range (excluding scheduled outages). If we can be of further service on this matter, please feel free to call on me.

Sincerely,

COMBUSTION ENGINEERING, INC.

S. E. Deabler

S. E. Deabler
District Manager
Kansas City

SED/rl

APPENDIX 1E
COMBUSTION ENGINEERING LETTER
JUNE 24, 1986

APPENDIX 1F
PYROFLOW CIRCULATING FLUIDIZED BED BOILERS
A COMPREHENSIVE OVERVIEW
NOVEMBER 14, 1984

SITE CERTIFICATION
APPLICATION

THE CEDAR BAY
COGENERATION PROJECT
VOLUME 2



**SITE CERTIFICATION
APPLICATION**

**THE CEDAR BAY COGENERATION
PROJECT**

VOLUME 2

Submitted by  Cedar Bay Inc.

**SITE CERTIFICATION
APPLICATION**

**THE CEDAR BAY COGENERATION
PROJECT**

VOLUME 2

Submitted by **ES**/Cedar Bay Inc.

DIRECTIONS FOR INSERTING AMENDMENT 3, OCTOBER 10, 1989

Remove

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TC-19
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Pages vi through viii
Pages xi and xii

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Insert

VOLUME 1

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Page 5-63a through 5-65

Remove

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Page 9-4

Insert

Pages 6-1 through 6-12

Pages 9-4 and 9-4a

VOLUME 3

Section 10.1.1, NPDES Application/Permit

Pages 1 and 2

Pages 1 and 2

Section 10.1.2, 404 Application

Page 10-2

Page 10-2

Entire application (9 pages)

Section 10.1.4, Coastal Zone Management Certification

Pages 10-4 and 10-5

Pages 10-4 and 10-5

Page 10-7

Page 10-7

Page 10-9

Page 10-9

Section 10.1.5, US Coast Guard Bridge Permit

Page 10-13

Page 10-13

Entire application (3 pages)

Section 10.6.1, Operate/Construct Air Pollution Sources

Pages 1 of 12 and 5 of 12 of CFB
application

Pages 1 of 12 and 5 of 12 of CFB
application

Pages 5 of 12, 6 of 12, and 12
of 12 of KRB application

Pages 5 of 12, 6 of 12, and 12
of 12 of KRB application

Pages 6 of 12 and 12 of 12 of
SDT application

Pages 6 of 12 and 12 of 12 of
SDT application

Pages 5 of 12 and 6 of 12 of
MEE application

Pages 5 of 12 and 6 of 12 of
MEE application

Pages 1 of 12 through 12 of 12 of
Limestone Dryers application

Section 10.6.2, Operate/Construct Wastewater Treatment and Disposal System

Pages 1 of 9 and 6B of 9

Pages 1 of 9 and 6B of 9

Page 10-21

Section 10.6.4, Florida Ground Water Monitoring Plan Approval

Page 1 of 2 of application form

Page 1 of 2 of application form

Section 10.7.1, St. Johns River Water Management District
Water Use Permit application

Page 1 of application form

Page 1 of application form

Section 10.8 and 10.9

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Section 10.10

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Page 10-78

Section 10.11

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Page 10-79

Section 10-12

Page 10-81

Page 10-80

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 23 seconds west longitude. The geographic coordinates of the kraft recovery complex chimney are approximately 30 degrees 25 minutes 17 seconds north latitude and 81 degrees 36 minutes 19 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 35 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



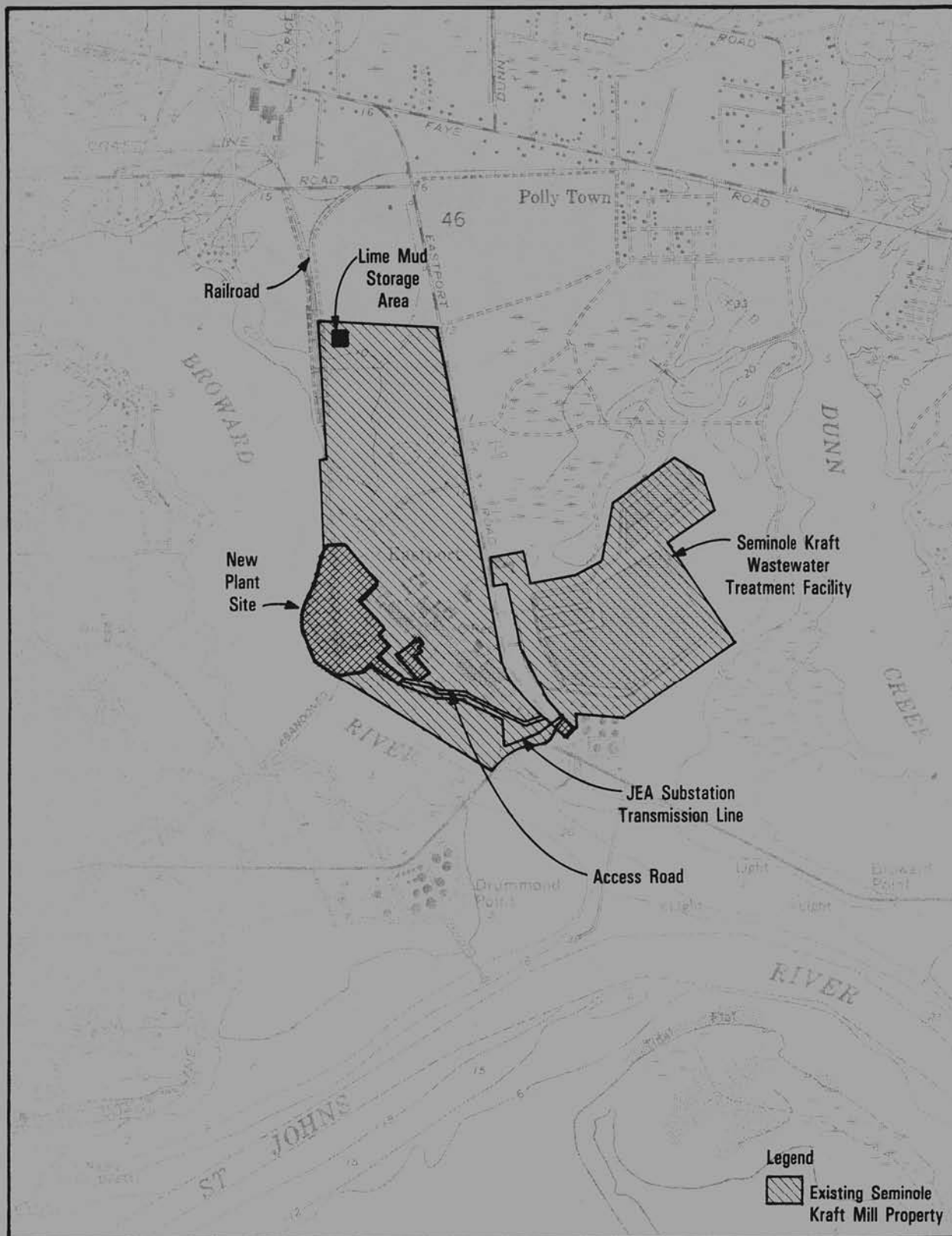
0 5 10

Scale in Miles

2-2

REGIONAL SITE LOCATION

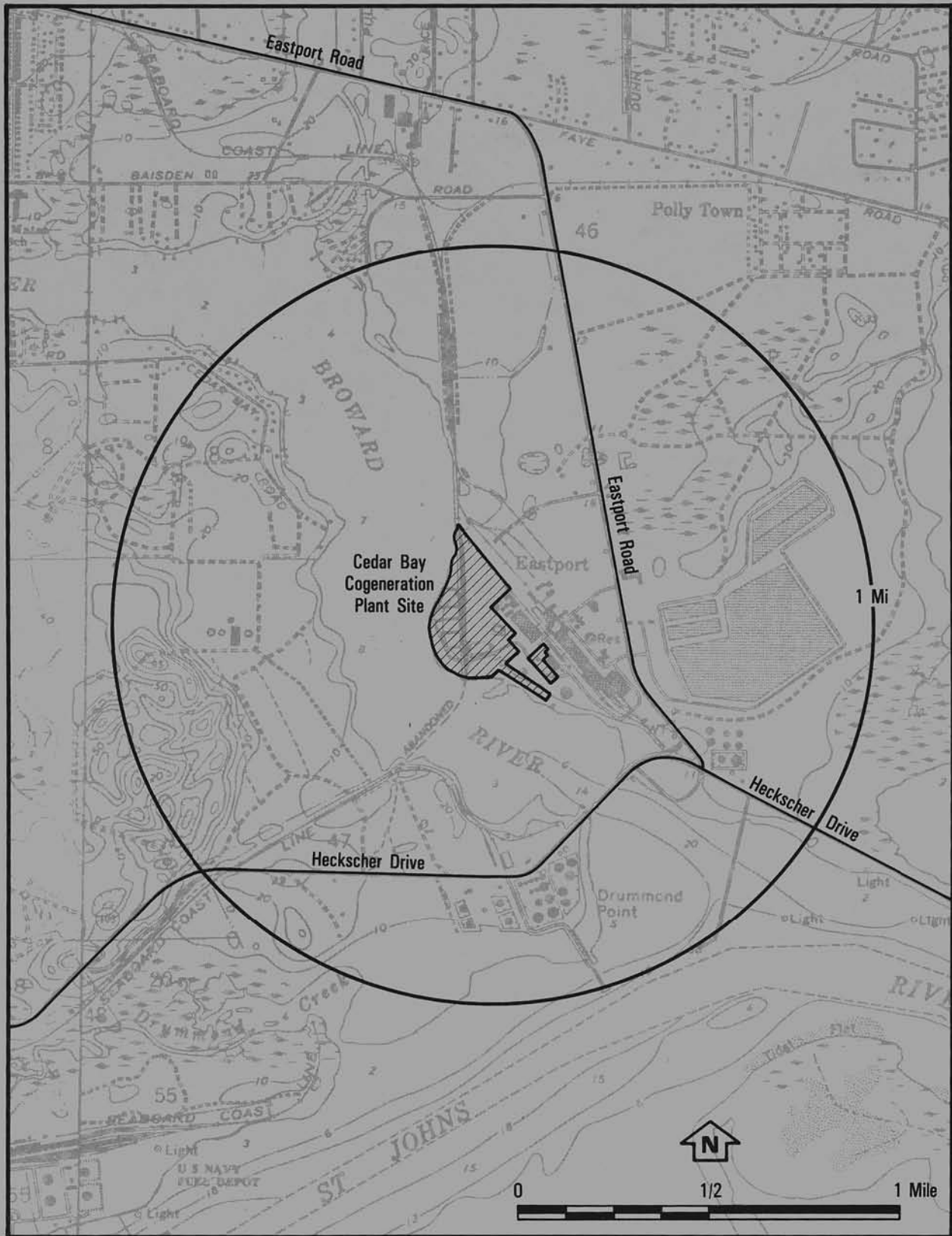
Figure 2.1.1



LOCAL SITE LOCATION

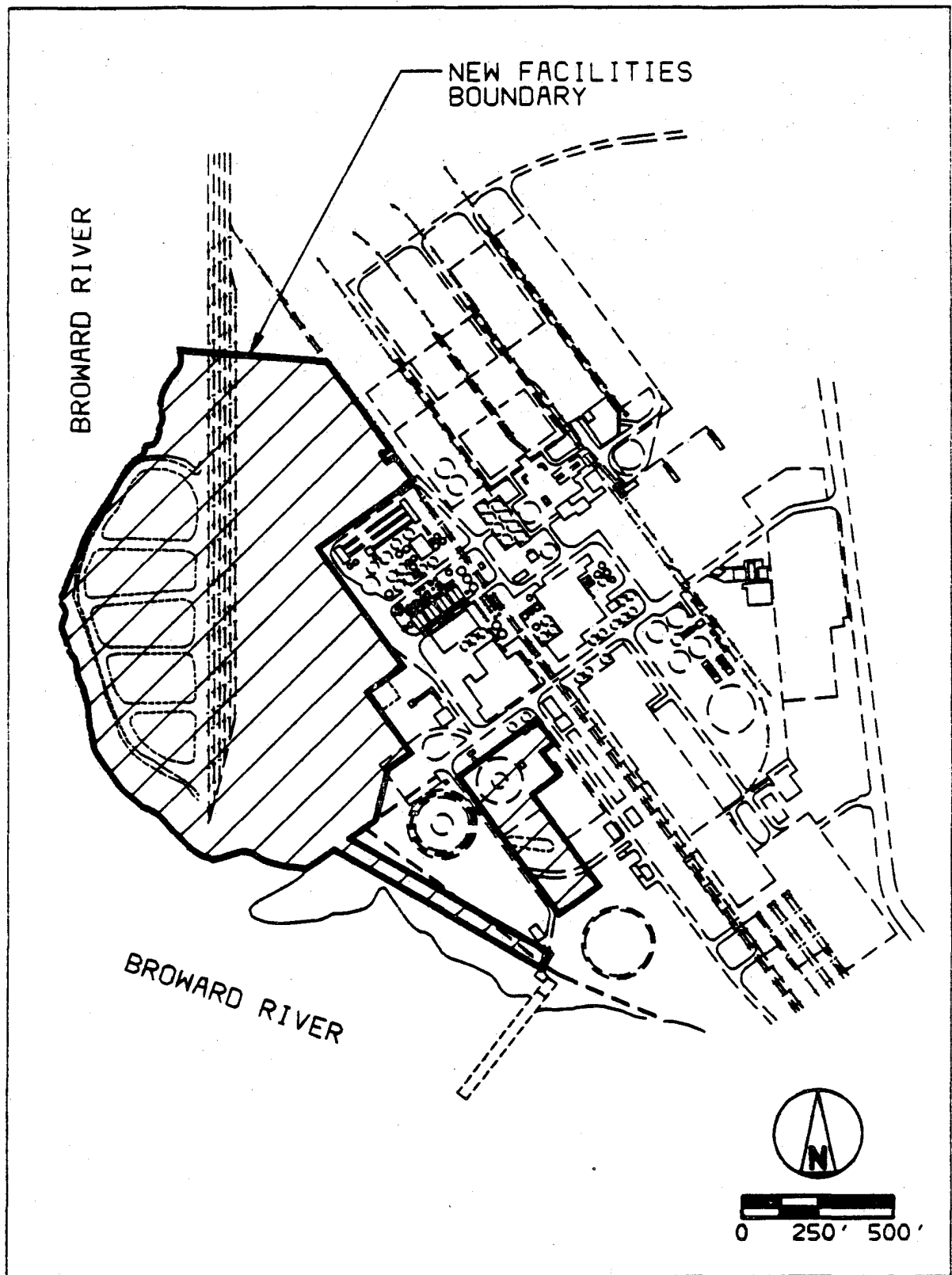
Figure 2.1-2

Amendment 1
021089
Amendment 3
080289
Amendment 4
112989



SITE LOCATION — 1-MILE RADIUS
(JACKSONVILLE, FLORIDA)

Figure 2.2-2



NEW FACILITIES LOCATION

Figure 2.1-3

occupied by the mill facilities, wood storage yard, and lime mud settling ponds and storage areas. The new cogeneration project will be located west 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 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

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 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

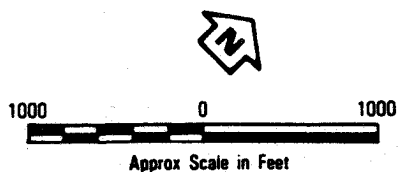
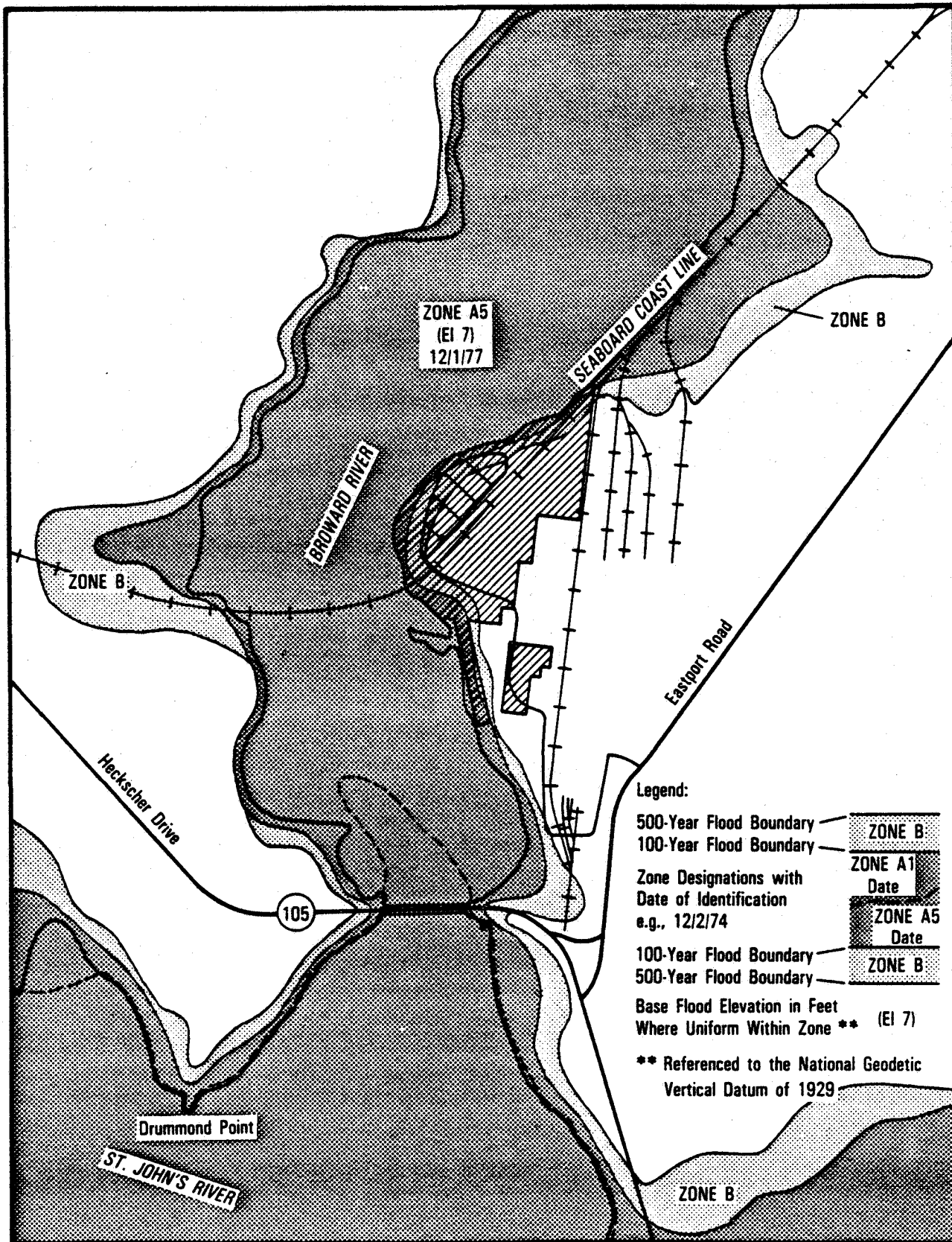
2.2 SOCIO-POLITICAL ENVIRONMENT

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



number of local neighborhood and municipal parks are also located within the 5-mile radius shown on Figure 2.2-1. These facilities are discussed further in Subsection 2.2.5. The Jacksonville Municipal Zoo is between 2 and 3 miles southwest of the site. In the Arlington area, south of the St. Johns River, is a portion of Jacksonville University. The University Country Club and Fairway Golf Courses are in the Arlington area within the 5-mile radius.

2

Figure 2.2-2 depicts the facility site area and the area within a 1-mile radius of the chimney. No historic sites, parks, military lands, or other government jurisdictions are located within a 1-mile radius of the stack.

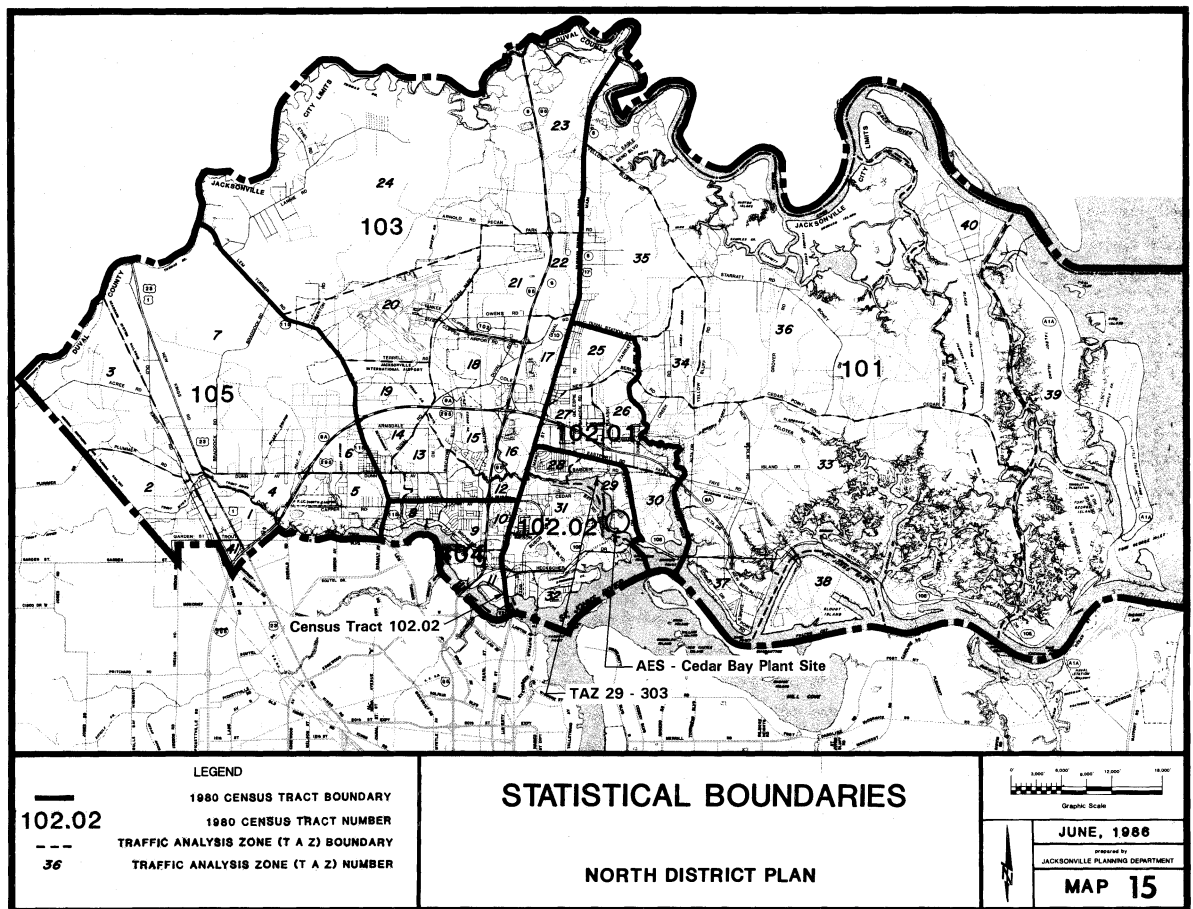
2.2.2 Zoning and Land Use Plans*

2.2.2.1 Overview of the Site. The proposed plant site falls within the North District of Duval County, approximately 8 miles northeast of the city center. It is adjacent to the Seminole Kraft paper mill, near the intersection of Heckscher Drive and Eastport Road. The following data are largely drawn from the North District Plan, prepared in June 1986 by the Jacksonville Planning Department. The plant site will lie within Traffic Analysis Zone 29-303 near Eastport, part of the Census Tract 102.02. The census tract number was assigned for the 1980 Population Census by the US Department of Commerce. The "traffic analysis zones" are subdivisions of the census tracts, and the codes have been assigned by the Jacksonville Planning Office and by the Jacksonville Urban Area Transportation Service. A map of this area, depicting the zone boundaries and the proposed plant site, is included on Figure 2.2-3. The proposed site will comprise an area of approximately 35 acres.

1

The total area for Traffic Analysis Zone 29-303 is 876.28 acres, of which 837.15 acres (96 percent) are suitable for urban development (the remainder is water or salt marsh). In 1985, 33.5 percent of this land was

*It is assumed for this section of the application that the direct and indirect socioeconomic impact will be concentrated within Duval County. Therefore, unless otherwise noted, data given below apply to Duval County.



in use. The bulk of this existing development is industrial (61.4 percent of developed land) and major transportation (14.2 percent). The latter comprises not only roads, but also rail lines owned by CSX (previously Seaboard Coast Lines). A more detailed profile of the 1985 land use in this zone is given in Table 2.2-1.

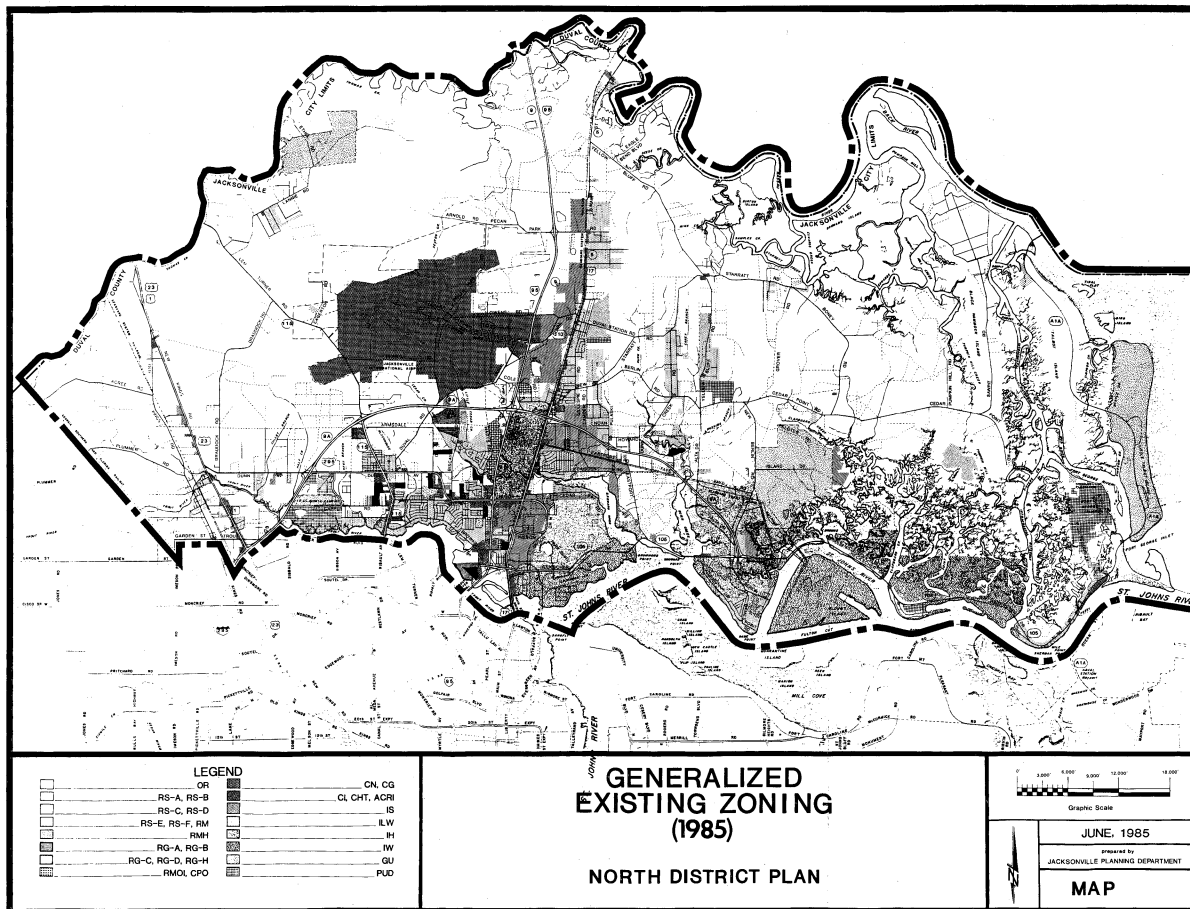
2.2.2.2 Zoning Regulations for the Site. The zoning designations for the plant site are shown in the map on Figure 2.2-4. The land at the site is designated as a Heavy Industrial District (IH). According to the Jacksonville Land Use Regulations, "[IH] districts are intended primarily for heavy manufacturing and closely related uses." Permitted uses include "an industrial...use which is otherwise lawful except those uses listed hereunder as being permissible only by exception." The list of exceptions does not include power plants. In this IH category, there are no minimum or maximum lot size requirements and no minimum yard size requirements.

3

3

TABLE 2.2-1. SUMMARY OF EXISTING LAND USE IN AREA SURROUNDING THE
PLANT SITE (Traffic Analysis Zone 29-303)

<u>Land Use</u>	<u>Acres</u>	<u>Percent</u>
Controls		
Gross area	876.28	NA
Less water	4.00	NA
Less salt marsh	35.13	NA
Net land area	837.15	100.00
Urbanized Development		
Single family	57.45	6.86
Multifamily	0.00	0.00
Parks and recreation	6.89	0.82
Institutional	4.18	0.50
Commercial and service	0.00	0.00
Communications and utilities	0.00	0.00
Major transportation	39.78	4.75
Industrial	172.41	20.59
Total urban development	280.71	33.53
Potential		
Net developable land	556.44	66.47



2-13

GENERALIZED EXISTING ZONING (1985)
NORTH DISTRICT PLAN

Figure 2.2.4

FIGURE 2.2-5

DELETED

3

2-14

Amendment 1
021089
Amendment 3
101089

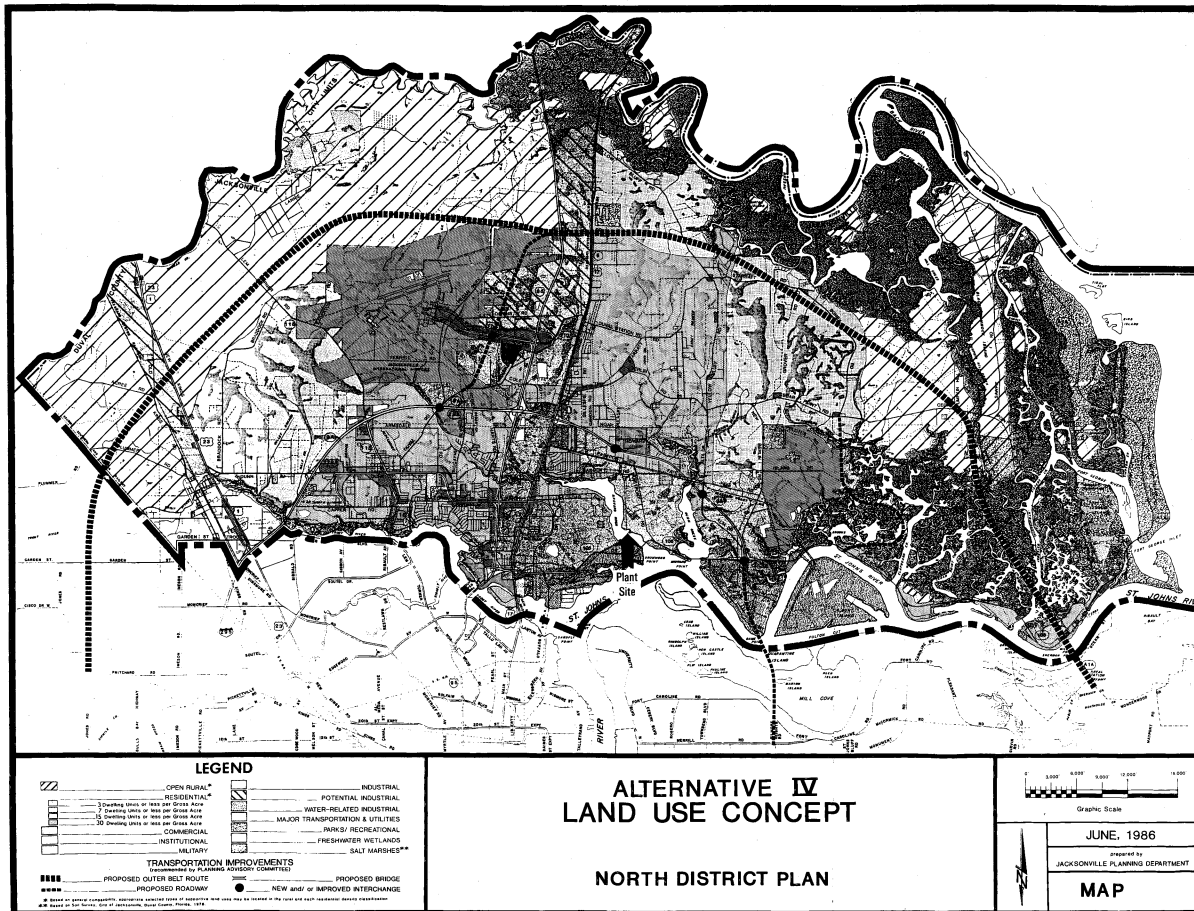
2.2.2.3 Development Plans. A long-range land development plan was developed by the Jacksonville Planning Department as a part of the North District Plan. A map showing this plan is included on Figure 2.2-6. The site itself is, according to the plan, wholly contained in a region intended for industrial development.

A part of the plan deals specifically with the development of the St. Johns River Power Park (SJRPP) (Figure 2.2-7) at a site located in the same area of the city as the proposed AES Project. Two features of the plan are particularly relevant. First, there is an apparent intent to foster the development of related industry near the SJRPP. The SJRPP itself is designated a Major Utility zone, and in the plan, land adjacent to the site has been set aside for potential industrial development. This is an indication of the intent of the Jacksonville Planning Department to further develop industry in this part of the city.

Second, the plan also proposes a number of improvements to the transportation facilities in that area of the city, designed to facilitate traffic flow in the face of increasing numbers of long coal trains needed to serve the SJRPP. These recommended improvements include five overpasses: on North Main Street near Eastport Road, on Eastport Road near North Main Street, on Westport Road near Faye Road, on Alta Drive near Faye Road, and on New Berlin Road near Faye Road. The trains that will supply the coal to the proposed Cedar Bay Cogeneration Plant will use the same route as those trains servicing the SJRPP and, hence, the impact on road traffic flow in that area of the city will be minimized.

2.2.3 Demography and Ongoing Land Use

2.2.3.1 Present Population Profile. The population of Duval County has grown rapidly during the 1980s, primarily because of increased immigration to the area, and this growth is forecast by the Jacksonville Planning Department to continue. The total population in 1987 was 670,688, an increase of almost 100,000 from 1980. The annual growth rate for the area



2-16

ALTERNATIVE IV LAND USE CONCEPT
NORTH DISTRICT PLAN

Figure 2.2-6



JACKSONVILLE AND VICINITY
SHOWING THE AES-CEDAR BAY PLANT SITE
AND THE ST. JOHN'S RIVER POWER PARK

1

population has been 2.49 percent, double the rate of the 1970s. The geographical pattern of growth has been uneven during this period, with the largest gains in the southeast regions of the county, and estimated decreases in population in the urban core. The estimated annual rate of growth in the Southeast district from 1980-87 was 5.76 percent, versus 3.21 percent in the North district (where the plant will be located) and negative 0.63 percent in the urban core. Much of the expansion has been due to a large increase in opportunities for white-collar workers in the service sector. Another major factor in the population growth has been the further development of three US Navy bases located in the county.

Table 2.2-2 presents the population profile of Duval County for the period 1980-87, showing the population trends for each of the districts in the county. These data are from the US Department of Commerce and from the Jacksonville Planning Department. Table 2.2-3 provides estimated population figures for 1988 and 1990 for districts within the county. The estimates for 1988 are obtained by extrapolating the 1987 population estimates by the 1980-87 average annual population growth rate for each of the districts. The population projections for 1990 were prepared by the Jacksonville Planning Department.

The Planning Department has forecast that the population growth of Duval County will continue through the year 2010, with an average annual growth rate (in the period 1980-2010) of 1.50 percent.

2.2.3.2 Present Land Use. Figures 2.2-8 through 2.2-10 indicate recent land use patterns in the areas within 5 miles of the proposed plant site. Most of this land is within the North District of the City of Jacksonville, and the following land-use data for the North District are taken from the North District Plan. | 2

The North District comprises approximately 150,000 acres, although only 111,545 acres can be considered suitable for development. In 1985 urbanized development had taken place on 30,951 acres (48.36 square miles) | 2

TABLE 2.2-2. POPULATION ESTIMATE FOR DUVAL COUNTY, FLORIDA, BY PLANNING DISTRICT AND MUNICIPALITY (April 1, 1987)

	<u>1980 Actual Population*</u>	<u>1987 Estimated Population</u>	<u>80-87 Net Change</u>	<u>80-87 Percent Change percent</u>	<u>Average Annual Percent Change percent</u>
Duval County	571,003	670,688	99,685	17.46	2.49
Planning Districts					
North District	33,408	40,912	7,504	22.46	3.21
Greater Arlington District	110,286	136,497	26,211	23.77	3.40
Southeast District	95,753	134,380	38,627	40.34	5.76
Southwest District	102,861	121,793	18,932	18.41	2.63
Northwest District	142,317	147,056	4,739	3.33	0.48
Urban Core District	56,295	53,831	-2,464	-4.38	-0.63
City of Jacksonville	540,920	634,469	93,549	17.29	2.47
Atlantic Beach	7,847	10,901	3,054	38.92	5.56
Baldwin	1,526	1,612	86	5.64	0.81
Jacksonville Beach	15,462	17,649	2,187	14.14	2.02
Neptune Beach	5,248	6,057	809	15.42	2.20
Other Municipalities	30,083	36,219	6,136	20.40	2.91

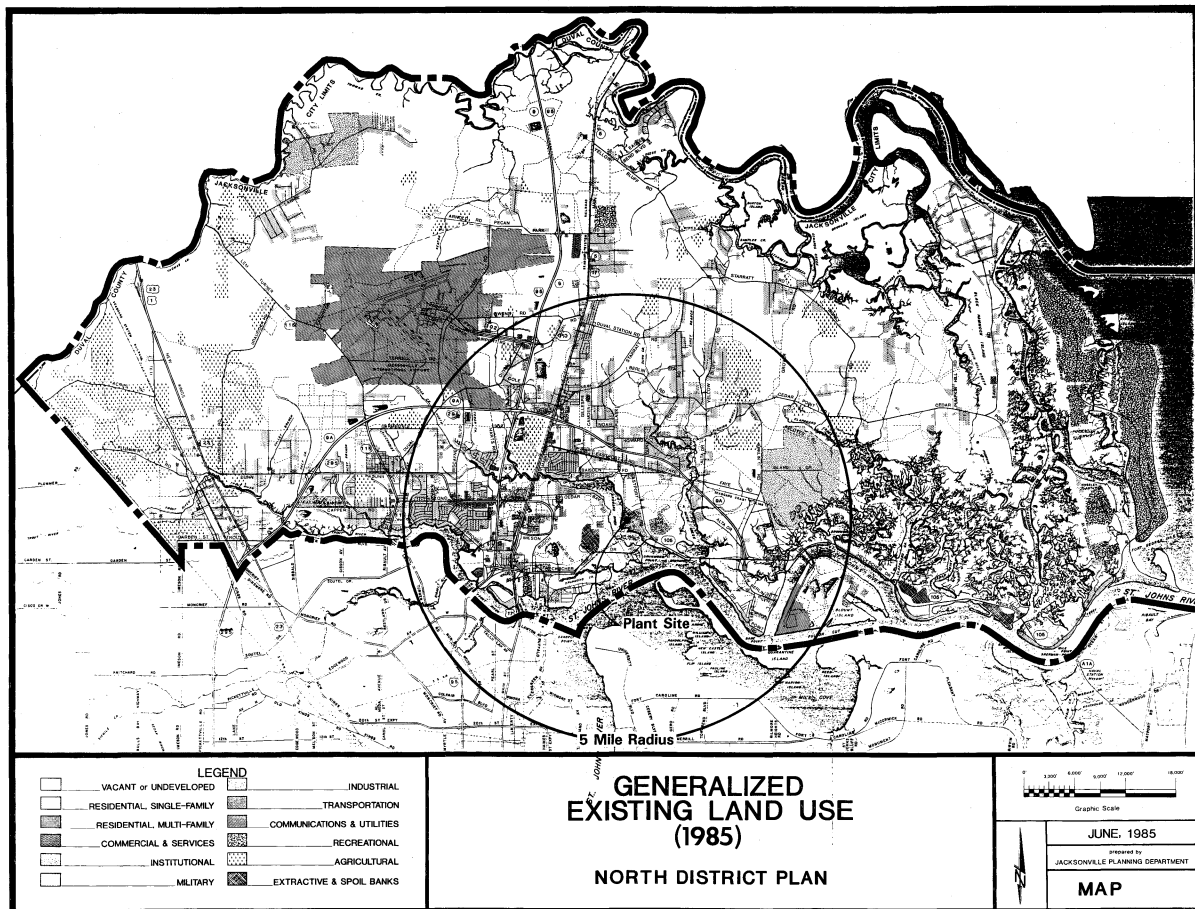
SOURCE: (*) US Department of Commerce, Bureau of the Census, 1980 Census of Population and Housing (Jacksonville Planning Department, August 1987).

TABLE 2.2-3. POPULATION PROJECTIONS FOR 1988 AND 1990

	<u>1988 Estimated Population</u>	<u>1990 Projected Population</u>
Duval County	687,388	690,354
Planning Districts		
North District	42,225	43,187
Greater Arlington District	141,137	139,988
Southeast District	142,120	144,601
Southwest District	124,996	127,294
Northwest District	147,761	147,876
Urban Core District	53,491	51,101
City of Jacksonville	650,140	654,047

NOTES:

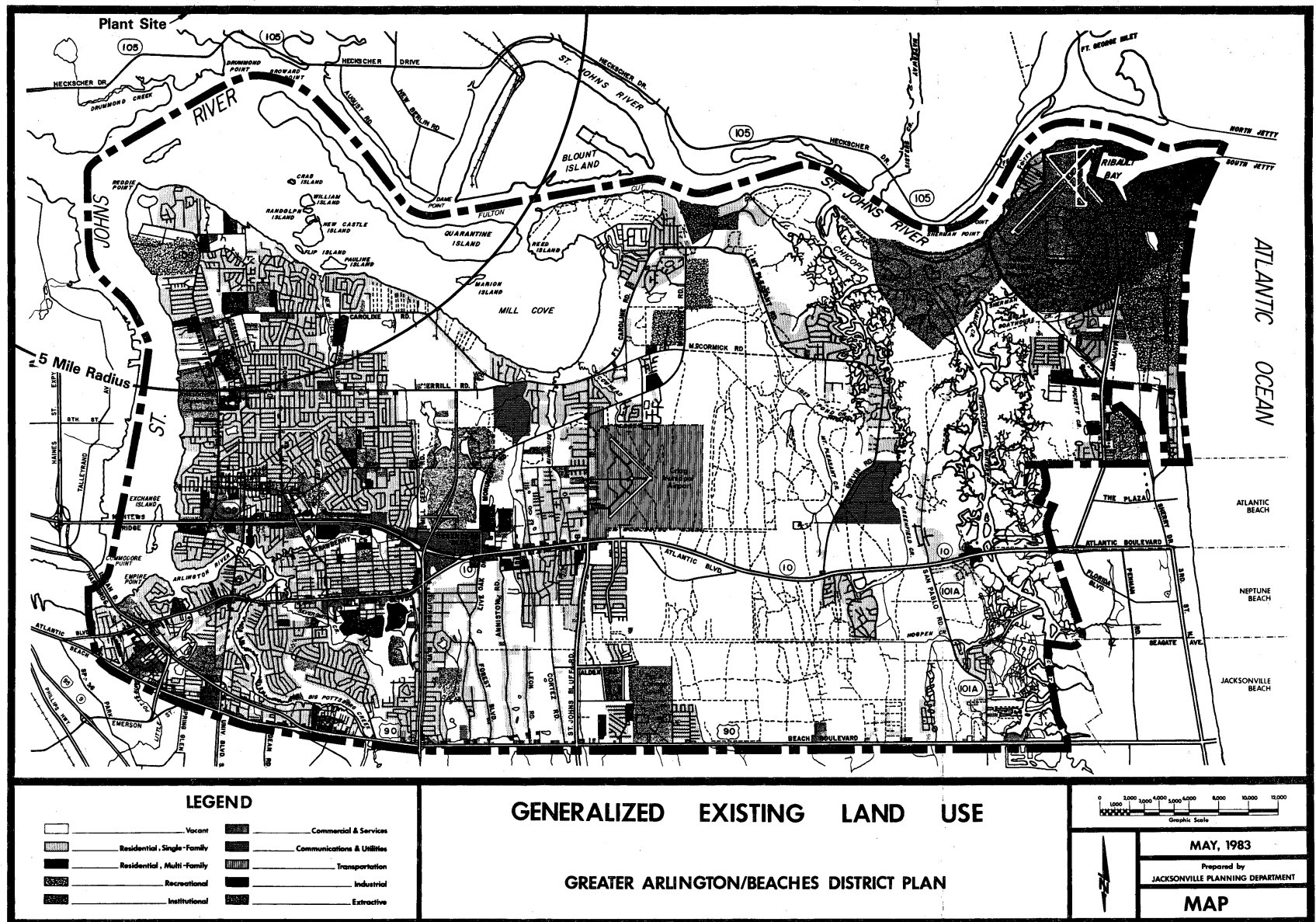
1. 1988 population estimate based on extrapolating 1987 Planning Department estimate by 1980-87 growth rate.
2. 1990 projected population prepared by Jacksonville Planning Department.



2-21

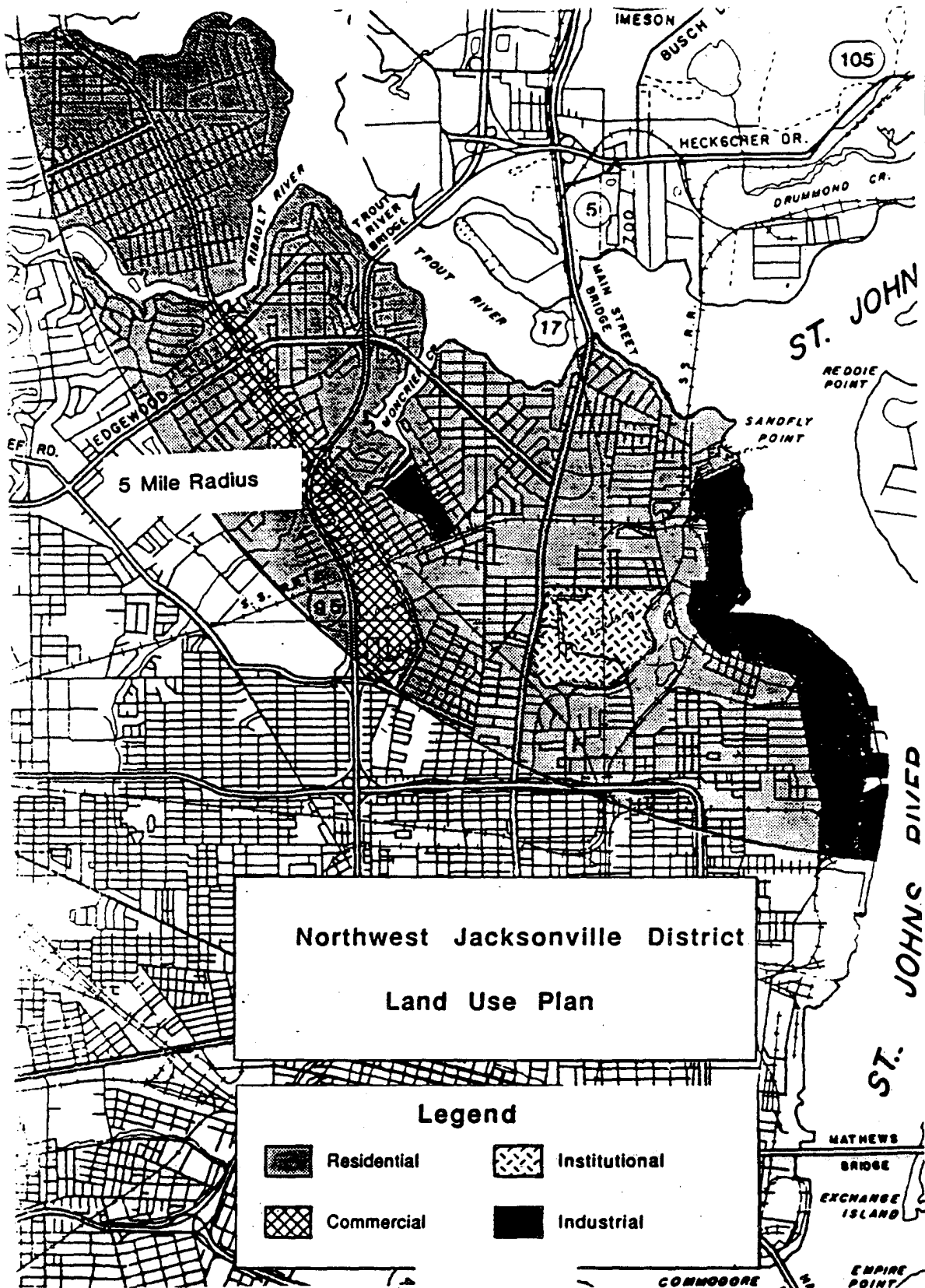
GENERALIZED EXISTING LAND USE (1985)
NORTH DISTRICT PLAN

Figure 2.2-8



2-22
GENERALIZED EXISTING LAND USE
GREATER ARLINGTON/BEACHES DISTRICT PLAN

Figure 2.2-9



in the District, or 27.8 percent of the land area suitable for development. The uses for this land were as follows.

2

<u>Use</u>	<u>Area</u> sq mi	<u>Percent of</u> <u>Developed Land</u>
Residential	15.64	32.3
Parks and Recreation	7.8	16.1
Institutional	2.56	5.3
Commercial	0.57	1.2
Communications and Utilities	4.14	8.6
Transportation	15.08	31.2
Industrial	2.56	5.3

Most of the residential development in the North District is single family, and development is concentrated in the south central portion of the district. Institutional development is largely composed of the North Campus of the Jacksonville Community College and the Jacksonville Correctional Institution. The Communications and Utilities land includes the Northside Power Generation Plant, the St. Johns River Power Park and the New Berlin Road Landfill.

2

A small portion of the Arlington District is within 5 miles of the plant (Figure 2.2-9). This district is across the St. Johns River, south of the plant site. Most of the land in this district and within the 5-mile radius is presently used for single family residences. Portions of this area are also used for recreation, multi-unit residences, and industry. The Jacksonville University campus is located within this area.

The 5-mile radius also includes a part of the Northwest Jacksonville District (Figure 2.2-10). This land is adjacent to the St. Johns River. At present, single and multiple family residences occupy much of this land. A significant portion of this area, along the waterfront, is used for industry. There is also a large cemetery in this area. Much of the area alongside Route 115 (Lem Turner Road) is commercial.

The best source of information reflecting recent land use trends in the vicinity of the site since 1985 was found to be building permit data. The area encompassing Census Tracts 102.01 and 102.02 bordered by Duval

2

Station Road on the north, by Dunn Creek on the east, by Main Street on the west, and by the St. Johns River on the south was chosen as the area of interest for this analysis. Table 2.2-3a summarizes the existing land use in this area in 1985 as classified by the Jacksonville Planning Department.

According to this classification, 1,526 acres or 16.7 percent of the developable land in this area was in residential use in 1985 encompassing 2,977 dwelling units. By September of 1988, an additional 237 residential building permits were issued in the area for 75 single family units and 162 mobile homes. Assuming an average of one half acre per new unit roughly implies an increase of 121 acres in residential use by 1988. With this assumed increase, 18 percent of total developable land was estimated to be in residential use by 1988.

In 1985, 10.6 percent of the developable land in Census Tracts 102.01 and 102.02 was devoted to industrial use. Between 1985 and 1988, 24 building permits were issued for the improvement, expansion, or development of industrial sites in this area representing over 2 million square feet of new industrial development. Most of this industrial development occurred along Heckscher Drive, Eastport and Busch Roads, and Main Street.

In 1985, less than one percent of the developable land area in Census Tracts 102.01 and 102.02 was used for commercial or service activities. Between 1985 and 1988, 72 building permits were issued for improvement, expansion, or new development of commercial or service establishments. These permits represented over 2.5 million square feet of new space mainly along Main Street, New Berlin Road, and Busch Drive, with some development occurring along Eastport Road and Heckscher Drive.

A few building permits were issued for institutional, communications and utilities, transportation, and agricultural uses; however, the new square footage devoted to these uses was insignificant.

Table 2.2-3b shows the recent trends in building permits and associated square footage of development by usage type in the vicinity of the proposed plant.

TABLE 2.2-3a. SUMMARY OF LAND USE EXISTING IN 1985 IN THE AREA SURROUNDING THE PLANT (CENSUS TRACTS 102.01 AND 102.02)

<u>Land Use</u>	<u>Census Tracts</u>		<u>Total</u> Acres	<u>Percent</u>
	<u>102.01</u> Acres	<u>102.02</u> Acres		
Controls				
Gross Area	5,565.24	5,777.92	11,343.16	
Less Water	624.91	938.9	1,563.81	
Less Salt Marsh	294.17	362.01	656.18	
Net Land Area	4,646.16	4,477.01	9,123.17	100
Urbanized Development				
Single Family	1,089.7	436.32	1,526.02	16.7
Multi-Family	0	0	0	0
Parks and Recreation	36.05	77.39	113.44	1.2
Institutional	20.19	158	178.19	2.0
Commercial and Service	44.52	30.65	75.17	0.8
Communications and Utilities	33	13.63	46.63	0.5
Major Transportation	186.9	316.85	503.75	5.5
Industrial	179.55	789.01	968.56	10.6
Total Urban Development	1,589.91	1,821.25	3,411.16	37.4
Remaining Developable Land	3,056.25	2,655.16	5,711.41	62.6

Source: Jacksonville Planning Department, North District Plan, Jacksonville, Florida, June 1986.

TABLE 2.2-3b. RECENT TRENDS IN BUILDING PERMITS (CENSUS TRACTS 102.01 AND 102.02)

Type	1985		1986		1987		1988		Total	
	No.	Square Feet	No.	Square Feet	No.	Square Feet	No.	Square Feet	No.	Square Feet
One-Family Units	11	0	20	0	14	0	30	0	75	0
M-Family Units	0	0	0	0	0	0	0	0	0	0
Mobile Homes	43	0	39	0	37	0	43	0	162	0
Recreational	0	0	0	0	1	0	0	0	1	0
Institutional	0	0	0	0	5	5,400	3	0	8	5,400
Commercial and Service	12	234,671	21	1,162,199	25	1,086,289	14	94,675	72	2,577,834
Communications and Utilities	2	57,499	0	0	0	0	2	0	4	57,499
Transportation	0	0	0	0	0	0	2	40,000	2	40,000
Industry	5	996,400	3	569,698	4	432,640	12	5,952	24	2,004,690
Agriculture	0	0	0	0	0	0	1	0	0	0
Total	73	1,288,570	83	1,731,897	86	1,524,329	107	140,627	349	4,685,423

Source: Jacksonville Planning Department, "Residential Building Permits," "Non-Residential Building Permit Activity," Jacksonville, Florida, 1985-1988.

2.2.4 Easements, Title, Agency Works

There are no easements or titles to be obtained for the main plant site area, which adjoins the operating Seminole Kraft pulp and paper mill. This land is owned by the Seminole Kraft Corporation. Because there are no roads or canals on the proposed main cogeneration facility plant site area, no rights-of-way will be crossed or changed. One plant feature that will require additional right-of-way/easements is the overhead conductor line to the offsite substation. Construction of the rail corridor expansion may also require additional easements. In the event this is necessary, easements will be obtained from the appropriate property owner by AES Cedar Bay or CSX Railroad.

Potential impacts associated with the rail spur expansion are covered in Section 6.3. The overhead conductor line will run southeast approximately 1/2 mile from the cogeneration facility across the Seminole Kraft paper mill property and Eastport Road to a Jacksonville Electric Authority substation that is already in service. A right-of-way/easement will be obtained from the County to cross Eastport Road.

2.2.5 Regional Scenic, Cultural, and Natural Landmarks

There are no recorded scenic, cultural, or natural landmarks located on the plant site. In addition, there are no formally recognized scenic landmarks within 5 miles of the proposed project. Two cultural landmarks within a 5-mile radius of the cogeneration plant site include the Jacksonville Municipal Zoo and part of Jacksonville University, as shown on Figure 2.2-1. The Jacksonville Municipal Zoo is located between 2 and 3 miles southwest of the site just east of North Main Street on Heckscher Drive. Jacksonville University is located in the Greater Arlington area of Jacksonville on the west side of University Boulevard, Highway 109. The two historic sites shown on Figure 2.2-1 are listed in the National Register of Historic Places. The Yellow Bluff Fort is approximately 3 miles southeast of the site on New Berlin Road. Yellow Bluff Fort was a Confederate fort built in 1862 during the Civil War to protect Jacksonville from Union gunboats. It was involved in fighting for two years as it changed several

times from Confederate to Union control. The Napoleon Bonaparte Broward house is located approximately 3 miles southwest of the site near Heckscher Drive and North Main Street. This Victorian style house was built in 1878 and later occupied by Napoleon Bonaparte Broward who was the 19th Governor of Florida.

The Registry of Natural Landmarks does not include any sites for Duval County, Florida; however, portions of the newly designated Timucuan Ecological and Historic Preserve are about 4 miles east of the project (Figure 2.2-1). Thirteen parks are located within the 5-mile radius of the cogeneration facility site. These are shown on Figure 2.2-1; park name, size, and type are listed in Table 2.2-3c.

2.2.6 Archaeological and Historic Sites

There are no listed historic or archaeological sites located on the Cedar Bay Cogeneration Facility site or associated facilities areas.

The Director of the Florida Division of Archives, History and Records Management, Mr. G. W. Percy, was contacted to review the cogeneration facility site to determine if the development would have any adverse impact on known or potential historic or archaeological resources. He determined that no adverse impacts were expected and that "the project(s) is (are) consistent with the historic preservation aspects of Florida's coastal zone program, and may proceed without further involvement with this agency." A copy of Mr. Percy's letter is presented as Exhibit A. The site is on property owned by the Seminole Kraft Corporation, in an area zoned for heavy industrial use. It is next to the pulp and paper mill facility which has been operating for over 30 years.

References

1. Black & Veatch Consulting Engineers, "Orlando Utilities Commission Curtis H. Stanton Energy Center, Unit 1, Site Certification Application," Vols 1-3, 1982.
2. Conversation with the Jacksonville Visitors Bureau, Jacksonville, Florida on July 15, 1988.

3. Conversation with the Jacksonville Planning Department, City of Jacksonville, Florida on June 24, 1988 and July 6, 1988.
4. Jacksonville Planning Department, 1988 Annual Statistical Package, City of Jacksonville, January 1988.

TABLE 2.2-3c. PARKS AND PUBLIC RECREATION FACILITIES*

1. Tom Marshall Park: 15-acre community park operated by the City of Jacksonville.
2. Model Airplane Field: 20-acre special facility operated by the City.
3. Heckscher Drive Fishing Pier: 4-acre special facility operated by the City.
4. Lake Lucinia Elementary School: 4-acre school playground leased by the City to serve as a neighborhood park.
5. Wigmore: 4-acre community park operated by the City.
6. Kooker Park: 6-acre community park operated by the City.
7. Mary Mann Jennings Park: 35-acre community park operated by the City.
8. Panama Park: 8-acre community park operated by the City.
9. Tallulah Playground: 6-acre neighborhood park operated by the City.
10. Burt Maxwell Boat Landing: 5-acre special facility operated by the City.
11. Ray Green Park: 42-acre community park operated by the City.
12. San Mateo Elementary School: 4-acre school playground leased by the City to serve as a neighborhood park.
13. Oceanway Sports Complex: 28-acre special facility leased by the City to serve as a community park. Includes the Oceanway Fish Management Area, a 6-acre urban pond project maintained by the Florida Game and Freshwater Fish Commission.

*Numbers correspond to facility identification on Figure 2.2-1.



FLORIDA DEPARTMENT OF STATE
 Jim Smith
 Secretary of State
 DIVISION OF HISTORICAL RESOURCES
 R.A. Gray Building
 Tallahassee, Florida 32399-0250
 (904) 488-1480

AES JACKSONVILLE			
FILE 14573 32.0409			
REC'D		AUG 12 1988	
K. Varkende		B&V	
CES CARVAJAL M. R. DAY M. R. GOANS C. Y. GUNN C. J. MART	☒	J. M. HORNBER R. I. JACOB M. L. JACORS K. R. WEISS N. A. STIKES	☐
G. R. SANGE		C. R. JACOB	

August 4, 1988

Mr. Steven M. Day
 Black and Veach
 Engineers - Architects
 P.O. Box 8405
 Kansas City, Missouri 64114

In Reply Refer To:

Beth J. LaCivita
 Historic Sites Specialist
 (904) 487-2333
 Project File No. 881801

RE: Your Letter of July 15, 1988, Cultural Resource Assessment Request,
 Cedar Bay Cogeneration Facility, Jacksonville, Duval County, Florida

Dear Mr. Day:

In accordance with the provisions of the applicable local ordinance and/or Sections 253.77, 267.061, 380.06, 380.061 and 403.918(2)(a)6, Florida Statutes, and implementing state regulations, and/or in accordance with the provisions of the National Historic Preservation Act of 1966 (Public Law 89-665) as amended and related federal laws and their implementing procedures for federally involved projects, we have reviewed the above cited project(s) to determine its(their) effect on significant archaeological and historical sites and properties.

A review of the Florida Master Site File indicates that no significant archaeological and/or historical sites are recorded for or considered likely to be present within the project area(s). Because of the project(s) nature it is considered unlikely that any such sites will be affected. Therefore, it is the opinion of this office that the proposed project(s) will have no effect on any sites listed, or eligible for listing, in the National Register of Historic Places, or otherwise of national, state or local significance. The project(s) is(are) consistent with the historic preservation aspects of Florida's coastal zone program, and may proceed without further involvement with this agency.

If you have any questions concerning our comments, please do not hesitate to contact us. Your interest and cooperation in helping to protect Florida's archaeological and historical resources are appreciated.

Sincerely,

George W. Percy

George W. Percy, Director
 Division of Historical Resources
 and
 State Historic Preservation Officer

GWP/gv
 Enclosure()

Archaeological Research
 (904) 487-2299

Florida Folklife Programs
 (904) 397-2192

Historic Preservation
 (904) 487-2333

Museum of Florida History
 (904) 488-1484

5. Jacksonville Planning Department, Greater Arlington/Beaches District Plan, City of Jacksonville, January 1986.
6. Jacksonville Planning Department, North District Plan, City of Jacksonville, June 1986.
7. United States Office of Archaeology and Historic Preservation, The National Register of Historic Places 1976, National Register Division, 1976; Updates made through April 1988 by notices from the Federal Register.
8. United States Department of the Interior, National Park Service Registry of National Landmarks, March 1983; Updates made through March 1988 from the Federal Register annual supplemental listing of natural landmarks.

2.2.7 Socioeconomics and Public Services

This section of the application describes the present socioeconomic state of the area that would be affected by the proposed project. It is expected that the area principally affected will be Duval County. This application section describes the present socioeconomic profile for the county. Section 7.0 of this application describes the projected socioeconomic impact of the proposed project. The data below were collected from several sources, including the 2005 Development Plan for Duval County, the North District Plan, the 1987 Northeast Florida Comprehensive Regional Policy Plan, the 1980 Census of Population and Housing for Jacksonville, and the 1987 Annual Statistical Package prepared by the Jacksonville Planning Department.

2.2.7.1 Employment. The increase in population in Duval County has been paralleled by a dramatic increase in employment. During the period 1980-87, nonagricultural employment grew by 32 percent, from 288,600 persons to 382,200 persons. The rate of unemployment has ranged from a low 5.0 percent in 1980 to 7.8 percent in 1983. It currently stands at 5.2 percent (August 1988). The following sector-by-sector analysis of employment from 1980-87 will give a clearer picture of the employment trends in the county.

Construction. Employment in construction has risen during this period from 15,500 jobs to 27,200. This dramatic expansion (75 percent) is an indication of the economic growth of the area. The construction sector itself

has grown from 5.4 percent to 7.1 percent of total employment during this period.

Manufacturing. Manufacturing employment has not kept pace with the growth of the county's economy, an indication of the trend toward service-based industries. Manufacturing jobs rose from 34,100 (11.8 percent of total employment) to 38,000 (9.9 percent). This was an increase of 11.4 percent, considerably less than the 32 percent growth of the total economy.

Transportation and Public Utilities. Employment in the transportation and public utilities sector rose from 23,700 to 27,200, a 14.8 percent increase. The sector decreased in size from 8.2 percent of total employment in 1980 to 7.1 percent.

Wholesale Trade. The wholesale trade sector also grew slowly relative to Construction and Services. Employment grew by 23 percent, from 22,600 jobs to 27,800. This sector presently represents 7.3 percent of the total employment in the county.

Retail Trade. Retail trade employment grew dramatically (45.4 percent) during the period 1980-87. The number of jobs increased from 51,700 (17.9 percent of total) to 75,200 (19.7 percent).

Finance, Insurance, and Real Estate. Employment in the finance, insurance, and real estate sector grew 33.5 percent, from 27,200 jobs to 36,300. This sector comprised 9.5 percent of total employment in Duval County in 1987.

Services and Mining. Services and mining was one of the most rapidly growing sectors in the economy during this period. The number of jobs grew 54.4 percent, and there were 32,600 jobs added. This sector now makes up 24.2 percent of the economy.

Total Government. Employment in the Government sector grew slightly (7.6 percent) during this period, primarily because of the continued development of the naval bases. Government employment is a significant factor in the county economy, comprising 15 percent of total employment.

2.2.7.2 Income. The growth in the level of household income in Duval County from 1970 to 1980 is detailed in the following table.

	<u>1970</u>	<u>1980</u>	<u>Change</u> <u>percent</u>
Families			
Median	8,671	17,661	103.7
Mean	9,931	20,784	109.3
Households			
Median	6,642	14,938	124.9
Mean	8,039	18,377	128.6
Per Capita (Age 15+)	2,834	6,822	140.7

SOURCE: 1980 Census of Population and Housing, Jacksonville SMSA, US Department of Commerce, Bureau of the Census, 1983.

In 1980, an estimated 12.7 percent of families in Duval County had incomes below the poverty line. The 1985 per capita income was \$10,565, an increase of 55 percent from 1980.

2.2.7.3 Housing. This section presents a profile of the existing housing stock, along with trends in housing construction since 1980, the average size of the household, and finally the stock of housing for the next two decades. Data for this section are largely drawn from the 1987 Statistical Package prepared by the Jacksonville Planning Department.

The profile of the existing housing stock is summarized in the following table.

	<u>1980</u>	<u>1987</u>	<u>Net</u> <u>Change</u>	<u>Percent</u> <u>Change</u>
Single Family	142,310	161,482	19,172	13.47
Duplexes	6,811	7,753	942	13.83
Tri/Quad-plexes	9,841	16,286	6,445	65.49
Five or More	41,562	54,333	12,771	30.73
Mobile Homes	13,032	23,461	10,429	80.03
Demolitions	<u>0</u>	<u>-1,802</u>	<u>-1,802</u>	<u>--</u>
Total	213,556	261,512	47,957	22.46

The greatest percentage increase has been in mobile homes and multifamily units; 53.49 percent of this new multifamily construction has been in the

Southeast District. A total of 92.9 percent of these new multifamily dwellings have been built in three areas of the county: Southeast District, Greater Arlington District, and Southwest District.

In addition to the dwellings listed above, there were an estimated 21,966 seasonal units (transitory apartments, rooming houses, hotels and campgrounds) in 1985, and this number was forecast to grow to 26,965 in 1995.

The average household size during this same period has declined dramatically, from 3.35 persons per dwelling in 1980 to 2.6 persons in 1987. This is a 22.4 percent decrease.

The Planning Department has forecast that housing stock in Duval County will continue to grow, expanding by 60.6 percent by the year 2010, to a total of 363,831 units. A table summarizing the projected housing growth pattern is included in Table 2.2-4. This continued growth is demonstrated by the number of new building permits issued in the period from April 1987 through May 1988, shown in the following table.

<u>Building Type</u>	<u>Number of Permits</u>	<u>Percent of Total</u>
Single Family	4,550	61
Multifamily	2,071	28
Mobile Homes	837	11

SOURCE: Jacksonville Planning Department.

2.2.7.4 Area Public Services and Utilities.

Education. There are presently a total of 132 public schools in Duval County, categorized as follows.

<u>Grades</u>	<u>Number of Schools</u>
K-6	96
6-8	1
7 only	4
7-9	9
7-12	3
8-9	7
8-12	1
9-12	1
10-12	<u>10</u>
Total	132

TABLE 2.2-4. PROJECTED HOUSEHOLD POPULATION AND DWELLING UNITS FOR DUVAL COUNTY, FLORIDA (1980-2010)

Year	Population		Group Quarters			Household Size	Dwelling Units			Vacancy Rate percent
	Total	Household	Total	Civilian	Military*		Total	Occupied	Vacant	
1980	571,003	559,694	11,309	6,235	5,074	2.6863	226,611	208,151	18,260	8.06
1985	633,920	617,885	16,035	6,561	9,474	2.6093	258,518	236,799	21,719	8.40
1990	690,354	672,570	17,784	6,887	10,897	2.5611	285,756	262,610	23,146	8.10
1995	733,914	715,804	18,110	7,213	10,897	2.5098	310,747	285,204	25,543	8.22
2000	769,565	751,129	18,436	7,539	10,897	2.4659	332,285	304,606	27,679	8.33
2005	799,467	780,705	18,762	7,865	10,897	2.4289	351,090	321,423	29,667	8.45
2010	827,151	808,063	19,088	8,191	10,897	2.4289	363,831	332,687	31,144	8.56

*Includes only 28.32 percent of the personnel projected to be assigned aboard ships for N.S. Mayport basin (because the projected remainder has another place of residence within 50 miles), and other unaccompanied personnel for all three naval facilities.

SOURCE: US Department of Commerce, Bureau of the Census, 1980 Census of Population and Housing (Jacksonville Planning Department, October 1985).

The enrollment profile for these schools is as follows.

<u>Grade</u>	<u>Enrollment</u>
K	9,562
1	9,939
2	9,057
3	8,518
4	8,071
5	7,601
6	6,988
7	8,132
8	8,167
9	7,245
10	9,090
11	6,703
12	<u>5,156</u>
Total	104,229

There was a decline in Duval County school enrollment during the 1970s, but enrollment is expected to increase during the period 1980-2000. In 1977-78, 14.5 percent of elementary school students and 12.5 percent of secondary students were enrolled in private or parochial schools. If it is assumed that the percentage of students enrolled in these schools remains constant in the future, then the forecast enrollment and capacity needs for Duval County are as follows (data from the Duval County 2005 Comprehensive Plan).

	<u>Projected Enrollment</u>	<u>Additional Schools</u>
<u>Elementary Schools</u>		
1980	49,582	2
1990	56,570	0
2005	65,200	8
<u>Secondary Schools</u>		
1980	52,170	0
1990	52,273	0
2005	63,709	6

An alternative assumption is that the absolute number of students in non-government schools remains constant. In this case, the number of additional schools required would be slightly lower in some cases.

Fire and Police Service. Within the North District, there are presently (1985) eight fire stations, manned by a combination of paid and volunteer personnel. Two of the facilities are manned only by volunteers. Structural conditions of the facilities vary from fair for most stations to very good for the newer facilities. Because of the large geographic area in the North District, very few areas are serviced with an average response time of less than three minutes from existing stations. This is expected to improve somewhat with the relocation of one of the fire stations and the addition of new equipment. The station is being moved from the Navy Fuel Depot to the intersection of Busch Drive and North Main Street.

The evaluation of the Duval County police facilities for the 2005 Comprehensive Plan recommended the construction of a new jail and the possible construction of new police stations, if a decentralized policy were adopted.

Parks and Recreation. The 1978 Duval County park acreage was as follows.

	<u>Existing 1978</u> acres
Community	738
Metropolitan	1,643
Regional	<u>2,879</u>
Total	5,260

SOURCE: 2005 Comprehensive Plan, Jacksonville Area Planning Board, 1980.

In 1988, the total existing park land area is 3,149 acres (Jacksonville Parks and Recreation Department).

Water, Sewage, and Sanitation Services. There is presently excess capacity in the water and sewer services, according to the Duval County Public Works Department. The sewage system has a capacity of 87.41 million gallons per day, whereas the present demand is only 44.99 million gallons per day. The water treatment system is capable of providing 175 million gallons per day, versus a maximum demand of 65.45 million gallons per day. City water is not available and, therefore, will not be used at the Cedar Bay site.

The sanitation service had a capacity of 1.1 million pounds per day in 1980, versus an approximate demand of 864,000 pounds per day at that time, as cited in the St. Johns River Power Park permit application. However, remaining space in existing landfills is becoming critically small. At the present time, there are two municipal landfills in operation. One of these will be closed later this year. An application has been filed for a second landfill in the Southeast District. It is expected to be opened in 1989. The county has also filed a request for expansion of the present North District landfill. If both requests are granted, the system capacity will be approximately 1.7 million cubic yards of usable space. The county is also planning to build a refuse-to-energy plant, to be operational by 1992 to help reduce the volume of solid waste.

Health Services. At present, there is no hospital in the North District of Duval County. The nearest two facilities are located approximately 4.5 miles south on I-95. These two hospitals (Methodist Hospital, Inc., and the University Hospital of Jacksonville) are multipurpose facilities. In addition, there are other hospitals farther from the District. The Jacksonville Planning Department has forecast the need for a small-to-medium size facility to service the needs of the expanding population in this North District.

There are numerous medical and dental private offices and clinics in the District. The majority of these are located in the southern and central portions of the North District.

Gas and Electric Utilities. The area of the project site and most of Duval County are within Jacksonville Electric Authority's area. However, there are areas in the county served by other electric utilities. Parts of the North District are serviced by Okefenokee Coop., and some western areas of the county are served by Clay County Coop. or Florida Power and Light.

Gas use in the county is limited according to a Jacksonville Planning Department spokesman. The primary gas supplier is Western Natural Gas Company, which ships the gas from Louisiana.

Transportation Facilities. Six regionally significant roadways were identified within a five-mile radius of the proposed project, as shown on Figure 2.2-10A. These roadways include Interstate 95 which runs north and

south through the Jacksonville metropolitan area, Interstate 295 which serves as the major bypass around the west side of the City, State Route 9A which encircles the northeast perimeter of the City, Main Street or US Highway 17 which runs east of and parallel to the northern portion of I-95, Heckscher Drive or SR-105 which runs east and west along the north bank of the St. Johns River, and Eastport/Faye Road which connects Main Street on the west to SR-9A on the east. As shown on the figure midway between Main and 9A, Eastport Road turns southeast and connects with Heckscher Drive at roughly the proposed project site. I-95 and I-295 are divided, 4-lane interstate highways; Main Street is 4-lane; and 9A, Heckscher Drive, Eastport, and Faye Roads are each 2-lane roadways.

Table 2.2-4A presents historical average daily traffic counts for each of these roadways at the Federal Department of Transportation stations with the highest 1988 counts. No official traffic counts have been taken along the north-south portion of Eastport Road. The majority of trips along this segment originate or terminate at the Seminole Kraft Paper Mill, which is estimated to generate approximately 12,000 truck trips north and 4,000 trips south per year along this route.

The increase in average daily traffic volumes over each of these regional roadways has been significant throughout the 1980s. Growth rates have been above those for Duval County population over the same time period.

Future traffic volumes on I-95 and I-295 will be affected by tourism traffic as well as local and regional growth. Future volumes along Main Street, SR-9A, Heckscher Drive, and Eastport and Faye Roads will mainly be determined by trends in commercial and industrial development in the North District of Jacksonville. In addition, traffic on SR-9A will be dependent upon future completion of the Southside Boulevard Connector.

Planning studies conducted in the 1970s called for the construction of an east bypass around the city, the northern portion of which would consist of an expansion of SR-9A called the Dames Point Expressway. The Dames Point Bridge over the St. Johns River was opened in March 1989, and the expansion of SR-9A into a limited access expressway will likely be scheduled as soon as funding can be arranged.

TABLE 2.2-4a. TRENDS IN AVERAGE DAILY TRAFFIC COUNTS ON REGIONALLY SIGNIFICANT ROADWAYS

FDOT* Traffic Count Station Number	Location	Average Daily Traffic Counts							Percent Average Annual Increase	Projected Average Daily Traffic Counts		Projected Peak Hourly Traffic Counts		Service Level Capacities	
		1979	1982	1984	1985	1986	1987	1988		1991	1992	1991	1992	Average Daily	Peak Hourly
118	I-95 just north of I-295	28,725	37,845	38,280	45,100	49,410	51,540	51,985	4.8**	59,800	67,600	6,330	6,760	49,800	
200	I-295 between I-95 and Main	6,450	8,845	8,335	12,940	14,715	15,010	18,595	12.5	26,500	29,800	2,650	2,980	42,000	
212	SR-9A just west of Pulaski	N/A	N/A	N/A	N/A	9,450	9,990	10,240	4.1	11,600***	12,000***	1,160***	1,200***	15,800***	
206	Main just north of Heckscher	16,770	N/A	18,245	18,635	21,670	23,800	24,370	4.2	27,600	28,700	2,760	8,870		5,200
106	Heckscher between I-95 and Main	9,620	10,335	10,780	12,030	11,750	10,660	10,235	0.7	10,500	10,500	1,050	1,050		2,600
109	Heckscher at east end of Broward River Bridge	8,635	11,055	12,040	11,920	12,320	15,730	16,560	7.5	20,600	22,100	2,060	2,210		2,000
	Eastport Road on east/west segment	N/A	4,514	N/A	N/A	N/A	N/A	N/A		8,000	8,700	800	870		2,600

Sources: "Annual Average Daily Traffic Counts," metropolitan planning organization for the Jacksonville urbanized area.
Jacksonville Streets and Highways Department.
Florida State Department of Transportation.
Site Certification Application for Jacksonville Electric Authority, St. Johns River Power Park.

*Federal Department of Transportation.

**Average increase 1985-1988.

***Does not reflect the traffic impacts of the Dames Point Bridge opening or the capacity of an expanded limited-access expressway.

Recent studies have called for upgrading and widening of Heckscher Drive. Current plans call for the expansion of the Broward River Bridge and the widening of the Heckscher Drive to four lanes during the 1990-1995 time period, with provision for six lanes at a later date.

Based on an extrapolation of historical increases in traffic volumes, future average daily traffic volumes in the vicinity of the project are projected in Table 2.2-4A. Projected traffic volumes are presented for 1991, the year of peak construction impact, and 1992, the first year of commercial operation for the proposed project.

Also shown on Table 2.2-4A are the projected peak volumes for each roadway in 1991 and 1992 based on the conservative assumption that peak hourly volumes may reach 10 percent of the average daily volumes. (According to the Site Certification Application for the Jacksonville Electric Authority St. Johns River Power Park, the ratios of peak hourly to average daily traffic flows ranged from 7.4 to 8.4 percent on the roadways near the project in 1980.)

Finally, Table 2.2-4A contains the estimated capacity levels for each of the regionally significant roadways in the vicinity of the site. These capacity levels are based on a level of service C, which is defined as stable traffic flow where most drivers are restricted in selecting their speed but where all stopped traffic will clear a signalized intersection.

As shown on Table 2.2-4A, the only area where current and projected traffic volumes appear to be approaching or exceeding the capacities at level of service C is I-95 just north of I-295. Current volumes indicate a service level of D, and if capacities continue to increase at recent historical rates, the level of service may be reduced to E by 1991. It is important to note that the congested conditions along I-95 north of I-295 are greatly reduced less than two miles north on I-95. The 1988 average daily traffic volumes at the Owens Road overpass was 38,380, well under the capacity for level C service.

Since the opening of the Dames Point Bridge in mid-March of 1989, traffic counts have been about 20,000 vehicles per day on the bridge. While this has resulted in increased attendance at coastal area parks and increased trips to Fernadina Beach, it may still be too early to predict

the impact on SR-9A traffic. To the extent that impacts on SR-9A traffic are significant, it seems reasonable to expect that the expansion of SR-9A into the Dames Point Expressway will be made a high priority project.

The north district of Jacksonville is served by the CSX Railroad, connecting to Georgia to the north and central Florida to the south. Several spurs exist in the vicinity of the proposed project. This existing rail line and spurs are shown on Figure 2.2-10A. Existing local and through rail traffic data along the CSX line are considered proprietary information and are not available.

References.

1. 1980 Census of Population and Housing, Jacksonville SMSA, US Department of Commerce, Bureau of the Census, 1983.

2. 1987 Annual Statistical Package, Jacksonville Planning Department, 1988.
3. 2005 Comprehensive Plan, Jacksonville Area Planning Board, 1980.
4. "Annual Average Daily Traffic Counts," metropolitan planning organization for the Jacksonville urbanized area.
5. EnviroSphere Company, Site Certification Application for Jacksonville Electric Authority, St. Johns River Power Park, 1981.
6. Florida State Department of Transportation, Site Certification Application for Jacksonville Electric Authority, St. Johns Power Park.
7. North District Plan, Jacksonville Planning Department, 1986.
8. Northeast Florida Comprehensive Regional Policy Plan, Northeast Florida Regional Planning Council, Jacksonville, 1987.
9. Telephone conversations with Duval County Sanitation Department and Public Works Department.

2.3 BIOPHYSICAL ENVIRONMENT

2.3.1 Geology

Three types of geologic data were used to determine subsurface conditions affecting the project: (1) published literature providing regional geologic information for Florida's Duval County's geologic setting, (2) on-site subsurface investigation reports provided by Law Engineering and Testing Company (LETCO), and (3) a ground water study performed by Environmental Resources Management South, Inc. (ERM). These reports provided information on site stratigraphy, aquifers, and soils engineering properties. Copies of pertinent reports are included in Appendix 10.10.

Using information from these sources, regional geologic features affecting the site were evaluated and site specific geology was determined. Geologic cross sections through the site show lithologic units and boring logs describe their engineering properties. The following two sections describe regional and site specific geologic features and how they affect project structures and design.

2.3.1.1 Geologic Description of the Site Area. Reports listed in the references were reviewed to develop a regional framework for the southeastern United States, Florida, and Duval County.

These reports provide information on geologic structure, stratigraphy, geologic history, seismicity, and hydrogeology. Using this information, regional geologic features which may affect the project were evaluated and

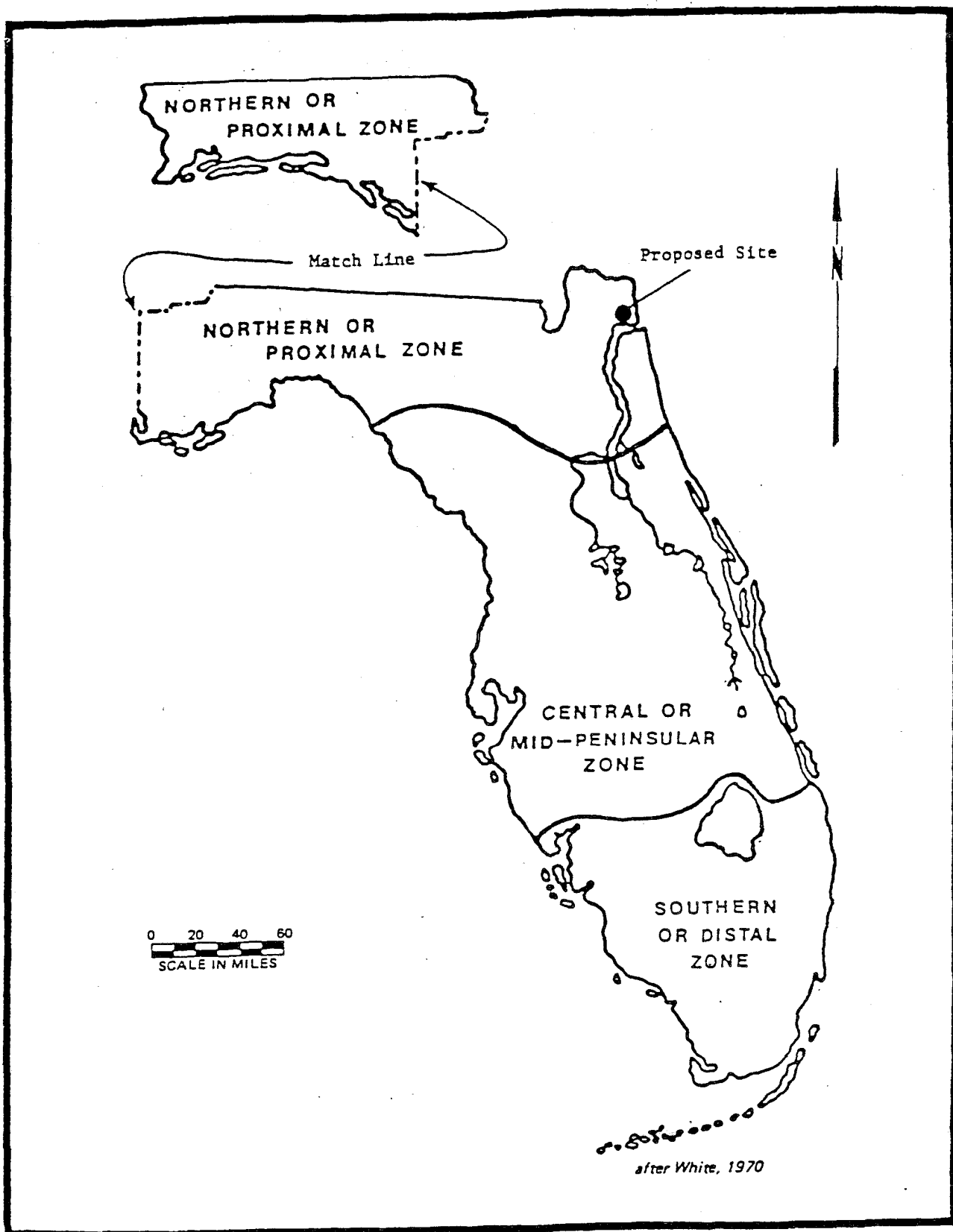
probable site geology was developed. Regional geology is summarized in the following sections.

- Physiography. Jacksonville, Florida is within the northern or Proximal physiographic zone, typified by continuous high ground between the Gulf Coastal lowlands and Eastern Valley (Figures 2.3-1 and 2.3-2). The site is marginally between the St. Mary's Meander Plain and Eastern Valley. The Broward River and the St. Johns River form western and southern site boundaries, and are subject to tidal fluctuations.

Geomorphology is composed of marine terraces formed when the ocean level dropped. Low scarps at relatively uniform elevations are remnants of ancient shorelines. The Pamlico and Silver Bluff Marine terraces are found on the site (Figure 2.3-3).

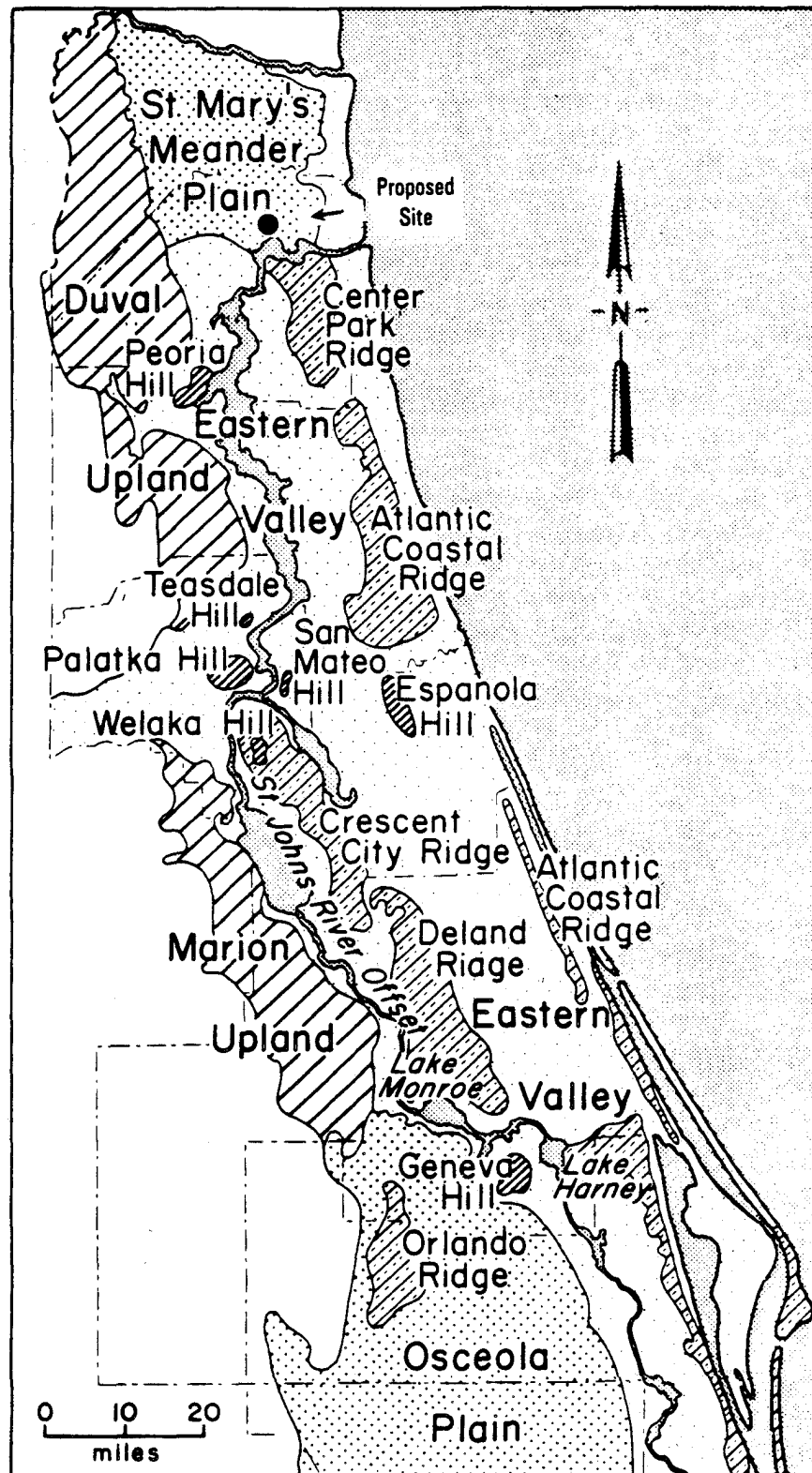
Soils underlying the site range from dense to loose, fine to medium grained sands with occasional silty or clayey sand lenses. These sands are excessively to moderately drained (SCS).

- Structural Geology. Predominant geologic structures are the Peninsular Arch and Ocala Uplift (Figures 2.3-4 and 2.3-5). The Peninsular Arch is a structural high trending south-southeast, and the Ocala Uplift consists of shallow folds trending northwest-southeast. Movements associated with the Ocala Uplift are believed to cause fracturing and normal dip slip shear faults. This fracturing and faulting may control the St. Johns River course (Figure 2.3-5).
- Stratigraphy. Florida's stratigraphy consists of unconsolidated sediments overlying a sedimentary rock sequence which overlies crystalline basement rocks. Table 2.3-1 describes these units. The sedimentary stratigraphic sequence of peninsular Florida is made of about 8,000 feet of marine, littoral, and terrestrial deposits. Of this total, approximately 5,000 feet of these sediments are of Paleozoic and Mesozoic age. The Cenozoic strata extend to over 3,000 feet below the ground surface. These strata contain all of the geologic and hydrologic formations of primary importance to this project. Figures 2.3-6 and 2.3-7 show a generalized geologic section and geologic maps of Duval County.

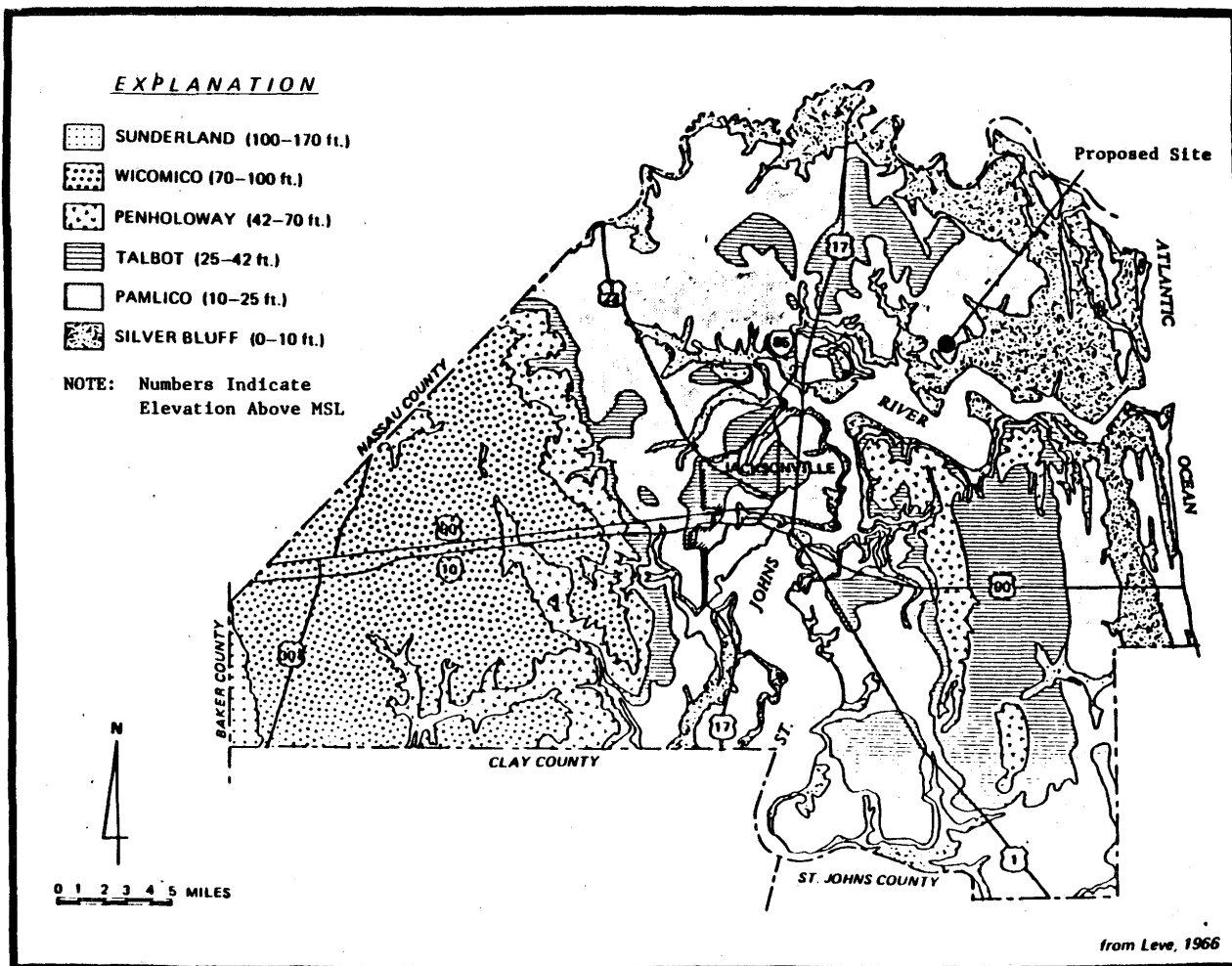


PHYSIOGRAPHIC DIVISIONS OF FLORIDA

Figure 2.3-1

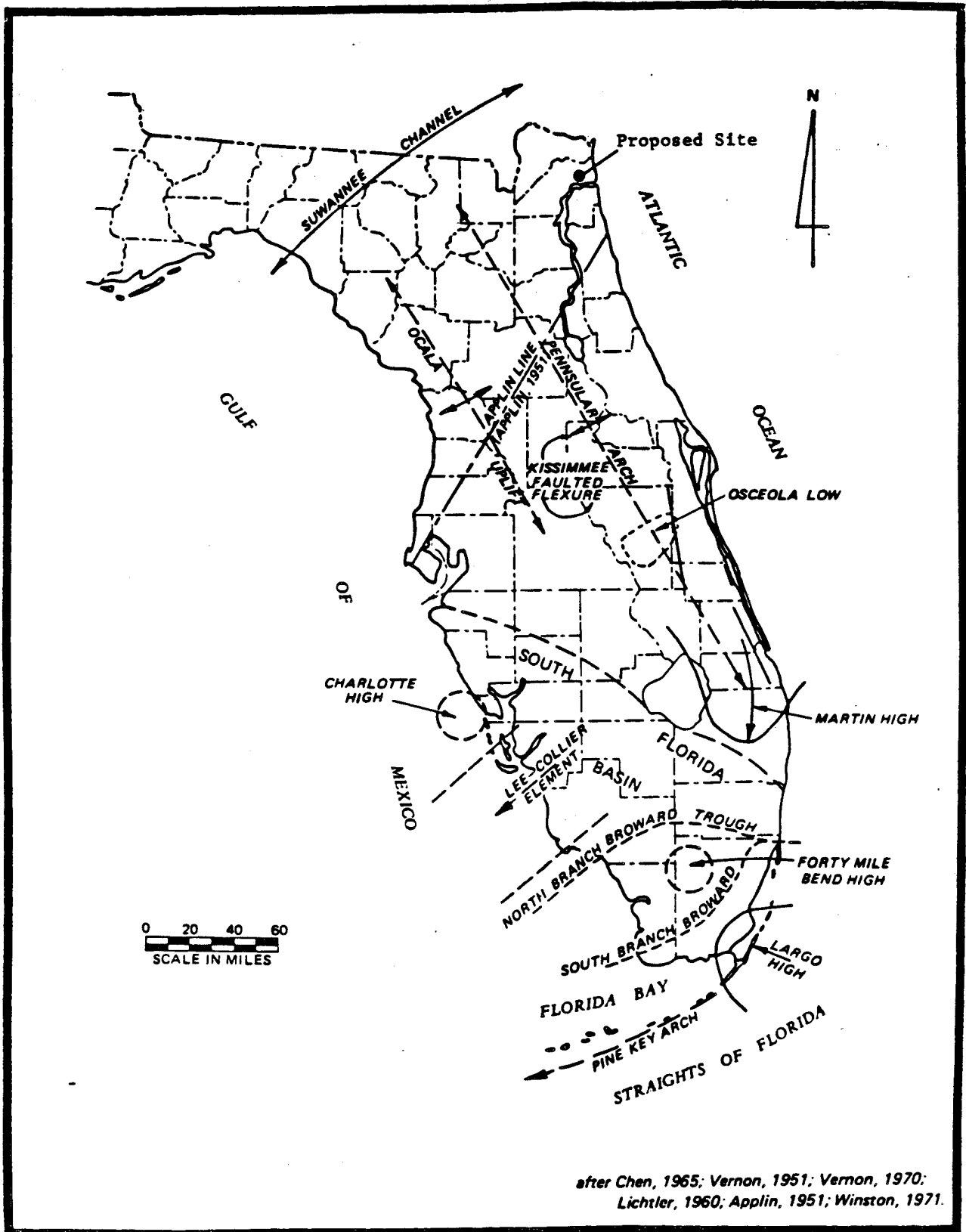


LANDFORMS IN THE REGION
OF THE ST. JOHNS RIVER



PLEISTOCENE MARINE TERRACES

Figure 2.3-3



REGIONAL STRUCTURAL ELEMENTS

Figure 2.3-4

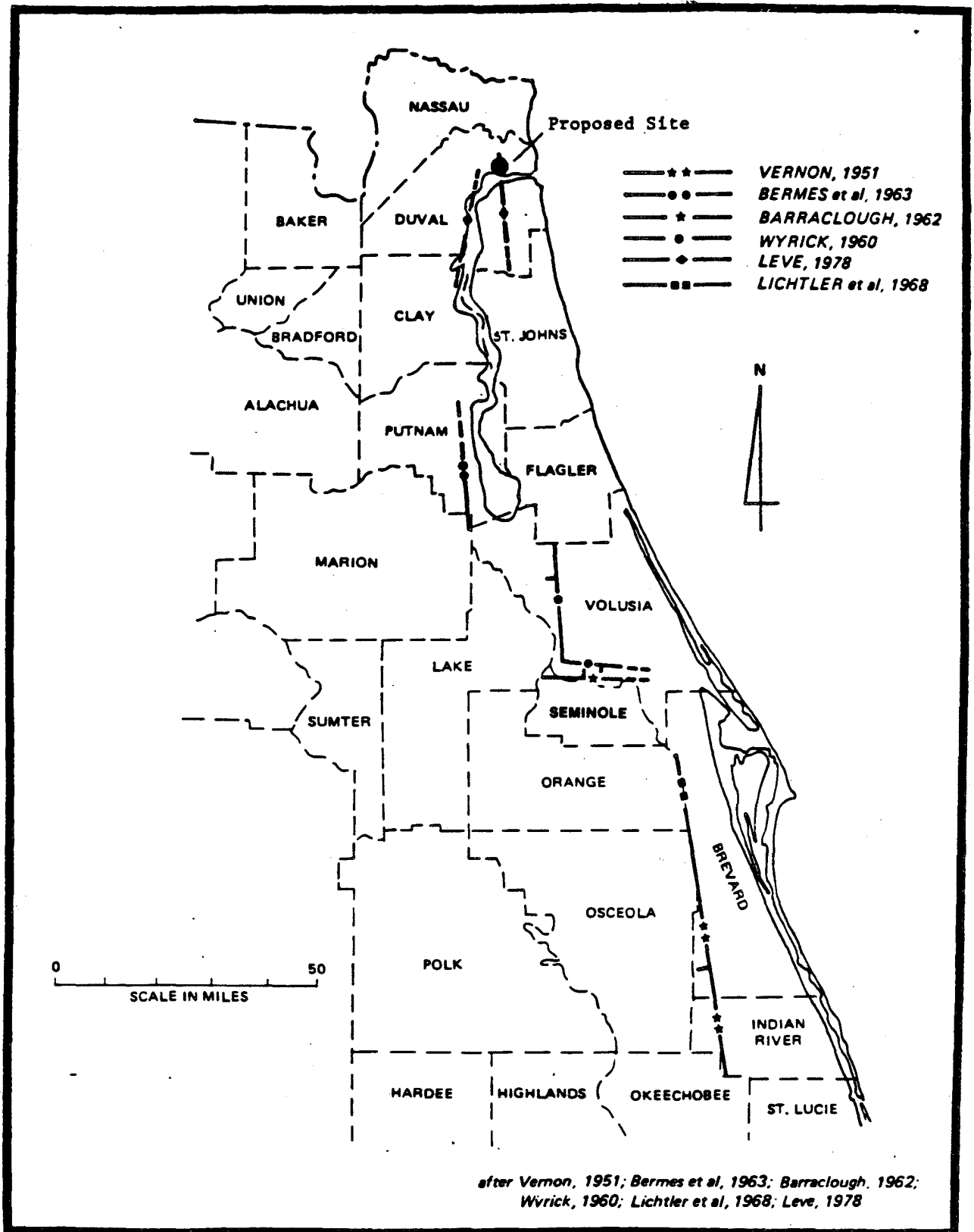
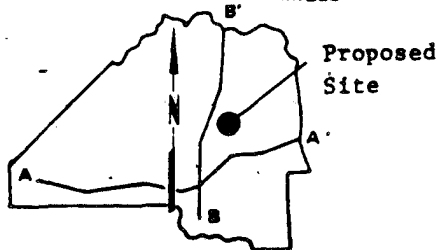
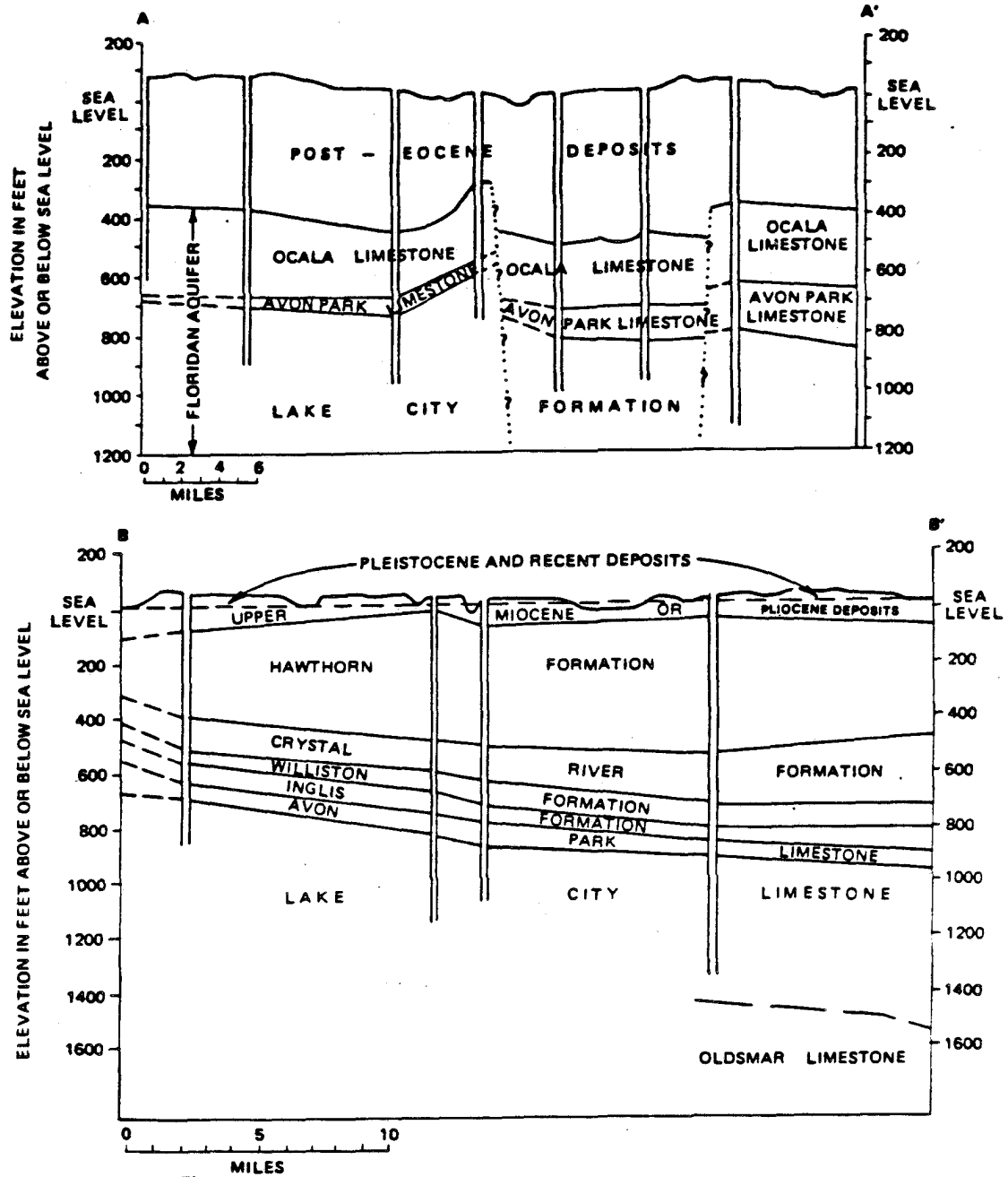


TABLE 2.3-1. STRATIGRAPHY OF THE CENOZOIC FORMATIONS OF DUVAL COUNTY

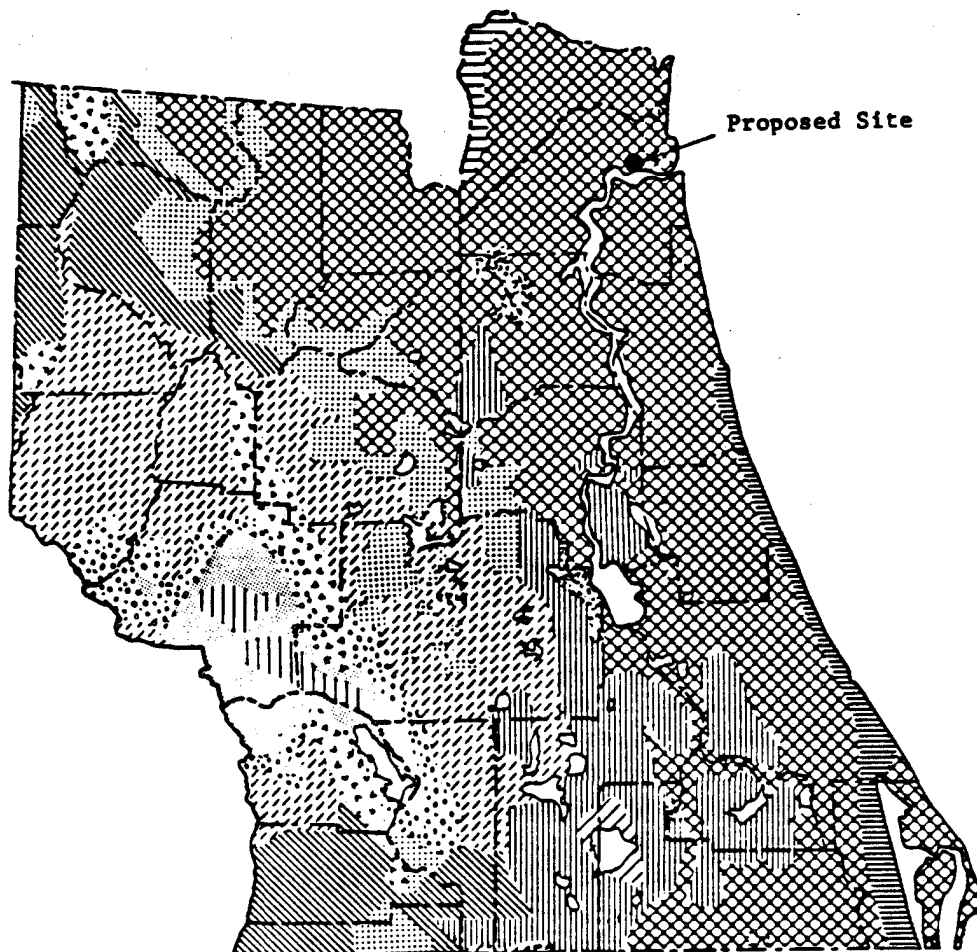
<u>Geologic Age</u>	<u>Stratigraphic Unit</u>	<u>Approximate Thickness feet</u>	<u>Lithologic Character</u>
Recent and Pleistocene	Recent and Pleistocene deposits	0 - 150	Soil, muck, coarse to fine sand, shell, and some clayey sand
Pliocene	Pliocene or Upper Miocene deposits	20 - 110	Gray-green calcareous, silty clay and clayey sand; contains shell beds and white soft, friable limestone beds
Miocene	Hawthorn Formation	260 - 490	Gray to blue-green calcareous phosphatic, sandy clays and clayey sands; contains fine to medium phosphatic sand lenses and limestone and dolomite beds, particularly near the base of the formation
	Ocala Group		
	Crystal River Formation	50 - 300	White to cream chalk, massive fossiliferous marine limestone
	Williston Formation	20 - 100	Tan to buff granular, marine limestone
Eocene	Inglis Formation	40 - 100	Tan to buff granular, calcitic, marine limestone; contains thin dolomite lenses and zones of Miliolidae foraminiferal coquina
	Avon Park Limestone	50 - 250	Alternating beds of brown to tan hard, massive dolomite, brown finely crystalline dolomite, and granular calcitic limestone
	Lake City Limestone	425 - 500+	White to brown, purple-tinted lignitic, granular limestone and gray hard, massive dolomite; contains lignite beds and zones of Valvulinidae foraminiferal coquina
	Oldsmar Limestone	846	Cream to brown massive to chalky granular limestone and tan to brown massive to finely crystalline dolomite



after Leve, 1966 and Leve, 1978

GEOLOGIC CROSS SECTIONS,
DUVAL COUNTY

Figure 2.3-6



0 10 20 30 40 50 MILES

SERIES	STAGE	FORMATION & MEMBER
RECENT AND PLEISTOCENE		SEVERAL LOWER MARINE AND ESTUARINE TERRACE DEPOSITS
		LAKE FLIRT MARL
PLEISTOCENE		ANASTASIA FORMATION
		FORT THOMPSON FORMATION
MIOCENE	CHOCTA- WHATCHEE	"CHARLTON" FORMATION
		JACKSON BLUFF FORMATION
		ALACHUA FORMATION
		FORT PRESTON FORMATION
		HAWTHORN FORMATION
OLIGOCENE		SUWANNEE LIMESTONE
EOCENE	JACKSON	CRYSTAL RIVER FM.
		WILLISTON FM.
		INGLIS FM.
	CLAIBORNE	AVON PARK LIMESTONE

after Vernon & Puri, 1964

GENERALIZED REGIONAL GEOLOGIC MAP

The Cedar Keys limestone is the oldest strata in the Cenozoic series. The limestone was deposited in an open Paleocene sea. Generally, its composition is believed to be of evaporites and hard bioclastic limestones, some of which have likely been dolomitized. It serves as the regional aquiclude for the overlying Floridan aquifer.

The Floridan Aquifer consists of all of the Eocene Epoch deposits overlying the Cedar Keys limestone. In ascending order, these deposits include the Oldsmar limestone, Lake City limestone, Avon Park limestone, and Ocala group. The Oldsmar, Lake City, and Avon Park limestones are dolomitic, crystalline dolomitic, and granular calcitic limestones. The Ocala group consists of chalk, fossiliferous marine limestone and marine limestone, and represents the last deposition of the Eocene Epoch.

The Ocala group is the oldest deposit to outcrop in Florida. Exposures of the group are visible along the structure known as the Ocala Arch, located some 60 to 70 miles west-southwest of the Jacksonville area.

The Hawthorn formation deposited during the Miocene Epoch overlies the Ocala group. Thickness of the Hawthorn varies from 290 to 490 feet thick. It is identified by gray to blue-green phosphatic, sandy clays and clayey sands with fine to medium phosphatic sand lenses and limestone beds more prevalent near the formation's base. The Hawthorn formation serves as the aquiclude between the Floridan and surface aquifers.

Resting conformably on top of the Hawthorn are deposits 20 to 110 feet thick of Upper Miocene to Pliocene age. These deposits are silty clays and clayey sands grading to soft, white, friable limestone beds.

Pleistocene and Holocene deposits make up the upper 150 feet of sediments in Northern Peninsular Florida. These unconsolidated sediment deposits are marine terraces, and materials are

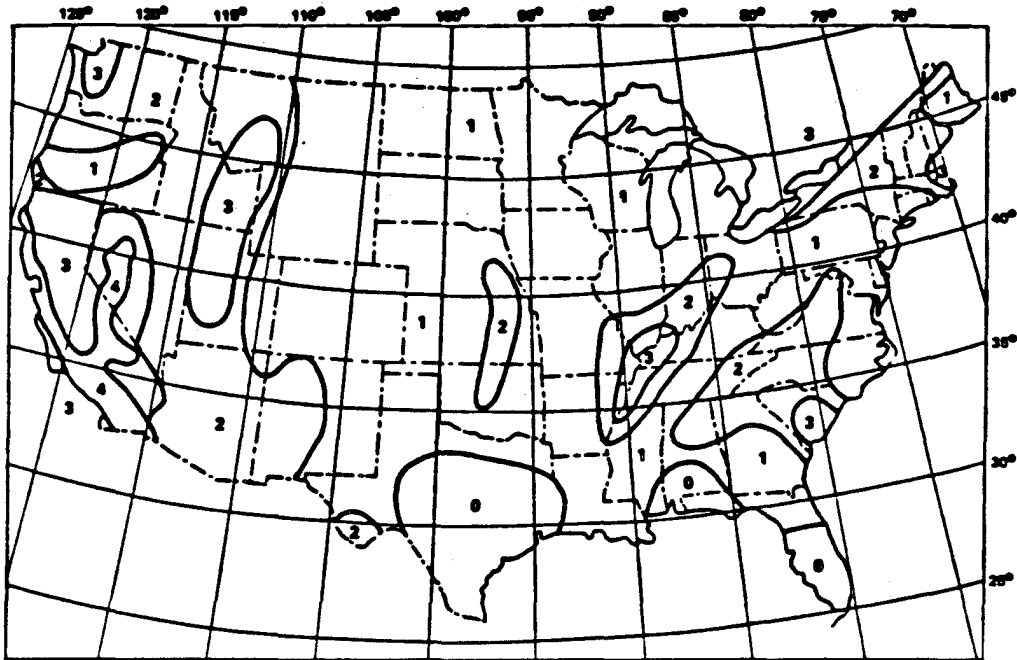
loose to dense sands, sandy clays, and silty clays. Marine terrace depositional environments produce deposits which are quite variable so stratigraphic uniformity is not expected.

- Seismicity. The site is located in Seismic Risk Zone 1 (Figure 2.3-8), one of the most seismically stable areas of the United States. The potential for damage from a seismic event at the site is minimal. All of the earthquakes that have occurred in Florida and Georgia have had a Modified Mercalli Intensity of VI or less and have caused very minor damage (Figures 2.3-9 and 2.3-10). The strongest earthquake noted to date in Florida occurred in 1879 near Gainesville, about 70 miles away. It had an intensity of VI. The closest earthquake to the site was near Jacksonville in 1900. It had an intensity of V.

The strongest earthquake to affect the site region was at Charleston, South Carolina, in 1886 (Figure 2.3-11). This series of earthquakes had intensities of IX-X and were 200 miles from the site. Table 2.3-2 describes earthquakes that have affected Florida, and Table 2.3-3 provides the Modified Mercalli Intensity Scale.

2.3.1.2 Detailed Site Lithologic Description. LETCO has drilled boreholes on the site since 1961. Relevant subsurface investigation reports are included in Appendix 10.10. Figure 2.3-12 is the boring location plan. Twenty-one borings and 10 auger hole locations are shown. These borings are believed to be representative of materials found on the site. Some of the site area has been used to store lime mud and wood chips. Borings show that these materials may be as much as 19 feet deep, overlying the natural soils.

Boreholes drilled on the site show that the natural deposits are very erratic. The soils are medium to dense sands and silty sands that vary greatly with depth and from one location to another, typical of marine terrace deposits. These soils are about 80 feet deep and overlie the Hawthorn formation.



ZONE 0 No damage.

ZONE 1 Minor damage; distant earthquakes may cause damage to structures with fundamental periods greater than 1.0 second; corresponds to intensities V and VI of the M.M. Scale.

ZONE 2 Moderate damage; corresponds to intensity VII of the M.M. Scale.

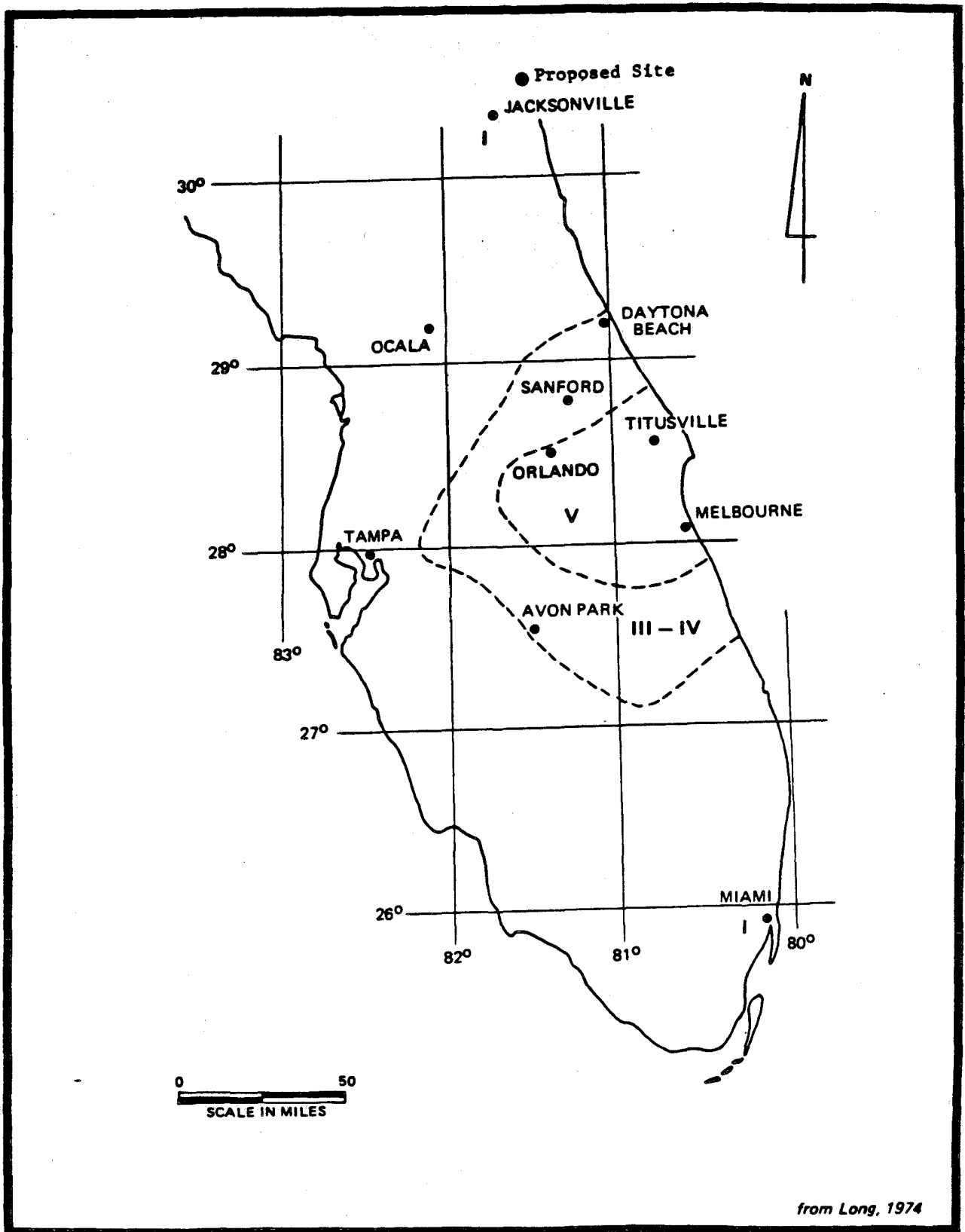
ZONE 3 Major damage; corresponds to intensity VIII and higher of the M.M. Scale.

ZONE 4 Those areas within Zone No. 3 determined by the proximity to certain major fault systems.

Modified Mercalli Intensity Scale of 1931

after Algermissen, 1969

SEISMIC RISK MAP



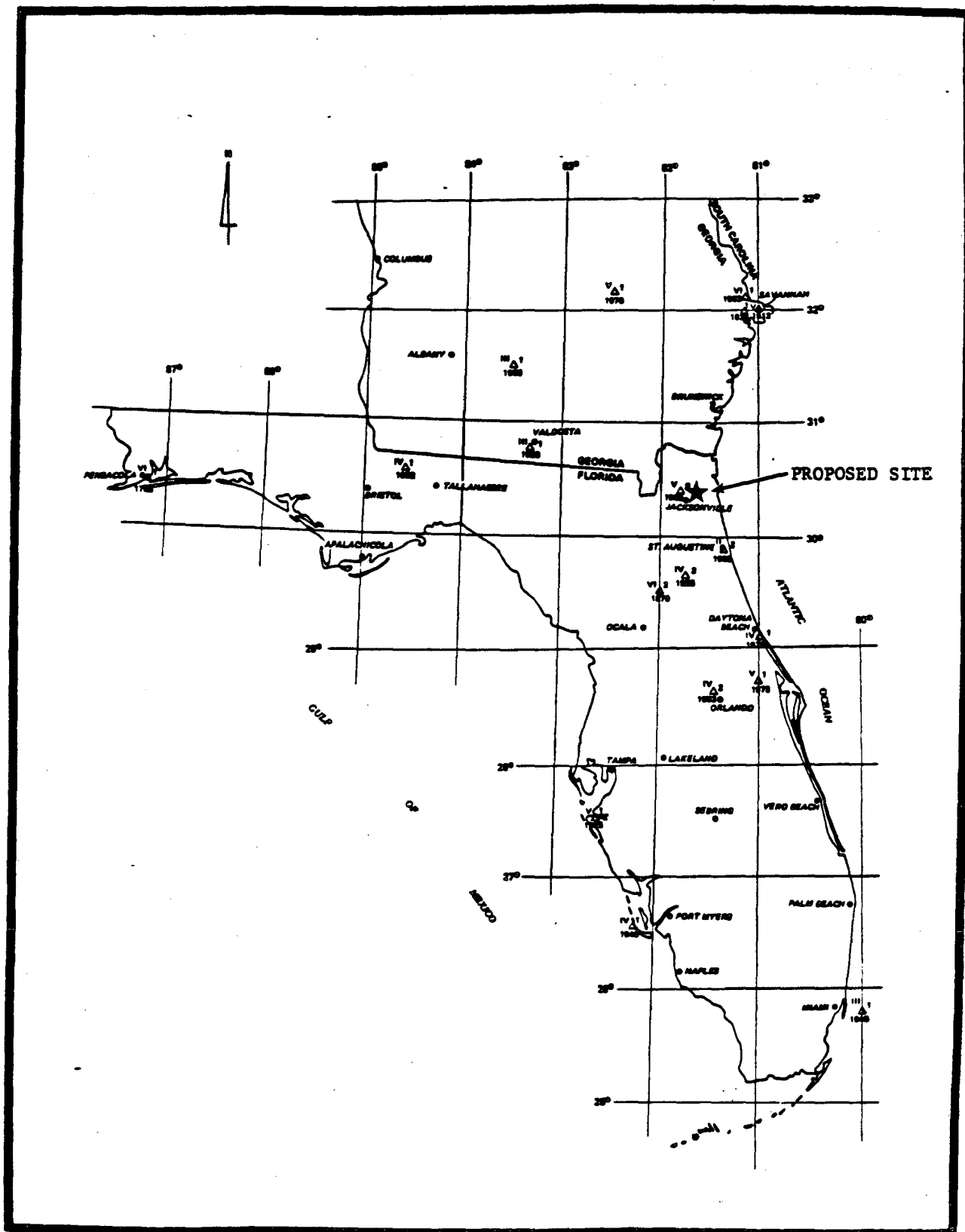
from Long, 1974

MODIFIED MERCALLI ISOSEISMAL MAP
OF THE FLORIDA EARTHQUAKE,
OCTOBER 27, 1973

100488

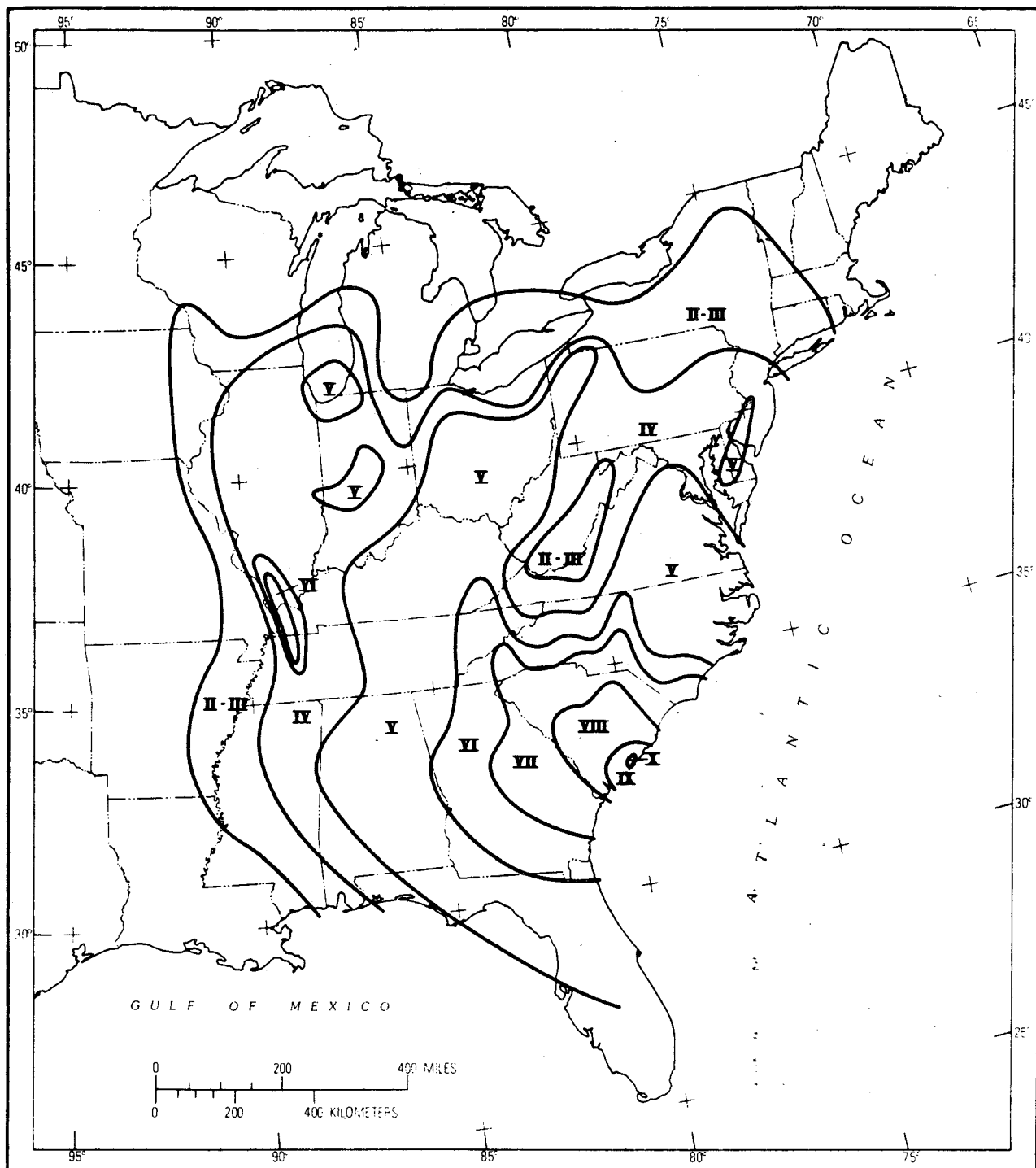
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Figure 2.3-9



SEISMICITY MAP OF FLORIDA
AND SOUTH GEORGIA

Figure 2.3-10



**ISOSEISMAL MAP OF THE EASTERN UNITED STATES
SHOWING THE INTENSITY LEVELS OF THE
1886 CHARLESTON EARTHQUAKE**

Figure 2.3-11

TABLE 2.3-2. MAJOR EARTHQUAKES THAT HAVE AFFECTED FLORIDA

<u>Year</u>	<u>Date</u>	<u>Time</u>	<u>MM Intensity</u>	<u>Location</u>	<u>N. Lat.*</u>	<u>W. Long*</u>	<u>Felt Area</u> sq miles
1811	December 16	02:00	XII	New Madrid, MO	36.6	89.6	2,000,000
1812	January 23	--	XII	New Madrid, MO	36.6	89.6	--
	February 07	--	XII	New Madrid, MO	36.6	89.6	--
1868	March 26	--	VI-VII**	Havana, Cuba	23.1	82.4	--
1880	January 27	22:33	VIII	Vuelto Abajo, Cuba	22.8	80.8	65,000
	January 23	04:00					
1886	August 31	21:51 21:59	IX-X	Charleston, SC	32.9	80.0	2,000,000

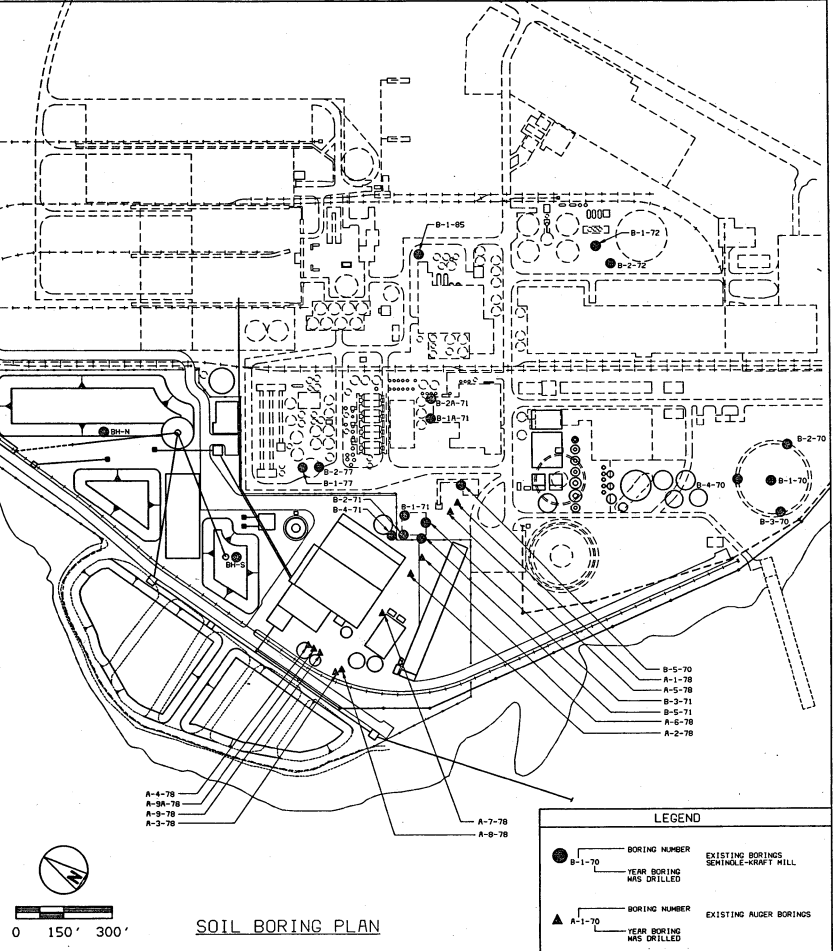
*Approximate epicentral location.

**Seismic origin questionable.

Reference: Earthquake Information Bulletin, 1971; Coffman and Von Hake, 1973.

TABLE 2.3-3. MODIFIED MERCALLI SCALE, 1956 VERSION

- I. Not felt. Marginal and long period effects of large earthquakes (I Rossi-Forel Scale).
- II. Felt by persons at rest, on upper floors, or favorably placed (I-II Rossi-Forel Scale).
- III. Felt indoors. Hanging objects swing. Vibration like passing of light trucks. Duration estimated. May not be recognized as an earthquake (III Rossi-Forel Scale).
- IV. Hanging objects swing. Vibration like passing of heavy trucks; or sensation of a jolt like a heavy ball striking the walls. Standing motor cars rock. Windows, dishes, doors, rattle. Glasses clink. Crockery clashes in the upper range of IV wooden walls and frame creak (IV Rossi-Forel Scale).
- V. Felt outdoors; direction estimated. Sleepers wakened. Liquids disturbed, some spilled. Small unstable objects displaced or upset. Doors swing, close, open. Shutters, pictures move. Pendulum clocks stop, start, change rate (V-VI Rossi-Forel Scale).
- VI. Felt by all. Many frightened and run outdoors. Persons walk unsteadily. Windows, dishes, glassware broken. Knickknacks, books, etc., off shelves. Pictures off walls. Furniture moved or overturned. Weak plaster and masonry cracked. Small bells ring (church, school). Trees, bushes shaken visibly, or heard to rustle (VI-VII Rossi-Forel Scale).
- VII. Difficult to stand. Noticed by drivers of motor cars. Hanging objects quiver. Furniture broken. Damage to weak masonry, including cracks. Weak chimneys broken at roof line. Fall of plaster, loose bricks, stones, tiles, cornices. Some cracks in ordinary masonry. Waves on ponds; water turbid with mud. Small slides and caving in along sand or gravel banks. Large bells ring. Concrete irrigation ditches damaged (VIII Rossi-Forel Scale).
- VIII. Steering of motor cars affected. Damage to ordinary masonry; partial collapse. Some damage to reinforced masonry. Fall of stucco and some masonry walls. Twisting, fall of chimneys, factory stacks, monuments, towers, elevated tanks. Frame houses moved on foundations if not bolted down; loose panel walls thrown out. Decayed piling broken off. Branches broken from trees. Changes in flow or temperature of springs and wells. Cracks in wet ground and on steep slopes (VIII+ to IX Rossi-Forel Scale).



BORING LOCATION PLAN

Figure 2.3-12



The Hawthorn formation consists of interbedded sandy clays, clayey sands, and limestones. It serves as the Floridan Aquifers' confining unit. Figures 2.3-13 through 2.3-15 show geologic sections believed typical of soils found onsite. Figures 2.3-17 and 2.3-18 show typical grain size curves for the sandy soils. | 2

2.3.1.3 Geologic Maps. Regional geologic maps are included as Figures 2.3-6 and 2.3-7. They show surficial deposits recent to Pleistocene Age and bedrock as Silurian and Ordovician ages. Figures 2.3-4 and 2.3-5 shown regional geologic structures, and Table 2.3-1 describes the geologic units. Detailed geologic descriptions are provided in Subsections 2.3.1.1 and 2.3.1.2.

2.3.1.4 Bearing Strength. Boring logs and subsurface investigation reports (Appendix 10.10) show that soils are loose to dense with blow counts from standard penetration tests varying from less than 5 blows per foot to over 100 blows per foot. Density tends to increase with depth and is usually greater than 20 blows per foot below a depth of 25 feet. The water table is within 3 to 8 feet of the ground surface.

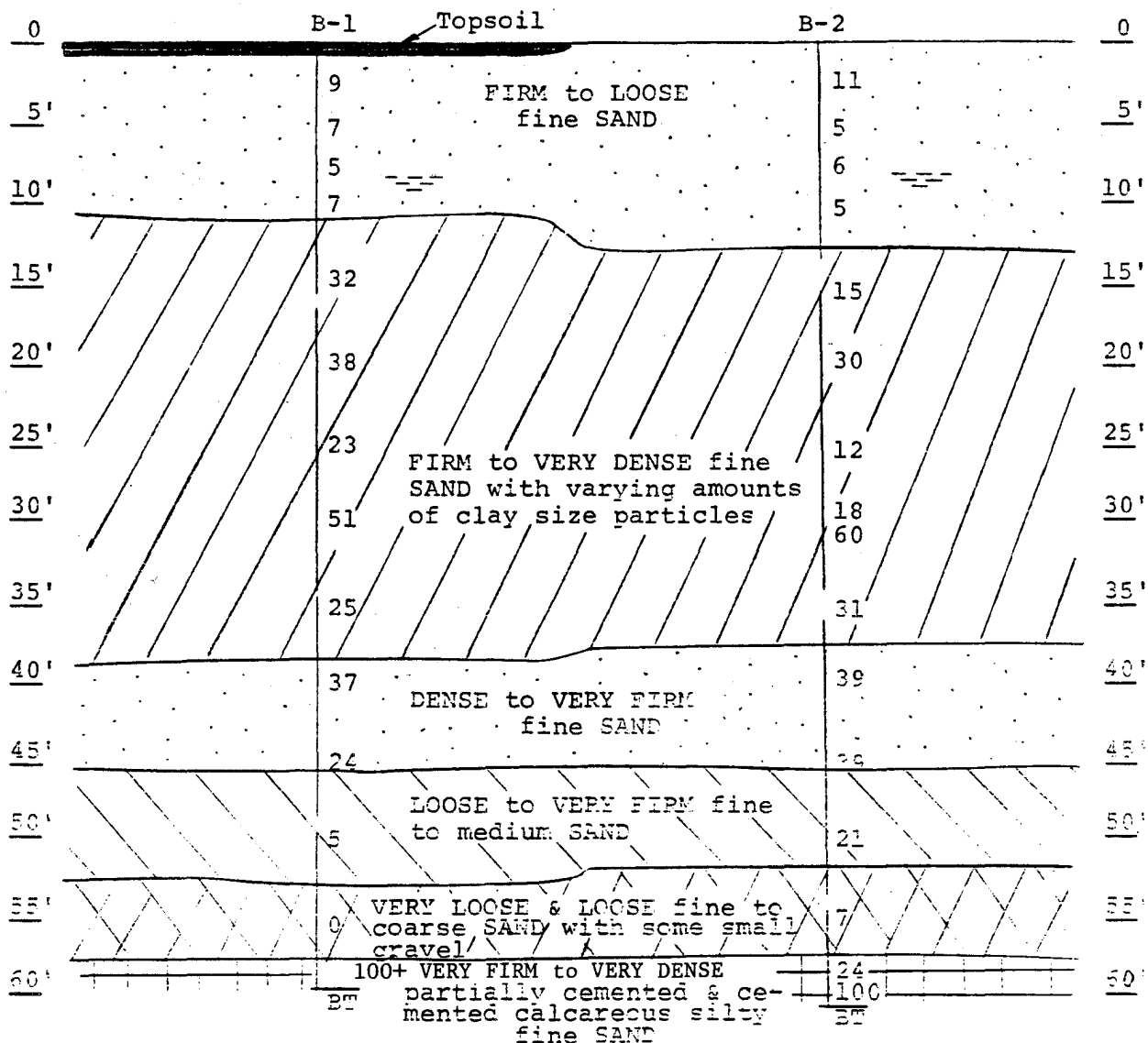
Foundations for heavy structures may be a combination of friction and bearing piles, driven into the dense sands or the Hawthorn formation. More lightly loaded structures will be placed on shallow footings, mats, or piles as necessary. Site improvements using ground modification techniques, such as deep dynamic compaction, vibroflotation, or vibro-replacement are being considered. If ground modification is used, the use of deep foundations may be greatly reduced or eliminated.

2.3.2 Subsurface Hydrology

Two aquifer systems of significance underlie the site. Table 2.3-4 provides a description of the stratigraphic and aquifer systems underlying Duval County. The Floridan Aquifer is encountered at depths ranging from 400 to 600 feet in the Duval County area. It is the principal source of fresh water for northeast Florida. The other aquifer is the surficial or shallow aquifer. It extends from the surface to an approximate depth of

Depth
Below
Grade

Depth
Below
Grade



BT Boring Terminated

Ground Water Level at
Time of Drilling

LAW ENGINEERING TESTING COMPANY
Jacksonville, Florida

GENERALIZED SUBSURFACE PROFILE

500,000 Gallon Demineralized
Water Storage Tank

St. Regis Paper Company
Jacksonville, Florida
LETGO Job No. J-1571

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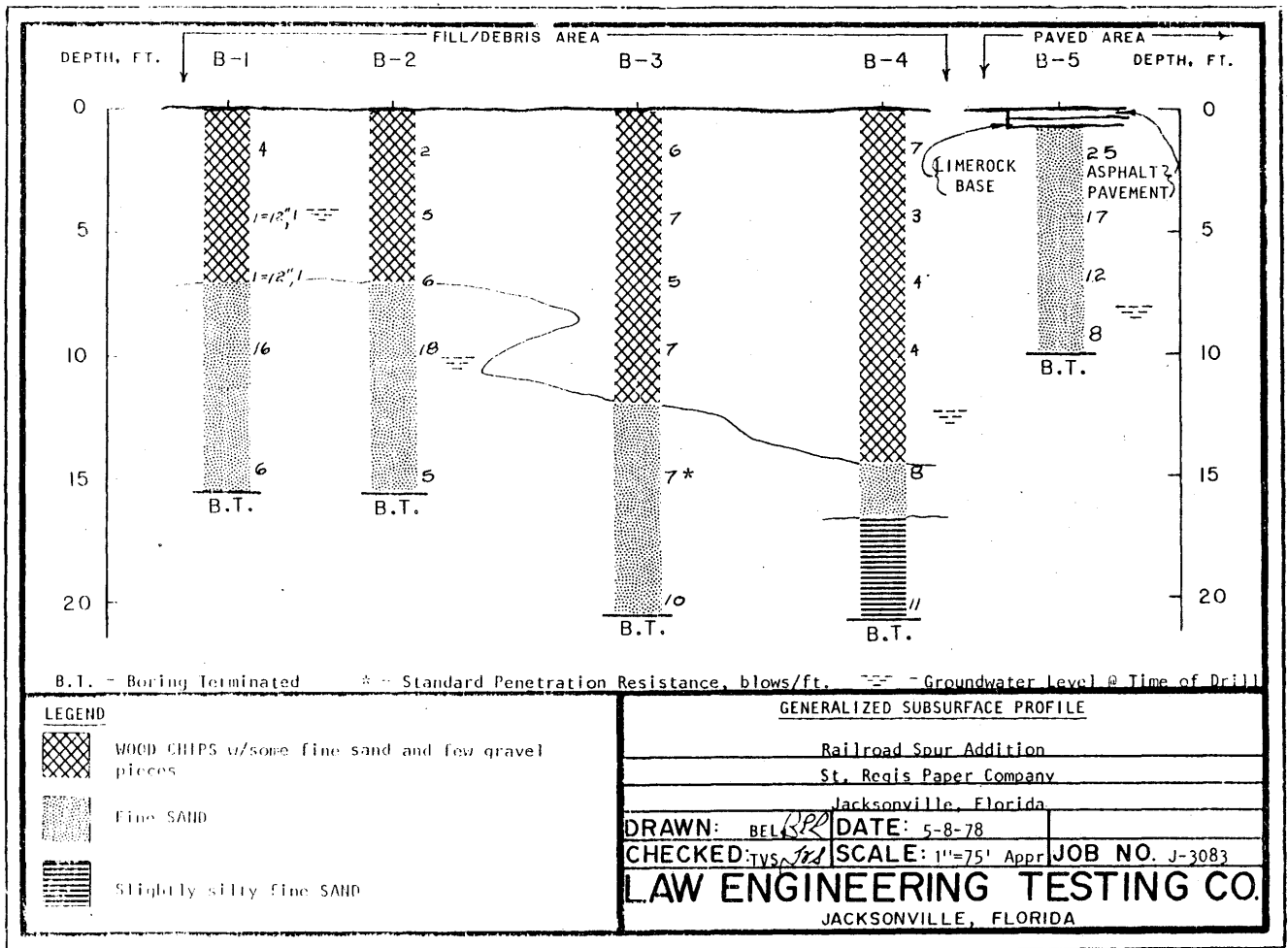
2-56

GENERALIZED SUBSURFACE PROFILE,
WATER STORAGE TANK

Figure 2.3-13

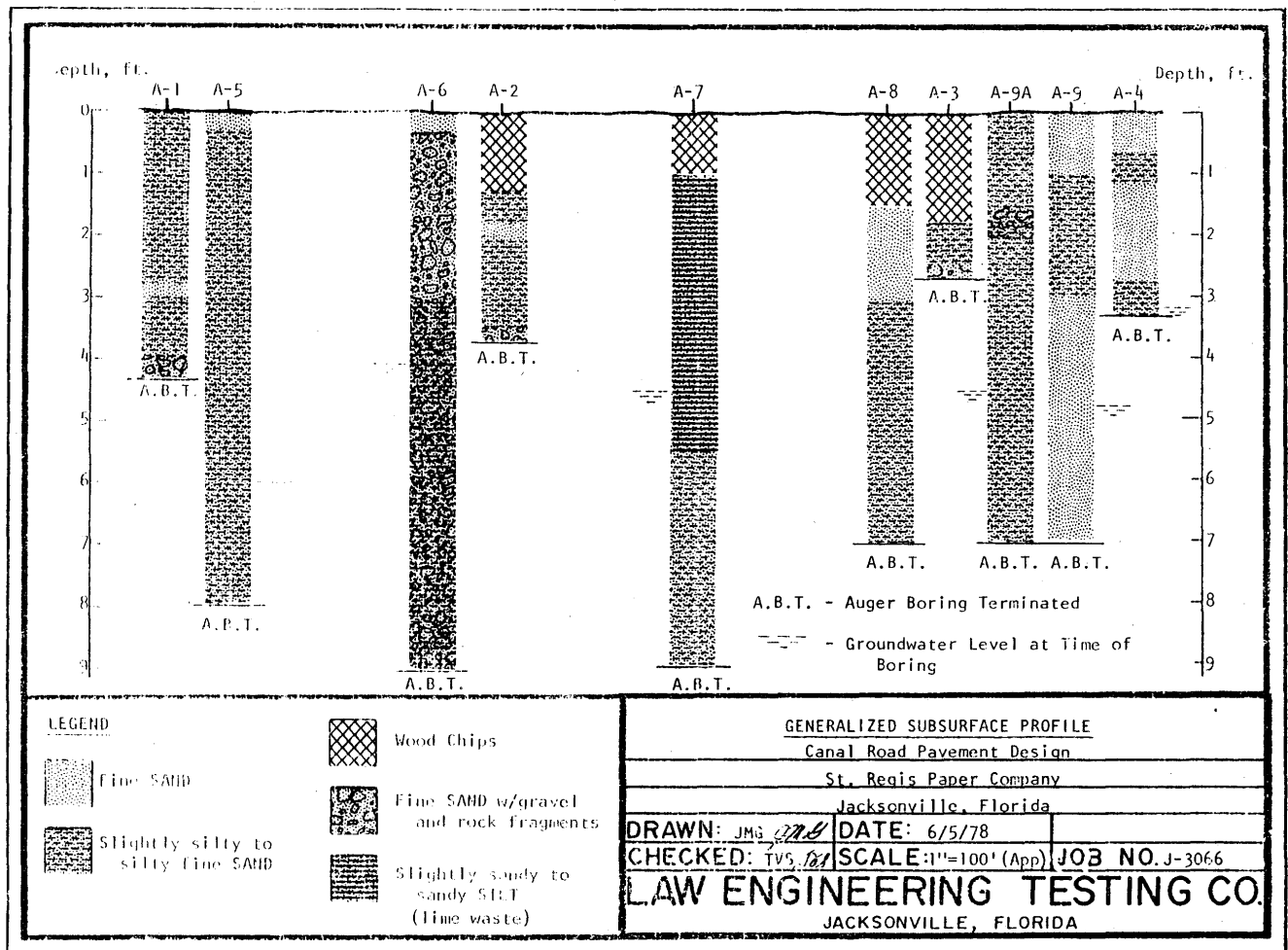
Image Quality

As you review the next group of images, Please note that the original documents were of poor quality.



GENERALIZED SUBSURFACE PROFILE,
RAILROAD SPUR ADDITION

Figure 2.3-14



GENERALIZED SUBSURFACE PROFILE,
CANAL ROAD

Figure 2.3-15

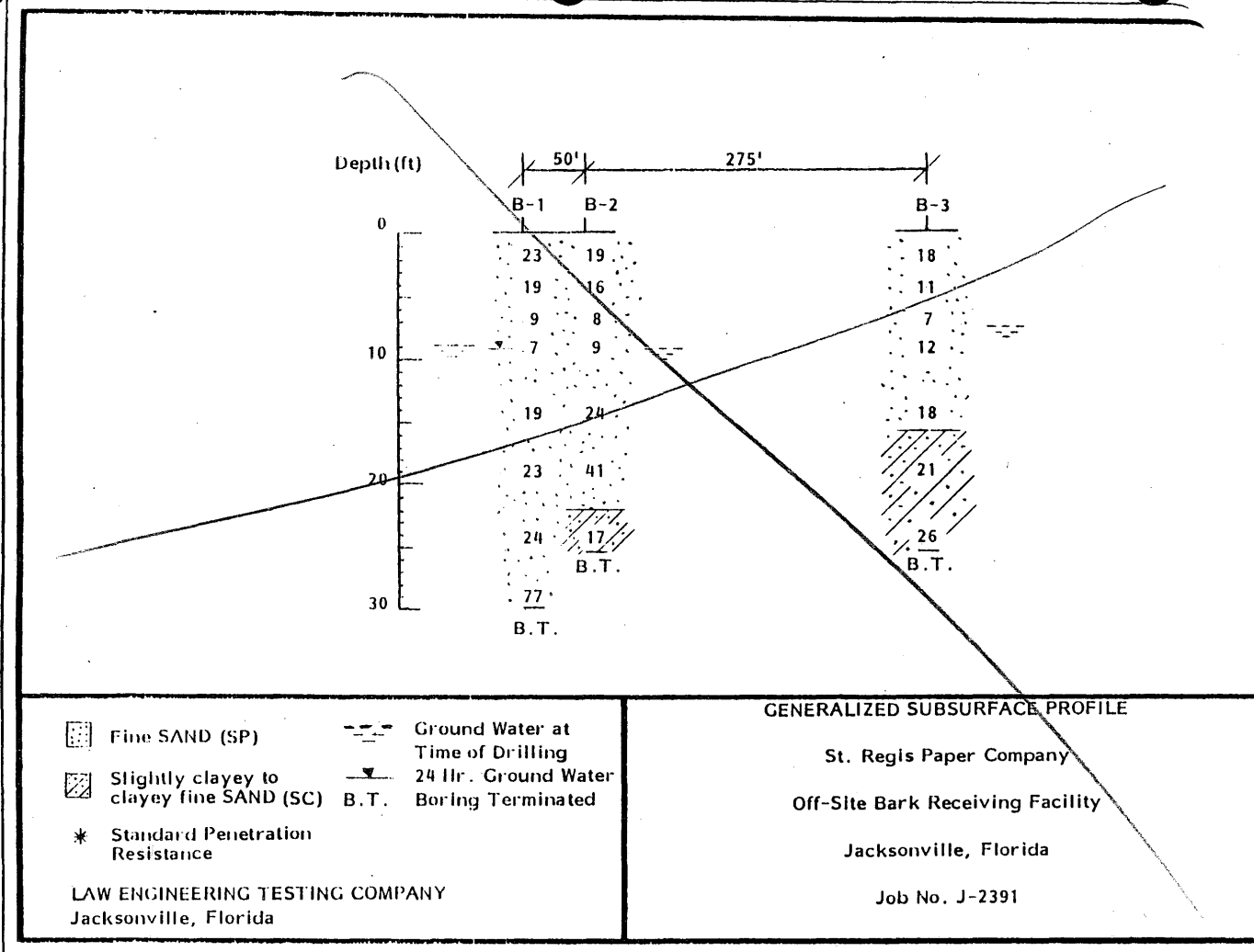
FIGURE 2.3-16

DELETED

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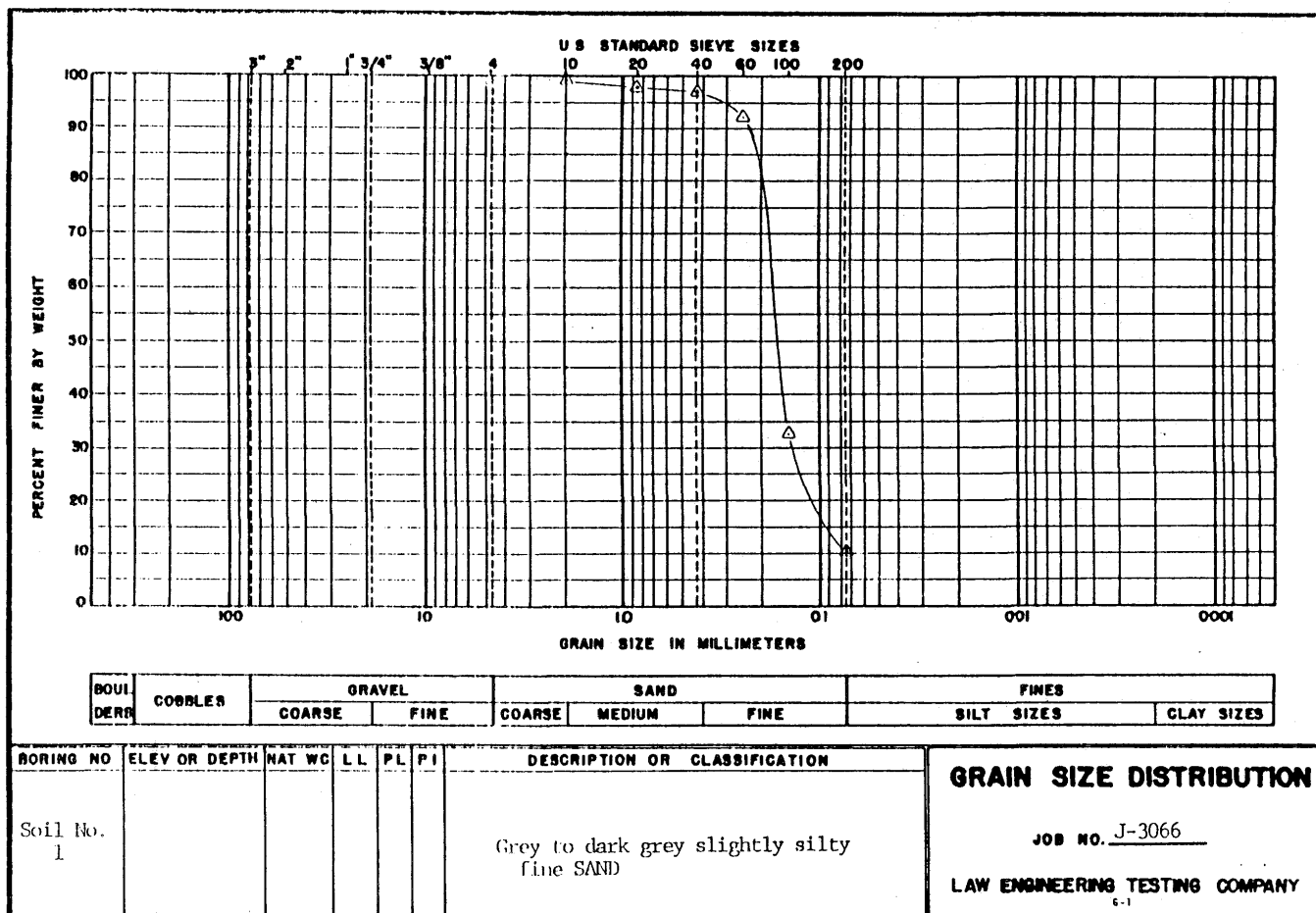


GENERALIZED SUBSURFACE PROFILE
OFFSITE BARK RECEIVING FACILITY

Figure 2.3-16

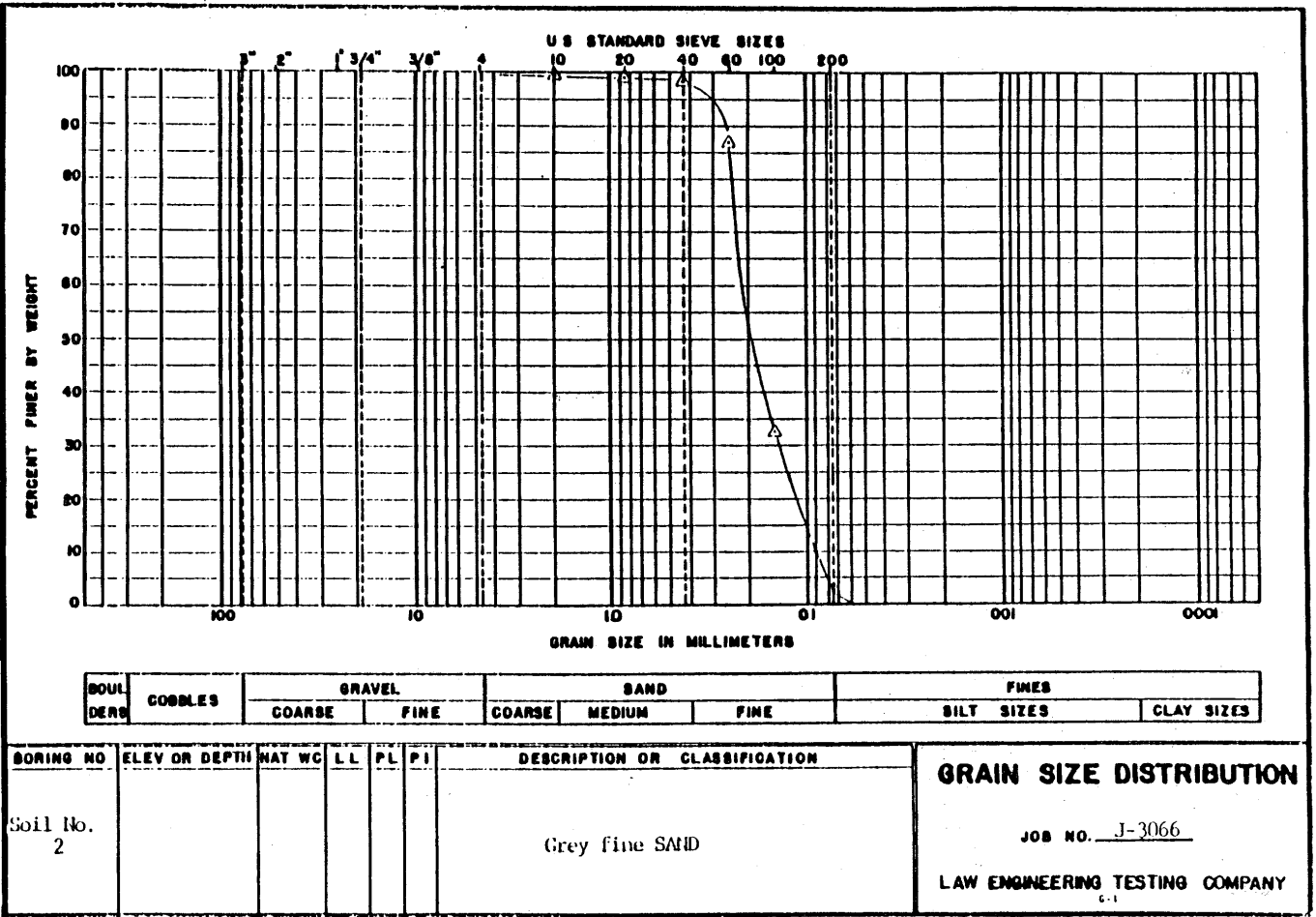
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GRAIN SIZE DISTRIBUTION, SOIL TYPE 1

Figure 2.3-17



GRAIN SIZE DISTRIBUTION, SOIL TYPE 2

Figure 2.3.18

TABLE 2.3-4. STRATIGRAPHIC UNITS AND AQUIFER SYSTEMS IN DUVAL, NASSAU, AND BAKER COUNTIES

Geologic Age	Stratigraphic Unit	Approximate Thickness feet	Lithologic Character	Aquifer System	Water-Bearing Properties
Recent and Pleistocene	Recent and Pleistocene deposits	0 - 150	Soll, muck, coarse to fine sand, shell, and some clayey sand	Shallow Aquifer System	Surficial sand yields small amounts of water. Sand and shell bed along coast yields moderate quantities.
Pliocene?	Pliocene or Upper Miocene deposits	20 - 110	Gray-green calcareous, silty clay and clayey sand; contains shell beds and white soft, friable limestone beds		Limestone, sand, and shell bed near base of deposits yield moderate to (locally) large amounts.
Miocene	Hawthorn Formation	260 - 490	Gray to blue-green calcareous phosphatic, sandy clays and clayey sands; contains fine to medium phosphatic sand lenses and limestone and dolomite beds, particularly near the base of the formation	Aquiclude	Relatively impermeable clays and marls in both the late Miocene or Pliocene deposits and the Hawthorn Formation confines the artesian water in the Eocene limestone and in the limestone and shell beds above the Eocene limestone. Yields small to moderate supplies.
Eocene	Ocala Group	Crystal River Formation	50 - 300	Floridan Aquifer System	Marine limestone formations utilized as the primary source of water in the area.
		Williston Formation	20 - 100		
		Inglis Formation	40 - 120		
	Avon Park Limestone	50 - 250	Alternating beds of brown to tan hard, massive dolomite, brown finely crystalline dolomite, and granular calcitic limestone		Massive dolomite beds restrict vertical movement of water.
	Lake City Limestone	425 - 500+	White to brown, purple-tinted lignitic, granular limestone and gray hard, massive dolomite; contains lignite beds and zones of Valvulinidae foraminiferal coquina		Limestone and porous dolomite beds yield large to very large quantities of water. Hard dolomite and limestone beds restrict vertical movement of water within certain zones. Potentially the greatest source of water in the area.
	Oldsmar Limestone	846	Cream to brown massive to chalky granular limestone and tan to brown massive to finely crystalline dolomite		

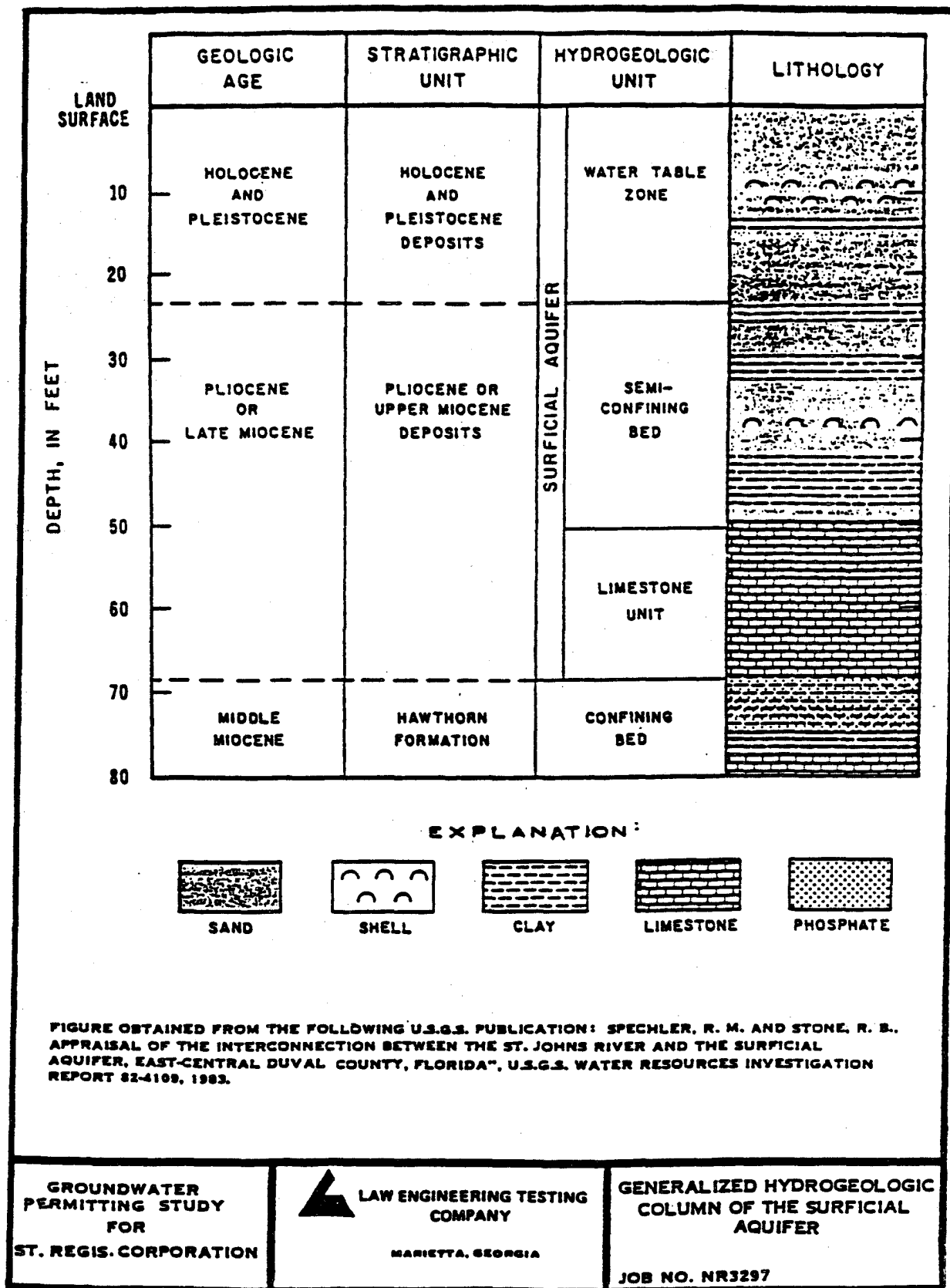
100 feet in the Duval County area.

2.3.2.1 Subsurface Hydrologic Data for the Site. Topography is gently sloping generally from the northeast to the southwest with surface elevations varying between 20 feet and sea level. Surficial deposits are sands, silty sands, and clayey sands to depths of 55 to 80 feet. The underlying unit is the Hawthorn formation, which separates the surficial and Floridan aquifers. Figure 2.3-18a show surficial aquifer stratigraphy. Soils tend to be loose to firm.

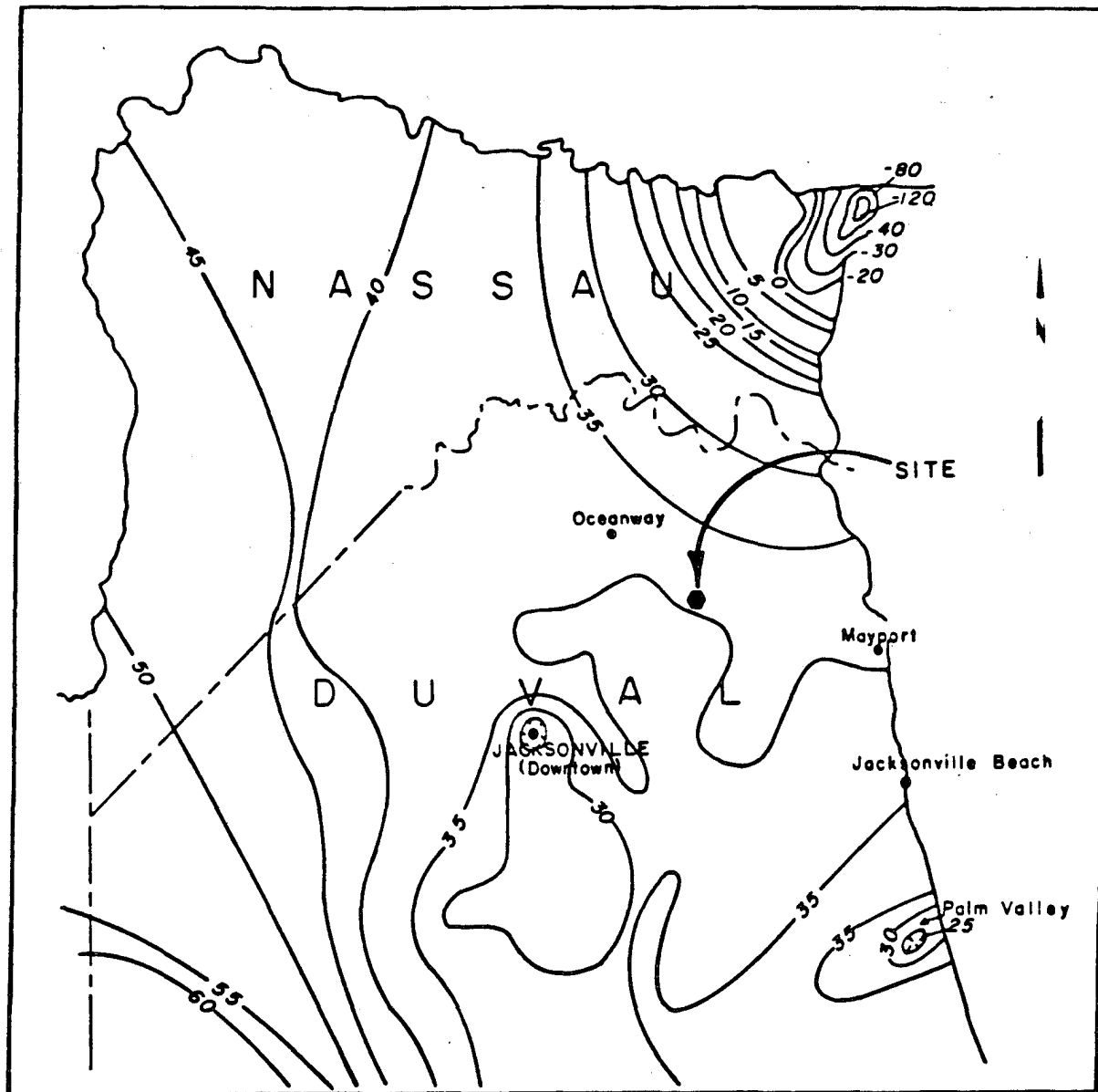
The following provide subsurface hydrologic data for the site.

- Floridan Aquifer. The Floridan Aquifer is artesian. Figure 2.3-19 shows its potentiometric surface, and Figure 2.3-20 shows the base of the Hawthorn formation, which serves as the upper confining unit. Stratigraphically, it is a sequence of alternating layers of soft, highly permeable limestones and hard crystalline limestones and dolomites of Eocene age approximately 1,600 feet thick. The Cedar Keys limestone serves as the lower confining unit. In the Jacksonville area, the top of the first water-bearing interval generally occurs at depths 400 to 600 feet below mean sea level. Transmissivity of this permeable zone ranges from 1.5×10^5 to 1.5×10^6 gallons per day per foot, based on an analysis of 20 aquifer tests in Duval County (Franks and Phelps, 1979). An average transmissivity of 6.0×10^5 gpd/ft was estimated for Duval County area. A specific storage of 10^{-6} ft⁻¹ was calculated from data for this zone and is considered to be fairly uniform for the Duval County area.

Recharge occurs as direct infiltration of rainfall where the Floridan sequence is exposed at the surface. This occurs to the west and southwest of Duval County in the areas of Putnam, Clay, Alachua, and Bradford Counties. Water percolates downward where confining beds are breached by sink holes and fractures. It also occurs through underlying and overlying confining beds where the



GENERALIZED HYDROGEOLOGIC COLUMN OF THE SURFICIAL AQUIFER

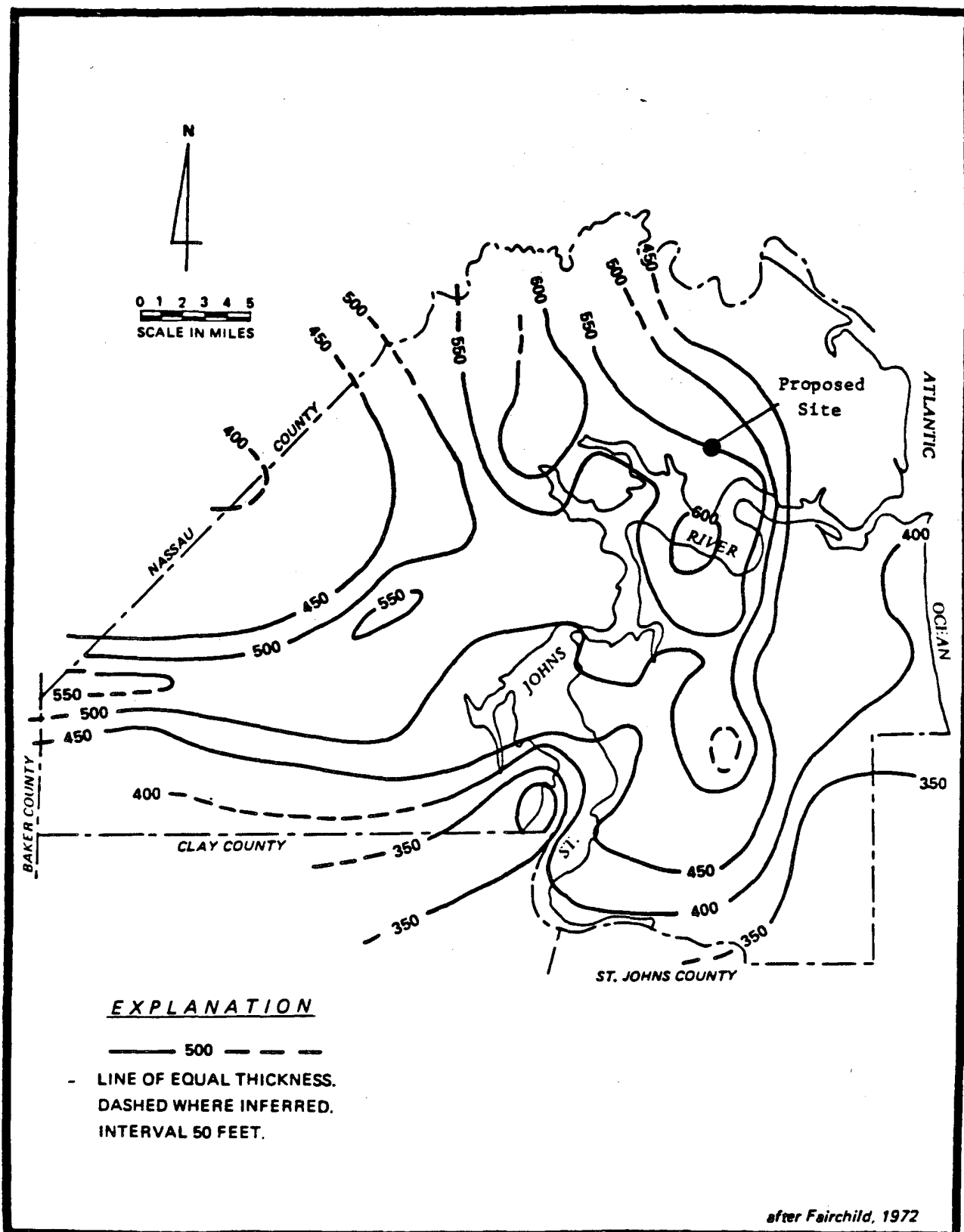


SOURCE: U.S. GEOLOGICAL SURVEY, OPEN-FILE REPORT 80-69, 1980.

—30— POTENTIOMETRIC CONTOUR - Shows altitude at which water level would have stood in tightly cased wells. Machures indicate depressions. Contour intervals 5, 20, and 40 feet. Datum is National Geodetic Vertical Datum of 1929 (NGVD).



POTENTIOMETRIC SURFACE MAP OF THE
FLORIDAN AQUIFER: MAY 1979



MAP OF DUVAL COUNTY SHOWING THE THICKNESS OF
 THE SEDIMENTS OVERLYING THE OCALA GROUP

Floridan Aquifer piezometric surface is lower than that of adjacent water-bearing strata.

Water within the Floridan Aquifer generally moves laterally to the northeast. Discharge from the aquifer occurs naturally as spring discharge and as discharge to the Atlantic Ocean. Water quality is described in Section 3.5, Plant Water Use.

The United States Geological Survey (USGS) has three observation wells in the Floridan Aquifer located approximately 2,000 feet east of Eastport Road and the Seminole Kraft plant wellfield. The piezometric level of the Floridan, as monitored in these wells, varies from approximately elevations 41 feet to 32 feet NVGD over the past eight years. The well grade elevations are approximately 16 feet NVGD. The Floridan Aquifer at the project site is, therefore, free flowing artesian. The Seminole plant wells flow at approximately 7,500 gpm at 9.5 psi pressure at the ground surface.

- Near Surface Aquifer. Overlying the Floridan artesian aquifer is the Hawthorn formation. The Hawthorn formation, which has low permeability, serves as a confining unit to severely limit movement of water between the surficial aquifer and the underlying Floridan Aquifer. The Hawthorn formation consists of silt, sand, shell, and limestone beds. Vertical hydraulic conductivity was estimated to be 1.0×10^{-3} ft/d. Specific storage was estimated to be 1.0×10^{-5} ft⁻¹ (Franks and Phelps, 1979).

The Hawthorn formation is overlain by the surficial aquifer system. This system underlies the Duval County area to depths of 100 to 200 feet. The USGS reports that the local surficial aquifer system is divided into three zones as shown on Figure 2.3-18a.

The water table zone occurs in the upper part of the aquifer where water is in an unconfined condition. Below the water table is a discontinuous semiconfining zone of sediments with lower

| 2

permeability which partially confines water in the lowest limestone unit. Underlying the limestone unit is the Hawthorn formation which has low permeability and serves as the lower confining unit.

Recharge to the surficial aquifer system is principally by infiltration of rainfall and percolation from surface water bodies. The confining and semiconfining beds in the surficial aquifer system and boundary conditions around the site will tend to provide a predominantly horizontal direction of flow for water within the aquifer and minimize vertically downward flow (Figure 2.3-21). Any shallow ground water is expected to discharge into the contiguous surface water bodies, the Broward River, St. Johns River, and Dunn Creek.

Most wells in the Jacksonville area producing water from the surficial aquifer system have been completed in the limestone unit or "shallow rock zone" lying at approximately 40 to 100 feet in depth below land surface.

Transmissivity of the limestone unit of the surficial aquifer system ranges from 2,000 to 10,000 gpd/ft. The average thickness of the unit was approximately 17 feet in 13 test wells drilled in Duval County for the purpose of evaluating the unit's hydrologic properties (Causey and Phelps, 1978). The aquifer conditions within the limestone unit range from full artesian to unconfined. The storage coefficient is expected to range from 10^{-1} to about 10^{-5} .

- Water Table Zone. The water table zone, above the semiconfining zone, is of lesser importance. It is formed of loose, unconsolidated sands and shell beds. Water in the water table zone occurs under phreatic conditions. These surface sediments overlying the limestone unit may range up to 90 feet thick and frequently require dewatering in cases where they are to be exposed by excavations.

Figure 2.3-22 shows ground water contours across the site. These contours show that the flow path of surface water on the

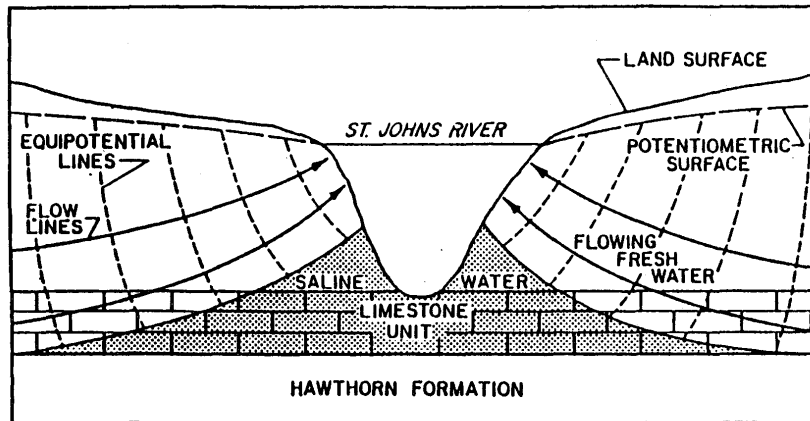


FIGURE OBTAINED FROM THE FOLLOWING U.S.G.S. PUBLICATION: SPECHLER, R. M. AND STONE, R. B., "APPRAISAL OF THE INTERCONNECTION BETWEEN THE ST. JOHNS RIVER AND THE SURFICIAL AQUIFER, EAST-CENTRAL DUVAL COUNTY, FLORIDA", U.S.G.S. WATER RESOURCES INVESTIGATION REPORT 82-4189, 1983.

GROUNDWATER PERMITTING STUDY
FOR
ST. REGIS CORPORATION



LAW ENGINEERING TESTING COMPANY

MARIETTA, GEORGIA

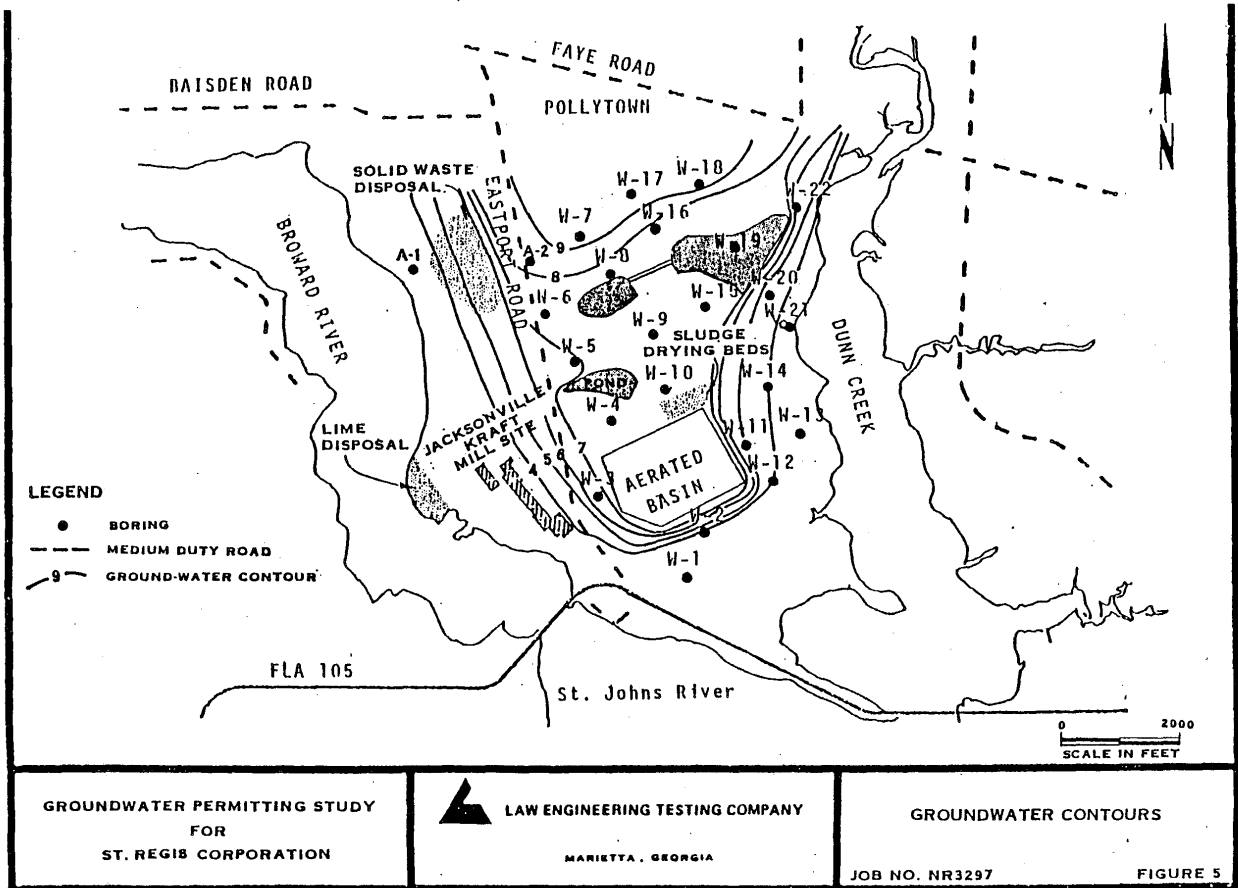
CONCEPTUAL VIEW OF GROUNDWATER
FLOW LINES

JOB NO. NR3287

FIGURE 6

CONCEPTUAL VIEW OF GROUND WATER FLOW LINES

Figure 2.3-21



GROUND WATER CONTOURS

Figure 2.3-22

site is toward the Broward River, St. Johns River, and Dunn Creek. All surface waters discharge into the river. The confining and semiconfining beds in the surficial aquifer and the site geometry provide a predominantly horizontal flow path, minimizing vertical water movement. LETCO reports state that hydraulic gradients in the water table zone are between 50 feet/year and 20 feet/year toward the Broward River.

2.3.2.2 Background Water Quality. Ground water is divided into three zones: the water table zone, the shallow aquifer, and the Floridan Aquifer. A description of the Floridan water is provided in Section 3.5. Plant construction and operation will affect the shallow aquifer and the water table zone. This section provides background data for the water table zone and surface aquifer.

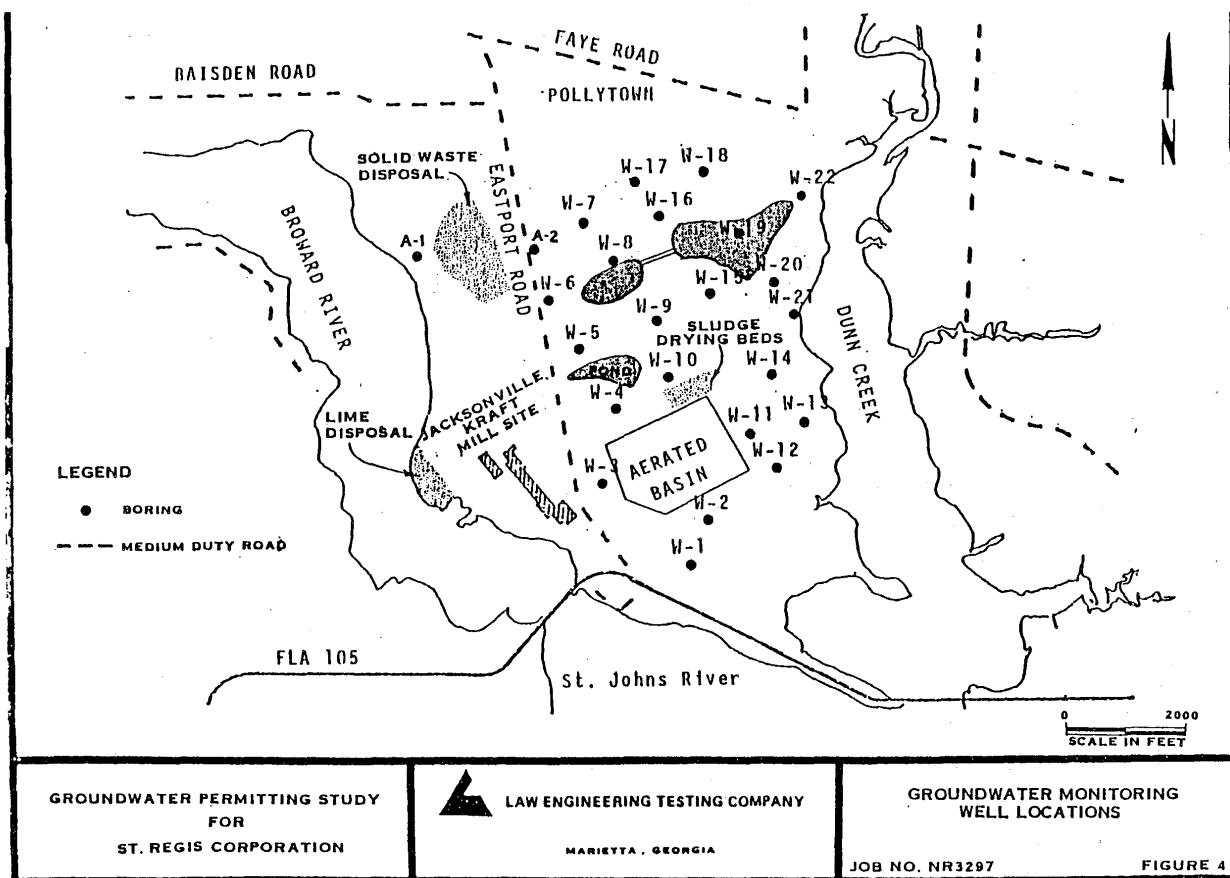
In 1983, LETCO performed a ground water study for the paper mill. Their report is included in Appendix 10.11. It includes data between 1972 and 1983.

Wastewater is treated by first removing solids, then passing through a bar screen, grit chamber, and clarifier before final treatment in an aeration basin. Additional sedimentation and biotreatment occurs in the aeration basin before water is discharged into the St. Johns River.

Monitoring well locations are shown on Figure 2.3-23 and water quality data from this report are included as Tables 2.3-4, 2.3-5, and 2.3-6.

LETCO's interpretation of the data provided the following conclusions.

- Seepage from waste ponds has been reduced by fines settling in the natural voids. After 11 years, there was only a slight down gradient movement of basin wastewater seepage.
- Any water leaving the site discharges immediately into the contiguous surface water bodies.
- Water quality data and biological data for the contiguous water bodies indicate no adverse effects from site ground water seepage.
- Waste loading to the contiguous surface water bodies will be less than 1 percent of the loading rates allowed by the NPDES permit.



GROUND WATER MONITORING WELL LOCATIONS

Figure 2.3-23

TABLE 2.3-5. SUMMARY OF 1972-1975 PERIODIC MONITORING

Ground Water Well Number	Range of Measurements		
	Water Level ft-msl	Conductivity μ mhos/cm	pH
1	8.5 - 13.0	--	--
2	11.0 - 17.2	200 - 900	5.6 - 7.8
3	3.8 - 9.6	240 - 1,200	5.5 - 10.1
4	12.0 - 14.9	180 - 380	6.3 - 8.6
5*	7.9 - 8.8	340 - 4,000	7.1 - 8.4
6	3.3 - 13.2	150 - 1,450	5.3 - 8.8
7	3.8 - 7.5	140 - 480	5.2 - 7.4
8	2.9 - 5.5	160 - 1,400	5.0 - 11.8
9	4.8 - 6.7	150 - 950	9.4 - 11.5
10	22.0 - 25.6	150 - 1,000	9.4 - 11.0
11	6.0 - 11.3	100 - 350	5.9 - 8.1
12	--	--	--
13	7.3 - 9.9	50 - 300	5.1 - 7.2
14	7.3 - 10.3	100 - 250	4.7 - 6.7
15	--	--	--
16	3.3 - 6.9	200 - 350	6.3 - 9.4
17	2.0 - 6.1	100 - 1,300	6.7 - 11.3
18	6.8 - 11.1	50 - 180	5.7 - 8.4
19	--	--	--
20	24.3 - 27.2	100 - 1,600	6.6 - 11.4
21	7.6 - 9.9	60 - 500	5.9 - 7.7
22	11.3 - 14.8	100 - 300	6.9 - 7.8

*Monitoring Period--July 1972 to April 1973.

TABLE 2.3-6. SUMMARY OF LABORATORY RESULTS*

<u>Water Quality Parameter</u>	<u>Well Number 2</u>	<u>Well Number 9</u>	<u>Well Number 10</u>	<u>Well Number 18</u>
Alkalinity, as CaCO ₃	15 - 73	9 - 195	18 - 122	7 - 56
Oxygen Demand, Chemical	8 - 368	2 - 24	0.5 - 135	2 - 44
Ammonia, as N	0.0 - 0.7	0.0 - 0.4	0.0 - 1.0	0.0 - 0.6
Kjeldahl Nitrogen	0.4 - 2.2	0.4 - 2.5	0.8 - 4.5	0.4 - 1.2
Nitrate, as N	0.02 - 3.9	0.02 - 1.5	0.02 - 0.45	0.02 - 1.5
Total Phosphorus, as P	0.04 - 2.0	0.03 - 1.1	0.04 - 0.59	0.02 - 2.8
Oxygen Demand, Biochemical	3 - 22	1 - 15	3 - 48	1 - 22
Total Solids	161 - 781	92 - 277	113 - 335	43 - 95
Dissolved Solids	143 - 720	88 - 255	110 - 270	36 - 76
Suspended Solids	18 - 39	4 - 47	19 - 140	4 - 51
Sodium	9 - 154	7 - 16	10 - 16	6 - 74

*Data from August 23, 1972 through December 17, 1976.

In July 1988, ERM performed a site ground water characterization for the western portion of the site. Fifteen monitoring wells and piezometers were installed, as shown on Figure 2.3-24, and water samples from each well were tested. Results from these tests are included in Appendix 10.11. No hazardous waste was detected on the property during the program. Fuel oil, black liquor, and mercury were detected; however, surface water quality at the river was within acceptable limits for Class III generally marine waters.

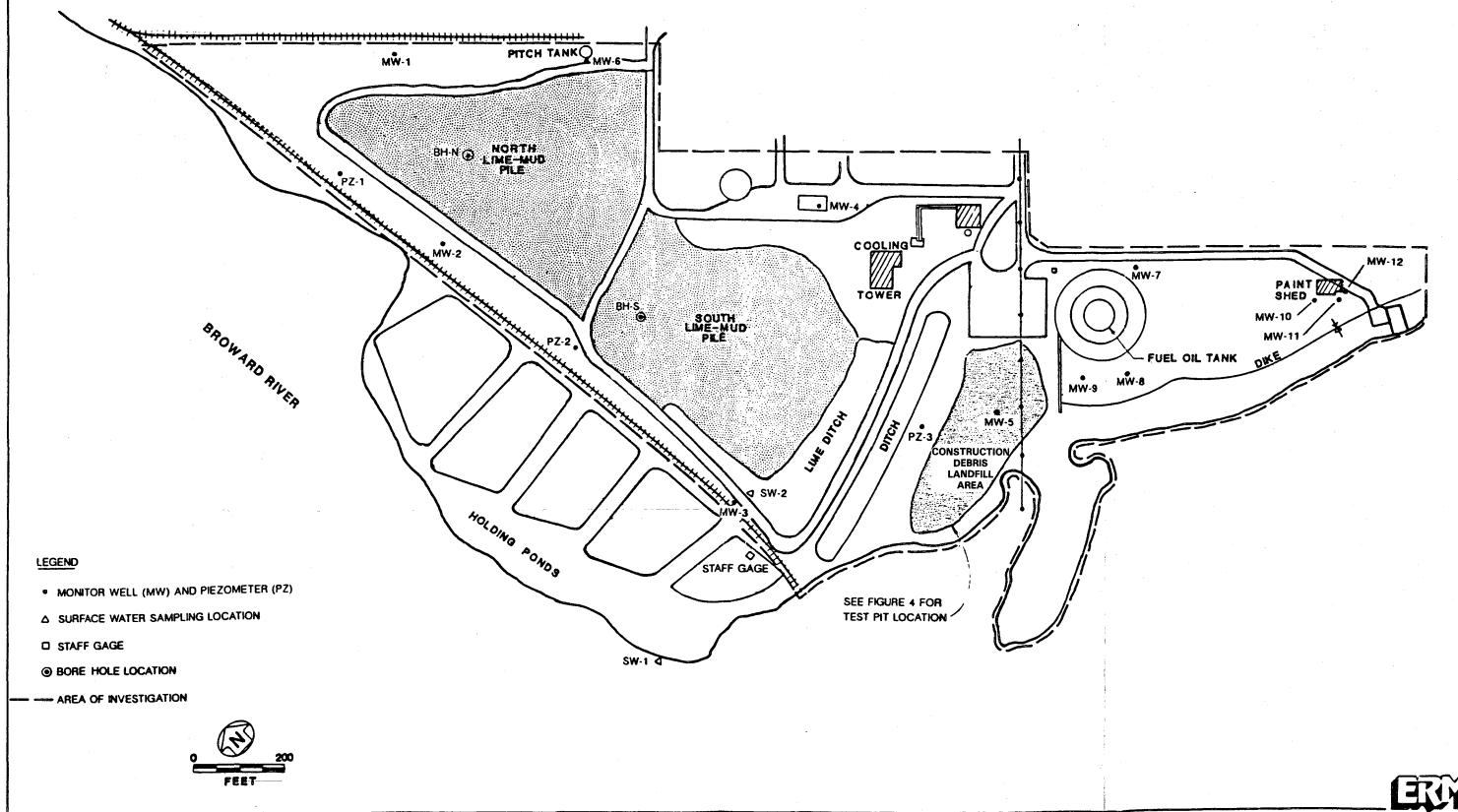
Classification for ground water will be according to ground water uses as established by Florida DER Chapter 17-3.403. According to the TDS of the surficial aquifer, the ground water at the site may be classified as a Class G-II or Class G-III. The surficial aquifer at the site has not been identified as a potable water supply by any known users. Water samples will be collected during construction and plant operation, as described in Section 5.3, and compared to these background data.

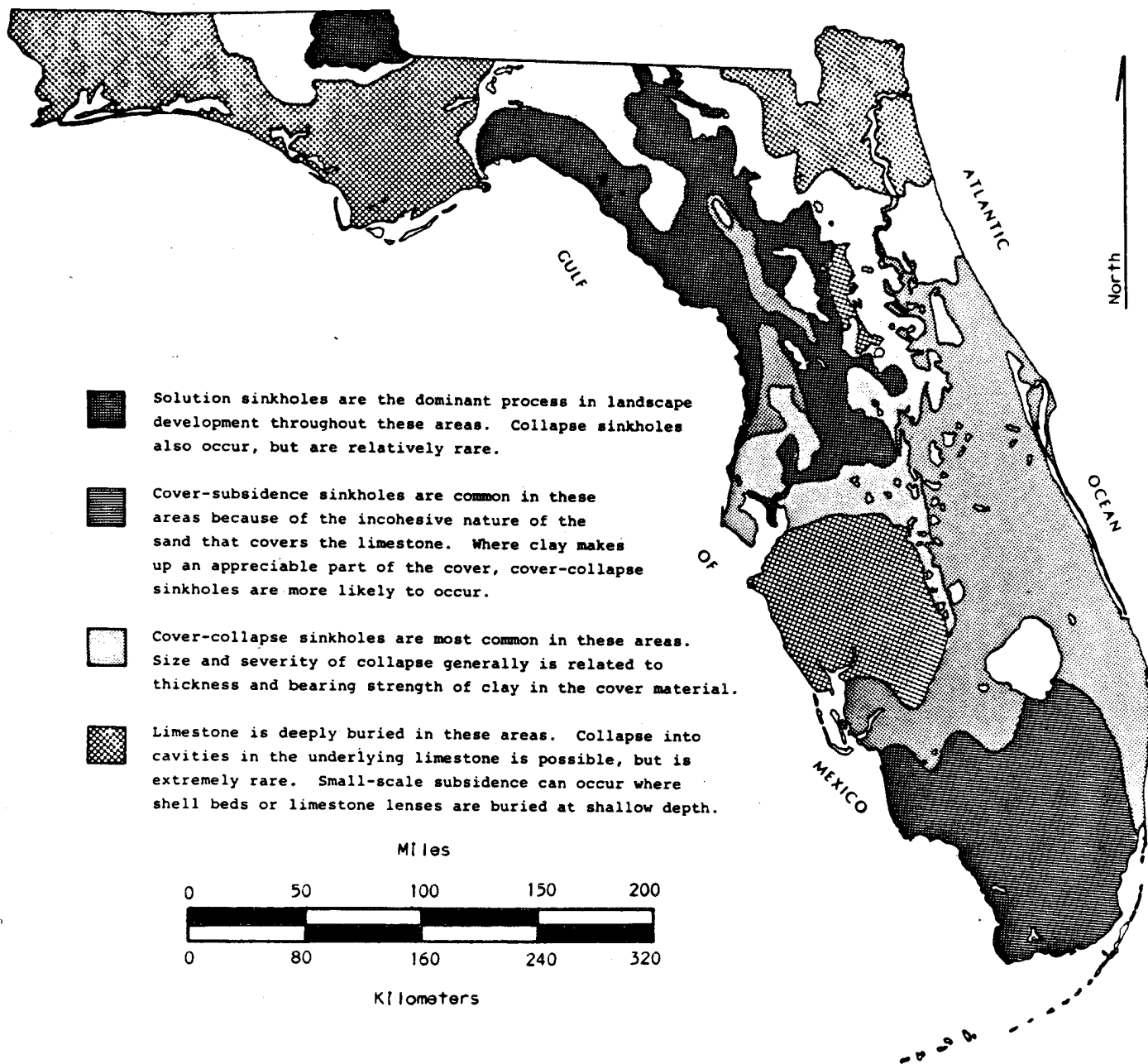
2.3.2.3 Karst Hydrogeology. Figure 2.3-25 shows the areas of predominant sinkholes in Florida. As this figure shows, the site is in an area where sinkholes are possible but extremely rare. As of 1984, no sinkholes have been reported in Duval County (Table 2.3-7). Sinkholes are not expected to be a problem.

2.3.3 Site Water Budget and Area Users

Climatological information is provided in Subsection 2.3.7. A brief summary of pertinent information is included in this subsection.

2.3.3.1 Jacksonville Climatological Conditions. The climatological information was obtained from meteorological data which were collected from Jacksonville International Airport. The Jacksonville International Airport is the closest first-order weather station in operation (located approximately 10 km northwest of the site). The data collected from this location are considered to be representative of long-term, onsite conditions because of its proximity to the site.





Barry F. Beck and William C. Sinclair, Sinkholes in Florida, The Florida Sinkhole Research Institute, University of Central Florida, 1986

AREAS OF PREDOMINANT SINKHOLE TYPES IN FLORIDA

Figure 2.3-25

TABLE 2.3-7. DISTRIBUTION OF REPORTED SINKHOLES BY COUNTY

Hillsborough	105	Hamilton	7
Citrus	83	Sumter	7
Polk	75	Dixie	3
Marion	56	Indian River	3
Pasco	53	Jackson	3
Levy	27	Gadsden	2
Orange	25	Gilchrist	2
Seminole	24	Madison	2
Suwannee	24	Sarasota	2
Columbia	23	Charlotte	1
Alachua	20	Collier	1
Volusia	18	Dade	1
Leon	16	Holmes	1
Hernando	14	Jefferson	1
Pinellas	14	Monroe	1
Lake	12	Palm Beach	1
Wakulla	11	Putnam	1
Taylor	10	Washington	1

SOURCE: "A Computer-Based Inventory of Recorded Recent Sinkholes in Florida," University of Central Florida, 1984.

2.3.3.2 Temperature. Table 2.3-8 contains monthly and seasonal values of average daily mean, maximum, and minimum temperatures. Temperature extremes are also included. The annual mean temperature is 67.9 F, with monthly means ranging from 54.4 F in January to 80.6 F in July. The highest temperature recorded was 105 F, and the lowest temperature was 7 F.

2.3.3.3 Precipitation. Rainfall at the Jacksonville area reaches a maximum during the summer months (May - October) and diminishes during the winter months (November - April). The average yearly rainfall at Jacksonville during the period 1872 to 1986 was 51.46 inches (USDC, 1978) with 60 to 70 percent of this average annual rainfall occurring between May and October. Monthly average amounts of rainfall are given in Table 2.3-9. The month with the highest average was September, with 7.10 inches. The lowest average rainfall occurred during November, with 1.95 inches. The record rainfall for one month occurred during September 1949, when 19.36 inches were recorded.

2.3.3.4 Evapotranspiration and Runoff. Rainfall in Duval County averages about 51.5 inches per year, and the average annual runoff from streams is about 20 inches. Base flow in streams is sustained by ground water inflow from the shallow aquifer system and accounts for 10 to 12 of the 20 inches of annual runoff. The remaining 8-10 inches of annual runoff is direct runoff from overland flow. Subtracting the 20 inch average annual runoff from the average annual rainfall leaves 34 inches of evapotranspiration per year.

2.3.3.5 Water Use. The proposed site is located within Duval County. Duval County comprises the lower portion of the St. Johns River Basin, which is part of the St. Johns River Water Management District (Figure 2.3-26).

Total water use for Duval County in 1986 was 372.16 Mgal/day (St. Johns River Water Management District, 1986). Of this, ground water use was 153.49 Mgal/day and surface water use was 218.67 Mgal/day (Tables 2.3-10 and 2.3-11). In 1987, nearly all fresh water consumption was developed from ground water sources, principally the Floridan Aquifer. A significant portion of water use by industry and power generation was developed from surface water sources, primarily the St. Johns River.

TABLE 2.3-8. DRY-BULB TEMPERATURE DATA FOR JACKSONVILLE, FLORIDA

<u>Month</u>	<u>Mean Temperature*</u>			<u>Extreme Temperature**</u>	
	<u>Monthly</u> F	<u>Daily</u> <u>Minimum</u> F	<u>Daily</u> <u>Maximum</u> F	<u>Lowest</u> F	<u>Highest</u> F
January	54.4	45.2	63.6	7	85
February	56.4	46.9	65.8	19	88
March	61.8	52.1	71.4	23	91
April	67.5	58.0	77.0	35	95
May	73.7	64.7	82.7	45	100
June	78.6	70.2	87.0	47	103
July	80.6	72.3	88.8	61	105
August	80.2	72.2	88.2	63	102
September	77.2	69.8	84.6	48	100
October	69.0	61.0	76.9	36	96
November	60.8	51.8	69.7	21	88
December	55.0	45.8	64.1	11	84
Annual	67.9	59.2	76.6	7	105
<u>Season</u>					
Summer	79.8	71.6	88.0	47	105
Fall	69.0	60.9	77.1	21	102
Winter	55.3	46.0	64.5	7	88
Spring	67.7	58.3	77.0	23	100

*Period of record: 1951-1980

**Period of record: 1953-1986

SOURCE: United States Department of Commerce, Local Climatological Data--
Annual Summary with Comparative Data--1986, Jacksonville, Florida,
National Climatic Center, Asheville, North Carolina, 1987.

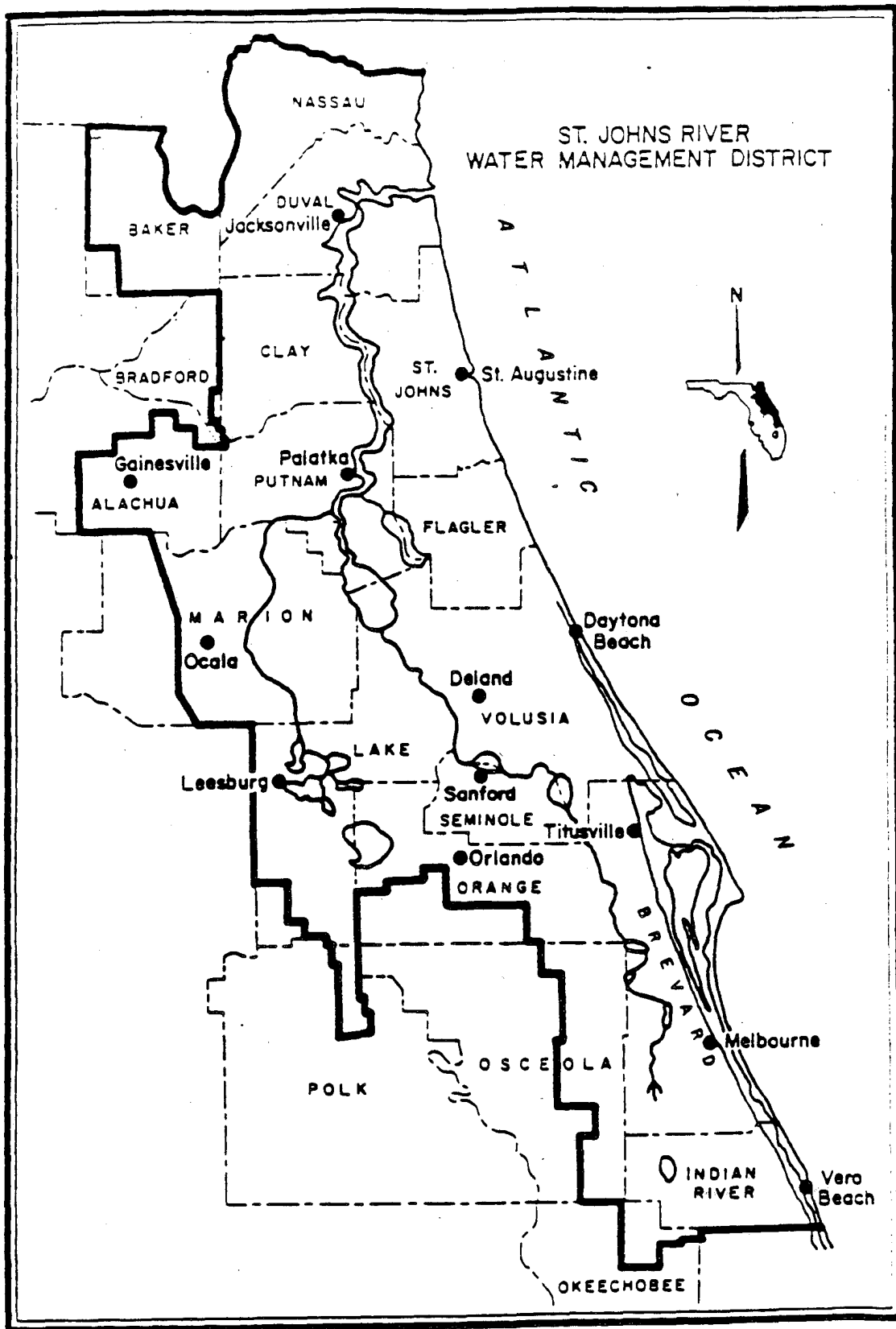
TABLE 2.3-9. TOTAL PRECIPITATION AND SNOWFALL DATA FOR JACKSONVILLE,
FLORIDA

<u>Month</u>	<u>Average Precipitation*</u> inches	<u>Average Snowfall**</u> inches
January	2.83	Trace
February	3.16	Trace
March	3.40	Trace
April	2.80	0.0
May	3.89	0.0
June	5.83	0.0
July	6.64	0.0
August	6.63	0.0
September	7.10	0.0
October	4.42	0.0
November	1.95	0.0
December	2.79	Trace
Annual	51.46	Trace

*Period of record: 1872-1986

**Period of record: 1942-1986

SOURCE: United States Department of Commerce, Local Climatological Data--
Annual Summary with Comparative Data--1986, Jacksonville, Florida,
National Climatic Center, Asheville, North Carolina, 1987.



ST. JOHNS RIVER WATER MANAGEMENT DISTRICT

TABLE 2.3-10. TOTAL WATER WITHDRAWALS BY COUNTY: 1986 ST. JOHNS RIVER WATER MANAGEMENT DISTRICT
(All Values in Million Gallons Per Day)

	Fresh Water			Saline Water			Reuse
	Ground	Surface	Totals	Ground	Surface	Totals	
Alachua	29.72	0.14	29.86	0.00	0.00	0.00	0.00
Baker	5.60	2.19	7.79	0.00	0.00	0.00	0.00
Bradford	0.34	0.00	0.34	0.00	0.00	0.00	0.00
Brevard	167.72	26.34	194.06	0.00	1,089.21	1,089.21	0.66
Clay	22.97	4.86	27.83	0.00	0.00	0.00	0.00
Duval	153.49	1.22	154.71	0.00	217.45	217.45	1.19
Flagler	9.42	1.33	10.75	0.00	0.00	0.00	0.00
Indian River	62.99	114.25	177.24	0.00	16.91	16.91	0.00
Lake	69.64	12.35	81.99	0.00	0.00	0.00	3.07
Marion	33.36	4.03	37.39	0.00	0.00	0.00	0.29
Nassau	47.67	0.97	48.64	0.00	0.00	0.00	0.68
Okeechobee	8.29	0.25	8.54	0.00	0.00	0.00	0.00
Orange	148.61	50.98	199.59	0.00	0.00	0.00	0.59
Osceola	6.45	8.67	15.12	0.00	0.00	0.00	0.00
Polk	10.01	0.99	11.00	0.00	0.00	0.00	0.00
Putnam	69.08	23.81	92.89	0.00	0.00	0.00	0.00
St. Johns	50.50	1.29	51.79	0.00	0.00	0.00	0.42
Seminole	70.20	2.31	72.51	0.00	0.00	0.00	0.00
Volusia	85.04	123.64	208.68	0.00	0.00	0.00	0.00
District Totals	1,051.10	379.62	1,430.72	0.00	1,323.57	1,323.57	6.90
Total Ground	1,051.10						
Total Surface		1,703.19					
District Totals		2,754.29					

TABLE 2.3-11. TOTAL FLORIDAN AQUIFER WITHDRAWALS FOR DUVAL COUNTY

Duval County Data - 1986

Total Population 645,709
 Total Land Area 840 square miles

St. Johns River Water Management District's Portion:

Population

Total 645,709
 Public Supply 544,394
 Self-Supplied 101,315
 Per Capita 164

Land Area (Acres)

Total Area 537,600 840 square miles
 Farmed 16,167
 Irrigated 2,684

	1986 Water Withdrawals (Mgal/d) by Category						
	Fresh Water			Saline Water			
	Ground	Surface	Totals	Ground	Surface	Totals	Reuse
Public Supply	89.20	0.00	89.20	0.00	0.00	0.00	0.00
Domestic Self-Supply	16.62	0.00	16.62	0.00	0.00	0.00	0.00
Com/Ind. Self-Supply	22.82	0.00	22.82	0.00	0.00	0.00	0.00
Agricultural Irr.	15.62	1.22	16.84	0.00	0.00	0.00	1.19
Power Generation S-S	3.09	0.00	3.09	0.00	217.45	217.45	0.00
Miscellaneous	<u>6.14</u>	<u>0.00</u>	<u>6.14</u>	<u>0.00</u>	<u>0.00</u>	<u>0.00</u>	<u>0.00</u>
	153.49	1.22	154.71	0.00	217.45	217.45	1.19
Total Ground	153.49						
Total Surface		218.67					
County Total*	372.16						

*Reuse amounts are not included in total.

2.3.3.6 Water Users. Major water users within 5 miles of the site are given in Table 2.3-12. In 1986, the Floridan Aquifer provided 153.49 Mgal/day for Duval County. Of the total, 69 percent was for water supply, 15 percent for industrial/commercial use, 10 percent for agricultural use, 2 percent for power, and 4 percent for miscellaneous use. Since then, the Seminole Kraft plant resumed operation, consuming about 20 Mgal/day. Revised percentages are 61 percent for water supply, 25 percent for industrial/commercial, 9 percent for agriculture, 1.5 percent for power, and 3.5 percent for miscellaneous.

Figure 2.3-27 locates all wells within 1 mile of the site, and Table 2.3-13 lists their owners and well types.

Figure 2.3-28 locates the Seminole Kraft plant supply wells.

2.3.4 Surficial Hydrology

The proposed site is located within the estuarine portion of the St. Johns River basin, about 13 miles upstream of the mouth of the river. The surface waters in this vicinity have been classified as Class III, predominantly marine waters, in Chapter 17-3 of the Florida Administrative Code (FAC). Waters of this type are intended for fish and wildlife propagation and management. Water test data (Appendix 10.12) show the presence of salt water in that segment of the St. Johns River adjacent to the proposed site. Chloride content at Station #2 just south of the site showed a concentration of 11,900 mg/l in September 1986. Water quality standards applicable to Class III, predominately marine, waters are presented in Table 2.3-14.

Surface waters around the site are the Broward River to the west, St. Johns River to the south, and Dunn Creek to the east. Ground water contours show gradients toward these three surface water bodies. There are no natural surface water bodies on the project site.

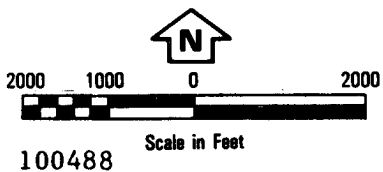
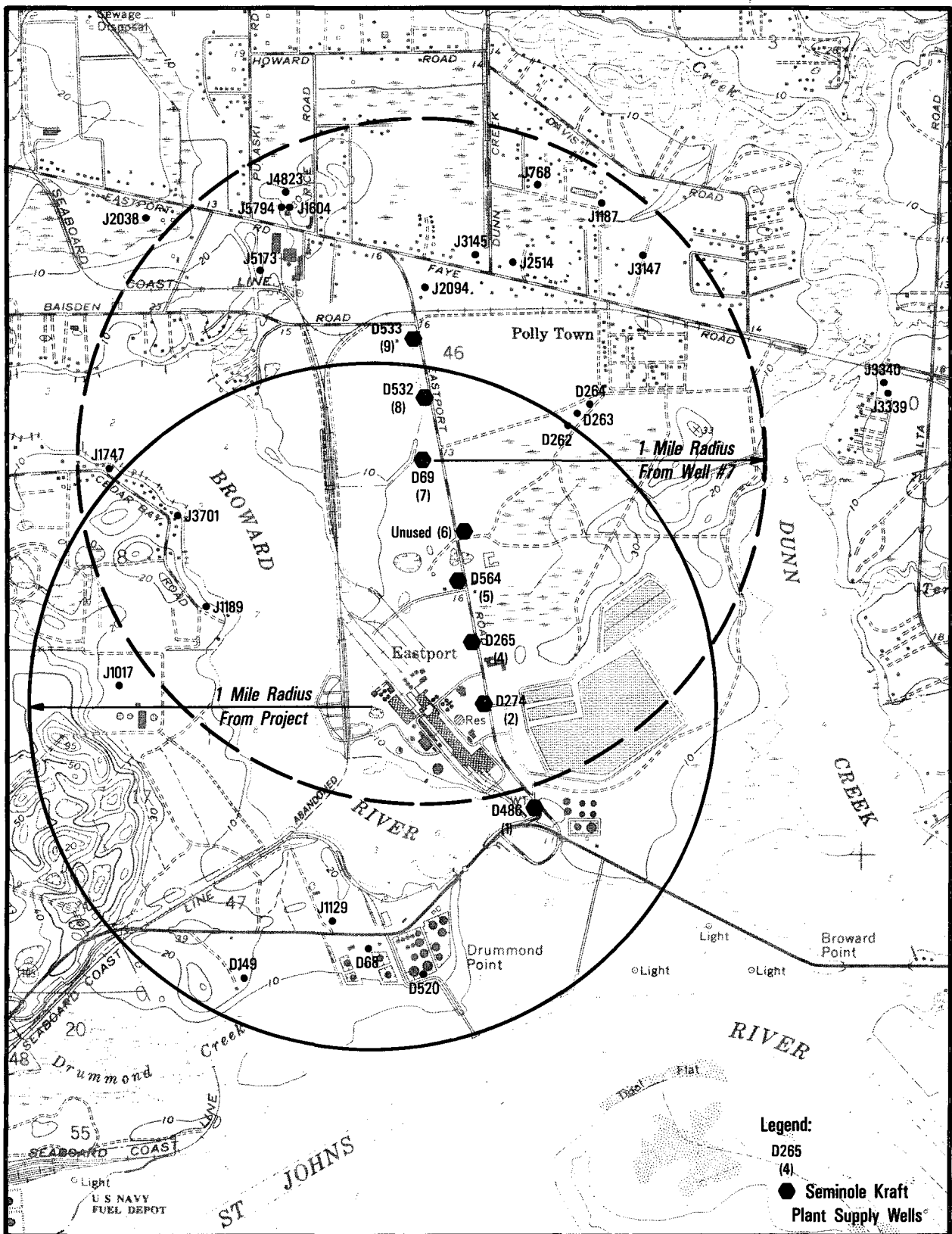
2.3.4.1 Bathymetry and Tidal Stages. The nearest stage and flow recording station is maintained by the USGS in Jacksonville, approximately 23 miles upstream of the mouth of the river, or about 10 miles upstream of the site area. There are no other published records of stage and/or flow in the site vicinity. The period of record for water levels at this station is

TABLE 2.3-12. MAJOR WATER USES WITHIN 5 MILES OF THE SITE (1986)*

User Utility/Facility	Use Type	Population Served	Withdrawal (MGD)		Withdrawal Source
			Ground	Surface	
Canal Utilities	Public Supply	6,706	1.625	0.000	Floridan aquifer
Jacksonville--City of	Public Supply	348,196	60.274	0.000	Floridan aquifer
Jacksonville Suburban Utilities	Public Supply	72,612	9.448	0.000	Floridan aquifer
Mandarin Utilities	Public Supply	29,203	4.305	0.000	Floridan aquifer
Southern States Utilities	Public Supply	8,628	1.225	0.000	Floridan aquifer
Alton Packaging Co.	Industrial		7.547	0.000	Floridan aquifer
Jacksonville Electric Authority	Power Gen.		2.201	217.449	Floridan aquifer and St. Johns River
Jacksonville Kraft Paper Co.**	Industrial		0.004	0.000	Floridan aquifer
SCM Organic Chemical Co.	Industrial		2.101	0.000	Floridan aquifer

*Technical Publication SJ88-7, St. Johns River Water Management District, August 1988.

**Currently Seminole Kraft Corporation; not in operation during 1986.



2-86

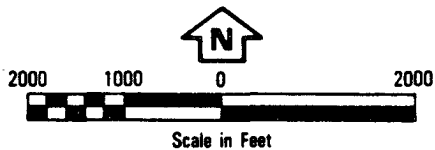
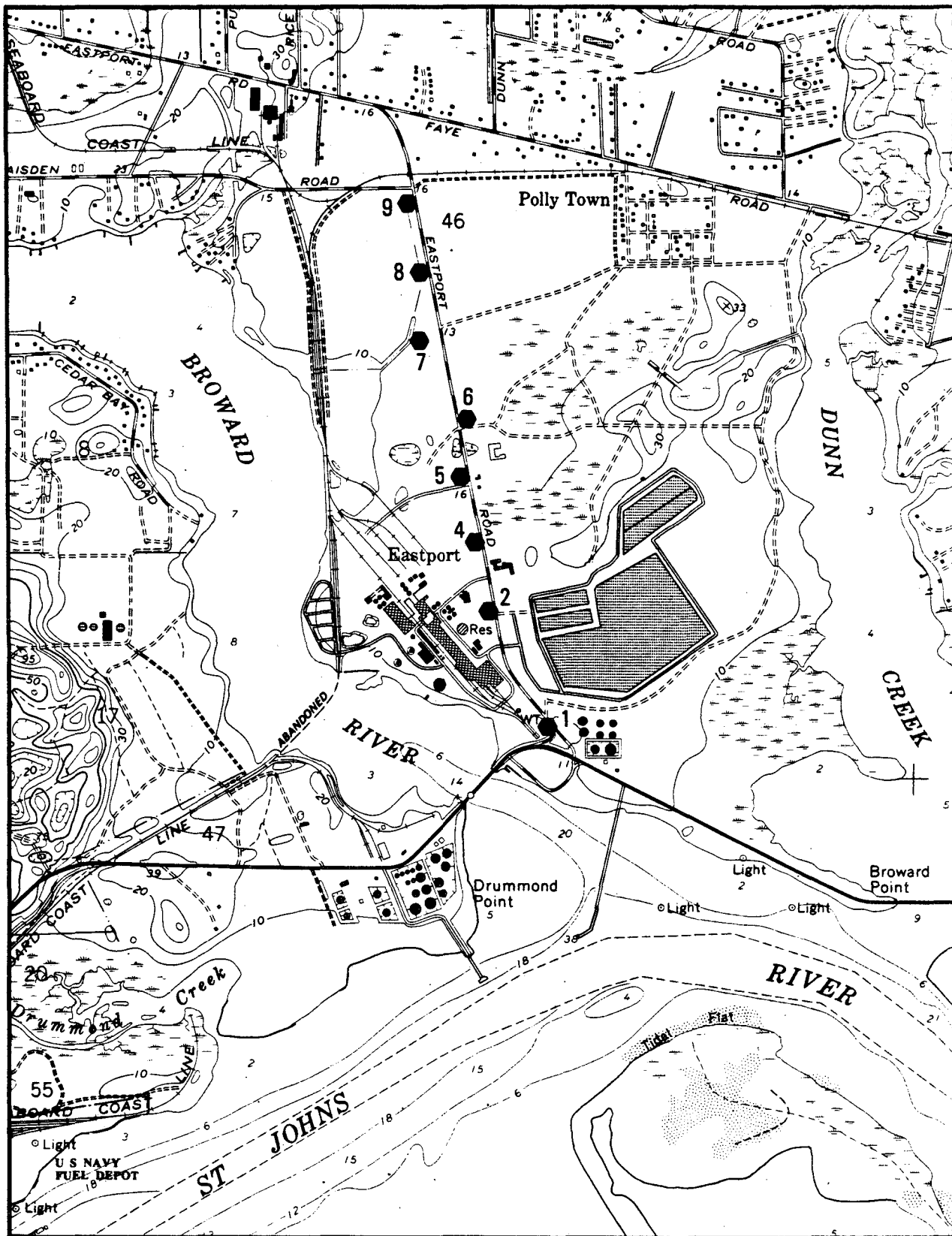
WELLS WITHIN 1 MILE RADIUS
 OF THE PROJECT SITE

Figure 2.3-27

TABLE 2.3-13. LIST OF WELLS WITHIN 1 MILE OF THE SITE

<u>Owner</u>	<u>Use Type</u>	<u>Designation</u>	<u>Aquifer</u>
City of Jacksonville	Industrial	J1017	Floridan
Trans-Florida Pipeline	Industrial	D68	Floridan
Dickerson, Inc.	Public Supply	J1129	Floridan
Montys Marina	Public Supply	D468	Floridan
Biltmore Estates	Domestic	D215	Floridan
Rockaway Beach	Unused	J1189	Floridan
Mrs. Hilderbrant	Private	D568	Floridan
Mrs. W. M. Bostwick	Private	D149	Floridan
Foley Lumber Co.	Unused	D520	Floridan
Seminole Kraft Paper Co.	Industrial	1, 2, 4, 5, 7, 8, 9	Floridan
Seminole Kraft Paper Co.	Industrial	D262	Floridan

2



2-88

SEMINOLE KRAFT PAPER COMPANY
WATER SUPPLY WELLS

Figure 2.3-28

TABLE 2.3-14. WATER QUALITY CRITERIA

Parameter	Class II	Class III	Class III
		Fresh Chloride Concentrate <1,500 mg/l	Marine Chloride Concentrate >1,500 mg/l
Oil and Grease			
Dissolved or Emulsified	5.0 mg/l	5.0 mg/l	5.0 mg/l
Undissolved	No visible oil to interfere with beneficial use	No visible oil to interfere with beneficial use	No visible oil to interfere with beneficial use
Pesticides and Herbicides			
Aldrin Plus			
Dieldrin	0.003 µg/l	0.003 µg/l	0.003 µg/l
Chlordane	0.004 µg/l	0.01 µg/l	0.004 µg/l
DDT	0.001 µg/l	0.001 µg/l	0.001 µg/l
Demeton	0.1 µg/l	0.1 µg/l	0.1 µg/l
Endosulfan	0.001 µg/l	0.003 µg/l	0.001 µg/l
Endrin	0.004 µg/l	0.004 µg/l	0.004 µg/l
Guthion	0.01 µg/l	0.01 µg/l	0.01 µg/l
Heptachlor	0.001 µg/l	0.001 µg/l	0.001 µg/l
Lindane	0.004 µg/l	0.01 µg/l	0.004 µg/l
Malathion	0.1 µg/l	0.1 µg/l	0.1 µg/l
Methoxychlor	0.03 µg/l	0.03 µg/l	0.03 µg/l
Mirex	0.001 µg/l	0.001 µg/l	0.001 µg/l
Parathion	0.04 µg/l	0.04 µg/l	0.04 µg/l
Toxaphene	0.005 µg/l	0.005 µg/l	0.005 µg/l
pH Range	6.5 to 8.5	6.0 to 8.5	6.5 to 8.5
pH Variation from Background	±1.0	±1.0	±1.0
Phenolic Compounds	1.0 µg/l	1.0 µg/l	1.0 µg/l
Phosphorous (Elemental)	0.1 µg/l	--	0.1 µg/l
Phthalate Esters	--	3.0 µg/l	--
Polychlorinated Biphenyls	0.001 µg/l	0.001 µg/l	0.001 µg/l
Radioactive Substances			
Radium 226 and 228	<5 pCi/l	<5 pCi/l	<5 pCi/l
Gross Alpha	<15 pCi/l	<15 pCi/l	<15 pCi/l
Selenium	25 µg/l	25 µg/l	25 µg/l
Silver	0.05 µg/l	0.07 µg/l	0.05 µg/l

TABLE 2.3-14 (Continued). WATER QUALITY CRITERIA

Parameter	Class II	Class III Fresh	Class III Marine
Specific Conductance	--	Shall not be increased more than 50% above background or to 1,275 μ mhos/cm, whichever is greater	--
Temperature	90 F Max Ambient +5 F	90 F Max Ambient +5 F	Summer: 92 F Max Ambient +2 F Remainder: 90 F Max Ambient +4 F
Transparency	<10% reduction from background	<10% reduction from background	<10% reduction from background
Turbidity	<29 NTU increase from background	<29 NTU increase from background	<29 NTU increase from background
Zinc	1.0 mg/l	30 μ g/l	1.0 mg/l
Alkalinity	--	>20 mg/l as CaCO_3	--
Aluminum	1.5 mg/l	--	1.5 mg/l
Ammonia, Un-ionized	--	0.02 mg/l	--
Antimony	0.2 mg/l	--	0.2 mg/l
Arsenic	0.05 mg/l	0.05 mg/l	0.05 mg/l
Beryllium	--	0.011 mg/l if hardness <150 mg/l CaCO_3 1.10 mg/l if hardness >150 mg/l CaCO_3	--
Biological Integrity	Shannon-Weaver Diversity Index (H) of benthic macroinvertebrates shall not be reduced to less than 75% of established background.	Shannon-Weaver Diversity Index (H) of benthic macroinvertebrates shall not be reduced to less than 75% of established background.	--
Bromates	100 mg/l	--	100 mg/l
Bromine (Free Molecular)	0.1 mg/l	--	0.1 mg/l
Cadmium	5.0 μ g/l	0.8 μ g/l if hardness <150 mg/l CaCO_3 1.2 μ g/l if hardness >150 mg/l CaCO_3	5.0 μ g/l
Chlorides	<10% increase over normal background levels in predominantly marine waters	--	<10% increase over normal background levels in predominantly marine waters
Chlorine (Total Residual)	0.01 mg/l	0.01 mg/l	0.01 mg/l
Chromium, Total (After Mixing)	0.05 mg/l	0.05 mg/l	0.05 mg/l
Coliforms, Fecal	14 counts/100 ml median; 43 counts/100 ml <10% of samples	200 counts/100 ml monthly average; 400 counts/100 ml <10% of samples per month; 800 counts/100 ml on any one day	200 counts/100 ml monthly average; 400 counts/100 ml <10% of samples per month; 800 counts/100 ml on any one day

TABLE 2.3-14 (Continued). WATER QUALITY CRITERIA

Parameter	Class II	Class III Fresh	Class III Marine
Coliforms, Total	70 counts/100 ml median; 230 counts <10% of samples	1,000 counts/100 ml monthly average; 1,000 counts/100 ml <20% of samples per month; 2,400 counts/ 100 ml at any time	1,000 counts/100 ml monthly average; 1,000 counts/100 ml <20% of samples per month 2,400 counts/ 100 ml at any time
Copper	15 µg/l	30 µg/l	15 µg/l
Cyanide	5.0 µg/l	5.0 µg/l	5.0 µg/l
Detergents	0.5 mg/l	0.5 mg/l	0.5 mg/l
Dissolved Gases, Total	<110% saturation	<110% saturation	<110% saturation
Dissolved Oxygen	>5.0 mg/l 24 hour average; >4.0 mg/l instantaneous	>5.0 mg/l	>5.0 mg/l 24 hour average; >4.0 mg/l instantaneous
Fluoride	1.5 mg/l	10 mg/l	5.0 mg/l
Iron	0.3 mg/l	1.0 mg/l	0.3 mg/l
Lead	50 µg/l	30 µg/l	50 µg/l
Manganese	100 µg/l	--	--
Mercury	0.1 µg/l	0.2 µg/l	0.1 µg/l
Nickel	100 µg/l	100 µg/l	100 µg/l
Nutrients	Shall not be altered so as to cause an imbalance in natural popula- tions of aquatic flora and fauna	Shall not be altered so as to cause an imbalance in natural populations of aquatic flora and fauna	Shall not be altered so as to cause an imbalance in natural popula- tions of aquatic flora and fauna

from February 1985 to the present. The maximum gauge height over the period of record is 5.21 feet above mean sea level (msl), and the minimum gauge height over the period of record is -1.97 feet msl.

Reasonable predictions for the tidal stage at the proposed site can be made based on the Department of Commerce tide predictions for Mayport, Florida. High and low tides are expected to occur at the site within an hour after they occur at Mayport.

2.3.4.2 Current and Flow. Current and flow data were collected for the Blount Island Channel between September 1979 and October 1980. Velocities varied from 0.45 ft/sec to 1.76 ft/sec during flood tide and 0.43 ft/sec to 1.79 ft/sec during ebb tide. Flows varied from 40,000 cfs at flood stage to 29,000 cfs at ebb stage. Similar conditions are expected for the site, which is about 3 miles upriver of the Blount Island Channel.

2.3.4.3 Water Quality. Water quality data for the Broward River, just upstream of this confluence with St. Johns River, were obtained from the Department of Health, Welfare and Bio-Environmental Services. Water was classified as Class III, generally marine. Water test data are included in Appendix 10.12.

2.3.5 Vegetation/Land Use

The proposed project site is located on industrialized land which is part of the Seminole Kraft Paper Company. The entire site has been used for industrial purposes for at least 30 years, during which time complete alteration of the natural vegetation of the area has occurred. The majority of onsite vegetation consists of a mix of annual and perennial weedy invasive species in various early stages of succession. A narrow band of trees has grown up on the banks of the Broward River. These trees have sprouted up since the early 1970s, at which time aerial photographs of the site show treeless banks. Figure 2.3-29 shows vegetation and land use for a 5-mile radius around the site.

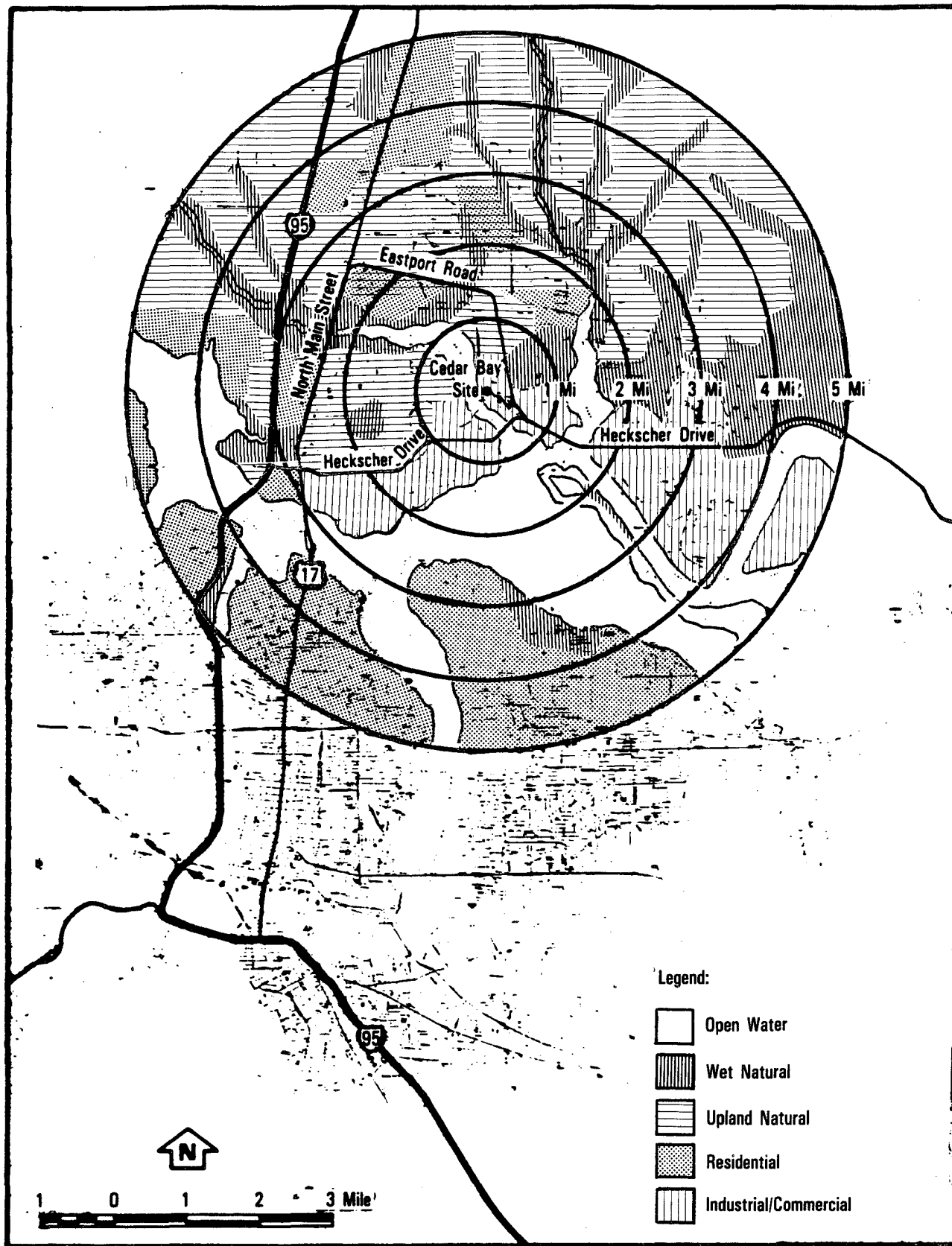
A survey was also performed onsite and in a nearby offsite area immediately north of the proposed site, to search for endangered and threatened species and to characterize vegetation types. A dead-end spur of the CSX

| 1

(formerly Seaboard Coast) Railroad Line runs through this area to the
Seminole Kraft

2-92a

Amendment 1
021089



VEGETATION AND LAND USE WITHIN
5 MILES OF SITE LOCATION

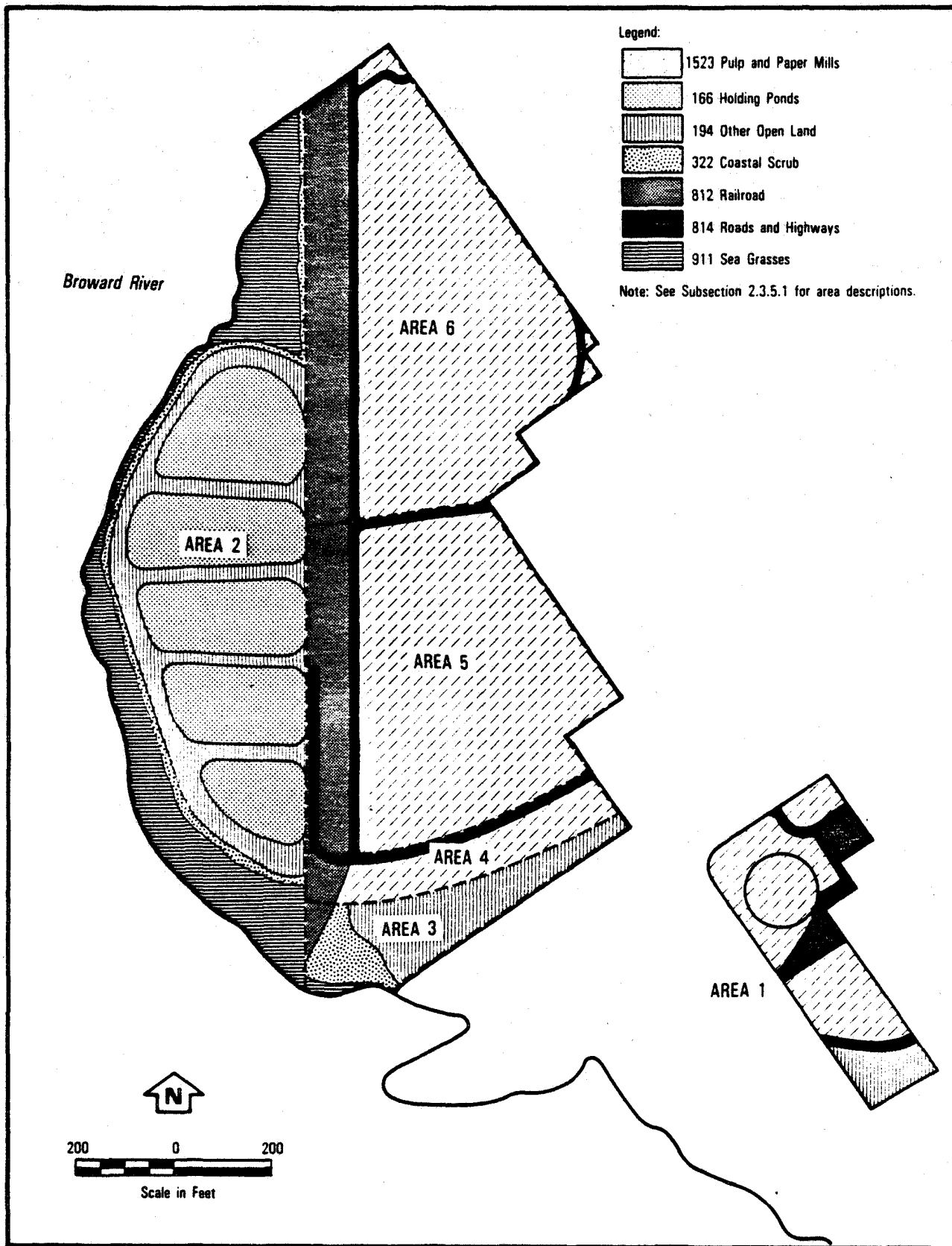
Figure 2.3-29

paper mill. This spur will be used for the project-related railroad corridor expansion and, therefore, has been included in the proposed cogeneration facility's terrestrial survey. The rail corridor is discussed in Section 6.3.

2.3.5.1 Proposed Project Site. For the purpose of this report, the proposed project site has been divided into six areas to aid in the description of vegetation types. Figure 2.3-30 illustrates these areas. Table 2.3-15 is a list of plant species identified in each area during the May 1988 terrestrial survey.

Area 1 is a small irregularly shaped industrial area approximately 400 feet southeast of the main project site. It consists of several connected parking lots and roads, an oil tank, and related vacant land, and is bounded by access roads and industrial buildings. Vegetation is minimal, consisting entirely of very hardy and aggressive weedy plants. A few shrubs and small trees have taken root in neglected areas. Typical species in Area 1 include sensitive brier (Schrankia microphylla), common ragweed (Ambrosia artemisiifolia), beggar ticks (Bidens alba), and Bermuda grass (Cynodon dactylon).

Area 2 is the westernmost portion of the proposed site. It is bounded by the Broward River on the west, north, and south, and the dead-end railroad spur on the east. Area 1 is dominated by a series of four holding ponds that extend north and south a distance of 1,000 feet and reach a maximum width of 350 feet. South and west of the holding ponds is a narrow upland area which is dominated by upland herbaceous plants, shrubs, and trees. This land narrows and eventually is reduced to a steep river bank next to the northern two holding ponds. Immediately north of the holding



ONSITE VEGETATION AND LAND USE AREAS

Figure 2.3-30

TABLE 2.3-15. VASCULAR PLANT SPECIES LIST COMPILED AT THE PROPOSED AES CEDAR BAY COGENERATION FACILITY, JACKSONVILLE, FLORIDA (May 18-19, 1988)*

Scientific Name	Common Name	Localities**						
		<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>
TREES								
<u>Acer rubrum</u> L. var. <u>trilobum</u> Torr. & Gray ex K. Koch	southern red maple			X				X
<u>Gordonia lasianthus</u> (L.) Ellis	loblolly bay		X	X				X
<u>Juniperus silicicola</u> (Small) Bailey	southern red cedar		X					X
<u>Pinus palustris</u> P. Mill.	longleaf pine							X
<u>Prunus serotina</u> Ehrh. var. <u>serotina</u>	black cherry		X	X			X	X
<u>Quercus incana</u> Bartr.	bluejack oak			X				X
<u>Quercus laevis</u> Walt.	turkey oak			X				X
<u>Quercus laurifolia</u> Michx.	laurel oak		X	X				X
<u>Quercus margaretta</u> Ashe	small post oak							X
<u>Quercus myrtifolia</u> Willd.	myrtle oak		X	X				X
<u>Quercus nigra</u> L.	water oak		X	X				X
<u>Quercus pumila</u> Walt.	running oak			X				
<u>Quercus virginiana</u> P. Mill.	Virginia live oak			X				X
<u>Sabal palmetto</u> (Walt.) Lodd. ex Schultes & Schultes	cabbage palm	X	X	X				X
<u>Salix caroliniana</u> Michx.	Carolina willow		X	X	X			
<u>Sassafras albidum</u> (Nutt.) Nees	sassafras		X					X
SHRUBS								
<u>Aralia spinosa</u>	devil's walking stick		X					
<u>Asimina incana</u> (Bartr.) Exell	flag pawpaw, polecat bush							X
<u>Asimina obovata</u> (Willd.) Nash	flag pawpaw							X
<u>Baccharis halimifolia</u> L.	groundsel tree		X	X	X		X	X
<u>Juniperus silicicola</u> (Sm.) Bailey	southern red cedar		X					

TABLE 2.3-15 (Continued). VASCULAR PLANT SPECIES LIST COMPILED AT THE
PROPOSED AES CEDAR BAY COGENERATION FACILITY,
JACKSONVILLE, FLORIDA (May 18-19, 1988)*

Scientific Name	Common Name	Localities**						
		1	2	3	4	5	6	7
<u>Myrica cerifera</u> L.	wax myrtle		X	X				
<u>Rhus copallina</u> L.	winged sumac		X	X				
<u>Sambucus canadensis</u> L.	elderberry	X	X	X			X	X
<u>Serenoa repens</u> (Bartr.) Small	saw palmetto							X
<u>Vaccinium myrsinites</u> Lam.	shiny blueberry							X
<u>Vaccinium</u> sp.								X
<u>HERBACEOUS PLANTS</u>								
<u>Albizia</u> sp.				X				
<u>Alternanthera philoxeroides</u> (Mart.) Griseb.	alligator weed			X				
<u>Ambrosia artemisiifolia</u> L.	common ragweed	X		X			X	X
<u>Amorpha fruticosa</u> L.	bastard indigo							X
<u>Andropogon brachystachyus</u>	short-spike bluestem		X	X				
<u>Andropogon floridanus</u> Scribn.	Florida bluestem				X	X	X	X
<u>Andropogon virginicus</u> L.	broomsedge		X					X
<u>Asclepias humistrata</u> Walt.	milkweed			X				X
<u>Asclepias tuberosa</u> L.	butterfly weed							X
<u>Baptisia</u> sp.								X
<u>Befaria racemosa</u> Vent.	tarflower						X	X
<u>Berchemia scandens</u> (Hill) K. Koch	rattan vine			X				
<u>Berlandiera subacaulis</u> (Nutt.) Nutt.	greeneyes	X	X	X		X	X	
<u>Bidens alba</u> (L.) DC.	beggar's ticks	X	X	X	X	X	X	X
<u>Carex albolutescens</u> Schwein.	sedge			X				
<u>Cassia</u> sp.				X				X
<u>Cenchrus echinatus</u> L.	southern sandspur	X		X				
<u>Chenopodium ambrosioides</u>	Mexican tea		X	X				

TABLE 2.3-15 (Continued). VASCULAR PLANT SPECIES LIST COMPILED AT THE PROPOSED AES CEDAR BAY COGENERATION FACILITY, JACKSONVILLE, FLORIDA (May 18-19, 1988)*

Scientific Name	Common Name	Localities**							
		1	2	3	4	5	6	7	
<u>Ciclospermum leptophyllum</u> (Pers.) Sprague (syn. <u>Apium leptophyllum</u> (Pers.) Muell.)	marsh parsley			X					1
<u>Cnidoscolus stimulosus</u> (Michx.) Engelm. & Gray	tread-softly							X	
<u>Crotalaria retusa</u> L.	NA							X	
<u>Cuthbertia graminea</u> Small	roseling							X	
<u>Cynodon dactylon</u> (L.) Pers.	Bermuda grass	X	X	X	X	X	X	X	
<u>Desmodium</u> sp.								X	
<u>Erigeron quercifolia</u> Lam.	southern fleabane							X	1
<u>Erigeron strigosus</u> Muhl. ex Willd.	daisy fleabane						X	X	
<u>Eupatorium capillifolium</u> (Lam.) Small	dog fennel	X	X	X			X	X	
<u>Euphorbia</u> cf Subgenus Agaloma								X	
<u>Froelichia floridana</u> (Nutt.) Moq.	cottonweed							X	
<u>Galactia elliottii</u> Nutt.	NA							X	
<u>Galium tinctorium</u> L.	bedstraw	X							
<u>Gaylussacia tomentosa</u> (Gray) Small	dangleberry							X	
<u>Geranium carolinianum</u> L.	cranesbill							X	1
<u>Gnaphalium purpureum</u> L.	purple cudweed							X	
<u>Hydrocotyl umbellata</u> L.	marsh pennywort	X		X					1
<u>Hypericum hypericoides</u> (L.) Crantz	St. John's wort			X				X	
<u>Hypericum tetrapetalum</u> Lam.	St. Andrew's cross							X	
<u>Ipomoea sagittata</u> Poir.	morning glory	X	X	X					
<u>Juncus dichotomus</u> Ell.	NA			X				X	
<u>Juncus effusus</u> L.	soft rush			X					1
<u>Juncus roemerianus</u>	needle rush		X	X					

TABLE 2.3-15 (Continued). VASCULAR PLANT SPECIES LIST COMPILED AT THE
PROPOSED AES CEDAR BAY COGENERATION FACILITY,
JACKSONVILLE, FLORIDA (May 18-19, 1988)*

Scientific Name	Common Name	Localities**						
		1	2	3	4	5	6	7
<u>Lactuca floridana</u> (L.) Gaertn.	wild lettuce						X	X
<u>Lantana camara</u> L.	NA	X		X				
<u>Lepidium virginicum</u> L.	poor man's pepper	X		X			X	X
<u>Lippia nodiflora</u> (L.) Greene	frog fruit			X				
<u>Melilotus alba</u> Medic.	white sweet clover	X	X	X			X	X
<u>Mikania scandens</u> (L.) Willd.	NA							X
<u>Monarda punctata</u> L.	horsemint			X				
<u>Opuntia humifusa</u> (Raf.) Raf.	prickly pear cactus							X
<u>Osmunda regalis</u> L. var. <u>spectabilis</u> (Willd.) Gray	royal fern							X
<u>Panicum</u> sp.	panic grass	X		X				X
<u>Parthenocissus quinquefolia</u> (L.) Planch.	Virginia creeper	X	X	X		X		
<u>Paspalum urvillei</u> Steud.	vasey grass							X
<u>Passiflora incarnata</u> L.	maypops	X		X		X	X	
<u>Phlox drummondii</u> Hook.	annual garden phlox	X						X
<u>Plantago wrightiana</u> Decne. ex DC.	NA	X	X	X		X		X
<u>Polygala lutea</u> L.	wild bachelor's buttons							X
<u>Polygonum punctatum</u> Ell.	dotted smartweed							X
<u>Ptilimnium capillaceum</u> (Michx.) Raf.	mock bishop's weed							X
<u>Rapanea punctata</u> (Lam.) Lundell	NA							X
<u>Rubus cuneifolius</u> Pursh	sand blackberry		X	X			X	X
<u>Rubus trivialis</u> Michx.	dewberry		X					
<u>Rudbeckia hirta</u> L.	blackeyed susan							X
<u>Rumex hastatulus</u> Baldw. ex Ell.	hastate-leaved dock	X	X	X	X	X		X
<u>Saururus cernuus</u> L.	lizard's tail							X

TABLE 2.3-15 (Continued). VASCULAR PLANT SPECIES LIST COMPILED AT THE PROPOSED AES CEDAR BAY COGENERATION FACILITY, JACKSONVILLE, FLORIDA (May 18-19, 1988)*

Scientific Name	Common Name	Localities**						
		1	2	3	4	5	6	7
<u>Schrankia microphylla</u> (Dry. ex Smith) J. F. Macbr.	sensitive brier	X	X	X				X
<u>Sida acuta</u> Burm. f.	broomweed	X	X					
<u>Silene antirrhina</u> L.	sleepy catchfly							X
<u>Sisyrinchium atlanticum</u> Bickn.	blue eye grass							X
<u>Smilax auriculata</u> Walt.	greenbrier		X	X				X
<u>Smilax bona-nox</u> L.	greenbrier			X			X	X
<u>Solidago chapmanii</u> Torr. & Gray	goldenrod		X	X				
<u>Solidago</u> cf. <u>gigantea</u> Ait.	goldenrod							X
<u>Sonchus asper</u> (L.) Hill	spiny-leaved sow thistle	X	X	X				X
<u>Spartina alterniflora</u>	saltmarsh cordgrass		X	X				
<u>Stillingia sylvatica</u> Garden ex L.	Queen's delight							X
<u>Thelypteris kunthii</u> (Desv.) Morton	NA							X
<u>Tillandsia usneoides</u> (L.) L.	Spanish moss							X
<u>Typha latifolia</u> L.	common cattail		X	X				
<u>Verbena</u> sp.								X
<u>Vitis rotundifolia</u> Michx. (syn. <u>Vitis munsoniana</u> Simpson)	southern fox grape		X	X			X	

*Scientific names follow the treatment of Kartesz, John T., and Rosemarie Kartesz, A Synonymized Checklist of the Vascular Flora of the United States, Canada, and Greenland, Vol. II, The Biota of North America, The University of North Carolina Press, Chapel Hill, 1980.

Colloquial names follow the treatment of Wunderlin, Richard P., Guide to the Vascular Plants of Central Florida, University of North Florida, Jacksonville.

Synonymized nomenclature of Wunderlin and alternative colloquial names are included in parentheses.

**Legend: Localities:

TABLE 2.3-15 (Continued). VASCULAR PLANT SPECIES LIST COMPILED AT THE
PROPOSED AES CEDAR BAY COGENERATION FACILITY,
JACKSONVILLE, FLORIDA (May 18-19, 1988)*

- Area 1: Onsite, approximately 400 feet southeast of main area; highly disturbed, industrialized area; weedy herbaceous plants, some woody species.
- Area 2: Onsite, west of railroad tracks; holding ponds and surrounding land; highly disturbed, industrialized area with adjacent Spartina-Juncus along Broward River.
- Area 3: Onsite, southern end of site; mix of thick shrubby areas and open, weedy areas; highly disturbed; Spartina-Juncus along river.
- Area 4: Onsite, bordering lime settling ditch. Highly disturbed.
- Area 5: Onsite, lime mud storage pile and adjacent settling ditch north of Area 4; highly disturbed.
- Area 6: Onsite, north end of site; lime mud storage pile with low flat excavated area and higher, debris-filled area; highly modified area with weedy herbaceous and woody species.
- Area 7: Railroad corridor north of proposed site, west of railroad (same habitat exists east of railroad); planted longleaf pine stands, open canopy with secondary succession trees and shrubs.

1

2

ponds in the Broward River is a Spartina-Juncus marsh that extends 650 feet northward and reaches a maximum of 150 feet into the Broward River.

A narrower strip of Spartina-Juncus extends down the periphery of Area 2 to the southern end of the proposed site. The river bank and upland portions of Area 2 have been greatly altered from their natural state, and are currently a mixture of weedy herbaceous sections and recently wooded sections. The open weedy sections are located around the holding ponds and also extend south and west of the ponds, as previously mentioned.

Vegetation here is indicative of high levels of disturbance in recent years. Dominant species include Bermuda grass (Cynodon dactylon), short-spike bluestem (Andropogon brachystachyus), dog fennel (Eupatorium capillifolium), and Mexican tea (Chenopodium ambrosioides).

Shrubby groundsel trees are scattered across the open areas, and are the dominant species of the wooded banks. Groundsel tree is aggressive and will adapt to the area; it can be found throughout the site in every life stage from seeding to mature fruiting trees. Other species in the scrubby wooded sections include black cherry (Prunus serotina), devil's walking stick (Aralia spinosa), wax myrtle (Myrica cerifera), and cabbage palm (Sabal palmetto).

Area 3 is the southern end of the project site, south of the lime settling ditch. It consists of three parallel subsections: an open, weedy strip immediately south of the settling ditch; a wide, partially wooded ditch south of the open area; and an unpaved, overgrown lot. All of Area 3 has been greatly altered from its natural state. The open, weedy and shrubby strip is dominated by young groundsel tree (Baccharis halimifolia), short-spike bluestem (Andropogon brachystachyus), and Bermuda grass (Cynodon dactylon). Based upon the lack of larger trees, it appears that this land has undergone major disruption in the recent past. The partially wooded ditch immediately south of this has apparently remained undisturbed for a longer period of time; it is densely vegetated by trees, shrubs, vines, and herbaceous plants, such as laurel oak (Quercus laurifolia), elderberry (Sambucus canadensis), and maypops (Passiflora incarnata). As can be seen in Table 2.3-15, the greatest amount of onsite diversity of

plant species occurs in this area. These species represent disturbance-tolerant, fast-growing members of the Florida coastal scrub community. At the mouth of this manmade ditch (at the Broward River) occurs a small amount of the Spartina-Juncus association typically found along brackish water shores. The southern edge of Area 3 includes the northern end of a vacant, overgrown lot. During the June, 1988 terrestrial survey, this area was overgrown with aggressive, weedy, disturbance-tolerant species such as maypops (Passiflora incarnata), white sweet clover (Melilotus alba), sensitive brier (Schrankia microphylla), and beggar's ticks (Bidens alba). It appears to undergo cycles of use and disuse. The majority of this lot is offsite.

Area 4 consists of land bordering a lime settling ditch north of Area 3. No vegetation occurs in the ditch due to the high pH of its contents. Typical weedy plants growing on its outer banks include common ragweed, Bermuda grass (Cynodon dactylon), broomsedge (Andropogon virginiana), and sapling groundsel trees.

Area 5 is the lime mud storage pile and adjacent lime settling ditch north of Area 4. This area has also been greatly altered for industrial use. The settling ditch is the south and east boundary of Area 5; it is not conducive to plant growth. The remainder of the land currently consists of low, wide lime flats with a raised border. Vegetation on the border is the typical onsite mixture of disturbance-tolerant woody and herbaceous plants such as groundsel tree, laurel oak, broomsedge, beggar ticks, and white sweet clover. The lime flats contain a similar composition of plants on the western half, and are mainly unvegetated on the eastern half.

Area 6, the northernmost onsite area, is another lime mud storage site. The southern half of Area 6 consists of a low excavated flat dominated by Bermuda grass. The northern half is a raised area with debris piles, and is dominated by white sweet clover, young groundsel trees, and broomsedge, with its less recently disturbed periphery covered by older trees and shrubs (groundsel tree, laurel oak, sabal palm).

Onsite wildlife habitat is scattered in small patches, and is of poor quality. Wildlife use of the site is limited to those species which are

able to adapt to human activity, industrialization, and disturbed habitat. Animals reportedly seen onsite by Seminole Kraft employees include fox, rabbits, snakes (especially rattlesnakes), tortoises (Subsection 2.3.6), and armadillos. Raccoons, skunks, mice, and white tail deer are also possible onsite, although the larger mammals are probably visitors rather than inhabitants, due to the lack of useful habitat.

The proposed lime mud storage area will be located in the pine-oak scrub area in the northwest corner of Seminole Kraft property (Figure 2.1-2). Table 2.3-15 (Area 7) provides a list of species identified in the railroad corridor during the May 1988 vegetation survey. Table 2.3-15a provides a list of species likely to be found in the lime mud storage facility during the September 1989 vegetation survey. The area has undergone previous disturbance; approximately two thirds of the proposed site has been cleared of its native soils and is currently used as a storage area for lime mud and primary clarifier sludge (mostly wood fiber and wood ash). The remaining one third of the area appears to be at original elevation, with relatively intact native sandy soils. Vegetation on this one third consists of pine-oak scrub species in various stages of secondary succession. Vegetation structure of the entire proposed site relates directly to the length of time since the most recent large-scale disturbance. Approximately half of the site is devoid of vegetation due to current landfill activity. The majority of species diversity is restricted to the western quarter of the proposed site, where severe disturbance appears to have been kept to a minimum in recent years, and native soils remain. Poor drainage (perhaps due to manmade alteration of drainage patterns) in the northwest quarter of the proposed site has enabled the establishment of plants such as willows (Salix sp.) in small areas at lower elevations.

2.3.6 Ecology

- o Federal Regulations--The Endangered Species Act of 1973 (16: USC 1531-1543) requires the protection of those plant and animal species officially listed as endangered or threatened, as determined by the US Fish and Wildlife Service, Department of the Interior. There are four federally listed threatened or endangered species, and five candidate species in Duval County.

TABLE 2.3-15a. VASCULAR PLANT SPECIES IDENTIFIED DURING A TERRESTRIAL SURVEY FOR THE PROPOSED LIME MUD STORAGE FACILITY*

<u>Scientific Name**</u>	<u>Common Name***</u>
<u>Trees</u>	
<u>Acer rubrum</u> L. var. <u>trilobum</u> Torr. & Gray ex K. Koch (Syn.: <u>A. r.</u> var. <u>tridens</u> Wood)	southern red maple
<u>Gordonia lasianthus</u> (L.)Ellis	loblolly bay
<u>Ilex glabra</u> (L.)Gray	inkberry
<u>Juniperus silicicola</u> (Sm.)Bailey	southern red cedar
<u>Persea borbonia</u> (L.)Spreng.	redbay
<u>Pinus palustris</u> P. Mill.	longleaf pine
<u>Prunus serotina</u> Ehrh. var. <u>serotina</u>	black cherry
<u>Quercus geminata</u> Sm. (Syn.: <u>Q. virginiana</u> P. Mill. var. <u>geminata</u> (Sm.)Sarg.)	scrub live oak
<u>Quercus laevis</u> Walt.	turkey oak
<u>Quercus laurifolia</u> Michx.	laurel oak
<u>Quercus margaretta</u> Ashe (Syn.: <u>Q. stellata</u> Wang var. <u>margaretta</u> (Ashe)Sarg.)	small post oak
<u>Quercus nigra</u> L.	water oak
<u>Sabal palmetto</u> (Walt.)Lodd.	cabbage palm
<u>Salix caroliniana</u> Michx.	Carolina willow
<u>Sassafras albidum</u> (Nutt.)Nees	sassafras
<u>Shrubs</u>	
<u>Asimina obovata</u> (Willd.)Nash	flag pawpaw
<u>Baccharis halimifolia</u> L.	groundsel tree
<u>Borrichia frutescens</u> (L.)DC.	sea daisies
<u>Gaylussacia frondosa</u> (L.)Torr. & Gray var. <u>frondosa</u>	dangleberry
<u>Gaylussacia tomentosa</u> (Gray)Sm.	dangleberry
<u>Licania michauxii</u> Prance (Syn.: <u>Chrysobalanus oblongifolius</u> Michx.)	gopher apple
<u>Myrica cerifera</u> L.	wax myrtle
<u>Rhus copallina</u> L.	winged sumac
<u>Sapium sebiferum</u> (L.)Roxb.	popcorn tree
<u>Serenoa repens</u> (Bartr.)Sm.	saw palmetto
<u>Vaccinium arboreum</u> Marsh.	sparkleberry

TABLE 2.3-15a (Continued). VASCULAR PLANT SPECIES IDENTIFIED DURING A
TERRESTRIAL SURVEY FOR THE PROPOSED LIME MUD
STORAGE FACILITY*

Scientific Name**	Common Name***
<u>Herbaceous Plants & Vines</u>	
<u>Ambrosia artemisiifolia</u> L.	common ragweed
<u>Ammophila</u> cf. <u>breviligulata</u> Fern.	beach grass
<u>Ampelopsis arborea</u> (L.)Koehne	pepper vine
<u>Andropogon floridanus</u> Scribn.	florida bluestem
<u>Aristida</u> cf. <u>stricta</u> Michx.	wiregrass
<u>Aster</u> sp.	aster
<u>Befaria racemosa</u> Vent.	tarflower
<u>Berlandiera subacaulis</u> (Nutt.)Nutt.	greeneyes
<u>Bidens alba</u> (L.)DC.	beggar's ticks
<u>Cacalia</u> sp.	NA
<u>Carphephorus corymbosus</u> (Nutt.) Torr. & Gray	NA
<u>Cassia fasciculata</u> Mich.	partridge pea
<u>Cenchrus echinatus</u> L.	sandspurs
<u>Cissus</u> sp.	NA
<u>Cnidoscolus stimulosus</u> (Michx.) Engelm & Gray	tread-softly
<u>Croton</u> cf. <u>capitatus</u> Michx.	woolly croton
<u>Cynodon dactylon</u> (L.)Pers.	Bermuda grass
<u>Cyperus compressus</u> L.	sedge
<u>Cyperus esculentus</u> L.	sedge
<u>Cyperus flavescens</u> L.	sedge
<u>Cyperus retrorsus</u> Chapm.	sedge
<u>Elephantopus tomentosus</u> L.	elephant's foot
<u>Eryngium</u> sp.	NA
<u>Eupatorium</u> cf. <u>serotinum</u> Michx.	NA (thoroughwort)
<u>Froelichia floridana</u> (Nutt.)Moq.	cottonweed
<u>Hydrocotyl umbellata</u> L.	marsh pennywort
<u>Hypericum hypericoides</u> (L.)Crantz	St. Andrew's cross
<u>Hypericum stans</u> (Michx.)Adams & Robson	NA (St. Peter's wort)
(<u>Hypericum crux-andraea</u> (L.)Crantz, of Wunderlin)	
<u>Leersia</u> sp.	cutgrass
<u>Leptochloa</u> sp.	NA (sprangletop)
<u>Lespedeza violacea</u> (L.)Pers.	NA
<u>Liatris tenuifolia</u> Nutt.	NA (blazing star)
<u>Lippia nodiflora</u> (L.)Greene	frog fruit
<u>Ludwigia peruviana</u> (L.)Hara	primrose willow
<u>Mikania scandens</u> (L.)Willd.	NA (climbing hempweed)
<u>Osmunda regalis</u> L. var. <u>spectabilis</u> (Willd.)Gray	royal fern

TABLE 2.3-15a (Continued). VASCULAR PLANT SPECIES IDENTIFIED DURING A TERRESTRIAL SURVEY FOR THE PROPOSED LIME MUD STORAGE FACILITY*

Scientific Name**	Common Name***
<u>Panicum</u> sp.	panic grass
<u>Parthenocissus quinquefolia</u> (L.)Planch.	Virginia creeper
<u>Paspalum dilatatum</u> Poir.	dallisgrass
<u>Poinsettia cyathophora</u> (Murr.) Klotzsch & Garcke	painted-leaf
<u>Polygonum hydropiperoides</u> Michx.	mild water-pepper
<u>Polygonum punctatum</u> Ell.	dotted smartweed
<u>Pteridium aquilinum</u> (L.)Kuhn	bracken fern
<u>Rhexia mariana</u> L.	meadow beauty
<u>Rubus</u> sp.	NA
<u>Rudbeckia hirta</u> L.	black-eyed susan
<u>Schrankia microphylla</u> (Dry) J. F. Macbr.	sensitive brier
<u>Sida acuta</u> Burm. f.	broomweed
<u>Smilax bona-nox</u> L.	greenbrier
<u>Solidago</u> sp.	goldenrod
<u>Sorghastrum secundum</u> (Ell.)Nash	lopsided Indiangrass
<u>Sorghum halepense</u> (L.)Pers.	Johnsongrass
<u>Thelypteris kunthii</u> (Desv.)Morton	NA
<u>Tillandsia usneoides</u> (L.)L.	Spanish moss
<u>Viola septembola</u> Le Conte	NA
<u>Woodwardia virginica</u> (L.)Sm.	Virginia chain fern

*Conducted by Black & Veatch, Engineers-Architects, for Applied Energy Services, Inc., at the Seminole Kraft Paper Mill, Jacksonville, Florida, September 27-29, 1989.

**Scientific names follow the treatment of John T. Kartesz, and Rosemarie Kartesz, 1980, A Synonymized Checklist of the Vascular Flora of the United States, Canada, and Greenland, Vol. II, The Biota of North America, The University of North Carolina Press, Chapel Hill.

Alternative scientific names of Wunderlin (1982) are included in parentheses.

***Common names are the first-choice names given in the following.

Richard P. Wunderlin, Guide to the Vascular Plants of Central Florida, 1983.

Species not covered in Wunderlin, and alternative common names in parentheses, are taken from the following.

Albert E. Radford et al., Manual of the Vascular Plants of the Carolinas, The University of North Carolina Press, Chapel Hill, 1968.

- State Regulations--Section 581.185-212 of the General Laws of Florida, "Preservation of native flora of Florida," and Section 39-27.003-005 of the Florida Administrative Code provide official lists of threatened and endangered and special concern species in Florida. "Threatened" and "endangered" are defined as any species which "is in danger of disappearing from its native habitat within the foreseeable future throughout all or a significant portion of its range because of 1) present or threatened destruction, modification, or curtailment of the range of the species, 2) overutilization of the species for commercial, scientific, or educational purposes, 3) disease or predation, 4) any other natural or manmade factor affecting the continued existence of the species." "Species of special concern" are those species at risk of becoming threatened or endangered in the near future. All three categories are protected by law in Florida.
- Important Flora and Fauna Within 5 Miles of Site--Florida Department of Environmental Regulation Form (Form 17-1.211(1) requires the identification of important flora and fauna within 5 miles of the proposed site, which might reasonably be expected to be affected by the project. This list is to be compiled from the following.
 - US Fish and Wildlife Service's list of endangered and threatened species.
 - Florida Game and Fresh Water Fish Commission's "Official Lists of Endangered and Potentially Endangered Fauna and Flora in Florida," in reference to threatened, endangered, and special concern species, (Florida Administrative Code Rule 39-27).
 - Game, furbearers, or freshwater game fish, as listed in Florida Administrative Code Rule 39-1.
 - Species which are indicators of or endemic to specific plant communities or habitat types.

Table 2.3-16 is the list of important flora and fauna as compiled from the above sources.

TABLE 2.3-16. IMPORTANT* FLORA AND FAUNA WITHIN 5 MILES OF THE PROPOSED SITE, WHICH ARE REASONABLY EXPECTED TO BE EFFECTED BY THE PROJECT

1. Bachman's sparrow	<u>Aimophila aestivalis</u>
2. Snowy Egret	<u>Egretta thula</u>
3. Louisiana or tricolored heron	<u>Egretta tricolor</u>
4. Gopher tortoise	<u>Gopherus polyphemus</u>
5. Eastern Indigo Snake	<u>Drymarchon corais couperi</u>
6. West Indies Manatee	<u>Trichechus manatus</u>
7. Royal fern	<u>Osmunda regalis</u> var. <u>spectabilis</u>
8. Aspidium fern	<u>Thelypteris kunthii</u>

*A specific group of species as defined by FGFWFC.

According to the Florida Natural Areas Inventory (FNAI), there are no records of federally or Florida listed threatened or endangered species onsite. However, the West Indian manatee, a federally and Florida endangered species, inhabits the waters of the St. Johns River. The FNAI provided an element occurrence list for Duval County, Florida (Table 2.3-17). Four reptiles, eleven birds, and three plants included in that list are federally or Florida listed threatened, endangered, special concern, or candidate species. The spotted turtle (Clemmys guttata), the great egret (Casmerodius albus), the white ibis (Eudocimus albus) and the least bittern (Ixobrychus exilis) were also included in the element occurrence list, but are not currently listed nor expected to become listed as threatened, endangered, special concern or candidate species, and so were not included in Table 2.3-16). Nine natural communities of "rare or exemplary occurrence" were also included as element occurrences for Duval County.

The American alligator (Alligator mississippiensis), an inhabitant of ponds, lakes, rivers and swamps, may potentially be onsite near the river or north of the site in a small wetland area. It has recently been reduced in rank to a federal listing of "threatened due to similarity of appearance" and a Florida listing of special concern. While the alligator has recovered from previously low numbers, its superficial resemblance to the rarer American crocodile has resulted in its current continued federal listing.

The loggerhead turtle (Caretta caretta caretta) is a species of coastal areas and waters and would not be expected onsite.

The gopher tortoise (Gopherus polyphemus), an inhabitant of upland sandy scrub and secondary succession areas, is currently a federal C2 candidate species and a species of special concern in Florida. It is possible that this species occurs onsite in areas with rather open canopies and sandy soil.

TABLE 2.3-17. A. OFFICIALLY LISTED FEDERAL OR FLORIDA THREATENED AND
ENDANGERED SPECIES OCCURRING IN DUVAL COUNTY, FLORIDA
B. NATURAL COMMUNITIES OCCURRING IN DUVAL COUNTY
(Provided by the Florida Natural Areas Inventory)

			Status	
			Federal	State
A.	AMPHIBIANS			
	<u>Ambystoma cingulatum</u>	flatwoods salamander	C2	
	REPTILES			
	<u>Alligator mississippiensis</u>	American alligator	LTSA	LS
	<u>Caretta caretta</u>	loggerhead	LT	LT
	<u>Gopherus polyphemus</u>	gopher tortoise	C2	LS
	BIRDS			
	<u>Ammodramus maritimus pelonotus</u>	Smyrna seaside sparrow	C2	
	<u>Cistothorus palustris griseus</u>	Worthington's marsh wren		LS
	<u>Egretta caerulea</u>	little blue heron		LS
	<u>Egretta thuja</u>	snowy egret		LS
	<u>Egretta tricolor</u>	tricolored heron		LS
	<u>Haliaeetus leucocephalus</u>	bald eagle	LE	LT
	<u>Mycteria americana</u>	wood stork	LE	LE
	<u>Pandion haliaetus</u>	osprey	LS	
	PLANTS			
	<u>Cheilanthes microphylla</u>	southern lip fern	LT	
	<u>Sphenostigma coelestinum</u>	Bartram's Ixia	C2	LT
	<u>Spiranthes polyantha</u>	green ladies' tresses	C2	LE
B.	NATURAL COMMUNITIES			
	<u>Estuarine tidal marsh</u>			
	<u>Estuarine unconsolidated substrate</u>			
	<u>Beach dune</u>			
	<u>Coastal strand</u>			
	<u>Dry prairie</u>			
	<u>Maritime hammock</u>			
	<u>Overwash plain</u>			
	<u>Scrub (oak scrub, palmetto scrub, rosemary scrub)</u>			
	<u>Shell mound</u>			

Legend:

C2 = candidate species
LE = listed as endangered
LS = listed as species of special concern
LT = listed as threatened
LTSA = listed as threatened due to similarity of appearance

The habitat of the Smyrna seaside sparrow (Ammodramus mar-
itimus pelonotus) is the Spartina-Juncus saltwater marshes of the
coast. No appropriate habitat occurs onsite. | 1

Worthington's long-billed marsh wren (Cistothorus palustris
griseus) is an extremely habitat-specific bird, confined to un-
disturbed Spartina alterniflora marshes along the Atlantic coast.
Suitable habitat does not occur onsite.

Shallow freshwater, brackish, and saltwater wetlands are the
habitats of the little blue heron (Egretta caerulea), although it
prefers freshwater areas for feeding. The Broward River, immedi-
ately west of the proposed site, provides shallow low-tide mud-
flats which are likely to be foraging areas for little blue
herons. These birds are listed as a species of special concern
in Florida, due in large part to the destruction of their habi-
tat.

The snowy egret (Egretta thula), once greatly reduced in
number by hunters because of their showy feathers, is now a com-
mon and widespread shorebird whose numbers show possible de-
creases in recent years. It is currently listed as a species of
special concern in Florida, also due to habitat destruction.
Snowy egrets are shallow water waders which are likely to feed in
the low-tide mudflats near the proposed site.

Another Florida species of special concern which may utilize
nearby waters is the Louisiana heron (Egretta tricolor, formerly
called the tricolored heron).

The wood stork (Mycteria americana) is listed as endangered
both federally and in Florida. It is known to occur in the large
expanses of wetland north of the St. Johns River near Dames Point.
It is not expected to be affected by the proposed project.

The burrowing owl (Athene cunicularia floridana), a Florida
species of special concern, is known to occur at Imerson Air-
field, approximately 2 miles west of the proposed site. The
bird's preference for open, prairie-like habitat makes it an un-
likely inhabitant onsite or in the railroad corridor area. The

proposed project is not expected to affect the individuals at Imerson Airfield.

The bald eagle (Haliaeetus leucocephalus leucocephalus) federally endangered and Florida threatened, is known to nest at Newcastle and Cedar Swamp, on the south side of the St. Johns River, within a 5-mile radius of the proposed site. The proposed project is not expected to significantly affect the bald eagles in the area.

The osprey (Pandion haliaeetus) is also not expected to utilize the proposed project area.

2.3.6.1 Cogeneration Facility. The following sections pertain to ecological aspects of the proposed cogeneration facility site.

- Protected Species. No USFWS or FGFWFC listed threatened, endangered, or special concern plant or animal species were found or are expected to be found onsite. However, several common animals included in the Florida Administrative Code Rule 39-1.004 (#29 Furbearers, #31 Game birds, #33 Game mammals) have been reported onsite by Seminole Kraft employees, or could potentially occur onsite. These animals are the raccoon, opossum, and skunk (all classified as furbearers) and the rabbit (classified as a game mammal). The small size of the onsite area and the poor quality of onsite habitats limit the type of animals to those which can utilize highly disturbed sites. The onsite area has been so greatly altered by human activity that very little wildlife habitat currently exists. Important fauna onsite is probably limited to small mammals such as rabbits, skunks, opossum, and raccoon. Even these animals would find very little habitat onsite.
- Species--Environmental Relationships. The onsite area is not likely to be utilized by any important fauna for breeding, with the possible exception of rabbits, which are known to nest very close to human activity. Otherwise, onsite areas are so highly disturbed that they are not appropriate habitat or breeding areas.

- o Preexisting Environmental Stresses. Preexisting environmental stresses onsite have been brought about by the operation of the Seminole Kraft paper mill. All native habitat has been removed during years of industrial use of the area. Remaining vegetation onsite is limited to highly disturbance-tolerant, often weedy species. Therefore, onsite habitats are restricted to artificially open weedy areas and thick shrubby areas. The entire onsite area is in various stages of early secondary succession, determined by the length of time since the last disturbance occurred in a given area. Areas with a monoculture of sweet clover are examples of recently completely disturbed sites. Areas with young shrubs and trees are still in early secondary succession, but have been undisturbed long enough to allow the growth of perennial woody plants (approximately four years or more). Aerial photos of the site show that no stage of succession exceeds approximately 15 to 20 years of age because photos of that era show a site devoid of trees.

No infestations, epidemics, or catastrophes (natural or man-induced) are known to have occurred in the onsite area.

2.3.6.2 Lime Mud Storage Facility. The following sections pertain to ecological aspects of the lime mud storage facility.

- Protected Species. Three protected species are known to occur in the railroad corridor and proposed lime mud storage area. Evidence of the gopher tortoise (Gopherus polyphemus) is throughout the upland secondary growth pine-oak area in the railroad corridor, gopher tortoise burrows, as well as tortoise grazing areas, also are found on the site of the proposed lime mud storage facility. It is also possible that other known associates of the gopher tortoise, such as the federally endangered eastern indigo snake (Drymarcon corais couperi) and the federal candidate species Bachman's sparrow (Aimophila aestivalis) may reside or feed in the proposed facility site. While neither of these species was observed during onsite surveys, their preferred habitats are pine-oak scrub lands.

Two protected plant species were found in the pine-oak scrub area in wet depressions at the edge of the railroad right-of-way. The royal fern (Osmunda regalis var. spectabilis) is protected by the Florida Department of Agriculture and Consumer Services (FDA) to prevent commercial exploitation. It is a common fern of eastern deciduous woodlands. The aspidium fern (Thelypteris kunthii) is listed as threatened by the FDA. This fern is most likely protected because it is at the southern edge of its range, and therefore is uncommon in Florida.

Several species listed in the Wildlife Code of the State of Florida (Florida Administrative Code Rule 39-1.004) are likely to use the proposed mud storage facility. These are as follows.

- Furbearers (#29): raccoon, opossum, skunk, coyote, fox, weasel.
- Game birds (#31): quail, woodcock.
- Game mammals (#33): deer, gray squirrel, fox squirrel, rabbit.

- Species-Environmental Relationships. It is possible that any or all of the above animals use the proposed lime mud storage facility site as habitat for feeding, and perhaps raccoon, opossum, skunk, rabbit, and both squirrel species use it for nesting.
- Preexisting Environmental Stresses. Preexisting environmental stresses to the proposed lime mud storage facility have been caused mainly by vegetation removal, soil excavation, and lime mud and primary clarifier sludge storage. Past stresses to the proposed lime mud storage facility consisted of conversion of the land to pine plantation from its presumed natural state of pine-oak scrub lands. It is likely that a large percentage of sensitive native plant species were eliminated from the area at that time.

2.3.6.3 Measurement Programs. Terrestrial surveys were performed in May 1988, August 1989, and September 1989. During these surveys, onsite plant communities were noted, threatened, endangered, and special concern species were searched for, and plant species lists were compiled for vegetation types on the proposed cogeneration site, the proposed lime mud storage facility, and in the railroad corridor. Plants were identified by a botanist and verified by using the collections of the University of Kansas Herbarium, Lawrence, Kansas. Through an extended program of exchange and collection, this herbarium includes a large number of specimens from the Southeast United States. Voucher specimens were collected for some plants and deposited in the University of Kansas Herbarium.

Plant species surveys and threatened/endangered surveys were performed by thorough pedestrian survey of the onsite area.

Floras used to aid plant identification were as follows.

- Godfrey, R. K., and J. W. Wooten. Aquatic and Wetland Plants of Southeastern United States, 1979. The University of Georgia Press, Athens.
- Radford, A. E., H. E. Ahles, and C. Ritchie Bell. Manual of the Vascular Flora of the Carolinas, 1968. The University of North Carolina Press, Chapel Hill.
- Wunderlin, R. P., Guide to the Vascular Plants of Central Florida, University of North Florida, Jacksonville, 1982.

2.3.6.4 References.

1. Cox, James, et al., Ecology and habitat protection needs of gopher tortoise (Gopherus polyphemus) populations found on lands slated for large-scale development in Florida, Nongame Wildlife Program Technical Report No. 4, Florida Game and Fresh Water Fish Commission, Tallahassee, Florida, December, 1987.
2. Florida Administrative Code, Section 39-27.003-005, Rules of the Game and Fresh Water Fish Commission, Rules.
3. Florida Game and Fresh Water Fish Commission, Official lists of endangered and potentially endangered fauna and flora in Florida, 1 July 1987, revised 28 December 1987.
4. Florida Natural Areas Inventory, Element Occurrences for Duval County Currently in the Inventory Database. Received 16 May 1988.
5. Godfrey, R. K., and J. W. Wooten. Aquatic and Wetland Plants of Southeastern United States, 1979. The University of Georgia Press, Athens.
6. Kale, Herbert W. III, ed., Birds, Vol. Two, IN Pritchard, P.C.H., series ed., Rare and Endangered Biota of Florida, University Presses of Florida, Gainesville, 1978.
7. Layne, James N., ed., Mammals, Vol. One, IN Pritchard, P.C.H., series ed., Rare and Endangered Biota of Florida, University Presses of Florida, Gainesville, 1978.
8. McDiarmid, Roy W., ed., Amphibians and Reptiles, Vol. Three, IN Pritchard, P.C.H., series ed., Rare and Endangered Biota of Florida, University Presses of Florida, Gainesville, 1978.
9. Radford, A. E., H. E. Ahles, and C. Ritchie Bell. Manual of the Vascular Flora of the Carolinas, 1968. The University of North Carolina Press, Chapel Hill.
10. Ward, Daniel B., ed., Plants, Vol. Five, IN Pritchard, P.C.H., series ed., Rare and Endangered Biota of Florida, University Presses of Florida, Gainesville.
11. Wunderlin, Richard P., Guide to the Vascular Plants of Central Florida, University of North Florida, Jacksonville, 1982.

2.3.7 Meteorology and Ambient Air Quality

2.3.7.1 Regional Climatology/Meteorology. The prevailing subtropical marine climate of the northeastern Florida region results from the influence of the Atlantic Ocean and the Bermuda high-pressure system. Long, warm, humid summers and short, mild winters prevail. Because of the southerly location and marine influences, this area has a notably equable climate, evidenced by small annual and diurnal temperature variations.

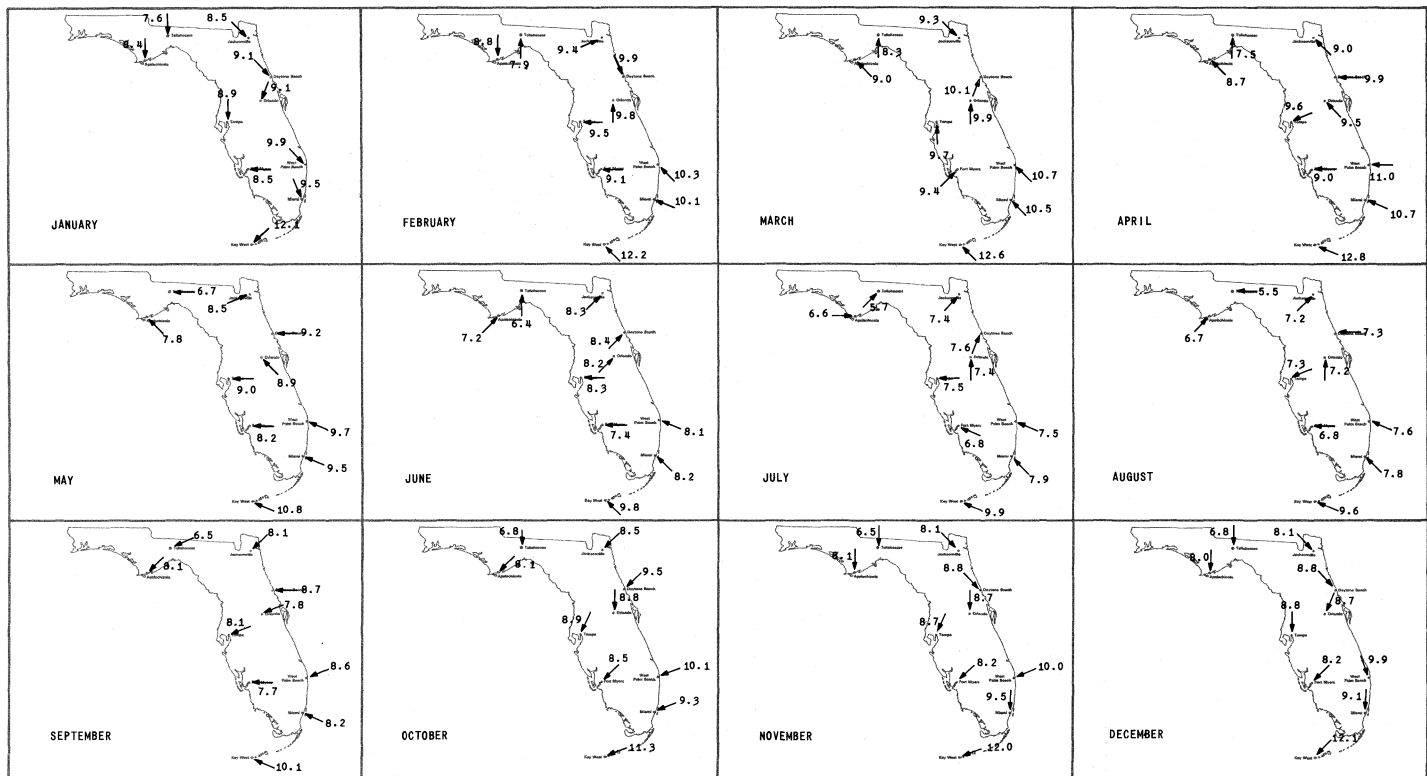
Rainfall is moderate to heavy during the summer (rainy season) and light during the winter (dry season). Well developed extratropical migratory high- and low-pressure centers usually travel north of the region.

Winds are of moderate speed, and blow predominantly from the southwest during the warmer half of the year (May through October). During the cooler months, the predominant direction is north-northeast. Winds with an easterly component occur about 35 percent of the time. Along the coastal areas of northeastern Florida, local land-sea breeze circulations modify regional wind patterns by superimposing an easterly wind component during the daytime hours and a westerly component at night. During the warmer half of the year, sea breezes are nearly a daily occurrence. Monthly and annual wind speed and prevailing direction for selected Florida cities are given on Figures 2.3-31 and 2.3-32, respectively.¹ Hurricane force winds have a 1 percent chance of occurrence for any given year in Jacksonville.

The average annual rainfall in this region is over 50 inches. Summer precipitation due to frequent afternoon thundershowers exceeds winter precipitation due to frontal systems, pre-frontal squall lines, and wave disturbances along fronts stalled over the Florida peninsula. Summer precipitation is mostly of the convective types, resulting in frequent summertime afternoon thundershowers in this region. Tropical disturbances periodically cause significant precipitation during the summer and fall seasons.

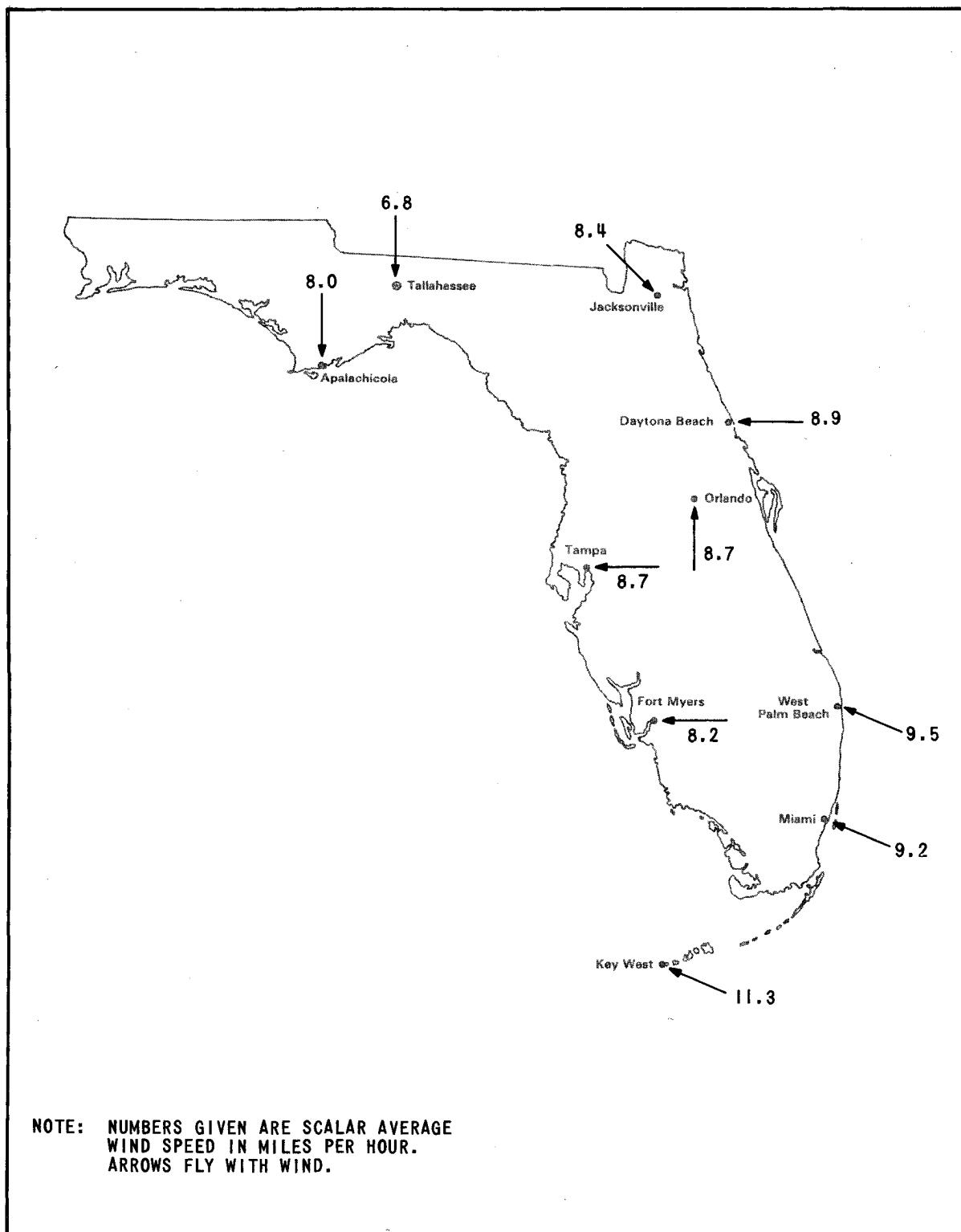
Extremely hot weather is rare because of the ocean influence; maximum temperatures over a summer average near 90 F along the coast and mid-90s at the Jacksonville International Airport. Winter temperatures are mild, interrupted only a few times per season by northerly or northwesterly advection of polar air. In these cases, minimum temperatures may reach 20 F. Inland locations generally display a greater range of temperatures due to the rapid heating and cooling of ground surfaces as compared with water bodies. Humidities are high ranging from 50 to nearly 100 percent diurnally.

The dispersion characteristics of the region are generally good because of land-sea breeze circulations, good ventilation, mixing due to convective instability, and flat terrain. This is especially true for coastal areas due to higher wind speeds and infrequent ground level inversions.



NOTE: NUMBERS GIVEN ARE SCALAR AVERAGE
WIND SPEED IN MILES PER HOUR.
ARROWS FLY WITH WIND.

MONTHLY AVERAGE WIND SPEED AND
PREVAILING DIRECTION FOR SELECTED FLORIDA CITIES
Figure 2.3-31



ANNUAL AVERAGE WIND SPEED AND
PREVAILING DIRECTION FOR SELECTED FLORIDA CITIES

Figure 2.3-32

2.3.7.2 Site Climatology. The Cedar Bay Cogeneration Project site is located in Jacksonville, Florida, along the Broward River at the confluence with the St. Johns River. There are no existing local meteorological data with long periods of record for the immediate plant site. However, there is a nearby location with meteorological data covering long periods of record which are considered representative of the site area. This location is the National Weather Service (NWS) office at the Jacksonville International Airport, Jacksonville, Florida. The NWS office has been at the airport since 1971 and is approximately 5 miles north of the project site.

- Temperature and Humidity. The temperature variation from season-to-season is moderate, with warm summers and mild winters. The atmosphere is moist, with an average relative humidity of approximately 75 percent. Temperatures exceed 95 F only about 10 times a year. Table 2.3-18 presents a summary of the means and extremes of monthly and daily dry-bulb temperatures.² The hottest month is July with a mean monthly temperature of 80.6 F. The daily minimum and maximum temperature averages are 72.3 F and 88.8 F, respectively, for this month. Sub-zero temperatures have never occurred. January is the coldest month with a mean monthly temperature of 54.4 F. Average January daily minimum and maximum temperatures are 45.2 F and 63.6 F, respectively. The absolute temperature range is from 105 F (July) to 7 F (January). The mean number of days per year with temperatures below 32 F is 14.9 days.

Table 2.3-19 presents a summary of the wet-bulb and dry-bulb design temperatures associated with the plant site. The 1 and 5 percent wet-bulb temperatures for June through September are 81 F and 79 F, respectively. The 1 and 5 percent dry-bulb temperatures for this site, based on historical data from June through September, are 95 F and 92 F, respectively.⁴ The 1 percent temperatures are exceeded only 1 percent of the time, and the 5 percent temperatures are exceeded 5 percent of the time. Table 2.3-19 also includes other design temperatures for percentages of 2-1/2, 10, 97-1/2, and 99.

TABLE 2.3-18. DRY-BULB TEMPERATURE DATA FOR JACKSONVILLE, FLORIDA

<u>Month</u>	<u>Mean Temperature*</u>			<u>Extreme Temperature**</u>	
	<u>Monthly</u> F	<u>Daily</u> <u>Minimum</u> F	<u>Daily</u> <u>Maximum</u> F	<u>Lowest</u> F	<u>Highest</u> F
January	54.4	45.2	63.6	7	85
February	56.4	46.9	65.8	19	88
March	61.8	52.1	71.4	23	91
April	67.5	58.0	77.0	35	95
May	73.7	64.7	82.7	45	100
June	78.6	70.2	87.0	47	103
July	80.6	72.3	88.8	61	105
August	80.2	72.2	88.2	63	102
September	77.2	69.8	84.6	48	100
October	69.0	61.0	76.9	36	96
November	60.8	51.8	69.7	21	88
December	55.0	45.8	64.1	11	84
Annual	67.9	59.2	76.6	7	105
<u>Season</u>					
Summer	79.8	71.6	88.0	47	105
Fall	69.0	60.9	77.1	21	102
Winter	55.3	46.0	64.5	7	88
Spring	67.7	58.3	77.0	23	100

*Period of record: 1951-1980.

**Period of record: 1953-1986.

SOURCE: United States Department of Commerce, Local Climatological Data--Annual Summary with Comparative Data--1986, Jacksonville, Florida, National Climatic Center, Asheville, North Carolina, 1987.

TABLE 2.3-19. WET-BULB AND DRY-BULB DESIGN TEMPERATURES

<u>Percent of Time</u>	<u>Temperatures (F)</u>	
	<u>Wet-Bulb</u>	<u>Dry-Bulb</u>
1*	81	95
2-1/2*	80	93
5*	79	92
10*	78	90
97-1/2**	--	32
99**	--	29

*Percentage of the time the temperature is exceeded during the months of June through September.

**Percentage of the time the temperature is exceeded during the months of December, January, and February.

SOURCE: The Marley Company, Cooling Tower Fundamentals and Application Principles, Kansas City, Missouri, 1982.

Mean monthly wet-bulb temperatures are listed in Table 2.3-20. Monthly wet-bulb temperature means range from 47.9 F in January to 74.3 F in July with the annual mean wet-bulb temperature being 61.8 F.⁵

Average site relative humidities are presented in Table 2.3-21.² The table shows that the average annual relative humidity is approximately 76 percent. Hourly average minimum and maximum values are 48 percent and 91 percent and occur at 1300 in April and 0700 in October, respectively. The relative humidity does not vary significantly from season to season, except for spring days being somewhat drier. Heavy fog (1/4 mile or less) averages slightly more than three days a month.

- Heating and Cooling Degree-Days. Units of degree-days can be used as an indicator of heating or cooling requirements. One heating degree-day is accumulated for each degree that the daily mean temperature drops below the base temperature of 65 F. Cooling degree-days are accumulated when the daily mean temperature is above 65 F. Table 2.3-22 gives mean monthly and annual degree-day totals for the plant site.
- Precipitation and Evaporation. Average monthly precipitation (rain and snow) totals are shown in Table 2.3-23. As shown in the table, the greatest source of precipitation occurs almost entirely in the form of rain. Thundershowers occur during the summer months when a measurable amount can be expected one day in two.

During the period 1957-1986, the annual precipitation has ranged from 35.77 inches to 70.57 inches. Snowstorms do not contribute to the annual precipitation totals. Extreme monthly precipitation totals are listed in Table 2.3-24. The highest recorded 24-hour rainfall total is 10.17 inches (September 1950). Maximum recorded rainfall totals for various time periods are presented in Table 2.3-25.⁶ Precipitation maximums and intensities for various return periods and durations are shown in

TABLE 2.3-20. MEAN WET-BULB TEMPERATURE DATA FOR THE PROJECT AREA

<u>Month</u>	<u>Mean Wet-Bulb Temperature</u> F
January	47.9
February	49.2
March	54.7
April	61.7
May	67.0
June	72.1
July	74.3
August	73.8
September	71.8
October	64.7
November	56.0
December	49.7
Annual	61.8
<u>Season</u>	
Summer	73.4
Fall	64.2
Winter	48.9
Spring	61.1

SOURCE: Derived from United States Air Force, Engineering Weather Data; Facility Design and Planning, AFM 88-29, TM 5-785, NAVFAC P-89, Washington, D.C., July 1978.

TABLE 2.3-21. AVERAGE RELATIVE HUMIDITY DATA FOR JACKSONVILLE, FLORIDA*

Month	Hour (Local Standard Time)				Average percent
	0100 percent	0700 percent	1300 percent	1900 percent	
January	84	87	57	74	76
February	82	86	53	68	72
March	82	86	50	65	71
April	84	86	48	64	71
May	85	85	50	66	72
June	87	87	57	73	76
July	88	88	58	75	77
August	90	91	60	78	80
September	90	91	63	80	81
October	89	91	58	79	79
November	88	89	56	79	78
December	86	88	59	78	78
Annual	86	88	56	73	76
<u>Season</u>					
Summer	88	89	58	75	78
Fall	89	90	59	79	79
Winter	84	87	56	73	75
Spring	84	86	49	65	71

*Period of record: 1951-1980.

SOURCE: United States Department of Commerce, Local Climatological Data--Annual Summary with Comparative Data--1986, Jacksonville, Florida, National Climatic Center, Asheville, North Carolina, 1987.

TABLE 2.3-22. HEATING AND COOLING DEGREE-DAY DATA FOR JACKSONVILLE,
FLORIDA*

Month	Normal Degree-Day	
	Heating**	Cooling**
January	396	30
February	302	25
March	166	51
April	21	102
May	0	282
June	0	420
July	0	505
August	0	496
September	0	396
October	21	160
November	164	38
December	322	15
Annual	1,402	2,520

*Period of record: 1951-1980.

**Base 65 F.

SOURCE: United States Department of Commerce, Local Climatological Data--
Annual Summary with Comparative Data--1986, Jacksonville, Florida,
National Climatic Center, Asheville, North Carolina, 1987.

TABLE 2.3-23. TOTAL PRECIPITATION AND SNOWFALL DATA FOR JACKSONVILLE,
FLORIDA

<u>Month</u>	<u>Average Precipitation*</u> inches	<u>Average Snowfall**</u> inches
January	2.83	Trace
February	3.16	Trace
March	3.40	Trace
April	2.80	0.0
May	3.89	0.0
June	5.83	0.0
July	6.64	0.0
August	6.63	0.0
September	7.10	0.0
October	4.42	0.0
November	1.95	0.0
December	2.79	Trace
Annual	51.46	Trace

*Period of record: 1872-1986.

**Period of record: 1942-1986.

SOURCE: United States Department of Commerce, Local Climatological Data--
Annual Summary with Comparative Data--1986, Jacksonville, Florida,
National Climatic Center, Asheville, North Carolina, 1987.

TABLE 2.3-24. EXTREME PRECIPITATION DATA FOR JACKSONVILLE, FLORIDA*

<u>Month</u>	<u>Extreme Precipitation</u>			<u>Extreme Snowfall</u>	
	<u>Maximum 24-Hour inches</u>	<u>Maximum Monthly inches</u>	<u>Minimum Monthly inches</u>	<u>Maximum 24-Hour inches</u>	<u>Maximum Monthly inches</u>
January	3.02	7.29	0.06	Trace	Trace
February	6.22	8.85	0.52	1.5	1.5
March	7.12	10.18	0.18	0.5	0.5
April	8.25	11.61	0.17	--	--
May	5.40	10.43	0.61	--	--
June	5.93	12.90	2.19	--	--
July	10.09	16.21	1.97	--	--
August	7.93	16.24	1.92	--	--
September	10.17	19.36	1.02	--	--
October	6.66	13.44	0.16	--	--
November	5.44	7.85	Trace	--	--
December	3.75	7.09	0.04	Trace	Trace
Annual	10.17	19.36	Trace	1.5	1.5

*Period of record: 1942-1986.

SOURCE: United States Department of Commerce, Local Climatological Data--
Annual Summary with Comparative Data--1986, Jacksonville, Florida,
National Climatic Center, Asheville, North Carolina, 1987.

TABLE 2.3-25. MAXIMUM RECORDED RAINFALL DATA FOR JACKSONVILLE, FLORIDA*

<u>Duration</u>	<u>Rainfall inches</u>	<u>Date</u>
5 Minutes	0.78	August 16, 1901
10 Minutes	1.32	July 23, 1955
15 Minutes	1.75	July 23, 1955
30 Minutes	2.83	August 18, 1946
60 Minutes	3.32	July 8, 1946
2 Hours	4.19	October 22, 1933
3 Hours	4.97	October 18, 1950
6 Hours	6.75	October 19, 1944
12 Hours	8.65	October 19, 1944
24 Hours	10.17	September 5, 1950

*Period of record: 1891-1961.

SOURCE: United States Weather Bureau, Maximum Recorded United States Point Rainfall for 5 Minutes to 24 Hours at 296 First-Order Stations, Technical Paper No. 2, Washington, D.C., 1963.

Table 2.3-26. The mean annual gross lake evaporation is estimated to be 45 inches, based on data from 1946 through 1955.

- Barometric Pressure. The annual site barometric pressure is 30.05 inches HgA.
- Wind, Stability, and Dispersion Characteristics. Five years of wind data (1981-1985) were used to generate the annual and seasonal wind roses from Jacksonville, as shown on Figures 2.3-33 through 2.3-37. These wind roses are considered appropriate in describing the general wind flow at the Cedar Bay Cogeneration Project site. Table 2.3-27 includes the annual percent frequency of occurrence of the wind speed categories for each of the 16 wind directions. The annual wind rose shows a generally uniform distribution of all wind directions. Annual wind speeds average about 3.9 meters per second (8.7 miles per hour) for the dominant wind directions. The winter wind rose shows a predominance of winds from the northwest quadrant at about 4 meters per second (9.0 miles per hour). The fall and spring wind roses show the typical transition to winter and summer seasonal wind flows. Summer shows a predominance of winds from the southwest quadrant at about 3 meters per second (6.5 miles per hour).

The design wind speed for wind loadings is 90 miles per hour for the Jacksonville area. The Jacksonville fastest mile speed on record is 82 miles per hour. The fastest mile of wind is defined as the fastest speed, in miles per hour, of any "mile" of wind passing a measurement point.

2.3.7.3 Atmospheric Dispersion. Atmospheric dispersion depends primarily on four meteorological parameters as follows.

- (1) Height of the mixed layer (mixing height).
- (2) Wind speed within the mixed layer.
- (3) Frequency of low level temperature inversions.
- (4) Atmospheric stability.

Holzworth has estimated mean mixing depths and average wind speed within the mixed layer for 62 National Weather Service radiosonde stations

TABLE 2.3-26. PRECIPITATION AMOUNTS AND INTENSITIES FOR SELECTED DURATIONS AND RETURN PERIODS EXPECTED IN THE PROJECT AREA

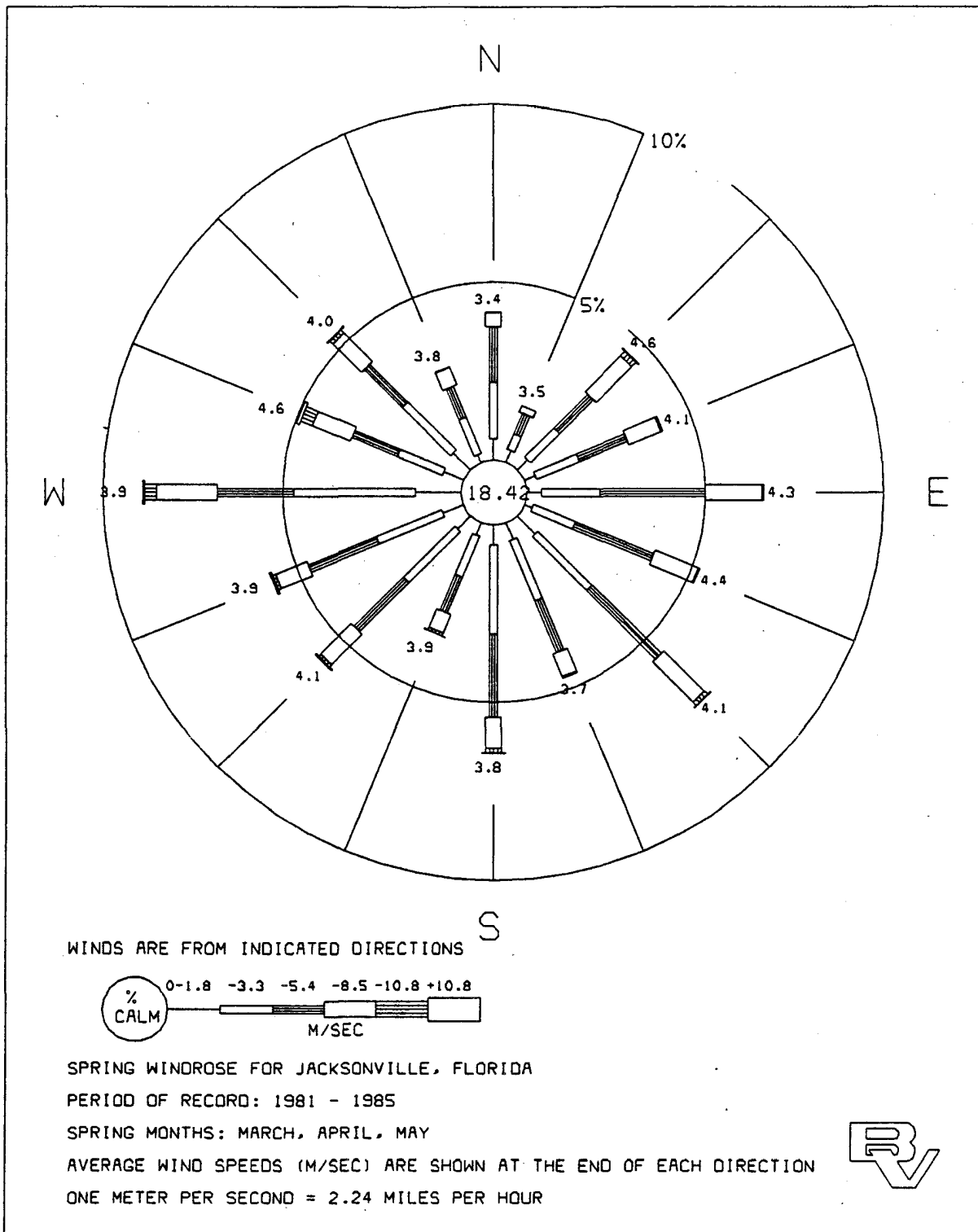
PRECIPITATION AMOUNTS

Duration hours	Return Period					
	2-Year inches	5-Year inches	10-Year inches	25-Year inches	50-Year inches	100-Year inches
1/2	1.75	2.10	2.39	2.71	2.29	3.20
1	2.19	2.60	3.05	3.40	3.78	4.07
2	2.60	3.29	3.77	4.37	4.78	5.28
3	2.90	3.75	4.10	4.87	5.50	6.00
6	3.49	4.42	5.12	5.59	6.65	7.15
12	4.00	5.43	6.21	7.09	8.01	8.88
24	4.50	6.45	7.46	8.34	9.73	11.05

PRECIPITATION INTENSITIES

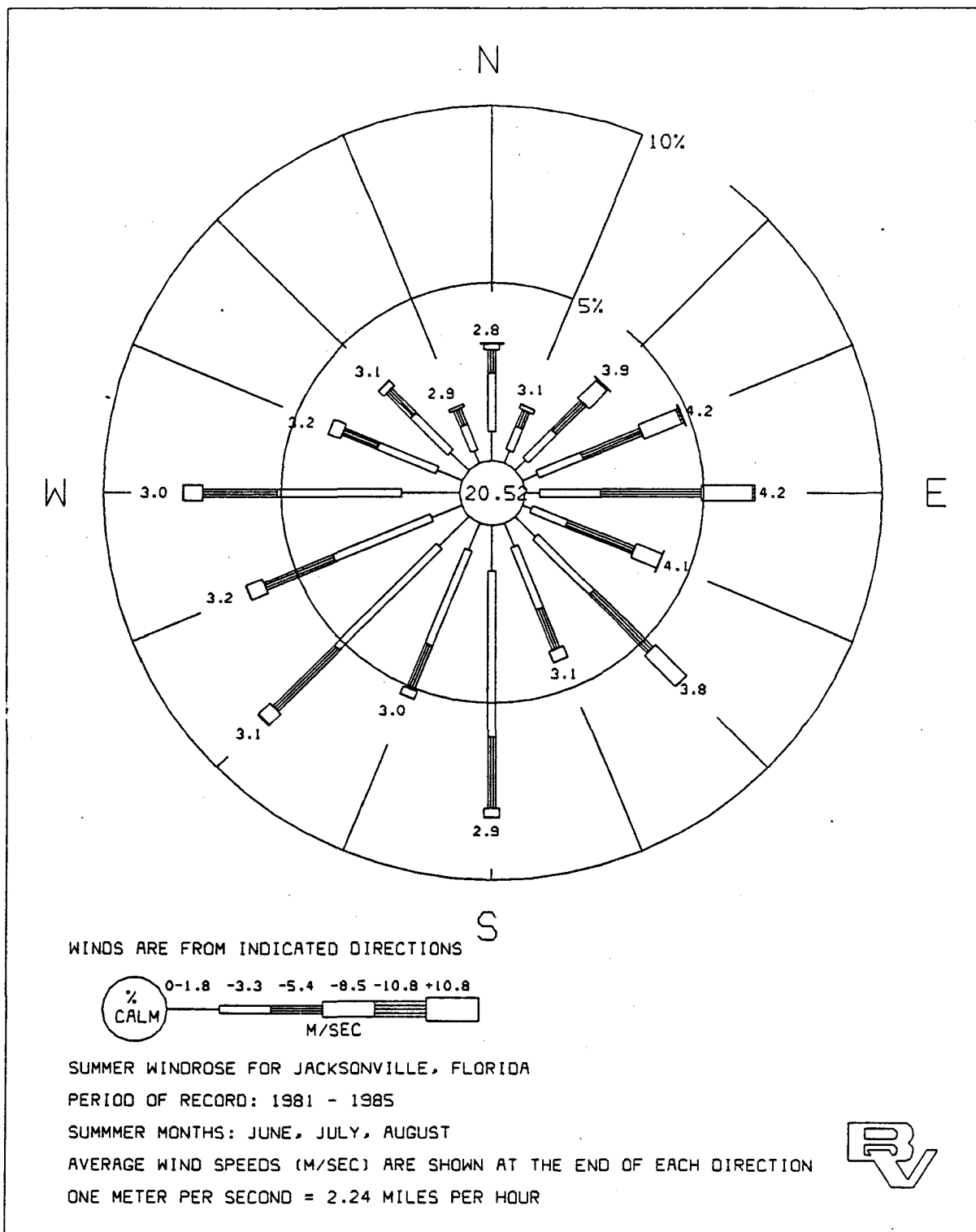
Duration hours	Return Period					
	2-Year in./h	5-Year in./h	10-Year in./h	25-Year in./h	50-Year in./h	100-Year in./h
1/2	3.50	4.20	4.78	5.42	4.58	6.40
1	2.19	2.60	3.05	3.40	3.78	4.07
2	1.30	1.65	1.89	2.19	2.89	2.64
3	0.97	1.25	1.37	1.62	1.83	2.00
6	0.58	0.74	0.85	0.93	1.11	1.19
12	0.33	0.45	0.52	0.59	0.67	0.74
24	0.19	0.27	0.31	0.35	0.41	0.46

SOURCE: United States Weather Bureau, Rainfall Frequency Atlas of the United States for Durations from 30 Minutes to 24 hours and Return Periods from 1 to 100 Years, Technical Paper No. 40, Washington, D.C., May 1961.



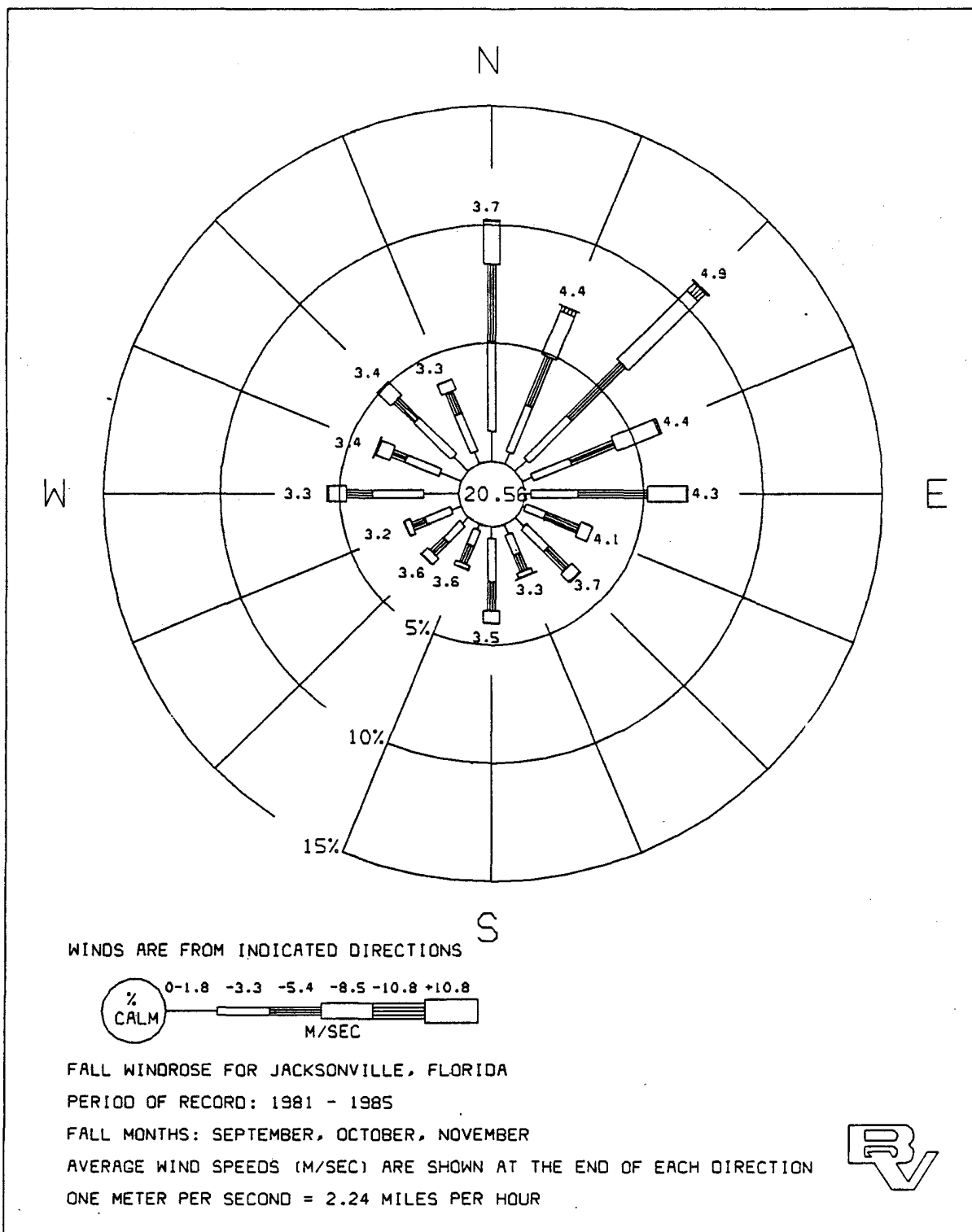
SPRING WIND ROSE FOR JACKSONVILLE, FLORIDA
 PERIOD OF RECORD: 1981-1985

Figure 2.3-33



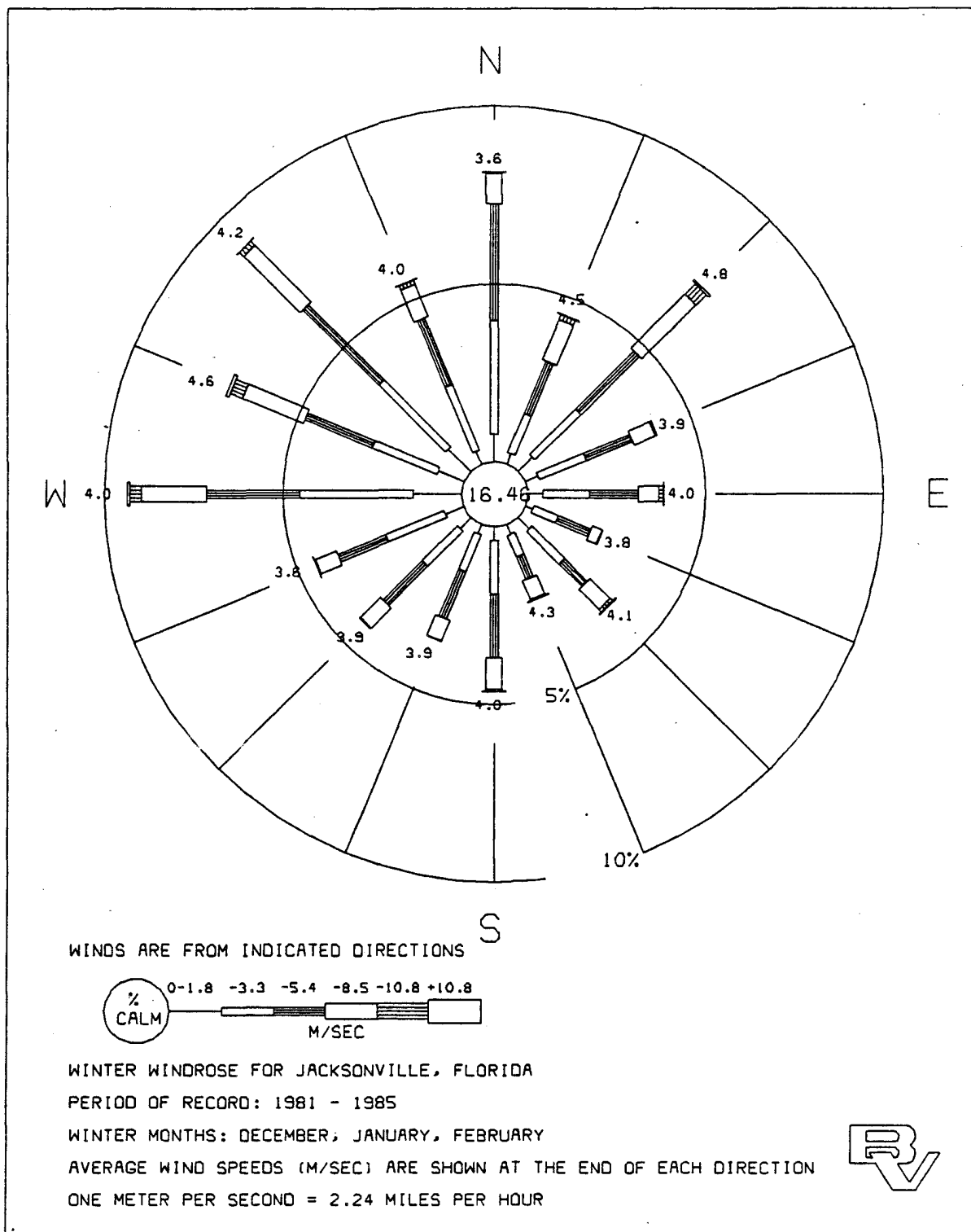
SUMMER WIND ROSE FOR JACKSONVILLE, FLORIDA
PERIOD OF RECORD: 1981-1985

Figure 2.3-34



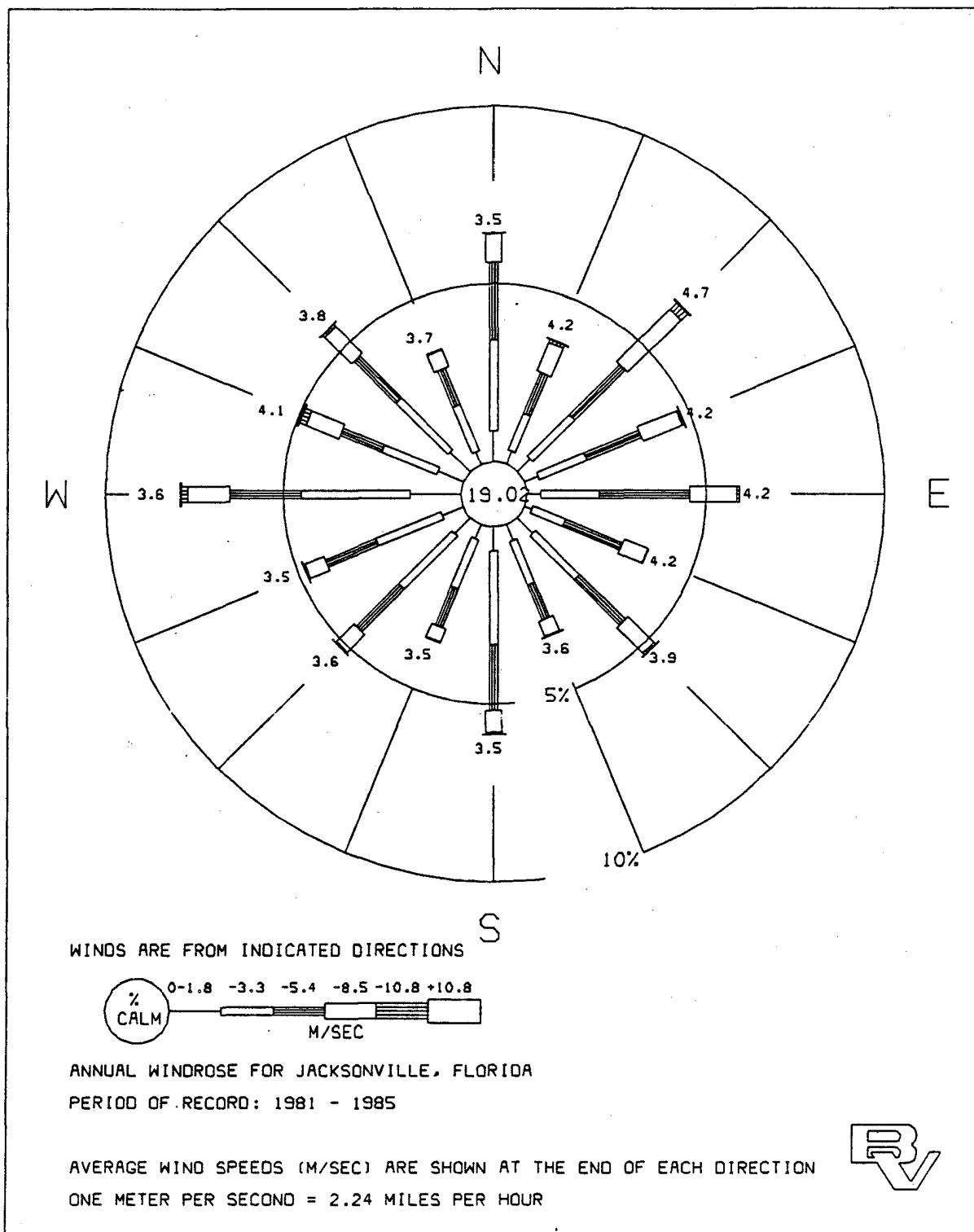
FALL WIND ROSE FOR JACKSONVILLE, FLORIDA
 PERIOD OF RECORD: 1981-1985

Figure 2.3-35



WINTER WIND ROSE FOR JACKSONVILLE, FLORIDA
PERIOD OF RECORD: 1981-1985

Figure 2.3-36



ANNUAL WIND ROSE FOR JACKSONVILLE, FLORIDA
PERIOD OF RECORDS: 1981-1985

Figure 2.3-37

TABLE 2.3-27. PERCENT FREQUENCY OF THE WIND SPEED CATEGORIES USED
IN THE ANNUAL WIND ROSE

Direction Sector	Wind Speed Categories, meters/sec						Total	Average Wind Speed m/sec
	0-3	4-6	7-11	11-16	17-21	21+		
N	0.9	2.5	2.2	0.8	0.0	0.0	6.4	3.5
NNE	0.4	1.1	1.2	0.9	0.1	0.0	3.7	4.2
NE	0.5	1.6	2.0	2.1	0.3	0.0	6.5	4.7
ENE	0.4	1.4	1.7	1.2	0.1	0.0	4.8	4.2
E	0.4	1.6	2.5	1.3	0.1	0.0	5.9	4.2
ESE	0.2	1.0	1.7	0.7	0.0	0.0	3.7	4.2
SE	0.6	1.7	1.8	1.0	0.1	0.0	5.3	3.9
SSE	0.5	1.3	1.1	0.4	0.0	0.0	3.4	3.6
S	0.7	2.6	1.8	0.6	0.1	0.0	5.8	3.5
SSW	0.4	1.5	1.2	0.4	0.0	0.0	3.5	3.5
SW	0.6	2.1	1.7	0.7	0.0	0.0	5.2	3.6
WSW	0.6	2.0	1.6	0.6	0.0	0.0	4.8	3.5
W	1.4	3.1	2.0	1.2	0.2	0.0	7.9	3.6
WNW	0.8	1.7	1.3	1.0	0.2	0.1	5.0	4.1
NW	0.8	2.1	1.7	1.1	0.1	0.0	5.7	3.8
NNW	0.4	1.4	1.1	0.5	0.0	0.0	3.4	3.7
Calm	19.0	--	--	--	--	--	19.0	--
Total	9.7	28.8	26.5	14.5	1.3	0.2	100.0	3.9

*1 m/sec equals 2.24 miles per hour.

SOURCE: Derived from hourly Jacksonville, Florida, meteorological data tapes (1981-1985), obtained from Florida Department of Environmental Regulations, April 1988.

within the 48 contiguous states.⁸ The morning and afternoon mixing depths are calculated from the twice daily vertical temperature profiles and the morning and afternoon surface temperatures. Below this level, relatively vigorous mixing occurs. Diffusion within layers above this height is inhibited because of thermal buoyancy considerations (that is, relatively stable conditions). The worst dispersion conditions occur when both the mixing depth and wind speed are low. In general, Florida has the best atmospheric dispersion conditions of any area in the 48 contiguous states. The area typically has combinations of greater mixing depths and higher wind speeds than other areas. Table 2.3-28 presents values of seasonal and annual morning and afternoon mixing depths and wind speed for Jacksonville.

Hosler has determined the frequency of inversions with bases below 500 feet for National Weather Service upper air stations in the contiguous United States. Table 2.3-29 lists inversion frequency data for Jacksonville from Hosler's work.

Atmospheric stability, in conjunction with general wind patterns, indicates the potential of the atmosphere to disperse airborne pollutants. Atmospheric conditions are typically categorized as unstable, neutral, or stable. An unstable atmosphere is one in which relatively rapid dispersion takes place in both the horizontal and vertical direction. Viewed in terms of changes in temperature with height, an unstable atmosphere is characterized by a sharp decrease in temperature with height. Neutral conditions are common in the atmosphere and are associated with moderate diffusion rates. Temperatures also decrease with height in a neutral atmosphere but not as rapidly as under unstable conditions (neutral conditions are associated with the adiabatic lapse rate). A stable atmosphere is characterized by slight decreases, or even increases of temperature with height, and greatly reduced dispersion rates in comparison with unstable or neutral atmospheres.

The stability classifications presented in this section are based on the well-known Turner or STAR method, which assigns a stability on the basis of surface wind speed, cloud cover, and solar altitude. The joint frequency distribution wind speed, wind direction, and stability for 1970-1974 at Jacksonville is summarized in Tables 2.3-30 through 2.3-35.¹⁰

TABLE 2.3-28. MIXING DEPTHS AND AVERAGE WIND SPEEDS THROUGH THE MIXED LAYER

<u>Season</u>	<u>Morning</u>		<u>Afternoon</u>	
	<u>Depth</u> m	<u>Wind Speed</u> m/s	<u>Depth</u> m	<u>Wind Speed</u> m/s
Winter	403	5.9	1,104	7.0
Spring	477	5.6	1,667	7.2
Summer	583	4.4	1,712	5.8
Fall	458	5.0	1,342	6.5
Annual	480	5.2	1,456	6.7

TABLE 2.3-29. LOW-LEVEL TEMPERATURE INVERSION FREQUENCY IN JACKSONVILLE,
FLORIDA

<u>Season</u>	<u>Percent of Total Hours</u>	<u>Percent of Days With Inversion Occurring</u>
Winter	40	70
Spring	28	65
Summer	23	58
Fall	41	76
Annual	33	65

TABLE 2.3-30. FREQUENCY DISTRIBUTION OF WIND SPEED, WIND DIRECTION, AND STABILITY--A STABILITY
(Jacksonville, Florida 1970-1974)

Direction	Speed (Knots)						Average Speed	Total
	1-3	4-6	7-10	11-16	17-21	Greater Than 21		
N	1	3	0	0	0	0	4.3	4
NNE	1	2	0	0	0	0	4.0	3
NE	2	3	0	0	0	0	3.6	5
ENE	2	5	0	0	0	0	4.0	7
E	2	4	0	0	0	0	4.2	6
ESE	3	9	0	0	0	0	4.2	12
SE	1	6	0	0	0	0	4.4	7
SSE	0	2	0	0	0	0	4.5	2
S	2	4	0	0	0	0	3.7	6
SSW	2	6	0	0	0	0	4.1	8
SW	0	3	0	0	0	0	4.7	3
WSW	0	8	0	0	0	0	4.1	8
W	1	10	0	0	0	0	4.4	11
WNW	0	3	0	0	0	0	4.3	3
NW	1	5	0	0	0	0	4.5	6
NNW	3	5	0	0	0	0	4.0	8
Avg.	3.0	4.5	0.0	0.0	0.0	0.0	3.1	
Total	21	78	0	0	0	0		

Number of Occurrences of A Stability = 134

Number of Calms with A Stability = 35

TABLE 2.3-31. FREQUENCY DISTRIBUTION OF WIND SPEED, WIND DIRECTION, AND STABILITY--B STABILITY
(Jacksonville, Florida 1970-1974)

Direction	Speed (Knots)						Average Speed	Total
	1-3	4-6	7-10	11-16	17-21	Greater Than 21		
N	25	35	11	0	0	0	4.7	71
NNE	9	16	13	0	0	0	5.3	38
NE	6	14	16	0	0	0	5.8	36
ENE	10	23	18	0	0	0	5.5	51
E	5	38	26	0	0	0	6.0	69
ESE	6	19	20	0	0	0	5.7	45
SE	13	32	21	0	0	0	5.4	66
SSE	4	15	13	0	0	0	6.0	32
S	14	35	22	0	0	0	5.4	71
SSW	9	21	13	0	0	0	5.3	43
SW	19	36	33	0	0	0	5.5	88
WSW	11	42	28	0	0	0	5.7	81
W	18	39	35	0	0	0	5.7	92
WNW	10	33	18	0	0	0	5.5	61
NW	14	39	17	0	0	0	5.3	70
NNW	13	21	13	0	0	0	5.1	47
Avg.	3.0	5.2	7.5	0.0	0.0	0.0	5.1	
Total	186	458	317	0	0	0		

Number of Occurrences of B Stability = 1035

Number of Calms with B Stability = 74

TABLE 2.3-32. FREQUENCY DISTRIBUTION OF WIND SPEED, WIND DIRECTION, AND STABILITY--C STABILITY
(Jacksonville, Florida 1970-1974)

Direction	Speed (Knots)					Greater Than 21	Average Speed	Total
	1-3	4-6	7-10	11-16	17-21			
N	8	40	49	2	0	0	6.6	99
NNE	4	20	31	7	0	0	7.4	62
NE	4	19	57	7	0	0	7.8	87
ENE	3	23	94	26	0	0	8.4	146
E	1	15	134	41	1	0	9.3	192
ESE	1	13	90	28	0	0	9.0	132
SE	4	23	80	25	0	0	8.7	132
SSE	8	16	35	5	0	0	7.0	64
S	10	33	60	9	0	0	7.3	112
SSW	4	25	58	13	1	0	7.9	101
SW	7	37	74	17	2	0	7.8	137
WSW	8	40	115	18	0	0	7.9	181
W	4	54	108	28	3	0	8.2	197
WNW	8	20	54	14	1	0	7.9	97
NW	9	29	61	9	0	1	7.4	109
NNW	6	14	32	3	0	0	7.0	55
Avg.	3.0	5.0	8.6	12.0	17.9	22.0	7.6	
Total	89	421	1,132	252	8	1		

Number of Occurrences of C Stability = 1999

Number of Calms with C Stability = 96

TABLE 2.3-33. FREQUENCY DISTRIBUTION OF WIND SPEED, WIND DIRECTION, AND STABILITY--D STABILITY
(Jacksonville, Florida 1970-1974)

Direction	Speed (Knots)						Average Speed	Total
	1-3	4-6	7-10	11-16	17-21	Greater Than 21		
N	4	31	64	31	2	1	8.7	133
NNE	0	19	39	79	4	2	11.0	143
NE	0	27	64	169	26	2	12.1	288
ENE	1	24	71	150	13	0	11.4	259
E	1	29	76	158	7	0	10.9	271
ESE	2	23	56	99	4	1	11.0	185
SE	1	13	53	126	8	0	11.8	201
SSE	2	23	25	33	5	1	9.9	89
S	4	35	63	77	5	0	9.9	184
SSW	1	22	56	58	5	0	10.3	142
SW	2	34	79	101	14	0	10.5	230
WSW	2	32	67	97	12	2	10.8	212
W	3	36	66	131	30	5	11.8	271
WNW	1	25	27	78	24	4	12.2	159
NW	3	13	37	60	19	1	11.7	133
NNW	1	19	30	32	1	0	9.4	83
Avg.	3.0	5.0	8.9	13.1	18.2	23.6	11.0	
Total	28	405	873	1,479	179	19		

Number of Occurrences of D Stability = 2992

Number of Calms with D Stability = 9

TABLE 2.3-34. FREQUENCY DISTRIBUTION OF WIND SPEED, WIND DIRECTION, AND STABILITY--E STABILITY
(Jacksonville, Florida 1970-1974)

Direction	Speed (Knots)						Average Speed	Total
	1-3	4-6	7-10	11-16	17-21	Greater Than 21		
N	21	46	115	37	0	0	7.7	219
NNE	6	25	70	43	4	0	9.3	148
NE	4	21	71	59	7	2	10.1	164
ENE	6	25	66	32	3	0	8.7	132
E	9	33	74	25	3	0	8.2	144
ESE	2	16	57	14	0	1	8.4	90
SE	5	18	79	31	1	2	8.9	136
SSE	4	17	68	29	3	0	8.8	121
S	9	35	115	32	3	0	8.4	194
SSW	7	22	72	23	0	0	8.1	124
SW	3	26	111	46	3	0	9.0	189
WSW	6	15	63	40	3	1	9.3	128
W	5	28	50	48	8	3	9.9	142
WNW	9	21	31	44	10	0	10.1	115
NW	6	26	51	50	6	0	9.6	139
NNW	7	20	45	28	2	0	8.9	102
Avg.	3.0	5.0	8.3	12.8	18.3	24.4	8.5	
Total	109	394	1,138	581	56	9		

Number of Occurrences of E Stability = 2388

Number of Calms with E Stability = 101

TABLE 2.3-35. FREQUENCY DISTRIBUTION OF WIND SPEED, WIND DIRECTION, AND STABILITY--F STABILITY
(Jacksonville, Florida 1970-1974)

Direction	Speed (Knots)						Average Speed	Total
	1-3	4-6	7-10	11-16	17-21	Greater Than 21		
N	104	217	70	0	0	0	4.9	391
NNE	33	75	16	0	0	0	4.8	124
NE	41	101	19	0	0	0	4.7	161
ENE	48	177	25	0	0	0	4.7	250
E	43	152	52	0	0	0	5.3	247
ESE	42	124	65	0	0	0	5.5	231
SE	48	181	73	0	0	0	5.4	302
SSE	53	112	35	0	0	0	5.1	200
S	95	260	49	0	0	0	4.8	404
SSW	59	201	29	0	0	0	4.8	289
SW	75	241	55	0	0	0	5.0	371
WSW	76	228	91	0	0	0	5.2	395
W	129	240	90	0	0	0	4.9	459
WNW	117	172	52	0	0	0	4.7	341
NW	79	165	59	0	0	0	5.0	303
NNW	73	120	47	0	0	0	4.9	240
Avg.	3.0	4.9	8.1	0.0	0.0	0.0	3.9	
Total	1,115	2,766	827	0	0	0		

Number of Occurrences of F Stability = 6052

Number of Calms with F Stability = 1344

2.3.7.4 Severe Weather.

- Thunderstorms and Hail. Thunderstorms normally occur every month. Based on a 35-year period of observation at Jacksonville, thunderstorms can be expected to occur on about 61 days a year in the vicinity of the site. About 87 percent of this thunderstorm activity occurs in the warmest six months of the year and is usually associated with summertime land mass heating and low level convergence of moist air by sea-breeze effects. Also, thunderstorms are produced by tropical storms as they approach the Florida coast.

Hail is occasionally present during thunderstorms but is not considered a significant hazard. There were only 25 reports of hail 3/4 inch or greater in diameter in the 1 degree longitude-latitude square containing the Cedar Bay Cogeneration Project during the period 1955 through 1967.¹¹

- Windstorms. Strong, gusty surface winds often occur in association with severe thunderstorm activity, well-developed cold fronts, and tropical cyclones. Winds in excess of 40 mph have been recorded in every month of the year at Jacksonville. The fastest mile of wind on record at Jacksonville is 82 mph.¹

2.3.7.5 Ambient Air Quality. One requirement in obtaining site certification and applicable air quality permits is to demonstrate that the operation of the proposed facility will not cause federal or state ambient air quality standards to be violated. In addition, impacts of the plant operation must not exceed remaining allowable air quality increments, which can be dependent upon the existing air quality status. The existing air quality in the vicinity of the Cedar Bay Cogeneration Project is described in this section along with applicable standards and allowable incremental effects. The impact predictions resulting from the addition of the proposed source emissions are described in Section 5.6.

Onsite air quality measurements were not necessary for this project since sufficient data were available from existing Duval County monitoring sites (1986). These data are considered to conservatively represent the

air quality at the project site and were used to determine base-line air quality.

- Air Quality Standards. Ambient air quality standards (AAQS) have been set to protect public health (primary standards) and public welfare (secondary standards). In addition, the state of Florida has adopted ambient air quality standards. The federal and state AAQS are given in Table 2.3-36.

In addition to ambient standards, the operation of the proposed units must not cause air quality incremental impacts beyond those specified by Prevention of Significant Deterioration (PSD) criteria. This site area is classified as PSD Class II. Class II PSD increments will be applicable for this analysis in all areas surrounding the facility. One Class I area exists within 100 kilometers of the site. Therefore, PSD Class I increment consumption will be modeled for the Okefenokee National Wilderness Area in southeastern Georgia. Class I and II increments are given in Table 2.3-37.

- Existing Air Quality. The State of Florida has been conducting air quality monitoring for criteria pollutants at locations throughout the state for many years. The FDER document Ambient Air Quality in Florida 1986 (1987) provides the most recent monitoring data for use in establishing background concentrations for the criteria pollutants.

FDER and EPA guidance would generally require the use of the highest or second-highest monitored concentrations to establish conservative background concentrations for the project area. For this analysis, 1986 data from all Duval County monitoring sites were reviewed for each pollutant. Generally, data with the highest concentrations were selected; however, locations of the samplers and monitoring objectives were also considered. Table 2.3-38 summarizes the existing monitoring data being proposed as conservative values of the background pollutant concentrations for the plant area. These monitoring sites are all located within

TABLE 2.3-36. AMBIENT AIR QUALITY STANDARDS

<u>Standard</u>	<u>Short-Term*</u>	<u>24-Hour*</u> <u>Average</u>	<u>Annual</u> <u>Average</u>
Sulfur Dioxide ($\mu\text{g}/\text{m}^3$)			
Federal Primary	--	365	80
Federal Secondary	1,300 (3-Hour)	--	--
Florida	1,300 (3-Hour)	260	60
Nitrogen Dioxide ($\mu\text{g}/\text{m}^3$)			
Federal Primary and Secondary	--	--	100
Florida	--	--	100
Carbon Monoxide (mg/m^3)			
Federal Primary and Secondary	40 (1-Hour)	--	--
Federal Primary and Secondary	10 (8-Hour)	--	--
Florida	Same as Federal	--	--
Particulate Matter (pm_{10}) ($\mu\text{g}/\text{m}^3$)			
Federal Primary and Secondary	--	150	50
Florida	--	150	50
Lead (Pb) ($\mu\text{g}/\text{m}^3$)			
Federal Primary and Secondary	--	--	1.5 (3 mo)
Florida	--	--	1.5 (3 mo)
Ozone			
Federal Primary and Secondary	235 (1-Hour)	--	--
Florida	235 (1-Hour)	--	--

*Not to be exceeded more than once per year; averaging times given in parentheses.

NOTE: $\mu\text{g}/\text{m}^3$ - micrograms per cubic meter at 25 C and 760 mm Hg.

mg/m^3 - milligrams per cubic meter at 25 C and 760 mm Hg.

TABLE 2.3-37. FEDERAL PSD CLASS I AND CLASS II INCREMENTS

<u>Pollutant</u>	<u>Class II Increment</u>	<u>Class I Increment</u>
Sulfur Dioxide (3-Hour)	512*	25*
Sulfur Dioxide (24-Hour)	91*	5*
Sulfur Dioxide (Annual)	20	2
Particulates (24-Hour)	37	10
Particulates (Annual)	19	5
NO _x ** (Annual)	25	2.5

*Increments that are not to be exceeded more than once per year.

**Proposed February 8, 1988.

TABLE 2.3-38. EXISTING AMBIENT AIR QUALITY MONITORING DATA*

	<u>Measured Concentration</u>	<u>Location</u>	<u>Year</u>
Sulfur Dioxide ($\mu\text{g}/\text{m}^3$)			
Annual	10	1960-081-H	1986
24-Hour	63	1960-081-H	1986
3-Hour	321	1960-081-H	1986
Nitrogen Dioxide ($\mu\text{g}/\text{m}^3$)			
Annual	29	1960-032-H	1985**
TSP ($\mu\text{g}/\text{m}^3$)			
Annual	37	1960-081-H	1986
24-Hour	76		
PM ₁₀ ($\mu\text{g}/\text{m}^3$)			
Annual	31	1960-004-H	***
24-Hour	65	1960-004-H	***
Carbon Monoxide (PPM)			
8-Hour	6	1960-082-H	1986
1-Hour	13	1960-082-H	1986
Lead ($\mu\text{g}/\text{m}^3$)			
Calendar Quarter	0.3	1960-084-H	1986

*From Ambient Air Quality in Florida 1986, Florida Department of Environmental Regulation, November 1987 (Reference 2).

**1986 not available.

***April 1986-March 1987.

SOURCE: State of Florida Department of Environmental Regulation, "Ambient Air Quality in Florida, 1986," 1987, p. A-28.

the vicinity of the proposed plant site or in the Jacksonville metropolitan area.

The proposed project site (all of Duval County) has been designated as nonattainment for ozone. A portion of the Jacksonville metropolitan area is designated as nonattainment for TSP. Once EPA Region II approves proposed revisions to Florida's State Implementation Plan (SIP), the TSP nonattainment area will be eliminated and will be subsequently designated as unclassifiable with respect to new fine particulate (PM_{10}) standards. Until this SIP revision has been approved by the EPA, the TSP nonattainment status will apply. Air quality dispersion modeling of the Jacksonville area by the FDER has indicated that if existing permitted sources were to operate at their permitted emission rates, an area with modeled SO_2 concentrations in excess of AAQS would exist. The SO_2 modeled exceedance issue and the nonattainment status conditions are addressed in Section 5.6.

2.3.7.6 References.

1. James T. Bradley, "The Climate of Florida," in Climates of the States, U.S. Department of Commerce, Washington, D.C., 1974, pp 45-70.
2. United States Department of Commerce, Local Climatological Data--Annual Summary with Comparative Data--1986, Jacksonville, Florida, National Climatic Center, Asheville, North Carolina, 1987.
3. United States Department of Commerce NOAA, Climatic Atlas of the United States, Southern Region, National Climatic Center, Asheville, North Carolina, 1986.
4. The Marley Company, Cooling Tower Fundamentals and Application Principles, Kansas City, Missouri 1982.
5. References derived from the United States Air Force, Engineering Weather Data; Facility Design and Planning, AFM 88-29, TM5-785, NAVFAC p. 89, Washington, D.C., July 1978.
6. United States Weather Bureau, Maximum Recorded United States Point Rainfall for 5 Minutes to 24 Hours at 296 First-Order Stations, Technical Paper No. 2, Washington, D.C., 1963.
7. United States Weather Bureau, Rainfall Frequency Atlas of the United States for Durations from 30 Minutes to 24-Hour and Return Periods from 1 to 100 Years, Technical Paper No. 40, Washington, D.C., May 1961, p. 71.

8. George C. Holzworth, Mixing Heights, Wind Speeds, and Potential for Urban Air Pollution Throughout the Contiguous United States, Publication No. AP-101, USEPA, Office of Air Programs, Research Triangle Park, North Carolina, January 1972.
9. Charles R. Hosler, Low-Level Inversion Frequency in the Contiguous United States, Monthly Weather Review, pp 319-339, September 1961.
10. US Atomic Energy Commission, "Onsite Meteorological Programs," Safety Guide 1.23, USAEC, Washington, D.C., February 1972.
11. Environmental Science Services Administration, "Severe-Local Storm Occurrence, 1955-1967," Technical Memorandum WBTM FCST 12, United States Department of Commerce, Silver Springs, Maryland, September 1969.
12. State of Florida Department of Environmental Regulation, "Ambient Air Quality in Florida, 1986," 1987, p. A-28.

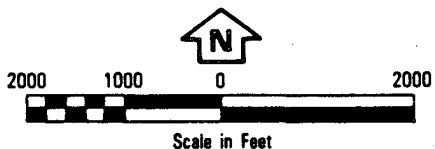
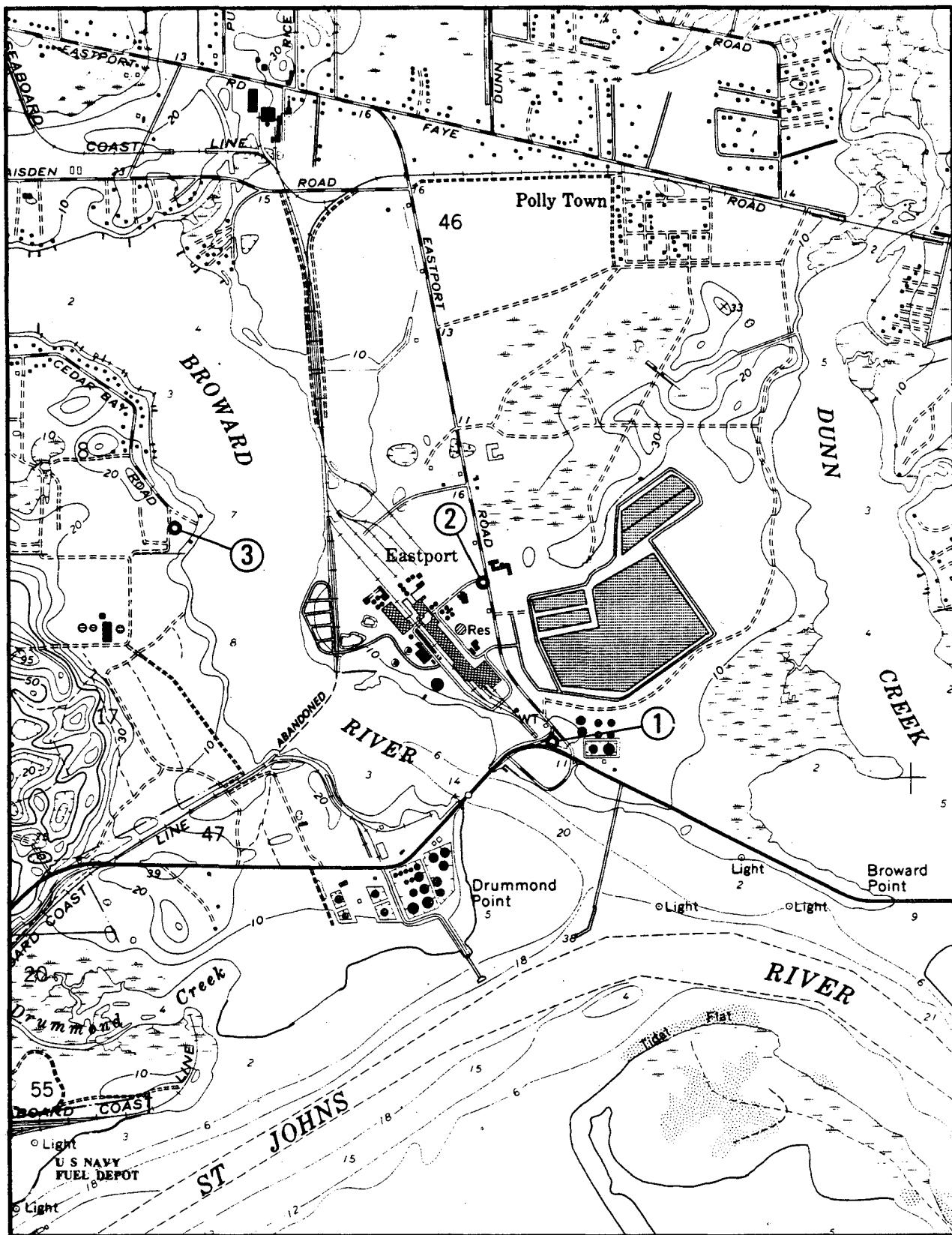
2.3.8 Noise

An analysis was performed to assess the potential noise impacts from the proposed Cedar Bay Cogeneration Project. The analysis involved four different tasks.

- Characterization of the existing noise environment in the vicinity of the cogeneration plant.
- Specification of allowable noise impacts based on federal, state, and local regulations.
- Estimation of probable noise impacts from the plant.
- Demonstration of compliance with all applicable ordinances.

The results of the first two tasks are presented and summarized in the following two subsections. Results of the third and fourth tasks are discussed in Section 5.7 of this report.

2.3.8.1 Existing Noise Environment. Background sound levels were collected at three noise monitoring locations (NMLs) in the vicinity of the Seminole Kraft paper mill property. These locations are shown on Figure 2.3-38. NML 3 represents the closest residences to the project. Noise levels were collected on two separate occasions, March 10 and July 28, 1988. L_{eq} values (60-second A-weighted averages) were made during both daytime and nighttime hours, along with the maximum one-second value during each period. Table 2.3-39 summarizes the existing sound levels and the corresponding times for which the samples were measured. The sound levels



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NOISE MONITORING LOCATIONS

Figure 2.3-38

TABLE 2.3-39. EXISTING NOISE LEVELS

NML*	Period	Day	Time	dBA		Identifiable Sources
				L _{eq}	L _{max}	
1	Nighttime	3-10-88	1:20 a.m.	48.3 50.0 60.7	51.7 54.6 81.8	Paper mill plant Train horn Train horn and two car passes in distance
1	Daytime	3-10-88	10:55 a.m.	70.0 68.7	79.6 77.4	Traffic on Heckscher Blvd., paper mill plant Train horn, leaf rustling Same as above
1	Nighttime	7-28-88	2:18 a.m.	66.2 64.2 63.6	75.3 67.8 67.8	Generator for construction lights and arrows on nearby bridge Traffic noise and generator Same as above
1	Daytime	7-28-88	3:45 p.m.	68.2 64.5 64.6	78.0 73.8 70.7	Approximately 30 car and truck passes Approximately 25 car and truck passes Approximately 15 car and truck passes and an airplane overhead
2	Nighttime	3-10-88	1:35 a.m.	69.9 68.7	74.5 73.3	Paper mill plant Same as above
2	Daytime	3-10-88	10:35 a.m.	72.0 71.1	78.5 83.2	Paper mill plant, wind noise, flapping flag, auto traffic Truck noise
2	Nighttime	7-28-88	2:25 a.m.	63.3 63.5 64.6	65.2 65.2 70.9	Paper plant mill Paper plant mill Paper plant mill
2	Daytime	7-28-88	3:25 p.m.	76.5 59.2 69.0	93.2 65.7 83.1	Paper plant mill, traffic Paper plant mill, traffic Paper plant mill, traffic
3	Nighttime	3-10-88	2:10 a.m.	46.6 46.3	49.3 48.3	Paper mill, insects Paper mill, insects
3	Daytime	3-10-88	11:20 a.m.	58.2 65.7 62.1	68.4 81.9 73.8	Wind noise, sewage treatment plant Wind noise, sewage treatment plant Wind noise, sewage treatment plant, one car pass
3	Nighttime	7-28-88	1:48 a.m.	51.6 51.6 51.5	53.3 53.1 54.7	Insect noise, sewage treatment plant Insect noise, sewage treatment plant Insect noise, sewage treatment plant
3	Daytime	7-28-88	4:11 p.m.	49.9 49.0 53.3	55.8 50.8 57.7	Insect noise, sewage treatment plant, paper mill Insect noise, sewage treatment plant, paper mill Insect noise, sewage treatment plant, paper mill

*Noise Measurement Location. See Figure 2.3-1 for placement with respect to the plant.

in the residential area generally are less than 50 dBA, except where measurements were affected by obvious interference, such as wind noise.

2.3.8.2 Applicable Noise Control Regulations. There are no existing federal or state noise control regulations that apply directly to offsite noise levels resulting from the project.

Two local ordinances regulating noise levels are applicable to the proposal from the project. The Land Use Regulations for the City of Jacksonville, Florida, provides requirements for noise from an industrially zoned property. They require that noise levels from an activity within an industrial (heavy) district shall not exceed 75 dBA at a point where the district adjoins a commercial district and 65 dBA at a point where the district adjoins a residential district.

The Jacksonville Environmental Protection Board also has noise level restrictions for the City of Jacksonville. The Noise Pollution Control Rule divides land areas according to use into four classes: A, B, C, and D. Restrictions on noise impact for each of the land area classes are listed within the rule as allowable overall (dBA) and octave band daytime and nighttime noise levels are listed. Industrial use properties, such as the Seminole Kraft tract, are classified as Class D. Most other land use in the immediate paper mill area is industrial. The nearest other land classifications surrounding the facility are Class B (residential) and Class C (commercial). The Eastport Road transportation corridor is a Class C land use, and the residential area located at the western shore of the Broward River (approximately 2,600 feet northwest from the project) is a Class B land use. The Broward River is designated U (Unclassified) and is not considered applicable to the Noise Pollution Control Rule. The daytime and nighttime octave band noise levels required in these situations are shown in Table 2.3-40.

The Jacksonville Environmental Protection Board also has a noise ordinance applicable to construction activities. This ordinance prohibits nighttime (10:00 p.m. to 7:00 a.m.) construction activities unless specifically permitted by the City of Jacksonville. Daytime noise impacts are limited to 75 dBA at the boundary of any Class C or Class D areas,

TABLE 2.3-40. ALLOWABLE NOISE LEVELS

Octave Band Center (Hz) Frequency	Maximum Allowable Octave Band Sound Pressure Levels (dB)			
	Class B		Class C All Hours	Class D All Hours
	Nighttime (10 p.m. to 7 a.m.)	Daytime (7 a.m. to 10 p.m.)		
31.5	75	80	80	85
63	74	78	78	84
125	67	73	73	79
250	63	67	67	74
500	56	61	61	69
1K	51	56	56	64
2K	47	52	52	59
4K	45	48	48	56
8K	40	45	45	63
Overall (dBA)	60	65	65	70

and to 65 dBA at the boundary of any Class A or Class B areas. If night-time construction is permitted, the impacts are limited to 60 dBA at the indicated property lines. These noise level requirements may be exceeded for a particular project with specific permission by the City of Jacksonville. 1 2

2.3.9 Other Environmental Features

As discussed in Subsections 2.3.5 and 2.3.6, the project site has been extensively disturbed by industry over the last 35 to 40 years. Little remaining vegetation or wildlife habitat remains.

An electric substation is located adjacent to the paper mill property, and an interconnection can be made with a very short line from the cogeneration plant to the substation (Figure 3.2-1). Therefore, it will not be necessary to construct a new transmission line.

The existing outfall at the Seminole Kraft paper mill will be used to discharge cooling tower blowdown from the cogeneration plant. It will not be necessary to construct a new structure in the river. P | 3

After construction of the facilities, several existing onsite facilities will be retired as follows.

- Three oil fired steam boilers.
- Two bark fired steam boilers.
- Three chemical recovery boilers.

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.

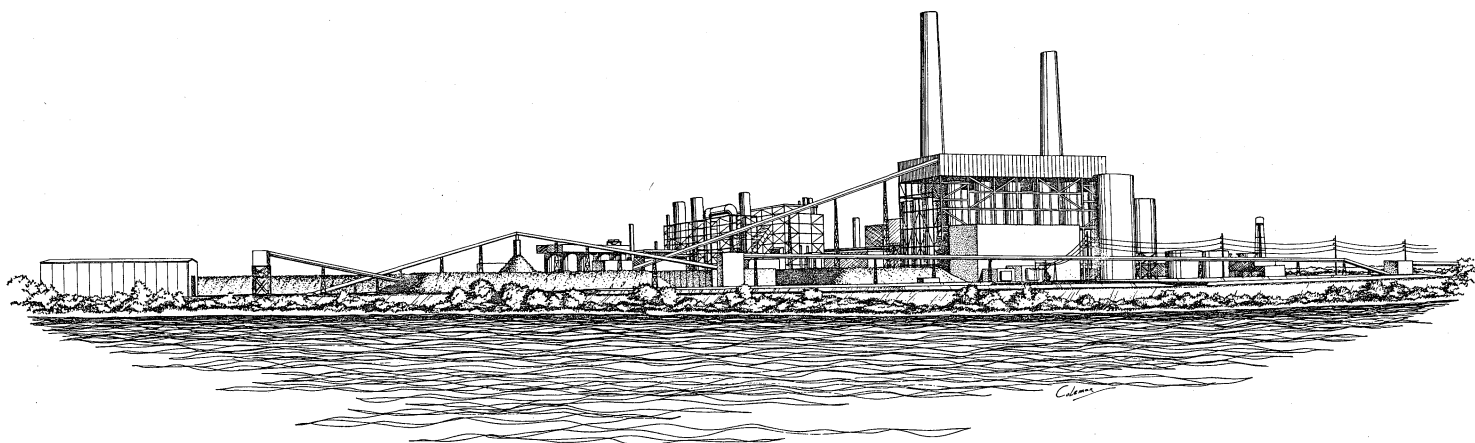
- Boilers with the capacity of the one-third capacity size have been designed and successfully operated. Boilers of the half-capacity or full capacity size would require design extrapolation and would be more subject to development problems.
- Three boilers will enhance availability of the plant. The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

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.

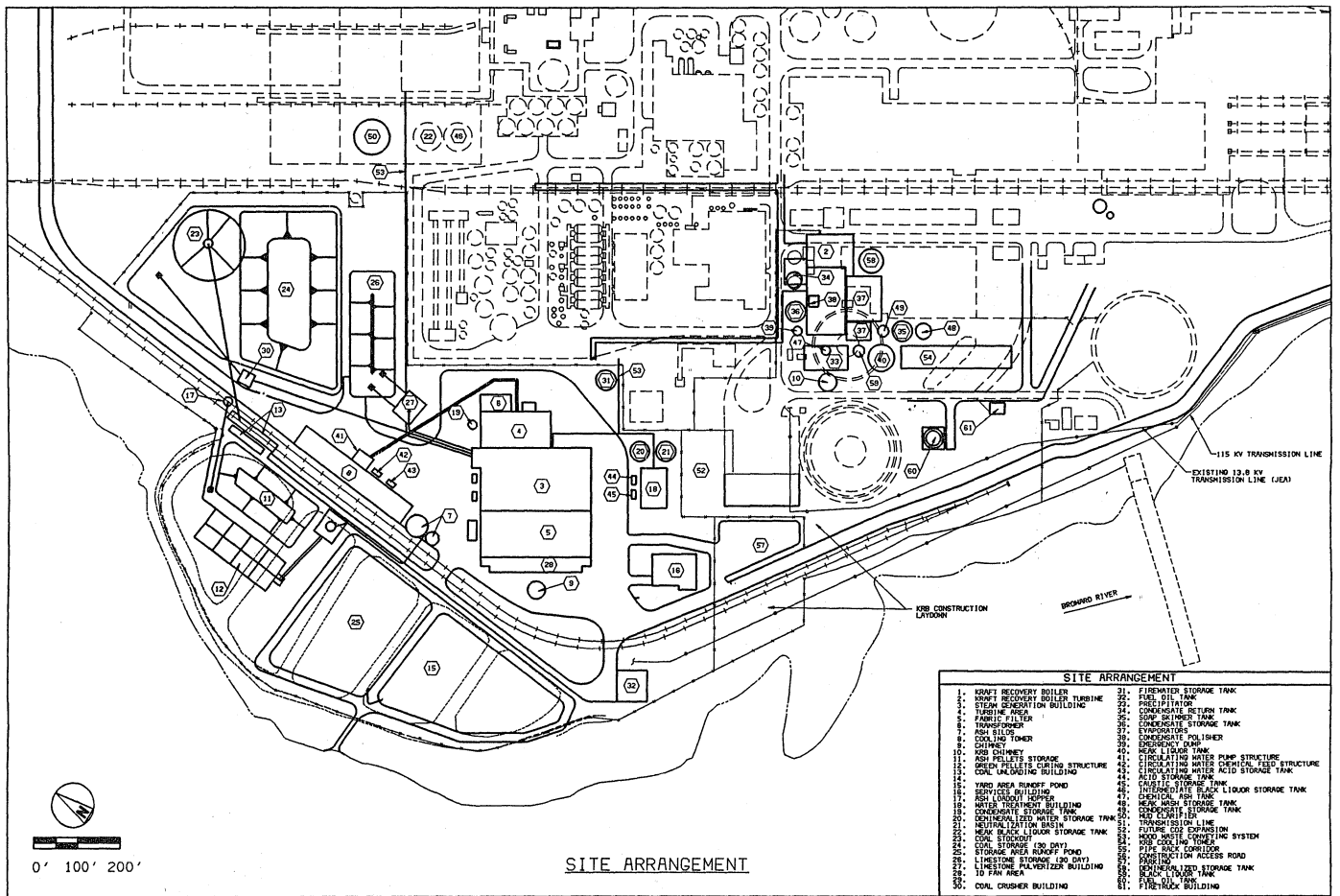
The kraft recovery boiler complex includes a kraft recovery boiler sized to recover the chemicals from the black liquor produced in the



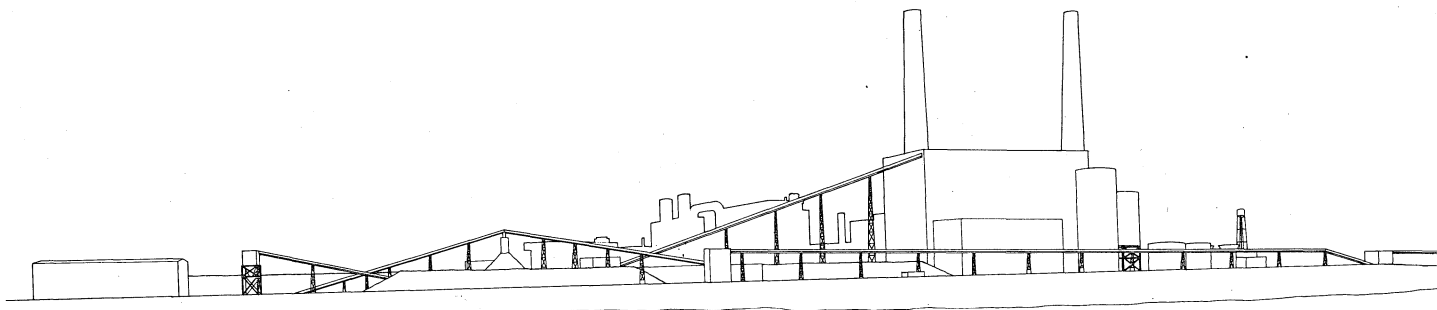
LOOKING EAST — SOUTHEAST

PROPOSED CEDAR BAY COGENERATION
PLANT AND PAPER MILL KRAFT
RECOVERY BOILER COMPLEX
Figure 3.11

Amendment 1
021089



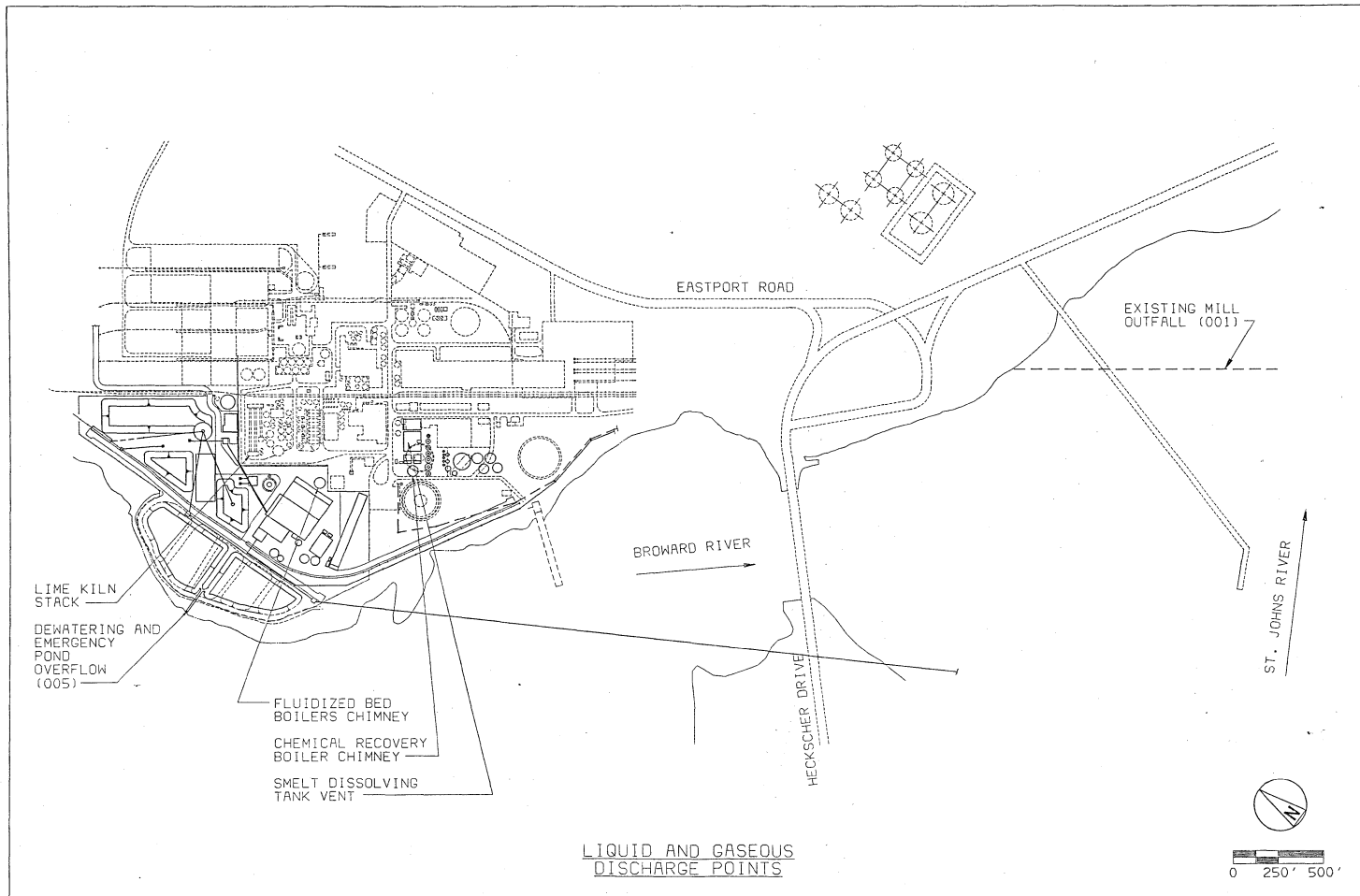
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 Amendment 2 070789
 Amendment 5 122189



Amendment 1
021089
Amendment 2
070789

GENERAL PLANT PROFILE
LOOKING EAST SOUTHEAST
Figure 3.2.2

3-5



Amendment 1
021089
Amendment 2
070789

3-6

LIQUID AND GASEOUS DISCHARGE POINTS

Figure 3.2.3

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 35-acre portion of the site between the mill and the Broward River. | 1

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 a long-term coal supply contract for the plant has been finalized, | 4

it is also possible 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

<u>Proximate Analysis</u>	<u>Design-Basis Coal</u>
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

<u>Fuel Analysis</u>	<u>Typical</u>
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

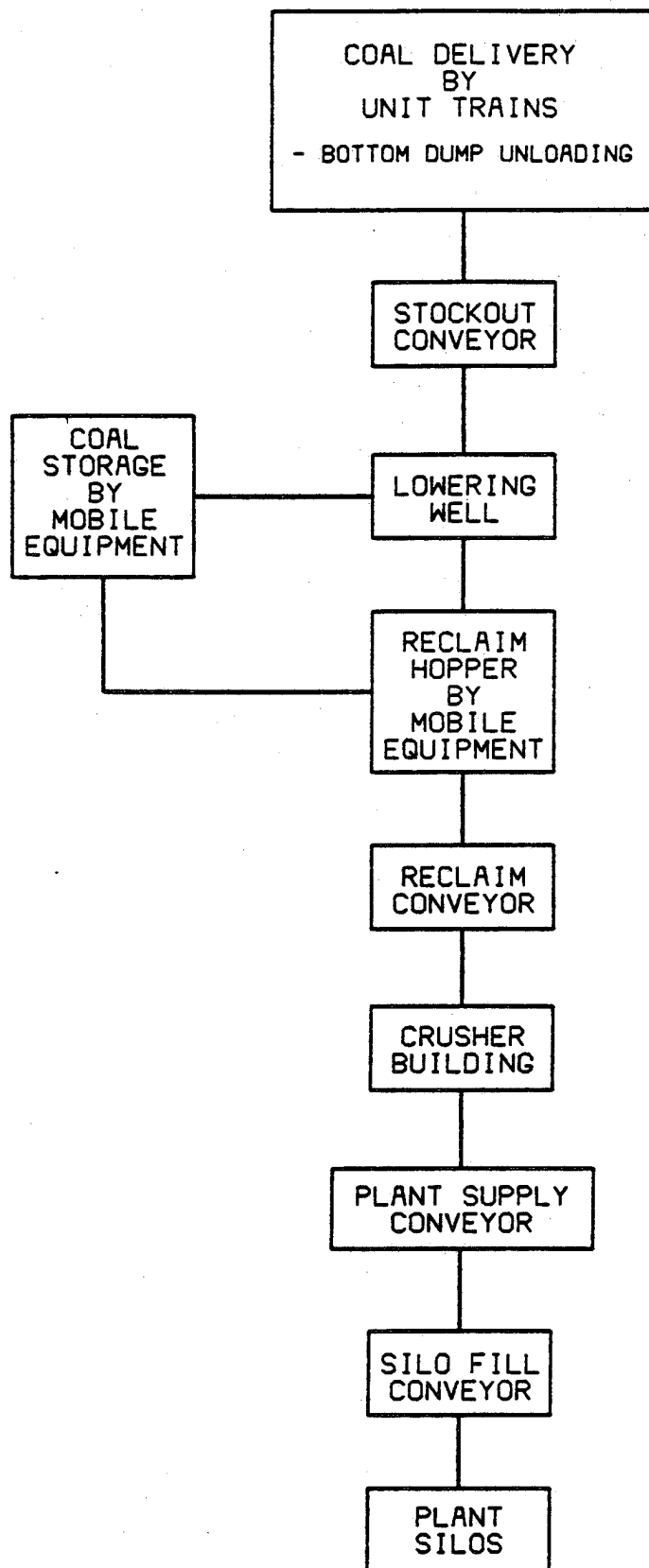
Fuel oil will be shipped to the plant by truck or rail, depending on the supplier.

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



COAL HANDLING PROCESS DIAGRAM

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

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 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 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 cylindrical 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 operating 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. 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)

<u>Year</u>	<u>Pulp Production</u> tons ADUP	<u>Fuel Oil Burned</u> 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
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)

<u>Pollutant</u>	<u>PB</u>	<u>BB</u>	<u>KRB</u>	<u>SDT</u>	<u>Total</u>
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)
SDT = Smelt dissolving tanks (3 total)
TSP = Total suspended particulate
PM₁₀ = Particulate under 10 microns
SO₂ = 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 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 follows.

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

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 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	Cogen- eration 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.

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

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

- Cogeneration plant.
 - Sulfur dioxide = 0.31 lb/MBtu.
 - Nitrogen oxides = 0.29 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.
 - 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.
 - 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.

Emissions of nitrogen oxides are based on 0.29 lb/MBtu, even though analyses in the remainder of the application are based on 0.36 lb/MBtu. The results of all analyses, as given, represent a conservative approach to the assessment.

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.

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 control 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. Controls 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	BACT	NSPS	BACT	NSPS	BACT	NSPS	BACT
	lb/MBtu	lb/MBtu	lb/MBtu	lb/MBtu	lb/MBtu	lb/MBtu	lb/MBtu	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.

**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.

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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Amendment 3

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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	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	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	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

Table 3.4-6 compares the existing pollutant emissions with the proposed facility's emissions and establishes the net emissions (existing minus proposed). EPA's significant emission rate criteria are also included 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 actually reduce the existing facility-wide SO₂ emissions by 377 tons per year. Table 3.4-6 indicates that sulfur dioxide (SO₂), total suspended particulate (TSP), total reduced sulfur (TRS), PM₁₀, 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 (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 SO₂ and particulate to levels well below New 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), SO₂, 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 SO₂, NO_x, and CO.

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

<u>Pollutant</u>	<u>Significant Emission Rates</u>	<u>Existing Emissions</u>	<u>Proposed Maximum Emissions*</u>	<u>Net Emissions</u>	<u>Applicable Pollutant</u>
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
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
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

*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. The noncriteria pollutants--beryllium, mercury, fluoride, and sulfuric acid mist--also require a BACT analysis.
- 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.

- CFB boilers have lower NO_x emission levels (0.36 lb/MBtu) as compared to pulverized coal fueled boilers. A CFB boiler should be capable of meeting a CO emission rate of 0.19 lb/MBtu while meeting 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 technologies adequately demonstrated to be considered for installation. Problems presented by the use of these systems include 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 experience and technical problems, a technical and economic analysis was performed for thoroughness of analysis. | 3
- 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 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.
- BACT regarding applicable noncriteria pollutants is accomplished as a result of flue gas desulfurization and particulate removal operations.

3.4.3.2 Kraft Recovery Boiler.

- Low combustion temperatures and staged combustion inhibit the 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.

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 1979-1980 was found to be the most representative back-to-back years of normal operating conditions. Thus, the mean emissions from these two years are used as the existing sources' actual emissions calculating net emissions.

The 1979-1980 emissions are shown in Table 3.4-1. 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 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 1979 and 1980. The current limiting standard is 0.1 lb/MBtu. Since the operation of the mill's power boilers during 1979 and 1980 would not reflect operation in compliance with today's standard, the TSP emissions were adjusted. The adjusted emissions were computed by

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

Pollutant	1979					1980					Average				
	PB	BB	KRB	SDT	Total	PB	BB	KRB	SDT	Total	PB	BB	KRB	SDT	Total
TSP	224	93	272	124	713	239	128	318	129	814	232	110	295	127	764
PM ₁₀	159	81	207	110	556	170	111	242	114	637	165	96	225	112	597
SO ₂	5,369	1,238	1,441	41	8,089	5,656	508	2,011	42	8,217	5,512	873	1,726	42	8,153
NO _x	999	542	1,414	--	2,955	1,063	457	1,453	--	2,973	1,031	500	1,433	--	2,964
CO	75	470	2,264	--	2,809	79	516	2,327	--	2,922	77	493	2,295	--	2,866
VOC	11	166	370	--	547	12	186	381	--	579	12	176	375	--	563
TRS	--	--	74	7	81	--	--	48	7	55	--	--	61	7	68

Legend: PB = Power boilers (3 total) SO₂ = Sulfur dioxide
BB = Bark boilers (2 total) NO_x = Nitrogen oxides
KRB = Kraft recovery boilers (3 total) CO = Carbon monoxide
SDT = Smelt dissolving tanks (3 total) VOC = Volatile organic compounds
TSP = Total suspended particulate TRS = Total reduced sulfur
PM₁₀ = Particulate under 10 microns -- = 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.

assuming the boilers emitted 0.1 lb/ MBtu of TSP for the fuel use rates and operating hours in 1979 and 1980. The formula for calculation is as follows.

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

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 and various material handling operations. Emission estimates are based on the Cedar Bay facility operating at maximum load for the entire year.

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

- Cogeneration plant.
 - Sulfur dioxide = 0.60 lb/MBtu (at least 90 percent removal).
 - Nitrogen oxides = 0.36 lb/MBtu.
 - Carbon monoxide = 0.19 lb/MBtu.
 - Particulate = 0.02 lb/MBtu.
 - VOC = 0.016 lb/MBtu.

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

Pollutant	Cogen- eration Plant	Kraft Recovery Boiler	Smelt Dissolving Tank	Multiple Effect Evaporator	Material Handling	Total*
Carbon Monoxide	2,654	2,321	--	--	--	4,975
Nitrogen Dioxide	5,028	1,695	--	--	--	6,723
Sulfur Dioxide	8,381	2,387	--	--	--	10,768
Particulate Matter	279	355	50	--	8	692
Particulate Matter (PM ₁₀)	277	267	44	--	8	596
Ozone (VOC)	224	261	--	--	--	485
Lead	98	2.2	0.03	--	--	100.2
Arsenic	166	0.9	0.01	--	--	167
Asbestos	--	--	--	--	--	--
Beryllium	1.6	1.1	0.01	--	--	2.7
Mercury	3.7	0.05	0.0005	--	--	3.8
Vinyl Chloride	--	--	--	--	--	--
Fluorides	1,207	4.6	0.05	--	--	1,212
Radionuclides	**	--	--	--	--	**
Sulfuric Acid Mist	643	--	--	--	--	643
Total Reduced Sulfur	--	35	8	2	--	45
Polycyclic Organic Matter	32	6.7	--	--	--	38.7
Chlorine	635	14.3	1.2	--	--	651
Barium	1.6	--	--	--	--	1.6
Zinc	38	--	--	--	--	38
Vanadium	4.8	--	--	--	--	4.8
Cadmium	1.7	--	--	--	--	1.7
Nickel	53	--	--	--	--	53
Cobalt	19	--	--	--	--	19
Chromium	36	1.0	0.01	--	--	37
Copper	2.8	--	--	--	--	2.8
Manganese	427	--	--	--	--	427
Hydrogen Sulfide	--	25.1	9.7	--	--	34.8
Methyl Mercaptan	--	6.3	3.6	--	--	9.9
Hydrogen Chloride	635	0.7	0.06	--	--	635.7
Phosphorus	1,905	--	--	--	--	1,905
Phenol	32	--	--	--	--	32
Pyridine	32	--	--	--	--	32
Acetaldehyde	32	--	--	--	--	32
Acetic Acid	32	--	--	--	--	32
Formaldehyde	3.1	--	--	--	--	3.1

*Totals may vary because of rounding.

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

-- = Negligible amount.

- Kraft recovery boiler.
 - Sulfur dioxide = 180 ppmvd corrected to 8 percent oxygen.
 - Nitrogen oxides = 180 ppmvd corrected to 8 percent oxygen.
 - Carbon monoxide = 400 ppmvd corrected to 8 percent oxygen.
 - Particulate = 0.032 gr/dscf corrected to 8 percent oxygen.
 - TRS = 5 ppmvd corrected to 8 percent oxygen.
 - VOC = 80 ppmvd corrected to 8 percent oxygen.
- Smelt dissolving tank.
 - TRS = 0.033 lb/3000 lb black liquor solids.
 - Particulate = 0.20 lb/3000 lb black liquor solids.

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.

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.

Tables 3.4-4 and 3.4-5 identify the fugitive dust sources and their associated emissions at the Cedar Bay facility. Both methods for material delivery (barge and rail car have been evaluated and are given for comparison purposes. These tables show that the dust control 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. Controls 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	BACT	NSPS	BACT	NSPS	BACT	NSPS	BACT
	lb/MBtu	lb/MBtu	lb/MBtu	lb/MBtu	lb/MBtu	lb/MBtu	lb/MBtu	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	90% Removal	0.6	NA	180 ppmvd @ 8% O ₂	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	*
Formaldehyde	NA	NA	NA	NA	NA	NA	NA	NA
Polycyclic Organic Matter	NA	NA	NA	NA	NA	NA	NA	NA
Chlorine	NA	NA	NA	NA	NA	NA	NA	NA
Barium	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	NA	NA	NA	NA	NA	NA	NA	NA
Vanadium	NA	NA	NA	NA	NA	NA	NA	NA
Cadmium	NA	NA	NA	NA	NA	NA	NA	NA
Nickel	NA	NA	NA	NA	NA	NA	NA	NA
Cobalt	NA	NA	NA	NA	NA	NA	NA	NA
Chromium	NA	NA	NA	NA	NA	NA	NA	NA
Copper	NA	NA	NA	NA	NA	NA	NA	NA
Manganese	NA	NA	NA	NA	NA	NA	NA	NA
Hydrogen Sulfide	NA	NA	NA	NA	NA	NA	NA	NA
Methyl Mercaptan	NA	NA	NA	NA	NA	NA	NA	NA
Hydrogen Chloride	NA	NA	NA	NA	NA	NA	NA	NA
Phosphorus	NA	NA	NA	NA	NA	NA	NA	NA

* No BACT required because of emission netting.

NA = Not Applicable.

ppmvd = parts per million dry volume.

dscf = dry standard cubic foot.

BLS = Black Liquor Solids.

TABLE 3.4-2b. MAXIMUM EXPECTED EMISSIONS FROM OIL STARTUP FOR THE CEDAR BAY COGENERATION FACILITY (TONS PER YEAR)

<u>Pollutant</u>	<u>Cogeneration Plant*</u>	<u>Kraft Recovery Boiler**</u>
Carbon Monoxide	2.3	11
Nitrogen Dioxide	9.0	43
Sulfur Dioxide	5.6	120
Particulate Matter	0.14	2.2
Particulate Matter (PM ₁₀)	0.14	2.2
Ozone (VOC)	0.56	2.7
Lead	0.00007	0.001
Arsenic	0.00004	0.0002
Asbestos	--	--
Beryllium	0.007	0.003
Mercury	0.000004	0.00001
Vinyl Chloride	--	--
Fluorides	0.0008	0.003
Radionuclides	--	--
Sulfuric Acid Mist	0.06	0.52
Total Reduced Sulfur	--	--
Formaldehyde	--	--
Polycyclic Organic Matter	--	--
Chlorine	0.005	0.02
Barium	0.00007	0.001
Zinc	0.0002	0.0008
Vanadium	0.21	0.79
Cadmium	0.02	0.07

TABLE 3.4-2b (Continued). MAXIMUM EXPECTED EMISSIONS FROM OIL STARTUP FOR THE CEDAR BAY COGENERATION FACILITY (TONS PER YEAR)

<u>Pollutant</u>	<u>Cogeneration Plant*</u>	<u>Kraft Recovery Boiler**</u>
Nickel	0.03	0.1
Cobalt	0.0002	0.0008
Chromium	0.00006	0.0002
Copper	0.0002	0.0008
Manganese	0.0002	0.0007
Hydrogen Sulfide	--	--
Methyl Mercaptan	--	--
Hydrogen Chloride	0.005	0.02
Phosphorus	--	--
Phenol	--	--
Pyridine	--	--
Acetaldehyde	--	--
Acetic Acid	--	--

*Based on distillate fuel usage of 160,000 gallons per year.

**Based on residual fuel usage of 750,000 gallons per year.

-- = Negligible amount.

TABLE 3.4-3 FUGITIVE DUST EMISSION ASSUMPTIONS

OPERATIONAL PARAMETERS

Limestone Consumption (35 tph)	270,000	tpy
Coal Consumption (145 tph)	1,270,000	tpy
Combustion Waste (67 tph)	510,000	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

TABLE 3.4-4. MATERIALS HANDLING DUST EMISSIONS BASED ON BARGE UNLOADING

No. Source	Activity	Emission Equation	H	U	s	M	V	Emission Factor	Use Rate	Uncontrolled Emissions	Control Method	Control Efficiency	Total Controlled Emissions	Point Source Emissions	Area Source Emissions
1 Barge Unloading	Digging Head (coal)	Bucket Wheel Recl.						0.0003 lb/t	1,270,000 ton/yr	0.19 ton/yr	None	0%	0.19 ton/yr		0.04 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	Total Enclosure	90%	0.22 ton/yr		0.05 lb/hr
4 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 and Baghouse	99%	0.00 ton/yr	0.00 lb/hr	
5 Belt Transfer Structure #2	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 and Baghouse	99%	0.00 ton/yr	0.00 lb/hr	
6 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						8.9343 lb/t	3 acres	4.89 ton/yr	Wet Suppression	50%	2.45 ton/yr		0.56 lb/hr
7 Limestone Pile	Limestone Stockout (truck)	Batch Drop	5	9	1.6	0.7	30	0.0036 lb/t	270,000 ton/yr	0.49 ton/yr	None	0%	0.49 ton/yr		0.11 lb/hr
	Limestone Reclaim	Batch Drop	5	9	1.6	0.7	7	0.0059 lb/t	270,000 ton/yr	0.79 ton/yr	None	0%	0.79 ton/yr		0.18 lb/hr
	Wind Erosion	Wind Erosion						2.3056 lb/ac/day	0.75 acres	0.32 ton/yr	Wet Suppression	50%	0.16 ton/yr		0.04 lb/hr
8 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	
9 Pulverizer Vent Dust Collector	Limestone Crushing	Stone Crushing						0.28 lb/t	270,000 ton/yr	37.80 ton/yr	Enclosure & Baghouse	99%	0.38 ton/yr	0.09 lb/hr	
10 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
11 Belt Transfer Structure #3	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	
12 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	270,000 ton/yr	3.52 ton/yr	Enclosure & Baghouse	99%	0.04 ton/yr	0.01 lb/hr	
13 Ash Silo Filters	Fly and Bed Ash Silo Fill	Continuous Drop	40	9	70	2		0.1397 lb/ton	510,000 ton/yr	35.63 ton/yr	Enclosure & Baghouse	99%	0.36 ton/yr	0.08 lb/hr	
14 Ash Conditioning Unloader	Combustion Waste Unloading	Continuous Drop	10	9	70	2		0.0349 lb/ton	510,000 ton/yr	8.91 ton/yr	Enclosure & Baghouse	99%	0.09 ton/yr		0.07 lb/hr
TOTAL													7.88 ton/yr	0.58 lb/hr 0.07 g/s	1.27 lb/hr 0.15 g/s

Parameters

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

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	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	270,000 ton/yr	0.49 ton/yr	None	0%	0.49 ton/yr		0.11 lb/hr
	Limestone Reclaim	Batch Drop	5	9	1.6	0.7	7	0.0059 lb/t	270,000 ton/yr	0.79 ton/yr	None	0%	0.79 ton/yr		0.18 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	270,000 ton/yr	37.80 ton/yr	Enclosure & Baghouse	99%	0.38 ton/yr	0.09 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	270,000 ton/yr	3.52 ton/yr	Enclosure & Baghouse	99%	0.04 ton/yr	0.01 lb/hr	
11 Ash Silo Filters	Fly and Bed Ash Silo Fill	Continuous Drop	40	9	70	2		0.1397 lb/ton	510,000 ton/yr	35.63 ton/yr	Enclosure & Baghouse	99%	0.36 ton/yr	0.08 lb/hr	
12 Ash Conditioning Unloader	Combustion Waste Unloading	Continuous Drop	10	9	70	2		0.0349 lb/ton	510,000 ton/yr	8.91 ton/yr	Enclosure & Baghouse	99%	0.09 ton/yr		0.02 lb/hr
TOTAL													7.80 ton/yr	0.58 lb/hr 0.07 g/sec	1.20 lb/hr 0.15 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

Table 3.4-6 compares the existing pollutant emissions with the proposed facility's emissions and establishes the net emissions (existing minus proposed). EPA's significant emission rate criteria are also included in Table 3.4-6 to determine pollutant applicability with regards to PSD permitting requirements. The table indicates that 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, sulfur dioxide (SO_2), carbon monoxide (CO), lead (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, has been determined as BACT for the cogeneration plant. BACT was determined using the EPA recommended top-down approach. A fabric filter will be used to limit particulate (TSP) emissions. 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)

<u>Pollutant</u>	<u>Significant Emission Rates</u>	<u>Existing Emissions</u>	<u>Proposed Maximum Emissions*</u>	<u>Net Emissions</u>	<u>Applicable Pollutant</u>
Carbon Monoxide	100	2,866	4,975	2,109	Yes
Nitrogen Oxide	40	2,964	6,723	3,759	Yes
Sulfur Dioxide	40	8,153	10,768	2,615	Yes
Particulate Matter	25	764	692	-72	No
Particulate Matter (PM ₁₀)	15	597	596	-1	No
Ozone (Volatile Organic Compounds)	40	563	485	-78	No
Lead	0.6	--	98	98	Yes
Asbestos	0.007	--			
Beryllium	0.0004	--	1.3	1.3	Yes
Mercury	0.1	--	3.1	3.1	Yes
Vinyl Chloride	1.0	--			
Fluorides	3	--	1,025	1,025	Yes
Sulfuric Acid Mist	7	--	545	545	Yes
Total Reduced Sulfur	10	68	45	-23	No

*Assumes 100 percent capacity factor.

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--SO₂, NO_x, CO, and lead--require a BACT analysis. The noncriteria pollutants--beryllium, mercury, fluorides, and sulfuric acid mist--also require a BACT analysis.
- 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.

- The Cedar Bay Cogeneration Plant will generate 2,300,000 lb/h of steam at the maximum design conditions. The largest commercial CFB boiler produces 925,000 lb/h of steam. There are numerous pulverized coal (PC) fired boilers operating that are larger than 2,300,000 lb/h. Consequently, the BACT analysis will compare three CFB boilers (each providing 33 percent of the total capacity), to a single full-capacity PC boiler.
- Flue gas desulfurization alternatives are evaluated on a total air quality control system (AQCS) basis. The AQCS contains FGD and particulate removal equipment, as well as waste disposal. SO₂ removal alternatives evaluated consistent with a top-down approach include the following.
 - One PC boiler followed by a wet limestone scrubber system designed for 94 percent SO₂ removal.
 - Three CFB boilers designed for 90 percent SO₂ removal.
 - PC boiler followed by a wet limestone scrubber system designed for 90 percent SO₂ removal.
 - PC boiler followed by a lime spray dryer system designed for 90 percent SO₂ removal.

- A PC boiler/wet limestone scrubber air quality control system (AQCS) designed to meet a 94 percent SO₂ removal requirement has the highest total levelized annual cost. Additional costs result in an incremental removal cost of \$2,300 per ton to go from 90 percent with a CFB boiler AQCS to 94 percent SO₂ removal. Based on economics, energy, and environmental considerations, a CFB boiler AQCS designed to meet a 90 percent SO₂ removal requirement represents BACT. BACT regarding noncriteria pollutants is accomplished as a result of FGD and particulate removal operations. | 2
- CFB boilers have lower NO_x emission levels than PC boilers (0.36 lb/MBtu as compared to 0.40 lb/MBtu). A CFB or a PC boiler should be capable of meeting a CO emission rate of 0.19 lb/MBtu (CFB boiler) or 0.11 lb/MBtu (PC boiler) while meeting previously discussed NO_x and SO₂ emission levels.
- Selective catalytic reduction (SCR), and selective noncatalytic reduction (Thermal DeNOx) NO_x emission control technologies are the only technologies adequately demonstrated to be considered for installation. There is no publicly available operating experience with the use of either of these two technologies downstream of a coal fired CFB boiler. Problems presented by the use of these systems include 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 lack of 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 or PC boiler would result in an incremental NO_x reduction cost of \$6,800 and \$6,200 per ton, respectively. Installation of a 60 percent efficient Thermal DeNOx system on a CFB or PC boiler would result in an incremental NO_x reduction cost of \$1,400 and \$1,200 per ton, respectively. | 2 | 2

- Consideration of environmental factors also supports the selection of combustion controls as BACT for NO_x . Use of an SCR or a Thermal DeNOx 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.

3.4.3.2 Kraft Recovery Boiler.

- Sulfur dioxide emissions from the kraft recovery boiler (KRB) are controlled by creating conditions (vigorous burning at high temperature) which minimize the initial SO_2 release from the black liquor, and by simultaneously creating conditions (vigorous burning and high lower furnace temperature) which are favorable for capturing SO_2 by reaction with alkaline sodium carbonate (Na_2CO_3) particles. Relatively large quantities of Na_2CO_3 are released during black liquor combustion.
- Manufacturers indicate that current KRB designs can consistently meet an SO_2 emission requirement of 180 ppmvd corrected to 8 percent oxygen (approximately 0.48 lb/MBtu).
- In addition to combustion controls, SO_2 emissions can be controlled by a flue gas desulfurization system. Currently, there are no kraft recovery boilers with supplemental FGD systems. A wet sodium scrubber FGD system designed for 90 percent SO_2 removal would result in an incremental removal cost of \$2,900 per additional ton of SO_2 removed. Therefore, based on economics and energy use, an SO_2 emission limit of 180 ppmvd corrected to 8 percent oxygen represents BACT.

- Despite a complete lack of operating experience, a Thermal DeNO_x 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.
- BACT for CO emissions from the KRB is proper boiler design and operation (consistent with previously proposed NO_x and SO₂ 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.

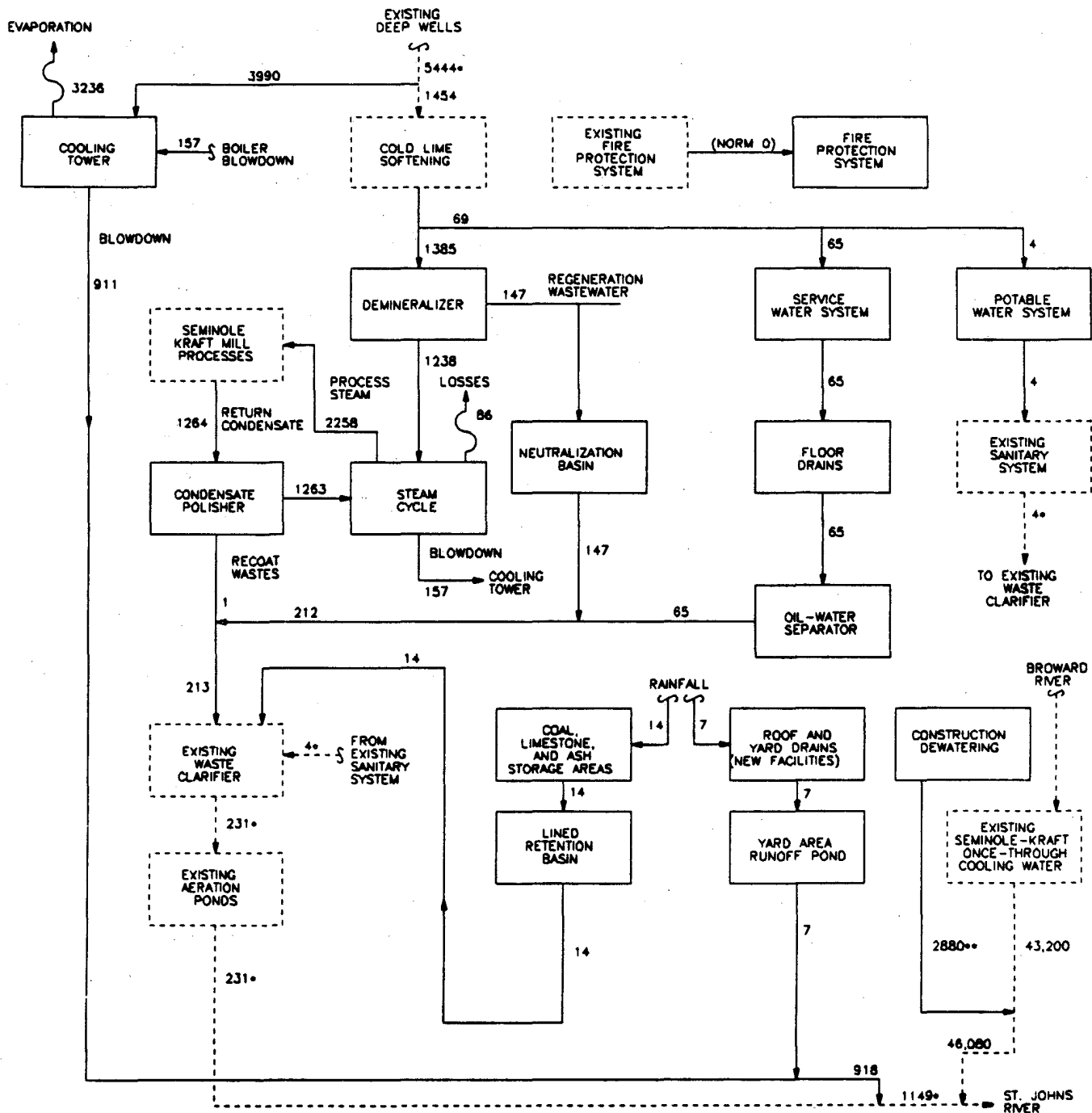
3.4.5 Design Philosophy

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 Corporation 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

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

<u>Constituent</u>	<u>Raw Well Water</u>	<u>Treated Well Water*</u>
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

	<u>Power</u>	<u>Recovery</u>	<u>Evaporator</u>
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 existing Seminole Kraft discharge pipeline to the St. Johns River.

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

<u>Constituent</u>	<u>Raw Well Water</u>	<u>Circulating Cooling Water*</u>
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 recast 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 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 BOD₅ 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 flow, 75 lb/day of suspended solids, and 20 lb/day of BOD₅. The peak flow, which will occur during heavy rainfall periods, is expected to be 624,000 gallons 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 BIOCIDES 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 existing Seminole Kraft waste clarifier via the chemical drains system.

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 BOD₅ per day, based on 0.075 pound of BOD₅ 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

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 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 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.

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

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 sold within the building materials industry or disposed of by the coal supplier at an approved disposal location outside of the state of Florida. 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 260,000 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 14,000 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 65,000 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 the chemical cleaning contractor as discussed in Subsection 3.6.6.

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.

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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 (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 western 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 sub-grade 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 discharged via an emergency overflow chute directly to the Broward River. | 1

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 construction area storm-water runoff 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. | 1 | 5

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 western portion of the new facilities area. The pond will be designed to retain, without | 1

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 discharged via an emergency overflow chute directly to the Broward River.

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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 supernatant 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, up-gradient 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

Ash landfill
results of
analysis

described. Fuel transportation, storage, and handling are discussed in Sections 3.3, 6.2, and 6.3.

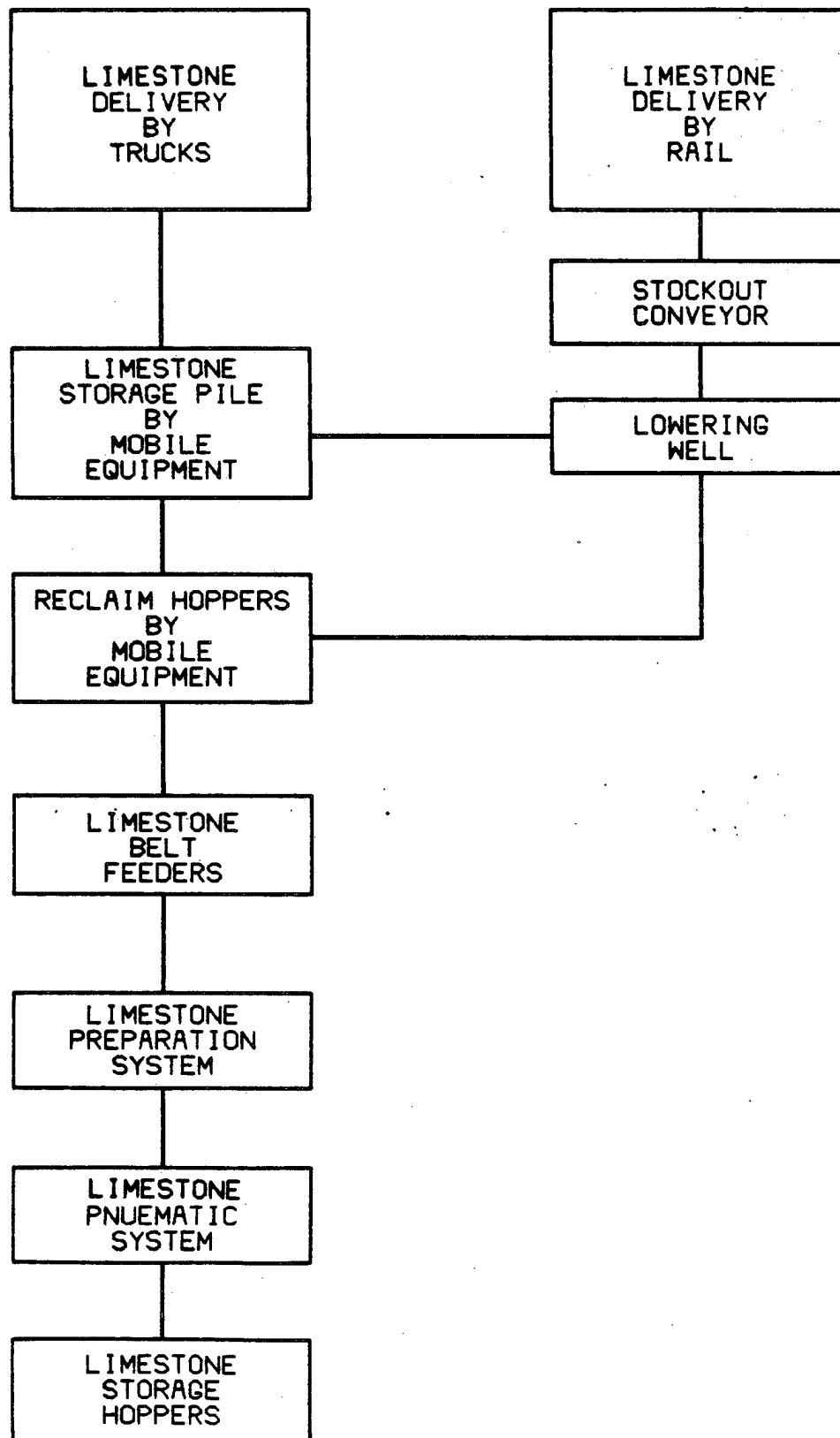
3.9.1 Construction Materials and Equipment

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.

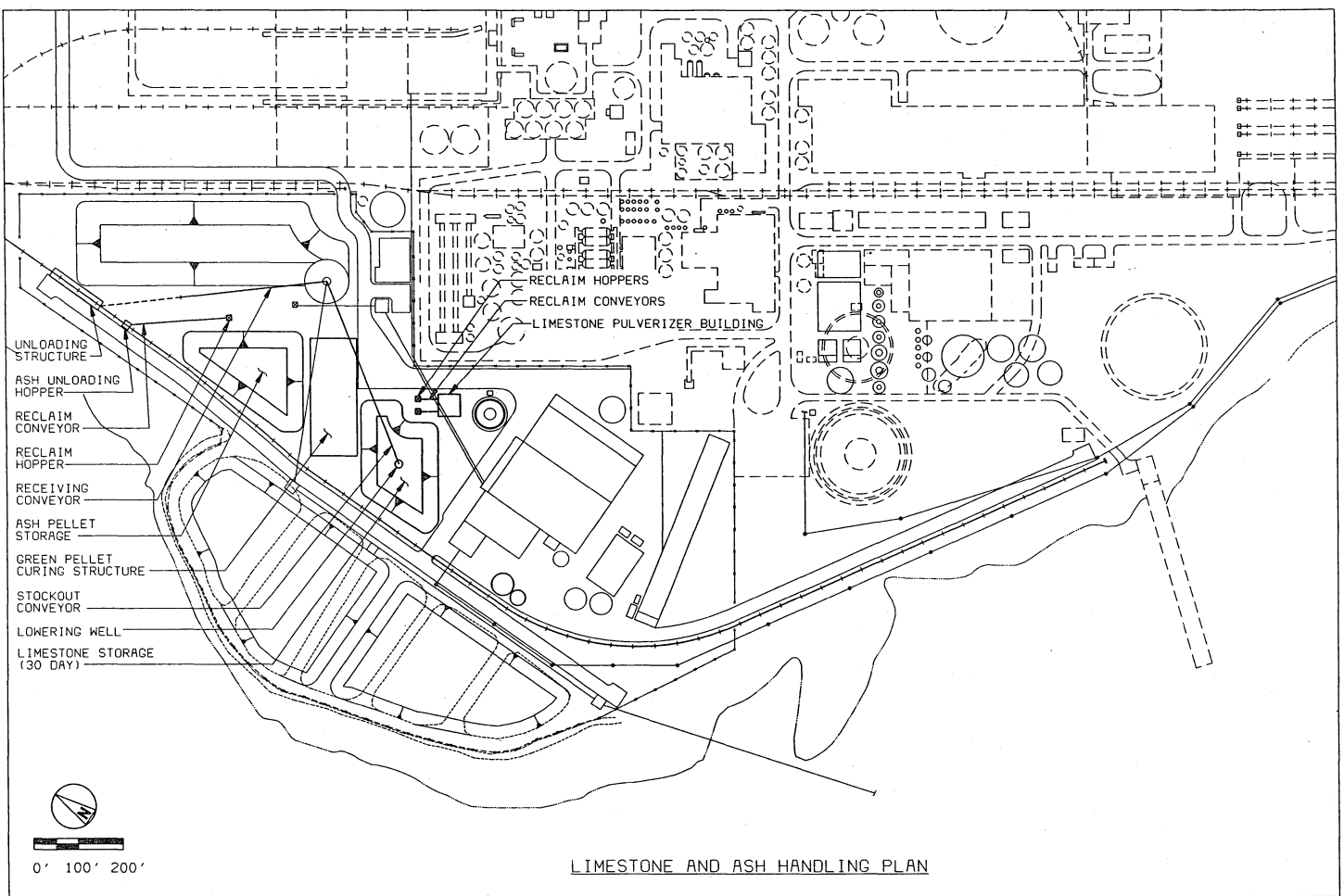
3.9.2 Limestone Handling

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 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



Amendment 1
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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 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 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 hoppers located in the Steam Generation Building.

The limestone storage area will consist of a maximum of 25,000 tons of limestone and will be located north of the Steam Generation Building. The 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 accomplished by fabric filter dust collectors. The limestone belt conveyors and feeders will have covers over the belt to control fugitive dust. If limestone is delivered by rail, then a lowering well as described in Section 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 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.

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

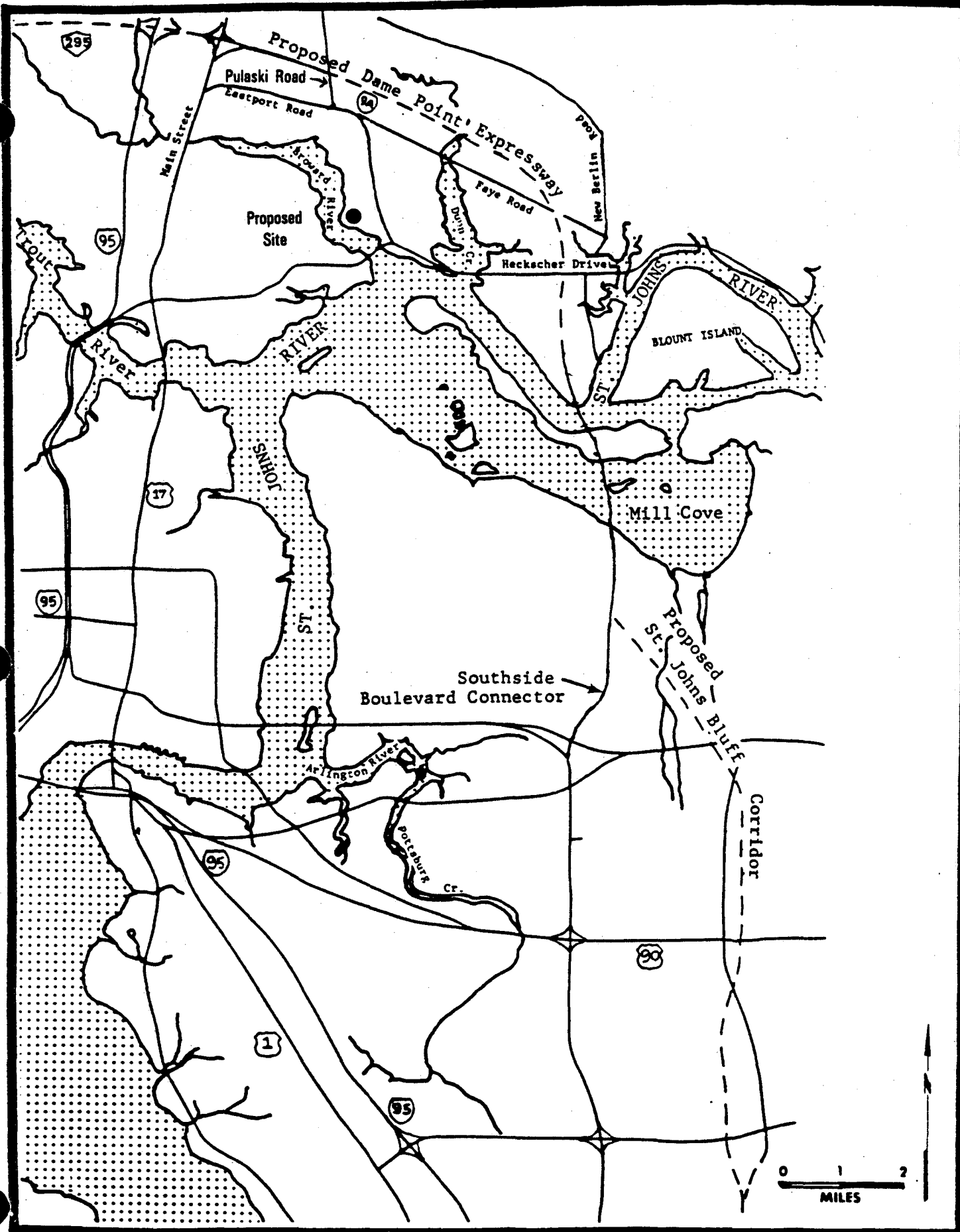
Heavily loaded construction trucks will travel to the site from Interstates 95 and 295 or the Dames Point Bridge to Highway 9A, as shown on Figure 3.9-3. Traffic will then exit to Pulaski Road south to Eastport Road. Heavy construction traffic will avoid Heckscher Drive due to bridge load limits. The 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



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

4.0 EFFECTS OF SITE PREPARATION AND PLANT AND ASSOCIATED FACILITIES CONSTRUCTION

4.1 LAND IMPACT

The construction of the Cedar Bay Cogeneration Project will have minimal negative impact on the existing land areas of the site. Further, the proposed project is expected to result in beneficial impacts from the standpoint of general site aesthetics, presenting a more orderly appearance.

4.1.1 General Construction Impacts

The Seminole Kraft paper mill site consists of 425 acres, and the new Cedar Bay Cogeneration Project facility will occupy approximately 35 acres of the paper mill property. The proposed construction area is presently used for storage of lime mud from the paper mill, a railroad yard, lime settling ponds, fuel oil storage, and debris storage, and the land already has been considerably disturbed. The construction of the cogeneration plant will have little impact on the existing land uses.

No explosives are planned for use during construction.

The area north of the existing mill material supply road will be used for construction laydown and storage. This area is presently being used for storage of sludge and debris. Relocation of this sludge and debris and a minimal amount of regrading and shell surfacing are required to make the area suitable for construction.

The coal and limestone handling and storage areas shown on the site arrangement, Figure 3.2-1, will also be used for a field office and construction laydown early during the construction period. Since the area is part of the previously disturbed paper mill site, there will be minimal impact.

An access road will be constructed from Eastport Road west across the paper mill property to the cogeneration plant site as shown on Figure 2.1-2. A description of the construction of the road is given in Section 3.9. The road construction will result in some slight alteration of the existing

terrain. The road will be 32 feet wide with a 20-foot wide paved center section and a 6-foot shoulder on either side. Grading and leveling of the road bed will be necessary. Essentially, all of the road will be built on the paper mill site, and impacts will be minor.

The existing rail spur will be modified and some new trackage added for access to the cogeneration plant. A description of the railroad line is given in Section 3.9, and a discussion of impacts is given in Section 6.3.

The Cedar Bay Cogeneration Plant will interconnect with the Jacksonville Electric Authority's substation located east of Eastport Road across from the plant site. Only a short interconnection with the substation will be necessary, and there will be no noticeable impacts. The interconnection is shown on Figure 2.1-2.

Construction wastes will be removed from the site for disposal at an approved facility. Any garbage (food containers, papers, etc.) will be collected in appropriate waste collection containers and disposed of off-site.

Oil from construction vehicles will be collected in appropriate containers and transported offsite for disposal at an approved site. There will be no onsite disposal of construction wastes.

4.1.2 Roads

Because none of the roads constructed for the new facilities will connect to state roads, information required by the Department of Transportation's "Utility Accommodation Guide" is not required.

4.1.3 Flood Zones

As shown on Figure 2.1-4, a portion of the proposed rail line extension at the Cedar Bay Cogeneration Plant is within the 100-year flood plain. This portion of the site will be filled to raise the area elevation so that it is equal to or greater than that of the Regulatory Flood Datum to avoid flooding. Addition of the fill should not increase flood elevations or flow velocities since floods are due to tidal action and the fill will not significantly restrict flow in the Broward River.

4.1.4 Topography and Soils

As described in Subsection 4.1.1, the proposed construction area is presently used for a railroad yard, lime settling ponds, fuel storage tank, and storage area for lime mud from the paper mill. 2

Initial site preparation will require the relocation of an estimated 230,000 cubic yards of the lime mud which has been stored on the cogeneration plant site including an estimated 100,000 cubic yards of saturated lime mud (muck) that has accumulated in the existing drainage ditches and settling ponds. The lime mud will be excavated using equipment typical of earth moving operations and transported by truck to a new lime mud storage area in the northwestern portion of the Seminole Kraft property. Figure 2.1-2 indicates the proposed location of the lime mud storage area. 2 4

Construction of the storage area will include a geomembrane cap and seeded earth cover. Upon completing the removal and relocation of the lime mud from the cogeneration plant site, the storage area will be completed and no further construction or operational activities are anticipated at that area.

Construction of the plant will require subgrade enhancement. Compacted subgrades will be provided by the importation of fill material. Ground modification techniques to compact existing soil may also be used. The strength and stability of the fill material and the modified soil will be superior to that of the existing soils and will be suitable for the expected construction and operation loads.

The permeability of compacted fill materials will likely be greater than that of the existing soils and lime mud deposits. Therefore, in comparison with existing conditions, percolation will likely increase and runoff decrease as a result of construction activities. This will result in a temporary increase in ground water recharge. As construction progresses and the area of impervious surfacing increases, percolation will decrease and runoff will increase. Construction runoff will be collected, contained, and discharged as described in Section 3.8.

Site preparation will involve the demolition and removal of a few existing structures. These structures include a fuel oil tank, minor 2

2
maintenance structures, and railroad tracks. Any site areas disturbed by the demolition activities will be compacted and smooth-graded. Disturbed soil may be densified with soil modification techniques. Some of these existing structures may contain asbestos materials. All demolition activities will be conducted in compliance with applicable requirements of the National Emissions Standards for Hazardous Air Pollutants (NESHAPS) rules. In addition, required notifications will be made to the Jacksonville Bio-environmental Services Division prior to any demolition activities.

A synthetic impervious liner will be installed in the fuel and ash handling areas of the site as described in Sections 3.3 and 3.8.

4
Relocation of the accumulated lime mud to the storage area and general site preparation operations will serve to "clean up" the appearance of the site and improve overall aesthetics. A perspective view of the proposed plant is provided in Section 3.1.

Ground modification techniques may be used to perform in situ deep compaction of the existing site soils to permit the use of shallow foundations for support of heavily loaded structures. The ground modification techniques may include vibroflotation, vibroreplacement, dynamic deep compaction, or a combination of several of these techniques. Vibroflotation and dynamic deep compaction would be utilized to densify the lower density surficial sand soils. Vibroflotation would require the placement of clean sand to refill probe holes. Dynamic compaction would require placement of clean fills to fill surface depression created by the settlement of the subsurface soils under the heavy impacts of the compaction weights. Vibroreplacement, as an alternative to the above techniques, will place columns of gravel or stone through low strength surface soil into denser underlying strata.

All the techniques will improve the bearing strength of the in situ soils. The ground modification programs will be limited to areas beneath the foundations of plant facilities. The modification programs will not extend to the underlying limestone bedrock and should not increase the potential for sinkhole formation. The fill materials used to fill the probe holes or relevel the site will be equal to or superior to the existing site soil materials.

4.2 IMPACT ON SURFACE WATER BODIES AND USES

4.2.1 Impact Assessment

The construction of the Cedar Bay Cogeneration Plant will have no appreciable impact on any surface waters. There are no bodies of water on the plant construction site. The area is presently a storage area for lime mud from the paper mill, with very sparse vegetation. A silt fence will be installed along the western perimeter of the site to prevent the deposition of silt in the river as a result of soil erosion during construction.

As described in Section 3.8, 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. Therefore, no increase in runoff to the Broward River is expected, as a result of construction activities.

4.2.2 Measuring and Monitoring Programs

During construction, water samples from the dewatering discharge will be collected and tested monthly and compared to the water quality standards for Class III water.

2 | 5

4.3 GROUND WATER IMPACTS

4.3.1 Ground Water Impact Assessment

4.3.1.1 Water Table Zone. Ground water quality impacts due to construction activities will be negligible. Studies show that any water infiltrating the site flows to the water table, then nearly horizontally toward the Broward or St. Johns River.

Construction water will be collected in ponds, treated as necessary, and discharged into the St. Johns River by way of the existing Seminole plant outfall. Seepage from these ponds to the ground will flow to the water table, then to the Broward River. Any water not collected by the ponds will also seep to the water table and be discharged into that river.

4.3.1.2 Shallow Aquifer. Dewatering for the coal receiving structure, circulating water pipes, and cooling tower basin will be required. The expected dewatering activities include a one-month period of initial draw-down at about 2,000 gpm for the railcar unloading facility, an additional five to eight-month period of dewatering for this same facility at about 1,000 gpm, and the remaining 15 months with miscellaneous dewatering varying from 0 to 350 gpm.

Several underground gasoline, fuel oil and diesel storage tanks exist in the Seminole Kraft Mill. All underground tanks will be emptied, cleaned and sand filled prior to start of construction. At three tank locations, two diesels and one heavy fuel oil, significant contaminated ground water or free hydrocarbon product was detected. The two diesel storage tanks are included in the State EDI program. No free product was detected at the fuel oil tank location. Removal of the contaminated ground water and free hydrocarbon product will be started prior to the start of construction dewatering operations at the one diesel tank location that is within the radius of influence of the dewatering operations. The dewatering operations are not anticipated to have any effect on the remaining two sites. The removal technique will create a small localized depression, and reverse ground water gradient, in the surficial ground water table by pumping water below the contaminated zone. This will prevent continued expansion of the contaminated zone due to the natural ground water gradient, or any future construction dewatering operations. The contaminated water and free hydrocarbons will be removed by a surface skimmer system in a well centered in the localized ground water table depression.

The site is on a peninsula and is surrounded by the Broward and St. Johns Rivers and Dunn Creek. Two shallow wells have been installed on the site, in the little league field along Kraft Road and in the Champion Garage. The radius of influence for dewatering the coal receiving structure is estimated to be 1,300 feet on the shoreside. The nearest of the shallow wells is 2,000 feet from the coal receiving structure and is not within the radius of influence of the dewatering activities. Therefore,

there should be no effect on any offsite shallow wells. Water from dewatering operations will be mixed with the Seminole Kraft once-through cooling water and discharged to the St. Johns River as described in Section 4.11.

4.3.1.3 Floridan Aquifer. Construction water will be withdrawn from the existing Seminole Kraft paper mill wells. The additional quantity of water required for construction will not cause the paper mill wells to exceed the permitted withdrawal rates.

4.3.2 Measuring and Monitoring Programs

Background water quality was described in Subsection 2.3.2.1, Subsurface Hydrologic Data for the Site. New monitoring wells will be installed and ground water will be monitored as described in Subsection 5.3.5.

4.4 ECOLOGICAL IMPACTS

4.4.1 Impact Assessment

4.4.1.1 Wildlife. The proposed cogeneration plant site currently is a lime mud storage area for the paper mill. There is minimal wildlife habitat present. No noticeable impacts on wildlife will result from the construction of the main cogeneration plant facility.

4.3.1.2 Shallow Aquifer. Dewatering for the coal receiving structure, circulating water pipes, and cooling tower basin will be required. The expected dewatering activities include a one-month period of initial draw-down at about 2,000 gpm for the railcar unloading facility, an additional eight-month period of dewatering for this same facility at about 1,000 gpm, and the remaining 15 months with miscellaneous dewatering varying from 0 to 350 gpm. 4

The site is on a peninsula and is surrounded by the Broward and St. Johns Rivers and Dunn Creek. Two shallow wells have been installed on the site, in the little league field along Kraft Road and in the Champion Garage. The radius of influence for dewatering the coal receiving structure is estimated to be 1,300 feet on the shoreside. The nearest well is 2,000 feet from the coal receiving structure and is not within the radius of influence of the dewatering activities. Therefore, there should be no effect on any offsite shallow wells. Water from dewatering well will be discharged directly into the Broward River. 2

4.3.1.3 Floridan Aquifer. Construction water will be withdrawn from the existing Seminole Kraft paper mill wells. The additional quantity of water required for construction will not cause the paper mill wells to exceed the permitted withdrawal rates.

4.3.2 Measuring and Monitoring Programs

Background water quality was described in Subsection 2.3.2.1, Subsurface Hydrologic Data for the Site. New monitoring wells will be installed and ground water will be monitored as described in Subsection 5.3.5. 2

4.4 ECOLOGICAL IMPACTS

4.4.1 Impact Assessment

4.4.1.1 Wildlife. The proposed cogeneration plant site currently is a lime mud storage area for the paper mill. There is minimal wildlife habitat present. No noticeable impacts on wildlife will result from the construction of the main cogeneration plant facility.

There are two potentially sensitive areas along the existing railroad line and in the proposed lime storage facility north of the cogeneration plant. During several surveys of the area, burrows of the gopher tortoise (Gopherus polyphemus) and gopher tortoise tracks were observed near the railroad, in the proposed corridor, and in the proposed storage facility area. Two tortoises have been sighted in the vicinity of the railroad. The Florida Committee on Rare and Endangered Plants and Animals (FCREPA) has recommended that the gopher tortoise be classified as a state threatened species; it is presently listed as a species of special concern.

Construction of the additional rail line will directly impact gopher tortoise burrows in the path of construction, as well as remove some feeding areas (open grassy areas along the existing railroad right-of-way). Construction of the lime mud storage facility will also remove gopher tortoise habitat, and will directly impact the burrows located within the perimeter of the storage facility construction site. Consultation with the Florida Game and Freshwater Commission is in progress to develop a mitigation plan.

4.4.1.2 Aquatic Biota. Construction of the cogeneration facilities on the Seminole Kraft paper mill site will have no appreciable aquatic impacts. The construction site has been disturbed previously, and there should be little increase in runoff to surface waters.

Modern holding pond facilities will be constructed entirely within the perimeter of the existing ponds, in a manner that will utilize the existing dike on the western periphery. All construction related activities will be confined to the inland side of an existing chain-link fence. Therefore, the Spartina-Juncus tidal marsh located along the Broward River shoreline will be protected from construction impacts.

No other onsite wetlands will be impacted by construction of the cogeneration plant facilities.

4.5 AIR IMPACT

Air quality impacts during the construction phase of the project will be temporary and generally minor. These impacts include the generation of fugitive dust and equipment exhaust emissions. The local air quality impact will be minimized by the application of appropriate dust suppression control methods, such as spraying or paving roads. The impacts will cease when construction activities are terminated and the facilities are ready for operation.

Building and road construction have the highest potentials for generating fugitive dust emissions. Emissions during the construction of buildings or roads will be associated with land clearing, ground excavation, cut and fill operations, and actual construction of the facility. Fugitive dust emissions can vary substantially from day to day depending on the level of activity, the specific operations, and prevailing weather conditions. A large portion of the emissions will result from vehicular traffic over roads at the construction site.

The proposed site is located at the existing industrial site of the Seminole Kraft paper mill on the east bank of the Broward River. The plant site covers approximately 35 acres. Most of this area will be disturbed by the construction process. Minor excavation will be required for the coal

buildings or roads will be associated with land clearing, ground excavation, cut and fill operations, and actual construction of the facility. Fugitive dust emissions can vary substantially from day to day depending on the level of activity, the specific operations, and prevailing weather conditions. A large portion of the emissions will result from vehicular traffic over roads at the construction site.

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receiving structure, and accumulated lime mud will be relocated to the northwestern portion of the Seminole Kraft property. The site will be covered with a sand fill and open areas revegetated after completion of construction. The construction process will disturb the site only temporarily, and most of the surface area of the site will be covered by buildings or paved roadways.

Another fugitive dust source related to the construction of the proposed facility is the vehicular travel to and from the plant site. The quantity of dust emissions from a road depends on the number of vehicles, vehicle speed, type of vehicle, and road surface type. The major roads surrounding and leading to the plant site are paved, and new roads on the plant site will be paved at the end of the construction period. Dust palliatives and water and water-based sprays will be applied to the roads as required to control fugitive dust emissions during construction.

Construction equipment exhaust also may cause a minor temporary local air quality impact. The major pollutant from diesel-powered construction equipment exhaust is particulate matter, but use of construction equipment will be short-term, and impacts will cease when construction is complete. The increase in vehicular traffic during construction will be small compared to the existing traffic from the Seminole Kraft paper mill.

4.6 IMPACT ON HUMAN POPULATIONS

Construction related impacts on the human population environment are expected to be minor, especially with regard to increases in traffic and routinely used facilities and resources. Some additional noise will result from construction activities.

The Cedar Bay Cogeneration facility site is in a heavy industry zoned area on the north side of Jacksonville, Florida. Even though the most populated areas of Jacksonville are south of the site across the St. Johns River in the Greater Arlington and Northwest areas, there are some neighborhoods in the north side areas near the facility site. There is a lightly populated neighborhood directly across the Broward River approximately 1/2 mile west of the site. The Polly Town neighborhood area is a very lightly populated area northeast of the site a little more than a mile

away on Faye Road. The San Mateo neighborhood is in a more populated area approximately 2 miles northwest of the facility site, south of Eastport Road near North Main Street. The other neighborhoods on the north side of Jacksonville in the proximity of the site are more than 3 miles to the west and northwest, on the west side of Interstate 95.

Traffic impacts will arise from construction workers traveling to and from the site and from truck deliveries of construction materials and equipment.

Table 4.6-1 provides a schedule of the estimated work force to be involved in the site preparation and construction of the Cedar Bay Cogeneration facility. The 30-month construction schedule is projected to start in January 1990 and be completed in June 1992. A projected peak workforce of 990 is indicated in June 1991. This includes a second shift as required for portions of construction and 5 percent casual overtime. The high work-force period would be approximately 16 months, during which the average number of employees would be 560. Construction employment during the peak quarter (second quarter of 1991) is projected to average 862.

Assuming a second construction work shift roughly equal to 50 percent of the primary shift, and assuming an average of 1.2 persons riding in each car, approximately 475 trips would be made to the site between the hours of 7:00 and 8:00 a.m., and from the site between 3:30 and 4:30 p.m., during the peak quarter of construction. An average of just over 300 rush hour trips during the high workforce period would be made to and from the site each day.

With construction workers arriving at the site from I-295 or I-95 via Heckscher Drive from the south, and via SR-9A to Pulaski to Eastport or via Main Street to Eastport Road from the north, the impact of 100 to 200 more trips per route is not expected to significantly affect the level of service along any of the regionally significant roadways previously described in Section 2.2.7.4. In addition, some workers may be expected to use the new Dames Point Bridge and approach the site from the east via Heckscher Drive or Faye Road.

As discussed in Section 3.9.1, the heaviest construction equipment will be delivered by rail. Trucks will be used to transport the less heavy

materials and equipment expected to be available locally from the greater Jacksonville area. As stated in Section 3.9.4, construction trucks will travel to the site from I-95 and I-295 or the Dames Point Bridge to SR-9A. Traffic will then exit to Pulaski Road south to Eastport Road. Construction truck traffic will avoid Heckscher Drive because of bridge load limits. Generally, truck deliveries will be scheduled around the arrival or departure of construction workforce shifts and should not add to peak traffic congestion conditions.

Given the significantly lower workforce required to construct the Cedar Bay project relative to the workforce required for the St. Johns Power Park, and given subsequent improvements to the roadways leading to the site, noticeable congestion impacts during construction should be short-term and relatively small.

The construction of the facility will produce a certain amount of noise which will impact those neighborhoods near the site. The noise sources and sound levels will vary according to the phase of construction. Major sources of noise are pile driving and earth moving equipment operation. The majority of the construction activities will be limited to normal daytime hours (7 a.m. to 10 p.m.) during the week. Any inconveniences caused by noise will be intermittent and of limited duration. The following noise control measures will serve to reduce the potential effect of facility construction noise.

- Exhaust mufflers used on all internal combustion engines.
- Pile driving operations conducted only during daytime hours, when background noise levels are higher.

4.7 IMPACT ON LANDMARKS AND SENSITIVE AREAS

There should be very minimal impact on the landmarks described in Subsection 2.2.5 during the construction of the Cedar Bay Cogeneration facility. While a portion of the construction workforce will choose Heckscher Drive as their route to the site, impacts on the Jacksonville Municipal Zoo should be minimal because of the noncoincidence of zoo and construction worker traffic.

4.8 IMPACT ON ARCHAEOLOGICAL AND HISTORIC SITES

No impacts are anticipated on the archaeological or historic sites in the vicinity of the Cedar Bay Cogeneration Project site. At this time, no archaeological studies are planned during the construction and operation of the facility. However, should any unforeseen discoveries occur, the Florida Secretary of State, Division of Archives, History and Records Management will be promptly notified, and an appropriate program will be developed. The Director of the Archives, History and Records Management will provide assistance by indicating the significance of the discovery and the appropriate preservation method to employ. The construction activities will be monitored to the extent that if a discovery occurs during construction, the activities in the immediate area of the discovery will be halted until the significance is determined and a method of preservation, if necessary, is put into place.

4.9 SPECIAL FEATURES

Trash and garbage will be collected in appropriate containers and removed from the site by a contractor for disposal at an approved facility. There will be no unusual products or raw materials used during construction which may affect the environment.

4.10 BENEFITS FROM CONSTRUCTION

The construction of the Cedar Bay Cogeneration Plant will have a beneficial impact on the local and regional economy. Construction materials will be purchased locally, within the state, and regionally. There will be increased employment opportunities, additional income, and more tax revenue. A detailed discussion of benefits from construction is given in Section 7.0.

4.11 VARIANCES

Law Engineering has performed several subsurface investigations at the Seminole Kraft mill site. Law performed insitu permeability tests during the development of the ground water monitoring plan for the mill, at the

time owned by the St. Regis Corporation, during 1983. The results of their tests indicated an insitu permeability averaging 0.007 fpm, with a maximum value of 0.0149 fpm. Previous analyses to determine the quantity of dewatering water have conservatively used the highest permeability value.

In order to determine the contributory flow areas, a horizontal flow net analysis was developed. This method of analysis is described in Seepage, Drainage and Flow Nets, by Harry R. Cedergren and "Dewatering and Ground Water Control for Deep Excavations" NAVFAC P-418. This is a graphical method that determines equipotential lines and flow streamlines to develop the drainage pattern to the excavation.

Figure 4.11-1 provides the flow net developed for the coal unloading structure. Eleven flow channels were developed. By this technique, each flow channel carries equal flows showing, as anticipated, that a large portion of the flow to the dewatering system will come from the existing Seminole Kraft lime mud ponds and the Broward River.

An analysis was performed to determine when ground water from the various sources (the Broward River, lime mud ponds, or ground water from the locations of the monitoring wells) will reach the coal unloading structure excavation. The velocity of ground water flow through a soil medium is described by the equation:

$$K_i/n = V$$

K = permeability

V = velocity

i = gradient

n = porosity

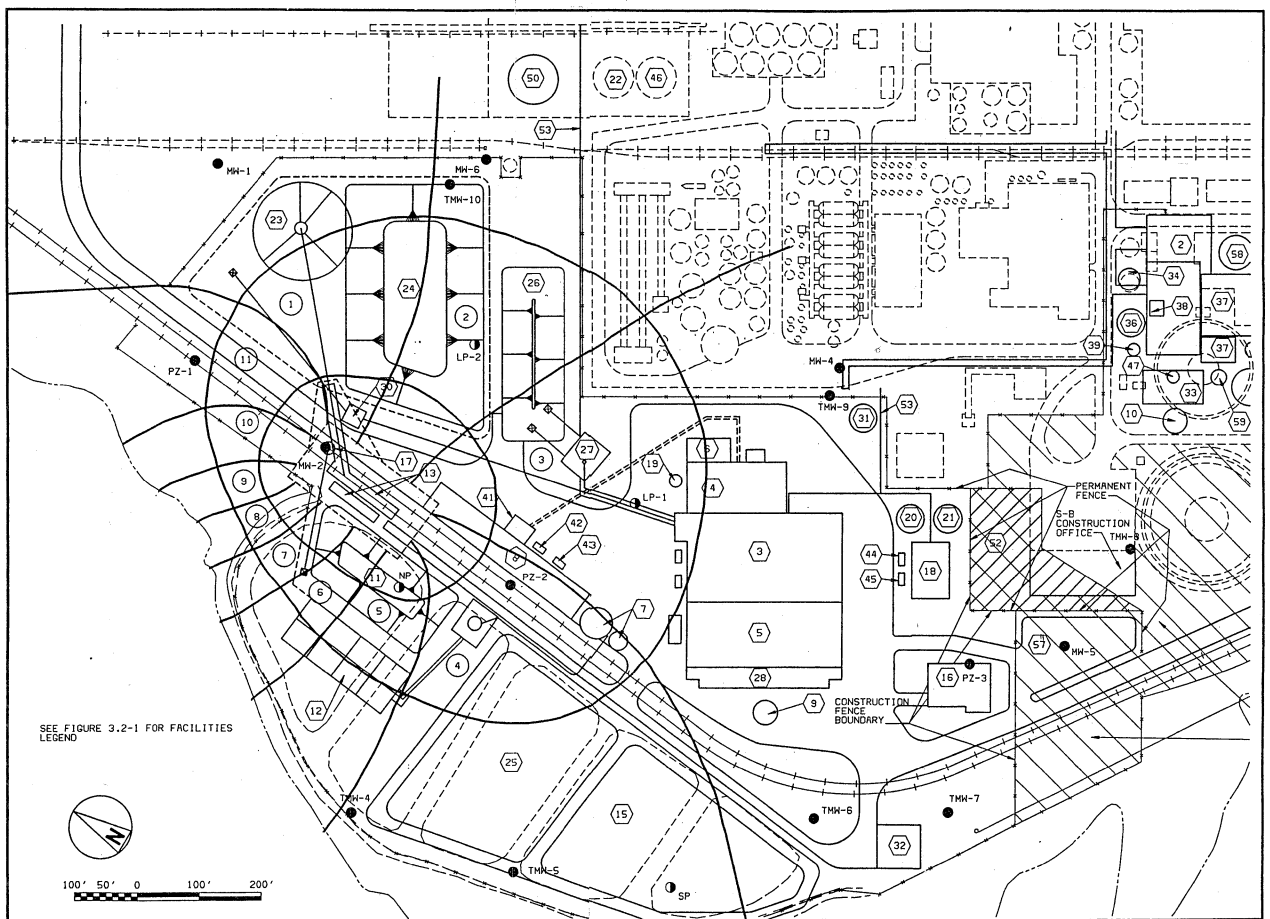
where

$$i = H/L$$

H = change in head

L = change in length

Due to the proximity of the existing lime mud ponds and the Broward River, water from these sources arrives at the excavation relatively soon. Based on the velocity equation previously defined, the time for Broward River water to reach the excavation for each flow channel is as follows.



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RAILCAR UNLOADING FACILITY
DEWATERING ANALYSIS

Figure 4.11-1

<u>Flow Path</u>	<u>Time (Days)</u>
4	202
5	55
6	34
7	21
8	16
9	13
10	36
11	117

Flow from the lime mud ponds will also form part of the water contribution for Flow Paths 4 through 8. Since the water from their ponds is of lesser quality than the Broward River, for a conservative analysis all water from these flow paths was assumed to come from the lime mud ponds. Due to the proximity of these ponds, the water from these ponds will reach the excavation within the first month of dewatering for Flow Paths 4 through 8.

The time for ground water to reach the coal unloading structure excavation from the vicinity of the monitoring wells was calculated in a similar manner. The maximum gradient for each well location to the excavation was used to minimize the time for the ground water to reach the excavation. In Flow Paths 1 through 3 and 11, only the wells were considered as the water sources for the remaining flow paths is either the lime mud ponds or the Broward River. The time for ground water to reach the excavation for each monitoring well is as follows.

<u>Well No.</u>	<u>Time (Days)</u>
MW-1	78
MW-2	0
MW-4	180
MW-5	418
MW-6	93
TMW-6	238
TMW-7	362

<u>Well No.</u>	<u>Time (Days)</u>
TMW-8	495
TMW-9	170
TMW-10	90
PZ-1	19
PZ-2	12
PZ-3	318

Initially, ground water will come from the vicinity of Well MW-2. To determine the quality of the dewatering discharge versus time, the water quality of each flow channel was determined by the time for the water to reach the excavation from each well or water source within the boundaries of the flow channel. Table 4.11-1 indicates the factors applied to each well to determine the "typical dewatering" analysis as a function of time. The quality of water from the lime mud ponds is assumed to be the average of Wells TMW-4 and TMW-5, since they are presently immediately downgradient of the lime mud ponds.

Table 4.11-2 indicates all available water quality analysis results from sampling of the Broward River and the various ground water monitoring wells. The table includes six values for the Broward, three at high tide and three at low tide. The sampling program undertaken by Savannah Laboratories for Black & Veatch on certain wells in October 1989 is included as well as tests run by Dames & Moore (D&M) in December 1988 and Environmental Resources Management-South Inc. (ERM) in July 1988. Note that values for certain metals are not included in the D&M and ERM data as their testing addressed only drinking water standards for potential hazardous wastewater determinations, not the Florida Class III surface water standards.

Only those wells which will impact the dewatering waste quality are included in Table 4.11-1. Monitoring Wells PZ-3, MW-5, TMW-6, TMW-7, and TMW-8 are not included because, as indicated previously, the ground water in their vicinity will not reach the dewatering location within the 180 day time frame.

Table 4.11-3 indicates the average value determined for the Broward River and each monitoring well used in this analysis. Since no data are

TABLE 4.11-1. MONITORING WELLS USED TO APPROXIMATE DEWATERING WATER QUALITY

<u>Days</u>	<u>Sectors</u>	<u>Monitoring Wells Used to Approximate Quality</u>
Initial	1 through 11	MW-2
30 Days	1, 11	PZ-1
	2	MW-1, MW-6, and TMW-10
	3	PZ-2
	4, 5, 6, 7, 8	TMW-4 and TMW-5
	9, 10	Broward River
60 Days	1	MW-1
	2	MW-1, MW-6, TMW-10
	3	PZ-2
	4, 5, 6, 7, 8	TMW-4 and TMW-5
	9, 10	Broward River
	11	PZ-1
90 Days	1	MW-1
	2	MW-6 and TMW-10
	3	MW-6, MW-10, PZ-2, MW-4, and TMW-9
	4, 5, 6, 7, 8	TMW-4 and TMW-5
	9, 10	Broward River
	11	PZ-1
120 Days	1	MW-1
	2	MW-6, and TMW-10
	3	MW-4 and TMW-9
	4, 5, 6, 7, 8	TMW-4 and TMW-5
	9, 10, 11	Broward River
180 Days	1	MW-1
	2	MW-6 and TMW-10
	3	MW-4 and TMW-9
	4, 5, 6, 7, 8	TMW-4 and TMW-5
	9, 10, 11	Broward River

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TABLE 4.11-2. MONITORING RESULTS

Parameter	Class III	Hi Tide Broward B&V 101889	Lo Tide Broward B&V 101889	Hi Tide Broward B&V 102089	Lo Tide Broward B&V 102089	Hi Tide Broward B&V 102489	Lo Tide Broward B&V 102489	PZ-1 D&M 122288	PZ-2 D&M 122288	PZ-2 B&V 101889	PZ-2 B&V 102089	PZ-2 B&V 102489	MW-1 D&M 122288	MW-1 ERM 080188	MW-2 D&M 122288
Aluminum, mg/l	1.5	0.12	0.33	0.36	5.3	0.21	0.23			1.7	13	2.7			
Antimony, mg/l	0.2	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Arsenic, mg/l	0.05	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.024	0.061	0.066	0.07	0.059	< 0.01	< 0.005	< 0.01
Bromate, mg/l	100	< 2500	< 2500	< 2500	< 2500	< 2500	< 2500			< 10	< 10	< 10			
Cadmium, mg/l	0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Chloride, mg/l	<10% inc	3800	2800	3700	5000	4700	4700			2.2	4.3	9.4			
Chromium, mg/l	0.05	< 0.01	< 0.01	< 0.01	0.015	< 0.01	< 0.01	0.1	0.017	< 0.01	0.027	< 0.01	0.085	< 0.01	0.028
Copper, mg/l	0.015	0.09	0.072	0.031	0.065	< 0.01	< 0.01	0.011	48	< 0.01	< 0.01	< 0.01	0.023	0.07	< 0.01
Cyanide, mg/l	0.005	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01		< 0.01
Fluoride, mg/l	5	0.5	0.5	0.32	0.42	0.48	0.4			< 0.2	< 0.2	< 0.2			
Iron, mg/l	0.3	0.13	0.4	0.48	6.8	0.17	0.25			1.8	3.5	1.8			
Lead, mg/l	0.05	0.005	0.0062	0.0058	0.02	< 0.005	< 0.005	0.054	0.008	0.012	< 0.005	< 0.005	0.011	0.12	0.021
Mercury, mg/l	0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0002	< 0.0002	< 0.0001	< 0.0001	< 0.0001	< 0.0002	0.00078	< 0.0002
Nickel, mg/l	0.1	< 0.01	0.014	< 0.01	< 0.01	< 0.01	0.014	0.028	0.014	< 0.01	0.023	< 0.01	0.019	0.09	0.028
Oil/grease, mg/l	5	1	1	1	1.6	1	1			< 1	< 1	< 1			
pH	6.5-8.5	7.6	7.7	7.6	7.6	7.5	7.6	7.5	7.5	6.9	7.3	7.3	9.5		12.0
Phenol, mg/l	0.001	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01		0.028
Tot Phos, mg/l (as needed)		0.13	0.1	0.24	1.1	0.13	0.14			0.37	0.37	0.37			
Selenium, mg/l	0.025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.005	0.011
Silver, mg/l	0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	(2)	(2)	<0.00005	<0.00005	<0.00005	(2)	(2)	(2)
Turbidity, NTU	<29 inc	11	11	12	250	3.1	5.9			4.3	60	14			
Zinc, mg/l	1	< 0.01	< 0.01	< 0.01	0.026	< 0.01	< 0.01	0.28	88	< 0.01	< 0.01	< 0.01	0.38	< 0.01	0.032

(2) Silver below detection limits.

TABLE 4.11-2 (Continued). MONITORING RESULTS

Parameter	Class III	MW-2 ERM 080188	MW-2 B&V 101889	MW-2 B&V 102089	MW-2 B&V 102489	MW-4 D&M 122188	MW-4 ERM 080188	MW-4 B&V 101889	MW-4 B&V 102089	MW-4 B&V 102489	MW-6 D&M 122288	TMW-4 D&M 122288	TMW-5 D&M 122288	TMW-9 D&M 122288	TMW-10 D&M 122288
Aluminum, mg/l	1.5		4.9	8.9	3.2			16	15	19					
Antimony, mg/l	0.2	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.083	< 0.05	0.068	< 0.05
Arsenic, mg/l	0.05	< 0.005	< 0.01	< 0.01	< 0.01	< 0.01	< 0.005	< 0.01	< 0.01	< 0.01	< 0.01	0.025	0.017	< 0.01	< 0.01
Bromate, mg/l	100		< 50	< 100	< 50			< 50	< 50	< 50					
Cadmium, mg/l	0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.027	< 0.005	< 0.005	< 0.005
Chloride, mg/l	<10% inc		260	120	310			140	120	210					
Chromium, mg/l	0.05	< 0.01	< 0.01	0.014	< 0.01	0.021	< 0.01	0.075	0.069	0.066	0.22	0.3	0.22	0.29	0.29
Copper, mg/l	0.015	< 0.01	< 0.01	< 0.01	< 0.01	0.031	0.04	< 0.01	0.015	0.034	0.047	0.98	0.64	1.8	0.19
Cyanide, mg/l	0.005		< 0.01	< 0.01	< 0.01			< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	
Fluoride, mg/l	5		< 0.2	0.32	0.41			0.24	0.24	0.28					
Iron, mg/l	0.3		1.1	1.9	0.87			8.2	7.7	9.1					
Lead, mg/l	0.05	< 0.02	0.0054	< 0.005	< 0.025	0.005	0.05	< 0.005	0.05	0.059	0.058	4.6	0.47	1	0.08
Mercury, mg/l	0.0001	< 0.0005	< 0.0001	0.00061	0.0002	0.0005	0.00122	< 0.0001	0.0004	0.0004	0.0006	0.0068	0.0005	0.0004	0.0067
Nickel, mg/l	0.1	0.02	< 0.01	0.026	0.02	0.052	0.08	0.036	0.023	0.025	0.067	0.16	0.35	0.24	0.1
Oil/grease, mg/l	5		< 1	< 1	< 1			2.1	4.7	4.4					
pH	6.5-8.5		12.0	12.1	12.0			9.9	10	10	10.7	8.6	10.8	8.1	9.7
Phenol, mg/l	0.001		0.066	0.06	0.1	< 0.01		0.012	0.012	0.014	< 0.01	0.023	0.029	< 0.01	< 0.01
Tot Phos, mg/l (as needed)			0.96	0.56	0.51			< 0.05	< 0.05	0.087					
Selenium, mg/l	0.025	< 0.005	< 0.01	< 0.05	< 0.01		< 0.005	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Silver, mg/l	0.00005	(2)	0.00007	<0.00005	<0.00006		(2)	0.00013	0.00011	0.00011	(2)	(2)	(2)	(2)	
Turbidity, NTU	<29 inc		350	120	23			180	85	2					
Zinc, mg/l	1	< 0.01	0.023	< 0.05	< 0.018	0.032	< 0.01	0.18	0.11	0.014	0.11	15	2.1	2.6	0.2

(2) Silver below detection limits.

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available for aluminum, bromate, chloride, fluoride, iron, oil and grease, total phosphorus, and turbidity in the wells analyzed by D&M and ERM, the values for these constituents are assumed to be the average of MW-2 and PZ-2. Also, since the D&M and ERM silver tests had detected limits several orders of magnitude above the Class III Standard value, the MW-2 and PZ-2 average silver value is also substituted for silver.

Two values are shown in Table 4.11-3 for average copper and zinc in well PZ-2. D&M reported copper and zinc at 48 mg/l and 88 mg/l, respectively, for PZ-2. Three additional samples by Black & Veatch on this well did not confirm these high values; the values obtained were below detection limits in all cases. Thus, Table 4.11-3 indicates a second average value for copper and zinc with subscript (1) which excludes the outlying values.

Table 4.11-4 shows the typical dewatering water, calculated by using Table 4.11-1 and the average values determined for each well.

The dewatering water will be mixed with Broward River water from the Seminole Kraft once-through cooling discharge prior to routing to the St. Johns River. Table 4.11-5 shows the expected analysis of the mixed effluent as a function of time. The maximum value of the six tests run by Black & Veatch is used for the Broward River cooling water.

Approximately 2,000 gpm will be required to be pumped from the shallow aquifer for approximately 30 days during initial dewatering and approximately 1,000 gpm will be required to be pumped for approximately 5 months thereafter. The dewatering water will be directed to an existing Seminole Kraft manhole where it will mix with 43.2 million gallons per day (30,000 gpm) of Seminole Kraft once-through cooling water. Seminole Kraft once-through cooling water is obtained from the Broward River. The combined effluent will then be discharged to the St. Johns River through the existing Seminole Kraft wastewater discharge structure. The existing outfall structure consists of a single 72-inch concrete pipe which splits and reduces to four separate 36-inch pipes with open ends located near the edge of the ship channel.

Table 4.11-5 shows that, at times, the mixed effluent to be above the Class III Standards for aluminum, cadmium, copper, iron, lead, mercury,

TABLE 4.11-3. AVERAGE VALUES FOR BROWARD RIVER AND MONITORING WELLS

Parameter	Class III	Average Broward	PZ-1	Average PZ-2	Average MM-1	Average MM-2	Average MM-4	MM-6	TMM-4	TMM-5	TMM-9	TMM-10	Average MM-2 PZ-2 *
Aluminum, mg/l	1.5	1.09	*	5.80	*	5.7	16.7	*	*	*	*	*	5.7
Antimony, mg/l	0.2	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	0.083	< 0.050	0.068	< 0.050	
Arsenic, mg/l	0.05	< 0.010	0.024	0.064	< 0.008	< 0.009	< 0.009	< 0.010	0.025	0.017	< 0.010	< 0.010	
Bromate, mg/l	100	< 2500	*	10.0	*	< 66.7	< 50.0	*	*	*	*	*	< 38.3
Cadmium, mg/l	0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.027	< 0.005	< 0.005	< 0.005	
Chloride, mg/l	<10% inc	4117	*	5.30	*	230	157	*	*	*	*	*	118
Chromium, mg/l	0.05	< 0.011	0.10	< 0.016	< 0.048	< 0.014	< 0.048	0.22	0.30	0.22	0.29	0.290	
Copper, mg/l	0.015	< 0.046	0.011	< 0.010	0.047	< 0.010	< 0.026	0.047	0.980	0.640	1.800	0.190	
Copper (I), mg/l	0.015	< 0.046	0.011	< 0.010	0.047	< 0.010	< 0.026	0.047	0.980	0.640	1.800	0.190	
Cyanide, mg/l	0.005	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	*	< 0.010
Fluoride, mg/l	5	0.44	*	< 0.200	*	< 0.31	0.25	*	*	*	*	*	< 0.26
Iron, mg/l	0.3	1.37	*	2.37	*	1.29	8.33	*	*	*	*	*	1.83
Lead, mg/l	0.05	< 0.008	0.054	< 0.008	0.066	< 0.015	< 0.034	0.058	4.600	0.470	1.000	0.080	
Mercury, mg/l	0.0001	< 0.0001	< 0.0002	< 0.00013	< 0.00049	< 0.00032	< 0.00052	0.00060	0.00060	0.00050	0.00040	0.007	
Nickel, mg/l	0.1	< 0.011	0.028	< 0.014	0.055	< 0.021	0.043	0.067	0.160	0.350	0.240	0.100	
Oil/grease, mg/l	5	< 1.10	*	< 1.0	*	< 1.0	3.7	*	*	*	*	*	< 1.0
pH	6.5-8.5	7.60	7.50	7.19	9.50	12.0	9.96	10.70	8.60	10.80	8.10	9.700	
Phenol, mg/l	0.001	< 0.010	< 0.010	< 0.010	< 0.010	0.075	< 0.013	< 0.010	0.023	0.029	< 0.010	< 0.010	
Tot Phos, mg/l (as needed)		0.31	*	0.37	*	0.68	< 0.062	*	*	*	*	*	0.52
Selenium, mg/l	0.025	< 0.010	< 0.010	< 0.010	< 0.008	< 0.017	< 0.009	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	
Silver, mg/l	0.00005	< 0.00005	*	< 0.0000	*	< 0.000	0.000	*	*	*	*	*	0.00004
Turbidity, NTU	<29 inc	48.8	*	26.1	*	164	89.0	*	*	*	*	*	95.2
Zinc, mg/l	1	< 0.013	0.28	< 22.0	< 0.20	< 0.027	< 0.069	0.11	15	2.1	2.6	0.20	
Zinc (I), mg/l	1	< 0.013	0.28	< 0.010	< 0.20	< 0.027	< 0.069	0.11	15	2.1	2.6	0.20	

* Average of MM-2 and PZ-2 used where there are no data available for Al, Br, Cl, F, Fe, Oil/Grease, Tot P, Ag, and Turbidity in PZ-1, MM-1, MM-6, TMM-4, TMM-5, and TMM-9. Silver is below detection limits.

(1) Excluding DQM 12/28/88 values for copper and zinc in PZ-2

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TABLE 4.11-4. CALCULATED VALUES FOR TYPICAL DEWATERING WATER VERSUS TIME

Parameter	Class III	Cooling Water Maximum Broward	Typical Dewatering Water					
			Initial	30 days	60 days	90 days	120 days	180 days
Aluminum, mg/l	1.5	5.3	5.67	4.90	4.90	5.10	4.96	4.96
Antimony, mg/l	0.2	< 0.05	< 0.050	< 0.058	< 0.058	< 0.058	< 0.058	< 0.058
Arsenic, mg/l	0.05	< 0.01	< 0.009	< 0.022	< 0.021	< 0.021	< 0.015	< 0.015
Bromate, mg/l	100	**	67	**	**	**	**	**
Cadmium, mg/l	0.005	< 0.0050	< 0.0050	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100
Chloride, mg/l	<10% inc	5000	230	835	835	833	1210	1210
Chromium, mg/l	0.05	0.015	< 0.014	< 0.16	< 0.15	< 0.16	< 0.16	< 0.16
Copper, mg/l	0.015	0.090	< 0.010	< 1.479	< 1.482	< 1.739	< 0.479	< 0.479
Copper (I), mg/l	0.015	0.090	< 0.010	< 0.388	< 0.391	< 0.430	< 0.479	< 0.479
Cyanide, mg/l	0.005	< 0.01	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Fluoride, mg/l	5	0.50	< 0.31	< 0.28	< 0.28	< 0.28	< 0.30	< 0.30
Iron, mg/l	0.3	6.80	1.29	1.79	1.79	1.92	2.00	2.00
Lead, mg/l	0.05	0.020	< 0.015	< 1.170	< 1.171	< 1.188	< 1.214	< 1.214
Mercury, mg/l	0.0001	<0.00010	<0.00032	< 0.0020	< 0.0020	< 0.0022	< 0.0021	< 0.0021
Nickel, mg/l	0.1	0.014	< 0.021	< 0.131	< 0.133	< 0.140	< 0.144	< 0.144
Oil/grease, mg/l	5	1.6	< 1.00	< 1.02	< 1.02	< 1.07	< 1.15	< 1.15
pH	6.5-8.5	7.7	12.03	7.77	7.86	7.91	8.10	8.10
Phenol, mg/l	0.001	< 0.010	0.075	< 0.017	< 0.017	< 0.017	< 0.017	< 0.017
Tot Phos, mg/l (as needed)		1.1	0.68	0.47	0.47	0.46	0.44	0.44
Selenium, mg/l	0.025	<0.00001	< 0.017	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Silver, mg/l	0.00005	<0.00005	<0.00004	<0.00004	<0.00004	<0.00004	<0.00004	<0.00004
Turbidity, NTU	<29 inc	250	164.3	80.5	80.5	79.1	82.3	82.3
Zinc, mg/l	1	0.026	< 0.027	< 6.0	< 5.9	< 6.4	< 4.0	< 4.0
Zinc (I), mg/l	1	0.026	< 0.027	< 4.0	< 3.9	< 4.0	< 4.0	< 4.0

** Bromate could not be measured accurately in Broward River due to interferences.

(1) Excluding D&M 12/28/88 values for copper and zinc in PI-2

TABLE 4.11-5. BLENDED DEWATERING WATER AND ONCE-THROUGH COOLING WATER EFFLUENT TO THE ST. JOHNS

Seminole-Kraft Cooling Water Flow: 43.2 mgd			Effluent to St. Johns River							St. Johns River Quality (2)			
Parameter	Class III	Cooling Water Maximum Broward	2000 gpm Dewat.		1000 gpm Dewatering						Minimum	Maximum	Average
			Initial	30 days	31 days	60 days	90 days	120 days	180 days				
Aluminum, mg/l	1.5	5.3	5.32	5.27	5.29	5.29	5.29	5.29	5.29		3.6	0.49	
Antimony, mg/l	0.2	< 0.05	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050		0.00095	0.00019	
Arsenic, mg/l	0.05	< 0.01	< 0.010	< 0.011	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010		0.001	0.00069	
Bromate, mg/l	100	**	**	**	**	**	**	**	**				
Cadmium, mg/l	0.005	< 0.005	< 0.0050	< 0.0053	< 0.0052	< 0.0052	< 0.0052	< 0.0052	< 0.0052	0.004	0.07	0.033	
Chloride, mg/l	<10% inc	5000	4702	4740	4866	4866	4866	4878	4878	330	17709	7328	
Chromium, mg/l	0.05	0.015	< 0.015	< 0.024	< 0.020	< 0.019	< 0.020	< 0.020	< 0.020	0	0.475	0.169	
Copper, mg/l	0.015	0.09	< 0.085	< 0.177	< 0.135	< 0.135	< 0.143	< 0.103	< 0.103	0.018	0.267	0.054	
Copper (I), mg/l	0.015	0.09	< 0.085	< 0.109	< 0.100	< 0.100	< 0.101	< 0.103	< 0.103	0.018	0.267	0.054	
Cyanide, mg/l	0.005	< 0.01	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010		0.09	0.01	
Fluoride, mg/l	5	0.5	< 0.49	< 0.49	< 0.49	< 0.49	< 0.49	< 0.49	< 0.49	0.23	0.84	0.51	
Iron, mg/l	0.3	6.8	6.46	6.49	6.64	6.64	6.64	6.65	6.65	0	1.11	0.401	
Lead, mg/l	0.05	0.020	< 0.0197	< 0.092	< 0.057	< 0.057	< 0.058	< 0.059	< 0.059	0	0.58	0.148	
Mercury, mg/l	0.0001	< 0.0001	< 0.00011	< 0.00022	< 0.00016	< 0.00016	< 0.00017	< 0.00016	< 0.00016	0.0	0.0064	0.0032	
Nickel, mg/l	0.1	0.014	< 0.014	< 0.021	< 0.018	< 0.018	< 0.018	< 0.018	< 0.018	0	0.04	0.027	
Oil/grease, mg/l	5	1.6	< 1.56	< 1.56	< 1.58	< 1.58	< 1.58	< 1.59	< 1.59				
pH	6.5-8.5	7.7	7.73	7.70	7.70	7.70	7.71	7.71	7.71	6.00	8.00	7.30	
Phenol, mg/l	0.001	< 0.01	< 0.014	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010				
Tot Phos, mg/l (as needed)	1.1	1.07	1.06	1.08	1.08	1.08	1.08	1.08	1.08	0.012	0.79	0.22	
Selenium, mg/l	0.025	< 0.00001	< 0.00108	< 0.00063	< 0.00033	< 0.00032	< 0.00032	< 0.00032	< 0.00032		0.00075	0.0005	
Silver, mg/l	0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005		0.00035	0.00016	
Turbidity, NTU	<29 inc	250	245	239	245	245	244	245	245	2.5	32	8.7	
Zinc, mg/l	1	0.026	< 0.026	< 0.40	< 0.22	< 0.22	< 0.23	< 0.16	< 0.16	0.003	0.4	0.066	
Zinc (I), mg/l	1	0.026	< 0.026	< 0.27	< 0.15	< 0.15	< 0.15	< 0.16	< 0.16	0.003	0.4	0.066	

** Bromate could not be measured accurately in Broward River due to interferences.

(1) Excluding D&M 12/28/88 values for copper and zinc in PZ-2

(2) From EPA Storet Retrieval Data and Ebasco "Water and Wastewater Study" performed for St. Johns Power Park, 1981.

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and turbidity. The high values for aluminum, copper iron, and turbidity are influenced to a great extent by high values in the once-through Broward River cooling water.

Calculated cadmium and mercury values are only slightly above the Class III standards. In the case of cadmium, the analyzed detection limit is at the Class III standard. All samples except one were analyzed to be below the detection limit, thus below the Class III standard. Therefore, the calculated combined effluent values are overstated and no variance is requested for cadmium. The situation is similar for mercury. The analyzed detection limit is at the Class III standard for the samples recently analyzed by Savannah Laboratory, while the detection limit is above the Class III standard for the remaining samples analyzed previously by Savannah Laboratory (Dames & Moore study) and Enviropact Services, Inc. (ERM study). Additionally, the Broward River samples were all analyzed below the lower detection limit (Class III standard). Therefore, the calculated combined effluent values are also likely overstated, and no variance is requested for mercury.

Mixing zones and variances from applicable Florida DER water quality standards are being requested for aluminum, iron, and turbidity in the construction dewatering combined discharge since these constituents are above Class III standards and the maximum St. Johns River concentrations are below the anticipated maximum discharge concentrations but above Class III standards. A variance only is requested for copper and lead since these constituents in the combined discharge are above Class III standards but the discharge concentrations are below the maximum concentrations in the St. Johns River. The combined dewatering discharge will pose no additional risk to the environment, marine life, public health, or to existing and potential drinking water supplies.

A Notice (corrected) of Variances Sought as Condition of Certification was submitted to DER on July 23, 1989.

No other variances from applicable standards due to construction activities have been identified at this time as being required for the AES Cedar Bay Cogeneration Project (see Section 5.12 for operation phase variances).

4.12 REFERENCES

Jacksonville Planning Department, North District Plan, City of Jacksonville, June 1986.

Conversations with the Jacksonville Streets and Highways Department, Jacksonville, Florida on August 11 and August 25, 1988.

Conversation with Florida Department of Transportation, Lake City, Florida on August 26, 1988.

5.0 EFFECTS OF PLANT OPERATION

5.1 EFFECTS OF THE OPERATION OF THE HEAT DISSIPATION SYSTEM

Because of the proposed heat dissipation system design, current thermal impacts on the St. Johns River will be reduced significantly. Further, potential environmental impacts due to operation of the cooling tower are shown to be very minor.

5.1.1 Temperature Effect on Receiving Body of Water

Cooling towers will be used to dissipate heat at the Cedar Bay Cogeneration Plant, and the once-through cooling system presently used at the Seminole Kraft paper mill will be taken out of service. Blowdown from the cogeneration plant will be from the cold side of the cooling towers, and the existing outfall at the paper mill will be utilized to discharge the blowdown to the St. Johns River.

There will be a major reduction in the thermal loading of the river from existing levels at the site. With the once-through cooling system, a maximum of 30,000 gpm of heated effluent is now discharged, and with cooling towers only 633 gpm will be discharged; a 98 percent decrease in volume.

There is an approximate 10 degree rise in temperature with the once-through cooling system in use resulting in a uniform thermal loading of approximately 150 MBtu/h in the river.

The Cedar Bay Cogeneration Plant will use ground water as the source of cooling water and the maximum predicted temperature of the blowdown discharge is 95 F. The actual thermal loading will vary with the ambient temperature of the river water and the meteorological conditions. The average temperature of the St. Johns River is 73.9 F, the maximum 91.4 F, and the minimum 49.6 F. At those temperatures, the maximum thermal loading (at 95 F discharge temperature) would be 6.2 MBtu/h, 0.5 MBtu/h, and

1

1

14.0 MBtu/h, respectively. These thermal loadings represent a reduction of 94 percent at the average river temperature, 89 percent at minimum temperature, and 98 percent maximum temperature. It is particularly significant that a major reduction (98 percent) in thermal loading will occur during the period when the ambient temperature of the St. Johns River is the highest and most susceptible to adverse thermal impacts.

The maximum wastewater discharge from the Cedar Bay plant cooling tower is estimated to be approximately 1,365 gpm with a maximum temperature of 95 F. The maximum discharge from the Seminole Kraft wastewater treatment facility will be approximately 14,665 gpm with a temperature of 89 F during the summer and 79 F during the winter. This results in a maximum combined wastewater discharge from the Cedar Bay and Seminole Kraft facilities of approximately 16,030 gpm with a discharge temperature of 89.5 F during the summer and 80.4 F during the winter.

Section 17-3.050 of the Florida Administrative Code (FAC) prohibits the discharge of water more than 2 F above the ambient or above 92 F in June, July, August, and September. During the remainder of the year, the limit is 4 F above the ambient or 90 F. Since these limits will be exceeded, a thermal mixing zone will be needed for the Cedar Bay cooling tower blowdown.

The following scenarios were considered to determine a worst case for sizing the thermal mixing zone.

- Case 1--Cedar Bay cooling tower blowdown, maximum discharge temperature (95 F), average ambient temperature (73.9 F), summer conditions (2 F approach).
- Case 2--Cedar Bay cooling tower blowdown, maximum discharge temperature (95 F), maximum ambient temperature (91.4 F), summer conditions (92 F limit).
- Case 3--Cedar Bay cooling tower blowdown, maximum discharge temperature (95 F), minimum ambient temperature (49.6 F), winter conditions (4 F approach).
- Case 4--Cedar Bay cooling tower blowdown/Seminole Kraft wastewater, combined discharge temperature (89.5 F), average ambient temperature (73.9 F), summer conditions (2 F approach).

- Case 5--Cedar Bay cooling tower blowdown/Seminole Kraft wastewater, combined discharge temperature (89.5 F), maximum ambient temperature (91.4 F), summer conditions (92 F limit). 1
- Case 6--Cedar Bay cooling tower blowdown/Seminole Kraft wastewater, combined discharge temperature (80.4 F), minimum ambient temperature (49.6 F), winter conditions (4 F approach). 2

The computer code UOUTPLM is used to model the discharge plume. A description of UOUTPLM is presented in EPA Report EPA/600/3-85/073a, "Initial Mixing Characteristics of Municipal Ocean Discharges." UOUTPLM computes the coordinates of the plume center line with respect to the point of discharge and the dilution factor as a function of the plume center line coordinates. The dilution factor is defined by the following equation.

$$D = (T_e - T_a) / (T_f - T_a) \quad 1$$

where

- D = Average dilution factor of the discharge plume,
- T_e = Temperature of the effluent at the point of discharge,
- T_a = Ambient temperature of the receiving body of water,
- T_f = Final temperature of the receiving body of water.

Based on these scenarios, dilution factors of 10.55 for Case 1, 6.00 for Case 2, 11.35 for Case 3, 7.80 for Case 4, and 7.70 for Case 6 were calculated. Case 5 does not require a mixing zone since the combined discharge temperature is within the limits established by Section 17-3.050 of the FAC. 2

The existing outfall structure consists of a single 72-inch concrete pipe which splits and reduces to four separate 36-inch pipes with open ends located near the edge of the ship channel. An analysis of the existing outfall structure indicates that the flow in individual pipes will vary between approximately 23 percent and 27 percent of the total discharge flow. As a worst case, it is estimated that the maximum flow through an individual pipe will be approximately 30 percent of the total flow. The modeling of the outfall structure for UOUTPLM is based on horizontal discharges which are parallel and in the same direction as the river current. 1 2

This is a conservative model for the actual discharges which are horizontal but at varying angles to the current. It has also been found that the ends of the pipes are sufficiently spaced so that no interaction between the plumes will occur.

Since the river is tidal, and current can flow in either direction, the mixing zones are assumed to be circular with the centers directly above the ends of the discharge pipes. The radius of each mixing zone is found by calculating a required dilution factor and then determining the horizontal distance of the plume center line from the point of discharge which corresponds to the calculated dilution factor.

As discussed in Subsection 2.3.4.2, the current velocity of the St. Johns River varies from 0.45 fps to 1.76 fps during flood tide and 0.43 fps to 1.79 fps during ebb tide. Based on USEPA Storet water quality data for the St. Johns River near Drummond Point, the average river water salinity is 13,250 mg/l. The maximum and minimum reported salinities are 25,000 mg/l and 5,000 mg/l, respectively.

Table 5.1-0 shows the effect of salinity on the size of the calculated mixing zone by varying river salinity from 5,000 mg/l to 25,000 mg/l for Case 3 at the minimum and maximum current velocities. As the salinity of the river water decreases, the plume travels greater distances before reaching the surface. In addition, the distance the plume travels before obtaining the required dilution increases. This results in the largest mixing zones being required at the minimum river salinity.

Based on the calculated dilution factors and preliminary modeling, Case 3 represents the most stringent conditions for Cedar Bay cooling tower blowdown and Case 4 represents the most stringent conditions for a combined discharge. Table 5.1-0a provides the required radius of each calculated mixing zone for Case 3 and Case 4, based on a minimum salinity of 5,000 mg/l and both a minimum current velocity of 0.43 fps and a maximum current velocity of 1.79 fps.

TABLE 5.1-0. EFFECT OF SALINITY ON MIXING ZONE SIZING

<u>Case</u>	<u>Total Discharge</u> gpm	<u>River Velocity</u> fps	<u>River Salinity</u> mg/l	<u>Radius</u> ft
3A-1	1,365	0.43	5,000	4.3
3A-2	1,365	0.43	10,000	3.8
3A-3	1,365	0.43	20,000	3.5
3A-4	1,365	0.43	25,000	3.3
3B-1	1,365	1.79	5,000	11.2
3B-2	1,365	1.79	10,000	8.5
3B-3	1,365	1.79	20,000	6.3
3B-4	1,365	1.79	25,000	5.0

2

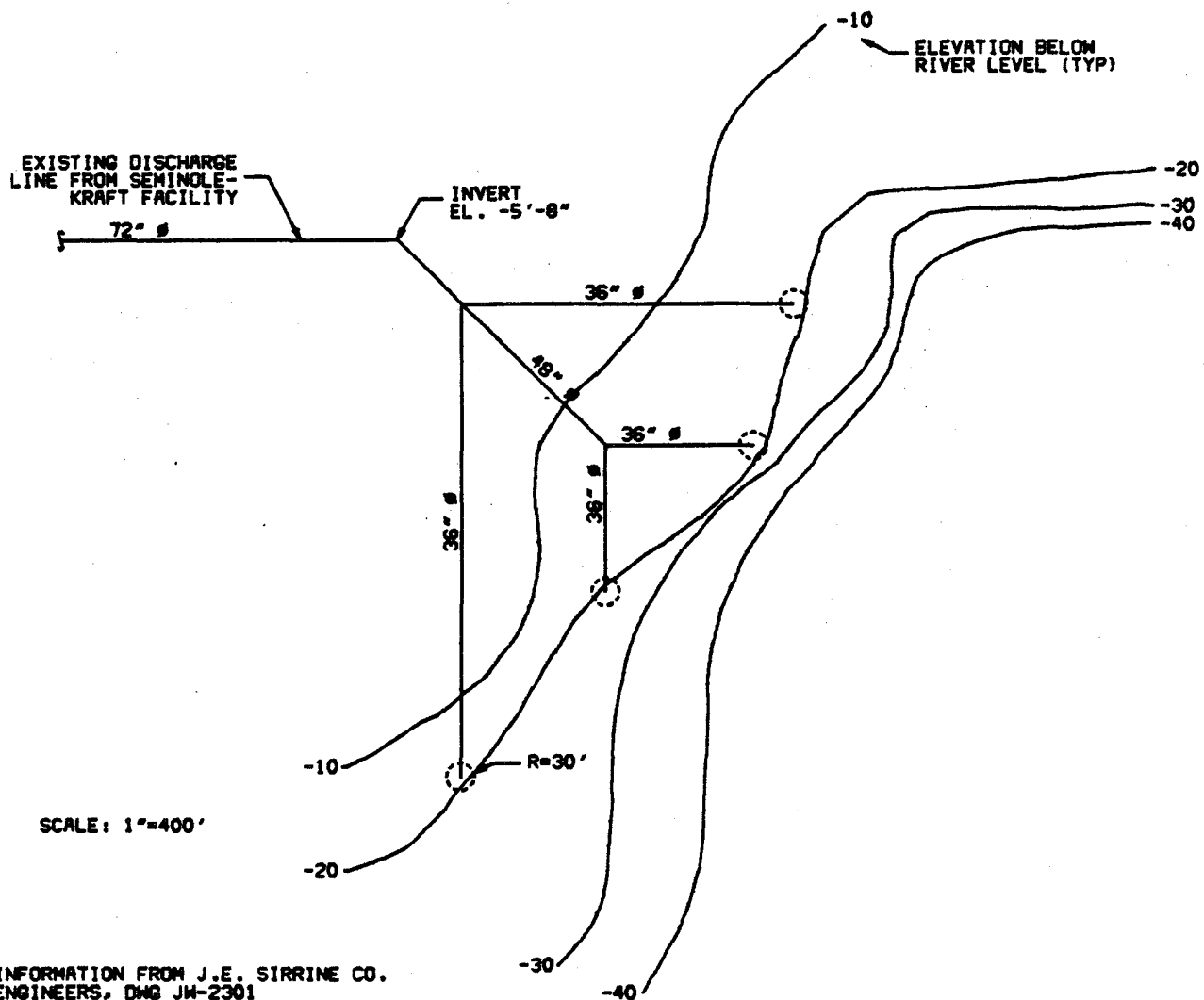
TABLE 5.1-0a. MIXING ZONES

<u>Case</u>	<u>Total Discharge</u> gpm	<u>River Velocity</u> fps	<u>River Salinity</u> mg/l	<u>Radius</u> ft
3A-1	1,365	0.43	5,000	4.3
3B-1	1,365	1.79	5,000	11.2
4A-1	16,030	0.43	5,000	26.8
4B-1	16,030	1.79	5,000	25.1

2

Based only on Cedar Bay cooling tower blowdown (Case 3), the largest mixing zone will be required when river salinity is at the minimum (5,000 mg/l) and current velocity is at the maximum (1.79 fps). These conditions result in a mixing zone with a radius of approximately 11.2 feet. When the discharge is considered as consisting of both Cedar Bay cooling tower blowdown and Seminole Kraft wastewater treatment plant effluent (Case 4), the largest mixing zone will be required when river salinity is at the minimum and current velocity is at the minimum (0.43 fps). These conditions result in a mixing zone with a radius of approximately 26.8 feet.

To ensure proper mixing for all possible conditions and combinations of discharge, it is estimated that each mixing zone will require a radius of approximately 30 feet. Figure 5.1-0 illustrates the configuration of the discharge structure and the four mixing zones.



THERMAL MIXING ZONES

Figure 5.1-0

5-2f

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5.1.2 Effects on Aquatic Life

Since there will be a major reduction in the thermal loading of the St. Johns River as the result of the use of cooling towers instead of once-through cooling, any existing thermal impacts on the aquatic biota of the river will be reduced. As discussed in Subsection 5.1.1, the discharge from the cooling towers will be only about 2 percent of the volume now being discharged from the paper mill.

In addition, there will be no further entrainment or impingement impacts on aquatic biota when the once-through cooling system is discontinued. The existing discharge structure will be used by the cogeneration plant, and it will not be necessary to build a new structure in the river.

5.1.3 Biological Effects of Modified Circulation

Ground water will be used for cooling water to operate the Cedar Bay Cogeneration Plant. There will be no biological effects of modifying the natural circulations of a water body.

5.1.4 Effects of Offstream Cooling

5.1.4.1 Background Information. The facility design includes a linear mechanical cooling tower with an estimated 10 fans. Cooling tower impacts are evaluated using the Electric Power Research Institute (EPRI) funded Seasonal/Annual Cooling Tower Impact (SACTI) computer program. This program can predict the seasonal and annual impacts of the cooling tower plume's potential for drift, icing, and fogging. The same five-year set of meteorological data (1981-1985) used for the air quality analyses in Section 5.6 is also used with this model to estimate cooling tower impacts.

Table 5.1-1 shows the cooling tower parameters that are modeled to determine potential salt deposition, hours of icing, and hours of fogging.

The cooling tower was modeled with well water, which is being considered to supply makeup cooling water.

TABLE 5.1-1. COOLING TOWER MODELING PARAMETERS (Estimated)

Tower Type	Linear Mechanical Draft
Number of Fans	10 (estimated only)
Dimensions	
Length	600 ft (182.88 m)
Width	54 ft (16.46 m)
Height	31 ft (9.45 m)
Effective Outlet Diameter	101.19 ft (30.85 m)
Heat Dissipation Rate	506.9 MW
Total Airflow Rate	6,975.51 kg/s total for all fans
Drift Loss Rate	4.1 gal/min
Cooling Water Salt Concentration	0.00192 grams salt/gram solution (total for all cycles)

COOLING TOWER DRIFT DROPLET SPECTRA

<u>Diameter</u> micron	<u>Mass Frequency</u> percent
1	0
20	25
45	25
85	20
115	10
170	10
240	5
375	4
425	1

5.1.4.2 Salt Deposition. The SACTI program is used to predict salt deposition totals for the 16 compass directions surrounding the cooling tower. The evaluated distances start at 100 meters and continue out in 100-meter intervals to 10,000 meters.

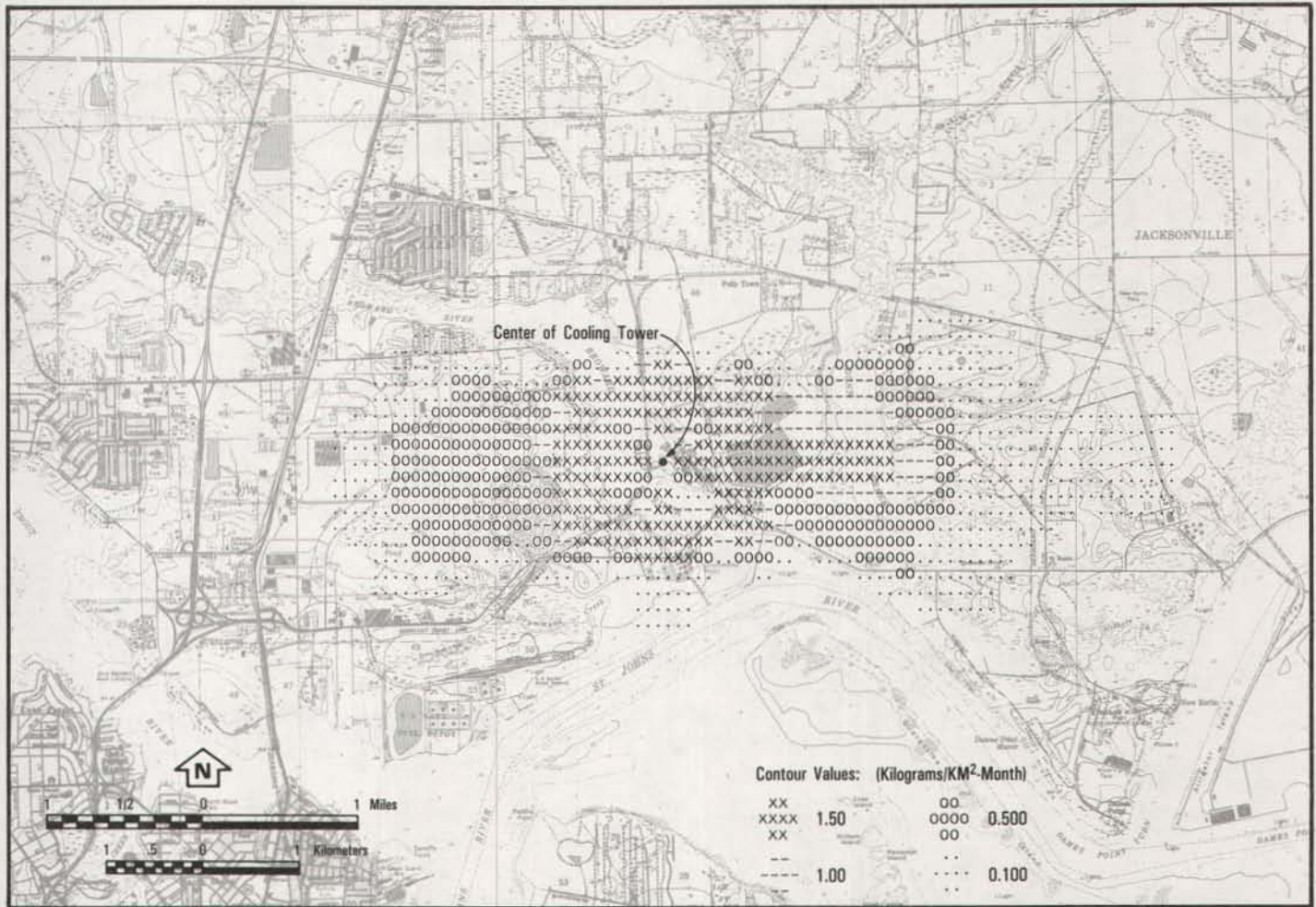
Figure 5.1-1 shows the estimated average salt deposition rate for the Cedar Bay Cogeneration Project's cooling tower. The estimated maximum salt deposition rate for the Cedar Bay Cogeneration Project is approximately 111 kilograms per square kilometer per month ($\text{kg}/\text{km}^2/\text{month}$) or 1 lb/acre/month. The location of the maximum rate is 200 meters east of the tower. Within 100 meters of the tower, the predicted salt deposition rates range from 0 $\text{kg}/\text{km}^2/\text{month}$ at some southerly and northerly directions to 25.59 $\text{kg}/\text{km}^2/\text{month}$ (east). The estimated average is 5.11 $\text{kg}/\text{km}^2/\text{month}$ or 0.05 lb/acre/month.

The salt deposition rate decreases significantly with distance within the first 300 meters and then continues to decrease out to 1,300 meters. Beyond 1,300 meters, the average salt deposition rate is reduced to less than 1.0 $\text{kg}/\text{km}^2/\text{month}$. The estimated average deposition rate is reduced further at 3,200 meters to less than 0.10 $\text{kg}/\text{km}^2/\text{month}$.

The highest salt deposition rates occur onsite and very near the cooling tower. Since this area has been previously greatly disturbed and only sparse or no vegetation remains, there is little potential for adverse impacts. There are no known threatened or endangered species that occur in the vicinity of the cooling tower.

5.1.4.3 Icing Potential. The SACTI model also analyzes the potential for icing within 1,600 meters of the cooling tower. Icing occurs when the surface temperature is below freezing and the visible cooling tower plume contacts the ground. In Jacksonville, the mean number of days per year with minimum and maximum temperatures below 32 degrees Fahrenheit is 15 and zero, respectively. Icing is predicted to occur at a maximum of 0.0 hours per year. Since icing is not expected to occur, no significant physical damage to vegetation or impact on roadways is expected.

5.1.4.4 Fogging Potential. The SACTI model also analyzes the potential for fogging for 16 radial directions within 1,600 meters of the cooling



PLUME SALT DEPOSITION
FROM THE CEDAR BAY COOLING TOWER

Figure 5.1-1

tower. Figure 5.1-2 shows the hours of fogging per year due to the Cedar Bay Cogeneration Project's cooling tower. The cooling tower impacts, as shown on Figures 5.1-1 and 5.1-2, are based on the orientation of the cooling tower proposed in the initial SCA. The impacts have now been translated to reflect the coordinates of the cooling tower as located on the revised site arrangement (Figure 3.2-1). Thirteen radial directions surrounding the cooling tower are predicted to experience some cooling tower fog during the year. The maximum number of hours of annual cooling tower fog for any single receptor point is predicted to be only about six hours per year. This maximum location is 100 meters southwest of the tower. Most of the predicted fogging will occur over the Broward River where advection fog is more likely to occur. Climatologically, natural fog occurs an average of 55 days per year. The only major roads that are predicted to experience additional fogging are Eastport Road, east of the plant, and Heckscher Drive, southwest of the plant. These roads are expected to have additional fogging in isolated areas of about one hour and three hours per year, respectively.

5.1.5 Measurement Program

Temperature measurement will be made of the effluent discharge (cooling tower blowdown) twice a week, or as otherwise specified by the NPDES permit for the cogeneration plant.

5.2 EFFECTS OF CHEMICAL AND BIOCIDES DISCHARGES

Discharges will be made via the existing Seminole Kraft outfall. New discharges consist of cooling tower blowdown and yard area runoff pond discharge. Industrial wastewater will not be discharged to waters but will be routed to the existing Seminole Kraft Industrial Treatment System. Federal New Source Performance Standards applicable to new discharges are provided in Table 5.2-1.

5.2.1 Industrial Wastewater

Other than cooling tower blowdown, there will be three major sources of wastewater from the Cedar Bay Cogeneration Plant. The first source consists of low volume plant drains including demineralizer regeneration wastewater, condensate polisher regeneration wastewater, and miscellaneous plant drain wastewater. The second source consists of coal, limestone, and ash area runoff. The third will be sanitary wastes from the Cedar Bay



FREQUENCY OF PLUME FOGGING
FROM THE CEDAR BAY COOLING TOWER
Figure 5.1.2

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TABLE 5.2-1. USEPA STANDARDS OF PERFORMANCE FOR NEW SOURCES STEAM ELECTRIC POWER GENERATING^a

<u>Waste Streams and Pollutants^b</u>	<u>Maximum mg/l</u>	<u>Average mg/l</u>
All Waste Streams		
pH (except once-through cooling)	6.0 - 9.0 (Standard Units)	
Polychlorinated biphenyls	No Discharge	
Low Volume Waste Streams		
Total suspended solids	100	30
Oil and grease	20	15
Bottom Ash Transport Water		
Total suspended solids	100	30
Oil and grease	20	15
Fly Ash Transport Water	No water may be discharged	
Chemical Metal Cleaning Waste		
Total suspended solids	100	30
Oil and grease	20	15
Copper (total)	1	1
Iron (total)	1	1
Once-Through Cooling Water		
Total residual chlorine ^g	0.2	
Free available chlorine ^e	0.5	0.2
Cooling Tower Blowdown		
Total residual chlorine	d	
Free available chlorine ^d	0.5	0.2
126 priority pollutants	f	f
Except:		
Chromium (total)	0.2	0.2
Zinc (total)	1.0	1.0
Coal Pile Runoff		
Total suspended solids ^c	50	

TABLE 5.2-1 (Continued). USEPA STANDARDS OF PERFORMANCE FOR NEW SOURCES
STEAM ELECTRIC POWER GENERATING^a

^aSource: 40 CFR Part 423, 1983.

^bExcept where specified otherwise, the allowable discharge equals flow multiplied by the concentration limit.

^cUntreated overflow from a facility designed, constructed, and operated to treat the volume of runoff resulting from a 10-year, 24-hour rainfall event shall not be subject to this limit.

^dNeither free available chlorine nor total residual chlorine may be discharged from any unit for more than 2 hours in any one day, and not more than one unit in any plant may discharge free available or total residual chlorine at any one time, unless the utility can demonstrate to the Regional Administrator or State, if the State has NPDES permit issuing authority, that the units in a particular location cannot operate at or below this level of chlorination.

^eFor any plant with a rated generating capacity of less than 25 megawatts neither free available chlorine nor total residual chlorine may be discharged from any unit for more than 2 hours in any one day and not more than one unit in any plant may discharge free available or total residual chlorine at any one time unless the utility can demonstrate to the Regional Administrator or State, if the State has NPDES permit issuing authority, that the units in a particular location cannot operate at or below this level of chlorination.

^fDetermined by engineering calculation at the discretion of the permitting authority.

^gFor any plant with a total rated electricity generating capacity of 25 or more megawatts neither free available chlorine nor total residual chlorine may be discharged from any unit for more than 2 hours per day unless the discharger demonstrates to the permitting authority that the discharge for more than two hours is required for macroinvertebrate control. Simultaneous multi-unit chlorination is permitted.

Cogeneration Plant routed to the existing Seminole Kraft sanitary system. These wastewaters will not discharge but will be treated in the existing Seminole Kraft Corporation's industrial wastewater treatment facility before ultimate discharge to the St. Johns River. The discharge from the treatment facility is covered under existing NPDES permit FL0000400.

Retirement of existing facilities at the paper mill will result in reduction of wastewater from existing sources to the treatment facility. Table 5.2-2 compares the existing Seminole Kraft wastewater flows with estimated wastewater flows resulting from the operation of the Cedar Bay Cogeneration Plant. The overall effect of the new facility will be a reduction in total wastewater flow. Suspended solids loading will also be significantly reduced as a result of retirement of the existing bark boiler scrubbers.

Table 5.2-3 indicates the estimated quality of the Cedar Bay project combined low volume plant drains prior to the Seminole Kraft Corporation industrial wastewater treatment facility. The quality of this wastewater was calculated by averaging the estimated qualities of the demineralizer wastewater, condensate polisher regeneration wastewater, and miscellaneous plant drain wastewater.

Table 5.2-4 indicates the estimated quality of the coal, limestone, and ash area runoff prior to the Seminole Kraft Corporation industrial wastewater treatment facility. The quality of this wastewater was calculated by averaging the estimated qualities of the three individual streams (coal pile runoff, ash pile runoff, and limestone area runoff). The values given are a very rough estimate based on data from Reference 1 for Eastern Tennessee and Kentucky coal. Storage pile runoff quality will be variable and depends upon the source of coal, quantity of coal, runoff drainage characteristics, and the duration and intensity of the rainfall event. A runoff collection pond sized for a 10-year, 24-hour storm will be used to provide settling and flow equalization.

The existing Seminole Kraft industrial treatment facility consists of a clarifier and aeration ponds. The existing NPDES permit (FL0000400) for the Seminole Kraft mill limits the biochemical oxygen demand discharge to

TABLE 5.2-2. ESTIMATE OF THE EFFECT OF CEDAR BAY PROJECT ON WASTEWATER TREATED BY EXISTING SEMINOLE KRAFT INDUSTRIAL TREATMENT FACILITY

	<u>Flow</u> gpd	<u>Suspended Solids</u> lb/day	<u>BOD₅</u> lb/day	
Wastewater Reduction from Existing Facilities to be Retired				
Bark boiler scrubbers	0*	2,150	ND	
Existing boiler blowdown	513,000	42	ND	
Existing demineralizer regenerant wastes	<u>309,000</u>	<u>25</u>	<u>ND</u>	
Subtotal	822,000	2,217	ND	
Wastewater Resulting from New Facilities				
Low volume drains including demineralizer wastewater, condensate polisher wastes, and floor drains	213,000	71	18	
Coal, limestone, and ash area runoff	14,000	3	1	2
Additional sanitary wastewater	<u>4,000</u>	<u>1</u>	<u>1</u>	
Subtotal	231,000	75	20	2
Net Reduction	591,000			

*Since existing bark boilers use recycled water for scrubber makeup, net flow reduction will be zero.

ND - Not determined, data not available.

TABLE 5.2-3. LOW VOLUME WASTES ESTIMATED QUALITY

<u>Constituent</u>	<u>Average Concentration mg/l</u>	<u>Maximum Concentration mg/l</u>	
Five Day Biochemical Oxygen Demand	<10.0	10.0	1
Chemical Oxygen Demand	<10.0	10.0	
Total Organic Carbon	<10.0	10.0	
Total Suspended Solids	40.0	80.0	
Ammonia	<1.0	1.0	
pH (in pH units)	7.1	9.0	
Oil and Grease	<10.0	15.0	
Calcium	82	125	
Magnesium	150	200	
Sodium	1,546	2,320	
Potassium	4.5	6.7	
M-Alkalinity as CaCO ₃	217	325	1
Sulfate	3,500	5,000	
Chloride	162	243	
Nitrate	6.0	10.0	
Fluoride	3.2	5.0	
Silica	196	294	
Chlorine	(1)	(1)	
Phosphate (total)	(1)	(1)	1
Cyanide	(1)	(1)	
Iron	0.40	0.50	
Manganese	(1)	(1)	
Aluminum	(1)	(1)	
Nickel	(1)	(1)	
Zinc	(1)	(1)	1
Copper	0.001	0.060	
Cadmium	(1)	(1)	
Chromium	(1)	(1)	
Beryllium	(1)	(1)	

TABLE 5.2-3 (Continued). LOW VOLUME WASTES ESTIMATED QUALITY

<u>Constituent</u>	<u>Average Concentration mg/l</u>	<u>Maximum Concentration mg/l</u>
Arsenic	(1)	(1)
Selenium	(1)	(1)
Antimony	(1)	(1)
Mercury	(1)	(1)
Barium	(1)	(1)
Silver	(1)	(1)
Lead	(1)	(1)
Thallium	(1)	(1)

(1) Not believed to be present in significant quantity.

TABLE 5.2-4. COAL, LIMESTONE, AND ASH STORAGE AREA RUNOFF ESTIMATED QUALITY

<u>Constituent</u>	<u>Average Concentration mg/l</u>	<u>Maximum Concentration mg/l</u>
Five Day Biochemical Oxygen Demand	13.5	27.0
Chemical Oxygen Demand	426	817
Total Organic Carbon	145	282
Total Suspended Solids	30	100
Ammonia	0.5	0.9
pH	5	8.50
Oil and Grease	14	23
Magnesium	6.2	12.5
Nitrate	0.6	1.1
Chlorine	0.00	0.00
Cyanide	0.01	0.02
Iron	36.1	217
Manganese	5.4	14.5
Aluminum	36.2	145
Nickel	0.25	1.4
Zinc	0.91	2.9
Copper	0.09	0.46
Cadmium	0.004	0.011
Chromium	0.11	0.24
Beryllium	0.0029	0.0029
Arsenic	0.00089	0.0023
Selenium	0.00078	0.0012
Antimony	0.00036	0.0011
Mercury	0.00072	0.0033
Barium	0.382	1.811
Silver	0.0018	0.0029
Lead	0.154	0.380
Thallium	0.00036	0.00036

7,480 pounds per day average and 15,860 pounds per day maximum and suspended solids to 13,000 pounds per day average and 33,600 pounds one day maximum. The effluent pH must be between 6 and 9. The existing NPDES permit is currently in the renewal process and these numbers are subject to change.

Estimates of quality of the combined wastewaters from the Cedar Bay Cogeneration Plant which will be treated in the existing wastewater facility are given in Table 5.2-5. These wastewaters will not impact the existing treatment facility as the BOD₅ and suspended solids loadings are negligible compared to the paper mill wastes. The additional flow being treated by the facility as a result of the Cedar Bay Cogeneration Plant will be offset by a decrease in wastewater resulting from retirement of existing power generation facilities at the paper mill as shown in Table 5.2-2.

The industrial treatment system effluent discharges to the St. Johns River. The St. Johns River has been classified by the Florida Department of Environmental Regulation as a Class III water. The criteria for Class III waters are listed in Table 5.2-6. These criteria specify the concentrations of pollutants which are allowed beyond a designated mixing zone in the river.

An analysis was performed to determine the possible impact of constituents in the Cedar Bay project wastewater on the total Seminole Kraft effluent. Except for five metals, all constituents in the Cedar Bay wastewater are below the Class III water quality standards prior to introduction of the Cedar Bay project wastewater to the Seminole Kraft industrial treatment process. Table 5.2-7 indicates the concentrations of the five metals as reported in the existing Seminole Kraft effluent, and the effect on addition of the estimated concentrations from the Cedar Bay project wastewater. The analysis demonstrates no significant impact on existing effluent except for iron concentrations at the maximum Cedar Bay flow case. However, since some iron will be removed in the oxidizing conditions existing in the Seminole Kraft aeration ponds, there likely will be no net effect on discharge quality. Iron is further discussed in Subsection 5.2.2.

TABLE 5.2-5. ESTIMATED QUALITY OF CEDAR BAY COGENERATION PLANT COMBINED DISCHARGE TO SEMINOLE KRAFT CORPORATION WASTEWATER TREATMENT FACILITY

<u>Constituent</u>	<u>Average Concentration mg/l</u>	<u>Maximum Concentration mg/l</u>	
Five Day Biochemical Oxygen Demand	11	11	1
Chemical Oxygen Demand	32	83	
Total Organic Carbon	17	32	
Total Suspended Solids	39	58	
Ammonia	1.1	1.1	
pH (in pH units)	7.1	9.0	
Oil and Grease	10	12	
Calcium	77	81	
Magnesium	141	141	
Sodium	1,441	1,492	
Potassium	4.2	4.3	
M-Alkalinity as CaCO ₃	203	210	1
Sulfate	3,264	3,264	
Chloride	151	157	
Nitrate	5.6	6.5	
Fluoride	3.0	3.2	
Silica	183	190	
Chlorine	0.00	0.02	
Phosphate (total)	0.06	0.07	1
Cyanide	0.00054	0.0016	
Iron	2.2	6.6	1
Manganese	0.27	0.94	
Aluminum	1.8	6.3	
Nickel	0.01	0.04	
Zinc	0.05	0.16	
Copper	0.005	0.05	
Cadmium	0.0002	0.00069	
Chromium	0.006	0.02	

TABLE 5.2-5 (Continued). ESTIMATED QUALITY OF CEDAR BAY COGENERATION PLANT
COMBINED DISCHARGE TO SEMINOLE KRAFT CORPORATION
WASTEWATER TREATMENT FACILITY

<u>Constituent</u>	<u>Average Concentration mg/l</u>	<u>Maximum Concentration mg/l</u>
Beryllium	0.00015	0.00052
Arsenic	0.000045	0.00015
Selenium	0.00004	0.00014
Antimony	0.000018	0.000063
Mercury	0.000037	0.00013
Barium	0.02	0.067
Silver	0.0001	0.0004
Lead	0.01	0.027
Thallium	0.000018	0.000063

1

TABLE 5.2-6. CLASS III WATER QUALITY CRITERIA (MARINE WATERS)

<u>Parameter</u>	<u>Concentration</u>
Aluminum	1.5 mg/l
Antimony	0.2 mg/l
Arsenic	0.05 mg/l
Bromates	100 mg/l
Bromine (Free Molecular)	0.1 mg/l
Cadmium	5.0 ug/l
Chlorides	<10 percent increase over normal background levels in predominately marine waters
Chlorine (Total Residual)	0.01 mg/l
Chromium, Total	0.05 mg/l
Coliforms, Fecal	200 counts/100 ml monthly average; 400 counts/100 ml <10 percent of samples per month; 800 counts/100 ml on any one day
Coliforms, Total	1,000 counts/100 ml monthly average; 1,000 counts/100 ml <20 percent of samples per month; 2,400 counts/100 ml at any time
Copper	15 ug/l
Cyanide	5.0 ug/l
Detergents	0.5 mg/l
Dissolved Gases, Total	<110 percent saturation
Dissolved Oxygen	>5.0 mg/l 24 hour average; >4.0 mg/l instantaneous
Fluoride	5.0 mg/l
Iron	0.3 mg/l
Lead	50 ug/l
Manganese	--
Mercury	0.1 ug/l
Nickel	100 ug/l
Nutrients	Shall not be altered so as to cause an imbalance in natural populations of aquatic flora and fauna

TABLE 5.2-6 (Continued). CLASS III WATER QUALITY CRITERIA (MARINE WATERS)

<u>Parameter</u>	<u>Concentration</u>
Oil and Grease	
Dissolved or Emulsified	5.0 mg/l
Undissolved	No visible oil to interfere with beneficial use
Pesticides and Herbicides	
Aldrin Plus Dieldrin	0.003 ug/l
Chlordane	0.004 ug/l
DDT	0.001 ug/l
Demeton	0.1 ug/l
Endosulfan	0.001 ug/l
Endrin	0.004 ug/l
Guthion	0.01 ug/l
Heptachlor	0.001 ug/l
Lindane	0.004 ug/l
Malathion	0.1 ug/l
Methoxychlor	0.03 ug/l
Mirex	0.001 ug/l
Parathion	0.04 ug/l
Toxaphene	0.005 ug/l
pH Range	6.5 to 8.5
pH Variation from Background	±1.0
Phenolic Compounds	1.0 ug/l
Phosphorous (Elemental)	0.1 ug/l
Polychlorinated Biphenyls	0.001 ug/l
Radioactive Substances	
Radium 226 and 228	<5 pCi/l
Gross Alpha	<15 pCi/l
Selenium	25 ug/l
Silver	0.05 ug/l
Transparency	<10 percent reduction from background
Temperature (Summer)	2 F above ambient (92 F maximum)

TABLE 5.2-6 (Continued). CLASS III WATER QUALITY CRITERIA (MARINE WATERS)

<u>Parameter</u>	<u>Concentration</u>
Temperature (Winter)	4 F above ambient (90 F maximum)
Turbidity	<29 NTU increase from background
Zinc	1.0 mg/l

1

TABLE 5.2-7. IMPACT OF THE CEDAR BAY COGENERATION PROJECT ON SEMINOLE KRAFT EFFLUENT METALS CONCENTRATIONS

	Seminole Kraft Contribution to S-K Treatment Plant*	Contribution to S-K Treatment Plant From Cedar Bay Cogeneration Project		Total Projected Industrial Treatment Plant Effluent		Total Projected Combined Effluent to St. John's River***	
		Average	Maximum	Average	Maximum	Average	Maximum
Flow							
mgd	20	0.23	0.62	20.23**	20.62**	21.15**	23.09**
gpm	13,889	159	432	14,048**	14,321**	14,690**	16,030**
Concentrations							
Iron, mg/l	0.23	2.2	6.6	0.25	0.42	0.25	0.43
Aluminum, mg/l	1.67	1.8	6.3	1.67	1.81	1.60	1.73
Copper, mg/l	<0.025	0.006	0.05	<0.025	<0.026	<0.025	<0.026
Mercury, mg/l	<0.005	0.000038	0.00013	<0.005	<0.005	<0.005	<0.005
Silver, mg/l	No Data	0.0001	0.0004	--	--	--	--

*Source: Seminole Kraft Corporation data.

**Actual total flow may be somewhat less since some existing Seminole Kraft facilities will be retired with the operation of the Cedar Bay Cogeneration Project. See Table 5.2-2.

***Includes cooling tower blowdown and site runoff retention basin discharge from the Cedar Bay Cogeneration Project.

Seminole Kraft Corporation recently performed a water quality analysis demonstrating that the existing discharge concentrations do not cause an exceedance of any water quality parameters in the St. Johns River. Since the Cedar Bay Cogeneration Project wastewater will not significantly impact the existing Seminole Kraft treatment plant discharge concentrations except possibly for iron, no adverse impacts to the St. Johns River are expected.

5.2.2 Cooling Tower Blowdown

Blowdown from the cooling tower will be routed to the existing discharge line from the Seminole Kraft once-through cooling systems. The blowdown quality is described in Section 3.5. The cooling tower blowdown estimated quality is given in Table 5.2-8. The effluent quality will meet the Federal effluent standards for new sources identified in Table 5.2-1. The chlorine limitation will be assured by the use of chemical dechlorination.

The blowdown water, which is essentially well water concentrated 4.6 times, will not exceed Class III water quality standards except possibly for iron.

Iron in the cooling tower blowdown is expected to average approximately 0.3 mg/l with a maximum of 0.5 mg/l. Based on USEPA Storet water quality data for the St. Johns River near the mouths of the Broward River and Dunns Creek, iron concentration in the St. Johns River averaged approximately 0.4 mg/l with a standard deviation of 0.23 mg/l. Iron in the St. Johns River exceeds the Class III standard of 0.3 mg/l approximately 67 percent of the time and exceeds the expected maximum cooling tower blowdown concentration of 0.5 mg/l approximately 33 percent of the time. The 0.3 mg/l limit primarily relates to suitability for drinking water purposes, not to its toxic effect. The St. Johns River is brackish and therefore unsuitable for a drinking water supply.

Because of the high iron concentration in the St. Johns River, a variance to the Class III standards will be needed. The variance is discussed in Section 5.12.

0.28 mg/l was selected since it results in approximately the same size mixing zone as the thermal mixing zone. It is

TABLE 5.2-8. COOLING TOWER BLOWDOWN ESTIMATED QUALITY

<u>Constituent</u>	<u>Average Concentration mg/l</u>	<u>Maximum Concentration mg/l</u>	
Five Day Biochemical Oxygen Demand	<10.0	10.0	1
Chemical Oxygen Demand	<10.0	10.0	
Total Organic Carbon	<10.0	10.0	
Total Suspended Solids	20.0	30.0	
Ammonia	<1.0	1.0	
pH (in pH units)	7.20	8.00	
Oil and Grease	(1)	(1)	
Calcium	290	360	
Magnesium	125	175	
Sodium	70	105	
Potassium	5	8	
M-Alkalinity as CaCO ₃	100	150	1
Sulfate	1,100	1,500	
Chloride	140	210	
Nitrate	2.3	4.5	
Fluoride	2.3	4.5	
Silica	150	190	
Chlorine	0.05	0.10	
Phosphate (total)	<0.50	0.50	
Cyanide	(1)	(1)	
Iron	0.30	0.50	1
Manganese	(1)	(1)	
Aluminum	(1)	(1)	
Nickel	(1)	(1)	
Zinc	(1)	(1)	
Copper	(1)	(1)	
Cadmium	(1)	(1)	
Chromium	(1)	(1)	
Beryllium	(1)	(1)	

TABLE 5.2-8 (Continued). COOLING TOWER BLOWDOWN ESTIMATED QUALITY

<u>Constituent</u>	<u>Average Concentration mg/l</u>	<u>Maximum Concentration mg/l</u>
Arsenic	(1)	(1)
Selenium	(1)	(1)
Antimony	(1)	(1)
Mercury	(1)	(1)
Barium	(1)	(1)
Silver	(1)	(1)
Lead	(1)	(1)
Thallium	(1)	(1)

(1) Not present in significant quantity.

expected that background iron concentrations will exceed 0.28 mg/l approximately 70 percent of the time.

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5.2.3 Measurement Program

Measurements from existing monitoring point 001A will continue as required in the existing Seminole Kraft NPDES permit. Measurements from existing monitoring point 001B will be discontinued since this once-through cooling stream will be eliminated. Monitoring at points 002, 003, 004, and 006 will be as required by the new NPDES permit from those sources.

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The following monitoring is proposed.

<u>Monitoring Point</u>	<u>Parameters</u>	<u>Frequency</u>
Cooling Tower Blowdown (002)	Cl ₂ , Fe, temperature	Weekly
Yard Runoff Pond Discharge (003)	pH, suspended solids, oil and grease	Quarterly
Boiler Blowdown (004)	Oil and grease, suspended solids	Once every 5 years
Low Volume Wastes (006)	Oil and grease	Weekly

1

2

1

2

Chemical analyses will be in accordance with the standard methods required by the Florida Department of Environmental Regulation.

5.2.4 References

1. "Characterization and Treatment of Trace Metals in Coal Pile Drainage," by Ken Chen, Ken Ogle, and Roger Minear, presented at the International Water Conference, October 24, 25, 26, 1983.

5.3 IMPACTS ON WATER SUPPLIES

The proposed plant operations are not expected to significantly impact surface or ground water supplies with regard to their quality or potential uses.

5.3.1 Surface Water

Surface waters around the site are the Broward River to the west, St. Johns River to the south, and Dunn Creek to the east. There are no natural

surface water bodies onsite. No surface water will be used by the plant. Existing use will cease when the old power facilities are abandoned.

The proposed site drainage system will be designed to comply with all federal, state, and local regulations regarding discharge into surface

waters. 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 an engineered system of ditches and ponds for treatment as necessary as described in Section 3.8. With the exception of stormwater flows in excess of the 25-year, 24-hour storm runoff (which will flow directly to the Broward River), all discharges from the ponds and plant systems will be directed to the existing Seminole Kraft outfall structure located on the St. Johns River. | 1

The anticipated volumes of water intake and discharge are presented in Section 3.5. Intake and discharge volumes are expected to be reduced significantly as compared to current Seminole Kraft paper mill operations.

The proposed plant operations are not expected to affect water quality within the area. Undisturbed plant areas will remain in their existing state and runoff water quality characteristics are expected to remain unchanged.

5.3.2 Ground Water Impacts

The following describes the effects of plant operations on the aquifers underlying the plant site.

5.3.2.1 Water Table Zone. Plant operation will have negligible effect on the water table water quality. Areas beneath coal and ash pellet piles will be lined and any water discharged onsite will be collected in ponds, treated as necessary and discharged. Any water infiltrating to the water table zone tends to flow horizontally and discharge into the rivers, so vertical travel of contaminants will be negligible. No water will be withdrawn for plant use from the water table zone.

5.3.2.2 Shallow Aquifer. No new wells will be installed in the shallow aquifer and plant operation will have no impact on the shallow aquifer from consumptive or infiltration effects. Shallow aquifer contamination will be minimized because of the use of liners for the coal pile, pellet storage area, and the runoff pond. Any seepage that may occur will not contaminate the shallow aquifer because infiltration that reaches the water table zone will flow horizontally toward the river. Q?

5.3.2.3 Floridan Aquifer. Water for plant operation and cooling will be withdrawn from the Floridan Aquifer. Approximately 7 mgd will be required.

Freshwater use in Duval County is 173.5 Mgal/day, with 158.01 Mgal/day from the Floridan Aquifer. Power generation in Duval County requires

2

Form
2D
NPOES

EPA New Sources and New Dischargers
Application for Permit to Discharge Process Wastewater

I. Outfall Location

For each outfall, list the latitude and longitude, and the name of the receiving water.

Outfall Number (list)	Latitude			Longitude			Receiving Water (name)
	Deg	Min	Sec	Deg	Min	Sec	
001	30	24	55	81	35	45	Existing outfall in the St. Johns River
002							Monitoring point for cooling tower blowdown
003							Monitoring point for runoff retention basin
004							Monitoring point for boiler blowdown
005	30	25	22	81	36	35	Discharge to the Broward River
006							Monitoring point for low volume wastes

II. Discharge Date (When do you expect to begin discharging?)

III. Flows, Sources of Pollution, and Treatment Technologies

A. For each outfall, provide a description of (1) All operations contributing wastewater to the effluent, including process wastewater, sanitary wastewater, cooling water, and stormwater runoff; (2) The average flow contributed by each operation; and (3) The treatment received by the wastewater. Continue on additional sheets if necessary.

[illegible]

3.09 Mgal/day. The Cedar Bay plant would increase the daily requirement for power generation to 10 Mgal/day.

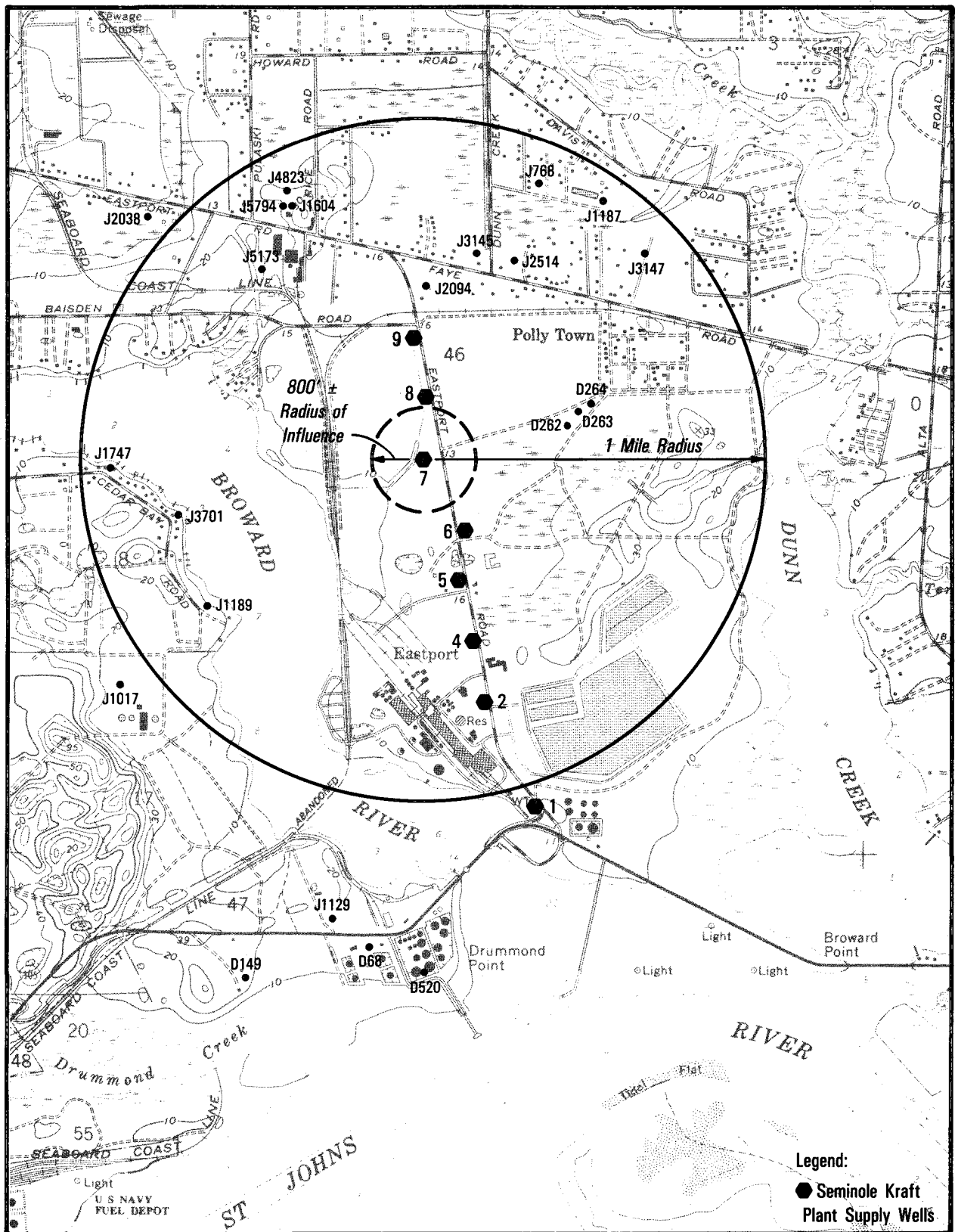
Total water withdrawn from the Floridan Aquifer for power generation within the St. Johns Water Management District was 133.72 Mgal/day in 1986. This plant would increase the total withdrawn for power generation to 143.72 Mgal/day.

The increased withdrawal from the Floridan Aquifer by the Cedar Bay Cogeneration Project will increase the core of depression in the piezo-metric surface of the Floridan in the area of the present Seminole Kraft Paper Co. well field. The free flowing production capacity of each of the seven Seminole Floridan wells is approximately 7,500 gpm. Wells 1 and 2 are equipped with pumps; however, they are used on a standby emergency basis. Wells 4, 5, 7, 8, and 9 are used on a rotating basis to produce 20 mgd with a maximum 25 mgd. At maximum individual well production, this would require utilization of two wells at 7,500 gpm and one well at 2,400 gpm.

The Cedar Bay Cogeneration Project will require additional withdrawal of 7 mgd from the Seminole Kraft plant well field, or 4,900 gpm. This would be equivalent, with the maximum Seminole Kraft plant usage, to three wells at a full design withdrawal rate of 7,500 gpm per well. This would, at the maximum distance from the plant, require full capacity of Wells 7, 8, and 9.

Since the Seminole plant will at times use Wells 9 and 8 at full capacity, the additional Cedar Bay project usage would be to add full capacity usage of Well 7.

Figure 5.3-1 shows the calculated radius of influence of Well 7 of approximately 800 feet at full capacity production. Seminole Kraft has noted no drawdown effects from adjacent production wells during actual pump operation at well spacing of approximately 1,000 feet. A mile radius circle is also drawn as a comparison. No wells other than the Seminole Kraft Paper Company well water supply wells are included in the radius of influence of Well 7. No wells outside the Seminole plant well field will therefore be affected. The additional drawdown at the existing wells, due



RADIUS OF INFLUENCE — WELL NO. 7

Figure 5.3-1

to the added usage of Well 7, will not affect the production capacity of the Seminole Kraft plant wells.

5.3.3 Drinking Water

The shallow aquifer is believed to be classified as Class G-II. The Floridan Aquifer is used as a source of drinking water in the area. The additional withdrawal for plant usage from the Floridan Aquifer will affect the piezometric surface as described in Subsection 5.3.2. The Floridan Aquifer is confined by the Hawthorn Formation aquiclude. Since no plant discharge encounters the Floridan Aquifer, there will be no water quality effects.

5.3.4 Leachate and Runoff

Leachate and runoff are anticipated to have no significant impact on water supplies. Coal and pellet storage piles will be lined. Water will be collected, treated in a holding pond, and then directed to the existing Seminole Kraft wastewater treatment system for treatment and discharge to the St. Johns River. Remaining site runoff will also be collected, treated, and discharged also to the St. Johns River. The coal quality for plant use has not been determined at this time. Subsection 5.2.1 discusses the potential discharges of treated wastewater with concentrations of some metals possibly exceeding the St. Johns River Class III standards. Such discharges are not expected to have a significant impact on the St. Johns River. Runoff collection is discussed in Section 3.8.

5.3.5 Measurement Programs

Ground water is believed to be Class G-II, and river water is Class III, generally marine. Water samples will be collected and tested at the monitoring locations and frequencies indicated in Section 5.2.3.

The ground water in the water table zone will be monitored to measure fluctuations in the potentiometric surface and for water quality. The new

monitoring well locations are shown on Figure 5.3-2. Ground water levels in the water table zone will be recorded monthly throughout all phases of the project from preliminary investigation through operation. Water quality analyses of samples of the ground water will be completed monthly until the baseline water quality is established, then bimonthly through the first year of plant operation and semi-annually thereafter. Parameters monitored and sample collection method are presented in Tables 5.3-1 and 5.3-2. A summary of the monitoring frequency is given in Table 5.3-3. Chemical analyses using standard methods required by the Florida Department of Environmental Regulation will be performed on ground water samples.

5.4 SOLID/HAZARDOUS WASTE DISPOSAL IMPACTS

No environmental impacts are expected from these wastes onsite, as solid waste will be disposed of offsite. Any potentially hazardous wastes will be rendered nonhazardous and further treated before discharge.

5.4.1 Solid Waste

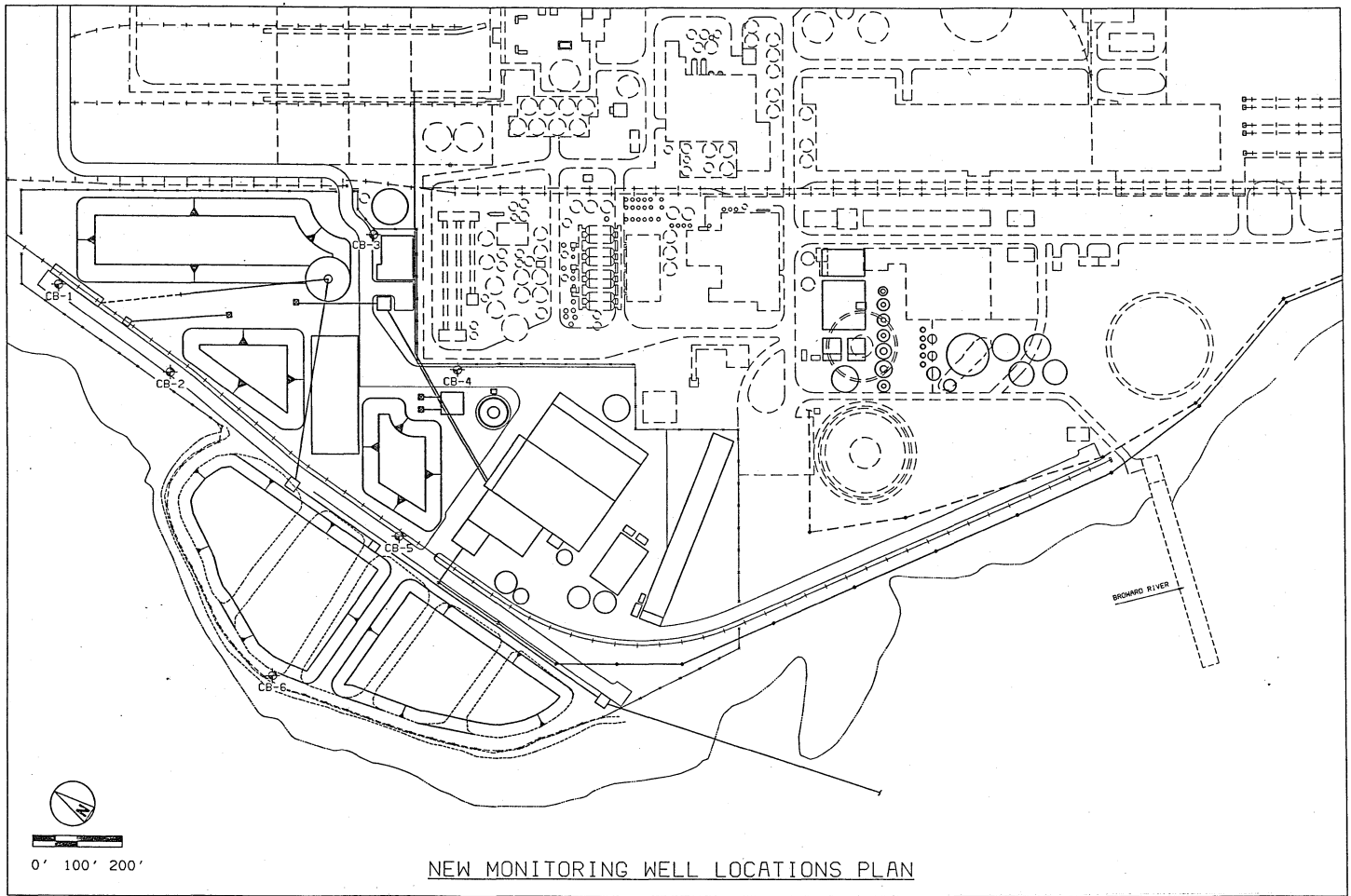
Combustion ash generated by the cogeneration plant will be disposed of by the coal supplier at an approved disposal site out of state or sold within the building materials industry. Trash and other solid waste materials will be disposed of offsite at an approved facility.

5.4.2 Hazardous Waste

There will be no hazardous waste associated with the cogeneration plant. Wastes from the regeneration of the demineralizers will be pH adjusted at the neutralization basin. A licensed contractor will be responsible for disposal of the boiler cleaning wastes. There will be no environmental impacts from the handling or treatment of these wastes.

5.5 SANITARY AND OTHER WASTES

The sanitary wastes from the cogeneration plant will be treated at the existing sanitary facilities at the Seminole Kraft paper mill. The treated sewage effluent will meet all applicable standards and no other appreciable impacts are anticipated.



Amendment 1
021089

NEW MONITORING WELL LOCATION PLAN
Figure 5.3-2

TABLE 5.3-1. LIST OF PHYSICAL AND CHEMICAL PARAMETERS FOR GROUND WATER
QUALITY ANALYSIS

Inorganic Constituents

Ammonia (as NH_4)
Calcium
Carbonate
Chloride
Fluoride
Hardness (as CaCO_3)
Hydrogen Sulfide
Magnesium
Nitrate (NO_3^-)
Nitrite (NO_2^-)
Oxygen (dissolved)
Phosphate
Potassium
Silica (colloidal and dissolved)
Sodium
Strontium
Sulfate

Organic Constituents

PCB
Phenols
Total Organic Carbon

Metals (Total)

Aluminum
Arsenic
Barium
Boron

Metals (Total) (Continued)

Cadmium
Chromium (Hexavalent)
Chromium (total) | 1
Copper
Iron
Lead
Manganese
Mercury
Molybdenum
Nickel
Selenium | 1
Silver
Vanadium
Zinc

Miscellaneous

Alkalinity (as CaCO_3)*
Alkalinity (as HCO_3)*
Color
Conductivity*
Density | 1
Gross Alpha
Ion Balance | 1
pH*
Temperature*
Total Dissolved Solids
Total Suspended Solids
Turbidity

*Field and laboratory measurements.

TABLE 5.3-1. LIST OF PHYSICAL AND CHEMICAL PARAMETERS FOR GROUND WATER QUALITY ANALYSIS

Inorganic Constituents

Ammonia (as NH_4)
 Calcium
 Chloride
 Fluoride
 Hardness (as CaCO_3)
 Hydrogen Sulfide
 Magnesium
 Nitrate (NO_{3-})
 Nitrite (NO_{2-})
 Phosphate
 Potassium
 Silica (colloidal and dissolved)
 Sodium
 Strontium
 Sulfate

Organic Constituents

PCB
 Phenols
 Total Organic Carbon

Metals (Total)

Aluminum
 Arsenic
 Barium
 Boron

Metals (Total) (Continued)

Cadmium
 Chromium (Hexavalent)
 Copper
 Iron
 Lead
 Manganese
 Mercury
 Molybdenum
 Nickel
 Selenium
 Silver
 Vanadium
 Zinc

Miscellaneous

Alkalinity (as CaCO_3)*
 Alkalinity (as HCO_3)*
 Color
 Conductivity*
 Gross Alpha
 pH*
 Temperature*
 Total Dissolved Solids
 Total Suspended Solids
 Turbidity

*Field and laboratory measurements.

TABLE 5.3-2. SAMPLE COLLECTION AND PRESERVATION METHODS

<u>Container</u>	<u>Volume</u>	<u>Preservation</u>	<u>Measurements</u>
Plastic	0.5 gal.	None	Gross Alpha Radiation
Plastic	1.0 gal.	None	pH, Alkalinity, Chloride, Fluoride, Conductivity, Total Dissolved Solids, Total Suspended Solids, Chromium (hexavalent), Silica, Sulfate, Color, Turbidity
Plastic	0.25 gal.	Nitric Acid to pH less than 2	Hardness, Mercury, Arsenic, Calcium, Potassium, Sodium, Strontium, Aluminum, Barium, Selenium, Vanadium, Cadmium, Copper, Iron, Lead, Magnesium, Manganese, Mercury, Molybdenum, Nickel, Silver, Zinc
Plastic	0.25 gal.	Sulfuric Acid to pH less than 2	Ammonia, Nitrate, Nitrite, Phosphate, Boron, Total Organic Carbon
Glass	0.25 gal.	Phosphoric Acid to pH less than 4. 1 gram copper sulfate per liter of sample added after collection	Phenol
Glass (Amber) with Teflon Cap	1.0 gal.	None	PCB
Plastic	250 ml.	1 ml. of 1 Molar Zinc Acetate, plus 1 ml. of 1 Normal Sodium Hydroxide	Hydrogen Sulfide

TABLE 5.3-3. MONITORING FREQUENCY OF SITE MONITORING WELLS

<u>Measurement</u>	<u>Project Phase</u>				
	<u>Presite Preparation</u>	<u>Site Preparation</u>	<u>Plant Construction</u>	<u>Plant Operation Year 0-1</u>	<u>Plant Operation Year 1-</u>
Water Level	Monthly	Monthly	Monthly	Monthly	Monthly
Water Quality	Monthly*	Monthly*	Monthly*	Monthly*	Semi-Annually

*Water quality analyses will be bimonthly after baseline quality is established.

Other wastewaters will be treated and disposed of as discussed in Section 3.5. No impacts are expected because the loading to the existing Seminole Kraft treatment system will not be increased as a result of the shutdown of the existing power, bark, and recovery boiler waste streams.

5.6 AIR QUALITY IMPACTS

The project will replace older, less environmentally efficient equipment with advanced kraft recovery boiler and clean coal technology, resulting in numerous environmental benefits. Major reductions are anticipated in ambient impacts of sulfur dioxide (SO_2), total suspended particulate matter (TSP), and particulates matter with aerodynamic diameters less than 10 microns (PM_{10}). In addition, the maximum total reduced sulfur (TRS) emission rate from the new recovery boiler will be lower than that from the existing kraft recovery boilers. This will result in a significant reduction in ambient air quality impacts and odor effects due to TRS emissions.

The air quality impacts resulting from the operation of the Cedar Bay Cogeneration Facility include the direct effects on pollution levels in the power plant vicinity and the further effects of those pollutants on human health and welfare. Subsections 5.6.1 through 5.6.4 describe the air quality impacts of the facility. This air quality assessment is used to support the PSD permit application.

5.6.1 Pollutant Applicability

Pollutant applicability is determined in Subsection 3.4.1 and is briefly summarized here. The pollutant applicability was determined by comparing emission rates of the proposed facility against those Seminole Kraft sources being replaced. An applicable pollutant is a regulated pollutant which has a net emission increase that exceeds "significant" levels defined by EPA and FDER.

Subsection 3.4.1 identified that nitrogen oxides (NO_x), carbon monoxide (CO), lead (Pb), beryllium (Be), mercury (Hg), fluorides, and sulfuric acid mist would be subject to the PSD permitting requirements. The permit requirements include BACT determination and air quality impact

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assessment as appropriate for each pollutant. All other regulated pollutants were estimated to be "netted out" or below EPA significant emission levels. Therefore, these pollutants are not subject to the PSD permit requirements. It should be noted that the initial SCA included SO₂ as a pollutant subject to PSD permit requirements. However, since the cogeneration facility is now committing to use a lower sulfur coal, the SO₂ emissions "net out" and SO₂ need no longer be considered in the PSD assessment.

5.6.2 Modeling Methodology

This subsection describes the overall air quality assessment methodology in support of the PSD permit application. The purpose of air quality modeling is to demonstrate compliance with the applicable ambient air quality standards (AAQS) and PSD increments. Tables 5.6-1 and 5.6-2 present the AAQS and PSD increments. Also, the FDER has identified that the Jacksonville area is a modeled nonattainment area for SO₂ and therefore the project cannot have a modeled significant SO₂ impact on this area. Although SO₂ is not subject to the PSD permit requirements, modeling was performed to show that, by replacing older less environmentally efficient sources, there is actually a dramatic improvement in air quality at sensitive locations. The assessment methodology is based on EPA's Guideline on Air Quality Models (Revised) July 1986 (including Supplement A, July 1987) and the UNAMAP 6 dispersion models. Subsequent to the publication of the initial SCA, the EPA issued several changes relevant to the downwash algorithms in the ISCST model. The most recent of these changes has been incorporated into the revised SO₂ modeling analysis and may result in substantial differences in concentrations for those sources subject to downwash.

Air quality impacts are determined for each applicable pollutant having an AAQS or PSD increment. The assessment also includes modeling of the proposed and the existing sources to establish the effects of replacing the existing Seminole Kraft sources with sources which are more environmentally efficient. Particular air quality sensitive areas for SO₂ impacts are the

PSD Class I area (Okefenokee Wilderness Area) and the FDER SO₂ modeled exceedance locations.

5.6.2.1 Applicable Air Quality Models. For most air quality modeling assessments it is desirable to use both screening level and refined dispersion modeling techniques. For this project, EPA's screening level model PTPLU-2 and the EPA document entitled Procedures for Evaluating Air Quality Impact of New Stationary Sources (Volume 10-Revised) are used to determine the highest predicted ground level concentration for various plant operating conditions.

The operating conditions of the circulating fluidized bed (CFB) boilers are evaluated at 50 and 75 percent load capacity plus the maximum design for the plant. The maximum CFB operation was determined to be the

TABLE 5.6-1. FEDERAL AND FLORIDA AMBIENT AIR QUALITY STANDARDS

<u>Pollutant</u>	<u>Sampling Period</u>	<u>Federal Standards</u>		<u>Florida Standards</u>
		<u>Primary</u>	<u>Secondary</u>	
		$\mu\text{g}/\text{m}^3$	$\mu\text{g}/\text{m}^3$	$\mu\text{g}/\text{m}^3$
Sulfur Dioxide (SO_2)	Annual	80	--	60
	24-hour	365	--	260
	3-hour	--	1,300	1,300
Nitrogen Dioxide (NO_2)	Annual	100	100	100
Particulate Matter (PM_{10})	Annual	50	50	50
	24-hour	150	150	150
Carbon Monoxide* (CO)	8-hour	10	--	10
	1-hour	40	--	40
Ozone (O_3)	1-hour	235	235	235
Lead (Pb)	Calendar Quarter	1.5	1.5	1.5

*Units are mg/m^3 .

TABLE 5.6-2. PSD CLASS I AND CLASS II AIR QUALITY INCREMENTS

<u>Pollutant</u>	<u>Class I Increment</u> $\mu\text{g}/\text{m}^3$	<u>Class II Increment</u> $\mu\text{g}/\text{m}^3$
SO_2		
Annual	2	20
24-hour	5	91
3-hour	25	512
Particulates		
Annual	5	19
24-hour	10	37
NO_x^*		
Annual	2.5	25

*Proposed February 8, 1988.

worst case operating condition and is the only operating level conservatively used for the refined air quality modeling. The proposed kraft recovery boiler (KRB) and smelt dissolving tank (SDT) are not expected to operate at varying conditions and thus were not evaluated with screening level modeling.

Following the recommended EPA modeling guidance for refined models, the ISCST (Industrial Source Complex Short-Term) dispersion model is used to determine impacts for the applicable pollutants. The ISCST model is a steady-state Gaussian plume model which can be used to assess pollutant concentrations from a wide variety of sources associated with an industrial source complex. This model can account for gravitational settling and dry deposition of particulates; building downwash conditions; point area, line, and volume sources; plume rise as a function of downwind distance; separation of sources; and limited terrain adjustment.

Modeling Options. ISCST's building downwash model option is used as appropriate to consider the effects of nearby buildings for both the existing and proposed sources. Several of the existing sources have stacks that are below the Good Engineering Practice (GEP) height and are, therefore, subjected to the turbulence surrounding the building. This situation can cause pollutants to be brought to the ground before appreciable mixing and dilution can occur. The proposed boilers will utilize GEP stack heights and thus will disperse pollutants above the building turbulence. The proposed SDT vent will be shorter and located on the KRB building. This vent will be within the building turbulence and, therefore, requires the use of building downwash modeling.

The following are miscellaneous options that are included in the assessment. The proposed modeling site is considered rural for modeling purposes based on the land use within a 3-kilometer radius. Standard EPA default modeling options are used for this analysis including building downwash as appropriate. For downwash modeling, the building dimensions are conservatively based on the maximum projected width regardless of the wind direction. Also, no terrain effects are included since the surrounding area is nearly flat.

Net Emission Impact Modeling. The basis for the air quality assessment is net emission impact modeling with ISCST for the applicable pollutants. The net emission impact represents the expected air quality effect of replacing the older sources with more efficient and environmentally desirable sources. Net emission impacts are determined by modeling separately the proposed and existing sources at common receptors for the entire five years of meteorological data and then comparing their impacts.

It is first necessary to use the existing Seminole Kraft sources to establish a "base" ambient concentration. The base concentration for each receptor is assumed to be represented by the second-highest concentration predicted from the five years of meteorological data for each receptor. For net impact assessment, the proposed source impact is conservatively represented by the highest modeled concentration at each receptor. This differs from standard air quality assessments where the second-highest concentration at each receptor can be used to compare with allowable PSD increments and AAQS. The net emission impacts are determined by subtracting the existing impacts (base concentrations) from the proposed impacts at each receptor. Note that a negative net impact represents a modeled improvement in the ground level concentration for that receptor.

If the predicted ground level concentrations from the proposed sources are below EPA significant impact levels, then no further air quality modeling is needed. If not, then the net impacts are compared with the significant impact levels.

If a net emission impact is considered significant, the predicted concentrations are used to establish project significant impact areas, identify potential interacting sources, and ultimately provide comparisons with the applicable AAQS and PSD increments. The significant impact area is used to identify additional sources to include in the AAQS analysis. All major sources of a particular pollutant are included in the modeling plus all sources outside the area which have a significant impact on the area. The maximum combined modeled impact is added to a representative background concentration to demonstrate compliance with the AAQS.

5.6.2.2 Meteorological Data. The ISCST model is generally used with a complete year of hourly, sequential meteorological surface data and twice-daily mixing depths. The preprocessed meteorological modeling data were obtained from the FDER for Jacksonville, Florida for 1981-1985. The full five-year period of data was used with the ISCST model to predict ground level concentrations.

5.6.2.3 Source Data. The combustion gas and process emissions associated with the existing (to be replaced) sources and proposed sources are both evaluated. The purpose of assessing both sources is to determine the impacts on the ambient air quality of replacing existing equipment with new, efficient, and well controlled boilers equipped with GEP stacks. It is anticipated that the replacement will show a net ambient air quality improvement.

Existing Source Data. Table 5.6-3 lists the modeling data for the individual existing Seminole Kraft paper mill sources. These parameters were previously included in the FDER modeling study for the major SO₂ sources in the Jacksonville area.

For convenience, similar Seminole Kraft sources can be combined into "composite" sources for modeling purposes. EPA's Guide for Compiling a Comprehensive Emission Inventory (March 1973) gives a refined method for "lumping" similar sources together. The procedure calculates a plume buoyancy term (K) for each individual stack using stack height (H), flow volume (V), exhaust gas temperature (T), and emission rates (a) in the following equation.

$$K = (H)(V)(T)/(a)$$

When combining sources, the stack with the lowest K value is selected and its stack parameters are used to represent the composite source. Emissions from all sources are added and used for the composite source. This method simplifies the dispersion modeling.

Table 5.6-4 shows the simplified source configuration for the existing Seminole Kraft SO₂ sources. These sources are within the influence of the existing KRB building and have stacks less than the GEP height. Therefore,

TABLE 5.6-3. EXISTING SEMINOLE KRAFT SOURCE DATA

<u>Source</u>	<u>SO₂ Emission Rate*</u> g/sec	<u>Stack Height</u> m	<u>Stack Exit Temperature</u> K	<u>Stack Exit Velocity</u> m/sec	<u>Stack Diameter</u> m
Power Boiler 1	54.6	32.3	433	20.12	1.83
Power Boiler 2	72.7	32.3	450	21.34	2.13
Power Boiler 3	72.7	32.3	450	22.86	2.13
Bark Boilers	114.0	41.5	329	13.72	2.44
Kraft Boiler 1	**	38.4	344	17.68	2.59
Kraft Boiler 2	**	38.4	344	17.98	2.74
Kraft Boiler 3	**	38.4	344	16.76	2.74
Lime Kiln 1	0.5	21.0	344	5.18	1.80
Lime Kiln 2	0.5	22.9	339	7.62	1.43
Lime Kiln 3	0.5	22.9	339	10.36	1.13
Smelt Dissolving Tank 1	**	36.6	344	3.96	1.07
Smelt Dissolving Tank 2	**	37.8	344	4.27	1.22
Smelt Dissolving Tank 3	**	37.8	347	4.27	1.22

*Based on FDER data; confirmed by AES calculations.

**Based on permit conditions; see Table 5.6-4.

TABLE 5.6-4. EXISTING COMPOSITE SOURCE DATA

<u>Source</u>	<u>SO₂ Emission Rate g/sec</u>	<u>Stack Height m</u>	<u>Stack Exit Temperature K</u>	<u>Stack Exit Velocity m/sec</u>	<u>Stack Diameter m</u>
Power Boilers	200.0*	32.3	433	20.12	1.83
Bark Boilers	114.0*	41.5	329	13.72	2.44
Kraft Boilers	47.2**	38.4	344	16.76	2.74
Lime Kilns	1.5*	22.9	339	10.36	1.13
Smelt Dissolving Tanks	1.4**	37.8	344	4.27	1.22

*Based upon FDER data; confirmed by AES calculations.

**Based on permitted fuel use and AP-42 factors.

it is necessary to include building downwash modeling for these sources. The modeled building height and projected width are 99 and 194 feet, respectively.

Proposed Source Data. Table 5.6-5 summarizes the proposed source characteristics and emission data for the three CFB boilers, KRB, SDT, and the limestone dryers. The three CFB boilers will exhaust pollutants through a common GEP stack. The KRB will utilize a separate GEP stack. The SDT includes a 30-foot high vent, located on top of the KRB building, to disperse pollutants. This vent is within the building turbulence and requires ISCST building downwash considerations. The limestone dryers will exhaust gases from a 10-foot vent located on top of the limestone pulverizer. The emissions will also be subject to downwash. The proposed CFB and KRB stack diameters and exit velocities are designed to provide optimum venting of flue gases during maximum operating conditions.

Figure 5.6-1 shows the relationship of the nearby buildings and the proposed emission release points. There are two main buildings that could influence pollutant dispersion: the CFB boiler and KRB buildings. GEP is determined from the nearby building height plus 1.5 times the lesser of the height or the project width. Therefore, the GEP stack determination is dependent on the distance and orientation to the various buildings because the projected building width can change.

The GEP stacks for the various sources vary slightly because of the orientation to the buildings. Table 5.6-6 summarizes the GEP heights for each source based on the dimensions for the two buildings. The greatest height for each source is used for modeling purposes.

5.6.2.4 Receptor Locations. The ISCST model uses either polar or X and Y coordinates for defining receptors. The typical polar receptor array consists of, but is not restricted to, 36 radials (one for every 10 degrees of azimuth) and user-specified downwind ring distances. For X and Y receptor locations, Universal Transverse Mercator (UTM) coordinates may be used or relative X (east-west) and Y (north-south) coordinates with respect to a user-specified origin. Also, discrete receptors can be used to assess impacts at isolated locations such as air quality monitors, PSD Class I areas, or simply the plant boundary.

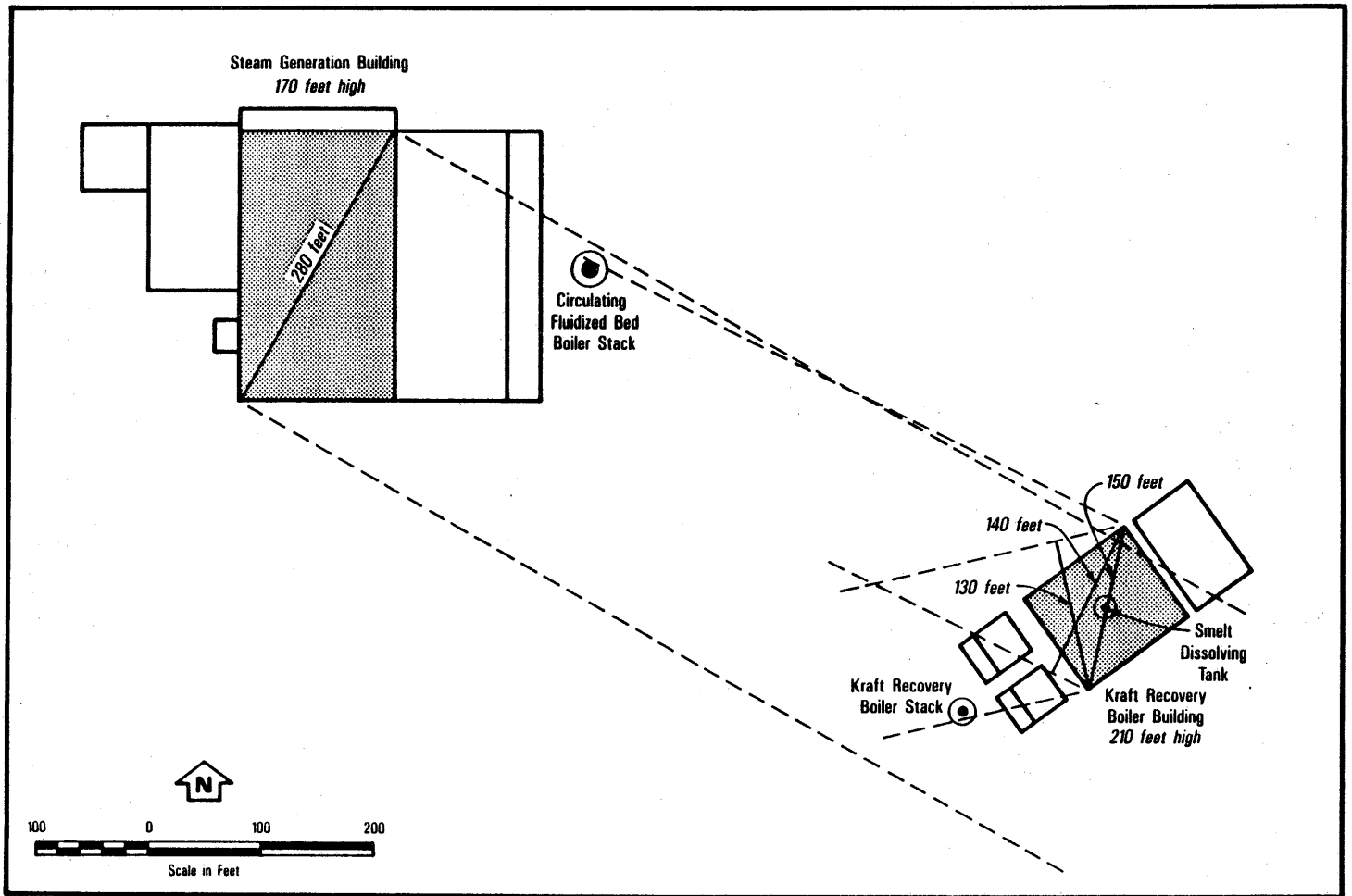
TABLE 5.6-5. PROPOSED SOURCE PARAMETERS FOR MAXIMUM LOAD CONDITIONS

Proposed Emissions

<u>Pollutant</u>	<u>Circulating Fluidized Bed Boiler</u>		<u>Kraft Recovery Boiler</u>		<u>Smelt Dissolving Tank</u>		<u>Limestone Dryers</u>	
	lb/h	g/sec	lb/h	g/sec	lb/h	g/sec	lb/h	g/sec
SO ₂	1,913	241.1	339	42.8	2.3	0.3	9.5	1.2
NO _x	1,148	144.6	369	46.5	--	--	4.5	0.6
CO	606	76.4	495	62.3	--	--	1.1	0.1
Pb	22.3	2.8	0.05	0.006	--	--	--	--

Source Characteristics

<u>Parameters</u>	<u>Circulating Fluidized Bed Boiler</u>	<u>Kraft Recovery Boiler</u>	<u>Smelt Dissolving Tank</u>	<u>Limestone Dryers</u>
Release Height, ft	425	425	240	30
Flow Volume, acfm	1,004,000	399,938	55,000	77,362
Stack Diameter, ft	14	11.25	5	3.42
Exit Velocity, fps	109	67	47	70
Exit Temperature, F	265	400	160	180



CEDAR BAY PLOT PLAN
AND BUILDING DIMENSIONS

Figure 5.6-1

TABLE 5.6-6. DETERMINATION OF GEP STACK HEIGHTS

<u>Nearby Building</u>	<u>Proposed Source</u>			
	<u>Circulating Fluidized Bed Boiler Stack</u>	<u>Kraft Recovery Boiler Stack</u>	<u>Smelt Dissolving Tank Vent</u>	<u>Limestone Dryer Vent**</u>
CFB Boiler Building				
Height, ft	170	170	170	170
Projected width, ft	280	280	280	175
GEP stack, ft*	425	425	425	425
Kraft Recovery Boiler Building				
Height, ft	210	210	210	NA
Projected width, ft	140	130	150	NA
GEP stack, ft*	420	405	435	NA

*Building height plus 1.5 times lesser of the building height or projected width.

**Limestone dryer vent not within area of influence of Kraft Recovery Boiler Building.

Polar receptors are primarily used for this analysis with the proposed CFB boiler stack located at the center. It is necessary to have enough receptor locations at appropriate distances and with adequate density to predict maximum concentrations for the various averaging periods. The receptors can also be used to identify the significant impact areas for applicable pollutants.

The initial receptor array is established according to EPA modeling workshop guidance and the EPA's PTPLU-2 dispersion modeling results. Additional receptor rings (distances) are selected after reviewing the initial ISCST modeling results. The purpose of the additional receptor rings is to increase the resolution of receptor spacing in the vicinity of expected maximum predicted concentrations or to extend the grid to the outer bounds of significant impact areas. Higher receptor resolution is accomplished by bracketing the maximum predicted concentration locations.

The initial modeled receptor distances for CO, NO₂, and Pb are 0.979, 1.273, 1.664, 2.252, 2.937, 3.818, 5.091, 6.657, and 8.811 kilometers. Depending on the applicable averaging times and pollutants, additional receptor distances are included at 80-meter intervals from 0.220 kilometer to 0.940 kilometer. These distances represent locations near the plant boundary.

Discrete receptors are used to determine the air quality impacts at the three modeled SO₂ exceedance locations, previously identified by FDER. Also, 13 additional discrete receptors are used along the southern and eastern boundary of the Okefenokee Wilderness area (PSD Class I area).

5.6.3 Assessment Results

The objective of the modeling analysis was to ensure that the PSD Class I and II increments and applicable air quality standards will be met during the operation of the proposed power plant. The following summarizes the individual air quality impact assessments for the applicable criteria pollutants: NO_x, CO, and Pb. The other criteria pollutants were demonstrated to be netted out (Subsection 3.4.1) based on the replacement of the

existing sources. Although SO₂ was netted out, modeling was performed to show the benefit to sensitive air quality areas obtained by replacing the existing Seminole Kraft sources with more environmentally efficient sources. Also, because of the absence of specific standards, air quality impact assessments were not required for the applicable noncriteria pollutants.

Air dispersion modeling is based on the facility configuration as shown on Figure 3.2-1.

As previously described in Subsection 5.6.2.1, the concept of net emission impact modeling was used for each applicable pollutant. The permitted (maximum allowable) emission rates for those Seminole Kraft sources to be replaced were used to establish short-term air quality base impacts. The actual emissions were used for determining the annual base impacts. Modeling for the proposed sources to determine short-term impacts was based on the maximum expected emission rates. Annual modeling of the proposed sources was based on 1.70 percent sulfur content for the coal used in the CFB. The CFB was conservatively modeled at 100 percent capacity. The area of modeling interest is the significant impact area as defined by the proposed sources alone.

5.6.3.1 Sulfur Dioxide Concentrations. This assessment evaluates impacts at sensitive air quality areas. These areas include the SO₂ PSD Class I area and the three FDER modeled exceedance locations.

PSD Class I SO₂ Impacts. There is one PSD Class I area within 100 kilometers of the proposed power plant. The Okefenokee Wilderness Area is about 60 kilometers northwest of Jacksonville. Therefore, 13 discrete receptors are positioned along the south and east boundaries of this PSD Class I area to determine increment consumption. The short-term impacts were based on net permitted emission rates.

Table 5.6-7 summarizes the net emission impact modeling for the PSD Class I area. For all receptor locations, the net concentrations fall below significant impact levels and in fact are negative. The maximum net impacts for 3-hour, 24-hour, and annual averaging periods are -67.3, -10.5, and -0.16 $\mu\text{g}/\text{m}^3$, respectively. This signifies an improvement in air quality and would actually expand the allowable PSD increment for this area. It should be noted that these impacts demonstrate a greater improvement for the 3-hour and 24-hour averaging periods than those presented in the initial SCA. This is primarily due to changes in some of the proposed stack parameters and emission rates. In addition, some differences result from the EPA directed changes in the downwash procedures of the ISCST model.

FDER Modeled SO₂ Exceedance Areas. This analysis was intended to address the FDER concern for the project's impact on the SO₂ modeled exceedance locations in Jacksonville, and is our understanding of the FDER's requirement of an applicant before a permit for new construction can be considered.

FDER modeling indicated that at three discrete receptors the predicted SO₂ impacts could exceed AAQS if all sources in their inventory were to operate at permitted SO₂ emission rates. However, no exceedance of the SO₂ standard has actually been measured. The analysis in this application demonstrates that net ambient impacts resulting from the project (i.e., ambient impacts from the new CFB boiler, KRBs, and SDT minus impacts from the existing power and bark boilers, KRBs, and SDTs, assuming Seminole Kraft permitted emission rates) will be less than significant impact levels at the modeled exceedance points. That is, less than 25 $\mu\text{g}/\text{m}^3$ for a 3-hour average, 5 $\mu\text{g}/\text{m}^3$ for a 24-hour average, and 1 $\mu\text{g}/\text{m}^3$ for an annual average.

Table 5.6-8 lists the predicted air quality impacts at the three FDER exceedance points based on the Seminole Kraft sources to be replaced and the proposed new sources. The net concentrations at FDER's modeled exceedance points not only fell below significant impact levels for all the

TABLE 5.6-7. NET SO₂ IMPACTS AT THE OKEFENOKEE WILDERNESS AREA
(PSD CLASS I AREA)

<u>Averaging Period</u>	<u>Proposed Source Impact (Highest)</u> $\mu\text{g}/\text{m}^3$	<u>Existing Source Impact (Second-Highest)</u> $\mu\text{g}/\text{m}^3$	<u>Net Emission Impact</u> $\mu\text{g}/\text{m}^3$	<u>PSD Class I Increment</u> $\mu\text{g}/\text{m}^3$
3-Hour	9.2	76.5	-67.3	25
24-Hour	3.4	13.9	-10.5	5
Annual	0.09	0.25*	-0.16	2

*Highest concentration.

TABLE 5.6-8. NET SO₂ IMPACTS AT THE FDER MODELED EXCEEDANCE AREAS*

Averaging Period	UTM Coordinates, km		
	437.3, 3353.5	438.6, 3360.6	438.3, 3360.8
	µg/m ³	µg/m ³	µg/m ³
3-Hour			
Highest proposed	15.4	35.0	43.5
Second-highest existing	197.9	331.3	410.5
Net emission impact	-182.5	-296.3	-367.1
EPA significant level	25	25	25
24-Hour			
Highest proposed	4.1	5.9	6.8
Second-highest existing	33.0	88.5	109.9
Net emission impact	-28.9	-82.6	-103.1
EPA significant level	5	5	5
Annual			
Highest proposed	0.18	0.30	0.33
Highest existing	1.20	3.35	4.47
Net emission impact	-1.02	-3.05	-4.14
EPA significant level	1	1	1

*Negative net emission impact represents net air quality improvement.

modeled years, but were also negative, indicating an air quality improvement at these modeled SO₂ exceedance points.

The highest (least negative) net impacts were predicted to be about -183 µg/m³, -28.9 µg/m³, and -1.0 µg/m³ for 3-hour, 24-hour, and annual periods, respectively. Once again, these values show a greater improvement for the short-term averages than those presented in the initial SCA. This improvement results from changes in some stack parameters and emission rates and EPA directed changes in the ISCST downwash algorithms.

5.6.3.2 Nitrogen Dioxide Concentrations. All five years of meteorological data were used in the ISCST model to predict the annual concentrations of both the new sources and the existing sources. Receptor rings as described in Subsection 5.6.2 were included for this assessment to determine the NO₂ significant impact area for the proposed sources. Emissions from the existing sources were then modeled within the significant impact area (700 meter radius) to determine net impacts for the project. It was assumed that all NO_x emissions conservatively represent NO₂ emissions.

The modeling showed that for all years the net NO₂ concentrations are well below the annual significant impact of the 1 µg/m³ and are, in fact, negative. A negative impact signifies a predicted improvement in ambient air quality. The highest annual net impact was predicted to be -2.9 µg/m³ at 620 meters and 150 degrees. At this receptor the proposed sources contribute 0.50 µg/m³.

5.6.3.3 Carbon Monoxide Concentrations. The ISCST model was also used to determine the 1-hour and 8-hour CO concentrations. Like the SO₂ case, permitted emissions for CO were used for consideration of the short-term standards. Table 5.6-10 shows the maximum predicted 1- and 8-hour CO concentrations for the proposed sources. The net concentrations were not calculated because the new sources alone did not exceed the significant impacts for 1-hour and 8-hour averages of 2,000 and 500 µg/m³, respectively. The highest 1- and 8-hour predicted concentrations are about 94 and 25 µg/m³, respectively.

5.6.3.4 Lead Concentrations. Existing source emission rates are difficult to determine, so that the "netting" of impacts could not readily be performed. Instead, the proposed sources are modeled separately to determine

their impact levels. The maximum 24-hour concentrations were used as a conservative estimate of the quarterly concentration. The quarterly concentration would not exceed the maximum 24-hour concentration. The ISCST

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TABLE 5.6-9
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TABLE 5.6-10. PROPOSED MAXIMUM PREDICTED CO IMPACTS

<u>Averaging Period</u>	<u>Year</u>	<u>EPA Significant Levels</u> $\mu\text{g}/\text{m}^3$	<u>Maximum Concentration</u> $\mu\text{g}/\text{m}^3$	<u>Distance</u> m	<u>Direction*</u> deg
1-Hour	1981	2,000	87.1	1,273	90
	1982	2,000	86.9	1,273	350
	1983	2,000	94.1	1,273	100
	1984	2,000	94.0	1,273	140
	1985	2,000	87.2	1,273	300
8-Hour	1981	500	23.3	1,273	90
	1982	500	22.6	1,273	130
	1983	500	19.0	2,937	70
	1984	500	25.0	1,273	300
	1985	500	24.6	979	80

*Clockwise from north.

BESD. However, the BESD noise permit program has never been implemented (personal communication between Steven M. Day of Black & Veatch and James O. Sewell of BESD on September 22, 1988). Approval for conducting nighttime construction activities as may become necessary is being requested by this application.

5.7.2 Operational Noise

The major sources of operational noise at the project are expected to be the Generation Building, boiler draft fan, cooling tower, coal and limestone delivery and processing, and the chemical recovery complex. Other less significant sources include various electric motors, transformers, and fans used for dust collection. Trains are estimated to arrive every three days. It is anticipated that coal and limestone processing, which includes reclaim, transfer, and crushing, will operate during daytime hours (10:00 a.m. to 7:00 p.m.) only. This will tend to minimize any impact from the project.

5.7.3 Predicted Noise Impacts

Predicted noise impacts from construction and operation of the project are discussed in the following two subsections.

5.7.3.1 Construction Noise. It is anticipated that daytime sound levels caused by the project construction will be less than 75 dBA at the property lines which border Class C (commercial) or Class D (industrial) areas. It is also anticipated that daytime construction noise will be less than 65 dBA at the nearest Class B (residential) areas. If nighttime construction is necessary, noise impacts will be less than 60 dBA.

Because construction noise will be intermittent, of a temporary nature, and will be in compliance with the local noise control ordinance, the overall effect on the surrounding environment will be minimal.

5.7.3.2 Operational Noise. Sound levels caused by operations at the proposed cogeneration plant were predicted on the basis of noise emission

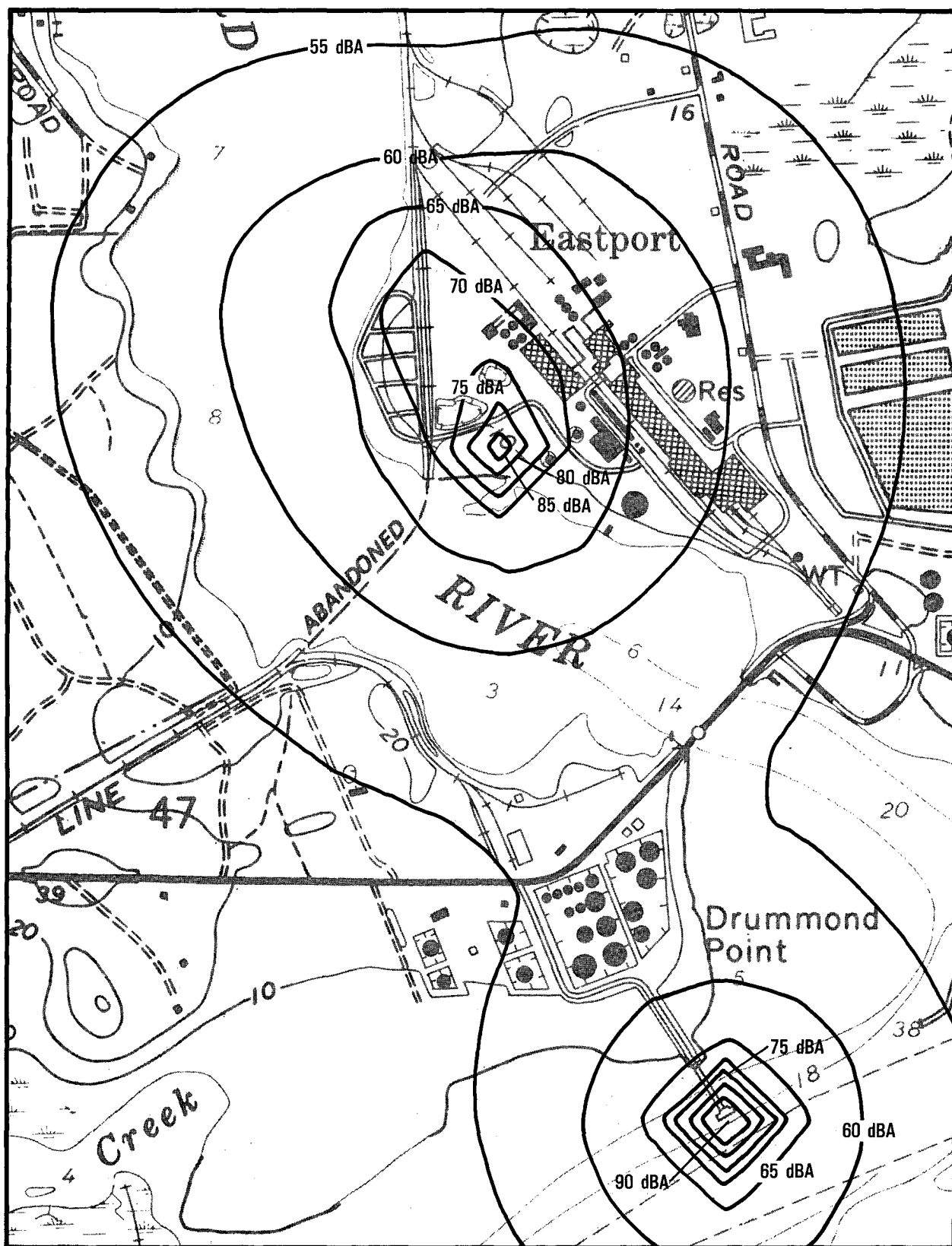
levels estimated from equipment specifications. Noise emissions estimated from specific equipment were generally derived from information contained in a guidance document by the Edison Electric Institute. These estimated noise emissions were adjusted to reflect the projected use of any noise control measures. Ambient sound levels caused by plant operations were then predicted using a computer model which takes into account wave divergence, directivity, atmospheric absorption, and characteristic resistance of the air. The program basically calculates the sound pressure level from each source and in each octave band for the receiver location specified. These sound pressure levels are combined to obtain the sound pressure levels due to all sources in each octave band and the overall (A-weighted) sound pressure level for each receiver location.

Noise impacts from the proposed facility were remodeled on the basis of the revised site arrangement. Only very minor differences resulted, compared to those shown in the original SCA. Predicted noise levels on Eastport Road, east of the plant, and at the nearest residences on Cedar Bay Road are about 3 dB lower than originally shown. Impacts on small areas to the south of the site are now about 2 dB higher than before. In all cases, predicted noise impacts remain well below the allowable levels. Because the remodeled impacts resulted in minor differences, the contours and tabulations previously included in the SCA are considered adequate to represent noise impacts from the proposed facility.

Figure 5.7-1 illustrates predicted contours of overall (A-weighted) sound levels caused by operations at the Cedar Bay Cogeneration Plant. These contours are for periods of material unloading and transferring and are representative of worst case conditions. Sound levels during periods when the coal and limestone processing are not in use will be lower.

FIGURE 5.7-2
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PREDICTED SOUND LEVEL IMPACTS
ON THE SURROUNDING AREA
CAUSED BY OPERATIONS AT THE
CEDAR BAY COGENERATION PROJECT

Figure 5.7-2

TABLE 5.7-1. NOISE IMPACTS (in dB) FROM OPERATIONS FROM THE CEDAR BAY COGENERATION PLANT COMPARED TO ALLOWABLE LEVELS

Frequency (Hz)	Class B Point			Class D Point		Class C Point	
	Project Impact with Railcar Delivery	Allowable Noise Levels		Project Impact with Railcar Delivery	Allowable Noise Levels	Project Impact with Railcar Delivery	Allowable Noise Levels
		Nighttime	Daytime				All Hours
31.5	71.2	75	80	74.9	85	74.9	80
63	62.8	74	78	66.2	84	66.2	78
125	62.3	67	73	65.8	79	65.8	73
250	58.5	63	67	62.4	74	62.4	67
500	54.6	56	61	58.4	69	58.4	61
1K	50.3	51	56	54.6	64	54.6	56
2K	43.0	47	52	48.9	59	48.9	52
4K	29.1	45	48	37.3	56	37.3	48
8K	0.0	40	45	11.3	63	11.3	45
Overall (dBA)	56.2	60	65	60.3	70	60.3	65

Because the criteria are satisfied as demonstrated in the preceding paragraphs, it can be concluded that the overall effect of the construction and operational noise from the Cedar Bay Cogeneration Plant on the surrounding area will be acceptable.

5.7.4 Compliance with Noise Regulations

Construction noise impacts will be in compliance with Section 4.208 of the Jacksonville Environmental Protection Board, Rule 4.0, Ordinance 4.208. Therefore, construction noise from 7:00 a.m. to 10:00 p.m. will be less than 75 dBA at the property line bordering Class C or Class D areas and less than 65 dBA at Class B areas. A permit will be obtained for any necessary construction activities between 10:00 p.m. and 7:00 a.m. Noise impacts for any permitted nighttime construction will be less than 60 dBA at the property line.

It was demonstrated in Subsection 5.7.3 that operational noise impacts during worst case conditions will be less than 65 dBA and 70 dBA at the property lines adjoining Class C and Class D areas, respectively, and less than 60 dBA at Class B areas. In addition, impacts by each octave band will be less than those specified in Rule 4.0 and presented in Subsection 2.3.8.2. Therefore, all applicable noise impact limits will be met.

5.7.5 Noise Mitigation

During construction, the following control measures will serve to reduce the noise impacts.

- Exhaust mufflers will be used on all internal combustion engines.
- Operations will be conducted only during daytime hours during the week or will comply with any necessary construction noise permits.

Noise control measures to control the intensity of potential noise impact by facility operations will include the following.

- All fan inlets and casings will be silenced to 85 dBA at 3 feet, 5 feet above the floor.

- All transformers will be specified as National Electrical Manufacturers' Association "quieted."
- Limestone pulverizing will take place inside an enclosure.

5.8 CHANGES IN NONAQUATIC SPECIES POPULATIONS

5.8.1 Impacts

The operation of the Cedar Bay Cogeneration Plant potentially will have a long-term beneficial effect on nonaquatic species. When older, less efficient boilers and other equipment at the paper mill are replaced with state-of-the-art circulating fluidized bed boilers, clean coal technology and good engineering practice (GEP) stacks, there will be a considerable reduction in ambient sulfur dioxide and particulate concentrations. This improvement in air quality ultimately could be beneficial to the health of wildlife species in the vicinity of the cogeneration plant.

There will be no long-term negative changes in populations of non-aquatic species as the result of the operation of the cogeneration plant. There is very little vegetation or wildlife habitat on the plant site, and no important species use the area.

5.8.2 Monitoring

Since no long-term adverse impacts on nonaquatic species are anticipated as the result of operation of the Cedar Bay Cogeneration Plant, a monitoring program is not indicated.

5.9 OTHER PLANT OPERATION EFFECTS

Some additional traffic congestion is expected to occur in the vicinity of the site throughout operation of the project. These rail and truck traffic impacts will arise from the transportation of coal and limestone to the plant and the transportation of ash away from the site for disposal some distance away. Impacts from the commuting of operating workers are expected to be insignificant since the average operating work shift consists of less than 25 people.

As stated in Subsections 3.9.2 and 3.9.3, limestone will be delivered to the site and ash will be removed from the site by either truck or rail.

If limestone is delivered to the site by truck, approximately 110 truckloads per week will be required, equating to 220 additional one-way truck trips per week. Ash removal by truck will require 202 truckloads per week or 404 one-way truck trips per week.

While the source of limestone and location of permanent ash disposal facilities is not currently known, it is fairly certain that the truck transportation routes will be on I-95 or I-295. A permanent ash disposal site is available to the coal supplier. The transportation of ash to the disposal site will be by rail unless the ash can be sold for use within the building material industry. In that case, some ash may be transported by truck.

Provided both ash and limestone are hauled by truck, an additional 624 truck trips per week would be generated by the project.

Once the Heckscher Drive improvements are completed, ash and limestone trucks would have the option of traveling west on Heckscher Drive to SR-9A or north on Eastport Road to Pulaski and SR-9A. From SR-9A the trucks have access to I-295 west or I-95 north.

Spread over daylight hours during weekdays only, these additional truck trips could increase peak daily traffic volumes by approximately 12 vehicles per hour. At most, this equates to a 1 to 2 percent increase over the projected peak hourly traffic volume in 1992.

At present, the Seminole Kraft mill receives deliveries and ships products around the clock so as to minimize traffic impacts. This practice would likely further reduce peak congestion impacts in the area.

Depending on the route or routes of the limestone and ash trucks, some additional impacts are expected from truck damage to the road surface. Additional repairs to the road surface are anticipated throughout the operation of the facility.

As stated in Section 3.3.3, the plant has been designed for coal to be delivered to the plant site by unit train railcars. Approximately one hundred twenty 90-car unit trains would be required per year. This equates

to one train every three days and one empty or full train trip every 1.5 days.

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While baseline rail traffic data over the coal transport route are not available, it is known that the rail line serving the mill spur is currently used for unit train coal delivery to the JEA St. Johns Power Park a

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few miles east of the mill site. The impact of one additional train each way every three days is not expected to have a significant effect on other rail traffic in the area.

Based on the use of a 90-car unit coal train with four locomotives and top speeds limited to 20 miles per hour in the city of Jacksonville (lower for crossovers, turnouts, and severe curves); at-grade crossings are each estimated to be blocked from 4 to 5 minutes per trip.

If the ash produced as a result of plant operation is removed from the site in the unit trains used to deliver coal, the impacts of additional truck traffic would be reduced by 65 percent with no increase in rail traffic impacts.

The Cedar Bay Cogeneration Project will supply process steam to the nearby Seminole Kraft paper mill as well as provide approximately 225 MW of electricity to Florida Power and Light Company (FP&L). The paper mill will benefit from the steam supply, and the electricity generated will contribute to the power supply of FP&L.

5.10 ARCHAEOLOGICAL SITES

If any historic or archaeological sites are discovered during construction, construction will be stopped in the area and the Florida State Historic Preservation Officer will be notified. The site will be protected until a suitable plan can be developed for either evaluating or preserving the site. Any necessary monitoring of post-construction activities to identify, catalog, or preserve archaeological sites that are discovered will be established through consultation with the approval of the State Historic Preservation Officer.

5.11 RESOURCES COMMITTED

Approximately 35 acres of the existing Seminole Kraft paper mill site will be committed to the Cedar Bay Cogeneration Project. The area currently is used for lime mud storage.

The materials and energy required to construct the cogeneration plant will be committed resources. Some materials may be reclaimed after the useful life of the plant.

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During operation, a maximum of 171,000 tons per year of limestone, which may be from the local area, will be committed to the facility.

The proposed facilities will use a maximum of 7 million gpd of ground water from the Floridan Aquifer.

5.12 VARIANCES

A variance from the Class III water quality standard for iron for the St. Johns River will be required for those periods when iron concentrations in the St. Johns River exceed the standard of 0.3 mg/l. A Notice (corrected) of Variances Sought as Condition of Certification was submitted to DER on July 23, 1989.

No other variances from applicable standards have been identified at this time as being required due to the operation of the AES Cedar Bay Cogeneration Project (See Section 4.11 for construction phase variances).

6.0 TRANSMISSION LINES AND OTHER LINEAR FACILITIES

6.1 TRANSMISSION LINE

The Eastport substation is located adjacent to the Seminole Kraft mill site, and it will not be necessary to construct a new transmission line offsite. A short new transmission line from the cogeneration plant to the substation will be necessary. This new line will follow the route of the existing transmission line from the substation to the mill wherever possible. The existing and new transmission line routings in the vicinity of the cogeneration plant are shown on Figure 3.2-1. The proposed transmission line route from the mill to the JEA substation is shown on Figure 2.1-2.

6.2 COAL MARINE TERMINAL

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6.3 RAILROAD CORRIDOR

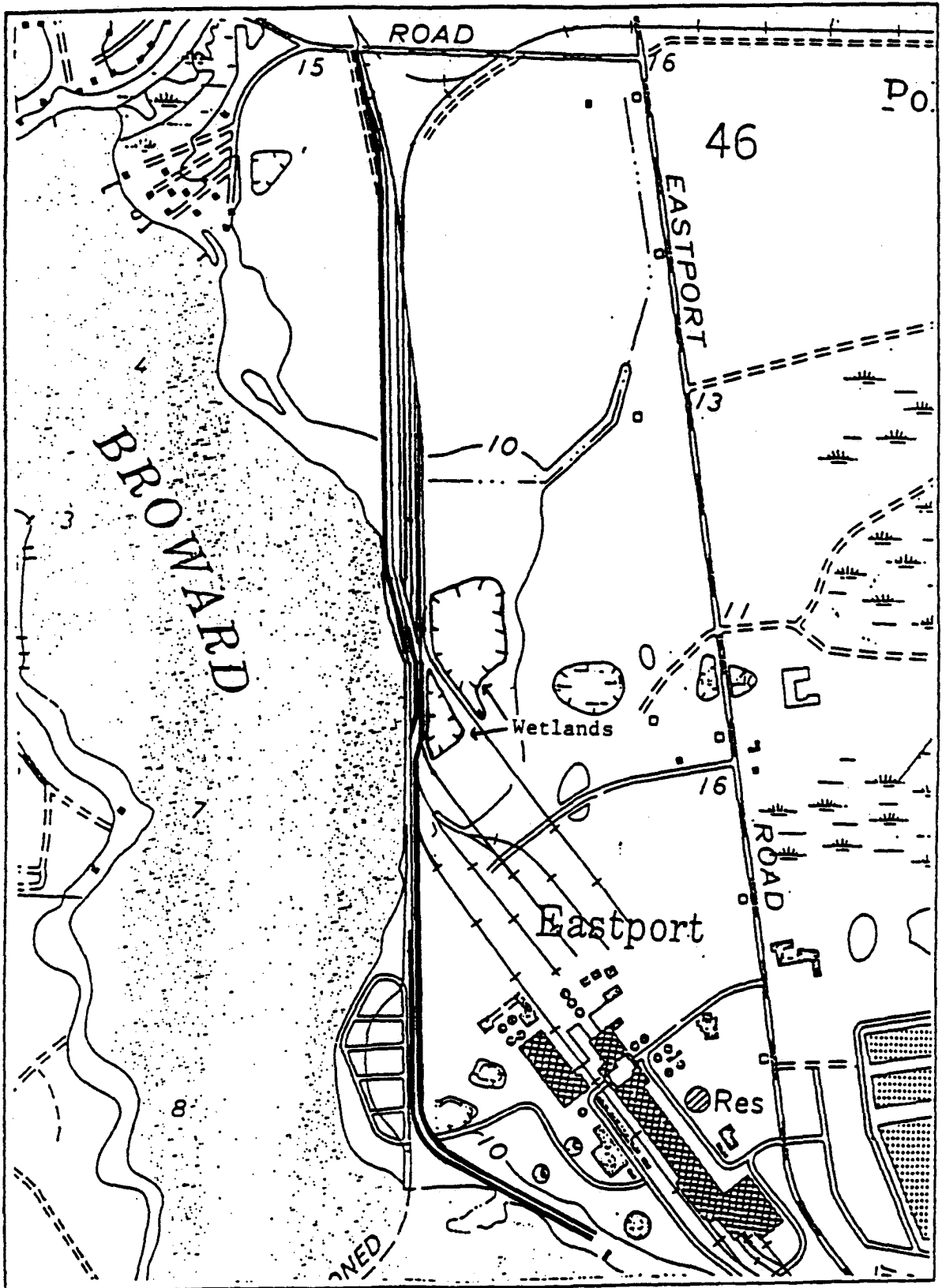
6.3.1 Project Introduction

The rail access onto the site for the new facilities will begin at the existing CSX rail line as shown on Figure 6.3-1.

In general, the new facilities will require one parallel rail line placed to the west of the existing rail sidings located north of the plant site, a new track placed east of the single causeway track, and a double track extension along the southern portion of the site.

6.3.2 Rail Corridor Location and Layout

The rail corridor and extension layout are shown on Figure 6.3-1.



RAILROAD LOCATION
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FIGURE 6.3-1

The new rail siding required for the new facilities will begin just south of the intersection of Baisden Road north of the project site. The rail will then extend south along the west side of the existing north rail sidings and will terminate approximately at the south end of the existing northern sidings. The new rail corridor easement in this area will extend approximately 60 feet west of the existing rail center line.

In addition, there will be a short length with two new tracks extending south of the north sidings and along the east side of the existing rail. Approximately 400 feet south of the ladder track, these two new tracks will tie together and one existing and one new track will continue south through the causeway area.

At approximately the northern boundary of the new plant facilities, these two tracks will both be newly installed. These two tracks will extend south of the previous end point following the river bank, and will extend approximately to the existing water intake structure on the Broward River, as shown on Figure 6.3-1.

6.3.3 Rail Line and Road Design Characteristics

The additional rail trackage will, at a minimum, be built in accordance with CSX Railroad and the AREA Specifications.

An access road located adjacent to the new southern rail extension line will be constructed for the purpose of rail inspection and maintenance. The access road along the rail in the area of the bulk material storage area will also provide access into the runoff storage pond area. The roads will be designed for the expected construction and operation loadings.

6.3.4 Cost Projections

The estimated construction cost for the rail siding north of the project site is \$400,000.

6.3.5 Rail Corridor Selection

The rail corridor for the new facilities was chosen both economically and logically to begin along the existing rail spur serving the site and continue the required extension to the south.

No other routes were investigated.

6.3.6 Socio-Political Environment of the Rail Corridor Area

6.3.6.1 Governmental Jurisdictions. The governmental jurisdictions for the proposed railroad corridor area are the same as those for the cogeneration facility site discussed in Subsection 2.2.1, since the corridor area adjoins the site to the north and east.

6.3.6.2 Zoning and Land Use Plans. Since the proposed railroad corridor area adjoins the cogeneration facility site and is well within the 5-mile radius of the site, the zoning and land use plans are covered in Subsection 2.2.2.

6.3.6.3 Easements, Title, Agency Works. The new railroad siding and extension may require the normal permits from the City of Jacksonville since it is inside the Jacksonville city limits. One portion of the railroad siding is north of the Seminole Kraft Corporation property and may require an additional easement from the current owner of adjacent property. The rest of the siding and all of the railroad extension are on Seminole Kraft property and will therefore require no additional easements.

6.3.6.4 Vicinity Scenic, Cultural, and Natural Landmarks. There are no scenic, cultural, or natural landmarks in the proposed railroad corridor area. Since the railroad area adjoins the cogeneration site and is well within the 5-mile radius of the site, the discussion in Subsection 2.2.5 covers the various landmarks that apply. These applicable landmarks are also shown on Figure 2.2-1.

6.3.6.5 Archaeological and Historic Sites. There are no archaeological or historic sites located in the proposed railroad corridor area. The discussion in Subsection 2.2.6 for the cogeneration facility site is applicable to the railroad corridor.

6.3.7 Biophysical Environment of the Corridor Area

6.3.7.1 Land Use/Vegetation. The north-south CSX railroad spur may be widened by one additional rail line from its termination at Seminole Kraft northward approximately one mile to its junction with the main east-west tracks. The 60-foot wide corridor will be immediately west of the existing railroad siding. For the purpose of this report, the corridor has been

identified as Area 7 consisting of remnant planted pines with secondary growth oaks and associated plants (see Figure 2.3-30 and Table 2.3-15).

Area 7, west of the railroad spur, consists of an overstory of planted longleaf pines, remnants of a pine plantation which has largely been harvested. An understory of shrubs and scrubby trees has grown up among the pines: Sabal palms (Sabal palmetto), black cherry (Prunus serotina), water oak (Quercus nigra) and blue-jack oak (Quercus incana). Ground cover includes broomsedge (Andropogon virginicus), wild lettuce (Lactuca floridana) and cranesbill (Geranium carolinianum). The area has obviously been altered in the past for use as a pine plantation (existing pines are in rows). The current condition of the area is one of secondary succession, with shrubs and scrub trees.

The secondary succession pine-oak scrub habitat in the railroad corridor is a preferred habitat of the gopher tortoise (Gopherus polyphemus), which has been sited in the railroad corridor. The gopher tortoise requires sandy soil for burrowing and egg-laying, low herbaceous plants for food, and scattered shrubs for shelter. The entire railroad corridor identified as Area 7 in Subsection 2.3.5 is appropriate habitat for the gopher tortoise.

6.3.7.2 Affected Waters and Wetlands. Near the south end of the existing railroad corridor, the Broward River is in close proximity of the existing rail. This area of the river is a low-tide shallow tidal flat, with needle rush (Juncus roemerianus) and cordgrass (Spartina patens). No additional widening of this rail corridor is planned (Figure 6.3-1). Therefore, no impacts upon the tidal flat will result.

Two new tracks will be placed south of the north sidings, along the east side of the existing rail. Construction of the tracks will result in unavoidable impacts on a small isolated freshwater wetland at the junction of two existing tracks (the southernmost wetland of the two identified on Figure 6.3-1). This wetland is of uncertain origin, and perhaps was formed when construction of the original railroad altered the natural drainage of the area. During 1989-1990, the area was observed in several stages of water depth. This fluctuation in water depth maintains a flora consisting

primarily of early successional weedy species such as cattails (Typha latifolia), sawgrass (Cladium jamaicense), sedges (Cyperus surinamensis) and rushes (Juncus effusus). All of these are disturbance tolerant species which are indicative of much disturbance to the wetlands in the recent past. Impacts will consist of filling approximately 0.4 acre on the west side of the wetland.

6.3.7.3 Ecology. Important flora and fauna of the railroad corridor are the same as discussed in Subsection 2.3.6.

Species-Environmental Relationships. In the railroad expansion corridor, the important species which may potentially be affected are the gopher tortoise (known to occur here), and Bachman's sparrow and the eastern indigo snake (both potentially occurring in this area, but not seen during the May 1988 terrestrial survey).

Bachman's sparrow (Aimophila aestivalis), a federal candidate species, may occur in the secondary succession planted pine area near the railroad corridor. The preferred habitat of this sparrow, also called "pine woods sparrow," is open areas of pines and oaks, with an understory of grasses and some shrubs. It feeds on the ground, mainly eating insects and seeds of grasses and sedges. Bachman's sparrow is a year-round resident of northern Florida. While this sparrow has not been seen in the railroad corridor area, it could potentially use the habitat found in and near the corridor.

The gopher tortoise (Gopherus polyphemus), a FGFWFC species of special concern, is a frequent inhabitant of longleaf pine and oak scrub areas, and is often found in secondary succession areas in planted pine stands. It requires sandy soil with a mixture of bare ground and herbaceous ground cover, with some shrubs. Evidence of gopher tortoise activity was found during the May 1988 terrestrial survey, and tortoises were seen in the secondary growth pine stands near the railroad corridor during July 1988. Construction of the additional line would remove a 60 foot wide strip of habitat, extending the length of the railroad spur (approximately 1 mile).

Mitigation measures are currently being discussed with FGFWFC to determine methods of relocating potentially affected tortoises. According to FGFWFC's "Guidelines for Gopher Tortoise Relocations" (February 1, 1988), a permit is required for gopher tortoise capture/relocation/release projects. Upon approval of the permit application by FGFWFC, and if gopher tortoise burrows are found in the railroad corridor, the applicant will follow specific guidelines for tortoise relocation. During the tortoise's active season (April 1 through October 1) and no earlier than four weeks before relocation, both the donor site (the railroad corridor) and the recipient site will be surveyed for the presence of active, inactive, and old burrows. Capture, transport, and release methods, post-location considerations, and reporting will all follow methods described in the Guidelines.

Another important species which has not been reported from the area, but often uses the same habitat as the gopher tortoise, is the eastern

indigo snake (Drymarcon corais couperi). It often seeks shelter in gopher tortoise burrows, and feeds upon small mammals and herpetiles. Eggs are laid in May and hatch in August or September.

Both of these species are being reduced in numbers due to loss of habitat and continued destruction of animals by humans during rattlesnake harvesting.

Two plants listed as "threatened" by the Florida Department of Agriculture (and therefore included in Florida Administrative Code Rule 39-27) were found near but not in the railroad corridor: royal fern (Osmunda regalis var. spectabilis) and aspidium fern (Thelypteris kunthii). Both of these ferns are common members of the eastern deciduous forests north of Florida, and this listing by the FDA as threatened is perhaps due to their less frequent occurrence in Florida, or perhaps they are at risk due to collecting. The few individuals of both of these species seen during the May 1988 terrestrial survey will not be affected by construction of the rail line. It is likely that other individuals occur in similar habitats beyond the 60-foot rail corridor.

Those furbearers, game birds, and game mammals listed by the Florida Administrative Code 39-1 which may utilize the secondary succession planted pine areas are the raccoon, opossum, skunk, and fox ("furbearers"), quail ("game bird"), gray and fox squirrels, rabbits, and deer ("game mammals"). No indications of these animals were found during the May 1988 terrestrial survey, but the secondary succession planted pine habitat near the rail corridor is potential habitat for all of them.

The railroad spur is currently being used by the Seminole Kraft Paper Mill. Traffic impacts on the environment in this area are expected to be similar to current levels.

Preexisting Environmental Stresses. The natural vegetation of the land west of the railroad spur (Area 7) was replaced with planted longleaf pine long ago. Current conditions of secondary succession consist of many remnant planted pines with an understory varying from tall oaks to open herbaceous areas. The past environmental stress of changing this natural area into pine plantation certainly removed most sensitive native plant

species. Animals still using this area must contend with nearby industrialization, including rail and highway traffic. Their movements have been restricted by fencing.

6.3.7.4 Measurements. A pedestrian survey of the railroad corridor and nearby areas was performed on May 18-19, 1988. Vegetation types were defined, plant species lists were compiled, and indications of animal life were recorded.

6.3.7.5 Other Environmental Features. This section is not applicable to the railroad corridor.

6.3.8 Effects of Right-of-Way Preparation and Rail Line Construction

6.3.8.1 Construction Techniques. The construction techniques used will be those recommended by the CSX Railroad, AREA Specifications, and good engineering practice.

6.3.8.2 Impact on Water Bodies and Uses. No construction, expansions, or improvements are planned in the Waters of the State.

6.3.8.3 Solid Wastes. The only anticipated forms of solid waste involved with the construction of the railroad will be vegetation from clearing and the railroad trackage (rails, ties, ballast, etc.) which is not suitable for the new construction. This solid waste will be disposed of in an appropriate area onsite.

6.3.8.4 Changes to Vegetation, Wildlife, and Aquatic Life. A small strip of land (approximately 60 feet wide) adjacent to the existing railroad spur will undergo changes due to the construction of the additional spur. The area consists partially of Broward River shoreline, with the majority of the corridor consisting of a mixture of roadside weeds (Bermuda grass, wild lettuce, milkweed, and beggar's ticks) and pine-scrub species (pine, water oak, laurel oak, cherry, and bluestem grass).

Because this area has been previously disturbed by the pine plantation, most plant species currently present represent invasive, disturbance-tolerant, successional species that will quickly reestablish along the edges of the new rail. Therefore, those areas cleared during construction will become revegetated with a mixture of species comparable to that currently within the corridor.

All vegetation along the western shore of the small isolated fresh-water wetland in the impact area will be completely and permanently removed. It is likely that the same species currently along the wetland shore will become established within one or two growing seasons along the berm of the proposed track, in a pattern dependent upon water depth and fluctuation.

The only threatened, endangered, or special concern plants that are known to occur near the railroad corridor are the royal fern (Osmunda regalis var. spectabilis) and the aspidium fern (Thelypteris kunthii). Although both are common members of eastern deciduous forests north of Florida, the Florida Department of Agriculture lists them as threatened. One individual was found for both of these species. Neither will be removed by construction of the rail line. It is likely that other individuals occur in similar habitats beyond the 60-foot rail corridor.

The only threatened, endangered, or special concern animal that is known to occur in the railroad corridor is the gopher tortoise. Construction of the additional line would permanently remove 7.3 acres of the tortoise's foraging/nesting habitat. Mitigation measures are currently being discussed with FGFWFC. If the eastern indigo snake occurs in this pine-scrub area, it would be similarly affected. As mentioned in Subsection 6.3.7, there are no indications of this snake's presence in the area. The only other important species which may be affected (if it occurs in this area) is Bachman's sparrow. As with the indigo snake, there are no known records of this bird's presence, but the pine-scrub area is appropriate habitat for it. Construction of the additional line may eliminate some trees and understory utilized by the sparrow, but grasses and sedges (as well as ground-dwelling insects) would quickly reestablish in the limited easement needed for construction, and large areas of similar habitat would remain undisturbed.

6.3.8.5 Impact on Human Populations. The railroad corridor and extension are very close to the proposed construction site area and the existing rail line. Section 4.6 covers the applicable impacts caused by the railroad corridor additions.

6.3.8.6 Impact on Regional Scenic, Cultural, and Natural Landmarks. The applicable impacts are covered in Section 4.7 due to the close proximity of the railroad corridor addition to the main cogeneration facility site.

6.3.8.7 Impact on Archaeological and Historic Sites. The applicable impacts are covered in Section 4.8 due to the close proximity of the railroad corridor additions to the main cogeneration facility site.

6.3.9 Post-Construction Impacts and Effects of Maintenance

6.3.9.1 Maintenance Techniques. Standard rail maintenance techniques will be performed along the corridor. Neither burning nor herbicides will be used for vegetation control. Therefore, following construction, the vegetation along the corridor will be unharmed and allowed to become naturalized.

6.3.9.2 Multiple Uses. The rail will be used strictly for access to the mill and new facilities.

6.3.9.3 Changes in Species Populations. Maintenance of the new railroad and its frontage road should not differ significantly from maintenance of the existing railroad and frontage road. Therefore, long-term net increases or decreases in the size of important species are not expected to differ from preconstruction trends.

6.3.9.4 Effects of Public Access. A new section of railroad line approximately 1 mile long will be constructed as described in Sections 6.3.1, 6.3.2, and 6.3.3. There presently is an access road along the proposed route for the rail line. This road will be demolished during the construction of the railroad line. Public access to the area will be the same after construction as before construction. Therefore, there will be no increased exposure to wildlife.

6.3.10 Other Post-Construction Effects

On the average, one 90-car unit coal train will arrive and depart from the new facilities every three days. Limestone delivery by 90-car unit train (if required) will arrive and depart from the new facilities an average of every 1.5 weeks. Effects of rail deliveries are discussed in Section 5.9.

7.0 ECONOMIC AND SOCIAL EFFECTS OF PLANT CONSTRUCTION AND OPERATION

The proposed Cedar Bay Cogeneration Plant is a \$480 million coal fired power plant and chemical recovery boiler, which will be located 6 miles northeast of Jacksonville, Florida. The plant will sell its electricity to Florida Power and Light, and its process steam to an adjacent paper mill belonging to the Seminole Kraft Corporation. The cogeneration plant will consist of three circulating fluidized bed boilers, an automatic extraction condensing turbine generator, and associated equipment. The project will also include the installation of new equipment at the paper mill, which will upgrade the present processing facilities and cause a dramatic reduction in odor emissions.

The impacts discussed here include both the direct socioeconomic benefits from increased employment and local purchases by the plant, as well as estimated indirect benefits derived from this increased regional economic activity. Except where otherwise noted, these benefits apply to the Duval County economy. Potential negative impacts of the project are also considered.

7.1 SOCIOECONOMIC BENEFITS

7.1.1 Direct Impact

The Cedar Bay Cogeneration Project will provide social and economic benefits to both Duval County and to the state of Florida in the form of additional employment, wages, nonwage investment, and local and state taxes. The direct benefits of the plant will come from the construction and operation of the Cedar Bay facilities. Construction of the plant, projected to begin in December 1989 and to be completed June 1992, will create jobs for local Florida construction workers, with an estimated average of about 633 full-time positions available during the one-year peak construction period (1991). This figure includes the construction workers necessary to build a coal conveyor if coal for the plant is shipped by barge via the St. Johns River. Wages during the peak year of construction

(1991) and for the entire period of construction (1989-1992) will total \$16.9 million and \$25.1 million, respectively. Local construction purchases will be an estimated \$7.0 million in 1991 and \$17.4 million for the three-year construction period. Finally, projected sales taxes are \$687,000 in 1991 and \$1.7 million for the construction period.

During the operating period, a total of 70 people will be employed full-time at the Cedar Bay Cogeneration Plant (at an estimated 1986 average rate of \$44,000 annually, including benefits, adjusted for inflation). Currently, there are 12 employees at the paper mill, whose jobs would be eliminated as a result of shutting down the present plant powerhouse. Therefore, the net gain in employment from the Cedar Bay Project is 58, and this figure is used in the calculations of all benefits.

In 1993, the first full year of operation of the plant, the direct economic benefits due to wages, local purchases, and taxes will total \$9.6 million. Over the entire 32-year operating life of the project these benefits will total \$771 million, specified in greater detail in Table 7.1-1.

In addition to the above economic benefits, it is important to note that one of the main purposes of the project is to sell steam to the Seminole Kraft paper mill at a price that will enable the mill to remain economically competitive. The mill presently employs 362 full-time workers, and the Cedar Bay Cogeneration Project will help assure the continuation of these jobs. Another direct social impact of the project is the substantial reduction in overall emissions from the paper mill as a result of the refurbishment of the mill's recovery boiler. This is expected to alleviate the odor problem in the area near the mill.

Table 7.1-2 illustrates the expected direct impact of the proposed Cedar Bay Project on Duval County employment. This area averaged 5.1 percent unemployment in May 1988, according to the Bureau of Labor Statistics. The Cedar Bay Project is expected to reduce unemployment to approximately 5.04 percent during the peak construction phase (assuming that the unemployment rate remains fixed). When the indirect employment impact is included, the impact is even greater. During the operating period, a similar but smaller direct employment benefit is projected to occur. The direct and indirect employment impacts are illustrated on Figure 7.1-1.

TABLE 7.1-1. ECONOMIC IMPACT OF AES CEDAR BAY COGENERATION PLANT (\$1,000)

	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
<u>Direct Effects</u>												
	(Dec)			(Jan-May)								
Cogeneration												
Construction Employment (person years)	9	231	633	74	0	0	0	0	0	0	0	0
Construction Wage/Worker (annual)	24.3	25.5	26.8	28.1	0	0	0	0	0	0	0	0
Total Construction Wages	218	5,888	16,941	2,080	0	0	0	0	0	0	0	0
Construction Investment	532	6,706	7,042	3,081	0	0	0	0	0	0	0	0
				(June-Dec)								
Operating Employment	0	0	0	34	58	58	58	58	58	58	58	58
Operating Wage/Worker	0	0	0	34.4	61.9	65.0	68.3	71.7	75.3	79.0	83.0	87.1
Total Operating Wages	0	0	0	1,164	3,591	3,770	3,959	4,157	4,365	4,583	4,812	5,053
Other O&M	0	0	0	2,916	5,248	5,511	5,786	6,076	6,380	6,699	7,033	7,385
<u>Total Direct Effects</u>												
Employment (full-time)	9	231	633	108	58	58	58	58	58	58	58	58
Wages	218	5,888	16,941	3,243	3,591	3,770	3,959	4,157	4,365	4,583	4,812	5,053
Investment	532	6,706	7,042	5,997	5,248	5,511	5,786	6,076	6,380	6,699	7,033	7,385
Property Taxes	0	0	0	360	738	758	779	803	829	857	887	920
Income Tax (5.5 percent)	0	0	0	0	0	0	0	0	188	427	671	860
Sales Tax (6.5 percent)	22	654	687	300	0	0	0	0	0	0	0	0
Total Direct Effect	772	13,248	24,669	9,900	9,577	10,039	10,525	11,036	11,761	12,566	13,403	14,217
<u>Indirect Effects</u>												
Indirect Employment	5	139	380	71	46	46	46	46	46	46	46	46
Indirect Wage/Worker	18.9	19.8	20.8	21.8	22.9	24.1	25.3	26.6	27.9	29.3	30.7	32.3
Total Indirect Wages	102	2,746	7,901	1,561	1,064	1,117	1,173	1,232	1,294	1,358	1,426	1,497
Secondary Investment	829	13,865	26,279	8,090	5,954	6,252	6,564	6,893	7,237	7,599	7,979	8,378
Total Indirect Effect	931	16,611	34,180	9,651	7,018	7,369	7,738	8,125	8,531	8,957	9,405	9,876
<u>Total Direct and Indirect Effects</u>												
Employment (full-time)	14	370	1,013	179	104	104	104	104	104	104	104	104
Total Wages	320	8,634	24,843	4,804	4,655	4,888	5,132	5,389	5,658	5,941	6,238	6,550
Total Investment	1,362	20,571	33,321	14,087	11,203	11,763	12,351	12,968	13,617	14,298	15,013	15,763
Total Taxes	22	654	687	660	738	758	779	803	1,017	1,284	1,558	1,779
Total Additional Income	1,704	29,859	58,850	19,552	16,596	17,408	18,263	19,161	20,292	21,523	22,809	24,093

TABLE 7.1-1 (Continued). ECONOMIC IMPACT OF AES CEDAR BAY COGENERATION PLANT (\$1,000)

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
<u>Direct Effects</u>												
Cogeneration												
Construction Employment (person years)	0	0	0	0	0	0	0	0	0	0	0	0
Construction Wage/Worker (annual)	0	0	0	0	0	0	0	0	0	0	0	0
Total Construction Wages	0	0	0	0	0	0	0	0	0	0	0	0
Construction Investment	0	0	0	0	0	0	0	0	0	0	0	0
Operating Employment	58	58	58	58	58	58	58	58	58	58	58	58
Operating Wage/Worker	91.5	96.0	100.8	105.9	111.2	116.7	122.6	128.7	135.1	141.9	149.0	156.4
Total Operating Wages	5,305	5,571	5,849	6,142	6,449	6,771	7,110	7,465	7,839	8,230	8,642	9,074
Other O&M	7,754	8,142	8,549	8,977	9,426	9,897	10,392	10,911	11,457	12,030	12,631	13,263
<u>Total Direct Effects</u>												
Employment (full-time)	58	58	58	58	58	58	58	58	58	58	58	58
Wages	5,305	5,571	5,849	6,142	6,449	6,771	7,110	7,465	7,839	8,230	8,642	9,074
Investment	7,754	8,142	8,549	8,977	9,426	9,897	10,392	10,911	11,457	12,030	12,631	13,263
Property Taxes	955	993	1,033	1,077	1,124	1,174	1,227	1,284	1,344	1,409	1,477	1,550
Income Tax (5.5 percent)	1,049	1,252	1,470	1,702	1,954	2,225	2,518	2,835	3,178	3,551	3,955	4,836
Sales Tax (6.5 percent)	0	0	0	0	0	0	0	0	0	0	0	0
Total Direct Effect	15,063	15,957	16,901	17,898	18,952	20,067	21,247	22,495	23,817	25,219	26,706	28,723
<u>Indirect Effects</u>												
Indirect Employment	46	46	46	46	46	46	46	46	46	46	46	46
Indirect Wage/Worker	33.9	35.6	37.4	39.2	41.2	43.2	45.4	47.7	50.1	52.6	55.2	58.0
Total Indirect Wages	1,572	1,651	1,733	1,820	1,911	2,007	2,107	2,212	2,323	2,439	2,561	2,689
Secondary Investment	8,797	9,237	9,699	10,184	10,693	11,227	11,789	12,378	12,997	13,647	14,329	15,046
Total Indirect Effect	10,369	10,888	11,432	12,004	12,604	13,234	13,896	14,591	15,320	16,086	16,891	17,735
<u>Total Direct and Indirect Effects</u>												
Employment (full-time)	104	104	104	104	104	104	104	104	104	104	104	104
Total Wages	6,878	7,222	7,583	7,962	8,360	8,778	9,217	9,678	10,162	10,670	11,203	11,763
Total Investment	16,551	17,379	18,248	19,160	20,118	21,124	22,180	23,289	24,454	25,677	26,960	28,308
Total Taxes	2,004	2,245	2,503	2,779	3,078	3,399	3,745	4,119	4,522	4,959	5,433	6,387
Total Additional Income	25,433	26,845	28,334	29,902	31,556	33,301	35,142	37,086	39,138	41,306	43,596	46,459

TABLE 7.1-1 (Continued). ECONOMIC IMPACT OF AES CEDAR BAY COGENERATION PLANT (\$1,000)

	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	35-Year Total
<u>Direct Effects</u>													
	(Jan-May)												
Cogeneration													
Construction Employment (person years)	0	0	0	0	0	0	0	0	0	0	0	0	
Construction Wage/Worker (annual)	0	0	0	0	0	0	0	0	0	0	0	0	
Total Construction Wages	0	0	0	0	0	0	0	0	0	0	0	0	25,127
Construction Investment	0	0	0	0	0	0	0	0	0	0	0	0	17,361
Operating Employment	58	58	58	58	58	58	58	58	58	58	58	24	
Operating Wage/Worker	164.3	172.5	181.1	190.2	199.7	209.7	220.1	231.1	242.7	254.8	267.6	281.0	
Total Operating Wages	9,528	10,004	10,504	11,030	11,581	12,160	12,768	13,407	14,077	14,781	15,520	6,790	262,050
Other O&M	13,926	14,622	15,353	16,121	16,927	17,773	18,662	19,595	20,575	21,603	22,684	9,924	384,227
<u>Total Direct Effects</u>													
Employment (full-time)	58	58	58	58	58	58	58	58	58	58	58	24	
Wages	9,528	10,004	10,504	11,030	11,581	12,160	12,768	13,407	14,077	14,781	15,520	6,790	287,177
Investment	13,926	14,622	15,353	16,121	16,927	17,773	18,662	19,595	20,575	21,603	22,684	9,924	401,588
Property Taxes	1,628	1,710	1,797	1,890	1,988	2,092	2,202	2,318	2,442	2,572	2,709	2,855	47,782
Income Tax (5.5 percent)	3,987	4,082	4,171	4,253	4,318	4,359	4,356	4,275	4,052	3,562	2,554	250	76,891
Sales Tax (6.5 percent)	0	0	0	0	0	0	0	0	0	0	0	0	1,662
Total Direct Effect	29,069	30,419	31,826	33,293	34,814	36,384	37,988	39,595	41,145	42,518	43,466	19,819	815,100
<u>Indirect Effects</u>													
Indirect Employment	46	46	46	46	46	46	46	46	46	46	46	19	
Indirect Wage/Worker	60.9	63.9	67.1	70.4	74.0	77.7	81.6	85.6	89.9	94.4	99.1	104.1	
Total Indirect Wages	2,824	2,965	3,113	3,269	3,432	3,604	3,784	3,973	4,172	4,380	4,599	2,012	89,627
Secondary Investment	15,798	16,588	17,417	18,288	19,203	20,163	21,171	22,229	23,341	24,508	25,733	11,258	481,641
Total Indirect Effect	18,622	19,553	20,531	21,557	22,635	23,767	24,955	26,203	27,513	28,888	30,333	13,271	571,269
<u>Total Direct and Indirect Effects</u>													
Employment (full-time)	104	104	104	104	104	104	104	104	104	104	104	44	
Total Wages	12,351	12,969	13,617	14,298	15,013	15,764	16,552	17,380	18,249	19,161	20,119	8,802	376,805
Total Investment	29,724	31,210	32,771	34,409	36,130	37,936	39,833	41,824	43,916	46,111	48,417	21,182	883,229
Total Taxes	5,615	5,792	5,969	6,143	6,306	6,451	6,558	6,594	6,494	6,134	5,263	3,105	126,335
Total Additional Income	47,691	49,972	52,357	54,850	57,449	60,151	62,943	65,798	68,658	71,407	73,799	33,090	1,386,369

TABLE 7.1-1 (Continued). ECONOMIC IMPACT OF AES CEDAR BAY COGENERATION PLANT (\$1,000)

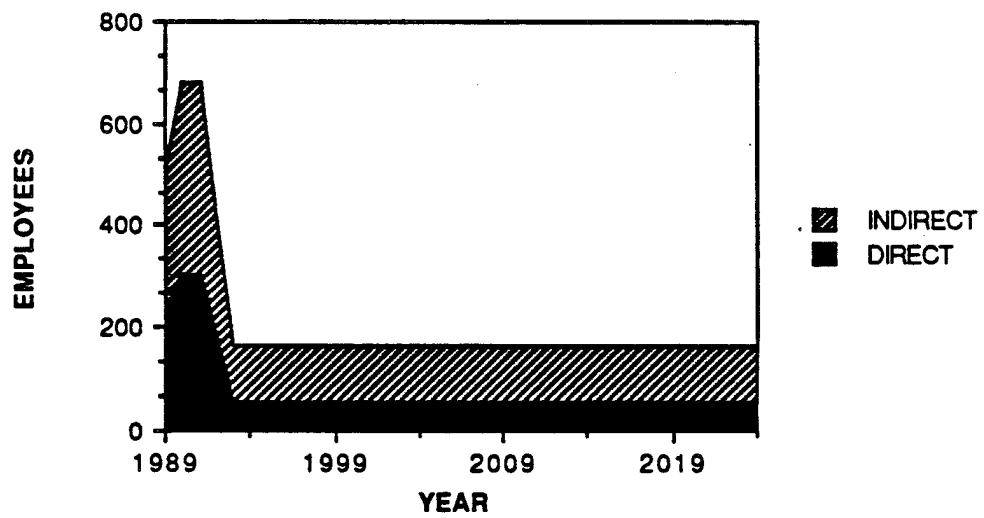
ASSUMPTIONS FOR CEDAR BAY	
1986-2024 Inflator (INF)	1.05
AES Wage Rate Plus Benefits (\$1,000 1986)	44
Indirect Wage Rate Plus Benefits (\$1,000 1986)	16.30
Construction Wage Rate Plus Benefits (\$1,000 1986)	20.97
Total (Net) Operators	58
Total Local Construction Purchases (\$1,000 1986)	32,000
Total Construction Payroll (\$1,000 1986)	37,000
Total Taxable Construction Costs (\$1,000 1986)	20,000
Annual Nonwage O&M Costs (\$1,000 1986)	3,730
Indirect Employment Multipliers	
Construction Period	0.6
Operating Period	0.8
Total Nonearnings Multipliers	
Household Multiplier	1.0894
Construction Multiplier	2.1110
Utility Multiplier	1.3891

Property tax calculated as 0.2 percent of the plant's valued assessment.

TABLE 7.1-2. DIRECT EFFECTS ON REGIONAL EMPLOYMENT FROM THE CEDAR BAY PLANT FACILITIES

	<u>Total Labor</u>	<u>Employed</u>	<u>Unemployed</u>	<u>Unemployment Rate</u> percent
Total for Jacksonville Metropolitan Area*	142,800	137,400	5,400	3.80
Peak AES Cedar Bay Construction (1991)	142,800	137,704	5,096	3.57
AES Cedar Bay Operation (Post-1992)	142,800	137,458	5,342	3.74

*From the Bureau of Labor Statistics: Local Area Unemployment Statistics. Figures based on April 1988 data.



ANNUAL ADDITIONAL REGIONAL EMPLOYMENT
DIRECT AND INDIRECT EFFECTS

Figure 7.1-1

7.1.2 Indirect Impacts

Secondary economic impacts due to the Cedar Bay Project have been quantified using two sources. Secondary employment multipliers were taken from a February 1982 Electric Power Research Institute (EPRI) publication titled Socioeconomic Impacts from Power Plants, which is based on 12 different case studies in the United States. Secondary nonwage investment multipliers are from an input-output model derived specifically for the Florida economy by the Regional Economic Analysis Division of the Bureau of Economic Analysis (US Department of Commerce), and can be found in the May 1986 publication titled Regional Multipliers: A User Handbook for the Regional Input-Output Modeling System published by the Department of Commerce.

During the construction period, approximately 380 full-time positions (primarily in the retail sector) are estimated to result from the secondary economic impacts of the proposed AES Cedar Bay plant, with total wages of approximately \$7.9 million in 1991 (the peak year of construction). Nonwage secondary investment as a result of the project will be \$26.3 million in 1991, and will be concentrated in the retail sector. The secondary economic impact of operations of the plant is expected to result in approximately 46 full-time positions (in addition to the actual plant workers) with total wages of \$1.1 million and nonwage secondary investment of approximately \$6 million in 1993 (the first full year of operation).

Table 7.1-3 summarizes the projected direct and indirect effects for the local and state economy over the entire 35-year period (3 years of construction, 32 years of operations), the results of which are illustrated on Figures 7.1-1 and 7.1-2. Figure 7.1-1 shows that the proposed plant is expected to stimulate approximately 1,000 full-time positions during the peak construction phase of the project and 104 full-time positions during the operations phase as a result of both the direct and indirect impacts of the plant. Figures 7.1-3 and 7.1-4 show that the project will increase Florida state income by approximately \$58.9 million during the peak construction year of the plant (1991) and by \$16.6 million during the first full year of operation of the plant (1993). The projected contribution to Florida income over the 35-year life of the project is roughly \$1.4 billion. The underlying assumptions of this analysis are presented in Table 7.1-4.

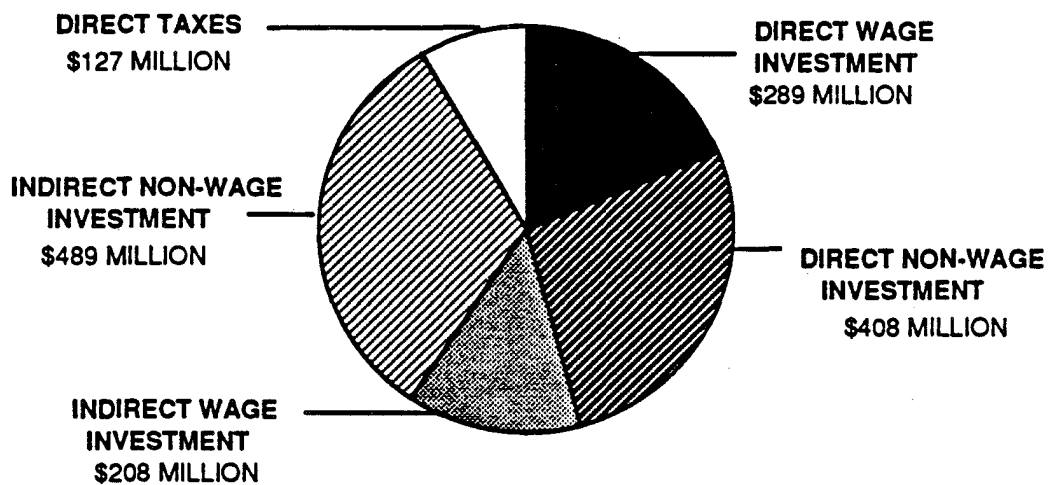
TABLE 7.1-3. SUMMARY TABLE--ECONOMIC IMPACTS OF THE CEDAR BAY COGENERATION PLANT ON THE FLORIDA STATE ECONOMY

	<u>Construction*</u>	<u>Operations*</u>
Direct Impacts		
Jobs**	633	58
Annual \$	\$ 25 million	\$ 10 million
Total \$***	\$ 44 million	\$ 771 million
Indirect Impacts		
Jobs**	380	46
Annual \$	\$ 34 million	\$ 7 million
Total \$***	\$ 56 million	\$ 516 million
Total Direct and Indirect	\$100 million	\$1,286 million

*The annual figures refer to the year 1991 for peak construction and 1993 for the first full year of operations.

**The number of jobs represent total full-time positions.

***The total \$ represents the cumulative total over a period of 35 years (3 years of construction, 32 years of operations).

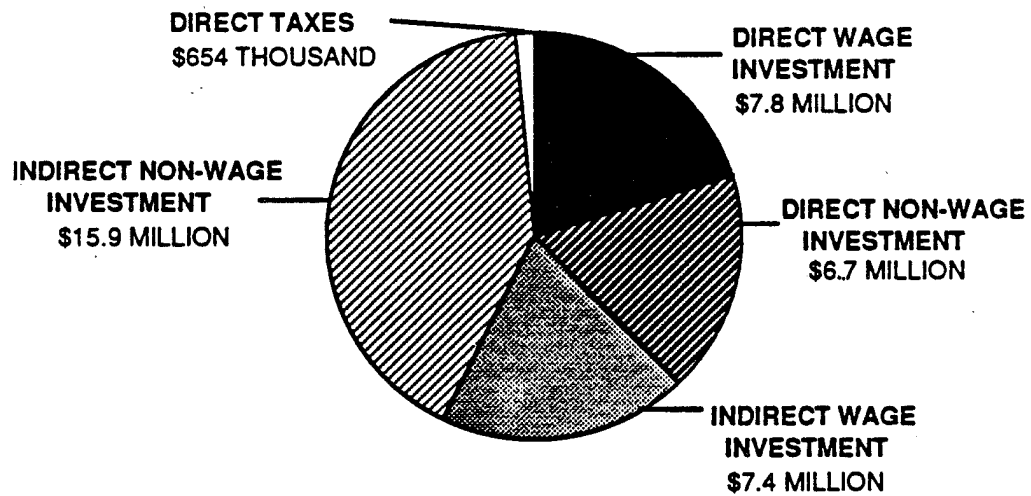


*1990 is the first full year of construction.

Note: Sum may not equal total due to independent rounding

TOTAL 35-YEAR ADDITIONAL INCOME
\$1.5 MILLION

Figure 7.1-2

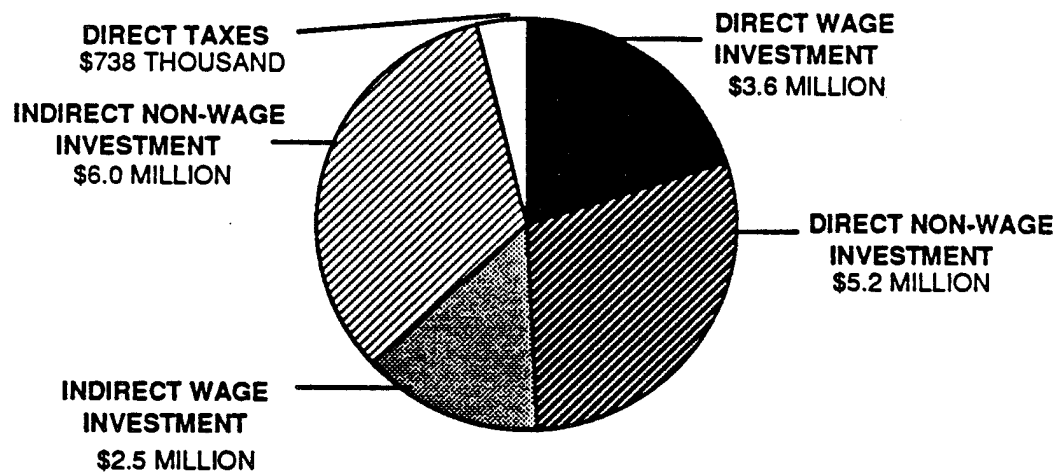


*1990 is the first full year of construction.

Note: Sum may not equal total due to independent rounding

ADDITIONAL CONSTRUCTION INCOME IN 1990,
\$38 MILLION

Figure 7.1.3



*1993 is the first full year of operation

Note: Sum may not equal total due to independent rounding.

ADDITIONAL OPERATING INCOME IN 1993,
\$18 MILLION

Figure 7.1-4

TABLE 7.1-4. ASSUMPTIONS FOR CEDAR BAY REGIONAL ECONOMIC IMPACT

1986-2024 Inflator	1.05
AES Wage Rate Plus Benefits (\$1,000 1986)	44
Indirect Wage Rate Plus Benefits (\$1,000 1986)	16.30
Construction Wage Rate Plus Benefits (\$1,000 1986)	20.97
Total (Net) Operators	58
Total Local Construction Purchases (\$1,000 1986)	32,000
Total Construction Payroll (\$1,000 1986)	37,000
Total Taxable Construction Costs (\$1,000 1986)	20,000
Annual Nonwage O&M Costs (\$1,000 1986)	3,730
Indirect Employment Multipliers	
Construction Period	0.6
Operating Period	0.8
Total Nonearnings Multipliers	
Household Multiplier	1.0894
Construction Multiplier	2.1110
Utility Multiplier	1.3891

Property tax calculated as 0.2 percent of the plant's valued assessment.

7.2 SOCIOECONOMIC COSTS

It is assumed that almost all of the workers for both the construction and operations phases of the project will be hired from Duval County. There will therefore be no significant migration into the area as a result of this project, and no substantial impact on educational, health care, or other social or public services. In addition, no significant increase in demand for new housing will occur as a result of the new plant. There will be some impact on traffic in the area of the plant as a result of the increased employment. This impact will be concentrated in the area of Heckscher Drive and Eastport Road, and will be most significant during the period of peak construction. The present traffic flow on Heckscher Drive in the vicinity of the plant is 15,730 vehicles per day.

8.0 SITE AND DESIGN ALTERNATIVES

8.1 SITE ALTERNATIVES

In late 1986, Stone Container Corporation (then a 49 percent owner of Seminole Kraft Corporation, now a 60 percent owner) initiated discussions with Applied Energy Services, Inc., (parent company to AES Cedar Bay, Inc.) on the possibility of constructing a cogeneration facility adjacent to the Seminole Kraft paper mill in Jacksonville, Florida. AES, Inc., would supply steam to the mill and would provide a new kraft recovery boiler. The project would allow the mill to shut down the existing inefficient oil, bark, and kraft recovery boilers, improving the long-term economic and environmental viability of the paper mill.

As part of these discussions, Stone Container offered to lease property adjacent to the Seminole Kraft mill to AES for construction of the project. This property (the proposed site) is an ideal construction site for the Cedar Bay Cogeneration Project for the following reasons.

- Proximity to the steam customer--Since Seminole Kraft will purchase about 640,000 lb/h of steam from AES, construction at an alternative site would lengthen the steam delivery line, increasing heat loss and reducing plant fuel use efficiency.
- Kraft recovery boiler (KRB) proximity to the existing mill--The KRB will be operated by Seminole Kraft personnel; it will be an integral part of the paper manufacturing process. A number of inefficiencies would exist if the KRB complex were not constructed adjacent to the mill.
- The industrial nature of the proposed site has been extensively disturbed by previous industrial use over the last 35 years. Because of its industrial nature, impacts to vegetation, animals, etc., will be extremely small.

Given the nature of this project's beginnings, the suitability of the proposed site for the project's needs, and the site's historic and future use for heavy industrial purposes, no further evaluation of alternative sites is included.

8.2 PROPOSED SITE DESIGN ALTERNATIVES

8.2.1 Alternative Heat Rejection Systems

Waste heat (from the condensation of turbine exhaust steam) is transferred to the atmosphere by a heat rejection system. Several systems are available to transfer this heat either directly to the atmosphere or indirectly through large bodies of water.

8.2.1.1 Once-Through Cooling System. In a once-through cooling system, cooling water from a river, lake, or pond is pumped through the condenser to condense the turbine exhaust steam. The heated water is then discharged back to the source. This alternative requires that the plant be close to a river or lake with sufficient capacity or that a cooling pond be developed onsite. Because of the adverse environmental effects of discharging heated water to rivers or lakes, and because of the high capital cost of cooling ponds, once-through cooling was not considered.

8.2.1.2 Dry and Wet-Dry Cooling Towers. Dry cooling towers dissipate heat from the condenser cooling water by conduction and convection directly to the atmosphere. Heated cooling water from the condensers is pumped through banks of finned-tube heat exchangers. The heat in the water is transferred by conduction through the metal walls of the finned-tubing and by convection to the atmosphere.

This system is advantageous in areas where there is little water available for cooling from any source are limited, since the system does not require makeup to replace water lost by evaporation. However, this system requires a very large physical structure and is very costly both in terms of initial expenditures and high plant auxiliary power requirements.

Wet-dry cooling towers use a combination of dry and evaporative cooling. This type of tower is a parallel path tower in which water is cooled first in a dry air-cooled section and then in a wet section. The air leaving the dry section and entering the wet is at a higher dry-bulb temperature but much lower humidity than air in the wet section. Consequently, mixing occurs, and the resulting air leaving the tower is in a

warm but unsaturated condition. Evaporation is reduced and makeup requirements are minimized. This system is advantageous where little water is available from any source. Neither dry nor wet-dry cooling towers are considered viable alternatives for the Cedar Bay Cogeneration Project since both capital and operating costs are high and an adequate supply of water for cooling tower makeup is available.

8.2.1.3 Natural Draft Cooling Towers. Wet natural draft cooling towers use a large chimney to create an upward draft which pulls air through the tower fill. Circulating water is pumped to the fill elevation of the tower and allowed to fall. Water is distributed over the fill, and heat exchange occurs by evaporation and convection. The difference in density between the warm air inside the tower and the cooler air outside creates a draft, and airflow is established without employing mechanical draft fans. Recent escalation in fuel costs has increased the feasibility of natural draft towers in larger utility applications since energy is not required for fan operation. However, the structure is large and initial capital costs are high. Given the size of the Cedar Bay plant and the relatively high cost for a natural draft cooling tower, it is not considered an attractive alternative for Cedar Bay.

8.2.1.4 Mechanical Draft Cooling Towers. Multifan mechanical draft cooling towers have been used extensively for power plant heat rejection systems. Mechanical draft towers use large fans to pull air through the tower fill. Water is distributed over the fill, and heat exchange takes place by evaporation and convection. Since airflow is produced by mechanical fans, the structure of the tower is smaller than a natural draft tower, and initial capital costs are lower.

Both rectangular mechanical draft cooling towers and round mechanical draft cooling towers have been used in the utility industry. Normally, rectangular cooling towers are built of treated wood, whereas round cooling towers are of concrete construction. Wood, rectangular mechanical draft cooling towers have a lower initial capital cost than round concrete cooling towers, and the operating costs are comparable. Round cooling towers exhibit better fogging and drifting characteristics. However, the rectangular mechanical draft cooling tower would be required to have the best

drift loss available, considering the latest drift elimination technology. The wood, rectangular mechanical draft cooling tower is the most advantageous heat rejection system for the Cedar Bay plant based on the above considerations.

8.2.2 Biological Fouling Control Alternatives

Biocide treatment of the recirculating cooling water is necessary to control biological fouling of the condensers, cooling towers, and the associated piping and structures. Biocide alternatives include chlorination, bromochlorination, chlorine dioxide, and ozone.

Bromochlorination, chlorine dioxide, and ozonization involve high operating costs and, therefore, have not gained acceptance for treatment of large quantities of recirculating cooling water. Since dechlorination of the cooling tower blowdown will be practiced, the use of alternative biocides does not involve any environmental advantage. Chlorine, therefore, is the biocide of choice.

Chlorine use will be minimized by practicing shock chlorination, in which chlorine is periodically fed for a timed period rather than continuously. Discharge of residual chlorine to the environment greater than limits will be precluded by chemical dechlorination of the cooling tower blowdown discharge to the St. Johns River using sulfur dioxide or sodium sulfite.

8.2.3 Intake System

Well water will be used for makeup to the Cedar Bay Cogeneration Project. As discussed in Section 3.5, withdrawal through the existing Seminole Kraft intake from the Broward River will be eliminated because the existing once-through cooling system will be abandoned. Since a new intake will not be required, no alternatives have been considered.

Neither of the two water supply alternatives discussed in Subsection 8.2.1 would require a new intake system. If river water were to be used for cooling, the existing intake system would be used. If treated sewage effluent were to be used for cooling, no intake structure would be required.

8.2.4 Discharge System

With the exception of the emergency overflow from the two onsite ponds during rainfalls in excess of the 25-year, 24-hour rainfall, the existing Seminole Kraft discharge system will be used for the Cedar Bay Cogeneration Project. The volume of discharge will be reduced as discussed in Section 3.5. Therefore, no alternatives have been considered.

8.2.5 Chemical Waste and Wastewater Treatment Alternatives

Each waste stream was evaluated to determine the type of treatment needed and the waste stream's suitability for reuse. The major wastewater streams are discussed individually below.

8.2.5.1 Cooling Tower Blowdown. The cooling tower blowdown discharge, using well water as the makeup source, will have a relatively high total dissolved solids concentration due to the concentrating effect of cooling tower evaporation. The blowdown is unsuitable for reuse in the plant except for possible use in the ash pelletizing operation. The blowdown, after treatment for chlorine removal, is suitable for direct discharge to the St. Johns River. The cooling tower blowdown discharge flow and temperature will be lower than the existing discharges from the once-through cooling systems for the Seminole Kraft boilers being replaced.

8.2.5.2 Steam Cycle. Boiler blowdown wastewater could be discharged to the St. Johns River; however, since it will have a relatively low dissolved solids content, it will be reused in the cooling tower system. Such reuse will not only reduce total discharge but will also reduce makeup requirements.

8.2.5.3 Makeup Water Demineralization. Demineralizer regenerant wastewater will have a relatively high total dissolved solids concentration and will, therefore, be unsuitable for reuse. The makeup water demineralizer replaces an existing, less efficient system in use by Seminole Kraft and should reduce net wastewater generation. Demineralizer regenerant wastewater, therefore, will receive pH adjustment at the neutralization basin and will then be routed to the existing Seminole Kraft wastewater treatment system, similar to the concept used on the existing demineralizer systems to be replaced.

8.2.5.4 Return Condensate Polishing. Return condensate polishing wastewater is intermittent and its quantity is relatively small. Because of

high suspended solids content, it is unsuitable for reuse. The wastewater will be directed to the Seminole Kraft wastewater treatment system, where suspended solids can be removed.

8.2.5.5 Metal Cleaning. Chemical and nonchemical metal cleaning are infrequent maintenance operations and do not contribute to normal wastewater flows. Chemical cleaning wastewater is high in dissolved solids content and iron concentration and is unsuitable for reuse. This wastewater is generated by the chemical cleaning contractor during preoperational cleaning and during maintenance cleaning thereafter, and will be properly disposed of by the contractor. Nonchemical metal cleaning wastes will be directed to the existing Seminole Kraft wastewater treatment system for treatment and disposal as discussed in Subsection 3.6.6.

8.2.5.6 Miscellaneous Chemical Drains. Miscellaneous chemical drains are intermittent and may have high dissolved solids content, making reuse unsuitable. Miscellaneous chemical drains will be directed to the neutralization basin.

8.2.5.7 Coal, Limestone, and Ash Storage Area Runoff. This wastewater may contain dissolved metals, due to the leaching from the contact of rainwater with the materials stored. The quality and quantity of the runoff is variable, making it unsuitable for reuse in the cooling tower. The runoff wastewater will undergo equalization and settling before it is discharged to the existing Seminole Kraft wastewater treatment facility.

8.2.6 Sanitary Waste Disposal Alternatives

Sanitary wastes must be treated prior to disposal, either in an existing or new biological treatment facility. The number of additional personnel required for the new cogeneration facilities will be offset, at least in part, by reduction of Seminole Kraft personnel used to operate the existing power and recovery boilers. The net increase in sanitary wastewater will be minimal. Sanitary wastes from new facilities will be directed to the existing Seminole Kraft sanitary system for treatment and disposal.

8.2.7 Solid Waste Disposal System

The combustion waste is a dry material containing many fine particles. When it is dry, it is handled pneumatically in a totally enclosed system with dust collectors at all transfer points. Loadout of dry ash into railcars or trucks is also conducted in a dustless manner. Alternatively, the ash can be formed into hardened pellets with the addition of water. Since the ash contains a large quantity of reactive calcium oxide, the addition of water creates a hardened cement-like material. Wet pellets are allowed to cure for about two days or more before they are removed from the site. The pellets can be handled much like coal using covered conveyors. The pelletizing system is proposed for use, but both methods can be designed to eliminate dusting problems.

The alternatives considered for ash disposal were onsite disposal, offsite but nearby disposal, disposal out of state, and use of the ash as a building material in the construction industry. Sale of the material to the building industry is the preferred method of ash disposal. However, a consistently reliable purchaser who could use all of the ash is not currently available. Consequently, plans for disposal of all the material at a proper site must be made. Onsite disposal would be the normally preferred option, but space limitations of the site preclude this option. An investigation of the availability and suitability of nearby sites for disposal was conducted by AES Cedar Bay, Inc., but no suitable site has yet been found. Consequently, present plans call for removal of the combustion wastes from the site by the coal supplier for disposal out of state.

8.2.8 Multiple Uses of the Plant

The site is already an active paper mill site. The addition of the cogeneration plant to the existing industrial site to produce electricity for sale to FPL can certainly be considered a multiple use of the site. The current use of bark and black liquor as a boiler fuel on the site will be maintained while the onsite use of oil will be mostly replaced by the use of the more abundant coal as a boiler fuel. As a cogeneration facility, the facility will continue to generate all the steam required for

the Seminole Kraft paper mill and much of the mill's electricity requirements. The facility will now also be generating 225 MW of electricity for sale to FPL.

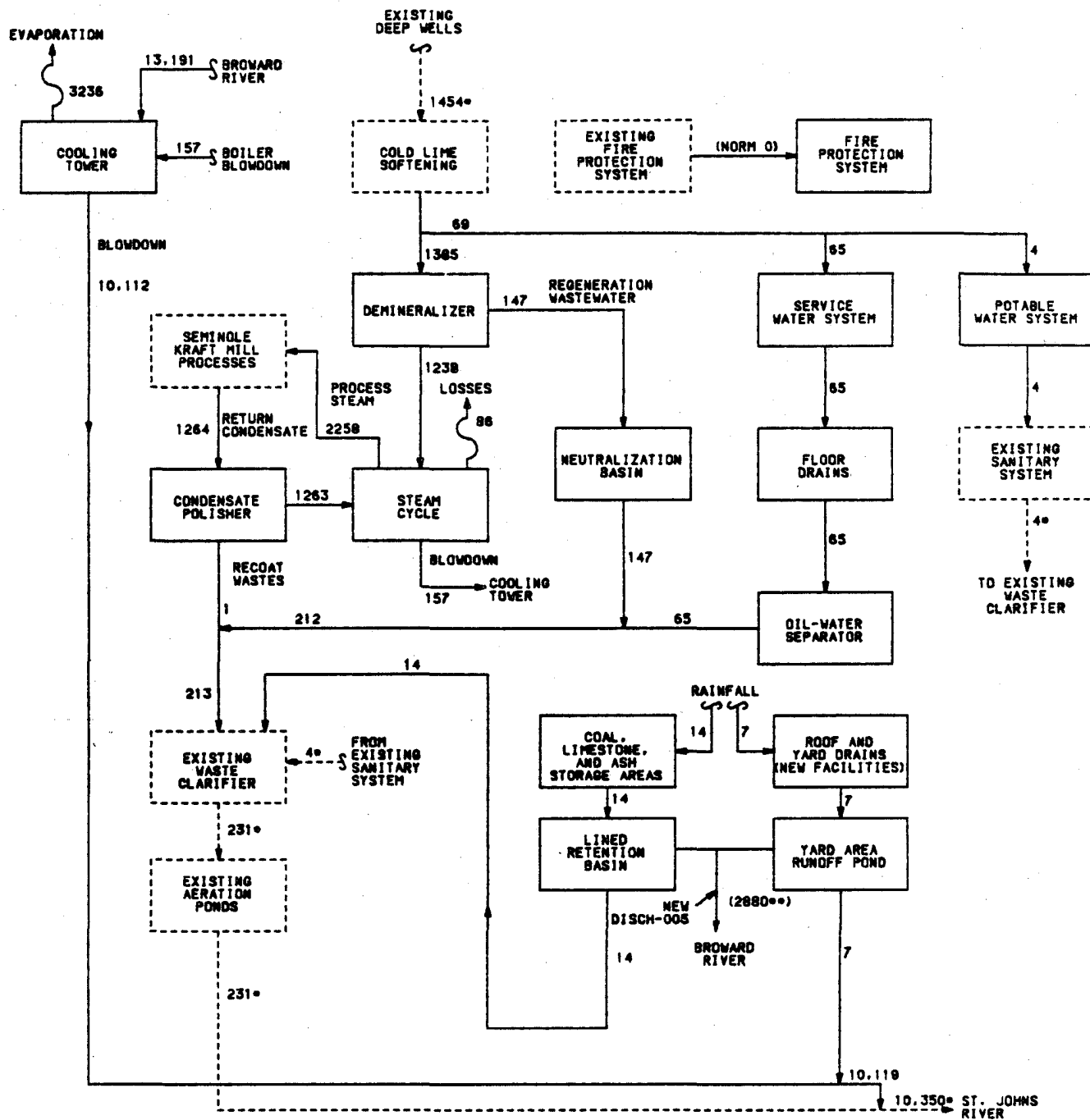
No other multiple uses of the site or the plant have been considered at this time.

8.2.9 Cooling Water Source

Water from the Broward River and effluent from a municipal sewage treatment plant (STP) were considered as possible alternatives to well water for makeup to the cooling towers. A water mass balance for annual average flows based on full load operation for each of these two alternatives is shown on Figures 8.2-1 and 8.2-2. The water mass balance for the proposed ground water system is shown on Figure 3.5-1. The remainder of plant water use for both alternative cases is supplied by wells. Table 8.2-1 compares the estimated capital and annual operating costs which will be affected by the use of Broward River water and STP effluent for cooling tower makeup to the proposed water source.

8.2.9.1 Broward River Water. Broward River water has a much higher dissolved solids content than the well water from the Floridan aquifer. This high dissolved solids content dramatically limits the cycles of concentration achievable in the circulating water system, lowering the value to about 1.3 cycles. The result is increased makeup and blowdown. The makeup rate increases to 9,269 gpm and the blowdown increases to 7,022 gpm. The anticipated water quality for the Broward River water and circulating water is shown in Table 8.2-2. The circulating water blowdown is returned to the St. Johns River through an existing line currently used for the Seminole Kraft once-through condensers and wastewater.

Circulating water treatment includes scale inhibitor feed and chlorination. Acid feed is not practical due to the large makeup flow rate required. The amount of scale inhibitor used is greatly increased as a result of the increased blowdown. The estimated maximum use of scale inhibitor based on maximum load conditions is 1,686 pounds per day. The chlorine feed rate is similar to the feed rate when well water is used for makeup. The blowdown is dechlorinated prior to discharge using a dilute solution of sulfur dioxide.

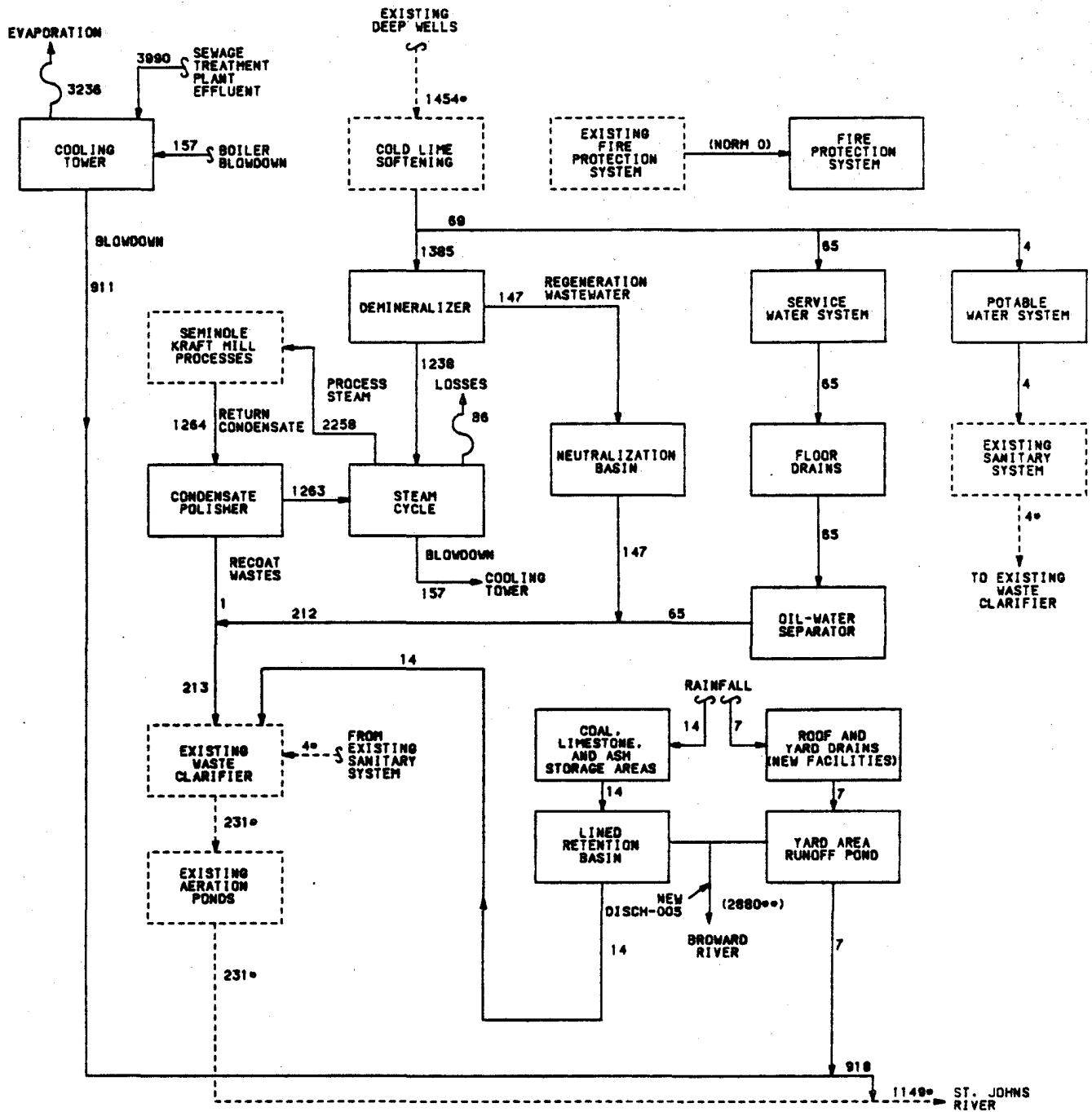


NOTES:

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.
4. AMOUNT OF FLOW ATTRIBUTABLE TO CEDAR BAY COGENERATION PROJECT
- ** CONSTRUCTION DEWATERING. FLOW WILL OCCUR ONLY DURING CONSTRUCTION.

WATER MASS BALANCE
BROWARD RIVER WATER
C. T. MAKEUP

Figure 8.2.1



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
SEWAGE TREATMENT PLANT
C. T. MAKEUP
Figure 8.2-2**

TABLE 8.2-1. DIFFERENTIAL CAPITAL AND OPERATING COSTS FOR COOLING TOWER
MAKEUP ALTERNATIVES (\$1,000)

	<u>Well Water</u>	<u>River Water</u>	<u>STP Effluent</u>
<u>Capital Cost</u>			
Condenser	Base	920	Base
Cooling Tower	Base	200	Base
STP Effluent Pipeline	Base	Base	2,400
Phosphorous Removal	<u>Base</u>	<u>Base</u>	<u>2,930</u>
Differential Capital Cost	Base	1,120	5,330
<u>Annual Operating Cost</u>			
Fixed Charges (16.7 percent)	Base	187	890
Phosphorous Removal	Base	Base	420
C.W. Chemical Feed	<u>Base</u>	<u>467</u>	<u>Base</u>
Differential Annual Operating Cost	Base	654	1,310

TABLE 8.2-2. ANTICIPATED BROWARD RIVER WATER AND CIRCULATING WATER ANALYSES

<u>Constituent</u>	<u>Broward River Water</u>	<u>Circulating Cooling Water</u>
Calcium, mg/l as CaCO_3	680	898
Magnesium, mg/l as CaCO_3	3,465	4,574
Sodium, mg/l as CaCO_3	15,516	20,481
Potassium, mg/l as CaCO_3	342	451
M-Alk, mg/l as CaCO_3	92	121
Sulfate, mg/l as CaCO_3	1,820	2,402
Chloride, mg/l as CaCO_3	18,330	24,196
SiO_2 , mg/l as SiO_2	6	8

The use of Broward River water as makeup to the cooling towers results in increased capital and operating costs for the plant. The condenser must be constructed of more expensive materials in order to resist the corrosivity of the river water. The cooling tower must be larger due to the decreased vapor pressure and hence decreased cooling ability of the high solids river water compared to the well water. Dechlorination and chlorine residual analysis equipment is required because the blowdown is being returned directly to the St. Johns River. The overall chemical cost for circulating water treatment is increased due to the increased inhibitor feed.

8.2.9.2 Sewage Treatment Plant Effluent. A phosphorous removal system is required to treat the STP effluent before it can be used as cooling tower makeup. The treatment system would include a solids contact basin, gravity filter, washwater recovery tank, thickener, and associated chemical feed equipment. The larger equipment would be located outdoors, with the remainder located in an extension of the water treatment building.

The quality of the STP effluent, after treatment for phosphorous and suspended solids reduction, would be similar to well water in many respects. Cooling tower makeup and blowdown rates when using STP effluent will be approximately the same as when using well water. The circulating water blowdown is returned to the St. Johns River through an existing line currently used for the Seminole Kraft once-through condensers and wastewater.

Circulating water treatment includes acid feed, scale inhibitor feed, and chlorination. The feed rates are also similar to the feed rates when well water is used for makeup. The blowdown is dechlorinated using a dilute solution of sulfur dioxide before it is discharged.

The use of STP effluent as makeup to the cooling towers results in increased capital and operating costs for the plant as a result of the costs of the pipeline and the phosphorous removal system.

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2

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Amendment 3
101089

9-4a

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SITE CERTIFICATION
APPLICATION

**THE CEDAR BAY
COGENERATION PROJECT
VOLUME 3**



SITE CERTIFICATION
APPLICATION

**THE CEDAR BAY COGENERATION
PROJECT**

VOLUME 3

Submitted by  Cedar Bay Inc.

**SITE CERTIFICATION
APPLICATION**

**THE CEDAR BAY COGENERATION
PROJECT**

VOLUME 3

Submitted by **AS**/Cedar Bay Inc.



10.0 APPENDICES

10.1 FEDERAL PERMIT APPLICATIONS OR APPROVALS

10.1.1 NPDES Application/Permit



GENERAL INFORMATION

Consolidated Permits Program
(Read the "General Instructions" before starting.)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
F														D

LABEL ITEMS

I. EPA I.D. NUMBER

FACILITY NAME

FACILITY
MAILING ADDRESSVI. FACILITY
LOCATION

PLEASE PLACE LABEL IN THIS SPACE

GENERAL INSTRUCTIONS

If a preprinted label has been provided, affix it in the designated space. Review the information carefully; if any of it is incorrect, cross through it and enter the correct data in the appropriate fill-in area below. Also, if any of the preprinted data is absent (the area to the left of the label space lists the information that should appear), please provide it in the proper fill-in area(s) below. If the label is complete and correct, you need not complete items I, III, V, and VI (except VI-B which must be completed regardless). Complete all items if no label has been provided. Refer to the instructions for detailed item descriptions and for the legal authorizations under which this data is collected.

II. POLLUTANT CHARACTERISTICS

INSTRUCTIONS: Complete A through J to determine whether you need to submit any permit application forms to the EPA. If you answer "yes" to any questions, you must submit this form and the supplemental form listed in the parenthesis following the question. Mark "X" in the box in the third column if the supplemental form is attached. If you answer "no" to each question, you need not submit any of these forms. You may answer "no" if your activity is excluded from permit requirements; see Section C of the instructions. See also, Section D of the instructions for definitions of bold-faced terms.

SPECIFIC QUESTIONS	MARK 'X'			SPECIFIC QUESTIONS	MARK 'X'		
	YES	NO	FORM ATTACHED		YES	NO	FORM ATTACHED
A. Is this facility a publicly owned treatment works which results in a discharge to waters of the U.S.? (FORM 2A)		X		B. Does or will this facility (either existing or proposed) include a concentrated animal feeding operation or aquatic animal production facility which results in a discharge to waters of the U.S.? (FORM 2B)		X	
C. Is this a facility which currently results in discharges to waters of the U.S. other than those described in A or B above? (FORM 2C)		X		D. Is this a proposed facility (other than those described in A or B above) which will result in a discharge to waters of the U.S.? (FORM 2D)	X		
E. Does or will this facility treat, store, or dispose of hazardous wastes? (FORM 3)		X		F. Do you or will you inject at this facility industrial or municipal effluent below the lowermost stratum containing, within one quarter mile of the well bore, underground sources of drinking water? (FORM 4)		X	
G. Do you or will you inject at this facility any produced water or other fluids which are brought to the surface in connection with conventional oil or natural gas production, inject fluids used for enhanced recovery of oil or natural gas, or inject fluids for storage of liquid hydrocarbons? (FORM 4)		X		H. Do you or will you inject at this facility fluids for special processes such as mining of sulfur by the Frasch process, solution mining of minerals, in situ combustion of fossil fuel, or recovery of geothermal energy? (FORM 4)		X	
I. Is this facility a proposed stationary source which is one of the 28 industrial categories listed in the instructions and which will potentially emit 100 tons per year of any air pollutant regulated under the Clean Air Act and may affect or be located in an attainment area? (FORM 5)	X			J. Is this facility a proposed stationary source which is NOT one of the 28 industrial categories listed in the instructions and which will potentially emit 250 tons per year of any air pollutant regulated under the Clean Air Act and may affect or be located in an attainment area? (FORM 5)		X	

III. NAME OF FACILITY

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15													
SKIP	C	E	D	A	R	B	A	Y	C	O	G	E	N	E	R	A	T	I	O	N	P	R	O	J	E	C	T

IV. FACILITY CONTACT

A. NAME & TITLE (last, first, & title)												B. PHONE (area code & no.)														
2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25			
S	W	A	I	N	,	J	E	F	F	R	E	Y	P	R	O	J	E	C	T	D	I	R	E	C	T	R

V. FACILITY MAILING ADDRESS

A. STREET OR P.O. BOX												B. CITY OR TOWN				C. STATE		D. ZIP CODE										
3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	
1	0	0	1	N	O	R	T	H	1	9	T	H	S	T.	S	U	I	T	E	2	0	0	0					

B. CITY OR TOWN												C. STATE		D. ZIP CODE													
4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	
A	R	L	I	N	G	T	O	N																			

C. STATE		D. ZIP CODE				
V	A	2	2	2	0	9

VI. FACILITY LOCATION

A. STREET, ROUTE NO. OR OTHER SPECIFIC IDENTIFIER												B. COUNTY NAME				C. CITY OR TOWN		D. STATE		E. ZIP CODE		F. COUNTY CODE (if known)				
5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	
E	A	S	T	P	O	R	T	R	D																	

B. COUNTY NAME												C. CITY OR TOWN		D. STATE		E. ZIP CODE		F. COUNTY CODE (if known)								
D	U	V	A	L																						

C. CITY OR TOWN												D. STATE		E. ZIP CODE		F. COUNTY CODE (if known)										
J	A	C	K	S	O	N	V	I	L	L	E															

D. STATE		E. ZIP CODE				F. COUNTY CODE (if known)	
F	L	3	2	2	1	8	

VII. SIC CODES (4-digit, in order of priority)

A. FIRST										B. SECOND											
C	7	4	9	1	3	(specify)					E	7	4	9	6	1	(specify)				
Electric Services										Steam Supply											
C. THIRD										D. FOURTH											
C	7	(specify)								E	7	(specify)									

I. OPERATOR INFORMATION

A. NAME																									B. Is the name listed in Item VIII-A also the owner?					
C	8	A	E	S	C	E	D	A	R	B	A	Y	I	N	C											☒ YES ☐ NO				

C. STATUS OF OPERATOR (Enter the appropriate letter into the answer box; if "Other", specify.)															D. PHONE (area code & no.)														
F - FEDERAL					M - PUBLIC (other than federal or state)					P - PRIVATE					O - OTHER (specify)					P (specify)					C A 7 0 3 5 5 2 1 3 1 5				

E. STREET OR P.O. BOX																								
1001 NORTH 19th ST SUITE 20000																								

F. CITY OR TOWN															G. STATE					H. ZIP CODE					IX. INDIAN LAND				
B A R L I N G T O N															V A					2 2 2 0 9					Is the facility located on Indian lands? ☐ YES ☒ NO				

X. EXISTING ENVIRONMENTAL PERMITS

A. NPDES (Discharges to Surface Water)										D. PSD (Air Emissions from Proposed Sources)											
C	9	N	N	A							C	9	P	N	A						
B. UIC (Underground Injection of Fluids)										E. OTHER (specify)											
C	9	U	N	A							C	9	N	A	(specify)						
C. RCRA (Hazardous Wastes)										E. OTHER (specify)											
C	9	R	N	A							C	9	N	A	(specify)						

XI. MAP

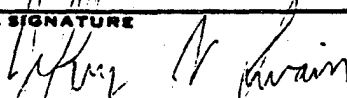
Attach to this application a topographic map of the area extending to at least one mile beyond property boundaries. The map must show the outline of the facility, the location of each of its existing and proposed intake and discharge structures, each of its hazardous waste treatment, storage, or disposal facilities, and each well where it injects fluids underground. Include all springs, rivers and other surface water bodies in the map area. See instructions for precise requirements. See Figures 2.2-2 and 3.2-3 of the SCA.

XII. NATURE OF BUSINESS (provide a brief description)

The Cedar Bay Cogeneration Project will include three fluidized bed coal-fired combustion boilers. The facility will produce approximately 225 MW of electricity for sale to Florida Power & Light and 640,000 lb/hr of process steam for sale to Seminole Kraft Corporation for paper production.

XIII. CERTIFICATION (see instructions)

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this application and all attachments and that, based on my inquiry of those persons immediately responsible for obtaining the information contained in the application, I believe that the information is true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

A. NAME & OFFICIAL TITLE (type or print)															B. SIGNATURE															C. DATE SIGNED									
Jeffrey V. Swain, Vice President																														10-9-89									

COMMENTS FOR OFFICIAL USE ONLY

VII. SIC CODES (4-digit, in order of priority)

A. FIRST										B. SECOND									
C	7	4	9	1	3	(specify) Electric Services	C	7	4	9	6	1	(specify) Steam Supply						
15	16	17	18	19		15	16	17	18	19									
C. THIRD										D. FOURTH									
C	7	(specify)	C	7	(specify)														
15	16		15	16															

OPERATOR INFORMATION

A. NAME																														B. Is the name listed in Item VIII-A also the owner?									
C	8	A	E	S		C	E	D	A	R		B	A	Y		I	N	C	☒ YES ☐ NO																				
15	16																									35	36												
C. STATUS OF OPERATOR (Enter the appropriate letter into the answer box; if "Other", specify.)																				D. PHONE (area code & no.)																			
F = FEDERAL S = STATE P = PRIVATE										M = PUBLIC (other than federal or state) O = OTHER (specify)										P (specify)										C A 7 0 3 5 5 2 1 3 1 5									
E. STREET OR P.O. BOX																																							
1 9 2 5 N O R T H L Y N N S T S U I T E 1 2 0 0																																							
F. CITY OR TOWN																				G. STATE					H. ZIP CODE					IX. INDIAN LAND									
B A R L I N G T O N																				V A					2 2 2 0 9					Is the facility located on Indian lands? ☐ YES ☒ NO									

X. EXISTING ENVIRONMENTAL PERMITS

A. NPDES (Discharges to Surface Water)															D. PSD (Air Emissions from Proposed Sources)														
C	9	N	A	C	9	P	N	A																					
15	16	17	18	15	16	17	18																						
B. UIC (Underground Injection of Fluids)															E. OTHER (specify)														
C	9	U	N	A	C	9		N	A	(specify)																			
15	16	17	18	15	16	17	18																						
C. RCRA (Hazardous Wastes)															E. OTHER (specify)														
C	9	R	N	A	C	9		N	A	(specify)																			
15	16	17	18	15	16	17	18																						

XI. MAP

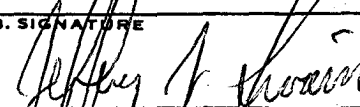
Attach to this application a topographic map of the area extending to at least one mile beyond property boundaries. The map must show the outline of the facility, the location of each of its existing and proposed intake and discharge structures, each of its hazardous waste treatment, storage, or disposal facilities, and each well where it injects fluids underground. Include all springs, rivers and other surface water bodies in the map area. See instructions for precise requirements. See Figures 2.2-2 and 3.2-3 of the SCA.

XII. NATURE OF BUSINESS (provide a brief description)

The Cedar Bay Cogeneration Project will include three fluidized bed coal-fired combustion boilers. The facility will produce approximately 225 MW of electricity for sale to Florida Power & Light and 640,000 lb/hr of process steam for sale to Seminole Kraft Corporation for paper production.

XIII. CERTIFICATION (see instructions)

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this application and all attachments and that, based on my inquiry of those persons immediately responsible for obtaining the information contained in the application, I believe that the information is true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

A. NAME & OFFICIAL TITLE (type or print)															B. SIGNATURE															C. DATE SIGNED									
Jeffrey V. Swain, Vice President																														10-25-88									
COMMENTS FOR OFFICIAL USE ONLY																																							

FORM

2D
DES



EPA New Sources and New Dischargers Application for Permit to Discharge Process Wastewater

I. Outfall Location

For each outfall, list the latitude and longitude, and the name of the receiving water

Outfall Number (list)	Latitude			Longitude			Receiving Water (name)
	Deg	Min	Sec	Deg	Min	Sec	
001	30	24	55	81	35	45	Existing outfall in the St. Johns River
002							Monitoring point for cooling tower blowdown
003							Monitoring point for runoff retention basin
004							Monitoring point for boiler blowdown
005							Monitoring point for construction dewatering
006							Monitoring point for low volume wastes

II. Discharge Date (When do you expect to begin discharging?)

III. Flows, Sources of Pollution, and Treatment Technologies

A. For each outfall, provide a description of (1) All operations contributing wastewater to the effluent, including process wastewater, sanitary wastewater, cooling water, and stormwater runoff; (2) The average flow contributed by each operation; and (3) The treatment received by the wastewater. Continue on additional sheets if necessary.

[illegible]

B. Attach a line drawing showing the water flow through the facility. Indicate sources of intake water, operations contributing wastewater to the effluent, and treatment units labeled to correspond to the more detailed descriptions in Item III-A. Construct a water balance on the line drawing by showing average flows between intakes, operations, treatment units, and outfalls. If a water balance cannot be determined (e.g., for certain mining activities), provide a pictorial description of the nature and amount of any sources of water and any collection or treatment measures. See Figure 3.5-1 of SCA.

C. Except for storm runoff, leaks, or spills, will any of the discharges described in item III-A be intermittent or seasonal?

☒ Yes (complete the following table)

☐ No (go to item IV)

Outfall Number	1. Frequency		2. Flow		
	a. Days Per Week (specify average)	b. Months Per Year (specify average)	a. Maximum Daily Flow Rate (in mgd)	b. Maximum Total Volume (specify with units)	c. Duration (in days)
006 Cycle makeup Demineralization	7	12	0.166	167,000 gal	0.257
006 Condensate polishing	2	12	0.0025	2,500 gal	0.333

IV. Production

If there is an applicable production-based effluent guideline or NSPS, for each outfall list the estimated level of production (projection of actual production level, not design), expressed in the terms and units used in the applicable effluent guideline or NSPS, for each of the first 3 years of operation. If production is likely to vary, you may also submit alternative estimates (attach a separate sheet).

Year	a. Quantity Per Day	b. Units of Measure	c. Operation, Product, Material, etc (specify)
N/A			

C. Use the space below to list any of the pollutants listed in Table 2D-3 of the instructions which you know or have reason to believe will be discharged from any outfall. For every pollutant you list, briefly describe the reasons you believe it will be present.

1. Pollutant

2. Reason for Discharge

VI. Engineering Report on Wastewater Treatment

A. If there is any technical evaluation concerning your wastewater treatment, including engineering reports or pilot plant studies, check the appropriate box below.

☐

Report Available

☐

No Report

B. Provide the name and location of any existing plant(s) which, to the best of your knowledge, resembles this production facility with respect to production processes, wastewater constituents, or wastewater treatments.

Name

Location

C. Use the space below to list any of the pollutants listed in Table 2D-3 of the instructions which you know or have reason to believe will be discharged from any outfall. For every pollutant you list, briefly describe the reasons you believe it will be present.

1. Pollutant	2. Reason for Discharge
Strontium	Low concentrations of strontium may be present due to the plant well water supply quality.

VI. Engineering Report on Wastewater Treatment

A. If there is any technical evaluation concerning your wastewater treatment, including engineering reports or pilot plant studies, check the appropriate box below.

☐ Report Available☐ No Report

B. Provide the name and location of any existing plant(s) which, to the best of your knowledge, resembles this production facility with respect to production processes, wastewater constituents, or wastewater treatments.

Name	Location
Thames Cogeneration Plant	Under construction in Montville, Connecticut

C. Use the space below to list any of the pollutants listed in Table 2D-3 of the instructions which you know or have reason to believe will be discharged from any outfall. For every pollutant you list, briefly describe the reasons you believe it will be present.

1. Pollutant	2. Reason for Discharge

VI. Engineering Report on Wastewater Treatment

A. If there is any technical evaluation concerning your wastewater treatment, including engineering reports or pilot plant studies, check the appropriate box below.

☐ Report Available

☐ No Report

B. Provide the name and location of any existing plant(s) which, to the best of your knowledge, resembles this production facility with respect to production processes, wastewater constituents, or wastewater treatments.

Name	Location

V Effluent Characteristics

A. and B. These items require you to report estimated amounts (both concentration and mass) of the pollutants to be discharged from each of your outfalls. Each part of this item addresses a different set of pollutants and should be completed in accordance with the specific instructions for that part. Data for each outfall should be on a separate page. Attach additional sheets of paper if necessary.

General Instructions (See table 2D-2 for Pollutants)

Each part of this item requests you to provide an estimated daily maximum and average for certain pollutants and the source of information. Data for all pollutants in Group A, for all outfalls, must be submitted unless waived by the permitting authority. For all outfalls, data for pollutants in Group B should be reported only for pollutants which you believe will be present or are limited directly by an effluent limitations guideline or NSPS or indirectly through limitations on an indicator pollutant.

1. Pollutant	2. Maximum Daily Value (include units)	3. Average Daily Value (include units)	4. Source (see instructions)
BOD5	27 mg/l 295 kg	14 mg/l 90 kg	4
COD	143 mg/l 1,560 kg	73 mg/l 464 kg	4
TOC	5 mg/l 55 kg	3 mg/l 19 kg	4
TSS	69 mg/l 753 kg	40 mg/l 254 kg	4
Ammonia	0.68 mg/l 7.4 kg	0.34 mg/l 2.2 kg	4
Temperature (Winter)	90 F	60 F	4
Temperature (Summer)	90 F	80 F	4
pH	12.0	8.0	4
Flow	2,880,000 gpd	1,680,000 gpd	4
Nitrate (as N)	1.8 mg/l 20 kg	0.93 mg/l 6 kg	4
Phosphorous (as P)	0.7 mg/l 7.6 kg	0.5 mg/l 5.4 kg	4
Sulfate	150 mg/l 1,636 kg	100 mg/l 635 kg	4
Iron	2.0 mg/l 21.8 kg	1.8 mg/l 19.6 kg	4
Magnesium	165 mg/l 1,800 kg	110 mg/l 700 kg	4
Aluminum	5.7 mg/l 62.1 kg	5.1 mg/l 32.4 kg	4
Chromium	<0.16 mg/l <1.74 kg	<0.13 mg/l <0.83 kg	4
Copper	<1.74 mg/l <18.9 kg	<0.94 mg/l <5.97 kg	4
Lead	<1.21 mg/l <13.2 kg	<1.0 mg/l <6.36 kg	4
Mercury	<0.0022mg/l <0.025 kg	<0.0018mg/l <0.01 kg	4
Nickel	<0.144 mg/l <1.57 kg	<0.119 mg/l <0.76 kg	4
Selenium	<0.017 mg/l <0.18 kg	<0.011 mg/l <0.07 kg	4
Zinc	<6.4 mg/l <69.7 kg	<4.4 mg/l <28.0 kg	4
Cadmium	<0.010 mg/l <0.11 kg	<0.009 mg/l <0.06 kg	4

VII. Other Information (Optional)

Use the space below to expand upon any of the above questions or to bring to the attention of the reviewer any other information you feel should be considered in establishing permit limitations for the proposed facility. Attach additional sheets if necessary.

VIII. Certification

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Name and Official Title (type or print)

JEFFREY V. SWAIN, VICE PRESIDENT

B. Phone No.

703-522-1315

C. Signature



D. Date Signed

2-8-89

C. Use the space below to list any of the pollutants listed in Table 2D-3 of the instructions which you know or have reason to believe will be discharged from any outfall. For every pollutant you list, briefly describe the reasons you believe it will be present.

1. Pollutant	2. Reason for Discharge

VI. Engineering Report on Wastewater Treatment

A. If there is any technical evaluation concerning your wastewater treatment, including engineering reports or pilot plant studies, check the appropriate box below.

☐ Report Available ☐ No Report

☐ Report Available ☐ No Report	
B. Provide the name and location of any existing plant(s) which, to the best of your knowledge, resembles this production facility with respect to production processes, wastewater constituents, or wastewater treatments.	
Name	

[illegible]

VII. Other Information (Optional)

Use the space below to expand upon any of the above questions or to bring to the attention of the reviewer any other information you feel should be considered in establishing permit limitations for the proposed facility. Attach additional sheets if necessary.

VIII. Certification

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

A. Name and Official Title (Type or print)

JEFFREY V. GWAIN, VICE PRESIDENT

B. Phone No.

703-522-1315

C. Signature

D. Date Signed

10-25-88

VII. Other Information (Optional)

Use the space below to expand upon any of the above questions or to bring to the attention of the reviewer any other information you feel should be considered in establishing permit limitations for the proposed facility. Attach additional sheets if necessary.

VIII. Certification

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Name and Official Title (type or print) <i>Thomas A. Tribune Vice President for</i> Jeffrey V. Swain, Vice President	B. Phone No. 703-522-1315
C. Signature <i>J. V. Swain</i>	D. Date Signed 7/6/89

10.1.2 Section 10 or 404 Application/Permit

(Deleted)

3

10-2

Amendment 3
101089

10.1.3 Prevention of Significant Deterioration

All required components of the Prevention of Significant Deterioration (PSD) permit application are contained in Sections 2.3.7 (Meteorology and Ambient Air Quality), 3.3 (Fuel), 3.4 (Air Emissions and Controls), 3.9 (Materials Handling), and 5.6 (Air Quality Impacts). Completed permit application forms for DER permits to construct air pollution sources are included in Appendix 10.6.1.

10.1.4 Coastal Zone Management Certification

As part of Florida's Coastal Management Program federal consistency procedures (15 CFR 93.50), all federal permits for which there are no corresponding state permits require certification of compliance with the Florida Coastal Management Program (FCMP). For this project, two such federal permits or approvals are necessary. These are the US Department of Transportation, Federal Aviation Administration (FAA) approval for stack construction, and the USEPA NPDES permit for process wastewater discharge and stormwater runoff.

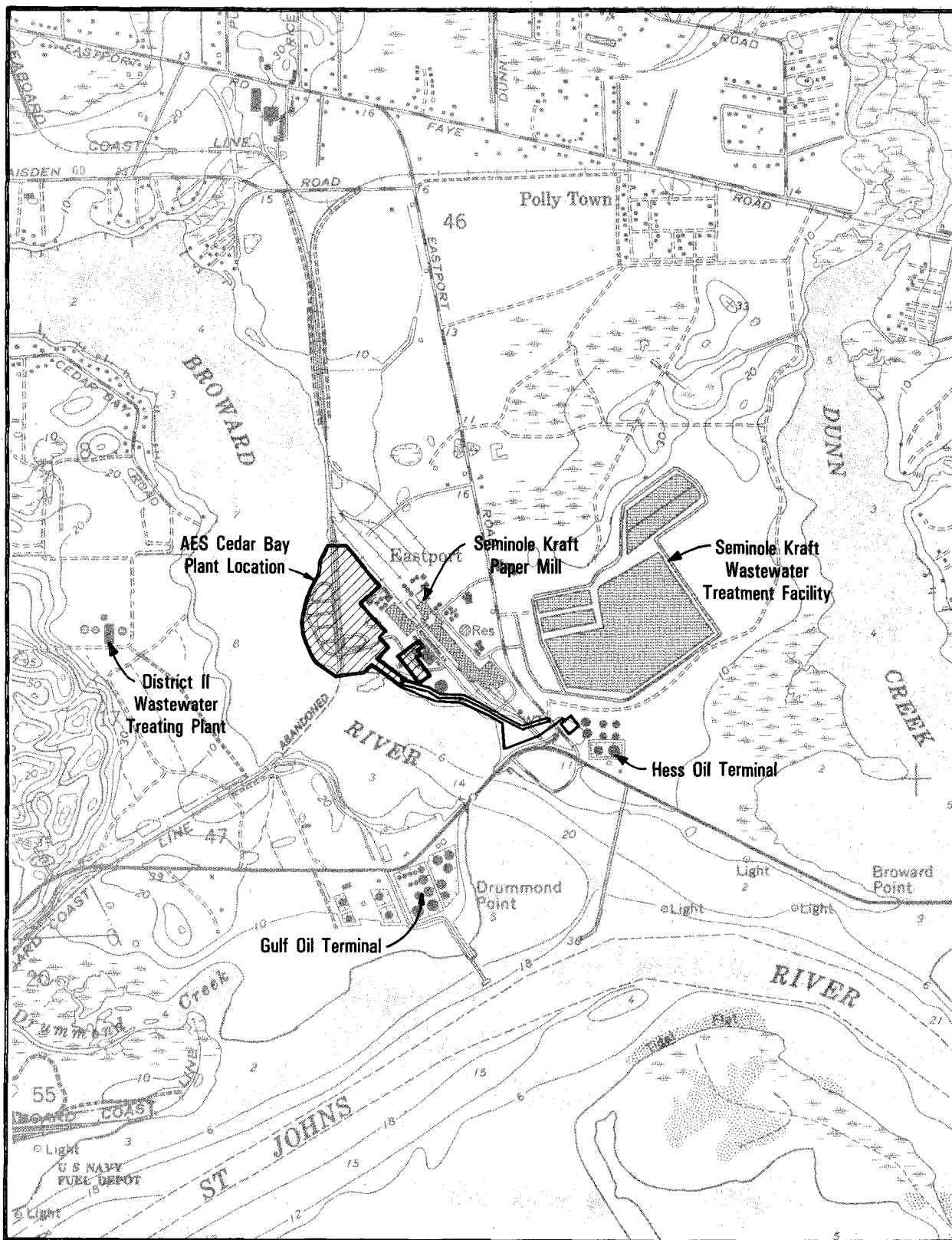
The Federal Consistency Evaluation Procedures require these permit applications to be accompanied by a consistency certification attachment which includes the following.

- A written and pictorial description of the project.
- An assessment of probable impacts relevant to applicable FCMP statutes.
- A signed statement by the applicant regarding consistency of the project with FCMP statutes.

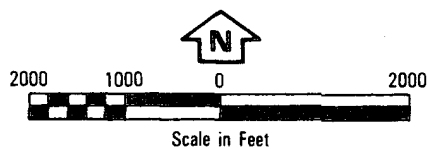
In accordance with FCMP consistency evaluation procedures, the certification package and permit application must be sent to the appropriate federal agencies (FAA and EPA) and Coordinator of the Florida State Planning and Development Clearinghouse, DER. Copies of the permit applications (except FAA) and certifications are included in this appendix.

10.1.4.1 Description of the Project. The AES Cedar Bay Cogeneration Project is an integrated power complex to be built on an existing industrial site in Jacksonville, Florida (Figure 10.1-5). 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 10.1-6).

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



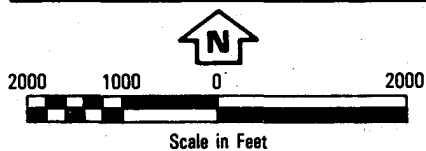
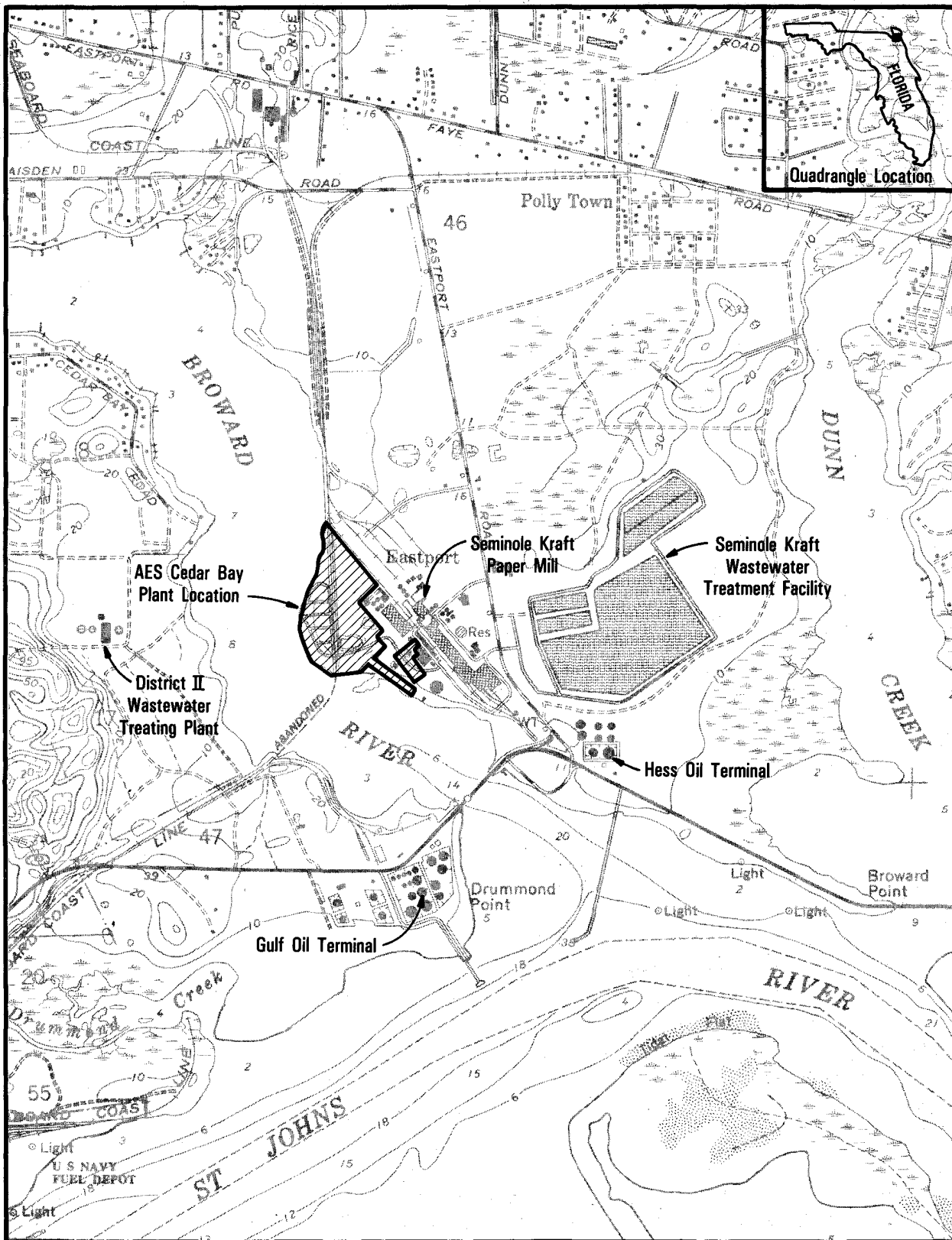
3



SITE LOCATION

Figure 10.1-5

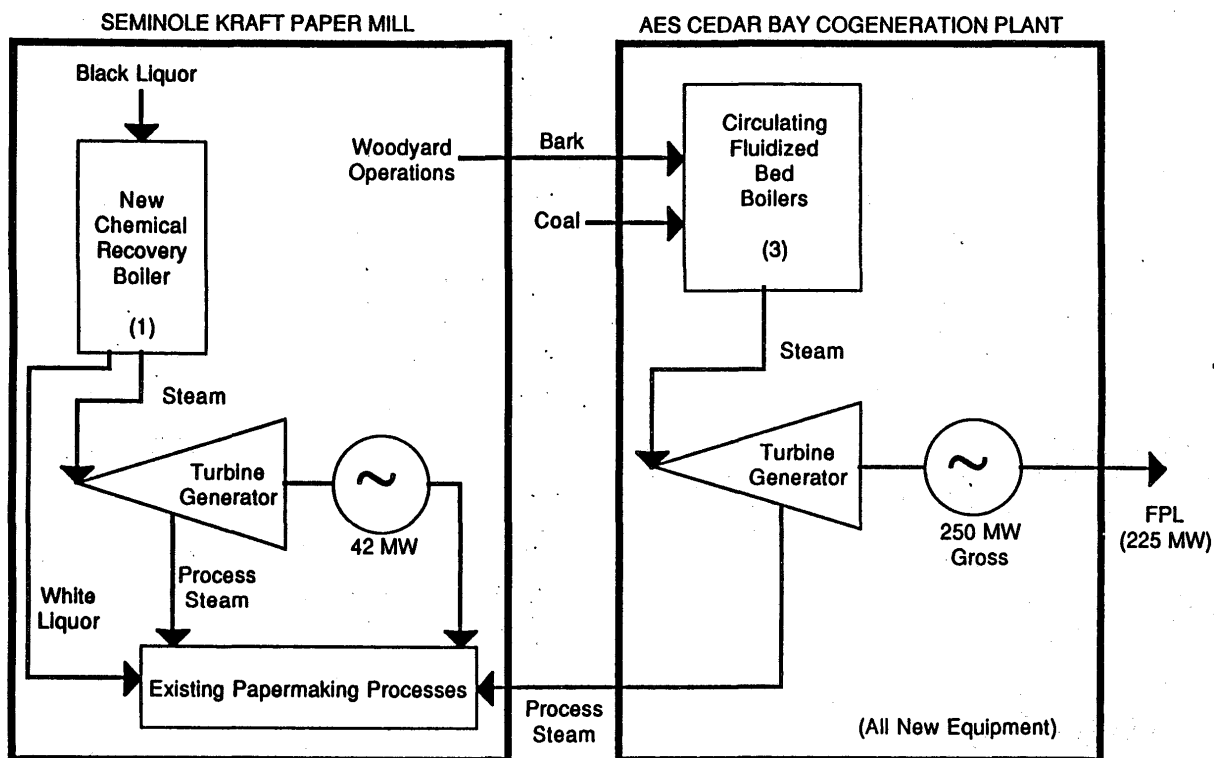
Amendment 1
021089
Amendment 3
080289



SITE LOCATION

Figure 10.1-5

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.

SCHEMATIC OF NEW FACILITY

Figure 10.1-6

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 10.1-7).

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.

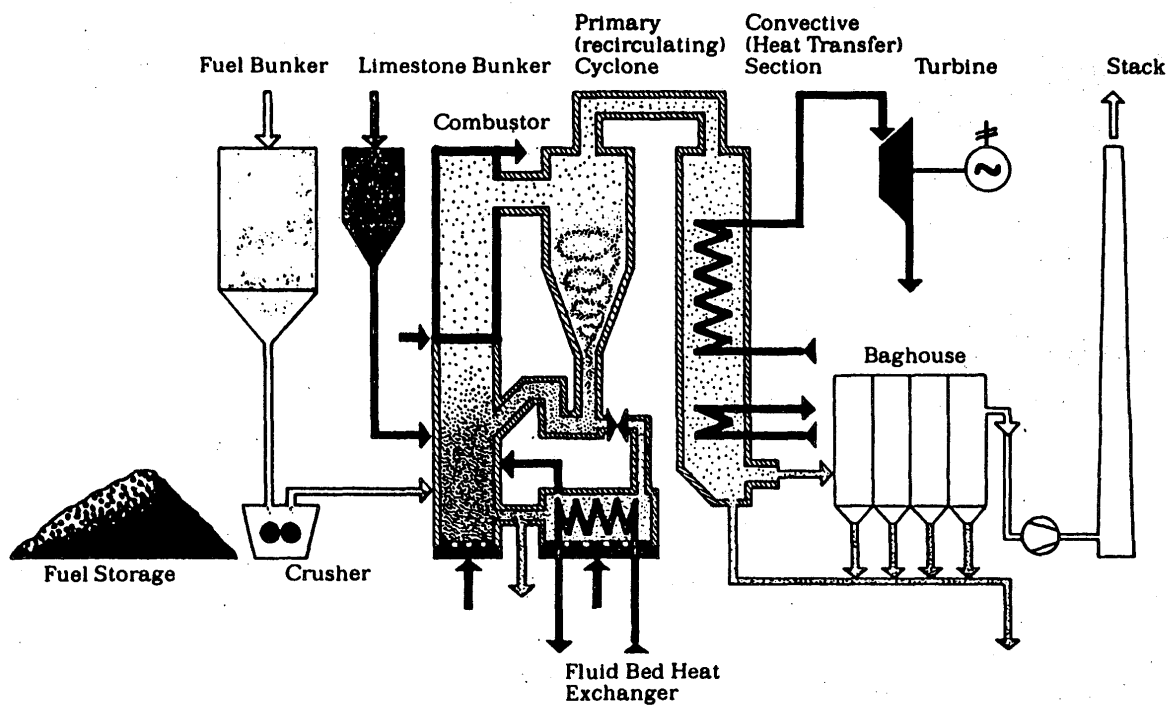
Offsets from the elimination and replacement of older, less environmentally efficient equipment at the mill will result in a number of environmental improvements. Eight existing boilers at the mill will be shut down: three oil-fired and two bark-fired power boilers and three kraft recovery boilers. The 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.

Coal will be delivered by rail, and a rail spur to the north of the site may be necessary.

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.

3

Typical Flow Chart for a Circulating Fluidized Bed Boiler System



TYPICAL FLOW CHART FOR A
CFB BOILER

Figure 10.1-7

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.

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.

Assessment of Probable Impacts. An assessment of probable impacts was made in relation to the Florida Coastal Management Program statutes as required by the Federal Consistency Evaluation Procedures.

Chapter 403, Environmental Control

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 (SO₂), particulate matter, volatile organic compounds (VOC), and total reduced sulfur (TRS) an odor-producing sulfur compound. Specific impacts include the following.

- SO₂--Maximum potential annual emissions will be significantly lower than representative emissions from existing mill sources. Consequently, maximum ambient impacts will be dramatically reduced as a result of this project.

- 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.
- 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 SO₂ 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.

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.

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.

Chapter 267, Archives, History, and Records Management

The Florida State Historic Preservation Officer has determined that there are no records of any archaeological or historic resources at the project site. No impacts are expected on any cultural resources as the result of the proposed project.

Chapter 373, Water Resources

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 mill average 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 consumption will be about 58 percent lower than that of Seminole Kraft at present. The South Florida Water Management District will review the proposed project for impacts on water resources.

A ground water monitoring program will be carried out to detect any impacts on water quality.

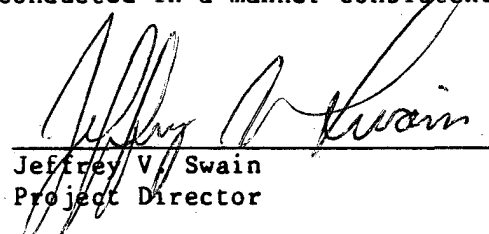
Power Plant Siting Act

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

Project. The application provides information concerning the existing conditions in the project area prior to construction, the anticipated changes resulting from construction, and anticipated impacts of the operation and maintenance of the proposed facilities so as to assure that applicable state, regional, and local standards will be met.

Consistency Determination

The proposed Cedar Bay Cogeneration Project complies with the Florida Coastal Management Program and will be conducted in a manner consistent with that program.



Jeffrey V. Swain
Project Director

10.1.5 US Coast Guard Bridge Permit
(Deleted)

10.2 ZONING DESCRIPTIONS

Detailed descriptions of current zoning designations are presented in Subsection 2.2.2 of this SCA.

10.3 • LAND USE PLAN DESCRIPTIONS

Detailed land use plan descriptions are provided in Section 2.2 of this SCA.

10.4 EXISTING STATE PERMITS

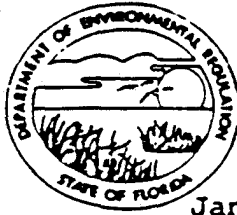
The following existing permits for the Seminole Kraft (SK) paper mill are included in this appendix section. Most of the listed air emission sources will be removed from service as a result of the Cedar Bay Cogeneration Project. Only the lime kilns and materials handling silos will remain in service. Surface water withdrawal would be discontinued because of the project; however, SK's ground water needs would continue.

- Air Emissions Operating Permits for the following.
 - Power Boiler No. 1
 - Power Boiler No. 2.
 - Power Boiler No. 3.
 - Bark Boiler No. 1.
 - Bark Boiler No. 2.
 - Recovery Boiler No. 1.
 - Recovery Boiler No. 2.
 - Recovery Boiler No. 3.
 - Smelt Dissolving Tank No. 1.
 - Smelt Dissolving Tank No. 2.
 - Smelt Dissolving Tank No. 3.
 - Lime Kiln No. 1.
 - Lime Kiln No. 2.
 - Lime Kiln No. 3.
 - Materials Handling Silos.
- Consumptive Water Use Permits for the following.
 - Surface water from Broward River.
 - Ground water from onsite wells.
- Wastewater Treatment System Operating Permit.
- National Pollutant Discharge Elimination System Permit.
- Consent order between Florida DER, Jacksonville BESD, and Seminole Kraft Corporation.

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

NORTHEAST DISTRICT

3426 BALLS ROAD
JACKSONVILLE, FLORIDA 32207
(904) 398-6959



BOB GRAHAM
GOVERNOR

VICTORIA J. TSCHINKEL
SECRETARY

ERNEST E. FREY
DISTRICT MANAGER

January 12, 1987

Mr. Frank Lee, Plant Manager
Seminole Kraft Corporation
9469 Eastport Road
Jacksonville, Florida 32218

Re: Duval County - AP
Jacksonville Kraft Paper Co., Inc
Air Pollution Operation Permits
On Attachment A

Dear Mr. Lee:

The Bio-Environmental Services Division (BESD) and the Department of Environmental Regulation have transferred the permits (effective December 8, 1986) listed on Attachment "A" as follows:

From: Jacksonville Kraft Paper Co., Inc.
9469 Eastport Road
Jacksonville, Florida 32218

To: Seminole Kraft Corporation
9469 Eastport Road
Jacksonville, Florida 32218

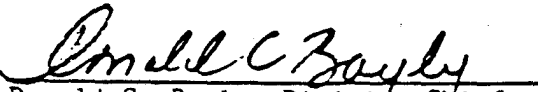
This letter and Attachment "A" shall be attached to and is part of the captioned permits.

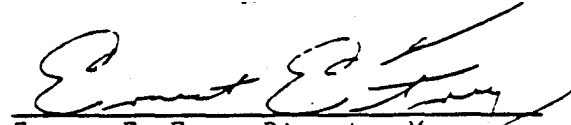
Please direct any questions concerning this matter, to the BESD at (904) 630-3210.

Very truly yours,

City of Jacksonville
Bio-Environmental Services Division

State of Florida
Dept. of Environmental Regulation


Donald C. Bayly, Division Chief


Ernest E. Frey, District Manager

DCB/EF/ecr

Attachment

cc: Mr. Bill Stewart, P.E., DER
Mr. Mike Fitzsimmons, DER
BESD File 2155A

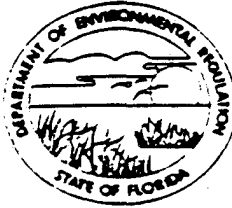
Attachment "A"

<u>SOURCE</u>	<u>PERMIT NO.</u>
Power Boiler No. 1	A016-71201
Power Boiler No. 2	A016-71202
Power Boiler No. 3	A016-71203
Bark Boiler No. 1	A016-71206
Bark Boiler No. 2	A016-71207
Recovery Boiler No. 1	A016-71208
Recovery Boiler No. 2	A016-71209
Recovery Boiler No. 3	A016-71210
Smelt Dissolving Tank No. 1	A016-71211
Smelt Dissolving Tank No. 2	A016-71212
Smelt Dissolving Tank No. 3	A016-71213
Lime Kiln No. 1	A016-71214
Lime Kiln No. 2	A016-71204
Lime Kiln No. 3	A016-71205
Materials Handling Silos	A016-71215

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

NORTHEAST DISTRICT

3426 BILLS ROAD
JACKSONVILLE, FLORIDA 32207



BOB GRAHAM
GOVERNOR

VICTORIA J. TSCHINKEL
SECRETARY

G. DOUG DUTTON
DISTRICT MANAGER

PERMITEE: Jacksonville Kraft Paper Co., Inc.
9469 Eastport Road
Jacksonville, Florida 32229

I.D. Number: 31-16-0067-06
Permit/Certification Number: A016-71201
Date of Issue: August 8, 1983
Expiration Date: July 31, 1988
County: Duval
Latitude/Longitude: 30:25:15/81:36:00
Section/Township/Range:
Project: Power Boiler #1
UTM E-7441.800 N-3365.575

This permit is issued under the provisions of Chapter(s) 403, Florida Statutes, and Florida Administrative Code Rule(s) 17-2 and 17-4. The above named permittee is hereby authorized to perform the work or operate the facility shown on the application and approved drawing(s), plans, and other documents attached hereto or on file with the department and made a part hereof and specifically described as follows:

For the operation of power boiler #1 for the production of steam. Maximum heat input is 185×10^6 BTUs per hour firing Bunker C or #6 fuel oil with a maximum sulfur content of 2.27% by weight.

Located at 9469 Eastport Road, Jacksonville, Florida 32229

Supporting documents are as follows:

- (1) Permit application received on June 17, 1983
- (2) Permit A016-20612
- (3) Particulate stack test dated June 25 and 28, 1982
- (4) Visible emission test dated June 25, 1982
- (5) Additional information received on June 27, 1983 and July 14, 1983
- (6) Permit transfer form received on July 8, 1983

Image Quality

As you review the next group of images, Please note that the original documents were of poor quality.

PERMITTEE: Jacksonville Kraft Paper Co., Inc.

I.D. Number:

31-16-0067-06

Permit/Certification Number:

A016-71201

Date of Issue:

August 8, 1983

Expiration Date:

July 31, 1988

GENERAL CONDITIONS:

1. The terms, conditions, requirements, limitations, and restrictions set forth herein are "Permit Conditions" and such are binding upon the permittee and enforceable pursuant to the authority of Sections 403.161, 403.727, and 403.859 through 403.861, Florida Statutes. The permittee is hereby placed on notice that the department will review this permit periodically and may initiate enforcement action for any violation of the "Permit Conditions" by the permittee, its agents, employees, servants or representatives.
2. This permit is valid only for the specific processes and operations applied for and indicated in the approved drawings or exhibits. Any unauthorized deviation from the approved drawings, exhibits, specifications, or conditions of this permit may constitute grounds for revocation and enforcement action by the department.
3. As provided in Subsections 403.087(6) and 403.722(5), Florida Statutes, the issuance of this permit does not convey any vested rights or any exclusive privileges. Nor does it authorize any injury to public or private property or any invasion of personal rights, nor any infringement of federal, state or local laws or regulations. This permit does not constitute a waiver of or approval of any other department permit that may be required for other aspects of the total project which are not addressed in the permit.
4. This permit conveys no title to land or water, does not constitute state recognition or acknowledgement of title and does not constitute authority for the use of submerged lands unless herein provided and the necessary title or leasehold interests have been obtained from the state. Only the Trustees of the Internal Improvement Trust Fund may express state opinion as to title.
5. This permit does not relieve the permittee from liability for harm or injury to human health or welfare, animals, plant or aquatic life or property and penalties therefor caused by the construction or operation of this permit source, nor does it allow the permittee to cause pollution in contravention of Florida Statutes and department rules, unless specifically authorized by an order from the department.
6. The permittee shall at all times properly operate and maintain the facility and systems of treatment and control (and related appurtenances) that are installed or used by the permittee to achieve compliance with the conditions of this permit, as required by department rules. This provision includes the operation of backup or auxiliary facilities or similar systems when necessary to achieve compliance with the conditions of the permit and when required by department rules.
7. The permittee, by accepting this permit, specifically agrees to allow authorized department personnel, upon presentation of credentials or other documents as may be required by law, access to the premises, at reasonable times, where the permitted activity is located or conducted for the purpose of:
 - a. Having access to and copying any records that must be kept under the conditions of the permit;
 - b. Inspecting the facility, equipment, practices, or operations regulated or required under this permit; and
 - c. Sampling or monitoring any substances or parameters at any location reasonably necessary to assure compliance with this permit or department rules.Reasonable time may depend on the nature of the concern being investigated.
8. If, for any reason, the permittee does not comply with or will be unable to comply with any condition or limitation specified in this permit, the permittee shall immediately notify and provide the department with the following information:
 - a. a description of and cause of non-compliance; and

PERMITTEE: Jacksonville Kraft Paper Co., Inc.

I.D. Number:

31-16-0067-06

Permit/Certification Number:

A016-71201

Date of Issue:

August 8, 1983

Expiration Date:

July 31, 1988

b. the period of noncompliance, including exact dates and times; or, if not corrected, the anticipated time the non-compliance is expected to continue, and steps being taken to reduce, eliminate, and prevent recurrence of the non-compliance.

The permittee shall be responsible for any and all damages which may result and may be subject to enforcement action by the department for penalties or revocation of this permit.

9. In accepting this permit, the permittee understands and agrees that all records, notes, monitoring data and other information relating to the construction or operation of this permitted source, which are submitted to the department, may be used by the department as evidence in any enforcement case arising under the Florida Statutes or department rules, except where such use is proscribed by Sections 403.73 and 403.111, Florida Statutes.
10. The permittee agrees to comply with changes in department rules and Florida Statutes after a reasonable time for compliance, provided however, the permittee does not waive any other rights granted by Florida Statutes or department rules.
11. This permit is transferable only upon department approval in accordance with Florida Administrative Code Rules 17-4.12 and 17-XLXO, as applicable. The permittee shall be liable for any non-compliance of the permitted activity until the transfer is approved by the department.
12. This permit is required to be kept at the work site of the permitted activity during the entire period of construction or operation.
13. This permit also constitutes:
 - () Determination of Best Available Control Technology (BACT)
 - () Determination of Prevention of Significant Deterioration (PSD)
 - () Certification of Compliance with State Water Quality Standards (Section 401, PL 92-500)
 - () Compliance with New Source Performance Standards
14. The permittee shall comply with the following monitoring and record keeping requirements:
 - a. Upon request, the permittee shall furnish all records and plans required under department rules. The retention period for all records will be extended automatically, unless otherwise stipulated by the department during the course of any unresolved enforcement action.
 - b. The permittee shall retain at the facility or other location designated by this permit records of all monitoring information (including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation), copies of all reports required by this permit, and records of all data used to complete the application for this permit. The time period of retention shall be at least three years from the date of the sample, measurement, report or application unless otherwise specified by department rule.
 - c. Records of monitoring information shall include:
 - the date, exact place, and time of sampling or measurements;
 - the person responsible for performing the sampling or measurements;
 - the date(s) analyses were performed;
 - the person responsible for performing the analyses;
 - the analytical techniques or methods used; and
 - the results of such analyses.
15. When requested by the department, the permittee shall within a reasonable time furnish any information required by law which is needed to determine compliance with the permit. If the permittee becomes aware that relevant facts were not submitted or were incorrect in the permit application or in any report to the department, such facts and information shall be submitted or corrected promptly.

Permittee: Jacksonville Kraft Paper Co., Inc.

I. D. Number:

91-16-0067-06

Permit/Certification Number: A016-71201

Date of Issue:

August 8, 1983

Expiration Date:

July 31, 1988

SPECIFIC CONDITIONS:

1. The maximum allowable emission rate for each pollutant is as follows:

POLLUTANT	EMISSION RATE	MAXIMUM ALLOWABLE EMISSION
****Particulate (Non-soot blowing)	17-2.650(2)(c)2 (0.1 lb/10 ⁶ BTU input)	18.5 lbs/hr *70.90 T/yr
Particulate (Soot blowing)	17-2.250 (0.3 lb/10 ⁶ BTU input)	**55.5 lbs/hr **30.39 T/yr
Visible Emissions (Non-soot blowing)	17-2.650(2)(c)2	20% Opacity
Visible Emissions (Soot blowing)	17-2.250	**60% Opacity

*Based upon 21 operating hours per day

**For a maximum of three (3) hours per 24 hour period

2. Testing of emissions shall be accomplished at 90% to 100% of the permitted capacity. If testing is performed at a rate less than 90% of the permitted capacity, operation shall be limited to that capacity until such time as an acceptable test is performed at 90% to 100% of permitted capacity. When operation is restricted to a lower capacity, because of testing at such a level, the Department/Bio-Environmental Services Division, upon advanced notification, will allow operation at higher capacities if such operation is for demonstrating compliance at a higher capacity (never to exceed design capacity).
3. Notify the Jacksonville Bio-Environmental Services Division (BESD) 14 days prior to source testing. Copies of the test report(s) shall be submitted to BESD within 45 days after completion of testing.
4. The following pollutant(s) shall be tested at intervals indicated from the date of July 1, 1983.

***Particulates 12 months

***Visible Emissions 12 months

Fuel oil analysis (% sulfur) . . 12 months

***Shall be conducted simultaneously during soot blowing and non-soot blowing operating modes.

5. Submit an annual operation report to BESD for this source on the form supplied for each calendar year on or before March 1.
6. Any revision(s) to a permit (and application) must be submitted and approved prior to implementing.

****Non-soot blowing particulate emission limits become effective September 15, 1983.

Permittee: Jacksonville Kraft Paper Co., Inc.

I. D. Number:

31-16-0067-06

Permit/Certification Number: A016-71201

Date of Issue:

August 8, 1983

Expiration Date:

July 31, 1988

SPECIFIC CONDITIONS:

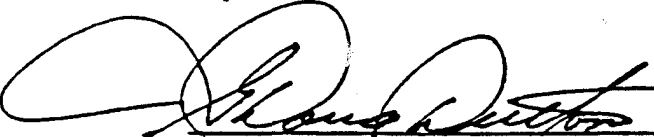
7. An Operation and Maintenance Plan dated February 8, 1982 and revised by letter dated May 27, 1982 is attached to and becomes part of this permit pursuant to RACT rules, Chapter 17-2, Florida Administrative Code. Operation and Maintenance records outlined by this plan shall be kept for a minimum period of two (2) years and be made available to BESD upon request.
8. Operation is limited to 8760 hours per year.

Issued this 8 day of August, 19 83

City of Jacksonville
Bio-Environmental Services Division

State of Florida
Department of Environmental Regulation


Donald C. Bayly, Division Chief


Doug Dutton, District Manager

5 Pages attached

Page 5 of 5

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

NORTHEAST DISTRICT

3426 BILLS ROAD
JACKSONVILLE, FLORIDA 32207



BOB GRAHAM
GOVERNOR

VICTORIA J. TSCHINKEL
SECRETARY

G. DOUG DUTTON
DISTRICT MANAGER

PERMITTEE: Jacksonville Kraft Paper Co., Inc.
9469 Eastport Road
Jacksonville, Florida 32229

I.D. Number: 31-16-0067-07
Permit/Certification Number: A016-71202
Date of Issue: August 8, 1983
Expiration Date: July 31, 1988
County: Duval
Latitude/Longitude: 30:25:15/81:36:00
Section/Township/Range:
Project: Power Boiler #2
UTM E-7441.800 N-3365.575

This permit is issued under the provisions of Chapter(s) 403, Florida Statutes, and Florida Administrative Code Rule(s) 17-2 and 17-4. The above named permittee is hereby authorized perform the work or operate the facility shown on the application and approved drawing(s), plans, and other documents attached hereto or on file with the department and made a part hereof and specifically described as follows:

For the operation of power boiler #2 for the production of steam. Maximum heat input is 246×10^6 BTUs per hour firing Bunker C or #6 fuel oil with a maximum sulfur content of 2.27% by weight.

Supporting documents are as follows:

- (1) Permit application received on June 17, 1983
- (2) Permit: A016-20607
- (3) Particulate stack test dated July 1, 2 and 5, 1982
- (4) Visible emission test dated July 2, 1982
- (5) Additional information received on June 27, 1983 and July 14, 1983
- (6) Permit transfer form received on July 8, 1983

PERMITTEE: Jacksonville Kraft Paper Co., Inc.

I.D. Number:

31-16-0067-07

Permit/Certification Number:

A016-71202

Date of Issue:

August 8, 1983

Expiration Date:

July 31, 1988

GENERAL CONDITIONS:

1. The terms, conditions, requirements, limitations, and restrictions set forth herein are "Permit Conditions" and as such are binding upon the permittee and enforceable pursuant to the authority of Sections 403.161, 403.727, or 403.859 through 403.861, Florida Statutes. The permittee is hereby placed on notice that the department will review this permit periodically and may initiate enforcement action for any violation of the "Permit Conditions" by the permittee, its agents, employees, servants or representatives.
2. This permit is valid only for the specific processes and operations applied for and indicated in the approved drawings or exhibits. Any unauthorized deviation from the approved drawings, exhibits, specifications, or conditions of this permit may constitute grounds for revocation and enforcement action by the department.
3. As provided in Subsections 403.087(6) and 403.722(5), Florida Statutes, the issuance of this permit does not convey any vested rights or any exclusive privileges. Nor does it authorize any injury to public or private property or any invasion of personal rights, nor any infringement of federal, state or local laws or regulations. This permit does not constitute a waiver of or approval of any other department permit that may be required for other aspects of the total project which are not addressed in the permit.
4. This permit conveys no title to land or water, does not constitute state recognition or acknowledgment of title, and does not constitute authority for the use of submerged lands unless herein provided and the necessary title or leasehold interests have been obtained from the state. Only the Trustees of the Internal Improvement Trust Fund may express state opinion as to title.
5. This permit does not relieve the permittee from liability for harm or injury to human health or welfare, animal, plant or aquatic life or property and penalties therefor caused by the construction or operation of this permittee source, nor does it allow the permittee to cause pollution in contravention of Florida Statutes and department rules, unless specifically authorized by an order from the department.
6. The permittee shall at all times properly operate and maintain the facility and systems of treatment and control (and related appurtenances) that are installed or used by the permittee to achieve compliance with the conditions of this permit, as required by department rules. This provision includes the operation of backup or auxiliary facilities or similar systems when necessary to achieve compliance with the conditions of the permit and when required by department rules.
7. The permittee, by accepting this permit, specifically agrees to allow authorized department personnel, upon presentation of credentials or other documents as may be required by law, access to the premises, at reasonable times, where the permitted activity is located or conducted for the purpose of:
 - a. Having access to and copying any records that must be kept under the conditions of the permit;
 - b. Inspecting the facility, equipment, practices, or operations regulated or required under this permit; and
 - c. Sampling or monitoring any substances or parameters at any location reasonably necessary to assure compliance with this permit or department rules.Reasonable time may depend on the nature of the concern being investigated.
8. If, for any reason, the permittee does not comply with or will be unable to comply with any condition or limitation specified in this permit, the permittee shall immediately notify and provide the department with the following information:
 - a. a description of and cause of non-compliance; and

MITTEE: Jacksonville Kraft Paper Co., Inc.

I.D. Number:

31-16-0067-07

Permit/Certification Number:

A016-71202

Date of Issue:

August 8, 1983

Expiration Date:

July 31, 1988

b. the period of noncompliance, including exact dates and times; or, if not corrected, the anticipated time the non-compliance is expected to continue, and steps being taken to reduce, eliminate, and prevent recurrence of the non-compliance.

The permittee shall be responsible for any and all damages which may result and may be subject to enforcement action by the department for penalties or revocation of this permit.

9. In accepting this permit, the permittee understands and agrees that all records, notes, monitoring data and other information relating to the construction or operation of this permitted source, which are submitted to the department, may be used by the department as evidence in any enforcement case arising under the Florida Statutes or department rules, except where such use is proscribed by Sections 403.73 and 403.111, Florida Statutes.
10. The permittee agrees to comply with changes in department rules and Florida Statutes after a reasonable time for compliance, provided however, the permittee does not waive any other rights granted by Florida Statutes or department rules.
11. This permit is transferable only upon department approval in accordance with Florida Administrative Code Rule 17-4.12 and 17-X0.30, as applicable. The permittee shall be liable for any non-compliance of the permitted activity until the transfer is approved by the department.
12. This permit is required to be kept at the work site of the permitted activity during the entire period of construction or operation.
13. This permit also constitutes:
 - () Determination of Best Available Control Technology (BACT)
 - () Determination of Prevention of Significant Deterioration (PSD)
 - () Certification of Compliance with State Water Quality Standards (Section 401, PL 92-500)
 - () Compliance with New Source Performance Standards
14. The permittee shall comply with the following monitoring and record keeping requirements:
 - a. Upon request, the permittee shall furnish all records and plans required under department rules. The retention period for all records will be extended automatically, unless otherwise stipulated by the department during the course of any unresolved enforcement action.
 - b. The permittee shall retain at the facility or other location designated by this permit records of all monitoring information (including all calibration and maintenance records and all original strip chart recordings continuous monitoring instrumentation), copies of all reports required by this permit, and records of all data used to complete the application for this permit. The time period of retention shall be at least three years from the date of the sample, measurement, report or application unless otherwise specified by department rules.
 - c. Records of monitoring information shall include:
 - the date, exact place, and time of sampling or measurements;
 - the person responsible for performing the sampling or measurements;
 - the date(s) analyses were performed;
 - the person responsible for performing the analyses;
 - the analytical techniques or methods used; and
 - the results of such analyses.
15. When requested by the department, the permittee shall within a reasonable time furnish any information required by law which is needed to determine compliance with the permit. If the permittee becomes aware that relevant facts were not submitted or were incorrect in the permit application or in any report to the department, such facts and information shall be submitted or corrected promptly.

Permittee: Jacksonville Kraft Paper Co., Inc.

I. D. Number:

31-16-0067-07

Permit/Certification Number: A016-71202

Date of Issue:

August 8, 1983

Expiration Date:

July 31, 1988

SPECIFIC CONDITIONS:

1. The maximum allowable emission rate for each pollutant is as follows:

POLLUTANT	EMISSION RATE	MAXIMUM ALLOWABLE EMISSION
****Particulate (Non-soot blowing)	17-2.650(2)(c)2 (0.1 lb/10 ⁶ BTU input)	24.6 lbs/hr *94.28 T/yr
Particulate (Soot blowing)	17-2.250 (0.3 lb/10 ⁶ BTU input)	**73.8 lbs/hr **40.41 T/yr
Visible Emissions (Non-soot blowing)	17-2.250(2)(c)2	20% Opacity
Visible Emissions (Soot blowing)	17-2.250	**60% Opacity

*Based upon 21 operating hours per day

**For a maximum of three (3) hours per 24 hour period

2. Testing of emissions shall be accomplished at 90% to 100% of the permitted capacity. If testing is performed at a rate less than 90% of the permitted capacity, operation shall be limited to that capacity until such time as an acceptable test is performed at 90% to 100% of permitted capacity. When operation is restricted to a lower capacity, because of testing at such a level, the Department/Bio-Environmental Services Division, upon advanced notification, will allow operation at higher capacities if such operation is for demonstrating compliance at a higher capacity (never to exceed design capacity).
3. Notify the Jacksonville Bio-Environmental Services Division (BESD) 14 days prior to source testing. Copies of the test report(s) shall be submitted to BESD within 45 days after completion of testing.
4. The following pollutant(s) shall be tested at intervals indicated from the date of July 1, 1983.

***Particulates 12 months
***Visible Emissions 12 months
Fuel Oil Analysis (% sulfur) 12 months

***Shall be conducted simultaneously during soot blowing and non-soot blowing operating modes.

5. Submit an annual operation report to BESD for this source on the form supplied for each calendar year on or before March 1.
6. Any revision(s) to a permit (and application) must be submitted and approved prior to implementing.

****Non-soot blowing particulate emission limits become effective September 15, 1983.

Permittee: Jacksonville Kraft Paper Co., Inc.

I. D. Number:

31-16-0067-07

Permit/Certification Number: A016-71202

Date of Issue:

August 8, 1983

Expiration Date:

July 31, 1988

SPECIFIC CONDITIONS:

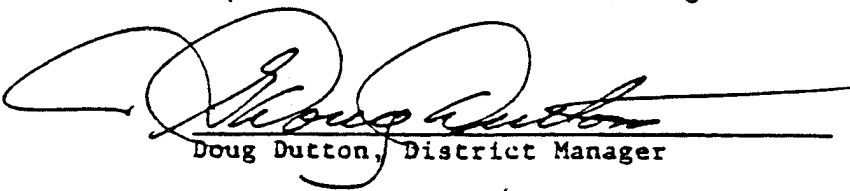
7. An Operation and Maintenance Plan dated February 8, 1982 and revised by letter dated May 27, 1982 is attached to and becomes part of this permit pursuant to RACT rules, Chapter 17-2, Florida Administrative Code. Operation and Maintenance records outlined by this plan shall be kept for a minimum period of two (2) years and be made available to BESD upon request.
8. Operation is limited to 8760 hours per year.

Issued this 8 day of August, 1983

City of Jacksonville
Bio-Environmental Services Division

State of Florida
Department of Environmental Regulation


Donald C. Bayly, Division Chief

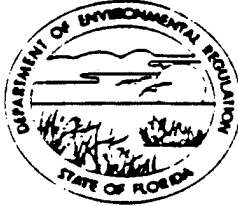

Doug Dutton, District Manager

5 Pages attached

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

NORTHEAST DISTRICT

3426 BILLS ROAD
JACKSONVILLE, FLORIDA 32207



BOB GRAHAM
GOVERNOR

VICTORIA J. TSCHINKEL
SECRETARY

G. DOUG DUTTON
DISTRICT MANAGER

PERMITTEE: Jacksonville Kraft Paper Co., Inc.
9469 Eastport Road
Jacksonville, Florida 32229

I.D. Number:	31-16-0067-08
Permit/Certification Number:	A016-71203
Date of Issue:	August 8, 1983
Expiration Date:	July 31, 1988
County:	Duval
Latitude/Longitude:	30:25:15/81:36:00
Section/Township/Range:	
Project:	Power Boiler #3
UTM:	E-7441.800 N-3365.575

This permit is issued under the provisions of Chapter(s) 403, Florida Statutes, and Florida Administrative Code Rule(s) 17-2 and 17-4. The above named permittee is hereby authorized to perform the work or operate the facility shown on the application and approved drawing(s), plans, and other documents attached hereto or on file with the department and made a part hereof and specifically described as follows:

For the operation of power boiler #3 for the production of steam. Maximum heat input is 246×10^6 BTUs per hour firing Bunker C or #6 fuel oil with a maximum sulfur content of 2.27% by weight.

Located at 9469 Eastport Road, Jacksonville, Florida 32229

Supporting documents are as follows:

- (1) Permit application received on June 17, 1983
- (2) Permit A016-20606
- (3) Particulate stack test dated July 6, 7, 8, 1982
- (4) Visible emission test dated July 8, 1982
- (5) Additional information received on June 27, 1983 and July 14, 1983
- (6) Permit transfer form received on July 8, 1983

PERMITTEE: Jacksonville Kraft Paper Co., Inc.

I.D. Number:

31-16-0067-08

Permit/Certification Number:

A016-71203

Date of Issue:

August 8, 1983

Expiration Date:

July 31, 1988

GENERAL CONDITIONS:

1. The terms, conditions, requirements, limitations, and restrictions set forth herein are "Permit Conditions" and as such are binding upon the permittee and enforceable pursuant to the authority of Sections 403.161, 403.727, or 403.859 through 403.861, Florida Statutes. The permittee is hereby placed on notice that the department will review this permit periodically and may initiate enforcement action for any violation of the "Permit Conditions" by the permittee, its agents, employees, servants or representatives.
2. This permit is valid only for the specific processes and operations applied for and indicated in the approved drawings or exhibits. Any unauthorized deviation from the approved drawings, exhibits, specifications, or conditions of this permit may constitute grounds for revocation and enforcement action by the department.
3. As provided in Subsections 403.087(6) and 403.722(5), Florida Statutes, the issuance of this permit does not convey any vested rights or any exclusive privileges. Nor does it authorize any injury to public or private property or any invasion of personal rights, nor any infringement of federal, state or local laws or regulations. This permit does not constitute a waiver of or approval of any other department permit that may be required for other aspects of the total project which are not addressed in the permit.
4. This permit conveys no title to land or water, does not constitute state recognition or acknowledgement of title, and does not constitute authority for the use of submerged lands unless herein provided and the necessary title or leasehold interests have been obtained from the state. Only the Trustees of the Internal Improvement Trust Fund may express state opinion as to title.
5. This permit does not relieve the permittee from liability for harm or injury to human health or welfare, animal, plant or aquatic life or property and penalties therefor caused by the construction or operation of this permitted source, nor does it allow the permittee to cause pollution in contravention of Florida Statutes and department rules, unless specifically authorized by an order from the department.
6. The permittee shall at all times properly operate and maintain the facility and systems of treatment and control (and related appurtenances) that are installed or used by the permittee to achieve compliance with the conditions of this permit, as required by department rules. This provision includes the operation of backup or auxiliary facilities or similar systems when necessary to achieve compliance with the conditions of the permit and when required by department rules.
7. The permittee, by accepting this permit, specifically agrees to allow authorized department personnel, upon presentation of credentials or other documents as may be required by law, access to the premises, at reasonable times, where the permitted activity is located or conducted for the purpose of:
 - a. Having access to and copying any records that must be kept under the conditions of the permit;
 - b. Inspecting the facility, equipment, practices, or operations regulated or required under this permit; and
 - c. Sampling or monitoring any substances or parameters at any location reasonably necessary to assure compliance with this permit or department rules.

Reasonable time may depend on the nature of the concern being investigated.

8. If, for any reason, the permittee does not comply with or will be unable to comply with any condition or limitation specified in this permit, the permittee shall immediately notify and provide the department with the following information:

- a. a description of and cause of non-compliance; and

PERMITEE: Jacksonville Kraft Paper Co., Inc.

I.D. Number:

31-16-0067-08

Permit/Certification Number:

A016-71203

Date of Issue:

August 8, 1983

Expiration Date:

July 31, 1988

b. the period of noncompliance, including exact dates and times; or, if not corrected, the anticipated time the non-compliance is expected to continue, and steps being taken to reduce, eliminate, and prevent recurrence of the non-compliance.

The permittee shall be responsible for any and all damages which may result and may be subject to enforcement action by the department for penalties or revocation of this permit.

9. In accepting this permit, the permittee understands and agrees that all records, notes, monitoring data and other information relating to the construction or operation of this permitted source, which are submitted to the department, may be used by the department as evidence in any enforcement case arising under the Florida Statutes or department rules, except where such use is proscribed by Sections 403.73 and 403.111, Florida Statutes.
10. The permittee agrees to comply with changes in department rules and Florida Statutes after a reasonable time for compliance, provided however, the permittee does not waive any other rights granted by Florida Statutes or department rules.
11. This permit is transferable only upon department approval in accordance with Florida Administrative Code Rules 17-4.12 and 17-X0.30, as applicable. The permittee shall be liable for any non-compliance of the permitted activity until the transfer is approved by the department.
12. This permit is required to be kept at the work site of the permitted activity during the entire period of construction or operation.
13. This permit also constitutes:
 - () Determination of Best Available Control Technology (BACT)
 - () Determination of Prevention of Significant Deterioration (PSD)
 - () Certification of Compliance with State Water Quality Standards (Section 401, PL 92-500)
 - () Compliance with New Source Performance Standards
14. The permittee shall comply with the following monitoring and record keeping requirements:
 - a. Upon request, the permittee shall furnish all records and plans required under department rules. The retention period for all records will be extended automatically, unless otherwise stipulated by the department, during the course of any unresolved enforcement action.
 - b. The permittee shall retain at the facility or other location designated by this permit records of all monitoring information (including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation), copies of all reports required by this permit, and records of all data used to complete the application for this permit. The time period of retention shall be at least three years from the date of the sample, measurement, report or application unless otherwise specified by department rule.
 - c. Records of monitoring information shall include:
 - the date, exact place, and time of sampling or measurements;
 - the person responsible for performing the sampling or measurements;
 - the date(s) analyses were performed;
 - the person responsible for performing the analyses;
 - the analytical techniques or methods used; and
 - the results of such analyses.
15. When requested by the department, the permittee shall within a reasonable time furnish any information required by law which is needed to determine compliance with the permit. If the permittee becomes aware that relevant facts were not submitted or were incorrect in the permit application or in any report to the department, such facts or information shall be submitted or corrected promptly.

Permittee: Jacksonville Kraft Paper Co., Inc.

I. D. Number:

31-16-0067-08

Permit/Certification Number:

A016-71203

Date of Issue:

August 8, 1983

Expiration Date:

July 31, 1988

SPECIFIC CONDITIONS:

1. The maximum allowable emission rate for each pollutant is as follows:

POLLUTANT	EMISSION RATE	MAXIMUM ALLOWABLE EMISSION
****Particulate (Non-soot blowing)	17-2.650(2)(c)2 (0.1 lb/10 ⁶ BTU input)	24.6 lbs/hr *94.28 T.yr
Particulate (Soot blowing)	17-2.250 (0.3 lb/10 ⁶ BTU input)	**73.8 lbs/hr **40.41 T.yr
Visible Emissions (Non-soot blowing)	17-2.650(2)(c)2	20% Opacity
Visible Emissions (Soot blowing)	17-2.250	**60% Opacity

*Based upon 21 operating hours per day

**For a maximum of three (3) hours per 24 hour period

2. Testing of emissions shall be accomplished at 90% to 100% of the permitted capacity. If testing is performed at a rate less than 90% of the permitted capacity, operation shall be limited to that capacity until such time as an acceptable test is performed at 90% to 100% of permitted capacity. When operation is restricted to a lower capacity, because of testing at such a level, the Department/Bio-Environmental Services Division, upon advanced notification, will allow operation at higher capacities if such operation is for demonstrating compliance at a higher capacity (never to exceed design capacity).
3. Notify the Jacksonville Bio-Environmental Services Division (BESD) 14 days prior to source testing. Copies of the test report(s) shall be submitted to BESD within 45 days after completion of testing.
4. The following pollutant(s) shall be tested at intervals indicated from the date of July 1, 1983.

***Particulates 12 months

***Visible Emissions 12 months

Fuel Oil Analysis (% sulfur) . . 12 months

***Shall be conducted simultaneously during soot blowing and non-soot blowing operating modes.

5. Submit an annual operation report to BESD for this source on the form supplied for each calendar year on or before March 1.
6. Any revision(s) to a permit (and application) must be submitted and approved prior to implementing.

****Non-soot blowing emission limits become effective September 15, 1983

Permittee: Jacksonville Kraft Paper Co., Inc.

I. D. Number: 31-16-0067-06
Permit/Certification Number: A016-71203
Date of Issue: August 8, 1982
Expiration Date: July 31, 1988

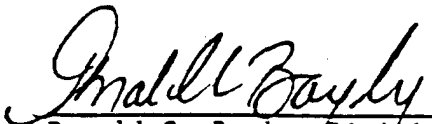
SPECIFIC CONDITIONS:

7. An Operation and Maintenance Plan dated February 8, 1982 and revised by letter dated May 27, 1982 is attached to and becomes part of this permit pursuant to RAC Rules, Chapter 17-2, Florida Administrative Code. Operation and Maintenance records outlined by this plan shall be kept for a minimum period of two (2) years and be made available to BESD upon request.
8. Operation is limited to 8760 hours per year.

Issued this 8 day of August, 1982

City of Jacksonville
Bio-Environmental Services Division

State of Florida
Department of Environmental Regulation


Donald C. Bayly, Division Chief

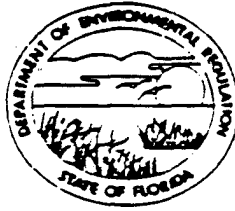

Doug Dutton, District Manager

5 Pages attached

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

NORTHEAST DISTRICT

3426 BILLS ROAD
JACKSONVILLE, FLORIDA 32207



BOB GRAHAM
GOVERNOR

VICTORIA J. TSCHINKEL
SECRETARY

G. DOUG BUTTO
DISTRICT MANAGER

PERMITTEE: Jacksonville Kraft Paper Co., Inc.
9469 Eastport Road
Jacksonville, Florida 32229

L.D. Number: 31-16-0067-04
Permit/Certification Number: A016-71204
Date of Issue: August 8, 1983
Expiration Date: July 31, 1988
County: Duval
Latitude/Longitude: 30:25:15/81:36:00
Section/Township/Range:
Project: Bark Boiler #1
UTM E-7441.800 N-3365.575

This permit is issued under the provisions of Chapter(s) 403, Florida Statutes, and Florida Administrative Code Rule(s) 17-2 and 17-4. The above named permittee is hereby authorized to perform the work or operate the facility shown on the application and approved drawing(s), plans, and other documents attached hereto or on file with the department and made a part hereof and specifically described as follows:

For the operation of bark boiler #1 for the production of steam. Maximum heat input is 193×10^6 BTUs per hour firing bark and/or Bunker C or #6 fuel oil with a maximum sulfur content of 2.27% by weight. Particulate emissions are controlled by 2 sets of 4 each Buell VT Cyclone Separators in series with a Ducon Venturi Scrubber Type VV0.

Located at 9469 Eastport Road, Jacksonville, Florida 32229.

Supporting documents are as follows:

- (1) Permit application received on June 17, 1983.
- (2) Permit A016-32761.
- (3) Particulate stack test dated February 23 and 25, 1983.
- (4) Additional information received on June 27, 1983, July 14, 1983 and July 15, 1983.
- (5) Permit transfer form received on July 8, 1983.

PERMITTEE: Jacksonville Kraft Paper Co., Inc.

I.D. Number:

Permit/Certification Number:

Date of Issue:

Expiration Date:

31-16-0067-04

A016-0067-04

August 8, 1983

July 31, 1988

GENERAL CONDITIONS:

1. The terms, conditions, requirements, limitations, and restrictions set forth herein are "Permit Conditions" and such are binding upon the permittee and enforceable pursuant to the authority of Sections 403.161, 403.727, or 403.859 through 403.861, Florida Statutes. The permittee is hereby placed on notice that the department will review this permit periodically and may initiate enforcement action for any violation of the "Permit Conditions" by the permittee, its agents, employees, servants or representatives.
2. This permit is valid only for the specific processes and operations applied for and indicated in the approved drawings or exhibits. Any unauthorized deviation from the approved drawings, exhibits, specifications, or conditions of this permit may constitute grounds for revocation and enforcement action by the department.
3. As provided in Subsections 403.087(6) and 403.722(5), Florida Statutes, the issuance of this permit does not convey any vested rights or any exclusive privileges. Nor does it authorize any injury to public or private property or any invasion of personal rights, nor any infringement of federal, state or local laws or regulations. This permit does not constitute a waiver of or approval of any other department permit that may be required for other aspects of the total project which are not addressed in the permit.
4. This permit conveys no title to land or water, does not constitute state recognition or acknowledgement of title and does not constitute authority for the use of submerged lands unless herein provided and the necessary title or leasehold interests have been obtained from the state. Only the Trustees of the Internal Improvement Trust Fund may express state opinion as to title.
5. This permit does not relieve the permittee from liability for harm or injury to human health or welfare, animal, plant or aquatic life or property and penalties therefor caused by the construction or operation of this permit source, nor does it allow the permittee to cause pollution in contravention of Florida Statutes and department rules, unless specifically authorized by an order from the department.
6. The permittee shall at all times properly operate and maintain the facility and systems of treatment and control (and related appurtenances) that are installed or used by the permittee to achieve compliance with the conditions of this permit, as required by department rules. This provision includes the operation of backup or auxiliary facilities or similar systems when necessary to achieve compliance with the conditions of the permit and when required by department rules.
7. The permittee, by accepting this permit, specifically agrees to allow authorized department personnel, upon presentation of credentials or other documents as may be required by law, access to the premises, at reasonable times, where the permitted activity is located or conducted for the purpose of:
 - a. Having access to and copying any records that must be kept under the conditions of the permit;
 - b. Inspecting the facility, equipment, practices, or operations regulated or required under this permit; and
 - c. Sampling or monitoring any substances or parameters at any location reasonably necessary to assure compliance with this permit or department rules.

Reasonable time may depend on the nature of the concern being investigated.

8. If, for any reason, the permittee does not comply with or will be unable to comply with any condition or limitation specified in this permit, the permittee shall immediately notify and provide the department with the following information:
 - a. a description of and cause of non-compliance; and

PERMITTEE: Jacksonville Kraft Paper Co., Inc.

I.D. Number:

31-16-0067-04

Permit/Certification Number: A016-71204

Date of Issue:

August 8, 1983

Expiration Date:

July 31, 1988

b. the period of noncompliance, including exact dates and times; or, if not corrected, the anticipated time the non-compliance is expected to continue, and steps being taken to reduce, eliminate, and prevent recurrence of the non-compliance.

The permittee shall be responsible for any and all damages which may result and may be subject to enforcement action by the department for penalties or revocation of this permit.

9. In accepting this permit, the permittee understands and agrees that all records, notes, monitoring data and other information relating to the construction or operation of this permitted source, which are submitted to the department, may be used by the department as evidence in any enforcement case arising under the Florida Statutes or department rules, except where such use is proscribed by Sections 403.73 and 403.111, Florida Statutes.
10. The permittee agrees to comply with changes in department rules and Florida Statutes after a reasonable time for compliance, provided however, the permittee does not waive any other rights granted by Florida Statutes or department rules.
11. This permit is transferable only upon department approval in accordance with Florida Administrative Code Rule 17-4.12 and 17-30.30, as applicable. The permittee shall be liable for any non-compliance of the permitted activity until the transfer is approved by the department.
12. This permit is required to be kept at the work site of the permitted activity during the entire period of construction or operation.
13. This permit also constitutes:
 - () Determination of Best Available Control Technology (BACT)
 - () Determination of Prevention of Significant Deterioration (PSD)
 - () Certification of Compliance with State Water Quality Standards (Section 401, PL 92-500)
 - () Compliance with New Source Performance Standards
14. The permittee shall comply with the following monitoring and record keeping requirements:
 - a. Upon request, the permittee shall furnish all records and plans required under department rules. The retention period for all records will be extended automatically, unless otherwise stipulated by the department during the course of any unresolved enforcement action.
 - b. The permittee shall retain at the facility or other location designated by this permit records of all monitoring information (including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation), copies of all reports required by this permit, and records of all data used to complete the application for this permit. The time period of retention shall be at least three years from the date of the sample, measurement, report or application unless otherwise specified by department rule.
 - c. Records of monitoring information shall include:
 - the date, exact place, and time of sampling or measurements;
 - the person responsible for performing the sampling or measurements;
 - the date(s) analyses were performed;
 - the person responsible for performing the analyses;
 - the analytical techniques or methods used; and
 - the results of such analyses.
15. When requested by the department, the permittee shall within a reasonable time furnish any information required by law which is needed to determine compliance with the permit. If the permittee becomes aware that relevant facts were not submitted or were incorrect in the permit application or in any report to the department, such facts or information shall be submitted or corrected promptly.

Permittee: Jacksonville Kraft Paper Co., Inc.

I. D. Number:

31-16-0067-04

Permit/Certification Number: A016-71204

Date of Issue:

August 8, 1983

Expiration Date:

July 31, 1988

SPECIFIC CONDITIONS:

1. The maximum allowable emission rate for each pollutant is as follows:

POLLUTANT	EMISSION RATE	MAXIMUM	
		ALLOWABLE EMISSION	
Particulate (bark fired)	17-2.650(2)(c)3 (0.2 lb/10 ⁶ BTU input)	38.6 lbs/hr	169.07 T/yr
Particulate (oil fired)	17-2.650(2)(c)3 (0.1 lb/10 ⁶ BTU input)	19.3 lbs/hr	*81.06 T/yr
Visible Emissions	17-2.650(2)(c)3	30%	

*Operating hours while firing oil are limited to 8400 per year

2. Testing of emissions shall be accomplished at 90% to 100% of the permitted capacity. If testing is performed at a rate less than 90% of the permitted capacity, operation shall be limited to that capacity until such time as an acceptable test is performed at 90% to 100% of permitted capacity. When operation is restricted to a lower capacity, because of testing at such a level, the Department/Bio-Environmental Services Division, upon advanced notification, will allow operation at higher capacities if such operation is for demonstrating compliance at a higher capacity (never to exceed design capacity).
3. Notify the Jacksonville Bio-Environmental Services Division (BESD) 14 days prior to source testing. Copies of the test report(s) shall be submitted to BESD within 45 days after completion of testing.
4. The following pollutant(s) shall be tested at intervals indicated from the date of July 1, 1983.

Particulates 6 months
Fuel oil analysis (% sulfur) . . 6 months
Visible Emissions. On request

5. Submit an annual operation report to BESD for this source on the form supplied for each calendar year on or before March 1.
6. Any revision(s) to a permit (and application) must be submitted and approved prior to implementing.

Permittee: Jacksonville Kraft Paper

I. D. Number:

31-16-0067-04

Permit/Certification Number: A016-71204

Date of Issue:

August 8, 1983

Expiration Date:

July 31, 1988

SPECIFIC CONDITIONS:

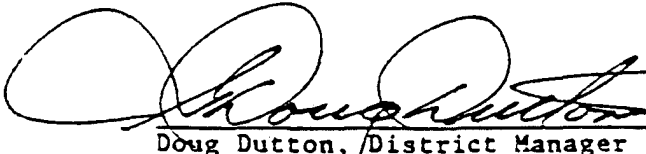
7. An Operation and Maintenance Plan dated February 8, 1982 and revised by letter dated May 27, 1982 is attached to and becomes part of this permit pursuant to RACT rules, Chapter 17-2, Florida Administrative Code. Operation and Maintenance records outlined by this plan shall be kept for a minimum period of two (2) years and be made available to BESD upon request.
8. Operation is limited to 8760 hours per year while firing bark.
9. The pressure drop in the Venturi Scrubber Type VVO shall be maintained at a minimum of 20 inches water gauge.

Issued this 8 day of August, 19 83

City of Jacksonville
Bio-Environmental Services Division

State of Florida
Department of Environmental Regulation


Donald C. Bayly, Division Chief


Doug Dutton, District Manager

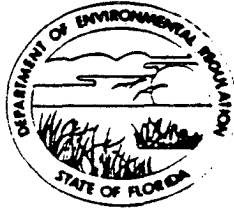
5 Pages attached

Page 5 of 5

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

NORTHEAST DISTRICT

3426 BILLS ROAD
JACKSONVILLE, FLORIDA 32207
(904) 396-6959



BOB GRAHAM
GOVERNOR
VICTORIA J. TSCHINKEL
SECRETARY
G. DOUG DUTTON
DISTRICT MANAGER

September 13, 1983

Mr. J. Michael Watson, Attorney
Jacksonville Kraft Paper Co., Inc.
2400 Gulf Life Tower
Jacksonville, Florida 32207

Dear Mr. Watson:

Duval County - AP
Jacksonville Kraft Paper Co., Inc.
Bark Boilers No. 1 and No. 2
Permits No. A016-71204 and A016-71205

Reference your letter to Bio-Environmental Services Division August 29, 1983 and B.E.S. response dated September 7, 1983.

You are advised that the captioned permits are revised to delete Specific Condition No. 9 which sets forth a minimum pressure drop in the venturi scrubbers Type VVO.

This revision does not change the requirement set forth in the Operation and Maintenance Plan for Particulate Control, RACT Rule, Section 17-2.650(2)(g), Florida Administrative Code, which requires recording the hourly differential pressure drop in these scrubbers and other performance parameters which are indicators of the condition, operating rates and efficiencies.

Sincerely,

G. Doug Dutton
for G. Doug Dutton
District Manager

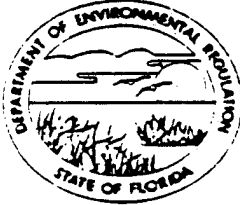
GDD:jjk

cc: Donald C. Bayly, BES
Eugene T. Tonn, P.E.

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

NORTHEAST DISTRICT

3426 BILLS ROAD
JACKSONVILLE, FLORIDA 32207



BOB GRAHAM
GOVERNOR

VICTORIA J. TSCHINKEL
SECRETARY

G. DOUG BUTTON
DISTRICT MANAGER

PERMITTEE: Jacksonville Kraft Paper Co., Inc.
9469 Eastport Road
Jacksonville, Florida 32229

I.D. Number:	31-16-0067-05
Permit/Certification Number:	A016-71205
Date of Issue:	August 8, 1983
Expiration Date:	July 31, 1988
County:	Duval
Latitude/Longitude:	30:25:15/81:36:00
Section/Township/Range:	
Project:	Bark Boiler #2
UTM	E-7441.800 N-3365.575

This permit is issued under the provisions of Chapter(s) 403, Florida Statutes, and Florida Administrative Code Rule(s) 17-2 and 17-4. The above named permittee is hereby authorized to perform the work or operate the facility shown on the application and approved drawing(s), plans, and other documents attached hereto or on file with the department and made a part hereof and specifically described as follows:

For the operation of bark boiler #2 for the production of steam. Maximum heat input is 193×10^6 BTUs per hour firing bark and/or Bunker C or #6 fuel oil with a maximum sulfur content of 2.27% by weight. Particulate emissions are controlled by 2 sets of 4 each Buell VT Cyclone Separators in series with a Ducon Venturi Scrubber Type VV0.

Located at 9469 Eastport Road, Jacksonville, Florida 32229

Supporting documents are as follows:

- (1) Permit application received on June 17, 1983.
- (2) Permit A016-32762.
- (3) Particulate stack test dated February 14, 15 and 17, 1983.
- (4) Additional information received on June 27, 1983, July 14, 1983 and July 15, 1983.
- (5) Permit transfer form received on July 8, 1983.

PERMITTEE: Jacksonville Kraft Paper Co., Inc.

I.D. Number:

Permit/Certification Number:

Date of Issue:

Expiration Date:

31-16-0067-05

A016-71205

August 8, 1983

July 31, 1988

GENERAL CONDITIONS:

1. The terms, conditions, requirements, limitations, and restrictions set forth herein are "Permit Conditions" and such are binding upon the permittee and enforceable pursuant to the authority of Sections 403.161, 403.727, 403.859 through 403.861, Florida Statutes. The permittee is hereby placed on notice that the department will review this permit periodically and may initiate enforcement action for any violation of the "Permit Conditions" by the permittee, its agents, employees, servants or representatives.
2. This permit is valid only for the specific processes and operations applied for and indicated in the approved drawings or exhibits. Any unauthorized deviation from the approved drawings, exhibits, specifications, or conditions of this permit may constitute grounds for revocation and enforcement action by the department.
3. As provided in Subsections 403.087(6) and 403.722(5), Florida Statutes, the issuance of this permit does not convey any vested rights or any exclusive privileges. Nor does it authorize any injury to public or private property or any invasion of personal rights, nor any infringement of federal, state or local laws or regulations. The permit does not constitute a waiver of or approval of any other department permit that may be required for other aspects of the total project which are not addressed in the permit.
4. This permit conveys no title to land or water, does not constitute state recognition or acknowledgement of title and does not constitute authority for the use of submerged lands unless herein provided and the necessary title or leasehold interests have been obtained from the state. Only the Trustees of the Internal Improvement Trust Fund may express state opinion as to title.
5. This permit does not relieve the permittee from liability for harm or injury to human health or welfare, animals, plant or aquatic life or property and penalties therefor caused by the construction or operation of this permit. The permittee shall not be a source, nor does it allow the permittee to cause pollution in contravention of Florida Statutes and department rules, unless specifically authorized by an order from the department.
6. The permittee shall at all times properly operate and maintain the facility and systems of treatment and control (and related appurtenances) that are installed or used by the permittee to achieve compliance with the conditions of this permit, as required by department rules. This provision includes the operation of backup or auxiliary facilities or similar systems when necessary to achieve compliance with the conditions of the permit and when required by department rules.
7. The permittee, by accepting this permit, specifically agrees to allow authorized department personnel, upon presentation of credentials or other documents as may be required by law, access to the premises, at reasonable times, where the permitted activity is located or conducted for the purpose of:
 - a. Having access to and copying any records that must be kept under the conditions of the permit;
 - b. Inspecting the facility, equipment, practices, or operations regulated or required under this permit; and
 - c. Sampling or monitoring any substances or parameters at any location reasonably necessary to assure compliance with this permit or department rules.Reasonable time may depend on the nature of the concern being investigated.
8. If, for any reason, the permittee does not comply with or will be unable to comply with any condition or limitation specified in this permit, the permittee shall immediately notify and provide the department with the following information:
 - a. a description of and cause of non-compliance; and

PERMITTEE: Jacksonville Kraft Paper Co., Inc.

I.D. Number:

31-16-0067-05

Permit/Certification Number:

A016-71205

Date of Issue:

August 8, 1983

Expiration Date:

July 31, 1988

b. the period of noncompliance, including exact dates and times; or, if not corrected, the anticipated time the non-compliance is expected to continue, and steps being taken to reduce, eliminate, and prevent recurrence of the non-compliance.

The permittee shall be responsible for any and all damages which may result and may be subject to enforcement action by the department for penalties or revocation of this permit.

9. In accepting this permit, the permittee understands and agrees that all records, notes, monitoring data and other information relating to the construction or operation of this permitted source, which are submitted to the department, may be used by the department as evidence in any enforcement case arising under the Florida Statutes or department rules, except where such use is proscribed by Sections 403.73 and 403.111, Florida Statutes.
10. The permittee agrees to comply with changes in department rules and Florida Statutes after a reasonable time for compliance, provided however, the permittee does not waive any other rights granted by Florida Statutes or department rules.
11. This permit is transferable only upon department approval in accordance with Florida Administrative Code Rules 17-4.12 and 17-30.30, as applicable. The permittee shall be liable for any non-compliance of the permitted activity until the transfer is approved by the department.
12. This permit is required to be kept at the work site of the permitted activity during the entire period of construction or operation.
13. This permit also constitutes:
 - () Determination of Best Available Control Technology (BACT)
 - () Determination of Prevention of Significant Deterioration (PSD)
 - () Certification of Compliance with State Water Quality Standards (Section 401, PL 92-500)
 - () Compliance with New Source Performance Standards
14. The permittee shall comply with the following monitoring and record keeping requirements:
 - a. Upon request, the permittee shall furnish all records and plans required under department rules. The retention period for all records will be extended automatically, unless otherwise stipulated by the department, during the course of any unresolved enforcement action.
 - b. The permittee shall retain at the facility or other location designated by this permit records of all monitoring information (including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation), copies of all reports required by this permit, and records of all data used to complete the application for this permit. The time period of retention shall be at least three years from the date of the sample, measurement, report or application unless otherwise specified by department rule.
 - c. Records of monitoring information shall include:
 - the date, exact place, and time of sampling or measurements;
 - the person responsible for performing the sampling or measurements;
 - the date(s) analyses were performed;
 - the person responsible for performing the analyses;
 - the analytical techniques or methods used; and
 - the results of such analyses.
15. When requested by the department, the permittee shall within a reasonable time furnish any information required by law which is needed to determine compliance with the permit. If the permittee becomes aware that relevant facts were not submitted or were incorrect in the permit application or in any report to the department, such facts or information shall be submitted or corrected promptly.

Permittee: Jacksonville Kraft Paper Co., Inc.

I. D. Number:

31-16-0067-05

Permit/Certification Number: A016-71205

Date of Issue:

August 8, 1983

Expiration Date:

July 31, 1988

SPECIFIC CONDITIONS:

1. The maximum allowable emission rate for each pollutant is as follows:

POLLUTANT	EMISSION RATE	MAXIMUM ALLOWABLE EMISSION
Particulate (bark fired)	17-2.650(2)(c)3 (0.2 lb/10 ⁶ BTU input)	38.6 lbs/hr 169.07 T/yr
Particulate (oil fired)	17-2.650(2)(c)3 (0.1 lb/10 ⁶ BTU input)	19.3 lbs/hr *81.06 T/yr
Visible Emissions	17-2.650(2)(c)3	30% Opacity

*Operating hours while firing oil are limited to 8400 per year.

2. Testing of emissions shall be accomplished at 90% to 100% of the permitted capacity. If testing is performed at a rate less than 90% of the permitted capacity, operation shall be limited to that capacity until such time as an acceptable test is performed at 90% to 100% of permitted capacity. When operation is restricted to a lower capacity, because of testing at such a level, the Department/Bio-Environmental Services Division, upon advanced notification, will allow operation at higher capacities if such operation is for demonstrating compliance at a higher capacity (never to exceed design capacity).
3. Notify the Jacksonville Bio-Environmental Services Division (BESD) 14 days prior to source testing. Copies of the test report(s) shall be submitted to BESD within 45 days after completion of testing.
4. The following pollutant(s) shall be tested at intervals indicated from the date of July 1, 1983.

Particulates 6 months
Fuel oil analysis (% sulfur) 6 months
Visible Emissions On request

5. Submit an annual operation report to BESD for this source on the form supplied for each calendar year on or before March 1.
6. Any revision(s) to a permit (and application) must be submitted and approved prior to implementing.

Permittee: Jacksonville Kraft Paper Co., Inc.

I. D. Number:

31-16-0067-05

Permit/Certification Number: A016-71205

Date of Issue:

August 8, 1983

Expiration Date:

July 31, 1988

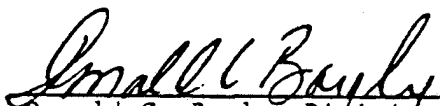
SPECIFIC CONDITIONS:

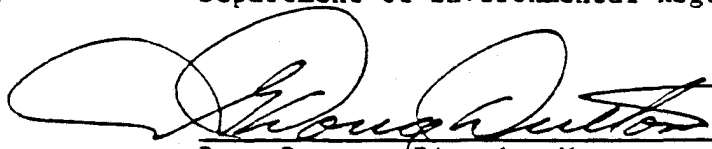
7. An Operation and Maintenance Plan dated February 8, 1982 and revised by letter dated May 27, 1982 is attached to and becomes part of this permit pursuant to RACT rules, Chapter 17-2, Florida Administrative Code. Operation and Maintenance records outlined by this plan shall be kept for a minimum period of two (2) years and be made available to BESD upon request.
8. Operation is limited to 8760 hours per year while firing bark.
9. The pressure drop in the Venturi Scrubber Type VVO shall be maintained at a minimum of 20 inches water gauge.

Issued this 8 day of August, 19 83

City of Jacksonville
Bio-Environmental Services Division

State of Florida
Department of Environmental Regulation


Donald C. Bayly, Division Chief


Doug Dutton, District Manager

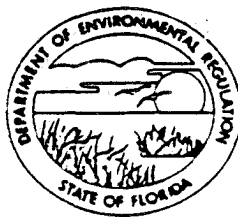
5 Pages attached

Page 5 of 5

DEPARTMENT OF ENVIRONMENTAL REGULATION

NORTHEAST DISTRICT

3426 BILLS ROAD
JACKSONVILLE, FLORIDA 32207
(904) 396-6959



Revised

BOB GRAHAM
GOVERNOR

VICTORIA J. TSCHINCEL
SECRETARY

G. DOUG DUTTON
DISTRICT MANAGER

September 13, 1983

Mr. J. Michael Watson, Attorney
Jacksonville Kraft Paper Co., Inc.
2400 Gulf Life Tower
Jacksonville, Florida 32207

Dear Mr. Watson:

Duval County - AP
Jacksonville Kraft Paper Co., Inc.
Bark Boilers No. 1 and No. 2
Permits No. A016-71204 and A016-71205

Reference your letter to Bio-Environmental Services Division August 29, 1983 and B.E.S. response dated September 7, 1983.

You are advised that the captioned permits are revised to delete Specific Condition No. 9 which sets forth a minimum pressure drop in the venturi scrubbers Type VVO.

This revision does not change the requirement set forth in the Operation and Maintenance Plan for Particulate Control, RACT Rule, Section 17-2.650(2)(g), Florida Administrative Code, which requires recording the hourly differential pressure drop in these scrubbers and other performance parameters which are indicators of the condition, operating rates and efficiencies.

Sincerely,

G. Doug Dutton
for G. Doug Dutton
District Manager

GDD:jjk

cc: Donald C. Bayly, BES
Eugene T. Tonn, P.E.

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

NORTHEAST DISTRICT

3426 BILLS ROAD
JACKSONVILLE, FLORIDA 32207



BOB GRAHAM
GOVERNOR

VICTORIA J. TSCHINKEL
SECRETARY

G. DOUG OUTTER
DISTRICT MANAGER

PERMITEE: Jacksonville Kraft Paper Co., Inc.
9469 Eastport Road
Jacksonville, Florida 32229

I.D. Number: 31-16-0057-09
Permit/Certification Number: A016-71206
Date of Issue: September 7, 1983
Expiration Date: July 31, 1988
County: Duval
Latitude/Longitude: 30:25:15 N 81:36:00
Section/Township/Range:
Project: Recovery Boiler #1
UTM: E-7441.750 N-3365.650

This permit is issued under the provisions of Chapter(s) 403, Florida Statutes, and Florida Administrative Code Rule(s) 17-2 and 17-4. The above named permittee is hereby authorized to perform the work or operate the facility shown on the application and approved drawing(s), plans, and other documents attached hereto or on file with the department and made a part hereof and specifically described as follows:

For the operation of Recovery Boiler #1 with a maximum feed rate of 43,333 lbs/hr of black liquor solids. Maximum heat input is 286×10^6 BTUs per hour. Particulate emissions are controlled by a Koppers Electrostatic Precipitator and a Varkaus venturi type scrubber (Model P-1200), in series. Number 6 fuel oil with a maximum sulphur content of 2.27% by weight may be used during startup, shutdown and malfunction.

Located at 9469 Eastport Road, Jacksonville, Florida 32229

Supporting documents are as follows:

- (1) Permit application received on June 17, 1983
- (2) Permit A016-33297
- (3) Particulate stack test dated November 23, 24 and 27, 1982
- (4) Additional information received on June 27, 1983 and July 14, 1983
- (5) Permit transfer form received on July 8, 1983

PERMITTEE: Jacksonville Kraft Paper Co., Inc.

I.D. Number:

31-16-0067-09

Permit/Certification Number:

A016-71206

Date of Issue:

September 7, 1983

Expiration Date:

July 31, 1988

GENERAL CONDITIONS:

1. The terms, conditions, requirements, limitations, and restrictions set forth herein are "Permit Conditions" such are binding upon the permittee and enforceable pursuant to the authority of Sections 403.161, 403.740, 403.859 through 403.861, Florida Statutes. The permittee is hereby placed on notice that the department review this permit periodically and may initiate enforcement action for any violation of the "Permit Conditions" by the permittee, its agents, employees, servants or representatives.
2. This permit is valid only for the specific processes and operations applied for and indicated in the drawings or exhibits. Any unauthorized deviation from the approved drawings, exhibits, specifications, or conditions of this permit may constitute grounds for revocation and enforcement action by the department.
3. As provided in Subsections 403.087(6) and 403.722(5), Florida Statutes, the issuance of this permit does not convey any vested rights or any exclusive privileges. Nor does it authorize any injury to public or private property or any invasion of personal rights, nor any infringement of federal, state or local laws or regulations. This permit does not constitute a waiver of or approval of any other department permit that may be required for aspects of the total project which are not addressed in the permit.
4. This permit conveys no title to land or water, does not constitute state recognition or acknowledgment of and does not constitute authority for the use of submerged lands unless herein provided and the necessary title leasehold interests have been obtained from the state. Only the Trustees of the Internal Improvement Trusts may express state opinion as to title.
5. This permit does not relieve the permittee from liability for harm or injury to human health or welfare, a plant or aquatic life or property and penalties therefor caused by the construction or operation of this project, nor does it allow the permittee to cause pollution in contravention of Florida Statutes and department rules, unless specifically authorized by an order from the department.
6. The permittee shall at all times properly operate and maintain the facility and systems of treatment and collection (and related appurtenances) that are installed or used by the permittee to achieve compliance with the conditions of this permit, as required by department rules. This provision includes the operation of backup or auxiliary facilities or similar systems when necessary to achieve compliance with the conditions of the permit and as required by department rules.
7. The permittee, by accepting this permit, specifically agrees to allow authorized department personnel, upon presentation of credentials or other documents as may be required by law, access to the premises, at reasonable times, where the permitted activity is located or conducted for the purpose of:
 - a. Having access to and copying any records that must be kept under the conditions of the permit;
 - b. Inspecting the facility, equipment, practices, or operations regulated or required under this permit; and
 - c. Sampling or monitoring any substances or parameters at any location reasonably necessary to assure compliance with this permit or department rules.Reasonable time may depend on the nature of the concern being investigated.
8. If, for any reason, the permittee does not comply with or will be unable to comply with any condition or limitation specified in this permit, the permittee shall immediately notify and provide the department with the following information:
 - a. a description of and cause of non-compliance; and

PERMITTEE: Jacksonville Kraft Paper Co., Inc.

I.D. Number:

31-16-0067-09

Permit/Certification Number:

A016-71206

Date of Issue:

September 7, 1983

Expiration Date:

July 31, 1988

b. the period of noncompliance, including exact dates and times; or, if not corrected, the anticipated time the non-compliance is expected to continue, and steps being taken to reduce, eliminate, and prevent recurrence of the non-compliance.

The permittee shall be responsible for any and all damages which may result and may be subject to enforcement action by the department for penalties or revocation of this permit.

9. In accepting this permit, the permittee understands and agrees that all records, notes, monitoring data and other information relating to the construction or operation of this permitted source, which are submitted to the department, may be used by the department as evidence in any enforcement case arising under the Florida Statutes or department rules, except where such use is proscribed by Sections 403.73 and 403.111, Florida Statutes.
10. The permittee agrees to comply with changes in department rules and Florida Statutes after a reasonable time for compliance, provided however, the permittee does not waive any other rights granted by Florida Statutes or department rules.
11. This permit is transferable only upon department approval in accordance with Florida Administrative Code Rules 17-A.12 and 17-X0.30, as applicable. The permittee shall be liable for any non-compliance of the permitted activity until the transfer is approved by the department.
12. This permit is required to be kept at the work site of the permitted activity during the entire period of construction or operation.
13. This permit also constitutes:
 - () Determination of Best Available Control Technology (BACT)
 - () Determination of Prevention of Significant Deterioration (PSD)
 - () Certification of Compliance with State Water Quality Standards (Section 401, PL 92-500)
 - () Compliance with New Source Performance Standards
14. The permittee shall comply with the following monitoring and record keeping requirements:
 - a. Upon request, the permittee shall furnish all records and plans required under department rules. The retention period for all records will be extended automatically, unless otherwise stipulated by the department, during the course of any unresolved enforcement action.
 - b. The permittee shall retain at the facility or other location designated by this permit records of all monitoring information (including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation), copies of all reports required by this permit, and records of all data used to complete the application for this permit. The time period of retention shall be at least three years from the date of the sample, measurement, report or application unless otherwise specified by department rule.
 - c. Records of monitoring information shall include:
 - the date, exact place, and time of sampling or measurements;
 - the person responsible for performing the sampling or measurements;
 - the date(s) analyses were performed;
 - the person responsible for performing the analyses;
 - the analytical techniques or methods used; and
 - the results of such analyses.
15. When requested by the department, the permittee shall within a reasonable time furnish any information required by law which is needed to determine compliance with the permit. If the permittee becomes aware that relevant facts were not submitted or were incorrect in the permit application or in any report to the department, such facts or information shall be submitted or corrected promptly.

Permittee: Jacksonville Kraft Paper Co., Inc.

I.D. Number:

31-16-0067-09

Permit/Certification Number: AQL6-71206

Date of Issue:

September 7, 1983

Expiration Date:

July 31, 1988

SPECIFIC CONDITIONS:

1. The maximum allowable emission rate for each pollutant is as follows:

POLLUTANT	EMISSION RATE	MAXIMUM	
		ALLOWABLE EMISSION	
Particulate	17-2.600(4)(b) (3.0 lbs/3000 lbs BLS* fed)	43.3 lbs/hr	189.7 T/yr
Total Reduced Sulphur	17-2.600(4)(b)	**5.44 lbs/hr	28.2 T/yr

*Black Liquor Solids **Based upon 17.5 ppm

2. Testing of emissions shall be accomplished at 90% to 100% of the permitted capacity. If testing is performed at a rate less than 90% of the permitted capacity, operation shall be limited to that capacity until such time as an acceptable test is performed at 90% to 100% of permitted capacity. When operation is restricted to a lower capacity, because of testing at such a level, the Department/Bio-Environmental Services Division, upon advanced notification, will allow operation at higher capacities if such operation is for demonstrating compliance at a higher capacity (never to exceed design capacity).
3. Notify the Jacksonville Bio-Environmental Services Division (BESD) 14 days prior to source testing. Copies of the test report(s) shall be submitted to BESD within 45 days after completion of testing.
4. The following pollutant(s) shall be tested at intervals indicated from the date of July 1, 1983.
- | | | |
|--------------------------------|-----------|-------------|
| Particulates | - - - - - | -6 months |
| *Total Reduced Sulphur | - - - - - | -6 months |
| **Fuel Oil Analysis (%Sulphur) | - - - - - | -On request |
- *Strip chart (24 hours continuous) from April 15 (8AM) to April 16 (8AM) due on or before July 1. Include average ACFM, %BLS and fuel flow.
- *Strip chart (24 hours continuous) from November 15 (8AM) to November 16 (8AM) due on or before January 1. Include average ACFM, % BLS and fuel flow.
- **#6 fuel oil and black liquor
5. Submit an annual operation report to BESD for this source on the form supplied for each calendar year on or before March 1.
6. Any revision(s) to a permit (and application) must be submitted and approved prior to implementing.

Permittee: Jacksonville Kraft Paper Co., Inc.

I. D. Number:

31-16-0067-09

Permit/Certification Number:

AD16-71206

Date of Issue:

September 7, 1983

Expiration Date:

July 31, 1988

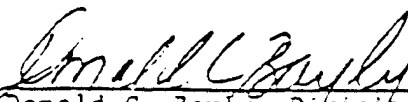
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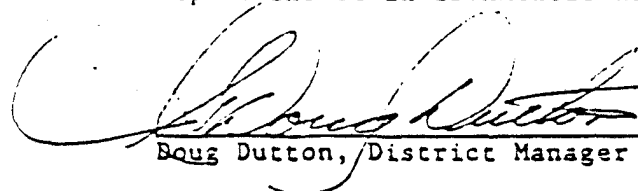
7. Operation is limited to 8760 hours per year.
8. An Operation and Maintenance Plan dated February 8, 1982 and revised by letter dated May 27, 1982 is attached pursuant to RACT rules, Chapter 17-2, Florida Administrative Code. Operation and Maintenance records outlined by this plan shall be kept for a minimum period of two (2) years and be made available to BESD upon request.

Issued this 7 day of September, 1983

City of Jacksonville
Bio-Environmental Services Division

State of Florida
Department of Environmental Regulation


Donald C. Bayly, Division Chief


Doug Dutton, District Manager

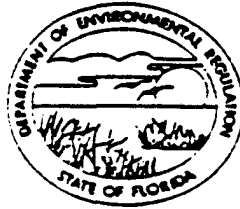
5 Pages attached

Page 5 of 5

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

NORTHEAST DISTRICT

3426 BILLS ROAD
JACKSONVILLE, FLORIDA 32207



BOB GRAHAM
GOVERNOR

VICTORIA J. TSCHINKEL
SECRETARY

G. DOUG DUTTON
DISTRICT MANAGER

PERMITTEE: Jacksonville Kraft Paper Co., Inc.
9469 Eastport Road
Jacksonville, Florida 32229

I.D. Number:	31-16-0067-10
Permit/Certification Number:	A016-71207
Date of Issue:	September 7, 1983
Expiration Date:	July 31, 1988
County:	Duval
Latitude/Longitude:	30:25:15/81:36:00
Section/Township/Range:	
Project:	Recovery Boiler #2
UTM	E-7441.750 N-3365.650

This permit is issued under the provisions of Chapter(s) 403, Florida Statutes, and Florida Administrative Code Rule(s) 17-2 and 17-4. The above named permittee is hereby authorized perform the work or operate the facility shown on the application and approved drawing(s), plans, and other documents attached hereto or on file with the department and made a part hereof and specifically described as follows:

For the operation of Recovery Boiler #2 with a maximum feed rate of 55,417 lbs/hr of Black Liquor Solids. Maximum heat input is 366×10^6 BTUs per hour. Particulate emissions are controlled by a Koppers Electrostatic precipitator and a Varkaus venturi type scrubber (Model P-250) in series. Number 6 fuel oil with a maximum sulphur content of 2.27% by weight may be used during startup, shutdown and malfunction.

Located at 9469 Eastport Road, Jacksonville, Florida 32229

Supporting documents are as follows;

- (1) Permit application received on June 17, 1983
- (2) Permit A016-33296
- (3) Particulate stack test dated December 14 and 15, 1982
- (4) Additional information received on June 27, 1983 and July 14, 1983
- (5) Permit transfer form received on July 8, 1983

PERMITTEE: Jacksonville Kraft Paper Co., Inc.

I.D. Number:
Permit/Certification Number:
Date of Issue:
Expiration Date:

31-16-0067-10
A016-71207
September 7, 1983
July 31, 1988

GENERAL CONDITIONS:

1. The terms, conditions, requirements, limitations, and restrictions set forth herein are "Permit Conditions" and as such are binding upon the permittee and enforceable pursuant to the authority of Sections 403.161, 403.727, or 403.859 through 403.861, Florida Statutes. The permittee is hereby placed on notice that the department will review this permit periodically and may initiate enforcement action for any violation of the "Permit Conditions" by the permittee, its agents, employees, servants or representatives.
2. This permit is valid only for the specific processes and operations applied for and indicated in the approved drawings or exhibits. Any unauthorized deviation from the approved drawings, exhibits, specifications, or conditions of this permit may constitute grounds for revocation and enforcement action by the department.
3. As provided in Subsections 403.087(6) and 403.722(5), Florida Statutes, the issuance of this permit does not convey any vested rights or any exclusive privileges. Nor does it authorize any injury to public or private property or any invasion of personal rights, nor any infringement of federal, state or local laws or regulations. This permit does not constitute a waiver of or approval of any other department permit that may be required for other aspects of the total project which are not addressed in the permit.
4. This permit conveys no title to land or water, does not constitute state recognition or acknowledgement of title, and does not constitute authority for the use of submerged lands unless herein provided and the necessary title or leasehold interests have been obtained from the state. Only the Trustees of the Internal Improvement Trust Fund may express state opinion as to title.
5. This permit does not relieve the permittee from liability for harm or injury to human health or welfare, animals, plant or aquatic life or property and penalties therefor caused by the construction or operation of this permitted source, nor does it allow the permittee to cause pollution in contravention of Florida Statutes and department rules, unless specifically authorized by an order from the department.
6. The permittee shall at all times properly operate and maintain the facility and systems of treatment and control (and related appurtenances) that are installed or used by the permittee to achieve compliance with the conditions of this permit, as required by department rules. This provision includes the operation of backup or auxiliary facilities or similar systems when necessary to achieve compliance with the conditions of the permit and when required by department rules.
7. The permittee, by accepting this permit, specifically agrees to allow authorized department personnel, upon presentation of credentials or other documents as may be required by law, access to the premises, at reasonable times, where the permitted activity is located or conducted for the purpose of:
 - a. Having access to and copying any records that must be kept under the conditions of the permit;
 - b. Inspecting the facility, equipment, practices, or operations regulated or required under this permit; and
 - c. Sampling or monitoring any substances or parameters at any location reasonably necessary to assure compliance with this permit or department rules.Reasonable time may depend on the nature of the concern being investigated.
8. If, for any reason, the permittee does not comply with or will be unable to comply with any condition or limitation specified in this permit, the permittee shall immediately notify and provide the department with the following information:
 - a. a description of and cause of non-compliance; and

PERMITTEE: Jacksonville Kraft Paper Co., Inc.

I.D. Number:

31-16-0067-10

Permit/Certification Number:

A016-71207

Date of Issue:

September 7, 1983

Expiration Date:

July 31, 1988

b. the period of noncompliance, including exact dates and times; or, if not corrected, the anticipated time the non-compliance is expected to continue, and steps being taken to reduce, eliminate, and prevent recurrence of the non-compliance.

The permittee shall be responsible for any and all damages which may result and may be subject to enforcement action by the department for penalties or revocation of this permit.

9. In accepting this permit, the permittee understands and agrees that all records, notes, monitoring data and other information relating to the construction or operation of this permitted source, which are submitted to the department, may be used by the department as evidence in any enforcement case arising under the Florida Statutes or department rules, except where such use is proscribed by Sections 403.73 and 403.111, Florida Statutes.
10. The permittee agrees to comply with changes in department rules and Florida Statutes after a reasonable time for compliance, provided however, the permittee does not waive any other rights granted by Florida Statutes or department rules.
11. This permit is transferable only upon department approval in accordance with Florida Administrative Code Rule 17-4.12 and 17-30.30, as applicable. The permittee shall be liable for any non-compliance of the permitted activity until the transfer is approved by the department.
12. This permit is required to be kept at the work site of the permitted activity during the entire period of construction or operation.
13. This permit also constitutes:
 - () Determination of Best Available Control Technology (BACT)
 - () Determination of Prevention of Significant Deterioration (PSD)
 - () Certification of Compliance with State Water Quality Standards (Section 401, PL 92-500)
 - () Compliance with New Source Performance Standards
14. The permittee shall comply with the following monitoring and record keeping requirements:
 - a. Upon request, the permittee shall furnish all records and plans required under department rules. The retention period for all records will be extended automatically, unless otherwise stipulated by the department during the course of any unresolved enforcement action.
 - b. The permittee shall retain at the facility or other location designated by this permit records of all monitoring information (including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation), copies of all reports required by this permit, and records of all data used to complete the application for this permit. The time period of retention shall be at least three years from the date of the sample, measurement, report or application unless otherwise specified by department rule.
 - c. Records of monitoring information shall include:
 - the date, exact place, and time of sampling or measurements;
 - the person responsible for performing the sampling or measurements;
 - the date(s) analyses were performed;
 - the person responsible for performing the analyses;
 - the analytical techniques or methods used; and
 - the results of such analyses.
15. When requested by the department, the permittee shall within a reasonable time furnish any information required by law which is needed to determine compliance with the permit. If the permittee becomes aware that relevant facts were not submitted or were incorrect in the permit application or in any report to the department, such facts or information shall be submitted or corrected promptly.

Permittee: Jacksonville Kraft Paper Co., Inc.

I. D. Number:

31-16-0067-10

Permit/Certification Number:

A016-71207

Date of Issue:

September 7, 1983

Expiration Date:

July 31, 1988

SPECIFIC CONDITIONS:

1. The maximum allowable emission rate for each pollutant is as follows:

POLLUTANT	EMISSION RATE	MAXIMUM ALLOWABLE EMISSION
Particulate	17-2.600(4)(b) (3.0 lbs/3000 lbs BLS* fed)	55.4 lbs/hr 242.7 T/yr
Total Reduced Sulphur	17-2.600(4)(b)	**8.58 lbs/hr 37.6 T/yr

*Black Liquor Solids **Based upon 17.5 ppm

2. Testing of emissions shall be accomplished at 90% to 100% of the permitted capacity. If testing is performed at a rate less than 90% of the permitted capacity, operation shall be limited to that capacity until such time as an acceptable test is performed at 90% to 100% of permitted capacity. When operation is restricted to a lower capacity, because of testing at such a level, the Department/Bio-Environmental Services Division, upon advanced notification, will allow operation at higher capacities if such operation is for demonstrating compliance at a higher capacity (never to exceed design capacity).
3. Notify the Jacksonville Bio-Environmental Services Division (BESD) 14 days prior to source testing. Copies of the test report(s) shall be submitted to BESD within 45 days after completion of testing.
4. The following pollutant(s) shall be tested at intervals indicated from the date of July 1, 1983
- | | |
|---------------------------------|--------------------|
| Particulates | - - - - - 6 months |
| *Total Reduced Sulphur | - - - - - 6 months |
| **Fuel Oil Analysis (% Sulphur) | - On request |
- *Strip chart (24 hours continuous) from April 15 (8AM) to April 16 (8AM) due on or before July 1. Include average ACFM, % BLS and fuel flow.
- *Strip chart (24 hours continuous) from November 15 (8AM) to November 16 (8AM) due on or before January 1. Include average ACFM, % BLS and fuel flow.
- ** #6 fuel oil and black liquor
5. Submit an annual operation report to BESD for this source on the form supplied for each calendar year on or before March 1.
6. Any revision(s) to a permit (and application) must be submitted and approved prior to implementing.

Permittee: Jacksonville Kraft Paper Co., Inc.

I. D. Number:

31-16-0067-10

Permit/Certification Number: A016-71207

Date of Issue:

September 7, 1983

Expiration Date:

July 31, 1988

SPECIFIC CONDITIONS:

7. Operation is limited to 8760 hours per year.
8. An Operation and Maintenance Plan dated February 8, 1982 and revised by letter dated May 27, 1982 is attached pursuant to RACT rules, Chapter 17-2, Florida Administrative Code. Operation and Maintenance records outlined by this plan shall be kept for a ~~minimum~~ period of two (2) years and be made available to BESD upon request.

Issued this 7 day of September, 19 83

City of Jacksonville
Bio-Environmental Services Division

State of Florida
Department of Environmental Regulation


Donald C. Bayly, Division Chief


Doug Dutton, District Manager

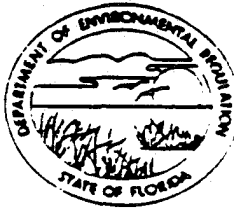
5 Pages attached

Page 5 of 5

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

NORTHEAST DISTRICT

3426 BILLS ROAD
JACKSONVILLE, FLORIDA 32207



BOB GRAJ
GOVERNOR

VICTORIA J. TSCHIN
SECRETARY

G. DOUG OUT
DISTRICT MANAGER

PERMITTEE: Jacksonville Kraft Paper Co., Inc.
9469 Eastport Road
Jacksonville, Florida 32229

I.D. Number: 31-16-0067-11
Permit/Certification Number: A016-71208
Date of Issue: September 7, 1983
Expiration Date: July 31, 1988
County: Duval
Latitude/Longitude: 30:25:15/81:36:00
Section/Township/Range:
Project: Recovery Boiler #3
UTM E-7441.750 N-3365.650

This permit is issued under the provisions of Chapter(s) 403, Florida Statutes, and Florida Administrative Code Rule(s) 17-2 and 17-4. The above named permittee is hereby authorized to perform the work or operate the facility shown on the application and approved drawing(s), plans, and other documents attached hereto or on file with the department and made a part hereof and specifically described as follows:

For the operation of Recovery Boiler #3 with a maximum feed rate of 55,417 lbs/hr of Black Liquor Solids. Maximum heat input is 366×10^6 BTUs per hour. Particulate emissions are controlled by a Koppers Electrostatic Precipitator and a Varkaus venturi type scrubber (Model P-250) in series. Number 6 fuel oil with a maximum sulphur content of 2.27% by weight may be used during startup, shutdown and malfunction.

Located at 9469 Eastport Road, Jacksonville, Florida 32229

Supporting documents are as follows:

- (1) Permit application received on June 17, 1983
- (2) Permit A016-27852
- (3) Particulate stack test dated November 2, 3 and 4, 1982
- (4) Additional information received on June 27, 1983 and July 14, 1983
- (5) Permit transfer form received on July 8, 1983

PERMITTEE: Jacksonville Kraft Paper Co., Inc.

I.D. Number:

Permit/Certification Number:

Date of Issue:

Expiration Date:

31-16-0067-11

A016-71208

September 7, 1983

July 31, 1988

GENERAL CONDITIONS:

1. The terms, conditions, requirements, limitations, and restrictions set forth herein are "Permit Conditions" and as such are binding upon the permittee and enforceable pursuant to the authority of Sections 403.161, 403.727, or 403.859 through 403.861, Florida Statutes. The permittee is hereby placed on notice that the department will review this permit periodically and may initiate enforcement action for any violation of the "Permit Conditions" by the permittee, its agents, employees, servants or representatives.
2. This permit is valid only for the specific processes and operations applied for and indicated in the approved drawings or exhibits. Any unauthorized deviation from the approved drawings, exhibits, specifications, or conditions of this permit may constitute grounds for revocation and enforcement action by the department.
3. As provided in Subsections 403.087(6) and 403.722(5), Florida Statutes, the issuance of this permit does not convey any vested rights or any exclusive privileges. Nor does it authorize any injury to public or private property or any invasion of personal rights, nor any infringement of federal, state or local laws or regulations. This permit does not constitute a waiver of or approval of any other department permit that may be required for other aspects of the total project which are not addressed in the permit.
4. This permit conveys no title to land or water, does not constitute state recognition or acknowledgement of title, and does not constitute authority for the use of submerged lands unless herein provided and the necessary title or leasehold interests have been obtained from the state. Only the Trustees of the Internal Improvement Trust Fund may express state opinion as to title.
5. This permit does not relieve the permittee from liability for harm or injury to human health or welfare, animal plant or aquatic life or property and penalties therefor caused by the construction or operation of this permitted source, nor does it allow the permittee to cause pollution in contravention of Florida Statutes and department rules, unless specifically authorized by an order from the department.
6. The permittee shall at all times properly operate and maintain the facility and systems of treatment and control (and related appurtenances) that are installed or used by the permittee to achieve compliance with the condition of this permit, as required by department rules. This provision includes the operation of backup or auxiliary facilities or similar systems when necessary to achieve compliance with the conditions of the permit and when required by department rules.
7. The permittee, by accepting this permit, specifically agrees to allow authorized department personnel, upon presentation of credentials or other documents as may be required by law, access to the premises, at reasonable times, where the permitted activity is located or conducted for the purpose of:
 - a. Having access to and copying any records that must be kept under the conditions of the permit;
 - b. Inspecting the facility, equipment, practices, or operations regulated or required under this permit; and
 - c. Sampling or monitoring any substances or parameters at any location reasonably necessary to assure compliance with this permit or department rules.Reasonable time may depend on the nature of the concern being investigated.
8. If, for any reason, the permittee does not comply with or will be unable to comply with any condition or limitation specified in this permit, the permittee shall immediately notify and provide the department with the following information:
 - a. a description of and cause of non-compliance; and

PERMITTEE: Jacksonville Kraft Paper Co., Inc.

I.D. Number:

31-16-0067-11

Permit/Certification Number:

A016-71208

Date of Issue:

September 7, 1983

Expiration Date:

July 31, 1988

b. the period of noncompliance, including exact dates and times; or, if not corrected, the anticipated time the non-compliance is expected to continue, and steps being taken to reduce, eliminate, and prevent recurrence of the non-compliance.

The permittee shall be responsible for any and all damages which may result and may be subject to enforcement action by the department for penalties or revocation of this permit.

9. In accepting this permit, the permittee understands and agrees that all records, notes, monitoring data and other information relating to the construction or operation of this permitted source, which are submitted to the department, may be used by the department as evidence in any enforcement case arising under the Florida Statutes or department rules, except where such use is proscribed by Sections 403.73 and 403.111, Florida Statutes.
10. The permittee agrees to comply with changes in department rules and Florida Statutes after a reasonable time for compliance, provided however, the permittee does not waive any other rights granted by Florida Statutes or department rules.
11. This permit is transferable only upon department approval in accordance with Florida Administrative Code Rule 17-4.12 and 17-X0.30, as applicable. The permittee shall be liable for any non-compliance of the permitted activity until the transfer is approved by the department.
12. This permit is required to be kept at the work site of the permitted activity during the entire period of construction or operation.
13. This permit also constitutes:
 - () Determination of Best Available Control Technology (BACT)
 - () Determination of Prevention of Significant Deterioration (PSD)
 - () Certification of Compliance with State Water Quality Standards (Section 401, PL 92-500)
 - () Compliance with New Source Performance Standards
14. The permittee shall comply with the following monitoring and record keeping requirements:
 - a. Upon request, the permittee shall furnish all records and plans required under department rules. The retention period for all records will be extended automatically, unless otherwise stipulated by the department during the course of any unresolved enforcement action.
 - b. The permittee shall retain at the facility or other location designated by this permit records of all monitoring information (including all calibration and maintenance records and all original strip chart recordings of continuous monitoring instrumentation), copies of all reports required by this permit, and records of all data used to complete the application for this permit. The time period of retention shall be at least three years from the date of the sample, measurement, report or application unless otherwise specified by department rule.
 - c. Records of monitoring information shall include:
 - the date, exact place, and time of sampling or measurements;
 - the person responsible for performing the sampling or measurements;
 - the data(s) analyses were performed;
 - the person responsible for performing the analyses;
 - the analytical techniques or methods used; and
 - the results of such analyses.
15. When requested by the department, the permittee shall within a reasonable time furnish any information required by law which is needed to determine compliance with the permit. If the permittee becomes aware that relevant facts were not submitted or were incorrect in the permit application or in any report to the department, such facts and information shall be submitted or corrected promptly.

Permittee: Jacksonville Kraft Paper Co., Inc.

I. D. Number:

31-16-0067-11

Permit/Certification Number: A016-71208

Date of Issue:

September 7, 1983

Expiration Date:

July 31, 1988

SPECIFIC CONDITIONS:

1. The maximum allowable emission rate for each pollutant is as follows:

POLLUTANT	EMISSION RATE	MAXIMUM	
		ALLOWABLE EMISSION	
Particulate	17-2.600(4)(b) (3.0 lbs/3000 lbs/ BLS* fed)	55.4 lbs/hr	242.7 T/yr
Total Reduced Sulphur	17-2.600(4)(b)	**8.58 lbs/hr	37.5 T/yr
*Black Liquor Solids		**Based upon 17.5 ppm	

2. Testing of emissions shall be accomplished at 90% to 100% of the permitted capacity. If testing is performed at a rate less than 90% of the permitted capacity, operation shall be limited to that capacity until such time as an acceptable test is performed at 90% to 100% of permitted capacity. When operation is restricted to a lower capacity, because of testing at such a level, the Department/Bio-Environmental Services Division, upon advanced notification, will allow operation at higher capacities if such operation is for demonstrating compliance at a higher capacity (never to exceed design capacity).
3. Notify the Jacksonville Bio-Environmental Services Division (BESD) 14 days prior to source testing. Copies of the test report(s) shall be submitted to BESD within 45 days after completion of testing.
4. The following pollutant(s) shall be tested at intervals indicated from the date of July 1, 1983.
- | | | |
|------------------------|-----------|------------|
| Particulates | - - - - - | 5 months |
| *Total Reduced Sulphur | - - - - - | 5 months |
| **Fuel Oil Analysis | - - - - - | On Request |
- *Strip chart (24 hours continuous) from April 15 (8AM) to April 16 (8AM) due on or before July 1. Include average ACFM, % BLS and fuel flow.
- *Strip chart (24 hours continuous) from November 15 (8AM) to November 16 (8AM) due on or before January 1. Include average ACFM, % BLS and fuel flow.
- **#6 fuel oil and black liquor.
5. Submit an annual operation report to BESD for this source on the form supplied for each calendar year on or before March 1.
6. Any revision(s) to a permit (and application) must be submitted and approved prior to implementing.

Permittee: Jacksonville Kraft Paper Co., Inc.

I. D. Number:

31-16-0067-11

Permit/Certification Number:

A016-71208

Date of Issue:

September 7, 1983

Expiration Date:

July 31, 1988

SPECIFIC CONDITIONS:

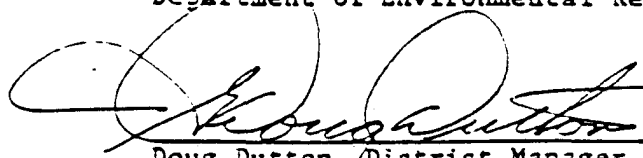
7. Operation is limited to 8760 hours per year.
8. An Operation and Maintenance Plan dated February 8, 1982 and revised by letter dated May 27, 1982 is attached pursuant to RACT rules, Chapter 17-2, Florida Administrative Code. Operation and Maintenance records outlined by this plan shall be kept for a minimum period of two (2) years and be made available to BESD upon request.

Issued this 7 day of September, 1983

City of Jacksonville
Bio-Environmental Services Division

State of Florida
Department of Environmental Regulation

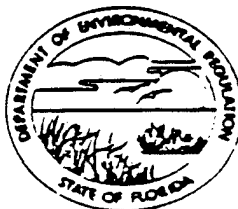

Donald C. Bayly, Division Chief


Doug Dutton, District Manager

5 Pages attached

Page 5 of 5

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION



NORTHEAST DISTRICT

1426 BILLS ROAD
JACKSONVILLE, FLORIDA 32207

BOB GRAHAM
GOVERNOR

VICTORIA J. TSCHINKEL
SECRETARY

G. DOUG DUTTON
DISTRICT MANAGER

PERMITTEE: Jacksonville Kraft Paper Co., Inc.
9469 Eastport Road
Jacksonville, Florida 32229

I.D. Number:	31-16-0067-12
Permit/Certification Number:	A016-71209
Date of Issue:	August 8, 1983
Expiration Date:	July 31, 1988
County:	Duval
Latitude/Longitude:	30:25:15/81:36:00
Section/Township/Range:	
Project:	Smelt Dissolving Tank #1
UTM	E-7441.750 N-3365.650

This permit is issued under the provisions of Chapter(s) 403, Florida Statutes, and Florida Administrative Code Rule(s) 17-2 and 17-4. The above named permittee is hereby authorized to perform the work or operate the facility shown on the application and approved drawing(s), plans, and other documents attached hereto or on file with the department and made a part hereof and specifically described as follows:

For the operation of smelt dissolving tank #1. The maximum process weight is 22,706 lbs/hr. Particulate emissions are controlled by a demister pad (York Separators, Inc.).

Located at 9469 Eastport Road, Jacksonville, Florida 32229

Supporting documents are as follows:

- (1) Permit application received on June 17, 1983
- (2) Permit A016-20605
- (3) Additional information received on June 27, 1983
- (4) Particulate stack test dated December 17 and 20, 1982
- (5) Permit transfer form received on July 3, 1983

PERMITTEE: Jacksonville Kraft Paper Co., Inc.

I.D. Number:

31-16-0067-12

Permit/Certification Number:

A016-71209

Date of Issue:

August 8, 1983

Expiration Date:

July 31, 1988

GENERAL CONDITIONS:

1. The terms, conditions, requirements, limitations, and restrictions set forth herein are "Permit Conditions" and as such are binding upon the permittee and enforceable pursuant to the authority of Sections 403.161, 403.727, or 403.859 through 403.861, Florida Statutes. The permittee is hereby placed on notice that the department will review this permit periodically and may initiate enforcement action for any violation of the "Permit Conditions" by the permittee, its agents, employees, servants or representatives.
2. This permit is valid only for the specific processes and operations applied for and indicated in the approved drawings or exhibits. Any unauthorized deviation from the approved drawings, exhibits, specifications, or conditions of this permit may constitute grounds for revocation and enforcement action by the department.
3. As provided in Subsections 403.087(6) and 403.722(5), Florida Statutes, the issuance of this permit does not convey any vested rights or any exclusive privileges. Nor does it authorize any injury to public or private property or any invasion of personal rights, nor any infringement of federal, state or local laws or regulations. This permit does not constitute a waiver of or approval of any other department permit that may be required for other aspects of the total project which are not addressed in the permit.
4. This permit conveys no title to land or water, does not constitute state recognition or acknowledgement of title, and does not constitute authority for the use of submerged lands unless herein provided and the necessary title or leasehold interests have been obtained from the state. Only the Trustees of the Internal Improvement Trust Fund may express state opinion as to title.
5. This permit does not relieve the permittee from liability for harm or injury to human health or welfare, animal, plant or aquatic life or property and penalties therefor caused by the construction or operation of this permitted source, nor does it allow the permittee to cause pollution in contravention of Florida Statutes and department rules, unless specifically authorized by an order from the department.
6. The permittee shall at all times properly operate and maintain the facility and systems of treatment and control (and related appurtenances) that are installed or used by the permittee to achieve compliance with the conditions of this permit, as required by department rules. This provision includes the operation of backup or auxiliary facilities or similar systems when necessary to achieve compliance with the conditions of the permit and when required by department rules.
7. The permittee, by accepting this permit, specifically agrees to allow authorized department personnel, upon presentation of credentials or other documents as may be required by law, access to the premises, at reasonable times, where the permitted activity is located or conducted for the purpose of:
 - a. Having access to and copying any records that must be kept under the conditions of the permit;
 - b. Inspecting the facility, equipment, practices, or operations regulated or required under this permit; and
 - c. Sampling or monitoring any substances or parameters at any location reasonably necessary to assure compliance with this permit or department rules.Reasonable time may depend on the nature of the concern being investigated.
8. If, for any reason, the permittee does not comply with or will be unable to comply with any condition or limitation specified in this permit, the permittee shall immediately notify and provide the department with the following information:
 - a. a description of and cause of non-compliance; and

PERMITTEE: Jacksonville Kraft Paper Co., Inc.

I.D. Number:

31-16-0067-12

Permit/Certification Number:

A016-71209

Date of Issue:

August 8, 1983

Expiration Date:

July 31, 1988

b. the period of noncompliance, including exact dates and times; or, if not corrected, the anticipated time the non-compliance is expected to continue, and steps being taken to reduce, eliminate, and prevent recurrence of the non-compliance.

The permittee shall be responsible for any and all damages which may result and may be subject to enforcement action by the department for penalties or revocation of this permit.

9. In accepting this permit, the permittee understands and agrees that all records, notes, monitoring data and other information relating to the construction or operation of this permitted source, which are submitted to the department, may be used by the department as evidence in any enforcement case arising under the Florida Statutes or department rules, except where such use is proscribed by Sections 403.73 and 403.111, Florida Statutes.
10. The permittee agrees to comply with changes in department rules and Florida Statutes after a reasonable time for compliance, provided however, the permittee does not waive any other rights granted by Florida Statutes or department rules.
11. This permit is transferable only upon department approval in accordance with Florida Administrative Code Rules 17-4.12 and 17-XI.XI, as applicable. The permittee shall be liable for any non-compliance of the permitted activity until the transfer is approved by the department.
12. This permit is required to be kept at the work site of the permitted activity during the entire period of construction or operation.
13. This permit also constitutes:
 - () Determination of Best Available Control Technology (BACT)
 - () Determination of Prevention of Significant Deterioration (PSD)
 - () Certification of Compliance with State Water Quality Standards (Section 401, PL 92-500)
 - () Compliance with New Source Performance Standards
14. The permittee shall comply with the following monitoring and record keeping requirements:
 - a. Upon request, the permittee shall furnish all records and plans required under department rules. The retention period for all records will be extended automatically, unless otherwise stipulated by the department, during the course of any unresolved enforcement action.
 - b. The permittee shall retain at the facility or other location designated by this permit records of all monitoring information (including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation), copies of all reports required by this permit, and records of all data used to complete the application for this permit. The time period of retention shall be at least three years from the date of the sample, measurement, report or application unless otherwise specified by department rule.
 - c. Records of monitoring information shall include:
 - the date, exact place, and time of sampling or measurements;
 - the person responsible for performing the sampling or measurements;
 - the data(s) analyses were performed;
 - the person responsible for performing the analyses;
 - the analytical techniques or methods used; and
 - the results of such analyses.
15. When requested by the department, the permittee shall within a reasonable time furnish any information required by law which is needed to determine compliance with the permit. If the permittee becomes aware that relevant facts were not submitted or were incorrect in the permit application or in any report to the department, such facts or information shall be submitted or corrected promptly.

Permittee: Jacksonville Kraft Paper Co., Inc.

I. D. Number:

31-16-0067-12

Permit/Certification Number: 4016-71209

Date of Issue:

August 8, 1983

Expiration Date:

July 31, 1988

SPECIFIC CONDITIONS:

1. The maximum allowable emission rate for each pollutant is as follows:

POLLUTANT	EMISSION RATE	MAXIMUM ALLOWABLE EMISSION
Particulate	17-2.650(2)(C)10.	16.2 lbs/hr 70.9 T/yr
Visible Emissions	17-2.650(2)(C)10.	10% Opacity

2. Testing of emissions shall be accomplished at 90% to 100% of the permitted capacity. If testing is performed at a rate less than 90% of the permitted capacity, operation shall be limited to that capacity until such time as an acceptable test is performed at 90% to 100% of permitted capacity. When operation is restricted to a lower capacity, because of testing at such a level, the Department/Bio-Environmental Services Division, upon advanced notification, will allow operation at higher capacities if such operation is for demonstrating compliance at a higher capacity (never to exceed design capacity).
3. Notify the Jacksonville Bio-Environmental Services Division (BESD) 14 days prior to source testing. Copies of the test report(s) shall be submitted to BESD within 45 days after completion of testing.
4. The following pollutant(s) shall be tested at intervals indicated from the date of July 1, 1983

Particulates - - - - - 12 months
Visible Emissions - - - - - On request

5. Submit an annual operation report to BESD for this source on the form supplied for each calendar year on or before March 1.
6. Any revision(s) to a permit (and application) must be submitted and approved prior to implementing.

Permittee: Jacksonville Kraft Paper Co., Inc.

I; D. Number:

31-16-0067-12

Permit/Certification Number: A016-71209

Date of Issue:

August 8, 1983

Expiration Date:

July 31, 1988

SPECIFIC CONDITIONS:

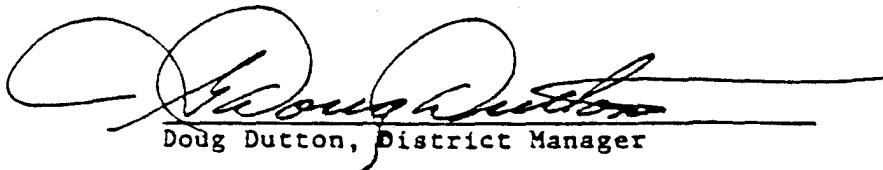
7. Operation is limited to 8760 hours per year.
8. An Operation and Maintenance Plan dated February 8, 1982 and revised by letter dated May 27, 1982 is attached pursuant to RACT rules, Chapter 17-2, Florida Administrative Code. Operations and Maintenance records outlined by this plan shall be kept for a minimum period of two (2) years and be made available to BESD upon request.

Issued this 8 day of August, 1983

City of Jacksonville
Bio-Environmental Services Division

State of Florida
Department of Environmental Regulation


Donald C. Bayly, Division Chief


Doug Dutton, District Manager

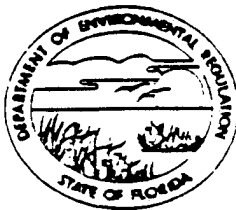
5 Pages attached

Page 5 of 5

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

NORTHEAST DISTRICT

3426 BILLS ROAD
JACKSONVILLE, FLORIDA 32207



BOB GRAHAM
GOVERNOR

VICTORIA J. TSCHINKEL
SECRETARY

G. DOUG BUTTON
DISTRICT MANAGER

PERMITTEE: Jacksonville Kraft Paper Co., Inc.
9469 Eastport Road
Jacksonville, Florida 32229

I.D. Number:	31-16-0067-13
Permit/Certification Number:	A016-71210
Date of Issue:	August 8, 1983
Expiration Date:	July 31, 1988
County:	Duval
Latitude/Longitude:	30:25:15/81:36:00
Section/Township/Range:	
Project:	Smelt Dissolving Tank #2
UTM	E-7441.750 N-3365.650

This permit is issued under the provisions of Chapter(s) 403, Florida Statutes, and Florida Administrative Code Rule(s) 17-2 and 17-4. The above named permittee is hereby authorized to perform the work or operate the facility shown on the application and approved drawing(s), plans, and other documents attached hereto or on file with the department and made a part hereof and specifically described as follows:

For the operation of smelt dissolving tank #2. The maximum process weight is 29,038 lbs/hr. Particulate emissions are controlled by a demister pad (York Separators, Inc.).

Located at 9469 Eastport Road, Jacksonville, Florida 32229

Supporting documents are as follows:

- (1) Permit application received on June 17, 1983
- (2) Permit A016-20604
- (3) Additional information received on June 27, 1983 and July 14, 1983
- (4) Particulate stack test dated October 25, 27 and 28, 1982
- (5) Permit transfer form received on July 3, 1983

PERMITTEE: Jacksonville Kraft Paper Co., Inc.

I.D. Number:
Permit/Certification Number:
Date of Issue:
Expiration Date:

31-16-0067-13
A016-71210
August 8, 1983
July 31, 1988

GENERAL CONDITIONS:

1. The terms, conditions, requirements, limitations, and restrictions set forth herein are "Permit Conditions" and as such are binding upon the permittee and enforceable pursuant to the authority of Sections 403.161, 403.727, or 403.859 through 403.861, Florida Statutes. The permittee is hereby placed on notice that the department will review this permit periodically and may initiate enforcement action for any violation of the "Permit Conditions" by the permittee, its agents, employees, servants or representatives.
2. This permit is valid only for the specific processes and operations applied for and indicated in the approved drawings or exhibits. Any unauthorized deviation from the approved drawings, exhibits, specifications, or conditions of this permit may constitute grounds for revocation and enforcement action by the department.
3. As provided in Subsections 403.087(6) and 403.722(5), Florida Statutes, the issuance of this permit does not convey any vested rights or any exclusive privileges. Nor does it authorize any injury to public or private property or any invasion of personal rights, nor any infringement of federal, state or local laws or regulations. This permit does not constitute a waiver of or approval of any other department permit that may be required for other aspects of the total project which are not addressed in the permit.
4. This permit conveys no title to land or water, does not constitute state recognition or acknowledgement of title, and does not constitute authority for the use of submerged lands unless herein provided and the necessary title or leasehold interests have been obtained from the state. Only the Trustees of the Internal Improvement Trust Fund may express state opinion as to title.
5. This permit does not relieve the permittee from liability for harm or injury to human health or welfare, animal, plant or aquatic life or property and penalties therefor caused by the construction or operation of this permitted source, nor does it allow the permittee to cause pollution in contravention of Florida Statutes and department rules, unless specifically authorized by an order from the department.
6. The permittee shall at all times properly operate and maintain the facility and systems of treatment and control (and related appurtenances) that are installed or used by the permittee to achieve compliance with the condition of this permit, as required by department rules. This provision includes the operation of backup or auxiliary facilities or similar systems when necessary to achieve compliance with the conditions of the permit and when required by department rules.
7. The permittee, by accepting this permit, specifically agrees to allow authorized department personnel, upon presentation of credentials or other documents as may be required by law, access to the premises, at reasonable times, where the permitted activity is located or conducted for the purpose of:
 - a. Having access to and copying any records that must be kept under the conditions of the permit;
 - b. Inspecting the facility, equipment, practices, or operations regulated or required under this permit; and
 - c. Sampling or monitoring any substances or parameters at any location reasonably necessary to assure compliance with this permit or department rules.Reasonable time may depend on the nature of the concern being investigated.
8. If, for any reason, the permittee does not comply with or will be unable to comply with any condition or limitation specified in this permit, the permittee shall immediately notify and provide the department with the following information:
 - a. a description of and cause of non-compliance; and

PERMITTEE: Jacksonville Kraft Paper Co., Inc.

I.D. Number:

31-16-0067-13

Permit/Certification Number:

A016-71210

Date of Issue:

August 8, 1983

Expiration Date:

July 31, 1988

b. the period of noncompliance, including exact dates and times; or, if not corrected, the anticipated time the non-compliance is expected to continue, and steps being taken to reduce, eliminate, and prevent recurrence of the non-compliance.

The permittee shall be responsible for any and all damages which may result and may be subject to enforcement action by the department for penalties or revocation of this permit.

9. In accepting this permit, the permittee understands and agrees that all records, notes, monitoring data and other information relating to the construction or operation of this permitted source, which are submitted to the department, may be used by the department as evidence in any enforcement case arising under the Florida Statutes or department rules, except where such use is proscribed by Sections 403.73 and 403.111, Florida Statutes.
10. The permittee agrees to comply with changes in department rules and Florida Statutes after a reasonable time for compliance, provided however, the permittee does not waive any other rights granted by Florida Statutes or department rules.
11. This permit is transferable only upon department approval in accordance with Florida Administrative Code Rules 17-4.12 and 17-30.30, as applicable. The permittee shall be liable for any non-compliance of the permitted activity until the transfer is approved by the department.
12. This permit is required to be kept at the work site of the permitted activity during the entire period of construction or operation.
13. This permit also constitutes:
 - () Determination of Best Available Control Technology (BACT)
 - () Determination of Prevention of Significant Deterioration (PSD)
 - () Certification of Compliance with State Water Quality Standards (Section 401, PL 92-500)
 - () Compliance with New Source Performance Standards
14. The permittee shall comply with the following monitoring and record keeping requirements:
 - a. Upon request, the permittee shall furnish all records and plans required under department rules. The retention period for all records will be extended automatically, unless otherwise stipulated by the department, during the course of any unresolved enforcement action.
 - b. The permittee shall retain at the facility or other location designated by this permit records of all monitoring information (including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation), copies of all reports required by this permit, and records of all data used to complete the application for this permit. The time period of retention shall be at least three years from the date of the sample, measurement, report or application unless otherwise specified by department rule.
 - c. Records of monitoring information shall include:
 - the date, exact place, and time of sampling or measurements;
 - the person responsible for performing the sampling or measurements;
 - the date(s) analyses were performed;
 - the person responsible for performing the analyses;
 - the analytical techniques or methods used; and
 - the results of such analyses.
15. When requested by the department, the permittee shall within a reasonable time furnish any information required by law which is needed to determine compliance with the permit. If the permittee becomes aware that relevant facts were not submitted or were incorrect in the permit application or in any report to the department, such facts or information shall be submitted or corrected promptly.

Permittee: Jacksonville Kraft Paper Co., Inc.

I. D. Number:

31-16-0067-13

Permit/Certification Number: A016-71210

Date of Issue:

August 8, 1983

Expiration Date:

July 31, 1988

SPECIFIC CONDITIONS:

1. The maximum allowable emission rate for each pollutant is as follows:

POLLUTANT	EMISSION RATE	MAXIMUM ALLOWABLE EMISSION
Particulate	17-2.650(2)(C)10.	18.9 lbs/hr 82.8 T/yr
Visible Emissions	17-2.650(2)(C)10.	10% Opacity

2. Testing of emissions shall be accomplished at 90% to 100% of the permitted capacity. If testing is performed at a rate less than 90% of the permitted capacity, operation shall be limited to that capacity until such time as an acceptable test is performed at 90% to 100% of permitted capacity. When operation is restricted to a lower capacity, because of testing at such a level, the Department/Bio-Environmental Services Division, upon advanced notification, will allow operation at higher capacities if such operation is for demonstrating compliance at a higher capacity (never to exceed design capacity).
3. Notify the Jacksonville Bio-Environmental Services Division (BESD) 14 days prior to source testing. Copies of the test report(s) shall be submitted to BESD within 45 days after completion of testing.
4. The following pollutant(s) shall be tested at intervals indicated from the date of July 1, 1983.

Particulates - - - - - 12 months

Visible Emissions - - - - - On request

5. Submit an annual operation report to BESD for this source on the form supplied for each calendar year on or before March 1.
6. Any revision(s) to a permit (and application) must be submitted and approved prior to implementing.

Permittee: Jacksonville Kraft Paper Co., Inc.

I. D. Number:

31-16-0067-13

Permit/Certification Number: A016-71210

Date of Issue:

August 8, 1983

Expiration Date:

July 31, 1988

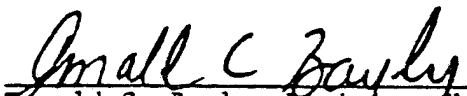
SPECIFIC CONDITIONS:

7. Operation is limited to 8760 hours per year.
8. An operation and Maintenance Plan dated February 8, 1982 and revised by letter dated May 27, 1982 is attached pursuant to RACT rules, Chapter 17-2, Florida Administrative Code. Operation and Maintenance records outlined by this plan shall be kept for a minimum period of two (2) years and be made available to BESD upon request.

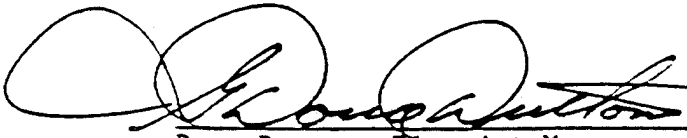
Issued this 8 day of August, 1983

City of Jacksonville
Bio-Environmental Services Division

State of Florida
Department of Environmental Regulation



Ronald C. Bayly, Division Chief



Doug Dutton, District Manager

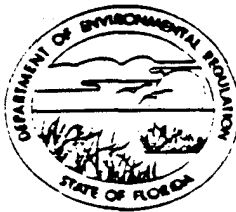
5 Pages attached

Page 5 of 5

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

NORTHEAST DISTRICT

3426 BILLS ROAD
JACKSONVILLE, FLORIDA 32207



BOB GRAHAM
GOVERNOR

VICTORIA J. TSCHINKEL
SECRETARY

J. DOUG OUTTON
DISTRICT MANAGER

~~PERMITTEE~~: Jacksonville Kraft Paper Co., Inc.
9469 Eastport Road
Jacksonville, Florida 32229

I.D. Number: 31-16-0067-14
Permit/Certification Number: A016-71211
Date of Issue: August 8, 1983
Expiration Date: July 31, 1988
County: Duval
Latitude/Longitude: 30:25:15/81:36:00
Section/Township/Range:
Project: Smelt Dissolving Tank #3
UTM E-7441.750 N-3355.650

This permit is issued under the provisions of Chapter(s) 403, Florida Statutes, and Florida Administrative Code Rule(s) 17-2 and 17-4. The above named permittee is hereby authorized to perform the work or operate the facility shown on the application and approved drawing(s), plans, and other documents attached hereto or on file with the department and made a part hereof and specifically described as follows:

For the operation of smelt dissolving tank #3. The maximum process weight is 29,038 lbs. Particulate emissions are controlled by a demister pad (York Separators, Inc.).

Located at 9469 Eastport Road, Jacksonville, Florida 32229

Supporting documents are as follows:

- (1) Permit application received on June 17, 1983
- (2) Permit A016-20618
- (3) Additional information received on June 27, 1983 and July 14, 1983
- (4) Particulate stack test dated October 7, 9 and 11, 1982
- (5) Permit transfer form received on July 8, 1983

PERMITEE: Jacksonville Kraft Paper Co., Inc.

I.D. Number:

31-16-0067-14

Permit/Certification Number:

A016-71211

Date of Issue:

August 8, 1983

Expiration Date:

July 31, 1988

PERMIT CONDITIONS:

The terms, conditions, requirements, limitations, and restrictions set forth herein are "Permit Conditions" and as such are binding upon the permittee and enforceable pursuant to the authority of Sections 403.161, 403.727, or 403.859 through 403.861, Florida Statutes. The permittee is hereby placed on notice that the department will review this permit periodically and may initiate enforcement action for any violation of the "Permit Conditions" by the permittee, its agents, employees, servants or representatives.

This permit is valid only for the specific processes and operations applied for and indicated in the approved drawings or exhibits. Any unauthorized deviation from the approved drawings, exhibits, specifications, or conditions of this permit may constitute grounds for revocation and enforcement action by the department.

As provided in Subsections 403.087(6) and 403.722(5), Florida Statutes, the issuance of this permit does not convey any vested rights or any exclusive privileges. Nor does it authorize any injury to public or private property or any invasion of personal rights, nor any infringement of federal, state or local laws or regulations. This permit does not constitute a waiver of or approval of any other department permit that may be required for other aspects of the total project which are not addressed in the permit.

This permit conveys no title to land or water, does not constitute state recognition or acknowledgement of title, and does not constitute authority for the use of submerged lands unless herein provided and the necessary title or leasehold interests have been obtained from the state. Only the Trustees of the Internal Improvement Trust Fund may express state opinion as to title.

This permit does not relieve the permittee from liability for harm or injury to human health or welfare, animal, plant or aquatic life or property and penalties therefor caused by the construction or operation of this permitted source, nor does it allow the permittee to cause pollution in contravention of Florida Statutes and department rules, unless specifically authorized by an order from the department.

The permittee shall at all times properly operate and maintain the facility and systems of treatment and control (and related appurtenances) that are installed or used by the permittee to achieve compliance with the conditions of this permit, as required by department rules. This provision includes the operation of backup or auxiliary facilities or similar systems when necessary to achieve compliance with the conditions of the permit and when required by department rules.

The permittee, by accepting this permit, specifically agrees to allow authorized department personnel, upon presentation of credentials or other documents as may be required by law, access to the premises, at reasonable times, where the permitted activity is located or conducted for the purpose of:

- a. Having access to and copying any records that must be kept under the conditions of the permit;
- b. Inspecting the facility, equipment, practices, or operations regulated or required under this permit; and
- c. Sampling or monitoring any substances or parameters at any location reasonably necessary to assure compliance with this permit or department rules.

Reasonable time may depend on the nature of the concern being investigated.

If, for any reason, the permittee does not comply with or will be unable to comply with any condition or limitation specified in this permit, the permittee shall immediately notify and provide the department with the following information:

- a. a description of and cause of non-compliance; and

PERMITTEE: Jacksonville Kraft Paper Co., Inc.

I.D. Number:

31-16-0067-14

Permit/Certification Number:

A016-71211

Date of Issue:

August 8, 1983

Expiration Date:

July 31, 1988

b. the period of noncompliance, including exact dates and times; or, if not corrected, the anticipated time the non-compliance is expected to continue, and steps being taken to reduce, eliminate, and prevent recurrence of the non-compliance.

The permittee shall be responsible for any and all damages which may result and may be subject to enforcement action by the department for penalties or revocation of this permit.

9. In accepting this permit, the permittee understands and agrees that all records, notes, monitoring data and other information relating to the construction or operation of this permitted source, which are submitted to the department, may be used by the department as evidence in any enforcement case arising under the Florida Statutes or department rules, except where such use is proscribed by Sections 403.73 and 403.111, Florida Statutes.
10. The permittee agrees to comply with changes in department rules and Florida Statutes after a reasonable time for compliance, provided however, the permittee does not waive any other rights granted by Florida Statutes or department rules.
11. This permit is transferable only upon department approval in accordance with Florida Administrative Code Rules 17-4.12 and 17-X0.30, as applicable. The permittee shall be liable for any non-compliance of the permitted activity until the transfer is approved by the department.
12. This permit is required to be kept at the work site of the permitted activity during the entire period of construction or operation.
13. This permit also constitutes:
 - () Determination of Best Available Control Technology (BACT)
 - () Determination of Prevention of Significant Deterioration (PSD)
 - () Certification of Compliance with State Water Quality Standards (Section 401, PL 92-500)
 - () Compliance with New Source Performance Standards
14. The permittee shall comply with the following monitoring and record keeping requirements:
 - a. Upon request, the permittee shall furnish all records and plans required under department rules. The retention period for all records will be extended automatically, unless otherwise stipulated by the department, during the course of any unresolved enforcement action.
 - b. The permittee shall retain at the facility or other location designated by this permit records of all monitoring information (including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation), copies of all reports required by this permit, and records of all data used to complete the application for this permit. The time period of retention shall be at least three years from the date of the sample, measurement, report or application unless otherwise specified by department rule.
 - c. Records of monitoring information shall include:
 - the date, exact place, and time of sampling or measurements;
 - the person responsible for performing the sampling or measurements;
 - the date(s) analyses were performed;
 - the person responsible for performing the analyses;
 - the analytical techniques or methods used; and
 - the results of such analyses.
15. When requested by the department, the permittee shall within a reasonable time furnish any information required by law which is needed to determine compliance with the permit. If the permittee becomes aware that relevant facts were not submitted or were incorrect in the permit application or in any report to the department, such facts or information shall be submitted or corrected promptly.

SPECIFIC CONDITIONS:

1. The maximum allowable emission rate for each pollutant is as follows:

POLLUTANT	EMISSION RATE	MAXIMUM ALLOWABLE EMISSION
Particulate	17-2.650(2)(C)10.	18.9 lbs/hr 82.8 T/yr
Visible Emissions	17-2.650(2)(C)10.	10% Opacity

2. Testing of emissions shall be accomplished at 90% to 100% of the permitted capacity. If testing is performed at a rate less than 90% of the permitted capacity, operation shall be limited to that capacity until such time as an acceptable test is performed at 90% to 100% of permitted capacity. When operation is restricted to a lower capacity, because of testing at such a level, the Department/Bio-Environmental Services Division, upon advanced notification, will allow operation at higher capacities if such operation is for demonstrating compliance at a higher capacity (never to exceed design capacity).

3. Notify the Jacksonville Bio-Environmental Services Division (BESD) 14 days prior to source testing. Copies of the test report(s) shall be submitted to BESD within 45 days after completion of testing.

4. The following pollutant(s) shall be tested at intervals indicated from the date of July 1, 1983

Particulates - - - - - 12 months

Visible Emissions - - - - - On request

5. Submit an annual operation report to BESD for this source on the form supplied for each calendar year on or before March 1.

6. Any revision(s) to a permit (and application) must be submitted and approved prior to implementing.

Permittee: Jacksonville Kraft Paper Co., Inc.

I. D. Number:

31-16-0067-14

Permit/Certification Number: A016-71211

Date of Issue:

August 8, 1983

Expiration Date:

July 31, 1988

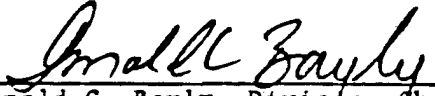
SPECIFIC CONDITIONS:

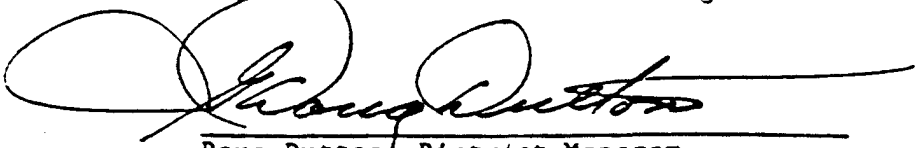
7. Operation is limited to 8760 hours per year
8. An Operation and Maintenance Plan dated February 8, 1982 and revised by letter dated May 27, 1982 is attached pursuant to RACT rules, Chapter 17-2, Florida Administrative Code. Operation and Maintenance records outlined by this plan shall be kept for a minimum period of two (2) years and be made available to BESD upon request.

Issued this 8 day of August, 1983

City of Jacksonville
Bio-Environmental Services Division

State of Florida
Department of Environmental Regulation


Donald C. Bayly, Division Chief


Doug Dutton, District Manager

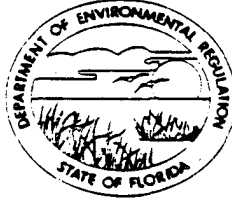
5 Pages attached

Page 5 of 5

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

NORTHEAST DISTRICT

3426 BILLS ROAD
JACKSONVILLE, FLORIDA 32207



BOB GRAHAM
GOVERNOR

VICTORIA J. TSCHINKEL
SECRETARY

G. DOUG DUTTON
DISTRICT MANAGER

PERMITTEE: Jacksonville Kraft Paper Co., Inc.
9469 Eastport Road
Jacksonville, Florida 32229

I.D. Number: 31-16-0067-01
Permit/Certification Number: A016-71212
Date of Issue: August 8, 1983
Expiration Date: July 31, 1988
County: Duval
Latitude/Longitude: 30:25:15/81:36:00
Section/Township/Range:
Project: Lime Kiln #1
UTM: E-7441.750 N-3365.650

This permit is issued under the provisions of Chapter(s) 403, Florida Statutes, and Florida Administrative Code Rule(s) 17-2 and 17-4. The above named permittee is hereby authorized to perform the work or operate the facility shown on the application and approved drawing(s), plans, and other documents attached hereto or on file with the department and made a part hereof and specifically described as follows:

For the operation of the #1 Lime Kiln. The maximum process weight is 22,180 lbs/hr. The maximum heat input is 60×10^6 BTUs per hour firing #6 fuel oil with a maximum sulphur content of 2.27% by weight. Particulate emissions are controlled by a Chemico S-F venturi type scrubber.

Located at 9469 Eastport Road, Jacksonville Florida 32229

Supporting documents are as follows:

- (1) Permit application received on June 17, 1983
- (2) Permit A016-21824
- (3) Additional information received on June 27, 1983 and July 14, 1983
- (4) Particulate stack test dated March 15 and 17, 1983
- (5) Permit transfer form received on July 8, 1983

PERMITTEE: Jacksonville Kraft Paper Co., Inc.

I.D. Number:

31-16-0067-01

Permit/Certification Number:

A016-71212

Date of Issue:

August 8, 1983

Expiration Date:

July 31, 1988

GENERAL CONDITIONS:

1. The terms, conditions, requirements, limitations, and restrictions set forth herein are "Permit Conditions" and as such are binding upon the permittee and enforceable pursuant to the authority of Sections 403.161, 403.727, or 403.859 through 403.861, Florida Statutes. The permittee is hereby placed on notice that the department will review this permit periodically and may initiate enforcement action for any violation of the "Permit Conditions" by the permittee, its agents, employees, servants or representatives.
2. This permit is valid only for the specific processes and operations applied for and indicated in the approved drawings or exhibits. Any unauthorized deviation from the approved drawings, exhibits, specifications, or conditions of this permit may constitute grounds for revocation and enforcement action by the department.
3. As provided in Subsections 403.087(6) and 403.722(5), Florida Statutes, the issuance of this permit does not convey any vested rights or any exclusive privileges. Nor does it authorize any injury to public or private property or any invasion of personal rights, nor any infringement of federal, state or local laws or regulations. This permit does not constitute a waiver of or approval of any other department permit that may be required for other aspects of the total project which are not addressed in the permit.
4. This permit conveys no title to land or water, does not constitute state recognition or acknowledgement of title, and does not constitute authority for the use of submerged lands unless herein provided and the necessary title or leasehold interests have been obtained from the state. Only the Trustees of the Internal Improvement Trust Fund may express state opinion as to title.
5. This permit does not relieve the permittee from liability for harm or injury to human health or welfare, animals, plant or aquatic life or property and penalties therefor caused by the construction or operation of this permitted source, nor does it allow the permittee to cause pollution in contravention of Florida Statutes and department rules, unless specifically authorized by an order from the department.
6. The permittee shall at all times properly operate and maintain the facility and systems of treatment and control (and related appurtenances) that are installed or used by the permittee to achieve compliance with the conditions of this permit, as required by department rules. This provision includes the operation of backup or auxiliary facilities or similar systems when necessary to achieve compliance with the conditions of the permit and when required by department rules.
7. The permittee, by accepting this permit, specifically agrees to allow authorized department personnel, upon presentation of credentials or other documents as may be required by law, access to the premises, at reasonable times, where the permitted activity is located or conducted for the purpose of:
 - a. Having access to and copying any records that must be kept under the conditions of the permit;
 - b. Inspecting the facility, equipment, practices, or operations regulated or required under this permit; and
 - c. Sampling or monitoring any substances or parameters at any location reasonably necessary to assure compliance with this permit or department rules.Reasonable time may depend on the nature of the concern being investigated.
8. If, for any reason, the permittee does not comply with or will be unable to comply with any condition or limitation specified in this permit, the permittee shall immediately notify and provide the department with the following information:
 - a. a description of and cause of non-compliance; and

PERMITTEE: Jacksonville Kraft Paper Co., Inc.

I.D. Number:

31-16-0067-01

Permit/Certification Number:

A016-71212

Date of Issue:

August 8, 1983

Expiration Date:

July 31, 1988

b. the period of noncompliance, including exact dates and times; or, if not corrected, the anticipated time the non-compliance is expected to continue, and steps being taken to reduce, eliminate, and prevent recurrence of the non-compliance.

The permittee shall be responsible for any and all damages which may result and may be subject to enforcement action by the department for penalties or revocation of this permit.

9. In accepting this permit, the permittee understands and agrees that all records, notes, monitoring data and other information relating to the construction or operation of this permitted source, which are submitted to the department, may be used by the department as evidence in any enforcement case arising under the Florida Statutes or department rules, except where such use is proscribed by Sections 403.73 and 403.111, Florida Statutes.
10. The permittee agrees to comply with changes in department rules and Florida Statutes after a reasonable time for compliance, provided however, the permittee does not waive any other rights granted by Florida Statutes or department rules.
11. This permit is transferable only upon department approval in accordance with Florida Administrative Code Rules 17-4.12 and 17-30.30, as applicable. The permittee shall be liable for any non-compliance of the permitted activity until the transfer is approved by the department.
12. This permit is required to be kept at the work site of the permitted activity during the entire period of construction or operation.
13. This permit also constitutes:
 - () Determination of Best Available Control Technology (BACT)
 - () Determination of Prevention of Significant Deterioration (PSD)
 - () Certification of Compliance with State Water Quality Standards (Section 401, PL 92-500)
 - () Compliance with New Source Performance Standards
14. The permittee shall comply with the following monitoring and record keeping requirements:
 - a. Upon request, the permittee shall furnish all records and plans required under department rules. The retention period for all records will be extended automatically, unless otherwise stipulated by the department, during the course of any unresolved enforcement action.
 - b. The permittee shall retain at the facility or other location designated by this permit records of all monitoring information (including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation), copies of all reports required by this permit, and records of all data used to complete the application for this permit. The time period of retention shall be at least three years from the date of the sample, measurement, report or application unless otherwise specified by department rule.
 - c. Records of monitoring information shall include:
 - the date, exact place, and time of sampling or measurements;
 - the person responsible for performing the sampling or measurements;
 - the date(s) analyses were performed;
 - the person responsible for performing the analyses;
 - the analytical techniques or methods used; and
 - the results of such analyses.
15. When requested by the department, the permittee shall within a reasonable time furnish any information required by law which is needed to determine compliance with the permit. If the permittee becomes aware that relevant facts were not submitted or were incorrect in the permit application or in any report to the department, such facts or information shall be submitted or corrected promptly.

Permittee: Jacksonville Kraft Paper Co., Inc.

I. D. Number:

31-16-0067-01

Permit/Certification Number: A016-71212

Date of Issue:

August 8, 1983

Expiration Date:

July 31, 1988

SPECIFIC CONDITIONS:

1. The maximum allowable emission rate for each pollutant is as follows:

POLLUTANT	EMISSION RATE	MAXIMUM ALLOWABLE EMISSION
Particulate	17-2.650(2)(C)9.	16 lbs/hr 70 T/yr
Visible Emissions	17-2.650(2)(C)9.	10% Opacity

2. Testing of emissions shall be accomplished at 90% to 100% of the permitted capacity. If testing is performed at a rate less than 90% of the permitted capacity, operation shall be limited to that capacity until such time as an acceptable test is performed at 90% to 100% of permitted capacity. When operation is restricted to a lower capacity, because of testing at such a level, the Department/Bio-Environmental Services Division, upon advanced notification, will allow operation at higher capacities if such operation is for demonstrating compliance at a higher capacity (never to exceed design capacity).
3. Notify the Jacksonville Bio-Environmental Services Division (BESD) 14 days prior to source testing. Copies of the test report(s) shall be submitted to BESD within 45 days after completion of testing.
4. The following pollutant(s) shall be tested at intervals indicated from the date of July 1, 1983.

Particulates - - - - - 6 months

Visible Emissions - - - - - On request

5. Submit an annual operation report to BESD for this source on the form supplied for each calendar year on or before March 1.
6. Any revision(s) to a permit (and application) must be submitted and approved prior to implementing.

Permittee: Jacksonville Kraft Paper Co., Inc.

I. D. Number:

31-16-0067-01

Permit/Certification Number: A016-71212

Date of Issue:

August 8, 1983

Expiration Date:

July 31, 1988

SPECIFIC CONDITIONS:

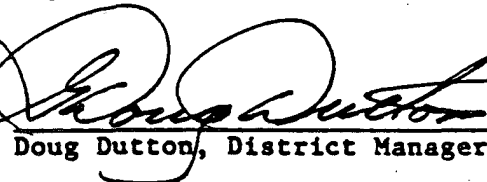
7. Operation is limited to 8760 hours per year.
8. An Operation and Maintenance Plan dated February 8, 1982 and revised by letter dated May 27, 1982 is attached pursuant to RACT rules, Chapter 17-2, Florida Administrative Code. Operation and Maintenance records outlined by this plan shall be kept for a minimum period of two (2) years and be made available to BESD upon request.

Issued this 8 day of August, 1983

City of Jacksonville
Bio-Environmental Services Division

State of Florida
Department of Environmental Regulation


Donald C. Bayly, Division Chief


Doug Dutton, District Manager

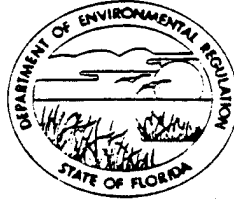
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Page 5 of 5

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

NORTHEAST DISTRICT

3426 BILLS ROAD
JACKSONVILLE, FLORIDA 32207



BOB GRAHAM
GOVERNOR

VICTORIA J. TSCHINKEL
SECRETARY

G. DOUG DUTTON
DISTRICT MANAGER

PERMITTEE: Jacksonville Kraft Paper Co., Inc.
9469 Eastport Road
Jacksonville, Florida 32229

I.D. Number:	31-16-0067-02
Permit/Certification Number:	A016-71213
Date of Issue:	August 17, 1983
Expiration Date:	July 31, 1988
County:	Duval
Latitude/Longitude:	30:25:15/81:36:00
Section/Township/Range:	
Project:	Lime Kiln #2
UTM	E-7441.750 N-3365.650

This permit is issued under the provisions of Chapter(s) 403, Florida Statutes, and Florida Administrative Code Rule(s) 17-2 and 17-4. The above named permittee is hereby authorized to perform the work or operate the facility shown on the application and approved drawing(s), plans, and other documents attached hereto or on file with the department and made a part hereof and specifically described as follows:

For the operation of the #2 Lime Kiln. The maximum process weight is 22,340 lbs/hr. The maximum heat input is 60×10^6 BTUs per hour firing #6 fuel oil with a maximum sulphur content of 2.27% by weight. Particulate emissions are controlled by a Zurn FA-0055 venturi scrubber.

Located at 9469 Eastport Road, Jacksonville, Florida 32229

Supporting documents are as follows:

- (1) Permit application received on June 17, 1983
- (2) Permit A016-21818
- (3) Additional information received on June 27, 1983 and July 14, 1983
- (4) Particulate stack test dated March 21 and 22, 1983
- (5) Permit transfer form received on July 8, 1983

PERMITTEE: Jacksonville Kraft Paper Co., Inc.

I.D. Number:

Permit/Certification Number:

Date of Issue:

Expiration Date:

31-16-0067-02

A016-71213

August 17, 1983

July 31, 1988

GENERAL CONDITIONS:

1. The terms, conditions, requirements, limitations, and restrictions set forth herein are "Permit Conditions" and as such are binding upon the permittee and enforceable pursuant to the authority of Sections 403.161, 403.727, or 403.859 through 403.861, Florida Statutes. The permittee is hereby placed on notice that the department will review this permit periodically and may initiate enforcement action for any violation of the "Permit Conditions" by the permittee, its agents, employees, servants or representatives.
2. This permit is valid only for the specific processes and operations applied for and indicated in the approved drawings or exhibits. Any unauthorized deviation from the approved drawings, exhibits, specifications, or conditions of this permit may constitute grounds for revocation and enforcement action by the department.
3. As provided in Subsections 403.087(6) and 403.722(5), Florida Statutes, the issuance of this permit does not convey any vested rights or any exclusive privileges. Nor does it authorize any injury to public or private property or any invasion of personal rights, nor any infringement of federal, state or local laws or regulations. This permit does not constitute a waiver of or approval of any other department permit that may be required for other aspects of the total project which are not addressed in the permit.
4. This permit conveys no title to land or water, does not constitute state recognition or acknowledgement of title, and does not constitute authority for the use of submerged lands unless herein provided and the necessary title or leasehold interests have been obtained from the state. Only the Trustees of the Internal Improvement Trust Fund may express state opinion as to title.
5. This permit does not relieve the permittee from liability for harm or injury to human health or welfare, animal plant or aquatic life or property and penalties therefor caused by the construction or operation of this permitted source, nor does it allow the permittee to cause pollution in contravention of Florida Statutes and department rules, unless specifically authorized by an order from the department.
6. The permittee shall at all times properly operate and maintain the facility and systems of treatment and control (and related appurtenances) that are installed or used by the permittee to achieve compliance with the conditions of this permit, as required by department rules. This provision includes the operation of backup or auxiliary facilities or similar systems when necessary to achieve compliance with the conditions of the permit and when required by department rules.
7. The permittee, by accepting this permit, specifically agrees to allow authorized department personnel, upon presentation of credentials or other documents as may be required by law, access to the premises, at reasonable times, where the permitted activity is located or conducted for the purpose of:
 - a. Having access to and copying any records that must be kept under the conditions of the permit;
 - b. Inspecting the facility, equipment, practices, or operations regulated or required under this permit; and
 - c. Sampling or monitoring any substances or parameters at any location reasonably necessary to assure compliance with this permit or department rules.Reasonable time may depend on the nature of the concern being investigated.
8. If, for any reason, the permittee does not comply with or will be unable to comply with any condition or limitation specified in this permit, the permittee shall immediately notify and provide the department with the following information:
 - a. a description of and cause of non-compliance; and

PERMITTEE: Jacksonville Kraft Paper Co., Inc.

I.D. Number:

31-16-0067-02

Permit/Certification Number:

A016-71213

Date of Issue:

August 17, 1983

Expiration Date:

July 31, 1988

b. the period of noncompliance, including exact dates and times; or, if not corrected, the anticipated time the non-compliance is expected to continue, and steps being taken to reduce, eliminate, and prevent recurrence of the non-compliance.

The permittee shall be responsible for any and all damages which may result and may be subject to enforcement action by the department for penalties or revocation of this permit.

9. In accepting this permit, the permittee understands and agrees that all records, notes, monitoring data and other information relating to the construction or operation of this permitted source, which are submitted to the department, may be used by the department as evidence in any enforcement case arising under the Florida Statutes or department rules, except where such use is proscribed by Sections 403.73 and 403.111, Florida Statutes.
10. The permittee agrees to comply with changes in department rules and Florida Statutes after a reasonable time for compliance, provided however, the permittee does not waive any other rights granted by Florida Statutes or department rules.
11. This permit is transferable only upon department approval in accordance with Florida Administrative Code Rules 17-4.12 and 17-30.30, as applicable. The permittee shall be liable for any non-compliance of the permitted activity until the transfer is approved by the department.
12. This permit is required to be kept at the work site of the permitted activity during the entire period of construction or operation.
13. This permit also constitutes:
 - () Determination of Best Available Control Technology (BACT)
 - () Determination of Prevention of Significant Deterioration (PSD)
 - () Certification of Compliance with State Water Quality Standards (Section 401, PL 92-500)
 - () Compliance with New Source Performance Standards
14. The permittee shall comply with the following monitoring and record keeping requirements:
 - a. Upon request, the permittee shall furnish all records and plans required under department rules. The retention period for all records will be extended automatically, unless otherwise stipulated by the department, during the course of any unresolved enforcement action.
 - b. The permittee shall retain at the facility or other location designated by this permit records of all monitoring information (including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation), copies of all reports required by this permit, and records of all data used to complete the application for this permit. The time period of retention shall be at least three years from the date of the sample, measurement, report or application unless otherwise specified by department rule.
 - c. Records of monitoring information shall include:
 - the date, exact place, and time of sampling or measurements;
 - the person responsible for performing the sampling or measurements;
 - the date(s) analyses were performed;
 - the person responsible for performing the analyses;
 - the analytical techniques or methods used; and
 - the results of such analyses.
15. When requested by the department, the permittee shall within a reasonable time furnish any information required by law which is needed to determine compliance with the permit. If the permittee becomes aware that relevant facts were not submitted or were incorrect in the permit application or in any report to the department, such facts or information shall be submitted or corrected promptly.

Permittee: Jacksonville Kraft Paper Co., Inc.

I. D. Number:

31-16-0067-02

Permit/Certification Number: A016-71213

Date of Issue:

August 17, 1983

Expiration Date:

July 31, 1988

SPECIFIC CONDITIONS:

1. The maximum allowable emission rate for each pollutant is as follows:

POLLUTANT	EMISSION RATE	MAXIMUM ALLOWABLE EMISSION
Particulate	17-2.650(2)(C)9.	16 lbs/hr 70 T/yr
Visible Emissions	17-2.650(2)(C)9.	10% Opacity

2. Testing of emissions shall be accomplished at 90% to 100% of the permitted capacity. If testing is performed at a rate less than 90% of the permitted capacity, operation shall be limited to that capacity until such time as an acceptable test is performed at 90% to 100% of permitted capacity. When operation is restricted to a lower capacity, because of testing at such a level, the Department/Bio-Environmental Services Division, upon advanced notification, will allow operation at higher capacities if such operation is for demonstrating compliance at a higher capacity (never to exceed design capacity).
3. Notify the Jacksonville Bio-Environmental Services Division (BESD) 14 days prior to source testing. Copies of the test report(s) shall be submitted to BESD within 45 days after completion of testing.
4. The following pollutant(s) shall be tested at intervals indicated from the date of July 1, 1983.

Particulates - - - - - 6 months
Visible Emissions - - - - - On request

5. Submit an annual operation report to BESD for this source on the form supplied for each calendar year on or before March 1.
6. Any revision(s) to a permit (and application) must be submitted and approved prior to implementing.

Permittee: Jacksonville Kraft Paper Co., Inc.

I. D. Number:

31-16-0067-02

Permit/Certification Number: A016-71213

Date of Issue:

August 17, 1983

Expiration Date:

July 31, 1988

SPECIFIC CONDITIONS:

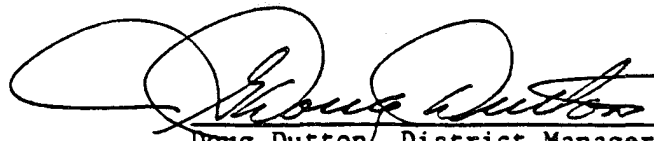
7. Operation is limited to 8760 hours per year.
8. An Operation and Maintenance Plan dated February 8, 1982 and revised by letter dated May 27, 1982 is attached pursuant to RACT rule, Chapter 17-2, Florida Administrative Code. Operation and Maintenance records outlined by this plan shall be kept for a minimum period of two (2) years and be made available to BESD upon request.

Issued this 17 day of August, 1983

City of Jacksonville
Bio-Environmental Services Division

State of Florida
Department of Environmental Regulation


Donald C. Bayly, Division Chief


Doug Dutton, District Manager

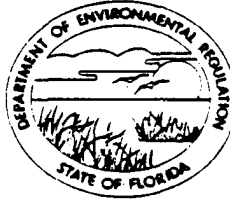
5 Pages attached

Page 5 of 5

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

NORTHEAST DISTRICT

3426 BILLS ROAD
JACKSONVILLE, FLORIDA 32207



BOB GRAHAM
GOVERNOR

VICTORIA J. TSCHINKEL
SECRETARY

G. DOUG DUTTON
DISTRICT MANAGER

PERMITTEE: Jacksonville Kraft Paper Co., Inc.
9469 Eastport Road
Jacksonville, Florida 32229

I.D. Number: 31-16-0067-03
Permit/Certification Number: A016-71214
Date of Issue: August 8, 1983
Expiration Date: July 31, 1988
County: Duval
Latitude/Longitude: 30:25:15/81:36:00
Section/Township/Range:
Project: Lime Kiln #3
UTM E-7441.750 N-3365.650

This permit is issued under the provisions of Chapter(s) 403, Florida Statutes, and Florida Administrative Code Rule(s) 17-2 and 17-4. The above named permittee is hereby authorized to perform the work or operate the facility shown on the application and approved drawing(s), plans, and other documents attached hereto or on file with the department and made a part hereof and specifically described as follows:

For the operation of the #3 lime Kiln. The maximum process weight is 22,340 lbs/hr. The maximum heat input is 60×10^6 BTUs per hour firing #6 fuel oil with a maximum sulphur content of 2.27% by weight or pitch with a normal sulphur content of 0.3% by weight. Particulate emissions are controlled by a Zurn No. 7598 venturi scrubber.

Located at 9469 Eastport Road, Jacksonville, Florida 32229

Supporting documents are as follows:

- (1) Permit application received on June 17, 1983
- (2) Permit A016-21819
- (3) Additional information received on June 27, 1983 and July 14, 1983
- (4) Particulate stack test dated March 8, 9 and 10, 1983
- (5) Permit transfer form received on July 8, 1983

PERMITTEE: Jacksonville Kraft Paper Co., Inc.

I.D. Number:

Permit/Certification Number:

Date of Issue:

Expiration Date:

31-16-0067-03

A016-71214

August 8, 1983

July 31, 1988

GENERAL CONDITIONS:

1. The terms, conditions, requirements, limitations, and restrictions set forth herein are "Permit Conditions" and as such are binding upon the permittee and enforceable pursuant to the authority of Sections 403.161, 403.727, or 403.859 through 403.861, Florida Statutes. The permittee is hereby placed on notice that the department will review this permit periodically and may initiate enforcement action for any violation of the "Permit Conditions" by the permittee, its agents, employees, servants or representatives.
2. This permit is valid only for the specific processes and operations applied for and indicated in the approved drawings or exhibits. Any unauthorized deviation from the approved drawings, exhibits, specifications, or conditions of this permit may constitute grounds for revocation and enforcement action by the department.
3. As provided in Subsections 403.087(6) and 403.722(5), Florida Statutes, the issuance of this permit does not convey any vested rights or any exclusive privileges. Nor does it authorize any injury to public or private property or any invasion of personal rights, nor any infringement of federal, state or local laws or regulations. This permit does not constitute a waiver of or approval of any other department permit that may be required for other aspects of the total project which are not addressed in the permit.
4. This permit conveys no title to land or water, does not constitute state recognition or acknowledgement of title, and does not constitute authority for the use of submerged lands unless herein provided and the necessary title or leasehold interests have been obtained from the state. Only the Trustees of the Internal Improvement Trust Fund may express state opinion as to title.
5. This permit does not relieve the permittee from liability for harm or injury to human health or welfare, animals, plant or aquatic life or property and penalties therefor caused by the construction or operation of this permitted source, nor does it allow the permittee to cause pollution in contravention of Florida Statutes and department rules, unless specifically authorized by an order from the department.
6. The permittee shall at all times properly operate and maintain the facility and systems of treatment and control (and related appurtenances) that are installed or used by the permittee to achieve compliance with the conditions of this permit, as required by department rules. This provision includes the operation of backup or auxiliary facilities or similar systems when necessary to achieve compliance with the conditions of the permit and when required by department rules.
7. The permittee, by accepting this permit, specifically agrees to allow authorized department personnel, upon presentation of credentials or other documents as may be required by law, access to the premises, at reasonable times, where the permitted activity is located or conducted for the purpose of:
 - a. Having access to and copying any records that must be kept under the conditions of the permit;
 - b. Inspecting the facility, equipment, practices, or operations regulated or required under this permit; and
 - c. Sampling or monitoring any substances or parameters at any location reasonably necessary to assure compliance with this permit or department rules.Reasonable time may depend on the nature of the concern being investigated.
8. If, for any reason, the permittee does not comply with or will be unable to comply with any condition or limitation specified in this permit, the permittee shall immediately notify and provide the department with the following information:
 - a. a description of and cause of non-compliance; and

MITTEE: Jacksonville Kraft Paper Co., Inc.

I.D. Number:

31-16-0067-03

Permit/Certification Number:

A016-71214

Date of Issue:

August 8, 1983

Expiration Date:

July 31, 1988

b. the period of noncompliance, including exact dates and times; or, if not corrected, the anticipated time the non-compliance is expected to continue, and steps being taken to reduce, eliminate, and prevent recurrence of the non-compliance.

The permittee shall be responsible for any and all damages which may result and may be subject to enforcement action by the department for penalties or revocation of this permit.

9. In accepting this permit, the permittee understands and agrees that all records, notes, monitoring data and other information relating to the construction or operation of this permitted source, which are submitted to the department, may be used by the department as evidence in any enforcement case arising under the Florida Statutes or department rules, except where such use is proscribed by Sections 403.73 and 403.111, Florida Statutes.
10. The permittee agrees to comply with changes in department rules and Florida Statutes after a reasonable time for compliance, provided however, the permittee does not waive any other rights granted by Florida Statutes or department rules.
11. This permit is transferable only upon department approval in accordance with Florida Administrative Code Rules 17-4.12 and 17-30.30, as applicable. The permittee shall be liable for any non-compliance of the permitted activity until the transfer is approved by the department.
12. This permit is required to be kept at the work site of the permitted activity during the entire period of construction or operation.
13. This permit also constitutes:
 - () Determination of Best Available Control Technology (BACT)
 - () Determination of Prevention of Significant Deterioration (PSD)
 - () Certification of Compliance with State Water Quality Standards (Section 401, PL 92-500)
 - () Compliance with New Source Performance Standards
14. The permittee shall comply with the following monitoring and record keeping requirements:
 - a. Upon request, the permittee shall furnish all records and plans required under department rules. The retention period for all records will be extended automatically, unless otherwise stipulated by the department, during the course of any unresolved enforcement action.
 - b. The permittee shall retain at the facility or other location designated by this permit records of all monitoring information (including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation), copies of all reports required by this permit, and records of all data used to complete the application for this permit. The time period of retention shall be at least three years from the date of the sample, measurement, report or application unless otherwise specified by department rule.
 - c. Records of monitoring information shall include:
 - the date, exact place, and time of sampling or measurements;
 - the person responsible for performing the sampling or measurements;
 - the data(s) analyses were performed;
 - the person responsible for performing the analyses;
 - the analytical techniques or methods used; and
 - the results of such analyses.
15. When requested by the department, the permittee shall within a reasonable time furnish any information required by law which is needed to determine compliance with the permit. If the permittee becomes aware that relevant facts were not submitted or were incorrect in the permit application or in any report to the department, such facts or information shall be submitted or corrected promptly.

Permittee: Jacksonville Kraft Paper Co., Inc.

I. D. Number:

31-16-0067-03

Permit/Certification Number: A016-71214

Date of Issue:

August 8, 1983

Expiration Date:

July 31, 1988

SPECIFIC CONDITIONS:

1. The maximum allowable emission rate for each pollutant is as follows:

POLLUTANT	EMISSION RATE	MAXIMUM ALLOWABLE EMISSION
Particulate	17-2.650(2)(C)9.	16 lbs/hr 70 T/yr
Visible Emissions	17-2.650(2)(C)9.	10% Opacity

2. Testing of emissions shall be accomplished at 90% to 100% of the permitted capacity. If testing is performed at a rate less than 90% of the permitted capacity, operation shall be limited to that capacity until such time as an acceptable test is performed at 90% to 100% of permitted capacity. When operation is restricted to a lower capacity, because of testing at such a level, the Department/Bio-Environmental Services Division, upon advanced notification, will allow operation at higher capacities if such operation is for demonstrating compliance at a higher capacity (never to exceed design capacity).
3. Notify the Jacksonville Bio-Environmental Services Division (BESD) 14 days prior to source testing. Copies of the test report(s) shall be submitted to BESD within 45 days after completion of testing.
4. The following pollutant(s) shall be tested at intervals indicated from the date of July 1, 1983.

Particulates - - - - - 6 months
Visible Emissions - - - - - On request

5. Submit an annual operation report to BESD for this source on the form supplied for each calendar year on or before March 1.
6. Any revision(s) to a permit (and application) must be submitted and approved prior to implementing.

Permittee: Jacksonville Kraft Paper Co., Inc.

I. D. Number:

31-16-0067-03

Permit/Certification Number:

A016-71214

Date of Issue:

August 8, 1983

Expiration Date:

July 31, 1988

SPECIFIC CONDITIONS:

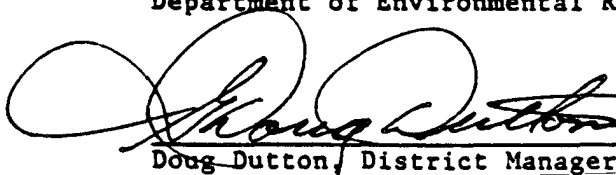
7. Operation is limited to 8760 hours per year.
8. An Operation and Maintenance Plan dated February 8, 1982 and revised by letter dated May 27, 1982 is attached pursuant to RACT rules, Chapter 17-2, Florida Administrative Code. Operation and Maintenance records outlined by this plan shall be kept for a minimum period of two (2) years and be made available to BESD upon request.

Issued this 8 day of August, 1983

City of Jacksonville
Bio-Environmental Services Division

State of Florida
Department of Environmental Regulation


Donald C. Bayly, Division Chief


Doug Dutton, District Manager

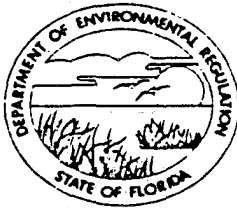
5 Pages attached

Page 5 of 5

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

NORTHEAST DISTRICT

3426 BILLS ROAD
JACKSONVILLE, FLORIDA 32207



BOB GRAHAM
GOVERNOR
VICTORIA J. TSCHINKEL
SECRETARY

G. DOUG DUTTON
DISTRICT MANAGER

PERMITTEE: Jacksonville Kraft Paper Co., Inc.
9469 Eastport Road
Jacksonville, Florida 32229

I.D. Number: 31-16-0067-(15-19)
Permit/Certification Number: A016-71215
Date of Issue: August 8, 1983
Expiration Date: July 31, 1988
County: Duval
Latitude/Longitude: 30:25:15/81:36:00
Section/Township/Range:
Project: Five (5) Materials
Storage Silos
E-7441.750 N-3365.650

UTM

This permit is issued under the provisions of Chapter(s) 403, Florida Statutes, and Florida Administrative Code Rule(s) 17-2 and 17-4. The above named permittee is hereby authorized to perform the work or operate the facility shown on the application and approved drawing(s), plans, and other documents attached hereto or on file with the department and made a part hereof and specifically described as follows:

For the operation of the following storage silos:

<u>SOURCE</u>	<u>MAXIMUM INPUT RATE LBS/HR</u>	<u>PARTICULATE CONTROL DEVICE</u>
Starch	23,000	Baghouse
Water Treatment Lime	6,000	Baghouse
Caustic Lime	6,000	Baghouse
Salt Cake I	8,000	Baghouse
Salt Cake II	5,800	Baghouse

Located at 9469 Eastport Road, Jacksonville, Florida 32229

Supporting documents are as follows:

- (1) Permit application received on July 17, 1983
- (2) Permit A016-14701
- (3) Additional information received on June 29, 1983
- (4) Permit transfer form received on July 8, 1983

PERMITTEE: Jacksonville Kraft Paper Co., Inc.

I.D. Number:

Permit/Certification Number:

Date of Issue:

Expiration Date:

31-16-0067-(15-19)

A016-71215

August 8, 1983

July 31, 1988

GENERAL CONDITIONS:

1. The terms, conditions, requirements, limitations, and restrictions set forth herein are "Permit Conditions" and as such are binding upon the permittee and enforceable pursuant to the authority of Sections 403.161, 403.727, or 403.859 through 403.861, Florida Statutes. The permittee is hereby placed on notice that the department will review this permit periodically and may initiate enforcement action for any violation of the "Permit Conditions" by the permittee, its agents, employees, servants or representatives.
2. This permit is valid only for the specific processes and operations applied for and indicated in the approved drawings or exhibits. Any unauthorized deviation from the approved drawings, exhibits, specifications, or conditions of this permit may constitute grounds for revocation and enforcement action by the department.
3. As provided in Subsections 403.087(6) and 403.722(5), Florida Statutes, the issuance of this permit does not convey any vested rights or any exclusive privileges. Nor does it authorize any injury to public or private property or any invasion of personal rights, nor any infringement of federal, state or local laws or regulations. This permit does not constitute a waiver of or approval of any other department permit that may be required for other aspects of the total project which are not addressed in the permit.
4. This permit conveys no title to land or water, does not constitute state recognition or acknowledgement of title, and does not constitute authority for the use of submerged lands unless herein provided and the necessary title or leasehold interests have been obtained from the state. Only the Trustees of the Internal Improvement Trust Fund may express state opinion as to title.
5. This permit does not relieve the permittee from liability for harm or injury to human health or welfare, animal, plant or aquatic life or property and penalties therefor caused by the construction or operation of this permitted source, nor does it allow the permittee to cause pollution in contravention of Florida Statutes and department rules, unless specifically authorized by an order from the department.
6. The permittee shall at all times properly operate and maintain the facility and systems of treatment and control (and related appurtenances) that are installed or used by the permittee to achieve compliance with the conditions of this permit, as required by department rules. This provision includes the operation of backup or auxiliary facilities or similar systems when necessary to achieve compliance with the conditions of the permit and when required by department rules.
7. The permittee, by accepting this permit, specifically agrees to allow authorized department personnel, upon presentation of credentials or other documents as may be required by law, access to the premises, at reasonable times, where the permitted activity is located or conducted for the purpose of:
 - a. Having access to and copying any records that must be kept under the conditions of the permit;
 - b. Inspecting the facility, equipment, practices, or operations regulated or required under this permit; and
 - c. Sampling or monitoring any substances or parameters at any location reasonably necessary to assure compliance with this permit or department rules.Reasonable time may depend on the nature of the concern being investigated.
8. If, for any reason, the permittee does not comply with or will be unable to comply with any condition or limitation specified in this permit, the permittee shall immediately notify and provide the department with the following information:
 - a. a description of and cause of non-compliance; and

PERMITTEE: Jacksonville, Kraft Paper Co., Inc.

I.D. Number:

31-16-0067-(15-19)

Permit/Certification Number:

A016-71215

Date of Issue:

August 8, 1983

Expiration Date:

July 31, 1988

b. the period of noncompliance, including exact dates and times; or, if not corrected, the anticipated time the non-compliance is expected to continue, and steps being taken to reduce, eliminate, and prevent recurrence of the non-compliance.

The permittee shall be responsible for any and all damages which may result and may be subject to enforcement action by the department for penalties or revocation of this permit.

9. In accepting this permit, the permittee understands and agrees that all records, notes, monitoring data and other information relating to the construction or operation of this permitted source, which are submitted to the department, may be used by the department as evidence in any enforcement case arising under the Florida Statutes or department rules, except where such use is proscribed by Sections 403.73 and 403.111, Florida Statutes.
10. The permittee agrees to comply with changes in department rules and Florida Statutes after a reasonable time for compliance, provided however, the permittee does not waive any other rights granted by Florida Statutes or department rules.
11. This permit is transferable only upon department approval in accordance with Florida Administrative Code Rules 17-4.12 and 17-30.30, as applicable. The permittee shall be liable for any non-compliance of the permitted activity until the transfer is approved by the department.
12. This permit is required to be kept at the work site of the permitted activity during the entire period of construction or operation.
13. This permit also constitutes:
 - () Determination of Best Available Control Technology (BACT)
 - () Determination of Prevention of Significant Deterioration (PSD)
 - () Certification of Compliance with State Water Quality Standards (Section 401, PL 92-500)
 - () Compliance with New Source Performance Standards
14. The permittee shall comply with the following monitoring and record keeping requirements:
 - a. Upon request, the permittee shall furnish all records and plans required under department rules. The retention period for all records will be extended automatically, unless otherwise stipulated by the department, during the course of any unresolved enforcement action.
 - b. The permittee shall retain at the facility or other location designated by this permit records of all monitoring information (including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation), copies of all reports required by this permit, and records of all data used to complete the application for this permit. The time period of retention shall be at least three years from the date of the sample, measurement, report or application unless otherwise specified by department rule.
 - c. Records of monitoring information shall include:
 - the date, exact place, and time of sampling or measurements;
 - the person responsible for performing the sampling or measurements;
 - the date(s) analyses were performed;
 - the person responsible for performing the analyses;
 - the analytical techniques or methods used; and
 - the results of such analyses.
15. When requested by the department, the permittee shall within a reasonable time furnish any information required by law which is needed to determine compliance with the permit. If the permittee becomes aware that relevant facts were not submitted or were incorrect in the permit application or in any report to the department, such facts or information shall be submitted or corrected promptly.

Permittee: Jacksonville Kraft Paper Co., Inc.

I. D. Number:

31-16-0067-(15-19)

Permit/Certification Number: A016-71215

Date of Issue:

August 8, 1983

Expiration Date:

July 31, 1988

SPECIFIC CONDITIONS:

1. The maximum allowable emission rate for each pollutant is as follows:

POLLUTANT	EMISSION RATE	MAXIMUM ALLOWABLE EMISSION
Visible Emissions	17-2.650(2)(C)11.	*5% Opacity

*Each source

2. Testing of emissions shall be accomplished at 90% to 100% of the permitted capacity. If testing is performed at a rate less than 90% of the permitted capacity, operation shall be limited to that capacity until such time as an acceptable test is performed at 90% to 100% of permitted capacity. When operation is restricted to a lower capacity, because of testing at such a level, the Department/Bio-Environmental Services Division, upon advanced notification, will allow operation at higher capacities if such operation is for demonstrating compliance at a higher capacity (never to exceed design capacity).
3. Notify the Jacksonville Bio-Environmental Services Division (BESD) 14 days prior to source testing. Copies of the test report(s) shall be submitted to BESD within 45 days after completion of testing.
4. The following pollutant(s) shall be tested at intervals indicated from the date of July 1, 1983.

*Visible Emissions - - - - - 12 months

*Each source Note: See Specific Condition No. 9

5. Submit an annual operation report to BESD for this source on the form supplied for each calendar year on or before March 1.
6. Any revision(s) to a permit (and application) must be submitted and approved prior to implementing.

Permittee: Jacksonville Kraft Paper Co., Inc.

I. D. Number:

31-16-0067-(15-19)

Permit/Certification Number: A016-71215

Date of Issue:

August 8, 1983

Expiration Date:

July 31, 1988

SPECIFIC CONDITIONS:

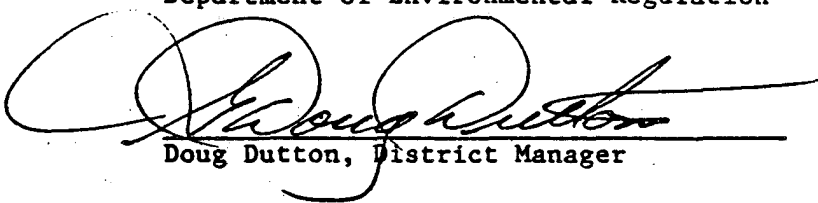
7. Operation is limited to 8760 hours per year.
8. An Operation and Maintenance Plan dated March 8, 1982 is attached pursuant to RACT rules, Chapter 17-2, Florida Administrative Code. Operation and Maintenance records outlined by this plan shall be kept for a minimum period of two (2) years and be made available to BESD upon request.
9. Visible emissions observations on each source shall be submitted to BESD within ninety (90) days of the issue date of this permit. These observations shall (be/have been) performed during calendar year 1983.

Issued this 8 day of August, 19 83

City of Jacksonville
Bio-Environmental Services Division

State of Florida
Department of Environmental Regulation


Donald C. Bayly, Division Chief


Doug Dutton, District Manager

5 Pages attached

Page 5 of 5

ST. JOHNS RIVER WATER MANAGEMENT DISTRICT
Post Office Box 1429
Palatka, Florida 32078-1429

PERMIT NO. 2-031-0001U DATE ISSUED March 8, 1983

A PERMIT AUTHORIZING:

Use of surface water from the Broward River to be used for cooling water for power production in pulp & paper production.

LOCATION:

Section 46, Township 1 North, Range 27 East
Duval County

ISSUED TO:
(owner)

Seminole Kraft Corporation
P. O. Box 26998
Jacksonville, FL 32218

Permittee agrees to hold and save the St. Johns River Water Management District and its successors harmless from any and all damages, claims, or liabilities which may arise from permit issuance. Said application, including all plans and specifications attached thereto, is by reference made a part hereof.

This permit does not convey to permittee any property rights nor any rights or privileges other than those specified herein, nor relieve the permittee from complying with any law, regulation or requirement affecting the rights of other bodies or agencies. All structures and works installed by permittee hereunder shall remain the property of the permittee.

This Permit may be revoked, modified or transferred at any time pursuant to the appropriate provisions of Chapter 373, Florida Statutes:

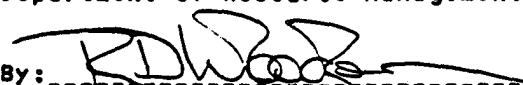
PERMIT IS CONDITIONED UPON:

See conditions on attached "Exhibit A", dated March 8, 1983

AUTHORIZED BY: St. Johns River Water Management District

Department of Resource Management

Governing Board

By: 
(Director)
R. DUKE WOODSON

By: 
(Assistant Secretary)
HENRY DEAN

"EXHIBIT A"

CONDITIONS FOR ISSUANCE OF PERMIT NUMBER 2-031-0001U

SEMINOLE KRAFT CORPORATION

DATED MARCH 8, 1983

1. District authorized staff, upon proper identification, will have permission to enter, inspect and observe permitted and related facilities in order to determine compliance with the approved plans, specifications and conditions of this permit.
2. Nothing in this permit should be construed to limit the authority of the St. Johns River Water Management District to declare a water shortage and issue orders pursuant to Section 373.175, Florida Statutes, or to formulate a plan for, implementation during periods of water shortage, pursuant to Section 373.246, Florida Statutes. In the event of a water shortage, as declared by the District Governing Board, the Permittee must adhere to reductions in water withdrawals as specified by the District.
3. Prior to the construction, modification, or abandonment of a well, the permittee must obtain a Water Well Construction Permit from the St. Johns River Water Management District pursuant to Chapter 40C-3, Florida Administrative Code. Construction, modification or abandonment of a well will require modification of the consumptive use permit when such construction, modification or abandonment is other than that specified and described on the consumptive use permit application form.
4. Leaking or inoperative well casings, valves, or controls must be repaired or replaced as required to put the system back in an operative condition acceptable to the District. Failure to make such repairs will be cause for deeming the well abandoned in accordance with Chapter 17.21.02(5), Florida Administrative Code and Chapter 373.309, Florida Statutes.
5. Permittee must mitigate any adverse impact caused by withdrawals permitted herein on legal uses of water existing at the time of permit application. The District has the right to curtail permitted withdrawal rates or water allocations if the withdrawals of water cause an adverse impact on legal uses of water which existed at the time of permit application. Adverse impacts are exemplified but not limited to:
 - (A) Reduction of well water levels resulting in a reduction of 10% in the ability of an adjacent well to produce water;
 - (B) Reduction of water levels in an adjacent surface water body resulting in a significant impairment of the use of water in that water body.
 - (C) Saline water intrusion or introduction of pollutants into the water supply of an adjacent water use resulting in a significant reduction of water quality; and
 - (D) Change in water quality resulting in either impairment or loss of use of a well or water body.
6. Permittee must mitigate any adverse impact caused by withdrawals permitted herein on adjacent land uses which existed at the time of permit application. The District has the right to curtail permitted withdrawal rates of water allocations if withdrawals of water cause an adverse impact on adjacent land use which existed at the time of permit application. Adverse impacts are exemplified by but not limited to:

2-031-0001U

- (A) Significant reduction in water levels in an adjacent surface water body;
 - (B) Land collapse or subsidence caused by a reduction in water levels; and
 - (C) Damage to crops and other types of vegetation.
7. The permittee must maintain records of total daily withdrawals from each source on a monthly basis for each year ending December 31. These records must be submitted to the District on Form EN-3 by January 31 of each year.
 8. This permit will expire seven years from the date of issuance.
 9. Maximum withdrawals must not exceed 15.7 BGAL/YR. (43 MGAL/D.)
 10. Use Classification is industrial.
 11. Source Classification is river.

ST. JOHNS RIVER WATER MANAGEMENT DISTRICT
Post Office Box 1429
Palatka, Florida 32078-1429

PERMIT NO. 2-031-0002U DATE ISSUED March 8, 1983

A PERMIT AUTHORIZING:

Use of groundwater from the Floridan Aquifer through seven eighteen-inch wells, three four-inch wells, one eight-inch well and one six-inch well to provide process water for Kraft Paper Production.

LOCATION:

Section 46, Township 1 North, Range 27 East
Duval County

ISSUED TO:
(owner)

Seminole Kraft Corporation
P. O. Box 26998
Jacksonville, FL 32218

Permittee agrees to hold and save the St. Johns River Water Management District and its successors harmless from any and all damages, claims, or liabilities which may arise from permit issuance. Said application, including all plans and specifications attached thereto, is by reference made a part hereof.

This permit does not convey to permittee any property rights nor any rights or privileges other than those specified herein, nor relieve the permittee from complying with any law, regulation or requirement affecting the rights of other bodies or agencies. All structures and works installed by permittee hereunder shall remain the property of the permittee.

This Permit may be revoked, modified or transferred at any time pursuant to the appropriate provisions of Chapter 373, Florida Statutes:

PERMIT IS CONDITIONED UPON:

See conditions on attached "Exhibit A", dated March 8, 1983

AUTHORIZED BY: St. Johns River Water Management District

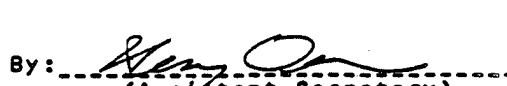
Department of Resource Management

Governing Board

By: 

(Director)

R. DUKE WOODSON

By: 

(Assistant Secretary)

HENRY DEAN

"EXHIBIT A"

CONDITIONS FOR ISSUANCE OF PERMIT NUMBER 2-031-0002U

SEMINOLE KRAFT CORPORATION

DATED MARCH 8, 1983

1. District authorized staff, upon proper identification, will have permission to enter, inspect and observe permitted and related facilities in order to determine compliance with the approved plans, specifications and conditions of this permit.
2. Nothing in this permit should be construed to limit the authority of the St. Johns River Water Management District to declare a water shortage and issue orders pursuant to Section 373.175, Florida Statutes, or to formulate a plan for implementation during periods of water shortage, pursuant to Section 373.246, Florida Statutes. In the event of a water shortage, as declared by the District Governing Board, the Permittee must adhere to reductions in water withdrawals as specified by the District.
3. Prior to the construction, modification, or abandonment of a well, the permittee must obtain a Water Well Construction Permit from the St. Johns River Water Management District pursuant to Chapter 40C-3, Florida Administrative Code. Construction, modification or abandonment of a well will require modification of the consumptive use permit when such construction, modification or abandonment is other than that specified and described on the consumptive use permit application form.
4. Leaking or inoperative well casings, valves, or controls must be repaired or replaced as required to put the system back in an operative condition acceptable to the District. Failure to make such repairs will be cause for deeming the well abandoned in accordance with Chapter 17.21.02(5), Florida Administrative Code and Chapter 373.309, Florida Statutes.
5. Permittee must mitigate any adverse impact caused by withdrawals permitted herein on legal uses of water existing at the time of permit application. The District has the right to curtail permitted withdrawal rates or water allocations if the withdrawals of water cause an adverse impact on legal uses of water which existed at the time of permit application. Adverse impacts are exemplified but not limited to:
 - (A) Reduction of well water levels resulting in a reduction of 10% in the ability of an adjacent well to produce water;
 - (B) Reduction of water levels in an adjacent surface water body resulting in a significant impairment of the use of water in that water body.
 - (C) Saline water intrusion or introduction of pollutants into the water supply of an adjacent water use resulting in a significant reduction of water quality; and
 - (D) Change in water quality resulting in either impairment or loss of use of a well or water body.
6. Permittee must mitigate any adverse impact caused by withdrawals permitted herein on adjacent land uses which existed at the time of permit application. The District has the right to curtail permitted withdrawal rates of water allocations if withdrawals of water cause an adverse impact on adjacent land use which existed at the time of permit application. Adverse impacts are exemplified by but not limited to:

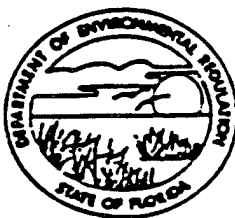
2-031-0002U

- (A) Significant reduction in water levels in an adjacent surface water body;
 - (B) Land collapse or subsidence caused by a reduction in water levels; and
 - (C) Damage to crops and other types of vegetation.
7. The permittee must maintain records of total daily withdrawals from each source on a monthly basis for each year ending December 31. These records must be submitted to the District on Form EN-3 by January 31 of each year.
 8. If water source is from wells, Permittee must develop and implement a Wellfield Operating Program within six (6) months of permit issuance.
 9. This permit will expire seven years from the date of issuance.
 10. Maximum annual withdrawals must not exceed 9.13 BGAL/YR (25 MGD).
 11. Any water quality data collected for other agencies must be submitted to the District.
 12. Use Classification is commercial-industrial.
 13. Source Classification is confined aquifer.

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

NORTHEAST DISTRICT

3428 BILLS ROAD
JACKSONVILLE, FLORIDA 32207



BOB GRAMAM
GOVERNOR

VICTORIA J. TSCHINKEL
SECRETARY

G. DOUG DUTTON
DISTRICT MANAGER

PERMITTEE:

Mr. J. Michael Watson, Attorney
Jacksonville Kraft Paper Co., Inc.
2400 Gulf Life Tower
Jacksonville, Florida 32207

L.D. Number: GMS 3116P06063
Permit/Certification Number: IO16-71200
Date of Issue: August 8, 1983
Expiration Date: August 2, 1988
County: Duval
Latitude/Longitude: 30°24'55"N/81°35'45"W.
Section/Township/Range:
Project: JACKSONVILLE KRAFT PAPER CO., INC.
WWTP O.P.

This permit is issued under the provisions of Chapter(s) 403, Florida Statutes, and Florida Administrative Code Rule(s) 17-3, 17-4, 17-6, 17-16, 17-19. The above named permittee is hereby authorized to perform the work or operate the facility shown on the application and approved drawing(s), plans, and other documents attached hereto or on file with the department and made a part hereof and specifically described as follows:

For the operation of a 20.0 MGD Industrial Wastewater Treatment System consisting of clarifier, settling pond, and aeration pond, discharging to St. Johns River, serving Jacksonville Kraft Paper Company, Inc.

Located at 9469 Eastport Road, Jacksonville, Duval County, Florida.

In accordance with application dated June 17, 1983.

PERMITTEE: Mr. J. Michael Watson, Attorney I.D. Number: GMS 3116P06063
JACKSONVILLE KRAFT PAPER CO., Permit/Certification Number: IO16-71200
INC. Date of Issue: August 8, 1983
Expiration Date: August 2, 1988

GENERAL CONDITIONS:

The terms, conditions, requirements, limitations, and restrictions set forth herein are "Permit Conditions" and as such are binding upon the permittee and enforceable pursuant to the authority of Sections 403.161, 403.727, or 403.859 through 403.861, Florida Statutes. The permittee is hereby placed on notice that the department will review this permit periodically and may initiate enforcement action for any violation of the "Permit Conditions" by the permittee, its agents, employees, servants or representatives.

This permit is valid only for the specific processes and operations applied for and indicated in the approved drawings or exhibits. Any unauthorized deviation from the approved drawings, exhibits, specifications, or conditions of this permit may constitute grounds for revocation and enforcement action by the department.

As provided in Subsections 403.087(6) and 403.722(5), Florida Statutes, the issuance of this permit does not convey any vested rights or any exclusive privileges. Nor does it authorize any injury to public or private property or any invasion of personal rights, nor any infringement of federal, state or local laws or regulations. This permit does not constitute a waiver of or approval of any other department permit that may be required for other aspects of the total project which are not addressed in the permit.

This permit conveys no title to land or water, does not constitute state recognition or acknowledgement of title, and does not constitute authority for the use of submerged lands unless herein provided and the necessary title or leasehold interests have been obtained from the state. Only the Trustees of the Internal Improvement Trust Fund may express state opinion as to title.

This permit does not relieve the permittee from liability for harm or injury to human health or welfare, animal, plant or aquatic life or property and penalties therefor caused by the construction or operation of this permittee's source, nor does it allow the permittee to cause pollution in contravention of Florida Statutes and department rules, unless specifically authorized by an order from the department.

The permittee shall at all times properly operate and maintain the facility and systems of treatment and control (and related appurtenances) that are installed or used by the permittee to achieve compliance with the conditions of this permit, as required by department rules. This provision includes the operation of backup or auxiliary facilities or similar systems when necessary to achieve compliance with the conditions of the permit and when required by department rules.

The permittee, by accepting this permit, specifically agrees to allow authorized department personnel, upon presentation of credentials or other documents as may be required by law, access to the premises, at reasonable times, where the permitted activity is located or conducted for the purpose of:

- a. Having access to and copying any records that must be kept under the conditions of the permit;
- b. Inspecting the facility, equipment, practices, or operations regulated or required under this permit; and
- c. Sampling or monitoring any substances or parameters at any location reasonably necessary to assure compliance with this permit or department rules.

Reasonable time may depend on the nature of the concern being investigated.

If, for any reason, the permittee does not comply with or will be unable to comply with any condition or limitation specified in this permit, the permittee shall immediately notify and provide the department with the following information:

- a. a description of and cause of non-compliance; and

SEE: Mr. J. Michael Watson, Attorney
JACKSONVILLE KRAFT PAPER CO.,
INC.

I.D. Number:
Permit/Certification Number:
Date of Issue:
Expiration Date:

GMS 3116P06063
IO16-71200
August 8, 1983
August 2, 1988

The period of noncompliance, including exact dates and times; or, if not corrected, the anticipated time the non-compliance is expected to continue, and steps being taken to reduce, eliminate, and prevent recurrence of the non-compliance.

The permittee shall be responsible for any and all damages which may result and may be subject to enforcement action by the department for penalties or revocation of this permit.

In accepting this permit, the permittee understands and agrees that all records, notes, monitoring data and other information relating to the construction or operation of this permitted source, which are submitted to the department, may be used by the department as evidence in any enforcement case arising under the Florida Statutes or department rules, except where such use is proscribed by Sections 403.73 and 403.111, Florida Statutes.

The permittee agrees to comply with changes in department rules and Florida Statutes after a reasonable time for compliance, provided however, the permittee does not waive any other rights granted by Florida Statutes or department rules.

This permit is transferable only upon department approval in accordance with Florida Administrative Code Rules 17-4.12 and 17-30.30, as applicable. The permittee shall be liable for any non-compliance of the permitted activity until the transfer is approved by the department.

This permit is required to be kept at the work site of the permitted activity during the entire period of construction or operation.

This permit also constitutes:

- () Determination of Best Available Control Technology (BACT)
- () Determination of Prevention of Significant Deterioration (PSD)
- () Certification of Compliance with State Water Quality Standards (Section 401, PL 92-500)
- () Compliance with New Source Performance Standards

The permittee shall comply with the following monitoring and record keeping requirements:

- 1. Upon request, the permittee shall furnish all records and plans required under department rules. The retention period for all records will be extended automatically, unless otherwise stipulated by the department, during the course of any unresolved enforcement action.
- 2. The permittee shall retain at the facility or other location designated by this permit records of all monitoring information (including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation), copies of all reports required by this permit, and records of all data used to complete the application for this permit. The time period of retention shall be at least three years from the date of the sample, measurement, report or application unless otherwise specified by department rule.
- 3. Records of monitoring information shall include:
 - the date, exact place, and time of sampling or measurements;
 - the person responsible for performing the sampling or measurements;
 - the date(s) analyses were performed;
 - the person responsible for performing the analyses;
 - the analytical techniques or methods used; and
 - the results of such analyses.

When requested by the department, the permittee shall within a reasonable time furnish any information required by law which is needed to determine compliance with the permit. If the permittee becomes aware that relevant facts were not submitted or were incorrect in the permit application or in any report to the department, such facts, or information shall be submitted or corrected promptly.

III: Mr. J. Michael Watson, Attorney
JACKSONVILLE KRAFT PAPER CO.,
INC.

I.D. Number:
Permit/Certification Number:
Date of Issue:
Expiration Date:

GMS 3116P06063
IO16-71200
August 8, 1983
August 2, 1988

IFIC CONDITIONS:

1. Operation reports containing results of the following examinations shall be submitted on a bi-monthly basis to both the Jacksonville Department of Health, Welfare and Bio-Environmental Services and DER.*

<u>Sampling Point</u>	<u>Constituents to Be Examined</u>	<u>Minimum Frequency</u>	<u>Sample Type</u>
Treated Process Effluent	5-day BOD	Daily	24-Hr. Composite
	Totl. Susp. Solids	Daily	24-Hr. Composite
	pH	Continuous	Recorder
	Temperature	2/week	Grab
	Flow	Continuous	Recorder

Contaminant discharges shall not exceed the following limitations:

<u>Process Effluent</u>	<u>Daily Ave. (lbs/day)</u>	<u>Daily Max. (lbs/day)</u>	<u>pH Units</u>
5-day BOD	7,840	15,680	
Total Suspended Solids	16,800	33,600	
pH Range			6.0 - 9.0
Floating Solids or Visible Foam - None other than in trace amounts.			

2. All records and data relating to the above item(s) shall be made available for inspection upon request by BESD and/or DER.*
3. Waste sludge or other solid wastes shall not be discharged into the receiving waters either directly or indirectly.
- ④ 4. No wastewater shall be allowed to deliberately bypass the existing pollution control facility without the prior approval of the DER.
5. This permit is valid only for the specific processes and operations (including the types and quantities of raw materials and chemicals) indicated in your application. Any changes in these which may result in altered characteristics of the discharge are not permitted without the prior approval of the DER and modification of this permit.
6. The operation of the pollution control facilities shall be under the full-time supervision of a person(s) who is qualified by formal training and/or practical experience in the field of Water Pollution Control.

*DER: Department of Environmental Regulation
BESD: Bio-Environmental Services Division

PERMIT CONDITIONS:

7. The treatment facilities are to be operated continuously in such a manner the maximum level of efficiency is maintained at all times.
8. The discharge authorized by this permit shall be consistent at all times with the water quality standards set forth in Chapter 17-3, Florida Administrative Code.

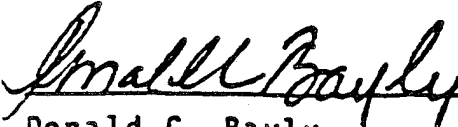
Should conditions in the receiving stream warrant, the Permittee may be required by the DER to upgrade, reduce, or cease discharge of effluents approved by this permit and adopt an alternative method of disposal within a reasonable period of time.

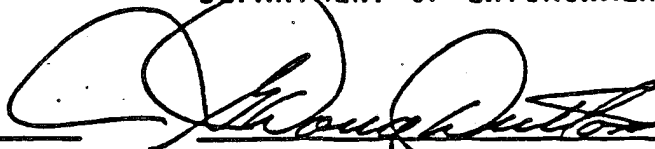
9. Monitoring requirements and effluent limitations of this permit are subject to revision should EPA NPDES permit requirements change.
10. In the event the Permittee is temporarily unable to comply with any of the conditions of this permit, he shall notify the regional engineer of the DER immediately. Notification shall include pertinent information as to the cause of the problem and what corrective measures are being taken to prevent its recurrence.

Issued this 8th day of Aug., 1983.

CITY OF JACKSONVILLE
BIO-ENVIRONMENTAL SERVICES

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION


Donald C. Bayly
Division Chief


G. Doug Dutton
District Manager



NPDES

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION IV

345 COURTLAND STREET
ATLANTA, GEORGIA 30365

AUTHORIZATION TO DISCHARGE UNDER THE
NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM

In compliance with the provisions of the Clean Water Act, as amended,
(33 U.S.C. 1251 et. seq; the "Act")

The Jacksonville Kraft Paper Company
P. O. Box 18019
Jacksonville, FL 32229

is authorized to discharge from a facility located at

9469 Eastport Road
Jacksonville, Duval County, Florida 32218

to receiving waters named

St. Johns River - latitude 30-24-55
- longitude 81-35-45

in accordance with effluent limitations, monitoring requirements and other
conditions set forth in Parts I, II, and III hereof. The permit consists of
this cover sheet, Part I 3 page(s), Part II 15 page(s) Part III 1 page,
and Part IV 2 pages.

This permit shall become effective on October 1, 1983 and modified
effective February 20, 1985.

This permit and the authorization to discharge shall expire at midnight,
September 30, 1988.

February 20, 1985

Date Signed

John J. Martin for
Frank J. Silva, Acting
Director
Water Management Division

PART I

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS - 001

These effluent limitations are to be achieved by the effective date of this permit and shall remain in effect until permit expiration for monitoring point Serial Number 001.

1. Such discharges shall be limited and monitored by the permittee as specified below:

<u>PARAMETER</u>	<u>DISCHARGE LIMITATIONS</u>				<u>MONITORING REQUIREMENTS</u>		
	<u>kg/day (lbs/day)</u>		<u>Other Units (Specify)</u>		<u>Measurement</u>	<u>Sample</u>	<u>Sampling</u>
	<u>Daily Avg</u>	<u>Daily Max</u>	<u>Daily Avg</u>	<u>Daily Max</u>	<u>Frequency</u>	<u>Type</u>	<u>Point</u>
Total Chlorine							
Residual (mg/l)	-	-		0.2	1/Year 6/	Grab 5/	001

- There shall be no discharge of floating solids or visible foam in other than trace amounts.
- Additional requirements in the attached state certification supersede any less stringent requirements listed here in.
- Samples taken in compliance with the monitoring requirements listed herein shall be taken at a point (001) after mixing of all spent cooling water with the process wastewater, but prior to mixing with the receiving waters.
- Chlorine samples will be taken during the time period affected by elemental chlorine addition.
- If at any time cooling water, affected by elemental chlorine addition, is discharged when process wastewater is not being discharged the above limits apply and monitoring frequency shall be 1/day, for as long as this condition exists.
- Monitoring shall be in January and reported on first calendar quarter discharge monitoring reports.

PART I

B. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS - 001-a

These effluent limitations are to be achieved by the effective date of this permit and shall remain in effect until permit expiration for monitoring point Serial Number 001-a.

1. Such discharges shall be limited and monitored by the permittee as specified below:

PARAMETER	DISCHARGE LIMITATIONS				MONITORING REQUIREMENTS		
	lbs/day		Other Units (Specify)		Measurement	Sample	Sampling
	Daily Avg	Daily Max	Daily Avg	Daily Max	Frequency	Type	Point
Flow, M ³ /Day (MGD)	-	-	-	Continuous	Recorder	001-a	
Biochemical Oxygen Demand (5 day)	7840	15860	-	-	Daily	24 hr. Composite	001-a
Suspended Solids	13000	33600	-	-	Daily	24 hr. Composite	001-a
pH (Standard Units)			(See item 2 below)		Continuous	Recorder	001-a
Temperature (°C, °F)					2/Week	Grab	001-a

2. The pH shall not be less than 6.0 standard units or greater than 9.0 standard units.
3. There shall be no discharge of floating solids or visible foam in other than trace amounts.
4. Additional requirements in the attached State certification supersede any less stringent requirements listed here in.
5. Samples taken in compliance with the monitoring requirements listed above shall be taken at a point (001-a) after collection and treatment of all process wastewater but prior to mixing with the non-contact cooling water discharge.

PART I

C. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS - 001-b

These effluent limitations are to be achieved by the effective date of this permit and shall remain in effect until permit expiration for monitoring point Serial Number 001-b.

1. Such discharges shall be limited and monitored by the permittee as specified below:

<u>PARAMETER</u>	<u>DISCHARGE LIMITATIONS</u>				<u>MONITORING REQUIREMENTS</u>		
	<u>kg/day (lbs/day)</u>		<u>Other Units (Specify)</u>		<u>Measurement</u>	<u>Sample</u>	<u>Sampling</u>
	<u>Daily Avg</u>	<u>Daily Max</u>	<u>Daily Avg</u>	<u>Daily Max</u>	<u>Frequency</u>	<u>Type</u>	<u>Point</u>
Flow, M ³ /Day (MGD)	-	-	-	-	1/Month	24 hr Representative	001-b
Temperature	-	-	35°C(95°F) 38°C(100°F)		2/Week	Grab	001-b

2. There shall be no discharge of floating solids or visible foam in other than trace amounts.
3. Additional requirements in the attached state certification supersede any less stringent requirements listed here in.
4. Samples taken in compliance with the monitoring requirements listed herein shall be taken at a point (001-b) after collection of all spent cooling water but prior to mixing with the process wastewater.

BEFORE THE STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

STATE OF FLORIDA DEPARTMENT
OF ENVIRONMENTAL REGULATION;
CITY OF JACKSONVILLE
BIO-ENVIRONMENTAL SERVICES
DIVISION

IN THE OFFICE OF THE
NORTHEAST DISTRICT

OGC Case No.

Complainant,

vs.

SEMINOLE KRAFT CORPORATION,

Respondent.

CONSENT ORDER

This Consent Order is made and entered into between the State of Florida Department of Environmental Regulation (Department), the City of Jacksonville, Bio-Environmental Services Division (BESD) and Seminole Kraft Corporation (Respondent), 9469 Eastport Road, Jacksonville, Florida 32218.

The Department, BESD and Respondent agree to the following:

1. The Department is the State agency and BESD is an approved local program pursuant to Section 403.182, Florida Statutes, empowered with the duty to enforce the provisions of Chapter 403, Florida Statutes (FS), and the rules promulgated thereunder in Florida Administrative Code (FAC) Title 17.
2. Respondent is a corporation authorized to do business in Florida. Respondent intends to purchase and operate a kraft sulfate paper mill (mill) formerly known as Jacksonville Kraft Paper Company, Inc., (JKPC) located at 9469 Eastport Road, Jacksonville, Duval County, Florida. A list of the individual emission sources at the mill and their corresponding permit numbers is attached and incorporated herein as Exhibit I. Respondent's local representative upon closing will be Mr. Frank Lee.
3. On or about October 15, 1985 Jacksonville Kraft ceased operation of the mill and it has not operated since then. The facility, including both the operational and emission control equipment, has substantially deteriorated since production operation ceased.

4. The rules do not specifically provide for the restarting of industrial facilities abandoned and unused over a period of time. Respondent has elected to apply for transfer of the operating permits previously held by JKPC. The purpose of this Consent Order is not to resolve any past or pending violations but to insure the proper rehabilitation, start up and operation of the facilities.

5. In conjunction with the operation of the mill, Respondent intends to operate the No. 1, No. 2 and No. 3 Power Boilers (power boilers) which emit pollutants into the ambient atmosphere. Operation of the power boilers is authorized by the Department under Operation Permits No. A016-71201, A016-71202, and A016-71203, respectively. Specific Condition No. 1 of these permits gives the maximum allowable emission rate for particulate matter (PM) emissions (non soot-blowing) as 0.10 lb/million BTU heat input.

6. Variance No. VE-16-141, granted by the Department, allowed JKPC to operate the power boilers at PM emission levels not to exceed 0.19 lb/million BTU heat input until September 15, 1985, at which time JKPC was to achieve the PM emission limiting standard required by FAC Rule 17-2.650(2)(c)2.

7. Respondent retained the firm of BE&K Engineering to do an independent and detailed evaluation of the stationary air emission sources located in the Power and Recovery area of the mill. That evaluation (Stone Container, Jacksonville, Florida, Power/Recovery Area Study No. 50-6200160-6-205 (Report)) confirmed that extensive repairs or renovations are necessary to the individual sources prior to the start-up in order to assure safe, commercially reliable and environmentally acceptable operation. A copy of the summary of the report is attached and incorporated herein as Exhibit II.

8. Each of Respondent's sources, as listed in Exhibit I, is classified as a major source, pursuant to Rule 17-2.100(112). F.A.C.

10. Respondent's facility is located in an area designated as unclassifiable for the pollutant sulfur dioxide (SO₂), pursuant to rule 17-2.430(2)(a).

11. Respondent's facility is located in an area of influence for particulate matter, as defined by Rule 17-7.100(17), F.A.C., in that it is within the locus of all points which are fifty (50) kilometers outside the boundary of that part of downtown Jacksonville, Florida, which is designated in Rule 17-2.410(2)(a)2, F.A.C., as a nonattainment area for particulate matter.

12. As a result of negotiations between the Department, BESD and the Respondent and in consultation with the U. S. Environmental Protection Agency, Region IV, the issues raised herein have been resolved by the signatories to this Order.

THEREFORE, having reached a resolution of the matter, pursuant to FAC Rule 17-103.110, the Department, BESD and Respondent mutually agree, and it is

ORDERED:

13. This Agreement shall take effect only upon transfer of title to the property from JKPC to Respondent which will occur upon financial closing. No source of air emissions will be operated by Seminole Kraft until this agreement is in effect. Should such transfer not take place this Agreement shall be null and void.

14. Prior to start-up, Respondent shall complete all environmentally related repairs, replacements, improvements and work as outlined in the BE&K Report. Respondent shall provide BESD and the Department with a report signed by a Professional Engineer, certifying the satisfactory completion of the work outlined in the Report. The Professional Engineer chosen to perform the review shall meet with BESD and Department staff prior to commencement of said review. Respondent shall review all other permitted sources and make the necessary repairs to assure their proper and efficient operation.

15. Prior to start-up of the digester systems, Respondent shall repair to original specification or its equivalent, the system for collection and transport of non-condensable gases

(NCG) from the existing digestors and tall oil system. The system for collection and transport of non-condensable gases includes the hot water accumulator and all appurtenances and ductwork between the accumulator and lime kilns. Within thirty (30) operating days of the first digester cook, Respondent shall attain full operational status of the NCG incineration system. Within one hundred twenty (120) operating days of start-up, Respondent will prepare a study of the NCG system in compliance with Rule 17-2.960, F.A.C. and if necessary, a schedule for achieving compliance with said Rule.

16. Respondent shall maintain and make available for inspection, records of all moneys spent on each source during repair, replacement, reconstruction or modification as outlined in paragraph 13 above, for a period of three (3) years.

17. Respondent shall notify the BESD and the Northeast District air engineers or their representatives, by telephone, fifteen (15) days prior to start-up of each source listed in Exhibit I and mail written notification within three (3) work days thereafter.

18. Respondent's sources are, from the start-up date, subject to visible emission (VE) limitations as set forth in Chapter 17-2, F.A.C., and Specific Conditions of the Operation Permits listed in Exhibit I.

19. Respondent shall conduct VE tests on each power boiler within 20 operating days from start-up of each power boiler, and shall submit the results of each test to the BESD within five (5) workdays after the tests are conducted.

20. For the purposes of this Consent Order an operating day for any individual source shall be defined as:

Any 24-hour period beginning at 7:00 a.m. during which any of the following has occurred for that source:

- A. Power Boilers, Bark Boilers and Lime Kilns- any Source was fired with any amount of fuel for any part of that 24 hour period except for the purposes of curing the refractory, boiling out the system or steam line flushing. The total period for refractory curing, boil out or steam line flushing shall be

limited to 192 hours and shall be documented for review by the Department.

- B. Smelt Dissolving Tanks (SDT), digestors and tall oil plant - any Source has been operated during any part of that 24 hour period to produce green liquor, pulp or tall oil, respectively.
- C. Recovery Boilers - any source was fired with any amount of black liquor or fired with oil during any part of that 24 hour period in excess of 192 hours. Documentation of oil firing time shall be retained for review by the Department and BESD.

21. Respondent shall install new total reduced sulfur (TRS) continuous emission monitors (CEM) on each lime kiln and each recovery boiler within 120 operating days after start-up of that unit. Respondent shall certify each recovery boiler TRS CEM within 150 operating days after start-up of that recovery boiler but no later than November 12, 1987. Respondent shall demonstrate that the lime kiln CEMS meet the requirements of applicable performance tests specified in 40 CFR, Part 60, Appendix B, no later than 150 operating days after start-up.

22. Respondent shall demonstrate compliance with the TRS emission limiting standards for the Smelt Dissolving Tanks pursuant to Rule 17-2.600(4)(c)4, F.A.C., 502 days after start-up but not later than twelve (12) months earlier than required by the rule.

23. Respondent shall demonstrate compliance with the TRS emission limiting standards for the multiple effect evaporators pursuant to Rule 17-2.600(4)(c)1, F.A.C., by 622 days after start-up but not later than nine months earlier than required by the rule.

24. All other TRS sources addressed by 17-2 must meet the applicable TRS emission limiting standards no later than the date required in the TRS rules.

25. Respondent shall test each source listed in Exhibit I in accordance with the schedule and test methods attached and incorporated herein as Exhibit III.

26. Respondent shall implement the compliance schedule, attached and incorporated herein as Exhibit IV, for each power boiler which fails to comply with the PM emission limit of 0.10 lbs/million BTU heat input during the initial compliance test. The Respondent retains the right to demonstrate compliance with emission limitations earlier than the time schedule in Exhibit IV.

27. Respondent shall start the boilers using fuel oil containing a maximum of 1.0% sulfur by weight. Respondent shall continue using oil with a maximum of 1% sulfur content by weight unless it demonstrates compliance with particulate matter limits at a higher level of sulfur. Any plan to demonstrate particulate compliance while using higher sulfur content oils shall be reviewed and approved by the Department and BESD prior to commencement of testing. The Department and BESD agree to perform such a review in a timely manner. In no case shall a higher sulfur content of oil be used than allowed by permit. Respondent shall test the oil, which shall be sampled at a mutually acceptable location, for sulfur content on a weekly basis for the first six months and monthly thereafter using any appropriate ASTM method or any other mutually acceptable method. Records of test results shall be retained for two years and shall be made available for review by the Department and BESD upon request.

28. Within 150 operating days of completion of the installation of the lime kiln CEMS described in paragraph 21 above, Respondent will complete a study defining the interim TRS emission limit which can be achieved with the present system through the application of Best Management Practices (BMP), which will be defined by the Department, BESD, and the Respondent prior to the beginning date of the study in this paragraph. The interim TRS limits will be established using the average of the measured 12 hour periods plus an amount which establishes an interim standard level that is expected to statistically occur 95% of the time (approximately 2 standard deviations).

29. Respondent agrees to use BMP to meet the interim emission limitations to be set pursuant to paragraph 27 and shall, beginning with establishment of the interim emission limitations, submit quarterly excess emission reports until compliance is demonstrated as required by Rules 17-2.600(4)(c)5 and 17-2.960, F.A.C. Compliance shall be determined through the EPA Reference Method 16 Test. Should the quarterly twelve (12) hour averages indicate less than 95% compliance with the interim emission limitation, Respondent will perform, if deemed necessary, a Method 16 Test to determine compliance with the interim emission limitation. Failure to meet the interim emission limitation by use of method 16 is an enforceable violation.

30. Prior to start-up of the recovery boiler Respondent shall establish operating conditions through engineering calculations at which one side of the Electrostatic Precipitator (ESP) and the scrubber can maintain compliance. After start-up of the source, the operating rate predicted by the calculations will be the highest rate at which the recovery boiler will operate while using only one side of the ESP until tests are conducted to confirm the level of estimated emissions. Respondent shall, within one year of the start-up date of each recovery boiler, conduct reference method tests to confirm the estimated emissions. If the tests do not indicate compliance while operating with only one side of the ESP and the scrubber, operating conditions will be adjusted so that the unit attains compliance with the particulate emission limitation.

31. Respondent shall submit, to BESD, the additional information requested in BESD's letter dated March 6, 1986 (attached and incorporated herein as Exhibit V) within 15 days of transfer of title to the Respondent.

32. Respondent shall submit, on or before February 12, 1987, to BESD and the Department, emission estimates (including calculations) as follows for each source:

Allowable	lbs/hr + T/yr
Potential (controlled)	lbs/hr + T/yr + concentration
Potential (uncontrolled)	lbs/hr + T/yr + concentration
Estimated Actual 1987	T/yr

The following pollutants shall be included in the emission estimates:

- Carbon Monoxide
- Sulfur Dioxide
- Particulate Matter
- Nitrogen Oxides
- Volatile Organic Compounds
- Lead
- Total Reduced Sulfur

33. If the data required pursuant to paragraphs 31 and 32 above is submitted late, Respondent shall pay the following to BESD and the Department:

- One (1) through ten (10) days late - \$100.00/day
- More than ten (10) days late - \$500.00/day
- for each day beyond ten (10) days late

34. If Respondent fails to meet the milestone dates in the compliance schedule in Exhibit IV, Respondent shall pay the following sums to BESD and the Department:

One (1) to ten (10) days late - \$100.00/day
Eleven (11) to thirty (30) days late - \$500.00/day
Thirty-one (31) or more days late - \$2,500.00/day

Any sum levied under this paragraph for non-compliance with the milestones shall be computed individually for each milestone in Exhibit IV and will accrue daily for failure to meet that milestone only until that milestone is met or until the final compliance date (day 365) is reached. No sum shall be imposed if final compliance is achieved on or before day 365.

35. If Respondent fails to conduct the compliance testing within the times specified in Exhibit III the sum of \$1,000 dollars per day per source which is not tested by the specified dates shall be paid.

36. The Department and BESD specifically reserve the right to take enforcement action for failure to meet the final compliance date specified in Exhibit IV or to demonstrate compliance with any applicable emission limitation.

37. This Consent Order shall terminate upon the last date specified or implied (November 12, 1989) in this Order or upon the written agreement of the parties.

38. Respondent agrees to apply for transfer of all air permits to Seminole Kraft within thirty (30) days of transfer of title to Respondent. The Department agrees to process the request in a timely manner in accordance with Rule 17-4.12, F.A.C.

39. If any event occurs which causes delay or the reasonable likelihood of delay in the achievement of the requirements of this Consent Order, Respondent shall have the burden of proving that the delay was or will be caused by circumstances beyond the reasonable control of Respondent, and could not have been or can not be overcome by due diligence. Upon occurrence of the event Respondent shall promptly notify the Department orally and, shall within seven (7) calendar days, notify the Department in writing of the anticipated length and cause of delay, the measures taken or to be taken to prevent or minimize the delay, and the time table by which Respondent intends to implement these measures. If Respondent can demonstrate to the satisfaction

of the Department and BESD that the delay or anticipated delay has been or will be caused by circumstances beyond the reasonable control of Respondent, the time for performance hereunder shall be extended for a period equal to the delay resulting from such circumstances. Such extension shall be confirmed by letter from the Department accepting or if necessary modifying the extension request. Respondent shall adopt all reasonable measures necessary to avoid or minimize delay. Increased costs of performance of any of the activities set forth in this Consent Order or changed economic circumstances shall not be considered circumstances beyond the control of Respondent.

40. Within thirty (30) days of an uncontested violation or entry of a final order requiring payment, Respondent shall pay the Department 50% of the accrued sums stated in paragraphs 33, 34 and 35 above by certified check or money order made payable to the Department of Environmental Regulation, and submitted to the Department of Environmental Regulation, Northeast District, 3426 Bills Road, Jacksonville, Florida 32207. Concurrently, Respondent shall pay BESD 50% of the accrued sums in paragraphs 33, 34 and 35 above, made payable to the City of Jacksonville, Air Pollution Trust Fund, and submitted to Bio-Environmental Services Division, Air Pollution Control, 515 West 6th Street, Jacksonville, Florida 32206.

41. Respondent shall allow authorized representatives of the Department and BESD access to the property at reasonable times for purposes of determining compliance with this Consent Order and the rules and regulations of the Department.

42. Nothing herein shall be construed as an admission of liability by Respondent nor as a release of any liability by the Department or BESD.

43. The Department and BESD hereby expressly reserve the right to initiate appropriate legal action to prevent or prohibit the future violation of applicable statutes, or the rules promulgated thereunder.

44. Respondent reserves the right to request a hearing regarding any future allegations of violations or controversies regarding this Order.

45. The Department and BESD, for and in consideration of the complete and timely performance by Respondent of the obligations agreed to in this Consent Order, hereby waive their right to seek judicial imposition of damages against Seminole Kraft, or civil or criminal penalties for violations outlined in this Consent Order. Respondent waives its right to a hearing or judicial review of the terms of this Consent Order, except in cases of third party intervention.

46. Except as set forth herein, entry of this Consent Order does not relieve Respondent of the need to comply with all other applicable federal, state, or local laws, regulations, or ordinances. The entry of this Consent Order does not abrogate the rights of substantially affected persons who are not parties to this Consent Order, pursuant to Chapter 120, Fla. Stat.

47. The terms and conditions set forth in the Consent Order may be enforced in a court of competent jurisdiction pursuant to Sections 120.69 and 403.121, Fla. Stat. Failure to comply with the terms of this Consent Order shall constitute a violation of Section 403.161(1)(b), Fla. Stat.

48. Respondent is fully aware a violation of the terms of this Consent Order may subject Respondent to judicial imposition of damages, civil penalties of up to \$10,000 per day, per offense, and criminal penalties.

49. No modification of the terms of this Consent Order shall be effective until reduced to writing and executed by both the Respondent, BESD and the Department.

50. Persons other than the parties to this Consent Order whose substantial interests are affected by this Consent Order have a right, pursuant to Section 120.57, Fla. Stat., to petition for an administrative determination (hearing). The petition must conform to the requirements of Chapters 17-103, F.A.C., and 28-5, F.A.C., and must be filed (received) with the Department's Office of General Counsel, 2600 Blair Stone

Road, Tallahassee, Florida 32301, within fourteen (14) days from receipt of this notice. Failure to file a petition within the fourteen (14) days constitutes a waiver of any right such person has to an administrative determination (hearing) pursuant to Section 120.57, Fla. Stat.

51. This Consent Order is final agency action of the Department pursuant to Section 120.69, Fla. Stat. and F.A.C. Rule 17-103.110(3), F.A.C., and it is final and effective on the date filed with the Clerk of the Department unless a Petition for Administrative Hearing is filed in accordance with Chapter 120, Fla. Stat. Upon the timely filing of a petition this Consent Order will not be effective until further order of the Department.

FOR RESPONDENT:

DATE _____

Seminole Kraft Corporation
9469 Eastport Road
Jacksonville, Florida 32218

DONE AND ORDERED this _____ day of _____,
in Jacksonville, Florida.

Donald C. Bayly
Division Chief

City of Jacksonville
Bio-Environmental Services
Division
515 West 6th Street
Jacksonville, Florida 32206

Victoria J. Tschinkel
Secretary

State of Florida Department
of Environmental Regulation
2600 Blair Stone Road
Tallahassee, Florida 32314

Telephone: (904) 488-4805

Copies furnished to:

Office of General Counsel, DER
Bio-Environmental Services Division, City of Jacksonville
Seminole Kraft Corporation
Terry Cole, Oertel & Hoffman, P. A.

EXHIBIT I

<u>SOURCE</u>	<u>PERMIT NO.</u>
Power Boiler No. 1	AO16-71201
Power Boiler No. 2	AO16-71202
Power Boiler No. 3	AO16-71203
Bark Boiler No. 1	AO16-71206
Bark Boiler No. 2	AO16-71207
Recovery Boiler No. 1	AO16-71208
Recovery Boilwer No. 2	AO16-71209
Recovery Boiler No. 3	AO16-71210
Smelt Dissolving Tank No. 1	AO16-71211
Smelt Dissolving Tank No. 2	AO16-71212
Smelt Dissolving Tank No. 3	AO16-71213
Lime Kiln No. 1	AO16-71214
Lime Kiln No. 2	AO16-71204
Lime Kiln No. 3	AO16-71205

EXHIBIT III

<u>SOURCE(S)</u>	<u>SCHEDULE (operating days)</u>	<u>POLLUTANT</u>	<u>TEST METHOD</u>
3 Power Boilers	One Power Boiler within 60 days of start-up. The other two Power Boilers within 120 days of start-up	PM	EPA Reference Method 5 or 17
	Each Power Boiler within 20 days of start-up and concurrent with PM test	VE	EPA Reference Method 9
2 Bark Boilers	One Bark Boiler within 60 days of start-up. The other Bark Boiler within 120 days of start-up	PM	EPA Reference Method 5
		VE	EPA Reference Method 9
3 Recovery Boilers	One Recovery Boiler within 90 days of start-up. The other two Recovery Boilers within 120 days of start-up	PM	EPA Reference Method 5
3 Lime Kilns	One Lime Kiln within 90 days after start-up. The other two Lime Kilns within 120 days after start-up	PM	EPA Reference Method 5
		VE	EPA Reference Method 9
3 Smelt Dissolving Tanks	One Smelt Dissolving Tank within 90 days of start-up. The other two within 120 days of start-up	PM	EPA Reference Method 5
		VE	EPA Reference Method 9

Note: All testing shall be completed as per above schedule.

Note: Special testing condition outlined in Table I, FAC Rule 17-2.700, shall be followed as applicable to each source and test method.

EXHIBIT IV
COMPLIANCE SCHEDULE - POWER BOILERS

Milestones

- Day 1 -date that the plan(s) are due to DER for installation of particulate emissions add-on control equipment.
- Day 90 -let bids for equipment
- Day 120 -begin on-site construction
- Day 300 -complete on-site construction
- Day 365 - demonstrate final compliance by reference test methods

Note: Day 1 begins 90 days after a failed stack test.

March 6, 1986

Re: Operating Permit Applications - Recovery Boilers, Lime Kilns, Smelt Dissolving Tanks, Digester System, Tall Oil Plant

The applications for the following operating permit applications have been determined incomplete and have been placed in abeyance pending receipt/clarification and acceptance of the following information:

1. A check (processing fee) in the amount of \$100.00 payable to the Florida Department of Environmental Regulation.
2. A check (application review fee) for an amount determined according to the attached schedule payable to the Tax Collector-City of Jacksonville.
3. Please provide:
 - a) Digester dimensions
 - b) Volume of wood chips per batch and % moisture (by weight)
 - c) Cooking (batch) time
 - d) Cross sectional sketch of digester
 - e) Blow tank dimensions
 - f) Cross sectional sketch of blow tank
 - g) Hot water accumulator dimensions
 - h) Cross sectional sketch of hot water accumulator
 - i) Calculations demonstrating:
 - i) Maximum, minimum, and average gas flow rate (ACFM & DSCFM), and maximum, minimum, and average velocities, out of each hot water accumulator

ii) Gas exit temperature into non-condensable gas system"

j) Average length of each blow

k) No. of blows per day; average and maximum

l) What is average and maximum no. of concurrent blows into each blow tank?

4. When and for how long during each cooking batch do the digesters vent to the condensers (turpentine system)?
5. A professional engineer's signature and seal is required for the digester permit application. An alternative to the statement in Section I.B. is attached.
6. Three additional copies of the permit application.
7. Signature and date of applicant, and date signed.
8. Operation and maintenance procedures which will be (are) implemented to minimize TRS emissions until such time as final compliance with Rule 17-2.600(4), Florida Administrative Code (FAC), is required.
9. Calculations (or test results) verifying (demonstrating) current TRS emission levels.
10. Calculations providing allowable TRS emission rates when final compliance with Rule 17-2.600(4), FAC, is required.
NOTE: Allowable emissions should be documented in ppm (corrected), lbs/hr and T/yr.
11. Sketch, flow diagram, and operational description of non-condensable gas system. Include pressure relief systems and settings.

B. Multiple Effect Evaporators (MEE) (Nos. 1, 2, and 3)

1. A check (processing fee) in the amount of \$100.00 payable to the Florida Department of Environmental Regulation for each MEE.
2. A check (application review fee) in the amount of \$750.00 payable to the Tax Collector-City of Jacksonville for each MEE.
3. Signature of applicant, and date signed.
4. A professional engineer's signature and seal is required for each MEE permit application. An alternative to the statement in I. B. is attached.
5. Please indicate specific gravity of:
 - a) Black Liquor fed into MEE
 - b) Black Liquor discharged from MEE

6. Please provide:

- a) MEE dimensions.
 - b) Is multiple effect evaporation a batch or continuous operation?
 - c) Identify emission point(s) on sketch
 - d) Emission stack geometry required by Section III.H.
7. Operation and maintenance procedures which will be (are) implemented to minimize TRS emissions until such time as final compliance with Rule 17-2.600(4), FAC, is required.
8. Calculations (or test results) verifying (demonstrating) current TRS emissions levels.
9. Calculations providing allowable TRS emission rates when final compliance with Rule 17-2.600(4), FAC, is required.
NOTE: Allowable emissions should be documented in ppm (corrected), lbs/hr and T/yr.
10. Information on FW spray and FW jets. Is this the cooling tower? Please describe purpose of system.

C. Tall Oil Plant

1. A check (processing fee) in the amount of \$100.00 payable to the Florida Department of Environmental Regulation.
2. A check (application review fee) for an amount determined according to the attached schedule payable to the Tax Collector-City of Jacksonville.
3. Signature of applicant, and date signed.
4. A professional engineer's signature and seal is required for the permit application. An alternative to the statement in I. B. is attached.
5. Operation and maintenance procedures which will be (are) implemented to minimize TRS emissions until such time as final compliance with Rule 17-2.600(4), FAC, is required.
6. Calculations (or test results) verifying (demonstrating) current TRS emissions levels.
7. Calculations providing allowable TRS emission rates when final compliance with Rule 17-2.600(4), FAC, is required.
NOTE: Allowable emissions should be documented in ppm (corrected), lbs/hr and T/yr.

8. Please indicate if any tanks (storage/operation) have the potential to emit TRS compounds to the atmosphere. If so, please list the tanks and describe emission point(s), and provide quantities of TRS emissions in ppm (corrected) lbs/hr and T/yr.

The following permit revision applications have been deemed incomplete and have been placed in abeyance pending receipt/clarification and acceptance of the information below:

A. Lime Kiln No. 1

1. Operation and maintenance procedures which will be (are) implemented to minimize TRS emissions until such time as final compliance with Rule 17-2.600(4), FAC, is required.
2. Calculations (or test results) verifying (demonstrating) current TRS emissions levels.
3. Calculations providing allowable TRS emission rates when final compliance with Rule 17-2.600(4), FAC, is required.

NOTE: Allowable emissions should be documented in ppm (corrected), lbs/hr and T/yr.

B. Lime Kiln No. 2

The same information is required as in A. above.

C. Lime Kiln No. 3

The same information is required as in A. above.

D. Smelt Dissolving Tank No. 1

The same information is required as in A. above.

E. Smelt Dissolving Tank No. 2

The same information is required as in A. above.

March 6, 1986

F. Smelt Dissolving Tank No. 3

The same information is required as in A. above.

Permit revision applications were not received for the recovery boilers. Although TRS is referenced in the current operating permits, the following additional information is required:

A. Recovery Boiler No. 1

1. Provide calculations showing the pounds per hour of black liquor solids (dry basis) fed into the recovery boiler.
2. Type of Kraft Recovery Furnace as described in Rule 17-2.600(4)(c)3., FAC.
3. Calculations demonstrating (providing) allowable TRS emission levels in ppm (corrected) lbs/hr and T/yr.

It is noted that Rule 17-2.971(1), FAC, requires an acceptable TRS continuous emission monitor to be installed on or before April 1, 1986, and certified on or before July 1, 1986. Performance specifications must conform with Rule 17-2.710, FAC, requirements. Please indicate the status of Jacksonville Kraft Paper Company concerning a TRS CEM on the recovery furnace.

B. Recovery Boiler No. 2

The same information is required as in A. above.

C. Recovery Boiler No. 3

The same information is required as in A. above.

Please direct the response, and any questions, to the undersigned.

Very truly yours,

Jerry E. Woosley
Associate Engineer

Enclosure

cc: Mr. Bill Stewart, P.E., DER, w/o enc.
Mr. Johnny Cole, w/o enc.
BESD File 1735 BB w/enc.

JEW/bgm

10.5 MONITORING PROGRAMS

Several environmental monitoring programs or surveys have been conducted on or near the project site. These programs have been carried out to provide base-line information about the site and surrounding areas. The following measurement/survey programs were included.

- Noise. Ambient noise measurements were taken in the site vicinity. These data are included in Subsection 2.3.8.
- Terrestrial Ecology. Surveys were conducted of the project site as well as the proposed coal conveyor and rail line corridors. Complete descriptions of the vegetation and wildlife ecology are included in Subsections 2.3.5, 2.3.6, 6.2.7.1, 6.2.7.3, 6.3.7.1, and 6.3.7.3.
- Lithology. Many core borings have been drilled by Law Engineering on the Seminole Kraft property since 1970. These borings define the subsurface geological structure and are believed representative of the Cedar Bay Cogeneration Project site. Information from many of the borings and auger holes is presented in Subsection 2.3.1.2. Additional information and data are included in Appendix 10.10.
- Ground Water Quality. Ground water quality has been monitored periodically onsite from 1972 to 1983 by Law Engineering. Additional ground water quality testing was performed by ERM in 1988. Results of the water quality testing programs are presented and discussed in Subsection 2.3.2.1. Additional measurement information is given in Appendix 10.11.
- Surface Water Quality. Water quality data for the Broward River, just upstream of its confluence with the St. Johns River, were obtained from the City of Jacksonville, Department of Health, Welfare and Bio-Environmental Services. River water is classified as Class III, generally marine. Water test data are given in Appendix 10.12.

- Air Quality. Air quality data, collected in the Jacksonville area by the Florida DER, have been used on this project to describe the background air quality of the site and impact areas. These data are described and representative background values are presented in Subsection 2.3.7.5.

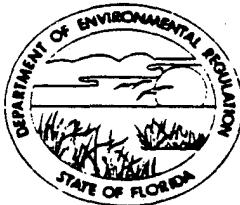
10.6 STATE PERMIT APPLICATIONS OR APPROVALS

10.6.1 Operate/Construct Air Pollution Sources

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

NORTHEAST DISTRICT

3426 BILLS ROAD
JACKSONVILLE, FLORIDA 32207



BOB GRAHAM
GOVERNOR

VICTORIA J. TSCHINKEL
SECRETARY

G. DOUG DUTTON
DISTRICT MANAGER

APPLICATION TO OPERATE/CONSTRUCT AIR POLLUTION SOURCES

SOURCE TYPE: Circulating Fluidized Bed Boiler ☒ New¹ ☐ Existing¹

APPLICATION TYPE: ☒ Construction ☐ Operation ☐ Modification

COMPANY NAME: AES Cedar Bay, Inc. COUNTY: Duval

Identify the specific emission point source(s) addressed in this application (i.e. Lime
Three unit Fluidized
Kiln No. 4 with Venturi Scrubber; Peaking Unit No. 2, Gas Fired) Bed Boiler

SOURCE LOCATION: XXXXXX Cedar Bay Cogeneration Facility City Jacksonville

UTM: East 441.7 km North 3365.6 km

Latitude 30 ° 25 ' 21 "N Longitude 81 ° 36 ' 23 "W

APPLICANT NAME AND TITLE: AES Cedar Bay, Inc.

APPLICANT ADDRESS: 1001 North 19th Street, Suite 2000, Arlington, Virginia 22209

SECTION I: STATEMENTS BY APPLICANT AND ENGINEER

A. APPLICANT

I am the undersigned owner or authorized representative* of AES Cedar Bay, Inc.

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

*Attach letter of authorization

Signed: Jeffrey N. Swain

Jeffrey N. Swain, Project Director
Name and Title (Please Type)

Date: 10-9-89 Telephone No. 703-522-1315

B. PROFESSIONAL ENGINEER REGISTERED IN FLORIDA (where required by Chapter 471, F.S.)

This is to certify that the engineering features of this pollution control project have been designed/examined by me and found to be in conformity with modern engineering principles applicable to the treatment and disposal of pollutants characterized in the permit application. There is reasonable assurance, in my professional judgment, that

¹ See Florida Administrative Code Rule 17-2.100(57) and (104)

the pollution control facilities, when properly maintained and operated, will discharge an effluent that complies with all applicable statutes of the State of Florida and the rules and regulations of the department. It is also agreed that the undersigned will furnish, if authorized by the owner, the applicant a set of instructions for the proper maintenance and operation of the pollution control facilities and, if applicable, pollution sources.

Signed DD Schultz

Donald Dean Schultz

Name (Please Type)

Black & Veatch, Engineers-Architects

Company Name (Please Type)

P. O. Box 8405, Kansas City, Missouri 64114

Mailing Address (Please Type)

Florida Registration No. 30304

Date: November 20, 1980 Telephone No. 913-339-2000

SECTION II: GENERAL PROJECT INFORMATION

- A. Describe the nature and extent of the project. Refer to pollution control equipment, and expected improvements in source performance as a result of installation. State whether the project will result in full compliance. Attach additional sheet if necessary.

The project will result in full compliance. See Sections 3.4 and 5.6 of the Site Certification Application

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

Start of Construction January 1990 Completion of Construction September 1992

- C. Costs of pollution control system(s): (Note: Show breakdown of estimated costs only for individual components/units of the project serving pollution control purposes. Information on actual costs shall be furnished with the application for operation permit.)

See BACT pollution control cost in Section 10.8 of Application.

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

None. See Section 10.4 for existing source permits.

E. Requested permitted equipment operating time: hrs/day 24 ; days/wk 7 ; wks/yr 52 ;
if power plant, hrs/yr 8760 ; if seasonal, describe: NA

F. If this is a new source or major modification, answer the following questions.
(Yes or No)

1. Is this source in a non-attainment area for a particular pollutant? Yes
a. If yes, has "offset" been applied? Yes*
b. If yes, has "Lowest Achievable Emission Rate" been applied? NA
c. If yes, list non-attainment pollutants. Ozone

2. Does best available control technology (BACT) apply to this source?
If yes, see Section VI. Yes

3. Does the State "Prevention of Significant Deterioration" (PSD)
requirement apply to this source? If yes, see Sections VI and VII. Yes

4. Do "Standards of Performance for New Stationary Sources" (NSPS)
apply to this source? Yes

5. Do "National Emission Standards for Hazardous Air Pollutants"
(NESHAP) apply to this source? No

H. Do "Reasonably Available Control Technology" (RACT) requirements apply
to this source? No

a. If yes, for what pollutants? NA

b. If yes, in addition to the information required in this form,
any information requested in Rule 17-2.650 must be submitted.

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

*Onsite source reductions yield net emission reductions for VOC.

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

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

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

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

1. Total Process Input Rate (lbs/hr): NA
2. Product Weight (lbs/hr): NA

C. Airborne Contaminants Emitted: (Information in this table must be submitted for each emission point, use additional sheets as necessary)

Name of Contaminant	Emission ¹		Allowed ² Emission Rate per Rule 17-2	Allowable ³ Emission lbs/hr	Potential ⁴ Emission		Relate to Flow Diagram
	Maximum lbs/hr	Actual T/yr			lbs/yr	T/yr	
(See Sections 3.4 and 5.6 of the Application.							

¹See Section V, Item 2.

²Reference applicable emission standards and units (e.g. Rule 17-2.600(5)(b)2. Table II, E. (1) - 0.1 pounds per million BTU heat input)

³Calculated from operating rate and applicable standard.

⁴Emission, if source operated without control (See Section V, Item 3).

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

Name and Type (Model & Serial No.)	Contaminant	Efficiency	Range of Particles Size Collected (in microns) (If applicable)	Basis for Efficiency (Section V Item 5)
(See Section 3.4 of Application)				

E. Fuels

Type (Be Specific)	Consumption*		Maximum Heat Input (MMBTU/hr)
	avg/hr	max./hr	
Combined Coal and Bark		281,788 lbs/h	3,189
No. 2 Fuel Oil (Startup)		160,000 gal/year	1,120

*Units: Natural Gas--MMCF/hr; Fuel Oils--gallons/hr; Coal, wood, refuse, other--lbs/hr.

Fuel Analysis: Combined coal and bark (No. 2 Fuel Oil)

Percent Sulfur: 1.70 to 3.30 (Max. 0.3) Percent Ash: 14.52 to 18.0

Density: (7.05 AP-42) lbs/gal Typical Percent Nitrogen: 1.19

Heat Capacity: 11,000 BTU/lb (140,000 AP-42) BTU/gal

Other Fuel Contaminants (which may cause air pollution): See Section 10.8 of the Site Certification Application for other fuel contaminants.

F. If applicable, indicate the percent of fuel used for space heating.

Annual Average None Maximum None

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

Ash will be generated as coal combustion and SO₂ removal by-products. Wastes will be removed from the site for final disposal. The ash will be disposed of by the coal supplier out of state or potentially marketed in the materials industry.

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

Stack Height: 435 ft. Stack Diameter: 14 ft.
 Gas Flow Rate: 1,004,000 Total ACFM 667,000 DSCFM Gas Exit Temperature: 265 °F.
 Water Vapor Content: 5 % Velocity: 109 FPS

SECTION IV: INCINERATOR INFORMATION

NA

Type of Waste	Type O (Plastics)	Type I (Rubbish)	Type II (Refuse)	Type III (Garbage)	Type IV (Pathological)	Type V (Liq. & Gas By-prod.)	Type VI (Solid By-prod.)
Actual lb/hr Incinerated							
Uncontrolled (lbs/hr)							

Description of Waste _____

Total Weight Incinerated (lbs/hr) _____ Design Capacity (lbs/hr) _____

Approximate Number of Hours of Operation per day _____ day/wk _____ wks/yr. _____

Manufacturer _____

Date Constructed _____ Model No. _____

	Volume (ft) ³	Heat Release (BTU/hr)	Fuel		Temperature (°F)
			Type	BTU/hr	
Primary Chamber					
Secondary Chamber					

Stack Height: _____ ft. Stack Diameter: _____ Stack Temp. _____

Gas Flow Rate: _____ ACFM _____ DSCFM* Velocity: _____ FPS

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

Type of pollution control device: ☐ Cyclone ☐ Wet Scrubber ☐ Afterburner

☐ Other (specify) _____

Brief description of operating characteristics of control devices: _____

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

NOTE: Items 2, 3, 4, 6, 7, 8, and 10 in Section V must be included where applicable.

SECTION V: SUPPLEMENTAL REQUIREMENTS

Please provide the following supplements where required for this application.

1. Total process input rate and product weight -- show derivation [Rule 17-2.100(127)]
2. To a construction application, attach basis of emission estimate (e.g., design calculations, design drawings, pertinent manufacturer's test data, etc.) and attach proposed methods (e.g., FR Part 60 Methods 1, 2, 3, 4, 5) to show proof of compliance with applicable standards. To an operation application, attach test results or methods used to show proof of compliance. Information provided when applying for an operation permit from a construction permit shall be indicative of the time at which the test was made.
3. Attach basis of potential discharge (e.g., emission factor, that is, AP42 test).
4. With construction permit application, include design details for all air pollution control systems (e.g., for baghouse include cloth to air ratio; for scrubber include cross-section sketch, design pressure drop, etc.)
5. With construction permit application, attach derivation of control device(s) efficiency. Include test or design data. Items 2, 3 and 5 should be consistent: actual emissions = potential (1-efficiency).
6. An 8 1/2" x 11" flow diagram which will, without revealing trade secrets, identify the individual operations and/or processes. Indicate where raw materials enter, where solid and liquid waste exit, where gaseous emissions and/or airborne particles are evolved and where finished products are obtained.
7. An 8 1/2" x 11" plot plan showing the location of the establishment, and points of airborne emissions, in relation to the surrounding area, residences and other permanent structures and roadways (Example: Copy of relevant portion of USGS topographic map).
8. An 8 1/2" x 11" plot plan of facility showing the location of manufacturing processes and outlets for airborne emissions. Relate all flows to the flow diagram.

9. The appropriate application fee in accordance with Rule 17-4.05. The check should be made payable to the Department of Environmental Regulation.
10. With an application for operation permit, attach a Certificate of Completion of Construction indicating that the source was constructed as shown in the construction permit.

SECTION VI: BEST AVAILABLE CONTROL TECHNOLOGY

- A. Are standards of performance for new stationary sources pursuant to 40 C.F.R. Part 60 applicable to the source?

☒ Yes ☐ No Subpart Da

Contaminant	Rate or Concentration
SO ₂	0.6 lb/MBtu and 70 percent removal for coals being considered
NO _x	0.60 lb/MBtu
Particulate Matter	0.03 lb/MBtu
Opacity	20 Percent (27 percent--6 minutes/hour)
SO ₂ , NO _x , Opacity, Oxygen (O ₂)	Continuous emission monitoring

- B. Has EPA declared the best available control technology for this class of sources (If yes, attach copy)

☐ Yes ☒ No Case by case determination

Contaminant	Rate or Concentration

- C. What emission levels do you propose as best available control technology? See Sections 3.4 and 10.8 of the Application.

Contaminant	Rate or Concentration

- D. Describe the existing control and treatment technology (if any). See Sections 3.4 and 10.4 of the Application.

1. Control Device/System:

2. Operating Principles:

3. Efficiency:*

4. Capital Costs:

Explain method of determining

5. Useful Life:

7. Energy:

9. Emissions:

6. Operating Costs:

8. Maintenance Cost:

Contaminant

Rate or Concentration

10. Stack Parameters

a. Height:

Ft.

b. Diameter:

Ft.

c. Flow Rate:

ACFM

d. Temperature:

°F.

e. Velocity:

FPS

E. Describe the control and treatment technology available (As many types as applicable, use additional pages if necessary). See Sections 3.4 and 10.9 of the Application.

1.

a. Control Device:

b. Operating Principles:

c. Efficiency:¹

d. Capital Cost:

e. Useful Life:

f. Operating Cost:

g. Energy:²

h. Maintenance Cost:

i. Availability of construction materials and process chemicals:

j. Applicability to manufacturing processes:

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

2.

a. Control Device:

b. Operating Principles:

c. Efficiency:¹

d. Capital Cost:

e. Useful Life:

f. Operating Cost:

g. Energy:²

h. Maintenance Cost:

i. Availability of construction materials and process chemicals:

¹Explain method of determining efficiency.

²Energy to be reported in units of electrical power - KWH design rate.

j. Applicability to manufacturing processes:

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

3.

a. Control Device:

b. Operating Principles:

c. Efficiency:¹

d. Capital Cost:

e. Useful Life:

f. Operating Cost:

g. Energy:²

h. Maintenance Cost:

i. Availability of construction materials and process chemicals:

j. Applicability to manufacturing processes:

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

4.

a. Control Device:

b. Operating Principles:

c. Efficiency:¹

d. Capital Costs:

e. Useful Life:

f. Operating Cost:

g. Energy:²

h. Maintenance Cost:

i. Availability of construction materials and process chemicals:

j. Applicability to manufacturing processes:

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

F. Describe the control technology selected: See Section 3.4 of Application

1. Control Device:

2. Efficiency:¹

3. Capital Cost:

4. Useful Life:

5. Operating Cost:

6. Energy:²

7. Maintenance Cost:

8. Manufacturer:

9. Other locations where employed on similar processes:

a. (1) Company:

(2) Mailing Address:

(3) City:

(4) State:

¹Explain method of determining efficiency.

²Energy to be reported in units of electrical power - KWH design rate.

(5) Environmental Manager:

(6) Telephone No.:

(7) Emissions:¹

Contaminant

Rate or Concentration

(8) Process Rate:¹

b. (1) Company:

(2) Mailing Address:

(3) City:

(4) State:

(5) Environmental Manager:

(6) Telephone No.:

(7) Emissions:¹

Contaminant

Rate or Concentration

(8) Process Rate:¹

10. Reason for selection and description of systems:

¹Applicant must provide this information when available. Should this information not be available, applicant must state the reason(s) why.

SECTION VII - PREVENTION OF SIGNIFICANT DETERIORATION

A. Company Monitored Data No preconstruction monitoring is required. See Section 2.3 of the Application.

1. _____ no. sites _____ TSP _____ () SO₂ _____ Wind spd/dir

Period of Monitoring _____ / _____ / _____ to _____ / _____ / _____
month day year month day year

Other data recorded _____

Attach all data or statistical summaries to this application.

Specify bubbler (B) or continuous (C).

2. Instrumentation, Field and Laboratory

- a. Was instrumentation EPA referenced or its equivalent? ☐ Yes ☐ No
- b. Was instrumentation calibrated in accordance with Department procedures?
☐ Yes ☐ No ☐ Unknown

B. Meteorological Data Used for Air Quality Modeling

1. 5 Year(s) of data from 01 / 01 / 81 to 01 / 01 / 85
month day year month day year

2. Surface data obtained from (location) Jacksonville, Florida

3. Upper air (mixing height) data obtained from (location) Waycross, Georgia

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

C. Computer Models Used

1. PTPLU-2 (UNAMAP 6) Modified? If yes, attach description.
2. ISCST (UNAMAP 6) Modified? If yes, attach description.
3. _____ Modified? If yes, attach description.
4. _____ Modified? If yes, attach description.

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

Applicants Maximum Allowable Emission Data

Pollutant	Emission Rate
TSP	<u>8.06</u> grams/sec
SO ₂	<u>241.03</u> grams/sec

E. Emission Data Used in Modeling

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

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

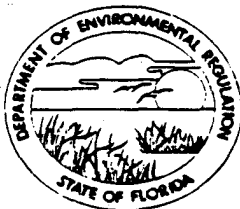
G. Discuss the social and economic impact of the selected technology versus other applicable technologies (i.e., jobs, payroll, production, taxes, energy, etc.). Include assessment of the environmental impact of the sources.

H. Attach scientific, engineering, and technical material, reports, publications, journals, and other competent relevant information describing the theory and application of the requested best available control technology.

STATE OF FLORIDA

DEPARTMENT OF ENVIRONMENTAL REGULATION

NORTHEAST DISTRICT

3426 BILLS ROAD
JACKSONVILLE, FLORIDA 32207BOB GRAHAM
GOVERNORVICTORIA J. TSCHINKEL
SECRETARYG. DOUG DUTTON
DISTRICT MANAGER

APPLICATION TO OPERATE/CONSTRUCT AIR POLLUTION SOURCES

SOURCE TYPE: Kraft Recovery Boiler ☒ New¹ ☐ Existing¹APPLICATION TYPE: ☒ Construction ☐ Operation ☐ ModificationCOMPANY NAME: Seminole Kraft Corporation COUNTY: DuvalIdentify the specific emission point source(s) addressed in this application (i.e. Lime
Kiln No. 4 with Venturi Scrubber; Peaking Unit No. 2, Gas Fired) Kraft Recovery BoilerSOURCE LOCATION: ~~Street~~ Cedar Bay Cogeneration Facility City JacksonvilleUTM: East 441.8 km North 3365.5 kmLatitude 30 ° 25 ' 17 "N Longitude 81 ° 36 ' 19 "WAPPLICANT NAME AND TITLE: Seminole Kraft CorporationAPPLICANT ADDRESS: 9469 Eastport Road, Jacksonville, Florida 32218-0998

SECTION I: STATEMENTS BY APPLICANT AND ENGINEER

A. APPLICANT

I am the undersigned owner or authorized representative* of Seminole Kraft Corporation

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

*Attach letter of authorization

Signed: L. A. StanleyL. A. Stanley, General Manager
Name and Title (Please Type)Date: 2/8/89 Telephone No. 904-751-6400

B. PROFESSIONAL ENGINEER REGISTERED IN FLORIDA (where required by Chapter 471, F.S.)

This is to certify that the engineering features of this pollution control project have been designed/examined by me and found to be in conformity with modern engineering principles applicable to the treatment and disposal of pollutants characterized in the permit application. There is reasonable assurance, in my professional judgment, that

¹ See Florida Administrative Code Rule 17-2.100(57) and (104)

the pollution control facilities, when properly maintained and operated, will discharge an effluent that complies with all applicable statutes of the State of Florida and the rules and regulations of the department. It is also agreed that the undersigned will furnish, if authorized by the owner, the applicant a set of instructions for the proper maintenance and operation of the pollution control facilities and, if applicable, pollution sources.

Signed D D Schultz

Donald Dean Schultz

Name (Please Type)

Black & Veatch, Engineers-Architects

Company Name (Please Type)

P. O. Box 8405, Kansas City, Missouri 64114

Mailing Address (Please Type)

Florida Registration No. 30304

Date: November 20, 1980 Telephone No. 913-339-2000

SECTION II: GENERAL PROJECT INFORMATION

- A. Describe the nature and extent of the project. Refer to pollution control equipment, and expected improvements in source performance as a result of installation. State whether the project will result in full compliance. Attach additional sheet if necessary.

The project will result in full compliance. See Sections 3.4 and 5.6 of the Site

Certification Application.

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

Start of Construction January 1990 Completion of Construction March 1992

- C. Costs of pollution control system(s): (Note: Show breakdown of estimated costs only for individual components/units of the project serving pollution control purposes. Information on actual costs shall be furnished with the application for operation permit.)

The electrostatic precipitator will cost approximately \$5.00 x 10⁶.

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

See Section 10.4 for existing source permits.

E. Requested permitted equipment operating time: hrs/day 24 ; days/wk 7 ; wks/yr 52 ;
if power plant, hrs/yr NA ; if seasonal, describe: Not seasonal

F. If this is a new source or major modification, answer the following questions.
(Yes or No)

1. Is this source in a non-attainment area for a particular pollutant? Yes
 - a. If yes, has "offset" been applied? *
 - b. If yes, has "Lowest Achievable Emission Rate" been applied? NA
 - c. If yes, list non-attainment pollutants. Ozone
2. Does best available control technology (BACT) apply to this source?
If yes, see Section VI. Yes
3. Does the State "Prevention of Significant Deterioration" (PSD)
requirement apply to this source? If yes, see Sections VI and VII. Yes
4. Do "Standards of Performance for New Stationary Sources" (NSPS)
apply to this source? Yes
5. Do "National Emission Standards for Hazardous Air Pollutants"
(NESHAP) apply to this source? No
- H. Do "Reasonably Available Control Technology" (RACT) requirements apply
to this source? No
 - a. If yes, for what pollutants? NA
 - b. If yes, in addition to the information required in this form,
any information requested in Rule 17-2.650 must be submitted.

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

*Onsite source reductions yield net emission reduction for VOC.

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

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

Description	Contaminants		Utilization Rate - lbs/hr	Relate to Flow Diagram
	Type	% Wt		
See III E.				

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

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

2. Product Weight (lbs/hr): NA

C. Airborne Contaminants Emitted: (Information in this table must be submitted for each emission point, use additional sheets as necessary)

Name of Contaminant	Emission ¹		Allowed ² Emission Rate per Rule 17-2	Allowable ³ Emission lbs/hr	Potential ⁴ Emission		Relate to Flow Diagram
	Maximum lbs/hr	Actual T/yr			lbs/yr	T/yr	
(See Sections 3.4 and 5.6 of the Application.							

¹See Section V, Item 2.

²Reference applicable emission standards and units (e.g. Rule 17-2.600(5)(b)2. Table II, E. (1) - 0.1 pounds per million BTU heat input)

³Calculated from operating rate and applicable standard.

⁴Emission, if source operated without control (See Section V, Item 3).

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

Name and Type (Model & Serial No.)	Contaminant	Efficiency	Range of Particles Size Collected (in microns) (If applicable)	Basis for Efficiency (Section V Item 5)
(See Section 3.4 of Application)				

E. Fuels

Type (Be Specific)	Consumption*		Maximum Heat Input (MMBTU/hr)
	avg/hr	max./hr	
Black liquor by-product		248,800 lbs/h	1,125
No. 6 Fuel Oil (Startup, Shutdown, and malfunction)		750,000 gal/year	

*Units: Natural Gas--MMCF/hr; Fuel Oils--gallons/hr; Coal, wood, refuse, other--lbs/hr.

Fuel Analysis: Black Liquor By-Product (No. 6 Fuel Oil)

Percent Sulfur: 2.60 (wet basis) (2.27) Percent Ash: 14.63 (wet basis)

Density: (7.88 AP-42) lbs/gal Typical Percent Nitrogen: 0.04

Heat Capacity: 4,522 BTU/lb (150,000 AP-42) BTU/gal

Other Fuel Contaminants (which may cause air pollution): See Section 10.9 of the Site

Certification Application for other fuel contaminants.

F. If applicable, indicate the percent of fuel used for space heating.

Annual Average None Maximum None

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

No solid wastes will be generated. Although ash (smelt) is produced, it is processed
in the smelt dissolving tank and recycled within the process. Boiler blowdown will be
reused as makeup to the cooling towers. See SCA Section 3.5 for full wastewater
treatment and disposal discussion.

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

Stack Height: 425 ft. Stack Diameter: 11.25 ft.
 Gas Flow Rate: 399,938 ACFM 202,328 DSCFM Gas Exit Temperature: 400 °F.
 Water Vapor Content: 17.6 % Velocity: 67.1 FPS

SECTION IV: INCINERATOR INFORMATION

NA

Type of Waste	Type 0 (Plastics)	Type I (Rubbish)	Type II (Refuse)	Type III (Garbage)	Type IV (Pathological)	Type V (Liq. & Gas By-prod.)	Type VI (Solid By-prod.)
Actual lb/hr Incinerated							
Uncontrolled (lbs/hr)							

Description of Waste _____

Total Weight Incinerated (lbs/hr) _____ Design Capacity (lbs/hr) _____

Approximate Number of Hours of Operation per day _____ day/wk _____ wks/yr. _____

Manufacturer _____

Date Constructed _____ Model No. _____

	Volume (ft) ³	Heat Release (BTU/hr)	Fuel		Temperature (°F)
			Type	BTU/hr	
Primary Chamber					
Secondary Chamber					

Stack Height: _____ ft. Stack Diameter: _____ Stack Temp. _____

Gas Flow Rate: _____ ACFM _____ DSCFM* Velocity: _____ FPS

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

Type of pollution control device: ☐ Cyclone ☐ Wet Scrubber ☐ Afterburner☐ Other (specify) _____

Brief description of operating characteristics of control devices: _____

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

NOTE: Items 2, 3, 4, 6, 7, 8, and 10 in Section V must be included where applicable.

SECTION V: SUPPLEMENTAL REQUIREMENTS

Please provide the following supplements where required for this application.

1. Total process input rate and product weight -- show derivation [Rule 17-2.100(127)]
2. To a construction application, attach basis of emission estimate (e.g., design calculations, design drawings, pertinent manufacturer's test data, etc.) and attach proposed methods (e.g., FR Part 60 Methods 1, 2, 3, 4, 5) to show proof of compliance with applicable standards. To an operation application, attach test results or methods used to show proof of compliance. Information provided when applying for an operation permit from a construction permit shall be indicative of the time at which the test was made.
3. Attach basis of potential discharge (e.g., emission factor, that is, AP42 test).
4. With construction permit application, include design details for all air pollution control systems (e.g., for baghouse include cloth to air ratio; for scrubber include cross-section sketch, design pressure drop, etc.)
5. With construction permit application, attach derivation of control device(s) efficiency. Include test or design data. Items 2, 3 and 5 should be consistent: actual emissions = potential (1-efficiency).
6. An 8 1/2" x 11" flow diagram which will, without revealing trade secrets, identify the individual operations and/or processes. Indicate where raw materials enter, where solid and liquid waste exit, where gaseous emissions and/or airborne particles are evolved and where finished products are obtained.
7. An 8 1/2" x 11" plot plan showing the location of the establishment, and points of airborne emissions, in relation to the surrounding area, residences and other permanent structures and roadways (Example: Copy of relevant portion of USGS topographic map).
8. An 8 1/2" x 11" plot plan of facility showing the location of manufacturing processes and outlets for airborne emissions. Relate all flows to the flow diagram.

9. The appropriate application fee in accordance with Rule 17-4.05. The check should be made payable to the Department of Environmental Regulation.
10. With an application for operation permit, attach a Certificate of Completion of Construction indicating that the source was constructed as shown in the construction permit.

SECTION VI: BEST AVAILABLE CONTROL TECHNOLOGY

- A. Are standards of performance for new stationary sources pursuant to 40 C.F.R. Part 60 applicable to the source?

☒ Yes ☐ No Subpart BB

Contaminant	Rate or Concentration
Particulate	0.044 gr/dscf corrected to 8% O ₂
Total Reduced Sulfur (TRS)	5 ppmvd corrected to 8% O ₂
Opacity	35 percent

- B. Has EPA declared the best available control technology for this class of sources (if yes, attach copy)

☐ Yes ☒ No Case by case determination

Contaminant	Rate or Concentration

- C. What emission levels do you propose as best available control technology? See Sections 3.4.3 and 10.9 of the Application.

Contaminant	Rate or Concentration

- D. Describe the existing control and treatment technology (if any). See Sections 3.4 and 10.4 of the Application.

1. Control Device/System:

2. Operating Principles:

3. Efficiency:

4. Capital Costs:

Explain method of determining

5. Useful Life:

7. Energy:

9. Emissions:

6. Operating Costs:

8. Maintenance Cost:

Contaminant

Rate or Concentration

10. Stack Parameters

a. Height:

ft.

b. Diameter:

ft.

c. Flow Rate:

ACFM

d. Temperature:

°F.

e. Velocity:

FPS

E. Describe the control and treatment technology available (As many types as applicable, use additional pages if necessary). See Sections 3.4 and 10.9 of the Application.

1.

a. Control Devices:

b. Operating Principles:

c. Efficiency:¹

d. Capital Cost:

e. Useful Life:

f. Operating Cost:

g. Energy:²

h. Maintenance Cost:

i. Availability of construction materials and process chemicals:

j. Applicability to manufacturing processes:

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

2.

a. Control Devices:

b. Operating Principles:

c. Efficiency:¹

d. Capital Cost:

e. Useful Life:

f. Operating Cost:

g. Energy:²

h. Maintenance Cost:

i. Availability of construction materials and process chemicals:

¹Explain method of determining efficiency.

²Energy to be reported in units of electrical power - KWH design rate.

j. Applicability to manufacturing processes:

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

3.

a. Control Device:

b. Operating Principles:

c. Efficiency:¹

d. Capital Cost:

e. Useful Life:

f. Operating Cost:

g. Energy:²

h. Maintenance Cost:

i. Availability of construction materials and process chemicals:

j. Applicability to manufacturing processes:

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

4.

a. Control Device:

b. Operating Principles:

c. Efficiency:¹

d. Capital Costs:

e. Useful Life:

f. Operating Cost:

g. Energy:²

h. Maintenance Cost:

i. Availability of construction materials and process chemicals:

j. Applicability to manufacturing processes:

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

F. Describe the control technology selected: See Section 3.4 of Application

1. Control Device:

2. Efficiency:¹

3. Capital Cost:

4. Useful Life:

5. Operating Cost:

6. Energy:²

7. Maintenance Cost:

8. Manufacturer:

9. Other locations where employed on similar processes:

a. (1) Company:

(2) Mailing Address:

(3) City:

(4) State:

¹Explain method of determining efficiency.

²Energy to be reported in units of electrical power - KWH design rate.

(5) Environmental Manager:

(6) Telephone No.:

(7) Emissions:¹

Contaminant

Rate or Concentration

(8) Process Rate:¹

b. (1) Company:

(2) Mailing Address:

(3) City:

(4) State:

(5) Environmental Manager:

(6) Telephone No.:

(7) Emissions:¹

Contaminant

Rate or Concentration

(8) Process Rate:¹

10. Reason for selection and description of systems:

¹Applicant must provide this information when available. Should this information not be available, applicant must state the reason(s) why.

SECTION VII - PREVENTION OF SIGNIFICANT DETERIORATION

A. Company Monitored Data No preconstruction monitoring is required. See Section 2.3 of the Application.

1. _____ no. sites _____ TSP _____ () SO₂ _____ Wind spd/dir

Period of Monitoring _____ / _____ / _____ to _____ / _____ / _____
month day year month day year

Other data recorded _____

Attach all data or statistical summaries to this application.

Specify bubbler (B) or continuous (C).

2. Instrumentation, Field and Laboratory

- a. Was instrumentation EPA referenced or its equivalent? ☐ Yes ☐ No
- b. Was instrumentation calibrated in accordance with Department procedures?
☐ Yes ☐ No ☐ Unknown

8. Meteorological Data Used for Air Quality Modeling

1. 5 Year(s) of data from 01 / 01 / 81 to 12 / 31 / 85
month day year month day year
2. Surface data obtained from (location) Jacksonville, Florida
3. Upper air (mixing height) data obtained from (location) Waycross
4. Stability wind rose (STAR) data obtained from (location) NA

C. Computer Models Used

- | | | | |
|----|---------------------------|-----------|-----------------------------|
| 1. | <u>PTPLU-2 (UNAMAP 6)</u> | Modified? | If yes, attach description. |
| 2. | <u>ISCST (UNAMAP 6)</u> | Modified? | If yes, attach description. |
| 3. | <u></u> | Modified? | If yes, attach description. |
| 4. | <u></u> | Modified? | If yes, attach description. |

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

Applicants Maximum Allowable Emission Data

Pollutant	Emission Rate	
TSP	13.5	grams/sec
so ₂	42.8	grams/sec

E. Emission Data Used in Modeling

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

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

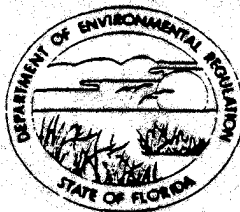
G. Discuss the social and economic impact of the selected technology versus other applicable technologies (i.e., jobs, payroll, production, taxes, energy, etc.). Include assessment of the environmental impact of the sources.

H. Attach scientific, engineering, and technical material, reports, publications, journals, and other competent relevant information describing the theory and application of the requested best available control technology.

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

NORTHEAST DISTRICT

3426 BILLS ROAD
JACKSONVILLE, FLORIDA 32207



BOB GRAHAM
GOVERNOR

VICTORIA J. TSCHINKEL
SECRETARY

G. DOUG DUTTON
DISTRICT MANAGER

APPLICATION TO OPERATE/CONSTRUCT AIR POLLUTION SOURCES

SOURCE TYPE: Smelt Dissolving Tank ☒ New¹ ☐ Existing¹

APPLICATION TYPE: ☒ Construction ☐ Operation ☐ Modification

COMPANY NAME: Seminole Kraft Corporation COUNTY: Duval

Identify the specific emission point source(s) addressed in this application (i.e. Lime
Kiln No. 4 with Venturi Scrubber; Peaking Unit No. 2, Gas Fired) Smelt Dissolving Tank
with Liquid Contact

SOURCE LOCATION: ~~XXXXXX~~ Cedar Bay Cogeneration Facility Scrubber
City Jacksonville

UTM: East 441.9 km North 3365.6 km

Latitude 30 ° 25 ' 18 "N Longitude 81 ° 36 ' 18 "W

APPLICANT NAME AND TITLE: Seminole Kraft Corporation

APPLICANT ADDRESS: 9469 Eastport Road, Jacksonville, Florida 32218-0998

SECTION I: STATEMENTS BY APPLICANT AND ENGINEER

A. APPLICANT

I am the undersigned owner or authorized representative* of Seminole Kraft Corporation

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

*Attach letter of authorization

Signed: L. A. Stanley

L. A. Stanley, General Manager
Name and Title (Please Type)

Date: 2/8/89 Telephone No. 904-751-6400

B. PROFESSIONAL ENGINEER REGISTERED IN FLORIDA (where required by Chapter 471, F.S.)

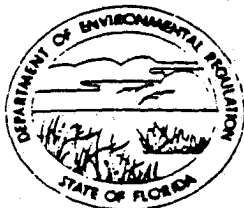
This is to certify that the engineering features of this pollution control project have
been designed/examined by me and found to be in conformity with modern engineering
principles applicable to the treatment and disposal of pollutants characterized in the
permit application. There is reasonable assurance, in my professional judgment, that

¹ See Florida Administrative Code Rule 17-2.100(57) and (104)

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

NORTHEAST DISTRICT

3426 BILLS ROAD
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COMPANY NAME: Seminole Kraft Corporation COUNTY: Duval

Identify the specific emission point source(s) addressed in this application (i.e. Lime
Kiln No. 4 with Venturi Scrubber; Peaking Unit No. 2, Gas Fired) Smelt Dissolving Tank
with liquid contact
scrubber

SOURCE LOCATION: ~~SMELT~~ Cedar Bay Cogeneration Facility City Jacksonville

UTM: East 442.3 km North 3366.4 km

Latitude 30° 25' 20" N Longitude 81° 36' 10" W

APPLICANT NAME AND TITLE: Seminole Kraft Corporation

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and I will promptly notify the department upon sale or legal transfer of the permitted
establishment.

*Attach letter of authorization

Signed: T. Frank Lee

T. Frank Lee, General Manager
Name and Title (Please Type)

Date: 10/14/88 Telephone No. 904-751-6400

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principles applicable to the treatment and disposal of pollutants characterized in the
permit application. There is reasonable assurance, in my professional judgment, that

¹ See Florida Administrative Code Rule 17-2.100(57) and (104)

the pollution control facilities, when properly maintained and operated, will discharge an effluent that complies with all applicable statutes of the State of Florida and the rules and regulations of the department. It is also agreed that the undersigned will furnish, if authorized by the owner, the applicant a set of instructions for the proper maintenance and operation of the pollution control facilities and, if applicable, pollution sources.

Signed D D Schultz

Donald Dean Schultz

Name (Please Type)

Black & Veatch, Engineers-Architects

Company Name (Please Type)

P. O. Box 8405, Kansas City, Missouri 64114

Mailing Address (Please Type)

Florida Registration No. 30304

Date: November 20, 1980 Telephone No. 913-339-2000

SECTION II: GENERAL PROJECT INFORMATION

- A. Describe the nature and extent of the project. Refer to pollution control equipment, and expected improvements in source performance as a result of installation. State whether the project will result in full compliance. Attach additional sheet if necessary.

The project will result in full compliance. See Sections 3.4 and 5.6 of the Site

Certification Application.

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

Start of Construction NA Completion of Construction NA

- C. Costs of pollution control system(s): (Note: Show breakdown of estimated costs only for individual components/units of the project serving pollution control purposes. Information on actual costs shall be furnished with the application for operation permit.)

Approximately \$100,000 to \$150,000 for scrubbers.

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

See Section 10.4 for existing source permits.

E. Requested permitted equipment operating time: hrs/day 24 ; days/wk 7 ; wks/yr 52 ;
if power plant, hrs/yr NA ; if seasonal, describe: Not seasonal

F. If this is a new source or major modification, answer the following questions.
(Yes or No)

1. Is this source in a non-attainment area for a particular pollutant? Yes
a. If yes, has "offset" been applied? *
b. If yes, has "Lowest Achievable Emission Rate" been applied? No
c. If yes, list non-attainment pollutants. Ozone

2. Does best available control technology (BACT) apply to this source?
If yes, see Section VI. No

3. Does the State "Prevention of Significant Deterioration" (PSD)
requirement apply to this source? If yes, see Sections VI and VII. Yes

4. Do "Standards of Performance for New Stationary Sources" (NSPS)
apply to this source? Yes

5. Do "National Emission Standards for Hazardous Air Pollutants"
(NESHAP) apply to this source? No

H. Do "Reasonably Available Control Technology" (RACT) requirements apply
to this source? No

a. If yes, for what pollutants? NA

b. If yes, in addition to the information required in this form,
any information requested in Rule 17-2.630 must be submitted.

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

*Onsite source reductions yield net emission reductions for VOC.

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

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

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

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

1. Total Process Input Rate (lbs/hr): NA
2. Product Weight (lbs/hr): NA

C. Airborne Contaminants Emitted: (Information in this table must be submitted for each emission point, use additional sheets as necessary)

Name of Contaminant	Emission ¹		Allowed ² Emission Rate per Rule 17-2	Allowable ³ Emission lbs/hr	Potential ⁴ Emission		Relate to Flow Diagram
	Maximum lbs/hr	Actual T/yr			lbs/yr	T/yr	
(See Sections 3.4 and 5.6 of the Application.							

¹See Section V, Item 2.

²Reference applicable emission standards and units (e.g. Rule 17-2.600(5)(b)2. Table II, E. (1) - 0.1 pounds per million BTU heat input)

³Calculated from operating rate and applicable standard.

⁴Emission, if source operated without control (See Section V, Item 3).

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

Name and Type (Model & Serial No.)	Contaminant	Efficiency	Range of Particles Size Collected (in microns) (If applicable)	Basis for Efficiency (Section V Item 5)
(See Section 3.4 of Application)				

E. Fuels

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

*Units: Natural Gas--MMCF/hr; Fuel Oils--gallons/hr; Coal, wood, refuse, other--lbs/hr.

Fuel Analysis:

Percent Sulfur: _____ Percent Ash: _____

Density: _____ lbs/gal Typical Percent Nitrogen: _____

Heat Capacity: _____ BTU/lb _____ BTU/gal

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

F. If applicable, indicate the percent of fuel used for space heating.

Annual Average None Maximum None

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

No solid wastes or wastewater will be generated.

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

Stack Height: 240 ft. Stack Diameter: 5 ft.
 Gas Flow Rate: 55,000 ACFM 35,000 DSCFM Gas Exit Temperature: 160 °F.
 Water Vapor Content: 25 % Velocity: 47 FPS

SECTION IV: INCINERATOR INFORMATION

NA

Type of Waste	Type 0 (Plastics)	Type I (Rubbish)	Type II (Refuse)	Type III (Garbage)	Type IV (Pathological)	Type V (Liq. & Gas By-prod.)	Type VI (Solid By-prod.)
Actual lb/hr Incinerated							
Uncontrolled (lb/hr)							

Description of Waste _____

Total Weight Incinerated (lbs/hr) _____ Design Capacity (lbs/hr) _____

Approximate Number of Hours of Operation per day _____ day/wk _____ wks/yr. _____

Manufacturer _____

Date Constructed _____ Model No. _____

	Volume (ft) ³	Heat Release (BTU/hr)	Fuel		Temperature (°F)
			Type	BTU/hr	
Primary Chamber					
Secondary Chamber					

Stack Height: _____ ft. Stack Diameter: _____ Stack Temp. _____

Gas Flow Rate: _____ ACFM _____ DSCFM* Velocity: _____ FPS

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

Type of pollution control devices: ☐ Cyclone ☐ Wet Scrubber ☐ Afterburner☐ Other (specify) _____

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

Stack Height: 240 ft. Stack Diameter: 5 ft.
 Gas Flow Rate: 55,000 ACFM (LATER) OSCFM Gas Exit Temperature: 160 °F.
 Water Vapor Content: (LATER) % Velocity: 47 FPS

SECTION IV: INCINERATOR INFORMATION

NA

Type of Waste	Type 0 (Plastics)	Type I (Rubbish)	Type II (Refuse)	Type III (Garbage)	Type IV (Pathological)	Type V (Liq. & Gas By-prod.)	Type VI (Solid By-prod.)
Actual lb/hr Incinerated							
Uncontrolled (lbs/hr)							

Description of Waste: _____

Total Weight Incinerated (lbs/hr) _____ Design Capacity (lbs/hr) _____

Approximate Number of Hours of Operation per day _____ day/wk _____ wks/yr. _____

Manufacturer: _____

Date Constructed _____ Model No. _____

	Volume (ft) ³	Heat Release (BTU/hr)	Fuel		Temperature (°F)
			Type	BTU/hr	
Primary Chamber					
Secondary Chamber					

Stack Height: _____ ft. Stack Diameter: _____ Stack Temp. _____

Gas Flow Rates: _____ ACFM _____ OSCFM Velocity: _____ FPS

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

Type of pollution control devices: ☐ Cyclone ☐ Wet Scrubber ☐ Afterburner
☐ Other (specify) _____

Brief description of operating characteristics of control devices: _____

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

NOTE: Items 2, 3, 4, 6, 7, 8, and 10 in Section V must be included where applicable.

SECTION V: SUPPLEMENTAL REQUIREMENTS

Please provide the following supplements where required for this application.

1. Total process input rate and product weight -- show derivation [Rule 17-2.100(127)]
2. To a construction application, attach basis of emission estimate (e.g., design calculations, design drawings, pertinent manufacturer's test data, etc.) and attach proposed methods (e.g., FR Part 60 Methods 1, 2, 3, 4, 5) to show proof of compliance with applicable standards. To an operation application, attach test results or methods used to show proof of compliance. Information provided when applying for an operation permit from a construction permit shall be indicative of the time at which the test was made.
3. Attach basis of potential discharge (e.g., emission factor, that is, AP42 test).
4. With construction permit application, include design details for all air pollution control systems (e.g., for baghouse include cloth to air ratio; for scrubber include cross-section sketch, design pressure drop, etc.)
5. With construction permit application, attach derivation of control device(s) efficiency. Include test or design data. Items 2, 3 and 5 should be consistent: actual emissions = potential (1-efficiency).
6. An 8 1/2" x 11" flow diagram which will, without revealing trade secrets, identify the individual operations and/or processes. Indicate where raw materials enter, where solid and liquid waste exit, where gaseous emissions and/or airborne particles are evolved and where finished products are obtained.
7. An 8 1/2" x 11" plot plan showing the location of the establishment, and points of airborne emissions, in relation to the surrounding area, residences and other permanent structures and roadways (Example: Copy of relevant portion of USGS topographic map).
8. An 8 1/2" x 11" plot plan of facility showing the location of manufacturing processes and outlets for airborne emissions. Relate all flows to the flow diagram.

9. The appropriate application fee in accordance with Rule 17-4.05. The check should be made payable to the Department of Environmental Regulation.
10. With an application for operation permit, attach a Certificate of Completion of Construction indicating that the source was constructed as shown in the construction permit.

SECTION VI: BEST AVAILABLE CONTROL TECHNOLOGY

- A. Are standards of performance for new stationary sources pursuant to 40 C.F.R. Part 60 applicable to the source?

☒ Yes ☐ No Subpart BB

Contaminant	Rate or Concentration
Total Reduced Sulfur (TRS)	0.033 lb/ton BLS (as H ₂ S)
Particulate	0.2 lb particulate/ton BLs (dry weight)

- B. Has EPA declared the best available control technology for this class of sources (If yes, attach copy)

☐ Yes ☒ No

Contaminant	Rate or Concentration

- C. What emission levels do you propose as best available control technology? See Section 3.4 of Application

Contaminant	Rate or Concentration

- D. Describe the existing control and treatment technology (if any). See Sections 3.4 and 10.4 of the Application.

1. Control Device/System:

2. Operating Principles:

3. Efficiency:*

4. Capital Costs:

Explain method of determining

5. Useful Life:

7. Energy:

9. Emissions:

6. Operating Costs:

8. Maintenance Cost:

Contaminant

Rate or Concentration

10. Stack Parameters

a. Height:

Ft.

b. Diameter:

Ft.

c. Flow Rate:

ACFM

d. Temperature:

°F.

e. Velocity:

FPS

E. Describe the control and treatment technology available (As many types as applicable, use additional pages if necessary). See Section 3.4 of Application.

1.

a. Control Device:

b. Operating Principles:

c. Efficiency:¹

d. Capital Cost:

e. Useful Life:

f. Operating Cost:

g. Energy:²

h. Maintenance Cost:

i. Availability of construction materials and process chemicals:

j. Applicability to manufacturing processes:

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

2.

a. Control Device:

b. Operating Principles:

c. Efficiency:¹

d. Capital Cost:

e. Useful Life:

f. Operating Cost:

g. Energy:²

h. Maintenance Cost:

i. Availability of construction materials and process chemicals:

¹Explain method of determining efficiency.

²Energy to be reported in units of electrical power - KWH design rate.

j. Applicability to manufacturing processes:

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

3.

a. Control Device:

b. Operating Principles:

c. Efficiency:¹

d. Capital Cost:

e. Useful Life:

f. Operating Cost:

g. Energy:²

h. Maintenance Cost:

i. Availability of construction materials and process chemicals:

j. Applicability to manufacturing processes:

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

4.

a. Control Device:

b. Operating Principles:

c. Efficiency:¹

d. Capital Costs:

e. Useful Life:

f. Operating Cost:

g. Energy:²

h. Maintenance Cost:

i. Availability of construction materials and process chemicals:

j. Applicability to manufacturing processes:

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

F. Describe the control technology selected: See Section 3.4 of Application

1. Control Device:

2. Efficiency:¹

3. Capital Cost:

4. Useful Life:

5. Operating Cost:

6. Energy:²

7. Maintenance Cost:

8. Manufacturer:

9. Other locations where employed on similar processes:

a. (1) Company:

(2) Mailing Address:

(3) City:

(4) State:

¹Explain method of determining efficiency.

²Energy to be reported in units of electrical power - KWH design rate.

(5) Environmental Manager:

(6) Telephone No.:

(7) Emissions:¹

Contaminant

Rate or Concentration

(8) Process Rate:¹

b. (1) Company:

(2) Mailing Address:

(3) City:

(4) State:

(5) Environmental Manager:

(6) Telephone No.:

(7) Emissions:¹

Contaminant

Rate or Concentration

(8) Process Rate:¹

10. Reason for selection and description of systems:

¹Applicant must provide this information when available. Should this information not be available, applicant must state the reason(s) why.

SECTION VII - PREVENTION OF SIGNIFICANT DETERIORATION

A. Company Monitored Data No preconstruction monitoring is required. See Section 2.3 of the Application.

1. _____ no. sites _____ TSP _____ () SO₂ _____ Wind spd/dir

Period of Monitoring _____ / _____ / _____ to _____ / _____ / _____
month day year month day year

Other data recorded _____

Attach all data or statistical summaries to this application.

Specify bubbler (B) or continuous (C).

2. Instrumentation, Field and Laboratory

- a. Was instrumentation EPA referenced or its equivalent? ☐ Yes ☐ No
- b. Was instrumentation calibrated in accordance with Department procedures?
☐ Yes ☐ No ☐ Unknown

B. Meteorological Data Used for Air Quality Modeling

1. 5 Year(s) of data from 01 / 01 / 81 to 12 / 31 / 85
month day year month day year
2. Surface data obtained from (location) Jacksonville, Florida
3. Upper air (mixing height) data obtained from (location) Waycross
4. Stability wind rose (STAR) data obtained from (location) NA

C. Computer Models Used

- | | | | |
|----|---------------------------|-----------|-----------------------------|
| 1. | <u>PTPLU-2 (UNAMAP 6)</u> | Modified? | If yes, attach description. |
| 2. | <u>ISCST (UNAMAP 6)</u> | Modified? | If yes, attach description. |
| 3. | | Modified? | If yes, attach description. |
| 4. | | Modified? | If yes, attach description. |

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

D. Applicants Maximum Allowable Emission Data

Pollutant	Emission Rate	
TSP	2.2	grams/sec
SO ₂	0.3	grams/sec

E. Emission Data Used in Modeling

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

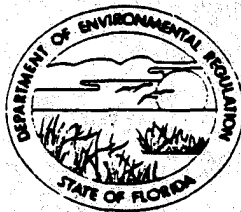
F. Attach all other information supportive to the PSD review.

G. Discuss the social and economic impact of the selected technology versus other applicable technologies (i.e., jobs, payroll, production, taxes, energy, etc.). Include assessment of the environmental impact of the sources.

4. Attach scientific, engineering, and technical material, reports, publications, journals, and other competent relevant information describing the theory and application of the requested best available control technology.

DEPARTMENT OF ENVIRONMENTAL REGULATION

NORTHEAST DISTRICT

3426 BILLS ROAD
JACKSONVILLE, FLORIDA 32207BOB GRAHAM
GOVERNORVICTORIA J. TSCHINKEL
SECRETARYG. DOUG DUTTON
DISTRICT MANAGER

APPLICATION TO OPERATE/CONSTRUCT AIR POLLUTION SOURCES

SOURCE TYPE: Multiple Effects Evaporator ☒ New¹ ☐ Existing¹APPLICATION TYPE: ☒ Construction ☐ Operation ☐ ModificationCOMPANY NAME: Seminole Kraft Corporation COUNTY: DuvalIdentify the specific emission point source(s) addressed in this application (i.e. Lime
Kiln No. 4 with Venturi Scrubber; Peaking Unit No. 2, Gas Fired) Lime Kiln StackSOURCE LOCATION: ~~Street~~ Cedar Bay Cogeneration Facility City JacksonvilleUTM: East 441.7 North 3365.7 kmLatitude 30 ° 25 ' 24 "N Longitude 81 ° 36 ' 26 "WAPPLICANT NAME AND TITLE: Seminole Kraft CorporationAPPLICANT ADDRESS: 9469 Eastport Road, Jacksonville, Florida 32218-0998

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*Attach letter of authorization

Signed: L. A. Stanley

L. A. Stanley, General Manager

Name and Title (Please Type)

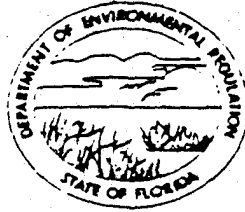
Date: 2/8/89 Telephone No. 904-751-6400

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¹ See Florida Administrative Code Rule 17-2.100(57) and (104)

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION



NORTHEAST DISTRICT

3426 BILLS ROAD
JACKSONVILLE, FLORIDA 32207

BOB GRAHAM
GOVERNOR
VICTORIA J. TSCHINKE
SECRETARY
G. DOUG BUTTS
DISTRICT MANAGER

APPLICATION TO OPERATE/CONSTRUCT AIR POLLUTION SOURCES

SOURCE TYPE: Multiple Effects Evaporator ☒ New¹ ☐ Existing¹

APPLICATION TYPE: ☒ Construction ☐ Operation ☐ Modification

COMPANY NAME: Seminole Kraft Corporation COUNTY: Duval

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

SOURCE LOCATION: ~~XXXXX~~ Cedar Bay Cogeneration Facility City Jacksonville

UTM: East 442.3 km North 3366.4 km

Latitude 30 ° 25 ' 20 "N Longitude 81 ° 36 ' 10 "W

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Signed: T. Frank Lee

T. Frank Lee, General Manager
Name and Title (Please Type)

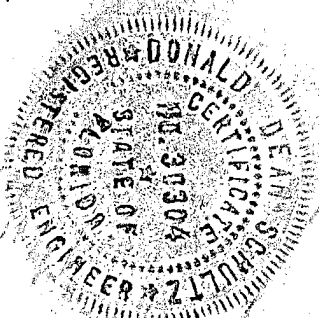
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the pollution control facilities, when properly maintained and operated, will discharge an effluent that complies with all applicable statutes of the State of Florida and the rules and regulations of the department. It is also agreed that the undersigned will furnish, if authorized by the owner, the applicant a set of instructions for the proper maintenance and operation of the pollution control facilities and, if applicable, pollution sources.



Signed D D Schultz

Donald Dean Schultz

Name (Please Type)

Black & Veatch, Engineers-Architects

Company Name (Please Type)

P. O. Box 8405, Kansas City, Missouri 64114

Mailing Address (Please Type)

Florida Registration No. 30304

Date: November 20, 1980 Telephone No. 913-339-2000

SECTION II: GENERAL PROJECT INFORMATION

- A. Describe the nature and extent of the project. Refer to pollution control equipment, and expected improvements in source performance as a result of installation. State whether the project will result in full compliance. Attach additional sheet if necessary.

The project will result in full compliance. See Section 3.4 of the Site Certification

Application

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

Start of Construction NA Completion of Construction NA

- C. Costs of pollution control system(s): (Note: Show breakdown of estimated costs only for individual components/units of the project serving pollution control purposes. Information on actual costs shall be furnished with the application for operation permit.)

NA

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

None

E. Requested permitted equipment operating time: hrs/day 24 ; days/wk 7 ; wks/yr 52 ;
if power plant, hrs/yr NA ; if seasonal, describe: Not seasonal

F. If this is a new source or major modification, answer the following questions.
(Yes or No)

1. Is this source in a non-attainment area for a particular pollutant? Yes
 - a. If yes, has "offset" been applied? *
 - b. If yes, has "Lowest Achievable Emission Rate" been applied? NA
 - c. If yes, list non-attainment pollutants. Ozone
2. Does best available control technology (BACT) apply to this source?
If yes, see Section VI. No
3. Does the State "Prevention of Significant Deterioration" (PSD)
requirement apply to this source? If yes, see Sections VI and VII. Yes
4. Do "Standards of Performance for New Stationary Sources" (NSPS)
apply to this source? Yes
5. Do "National Emission Standards for Hazardous Air Pollutants"
(NESHAP) apply to this source? No
- H. Do "Reasonably Available Control Technology" (RACT) requirements apply
to this source? No
 - a. If yes, for what pollutants? NA
 - b. If yes, in addition to the information required in this form,
any information requested in Rule 17-2.650 must be submitted.

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

*Onsite source reductions yield net emission reductions for VOC.

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

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

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

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

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

2. Product Weight (lbs/hr): NA

C. Airborne Contaminants Emitted: (Information in this table must be submitted for each emission point, use additional sheets as necessary)

Name of Contaminant	Emission ¹		Allowed ² Emission Rate per Rule 17-2	Allowable ³ Emission lbs/hr	Potential ⁴ Emission		Relate to Flow Diagram
	Maximum lbs/hr	Actual T/yr			lbs/yr	T/yr	
(See Section 3.4 of the Application.							

¹See Section V, Item 2.

²Reference applicable emission standards and units (e.g. Rule 17-2.600(5)(b)2. Table II, E. (1) - 0.1 pounds per million BTU heat input)

³Calculated from operating rate and applicable standard.

⁴Emission, if source operated without control (See Section V, Item 3).

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

Name and Type (Model & Serial No.)	Contaminant	Efficiency	Range of Particles Size Collected (in microns) (If applicable)	Basis for Efficiency (Section V Item 5)
(See Section 3.4 of the Application)				

E. Fuels

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

*Units: Natural Gas--MMCF/hr; Fuel Oils--gallons/hr; Coal, wood, refuse, other--lbs/hr.

Fuel Analysis:

Percent Sulfur: _____ Percent Ash: _____

Density: _____ lbs/gal Typical Percent Nitrogen: _____

Heat Capacity: _____ BTU/lb _____ BTU/gal

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

F. If applicable, indicate the percent of fuel used for space heating.

Annual Average _____ None _____ Maximum _____ None _____

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

No additional solid wastes or wastewater will be generated.

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

Stack Height: 75 ft. Stack Diameter: 3.7 ft.
 Gas Flow Rate: 22,000 ACFM 14,300 DSCFM Gas Exit Temperature: 150 °F
 Water Vapor Content: 25 % Velocity: 34 FPS

SECTION IV: INCINERATOR INFORMATION

NA

Type of Waste	Type 0 (Plastics)	Type I (Rubbish)	Type II (Refuse)	Type III (Garbage)	Type IV (Pathological)	Type V (Liq. & Gas By-prod.)	Type VI (Solid By-prod.)
Actual lb/hr Incinerated							
Uncontrolled (lbs/hr)							

Description of Waste _____

Total Weight Incinerated (lbs/hr) _____ Design Capacity (lbs/hr) _____

Approximate Number of Hours of Operation per day _____ day/wk _____ wks/yr. _____

Manufacturer _____

Date Constructed _____ Model No. _____

	Volume (ft) ³	Heat Release (BTU/hr)	Fuel		Temperature (°F)
			Type	BTU/hr	
Primary Chamber					
Secondary Chamber					

Stack Height: _____ ft. Stack Diameter: _____ Stack Temp. _____

Gas Flow Rate: _____ ACFM _____ DSCFM* Velocity: _____ FPS

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

Type of pollution control device: ☐ Cyclone ☐ Wet Scrubber ☐ Afterburner☐ Other (specify) _____

Brief description of operating characteristics of control devices: _____

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

NOTE: Items 2, 3, 4, 6, 7, 8, and 10 in Section V must be included where applicable.

SECTION V: SUPPLEMENTAL REQUIREMENTS

Please provide the following supplements where required for this application.

1. Total process input rate and product weight -- show derivation [Rule 17-2.100(127)]

To a construction application, attach basis of emission estimate (e.g., design calculations, design drawings, pertinent manufacturer's test data, etc.) and attach proposed methods (e.g., FR Part 60 Methods 1, 2, 3, 4, 5) to show proof of compliance with applicable standards. To an operation application, attach test results or methods used to show proof of compliance. Information provided when applying for an operation permit from a construction permit shall be indicative of the time at which the test was made.

3. Attach basis of potential discharge (e.g., emission factor, that is, AP42 test).

4. With construction permit application, include design details for all air pollution control systems (e.g., for baghouse include cloth to air ratio; for scrubber include cross-section sketch, design pressure drop, etc.)

5. With construction permit application, attach derivation of control device(s) efficiency. Include test or design data. Items 2, 3 and 5 should be consistent: actual emissions = potential (1-efficiency).

6. An 8 1/2" x 11" flow diagram which will, without revealing trade secrets, identify the individual operations and/or processes. Indicate where raw materials enter, where solid and liquid waste exit, where gaseous emissions and/or airborne particles are evolved and where finished products are obtained.

7. An 8 1/2" x 11" plot plan showing the location of the establishment, and points of airborne emissions, in relation to the surrounding area, residences and other permanent structures and roadways (Example: Copy of relevant portion of USGS topographic map).

8. An 8 1/2" x 11" plot plan of facility showing the location of manufacturing processes and outlets for airborne emissions. Relate all flows to the flow diagram.

9. The appropriate application fee in accordance with Rule 17-4.05. The check should be made payable to the Department of Environmental Regulation.
10. With an application for operation permit, attach a Certificate of Completion of Construction indicating that the source was constructed as shown in the construction permit.

SECTION VI: BEST AVAILABLE CONTROL TECHNOLOGY

- A. Are standards of performance for new stationary sources pursuant to 40 C.F.R. Part 60 applicable to the source?

☒ Yes ☐ No Subpart BB

2

Contaminant	Rate or Concentration
Total Reduced Sulfur	5 ppmvd corrected to 10% O ₂

2

- B. Has EPA declared the best available control technology for this class of sources (if yes, attach copy)

☐ Yes ☒ No

Contaminant	Rate or Concentration

- C. What emission levels do you propose as best available control technology? See Section 3.4 of the Application

Contaminant	Rate or Concentration

- D. Describe the existing control and treatment technology (if any). See Section 3.4 of the Application.

1. Control Device/System:

2. Operating Principles:

3. Efficiency:

4. Capital Costs:

Explain method of determining

5. Useful Life:

7. Energy:

9. Emissions:

6. Operating Costs:

8. Maintenance Cost:

Contaminant

Rate or Concentration

10. Stack Parameters

a. Height:

ft.

b. Diameter:

ft.

c. Flow Rate:

ACFM

d. Temperature:

°F.

e. Velocity:

FPS

E. Describe the control and treatment technology available (As many types as applicable, use additional pages if necessary). See Section 3.4 of the Application.

1.

a. Control Device:

b. Operating Principles:

c. Efficiency:¹

d. Capital Cost:

e. Useful Life:

f. Operating Cost:

g. Energy:²

h. Maintenance Cost:

i. Availability of construction materials and process chemicals:

j. Applicability to manufacturing processes:

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

2.

a. Control Device:

b. Operating Principles:

c. Efficiency:¹

d. Capital Cost:

e. Useful Life:

f. Operating Cost:

g. Energy:²

h. Maintenance Cost:

i. Availability of construction materials and process chemicals:

¹ Explain method of determining efficiency.

² Energy to be reported in units of electrical power - KWH design rate.

j. Applicability to manufacturing processes:

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

3.

a. Control Device:

b. Operating Principles:

c. Efficiency:¹

d. Capital Cost:

e. Useful Life:

f. Operating Cost:

g. Energy:²

h. Maintenance Cost:

i. Availability of construction materials and process chemicals:

j. Applicability to manufacturing processes:

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

4.

a. Control Device:

b. Operating Principles:

c. Efficiency:¹

d. Capital Costs:

e. Useful Life:

f. Operating Cost:

g. Energy:²

h. Maintenance Cost:

i. Availability of construction materials and process chemicals:

j. Applicability to manufacturing processes:

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

F. Describe the control technology selected: See Section 3.4 of the Application.

1. Control Device:

2. Efficiency:¹

3. Capital Cost:

4. Useful Life:

5. Operating Cost:

6. Energy:²

7. Maintenance Cost:

8. Manufacturer:

9. Other locations where employed on similar processes:

a. (1) Company:

(2) Mailing Address:

(3) City:

(4) State:

¹Explain method of determining efficiency.

²Energy to be reported in units of electrical power - KWH design rate.

(5) Environmental Manager:

(6) Telephone No.:

(7) Emissions:¹

Contaminant

Rate or Concentration

(8) Process Rate:¹

b. (1) Company:

(2) Mailing Address:

(3) City:

(4) State:

(5) Environmental Manager:

(6) Telephone No.:

(7) Emissions:¹

Contaminant

Rate or Concentration

(8) Process Rate:¹

10. Reason for selection and description of systems:

¹Applicant must provide this information when available. Should this information not be available, applicant must state the reason(s) why.

SECTION VII - PREVENTION OF SIGNIFICANT DETERIORATION

A. Company Monitored Data No preconstruction monitoring is required. See Section 2.3 of the Application.

1. _____ no. sites _____ TSP _____ () SO₂ _____ Wind spd/dir

Period of Monitoring _____ / _____ / _____ to _____ / _____ / _____
month day year month day year

Other data recorded _____

Attach all data or statistical summaries to this application.

Specify bubbler (B) or continuous (C).

2. Instrumentation, Field and Laboratory

- a. Was instrumentation EPA referenced or its equivalent? ☐ Yes ☐ No
b. Was instrumentation calibrated in accordance with Department procedures?
☐ Yes ☐ No ☐ Unknown

B. Meteorological Data Used for Air Quality Modeling

1. 5 Year(s) of data from 01 / 01 / 81 to 01 / 01 / 85
month day year month day year
2. Surface data obtained from (location) Jacksonville, Florida
3. Upper air (mixing height) data obtained from (location) Waycross, Georgia
4. Stability wind rose (STAR) data obtained from (location) NA

C. Computer Models Used

1. PTPLU-2 (UNAMAP 6) Modified? If yes, attach description.
2. ISCST (UNAMAP 6) Modified? If yes, attach description.
3. _____ Modified? If yes, attach description.
4. _____ Modified? If yes, attach description.

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

D. Applicant's Maximum Allowable Emission Data

Pollutant	Emission Rate
TSP	<u>NA</u> grams/sec
SO ₂	<u>NA</u> grams/sec

E. Emission Data Used in Modeling

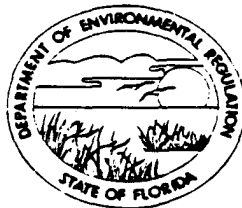
Attach list of emission sources. Emission data required is source name, description of point source (on NEDS point number), UTM coordinates, stack data, allowable emissions, and normal operating time.

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

G. Discuss the social and economic impact of the selected technology versus other applicable technologies (i.e., jobs, payroll, production, taxes, energy, etc.). Include assessment of the environmental impact of the sources.

H. Attach scientific, engineering, and technical material, reports, publications, journals, and other competent relevant information describing the theory and application of the requested best available control technology.

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION



NORTHEAST DISTRICT

3426 BILLS ROAD
JACKSONVILLE, FLORIDA 32207

BOB GRAHAM
GOVERNOR

VICTORIA J. TSCHINKEL
SECRETARY

G. DOUG DUTTON
DISTRICT MANAGER

APPLICATION TO OPERATE/CONSTRUCT AIR POLLUTION SOURCES

SOURCE TYPE: Limestone Dryers ☒ New¹ ☐ Existing¹

APPLICATION TYPE: ☒ Construction ☐ Operation ☐ Modification

COMPANY NAME: AES Cedar Bay, Inc. COUNTY: Duval

Identify the specific emission point source(s) addressed in this application (i.e. Lime
Two Unit
Kiln No. 4 with Venturi Scrubber; Peaking Unit No. 2, Gas Fired) Limestone Dryer

SOURCE LOCATION: ~~Street~~ Cedar Bay Cogeneration Facility City Jacksonville

UTM: East 441.6 North 3365.7

Latitude 30 ° 25 ' 24 "N Longitude 81 ° 36 ' 26 "W

APPLICANT NAME AND TITLE: AES Cedar Bay, Inc.

APPLICANT ADDRESS: 1001 North 19th Street, Arlington, Virginia 22209

SECTION I: STATEMENTS BY APPLICANT AND ENGINEER

A. APPLICANT

I am the undersigned owner or authorized representative* of AES Cedar Bay, Inc.

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

*Attach letter of authorization

Signed: Jeffrey N. Swain

Jeffrey N. Swain, Project Director
Name and Title (Please Type)

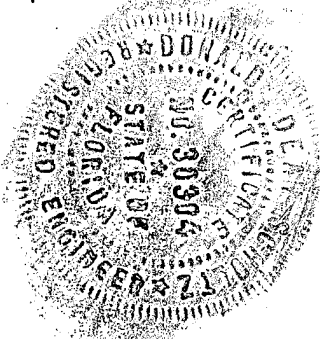
Date: 10-9-89 Telephone No. 703-522-1315

B. PROFESSIONAL ENGINEER REGISTERED IN FLORIDA (where required by Chapter 471, F.S.)

This is to certify that the engineering features of this pollution control project have been designed/examined by me and found to be in conformity with modern engineering principles applicable to the treatment and disposal of pollutants characterized in the permit application. There is reasonable assurance, in my professional judgment, that

¹ See Florida Administrative Code Rule 17-2.100(57) and (104)

the pollution control facilities, when properly maintained and operated, will discharge an effluent that complies with all applicable statutes of the State of Florida and the rules and regulations of the department. It is also agreed that the undersigned will furnish, if authorized by the owner, the applicant a set of instructions for the proper maintenance and operation of the pollution control facilities and, if applicable, pollution sources.



Signed Donald Dean Schultz

Donald Dean Schultz
Name (Please Type)

Black & Veatch, Engineers-Architects
Company Name (Please Type)

P.O. Box 8405, Kansas City, Missouri 64114
Mailing Address (Please Type)

Florida Registration No. 30304 Date: November 20, 1980 Telephone No. 913-339-2000

SECTION II: GENERAL PROJECT INFORMATION

- A. Describe the nature and extent of the project. Refer to pollution control equipment, and expected improvements in source performance as a result of installation. State whether the project will result in full compliance. Attach additional sheet if necessary.

The project will result in full compliance. See Sections 3.4 and 5.6 of the

Site Certification Application.

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

Start of Construction January 1990 Completion of Construction September 1992

- C. Costs of pollution control system(s): (Note: Show breakdown of estimated costs only for individual components/units of the project serving pollution control purposes. Information on actual costs shall be furnished with the application for operation permit.)

Included in the cost of the limestone pulverizer.

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

None. See Section 10.4 for existing source permits.

Requested permitted equipment operating time: hrs/day 24 ; days/wk 7 ; wks/yr 52 ;
if power plant, hrs/yr _____; if seasonal, describe: _____

F. If this is a new source or major modification, answer the following questions.
(Yes or No)

1. Is this source in a non-attainment area for a particular pollutant? Yes
 - a. If yes, has "offset" been applied? *
 - b. If yes, has "Lowest Achievable Emission Rate" been applied? NA
 - c. If yes, list non-attainment pollutants. Ozone
 2. Does best available control technology (BACT) apply to this source?
If yes, see Section VI. Yes
 3. Does the State "Prevention of Significant Deterioration" (PSD)
requirement apply to this source? If yes, see Sections VI and VII. Yes
 4. Do "Standards of Performance for New Stationary Sources" (NSPS)
apply to this source? Yes
 5. Do "National Emission Standards for Hazardous Air Pollutants"
(NESHAP) apply to this source? No
- H. Do "Reasonably Available Control Technology" (RACT) requirements apply
to this source? No
- a. If yes, for what pollutants? NA

- b. If yes, in addition to the information required in this form,
any information requested in Rule 17-2.650 must be submitted.

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

*Onsite source reductions yield net emissions reductions for VOC.

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

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

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

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

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

2. Product Weight (lbs/hr): _____

C. Airborne Contaminants Emitted: (Information in this table must be submitted for each emission point, use additional sheets as necessary)

Name of Contaminant	Emission ¹		Allowed ² Emission Rate per Rule 17-2	Allowable ³ Emission lbs/hr	Potential ⁴ Emission		Relate to Flow Diagram
	Maximum lbs/hr	Actual T/yr			lbs/yr	T/yr	
(See Sections 3.4 and 5.6 of the Application)							

¹See Section V, Item 2.

²Reference applicable emission standards and units (e.g. Rule 17-2.600(5)(b)2. Table II, E. (1) - 0.1 pounds per million BTU heat input)

³Calculated from operating rate and applicable standard.

⁴Emission, if source operated without control (See Section V, Item 3).

Control Devices: (See Section V, Item 4)

Name and Type (Model & Serial No.)	Contaminant	Efficiency	Range of Particles Size Collected (in microns) (If applicable)	Basis for Efficiency (Section V Item 5)
Fabric Filter for Limestone Separation	TSP	99.9 Percent	Later	Later

E. Fuels

Type (Be Specific)	Consumption*		Maximum Heat Input (MMBTU/hr)
	avg/hr	max./hr	
No. 2 Fuel Oil		238 Gal	31.4

*Units: Natural Gas--MMCF/hr; Fuel Oils--gallons/hr; Coal, wood, refuse, other--lbs/hr.

Fuel Analysis: No. 2 Fuel Oil

Percent Sulfur: 0.3 Max Percent Ash: Trace

Density: 7.05 (AP-42) lbs/gal Typical Percent Nitrogen: 0.2

Heat Capacity: BTU/lb (140,000 AP-42) BTU/gal

Other Fuel Contaminants (which may cause air pollution): See Section 10.9 of the Site

Certification Application for other fuel contaminants.

F. If applicable, indicate the percent of fuel used for space heating.

Annual Average None Maximum None

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

Small quantities of solid waste will be generated. The fabric filter will collect

99.9 percent of the solid waste and pneumatically transport it to the boilers.

Stack Height: 30 _____ Ft. Stack Diameter: 3.42 _____ Ft.
Gas Flow Rate: 77,362 _____ ACFM _____ DSCFM Gas Exit Temperature: 180 _____ °F.
Water Vapor Content: _____ % Velocity: 70 _____ FPS

NA

Type of Waste	Type 0 (Plastics)	Type I (Rubbish)	Type II (Refuse)	Type III (Garbage)	Type IV (Pathological)	Type V (Liq. & Gas By-prod.)	Type VI (Solid By-prod.)
Actual lb/hr Incinerated							
Uncontrolled (lbs/hr)							

Description of Waste _____
Total Weight Incinerated (lbs/hr) _____ Design Capacity (lbs/hr) _____
Approximate Number of Hours of Operation per day _____ day/wk _____ wks/yr. _____
Manufacturer _____
Date Constructed _____ Model No. _____

	Volume (ft) ³	Heat Release (BTU/hr)	Fuel		Temperature (°F)
			Type	BTU/hr	
Primary Chamber					
Secondary Chamber					

Stack Height: _____ ft. Stack Diameter: _____ Stack Temp. _____
Gas Flow Rate: _____ ACFM _____ DSCFM* Velocity: _____ FPS

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

Type of pollution control device: ☐ Cyclone ☐ Wet Scrubber ☐ Afterburner

☐ Other (specify) _____

Brief description of operating characteristics of control devices: _____

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

NOTE: Items 2, 3, 4, 6, 7, 8, and 10 in Section V must be included where applicable.

SECTION V: SUPPLEMENTAL REQUIREMENTS

Please provide the following supplements where required for this application.

1. Total process input rate and product weight -- show derivation [Rule 17-2.100(127)]
To a construction application, attach basis of emission estimate (e.g., design calculations, design drawings, pertinent manufacturer's test data, etc.) and attach proposed methods (e.g., FR Part 60 Methods 1, 2, 3, 4, 5) to show proof of compliance with applicable standards. To an operation application, attach test results or methods used to show proof of compliance. Information provided when applying for an operation permit from a construction permit shall be indicative of the time at which the test was made.
3. Attach basis of potential discharge (e.g., emission factor, that is, AP42 test).
4. With construction permit application, include design details for all air pollution control systems (e.g., for baghouse include cloth to air ratio; for scrubber include cross-section sketch, design pressure drop, etc.)
5. With construction permit application, attach derivation of control device(s) efficiency. Include test or design data. Items 2, 3 and 5 should be consistent: actual emissions = potential (1-efficiency).
6. An 8 1/2" x 11" flow diagram which will, without revealing trade secrets, identify the individual operations and/or processes. Indicate where raw materials enter, where solid and liquid waste exit, where gaseous emissions and/or airborne particles are evolved and where finished products are obtained.
7. An 8 1/2" x 11" plot plan showing the location of the establishment, and points of airborne emissions, in relation to the surrounding area, residences and other permanent structures and roadways (Example: Copy of relevant portion of USGS topographic map).
8. An 8 1/2" x 11" plot plan of facility showing the location of manufacturing processes and outlets for airborne emissions. Relate all flows to the flow diagram.

The appropriate application fee in accordance with Rule 17-4.05. The check should be made payable to the Department of Environmental Regulation.

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

SECTION VI: BEST AVAILABLE CONTROL TECHNOLOGY

- A. Are standards of performance for new stationary sources pursuant to 40 C.F.R. Part 60 applicable to the source?

☐ Yes ☒ No

Contaminant

Rate or Concentration

_____	_____
_____	_____
_____	_____
_____	_____

- B. Has EPA declared the best available control technology for this class of sources (If yes, attach copy)

☐ Yes ☒ No

Contaminant

Rate or Concentration

_____	_____
_____	_____
_____	_____
_____	_____

- C. What emission levels do you propose as best available control technology?

Contaminant

Rate or Concentration

NA _____	_____
_____	_____
_____	_____
_____	_____

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

1. Control Device/System:

2. Operating Principles:

3. Efficiency:*

4. Capital Costs:

Explain method of determining

5. Useful Life:

7. Energy:

9. Emissions:

6. Operating Costs:

8. Maintenance Cost:

Contaminant

Rate or Concentration

10. Stack Parameters

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

c. Flow Rate: ACFM d. Temperature: °F.

e. Velocity: FPS

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

1.

a. Control Device:

b. Operating Principles:

c. Efficiency:¹

d. Capital Cost:

e. Useful Life:

f. Operating Cost:

g. Energy:²

h. Maintenance Cost:

i. Availability of construction materials and process chemicals:

j. Applicability to manufacturing processes:

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

2.

a. Control Device:

b. Operating Principles:

c. Efficiency:¹

d. Capital Cost:

e. Useful Life:

f. Operating Cost:

g. Energy:²

h. Maintenance Cost:

i. Availability of construction materials and process chemicals:

¹Explain method of determining efficiency.

²Energy to be reported in units of electrical power - KWH design rate.

j. Applicability to manufacturing processes:

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

3.

a. Control Device:

b. Operating Principles:

c. Efficiency:¹

d. Capital Cost:

e. Useful Life:

f. Operating Cost:

g. Energy:²

h. Maintenance Cost:

i. Availability of construction materials and process chemicals:

j. Applicability to manufacturing processes:

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

4.

a. Control Device:

b. Operating Principles:

c. Efficiency:¹

d. Capital Costs:

e. Useful Life:

f. Operating Cost:

g. Energy:²

h. Maintenance Cost:

i. Availability of construction materials and process chemicals:

j. Applicability to manufacturing processes:

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

F. Describe the control technology selected:

1. Control Device:

2. Efficiency:¹

3. Capital Cost:

4. Useful Life:

5. Operating Cost:

6. Energy:²

7. Maintenance Cost:

8. Manufacturer:

9. Other locations where employed on similar processes:

a. (1) Company:

(2) Mailing Address:

(3) City:

(4) State:

¹Explain method of determining efficiency.

²Energy to be reported in units of electrical power - KWH design rate.

(5) Environmental Manager:

(6) Telephone No.:

(7) Emissions:¹

Contaminant

Rate or Concentration

(8) Process Rate:¹

b. (1) Company:

(2) Mailing Address:

(3) City:

(4) State:

(5) Environmental Manager:

(6) Telephone No.:

(7) Emissions:¹

Contaminant

Rate or Concentration

(8) Process Rate:¹

10. Reason for selection and description of systems:

¹Applicant must provide this information when available. Should this information not be available, applicant must state the reason(s) why.

SECTION VII - PREVENTION OF SIGNIFICANT DETERIORATION

A. Company Monitored Data No preconstruction monitoring is required. See Section 2.3 of the Application.

1. _____ no. sites _____ TSP _____ () SO₂* _____ Wind spd/dir

Period of Monitoring _____ / _____ / _____ to _____ / _____ / _____
month day year month day year

Other data recorded _____

Attach all data or statistical summaries to this application.

Specify bubbler (B) or continuous (C).

2. Instrumentation, Field and Laboratory

- a. Was instrumentation EPA referenced or its equivalent? ☐ Yes ☐ No
- b. Was instrumentation calibrated in accordance with Department procedures?
☐ Yes ☐ No ☐ Unknown

B. Meteorological Data Used for Air Quality Modeling

1. 5 Year(s) of data from 01 / 01 / 81 to 12 / 31 / 85
month day year month day year
2. Surface data obtained from (location) Jacksonville, Florida
3. Upper air (mixing height) data obtained from (location) Waycross, Georgia
4. Stability wind rose (STAR) data obtained from (location) NA

C. Computer Models Used

1. ISCST (UNAMAP6) Modified? If yes, attach description.
2. _____ Modified? If yes, attach description.
3. _____ Modified? If yes, attach description.
4. _____ Modified? If yes, attach description.

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

Applicants Maximum Allowable Emission Data

Pollutant	Emission Rate
TSP	<u>Negligible</u> grams/sec
SO ₂	<u>1.20</u> grams/sec

E. Emission Data Used in Modeling

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

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

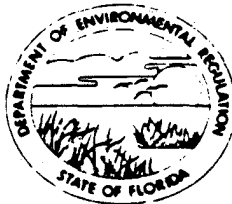
G. Discuss the social and economic impact of the selected technology versus other applicable technologies (i.e., jobs, payroll, production, taxes, energy, etc.). Include assessment of the environmental impact of the sources.

H. Attach scientific, engineering, and technical material, reports, publications, journals, and other competent relevant information describing the theory and application of the requested best available control technology.

10.6.2 Operate/Construct Industrial Wastewater Treatment and Disposal System

DEPARTMENT OF ENVIRONMENTAL REGULATION

NORTHEAST DISTRICT

BILLS ROAD
JACKSONVILLE, FLORIDA 32207BOB GRAHAM
GOVERNORVICTORIA J. TSCHINKEL
SECRETARYG. DOUG DUTTON
DISTRICT MANAGERAPPLICATION TO OPERATE/CONSTRUCT INDUSTRIAL
WASTEWATER TREATMENT AND DISPOSAL SYSTEMSType application: ☒ Operation ☐ Temporary Operation ☒ ConstructionSource Status: ☒ New ☐ Existing ☐ ModificationSource Name: Cedar Bay Cogeneration Project County: DuvalSource Location: Street: 9469 Eastport Road City: JacksonvilleLatitude 30° 24' 55" Longitude 81° 35' 45"Applicant Name and Title: Jeffrey Swain, Project DirectorApplicant Address: 1001 North 19th Street, Suite 2000, Arlington, VA 22209 3

DIRECTIONS

1. All applicable items must be completed in full in order to avoid delay in processing this application. Where attached sheets or other technical documentations are utilized in lieu of the space provided, indicate appropriate cross references.
2. Please type or print in ink.
3. Four (4) copies of this application and any supplemental information, and a check for the application fee in accordance with Florida Administrative Code Rule 17-4.05, made payable to the State of Florida Department of Environmental Regulation, must be submitted to the appropriate District office or approved local program.
4. Projects involving construction shall be accompanied by two (2) sets of engineering drawings, specifications and design data as prepared by a Professional Engineer registered in the State of Florida, where required by Chapter 471, Florida Statutes.
5. A map showing site location, property boundaries, layout of installation and other buildings, discharge point(s), etc., shall accompany the application. It shall also include any surface water bodies or potable water supply wells beyond the property boundaries that may be affected by a discharge plume, if any effluent is to be discharged to groundwater.
6. If effluent or sludges generated as wastes in the treatment process qualify as hazardous wastes as defined by Florida Administrative Code Rule 17-30, additional hazardous waste permits may be required.

PART I - STATEMENTS BY APPLICANT AND ENGINEER

A. Applicant

The undersigned owner or authorized representative* of AES Cedar Bay, Inc.

is fully aware that the statements made in this application for a Construction/Operation permit are true, correct and complete to the best of his knowledge and belief. Further, the undersigned agrees to maintain and operate the pollution source and pollution control facilities in such a manner as to comply with the provisions of Chapter 403, Florida Statutes, and all the rules of the department. He also understands that a permit, if granted by the department, will be non-transferable and he will promptly notify the department upon sale or legal transfer of the permitted establishment.

Jeffrey V. Swain
Signature of the owner or authorized representative

Jeffrey V. Swain, Project Director
Name and Title (Please type)

Date: 10-25-88 Telephone No. (703) 522-1315

*Attach letter of
authorization

B. Professional Engineer Registered in Florida (where required by Chapter 471, F.S.)

This is to certify that the engineering features of this pollution control project have been designed/examined by me and found to be in conformity with modern engineering principles, applicable to the treatment and disposal of pollutants characterized in the permit application. There is reasonable assurance, in my professional judgment, that the pollution control facilities, when properly maintained and operated, will discharge an effluent that complies with all applicable statutes of the State of Florida and the rules of the department. It is also agreed that the undersigned, if authorized by the owner, will furnish the applicant a set of instructions for the proper maintenance and operation of the pollution control facilities and, if applicable, pollution sources.

Signature: D. D. Schultz

Name (please type) Donald Dean Schultz

Florida Registration No. 30304

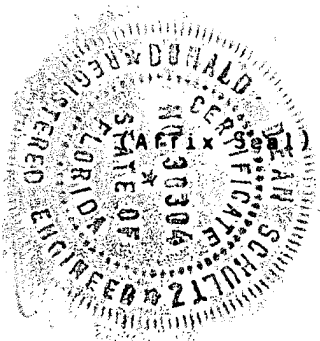
Company Name: Black & Veatch, Engineers-Architect

Address: P. O. Box 8405

Kansas City, Missouri 64114

Telephone No. (913) 339-2000

Date: October 26, 1988



PART II - DETAILED DESCRIPTION OF SOURCE

A. Describe the nature and extent of the project. Refer to existing pollution control facilities, expected improvements in performance of the facilities and state whether the project will result in full compliance. Attach additional sheet if necessary.

The Cedar Bay Cogeneration Project will include three fluidized bed coal-fired combustion boilers. The facility will produce approximately 225 MW of electricity for sale to Florida Power & Light, and will produce approximately 640,000 lb/hr of process steam for sale to the Seminole Kraft paper mill. Wastewater treatment facilities are described in Sections 3.5 and 5.2 of the SCA and are expected to result in full compliance.

B. Construction schedule, if applicable.

Start of Construction (Date): January 1990

Completion of Construction (Date): 1992

C. Cost of Construction (Show a breakdown of costs for individual components/units of the project serving pollution control purposes only). Information on actual costs shall be furnished with the application for operation permit.

Later

D. For this source indicate any previous DER permits; issuance dates, and expiration dates; and orders and notices.

Existing permits for Seminole Kraft papermill, including its wastewater treatment system, are included in Section 10.4 of the SCA.

E. Indicate the relationship between this project and area regional planning for wastewater treatment. List steps to be taken for this industrial waste facility to become part of an area wide wastewater treatment system.

NA

F. Indicate EPA-NPDES permit, effective date and expiration date.

Permit No. FL: 0000400*

October 1, 1983

September 30, 1988

Issue Date

Expiration Date

Modified February
20, 1985

(In the process of
being reissued)

ER Form 17-1.204(2)

Effective November 30, 1982

Page 3 of 9

*Existing permit for Seminole Kraft paper mill which will be maintained. Application is being made for a separate permit for additional discharges from Cedar Bay Cogeneration Project.

4. Production Rate 225 MW and approximately 640,000 lb/hr steam
tons/day, lbs/day, etc.

C. List sludge or slurry treatment units.

D. Describe volume, composition and disposal method of sludge. Identify location(s) of ultimate disposal.

E. Method(s) and Location(s) of Flow Measurement.

F. Describe practices to be followed to ensure adequate waste treatment during emergencies such as power loss and equipment failures causing shut down of pollution abatement equipment of the proposed/permitted facilities.

G. Laboratory: List tests for which equipment/chemicals are provided, or contract laboratory to perform analysis.

PART IV - INDUSTRIAL WASTEWATER CHARACTERISTICS

Information furnished in this section for construction permit shall be based on reasonable prediction and good professional judgment. However, actual data shall be submitted when applying for an operation permit. Note: If there is more than one discharge point, submit the following data for each point.

A. Flow (MGD):

0.91
Average

1.97
Maximum

1.97
Design

B. Water Quality Characteristics of Effluent

PARAMETER

CONCENTRATION (note units)

Organic:

volatile or purgeable

base/neutral extractable

acid extractables

total organic carbon (TOC)

biological oxygen demand (BOD)

Inorganic

heavy metals

major ions

Physical

pH

specific conductivity

temperature

suspended solids

Minimum	Maximum	30-day Average
	10 mg/l	<10 mg/l
	10 mg/l	<10 mg/l
	See Table 5.2-8 of SCA	
	See Table 5.2-8 of SCA	
	8.0	7.2
	4500	3300
	95 F	90 F
	30 mg/l	20 mg/l

PART IV - INDUSTRIAL WASTEWATER CHARACTERISTICS

Information furnished in this section for construction permit shall be based on reasonable prediction and good professional judgment. However, actual data shall be submitted when applying for an operation permit. Note: If there is more than one discharge point, submit the following data for each point.

A. Flow (MGD):

0.007

Average

0.50

Maximum

0.50

Design

B. Water Quality Characteristics of Effluent

PARAMETER

CONCENTRATION (note units)

Organic:

volatile or purgeable

base/neutral extractable

acid extractables

total organic carbon (TOC)

biological oxygen demand (BOD)

Inorganic

heavy metals

major ions

Physical

pH

specific conductivity

temperature

suspended solids

Minimum	Maximum	30-day Average
	<20 mg/l	<10 mg/l
	<20 mg/l	<10 mg/l
	Not Present	
	Not Present	
6.0	8.5	7.0
60 F	90 F	80 F
	50 mg/l	30 mg/l

PART IV - INDUSTRIAL WASTEWATER CHARACTERISTICS

Information furnished in this section for construction permit shall be based on reasonable prediction and good professional judgment. However, actual data shall be submitted when applying for an operation permit. Note: If there is more than one discharge point, submit the following data for each point.

A. Flow (MGD):

0.157	0.253	0.253
Average	Maximum	Design

B. Water Quality Characteristics of Effluent

PARAMETER

CONCENTRATION (note units)

Organic:

volatile or purgeable
base/neutral extractable
acid extractables
total organic carbon (TOC)
biological oxygen demand (BOD)

Inorganic

heavy metals, Iron (as Fe)
major ions, Phosphorous (as P)

Physical

pH
specific conductivity
temperature
suspended solids

Minimum	Maximum	30-day Average
	1 mg/l	<1 mg/l
	1 mg/l	<1 mg/l
	1.0 mg/l	0.5 mg/l
	10 mg/l	3 mg/l
	10.0	9.5
	212 F	212 F
	10 mg/l	<10 mg/l

PART IV - INDUSTRIAL WASTEWATER CHARACTERISTICS

Information furnished in this section for construction permit shall be based on reasonable prediction and good professional judgment. However, actual data shall be submitted when applying for an operation permit. Note: If there is more than one discharge point, submit the following data for each point.

A. Flow (MGD):

2.88

Average

2.88

Maximum

2.88

Design

B. Water Quality Characteristics of Effluent

PARAMETER

CONCENTRATION (note units)

Organic:

volatile or purgeable

base/neutral extractable

acid extractables

total organic carbon (TOC)

biological oxygen demand (BOD)

Inorganic

heavy metals

major ions

Physical

pH

specific conductivity

temperature

suspended solids

Minimum	Maximum	30-day Average
	5 mg/l	3 mg/l
	27 mg/l	14 mg/l
	See 10.1.1 NPDES Application	
See 10.1.1	NPDES Application	
6.0	12.0	8.0
60 F	90 F	80 F Summer 60 F Winter
	69 mg/l	40 mg/l

PART IV - INDUSTRIAL WASTEWATER CHARACTERISTICS

Information furnished in this section for construction permit shall be based on reasonable prediction and good professional judgment. However, actual data shall be submitted when applying for an operation permit. Note: If there is more than one discharge point, submit the following data for each point.

A. Flow (MGD):

0.213	0.340	0.340
Average	Maximum	Design

B. Water Quality Characteristics of Effluent

PARAMETER

CONCENTRATION (note units)

Organic:

volatile or purgeable

base/neutral extractable

acid extractables

total organic carbon (TOC)

biological oxygen demand (BOD)

Inorganic

heavy metals

major ions

Physical

pH

specific conductivity

temperature

suspended solids

Minimum	Maximum	30-day Average
	10 mg/l	< 10 mg/l
	10 mg/l	< 10 mg/l
	See 10.1.1 NPDES Application	
See 10.1.1	NPDES Application	
5.0	9.0	7.1
60 F	90 F	80 F Summer 60 F Winter
	80 mg/l	40 mg/l

2

PART V - EFFLUENT DISPOSAL

A. If effluent is discharged to surface waters, complete the following for each discharge point.

1. Immediate receiving body of water (RBW):

a. Name St. Johns River

b. Type of receiving water: ☐ Fresh ☒ Salt or brackish

☐ Drainage Ditch

☐ Landlocked Lake

☐ Canal

☐ Lake with Outfall

☐ Creek

☐ Tidal Estuary

☒ River

☐ Ocean or Gulf

☐ Other (Specify) _____

c. Classification of receiving water (in accordance with Rule 17-3): Class III

d. Minimum 7-day 10 year low flow of the RBW at the discharge point (if appropriate): 5000 cfs (EPA letter to Seminole Kraft Corp. dated 9-28-88)

e. Identify and describe the flow of effluent from the point of discharge to a major body of water. A suitably marked map or aerial photograph may be used. Discharge structure within St. Johns River.

2. Outfall Information:

a. Discharge location: St. Johns River

Latitude 30° 24' 55" N Longitude 81° 35' 45" W

b. Design configuration and construction materials:
Single 72 inch concrete pipe splits and reduces to four separate 36 inch pipes located near edge of ship channel.

c. Distance from shore: Approximately 156 ft.

d. Diameter: Four 36 inch discharges

e. Elevation of discharge invert: - 20 ft. MSL

f. Receiving water bottom depth at point of discharge: -30 ft. MSL

3. Do you request a mixing zone (refer to Fla. Admin. Code Rule 17-4.244)? If yes, for what parameters or pollutants?

Yes, for thermal discharges, refer to Section 5.1 of SCA.

8. If effluent is discharged to groundwater, complete the following: N/A

1. Disposal method: ☐ Slow Rate ☐ Percolation/Evaporation Pond
☐ Rapid Rate ☐ Combination (specify) _____
☐ Overland Flow ☐ Other (specify) _____
☐ Absorption Field _____

PART V - EFFLUENT DISPOSAL

A. If effluent is discharged to surface waters, complete the following for each discharge point.

1. Immediate receiving body of water (RBW):

- a. Name Broward River
- b. Type of receiving water: ☐ Fresh ☐ Salt or brackish
- ☐ Drainage Ditch ☐ Landlocked Lake
- ☐ Canal ☐ Lake with Outfall
- ☐ Creek ☐ Tidal Estuary
- ☒ River ☐ Ocean or Gulf
- ☐ Other (Specify) _____
- c. Classification of receiving water (in accordance with Rule 17-3): Class III
- d. Minimum 7-day 10 year low flow of the RBW at the discharge point (if appropriate): N/A cfs
- e. Identify and describe the flow of effluent from the point of discharge to a major body of water. A suitably marked map or aerial photograph may be used.
Discharge chute to Broward River.

2. Outfall Information:

- a. Discharge location: Broward River
- Latitude 30 ° 25 ' 22 "N Longitude 81 ° 36 ' 35 "W
- b. Design configuration and construction materials:
Single concrete discharge chute from construction dewatering pond to Broward River shoreline.
- c. Distance from shore: N/A
- d. Diameter: N/A
- e. Elevation of discharge invert: N/A MSL
- f. Receiving water bottom depth at point of discharge: N/A MSL

3. Do you request a mixing zone (refer to Fla. Admin. Code Rule 17-4.244)? If yes, for what parameters or pollutants?

Yes, for nickel and zinc in dewatering discharge.

B. If effluent is discharged to groundwater, complete the following: N/A

1. Disposal method: ☐ Slow Rate ☐ Percolation/Evaporation Pond
- ☐ Rapid Rate ☐ Combination (specify) _____
- ☐ Overland Flow ☐ Other (specify) _____
- ☐ Absorption Field _____

PART V - EFFLUENT DISPOSAL

A. If effluent is discharged to surface waters, complete the following for each discharge point.

1. Immediate receiving body of water (RBW):

- a. Name Broward River
- b. Type of receiving water: ☐ Fresh ☐ Salt or brackish
☐ Drainage Ditch ☐ Landlocked Lake
☐ Canal ☐ Lake with Outfall
☐ Creek ☐ Tidal Estuary
☒ River ☐ Ocean or Gulf
☐ Other (Specify) _____
- c. Classification of receiving water (in accordance with Rule 17-3): Class III
- d. Minimum 7-day 10 year low flow of the RBW at the discharge point (if appropriate): N/A cfs
- e. Identify and describe the flow of effluent from the point of discharge to a major body of water. A suitably marked map or aerial photograph may be used.
Discharge chute to Broward River.

2. Outfall Information:

- a. Discharge location: Broward River
Latitude 30 ° 25 ' 22 "N Longitude 81 ° 36 ' 35 "W
- b. Design configuration and construction materials:
Single concrete discharge chute from construction dewatering pond to Broward River shoreline.
- c. Distance from shore: N/A
- d. Diameter: N/A
- e. Elevation of discharge invert: N/A MSL
- f. Receiving water bottom depth at point of discharge: N/A MSL

3. Do you request a mixing zone (refer to Fla. Admin. Code Rule 17-4.244)? If yes, for what parameters or pollutants?

No

B. If effluent is discharged to groundwater, complete the following: N/A

1. Disposal method: ☐ Slow Rate ☐ Percolation/Evaporation Pond
☐ Rapid Rate ☐ Combination (specify) _____
☐ Overland Flow ☐ Other (specify) _____
☐ Absorption Field _____

PART V - EFFLUENT DISPOSAL

A. If effluent is discharged to surface waters, complete the following for each discharge point.

1. Immediate receiving body of water (RBW):

- a. Name St. Johns River
- b. Type of receiving water: ☐ Fresh ☒ Salt or brackish
- | | |
|--|--|
| ☐ Drainage Ditch | ☐ Landlocked Lake |
| ☐ Canal | ☐ Lake with Outfall |
| ☐ Creek | ☐ Tidal Estuary |
| ☒ River | ☐ Ocean or Gulf |
| ☐ Other (Specify) _____ | |
- c. Classification of receiving water (in accordance with Rule 17-3): Class III
- d. Minimum 7-day 10 year low flow of the RBW at the discharge point (if appropriate):
5000 cfs (EPA letter to Seminole Kraft Corp. dated 9-28-88)
- e. Identify and describe the flow of effluent from the point of discharge to a major body of water. A suitably marked map or aerial photograph may be used.
Discharge structure within St. Johns River.

2. Outfall Information:

- a. Discharge location: St. Johns River
- Latitude 30° 24' 55" N Longitude 81° 35' 45" W
- b. Design configuration and construction materials:
Single 72 inch concrete pipe splits and reduces to four separate 36 inch pipes located near edge of ship channel.
- c. Distance from shore: Approximately 156 ft.
- d. Diameter: Four 36 inch discharges
- e. Elevation of discharge invert: - 20 ft. MSL
- f. Receiving water bottom depth at point of discharge: -30 ft. MSL

3. Do you request a mixing zone (refer to Fla. Admin. Code Rule 17-4.244)? If yes, for what parameters or pollutants?

Refer to Section 5.2 of SCA.

B. If effluent is discharged to groundwater, complete the following: N/A

1. Disposal method:
- | | |
|---|---|
| ☐ Slow Rate | ☐ Percolation/Evaporation Pond |
| ☐ Rapid Rate | ☐ Combination (specify) _____ |
| ☐ Overland Flow | ☐ Other (specify) _____ |
| ☐ Absorption Field | _____ |

2. Location(s) of application area(s):

3. Ownership of land (if different from applicant):
Attach approval from owner for use of land for effluent disposal.

4. Describe the hydrology and geologic structures of the affected area, using site specific information, including the general vertical and lateral limits of each classification of groundwater. (Maps and cross sections are suggested.)

5. What is the direction of groundwater flow? _____

6. Water table levels generally range from a high of _____ feet to a low of _____ feet below average land surface elevation.

7. Surface or sub-surface irrigation:

a. Description of disposal structure(s).

b. Area under irrigation; total _____ per rotation.

Latitude ____° ____' ____"N Longitude ____° ____' ____"W

c. Irrigation rate: _____

d. Percolation rate: _____

e. Ultimate disposal of surface/sub-surface runoff: _____

f. Type of cover crop and general routine operation of the system:

8. Surface Impoundments:

a. Number of cells and latitude and longitude of each. _____

b. Bottom area of cells: _____ ft² _____ acres

c. Design depth of water in cells: _____ ft

d. Cell configuration (if rectangular): Length _____ ft; Width _____ ft

e. Average hydraulic loading rate: _____ inches/day _____ GPD/ft²

f. Hydraulic loading period: _____ days; resting period _____ days

g. Percolation rate: _____ gpd/ft²

9. Number and location of monitoring wells: _____

ADDITIONAL DATA FOR TEMPORARY OPERATION PERMIT
(For Existing Sources Not Meeting Department Standards)

Justification for Temporary Operation Permit Request

A. Attach additional sheets responding to the following items:

1. The facts and reasons which support that:

- a. the applicant has a waste for which no feasible and acceptable method of treatment or disposal is known and the applicant is making a bona fide effort through research and other means to discover and implement such a method;
- b. the applicant needs permission to pollute the waters within the state for a period of time necessary to complete research, planning, construction, installation or operation of an approved abatement facility or alternate waste disposal system;
- c. there is no present reasonable, alternative means of disposing of applicant's waste other than by discharging into waters of the state;
- d. the denial of a temporary operation permit would work an extreme hardship upon the applicant;
- e. granting of a temporary operation permit will be in the public interest;
- f. the schedule for meeting compliance in C. is reasonable;
- g. the discharge will not be unreasonably destructive to the quality of the receiving waters.

B. Technical Data:

1. Condition of receiving body of water:

2. Proposed Time Discharge is Required: _____

3. Reasons for Time Required:

4. Reasons why conditions of Chapter 403, F.S., and Florida Administrative Code Rules 17-3, 17-4 and 17-6 have not been met:

- C. Plans for meeting full compliance with Chapter 403, F.S., and Rules 17-3, 17-4 and 17-6.

Schedule of Increments of Progress to meet compliance:

1. Date when planning is expected to be complete _____
2. Date when engineering will be complete _____
3. Date construction application will be submitted to upgrade or replace the existing plant or build lift station and force main to phase out the present facility _____
4. Date contract will be let _____
5. Date construction will commence _____
6. Date construction is to be complete and so certified _____
7. Date that wastewater collection/transmission/treatment/effluent disposal systems will be certified "in compliance" with your permit _____

(cross out inappropriate components)

- D. Who will be responsible for overseeing that the above time schedule will be met?

NAME _____
(Print or type)

TITLE _____

ADDRESS _____

TELEPHONE NUMBER _____

Signature _____

Date _____

10.6.3 Joint Application for Permit, Dredge, Fill, and Structures
(Deleted)

10.6.4 Florida Ground Water Monitoring Plan Approval

10.6.4.1 Monitoring Well Locations. The AES Cedar Bay Cogeneration facility is located on a portion of the existing Seminole Kraft Mill Plant site. Ground water quality has been monitored periodically on the mill site since 1972.

The geohydrology, plant facility arrangement and plant water use have been documented previously in Sections 2.3, 3.2, and 3.5 of this application. The general trend of the ground water flow is across the project site to the Broward and St. Johns Rivers. The proposed new monitoring wells are located around the perimeter of the project site, as shown on Figure 5.3-2. Wells CB-3 and CB-4 are located upgradient from the project site. Wells CB-1, CB-2, CB-5, and CB-6 are downgradient from the plant facilities adjacent to the Broward River. Due to the confined area of the project, the wells are located relatively close to the plant facilities.

Wells CB-1 and CB-2 are downgradient of the ash pellet storage area and the coal storage area. Well CB-6 is downgradient of the storage area runoff pond. Only one intermediate monitoring well, CB-5, is provided since the plant facilities are located relatively close to the boundary of the zone of discharge.

10.6.4.2 Monitoring Well Installation. Risers for piezometers will consist of 2-inch diameter Schedule 40 PVC or equal pipe. The lower 60 inches of each riser will be a slotted screen section with 0.01-inch wide slots. The bottom of each riser will be capped.

Couplings for joining pipe sections will be the same material as the rise pipe. Joining cement will be as recommended by the pipe manufacturer.

Bentonite drilling mud will not be used to advance the hole in which a piezometer is to be installed. However, Johnson's "Revert" or an equivalent organic drilling fluid may be used.

Uniformly graded silica sand will be used as a backfill around the slotted section and will extend a minimum of 24 inches above the section. The sand filter will extend a minimum of 12 inches below the bottom of the screen. The sand filter will be placed in a slow, steady stream around the screen.

Directly above the sand filter will be an 18-inch impervious clay bentonite pellet seal and above the bentonite seal the entire length of the monitoring well to the ground surface will be backfill consisting of cement and sand grout.

The riser will extend a minimum of 24 inches above the ground surface and will receive a slip-on protective cap. The cap will have a 1/8-inch diameter drilled hole in it for venting. Each piezometer installation will have a protective casing with cover.

The standard protective casing will be 5-inch minimum diameter galvanized steel with lockable cap and heavy-duty padlock acceptable to the Engineer. All locks will be keyed alike. The steel protective casing will have a 1/8-inch diameter vent hole drilled in it 1 foot above the ground surface.

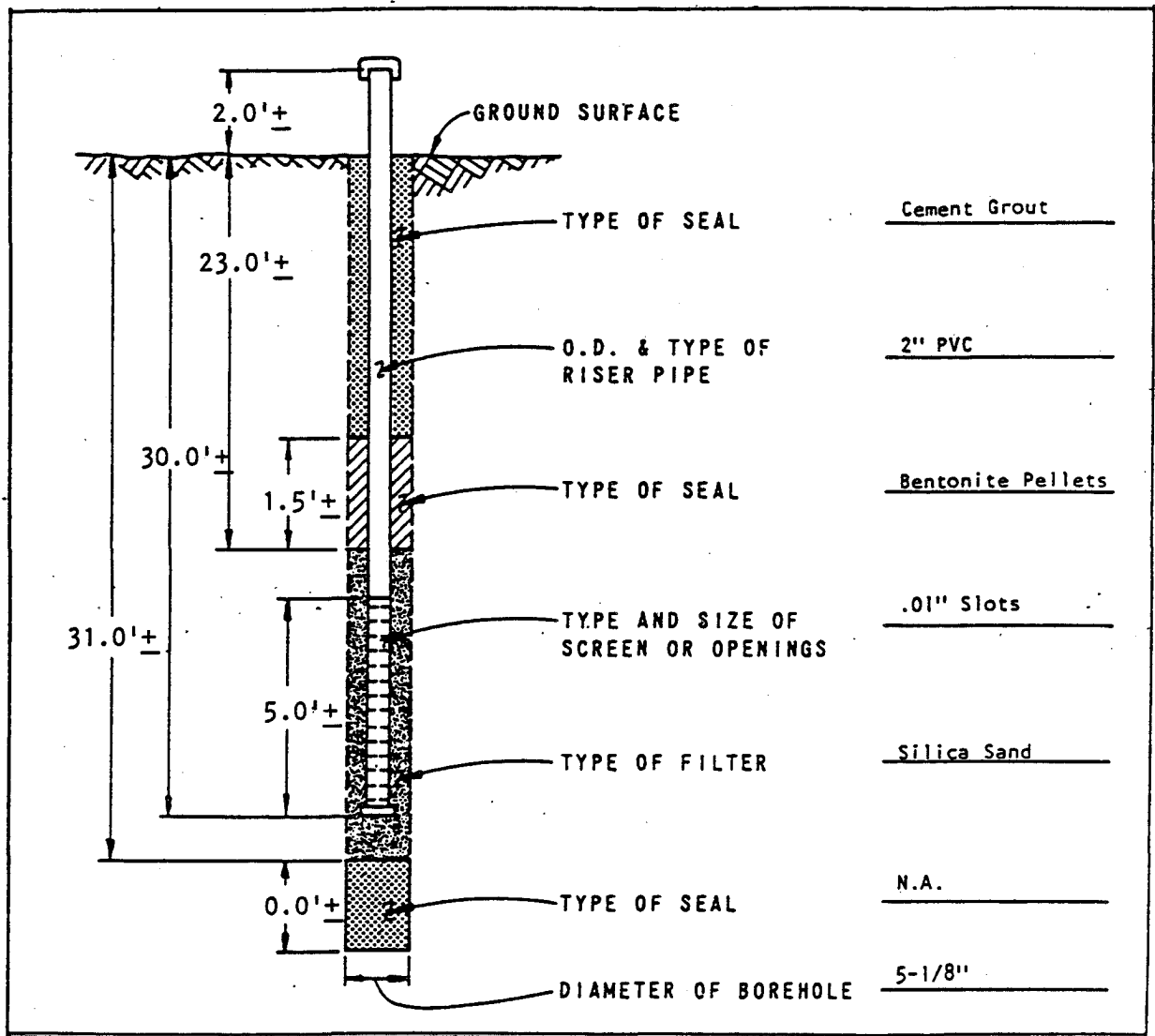
Following installation of the well, filter, and backfilling, the well will be developed by airlifting or pumping until the discharge water is clear and sounding indicates all loose material has been removed from the bottom of the piezometer. If an organic drilling fluid is used, Johnson's "Fast-Brake" or an equivalent will be added to the piezometer prior to development.

Each well will be marked with three vertical 6-foot long nominal 2-inch steel pipe with caps projecting a minimum of 3 feet above the ground surface and placed at the points of an equilateral triangle around the piezometer. The pipes will be painted white. The stakes will be embedded at least 30 inches in concrete.

The attached Figure 10.6-1 shows a complete monitoring well installation.

10.6.4.3 Sampling and Analysis Procedures. The ground water will be monitored to measure fluctuations in the potentiometric surface and water quality. Ground water levels in the water table zone will be recorded monthly throughout all phases of the project from preliminary investigation through operation. Water quality analyses of samples of the ground water

TYPICAL MONITORING WELL INSTALLATION



TYPICAL MONITORING WELL INSTALLATION

Figure 10.6-1

will be completed monthly until the base-line water quality is established, then bimonthly through the first year of plant operation and semiannually thereafter. Parameters monitored and sample collection method for this are presented in Tables 10.6-1 and 10.6-2. A summary of the monitoring frequency is given in Table 10.6-3. Chemical analyses using standard methods required by the Florida Department of Environmental Regulation will be performed on ground water samples.

TABLE 10.6-1. LIST OF PHYSICAL AND CHEMICAL PARAMETERS FOR GROUND WATER
QUALITY ANALYSIS

Inorganic Constituents

Ammonia (as NH_4)
Calcium
Chloride
Fluoride
Hardness (as CaCO_3)
Hydrogen Sulfide
Magnesium
Nitrate (NO_3^-)
Nitrite (NO_2^-)
Phosphate
Potassium
Silica (colloidal and dissolved)
Sodium
Strontium
Sulfate

Organic Constituents

PCB
Phenols
Total Organic Carbon

Metals (Total)

Aluminum
Arsenic
Barium
Boron

Metals (Total) (Continued)

Cadmium
Chromium (Hexavalent)
Copper
Iron
Lead
Manganese
Mercury
Molybdenum
Nickel
Selenium
Silver
Vanadium
Zinc

Miscellaneous

Alkalinity (as CaCO_3)*
Alkalinity (as HCO_3)*
Color
Conductivity*
Gross Alpha
pH*
Temperature*
Total Dissolved Solids
Total Suspended Solids
Turbidity

*Field and laboratory measurements.

TABLE 10.6-2. SAMPLE COLLECTION AND PRESERVATION METHODS

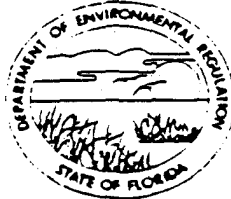
Container	Volume	Preservation	Measurements
Plastic	0.5 gal	None	Gross alpha radiation
Plastic	1.0 gal	None	pH, alkalinity, chloride, fluoride, conductivity, total dissolved solids, total suspended solids, chromium (hexavalent), silica, sulfate, color, turbidity
Plastic	0.25 gal	Nitric acid to pH less than 2	Hardness, mercury, arsenic, calcium, potassium, sodium, strontium, aluminum, barium, selenium, vanadium, cadmium, copper, iron, lead, magnesium, manganese, mercury, molybdenum, nickel, silver, zinc
Plastic	0.25 gal	Sulfuric acid to pH less than 2	Ammonia, nitrate, nitrite, phosphate, boron, total organic carbon
Glass	0.25 gal	Phosphoric acid to pH less than 4. 1 gram copper sulfate per liter of sample added after collection	Phenol
Glass (Amber) with Teflon Cap	1.0 gal	None	PCB
Plastic	250 ml	1 ml of 1 molar zinc acetate, plus 1 ml of 1 normal sodium hydroxide	Hydrogen sulfide

TABLE 10.6-3. MONITORING FREQUENCY OF SITE MONITORING WELLS

<u>Measurement</u>	<u>Project Phase</u>				
	<u>Pre-Site Preparation</u>	<u>Site Preparation</u>	<u>Plant Construction</u>	<u>Plant Operation Year 0-1</u>	<u>Plant Operation Year 1</u>
Water Level	Monthly	Monthly	Monthly	Monthly	Monthly
Water Quality	Monthly*	Monthly*	Monthly*	Monthly*	Semiannually

*Water quality analyses will be bimonthly after base-line quality is established.

DEPARTMENT OF ENVIRONMENTAL REGULATION

NORTHWEST DISTRICT
BRANCH OFFICEWIN TOWERS OFFICE BUILDING
300 BLAIR STONE ROAD
ALLAHASSEE, FLORIDA 32301BOB GRAHAM
GOVERNORVICTORIA J. TSCHINKEL
SECRETARYAPPLICATION FOR MONITORING PLAN APPROVAL
(Existing Sources)

INSTRUCTIONS: Submit four copies of this application and four copies of supporting information such as laboratory reports, maps and other documents to the appropriate District Office.

PART I - General Information

In compliance with Florida Administrative Code Rule 17-4.245(6)(c)2., the undersigned installation owner applies for approval from the Department for the monitoring criteria on the following property owned by:

<u>AES Cedar Bay, Inc.</u>			<u>Permit No.</u>	
<u>Corporation or Owner's Name</u>			<u>4913, 4961</u>	
<u>Cedar Bay Cogeneration Plant</u>			<u>SIC Code</u>	
<u>Installation Name</u>				
<u>9469 Eastport Road, Jacksonville</u>	<u>32218</u>	<u>Duval</u>	<u>30°25'21"N</u>	<u>81°36'23"W</u>
<u>Street Address</u>	<u>City</u>	<u>Zip</u>	<u>County</u>	<u>Latitude</u>
				<u>Longitude</u>
	<u>X 1/4</u>	<u>X 1/4</u>	<u>X 1/4</u>	<u>of 46</u>
				<u>T1S, R27E</u>
				<u>Section, Township, Range</u>

OWNER OR AUTHORIZED REPRESENTATIVE (If representative, attach letter of authorization.)

<u>Jeffrey V. Swain, Project Director</u>				<u>703-522-1315</u>	3
<u>Name and Official Title (Print or Type)</u>					
<u>1001 North 19th Street,</u>	<u>Arlington,</u>	<u>Virginia</u>	<u>2209</u>		
<u>Street</u>	<u>City</u>	<u>State</u>	<u>Zip</u>	<u>Telephone Number</u>	
<u>Signature: Jeffrey V. Swain</u>				<u>Date: 10-9-89</u>	

PART II - Content of Monitoring Plan

Pursuant to Rule 17-4.245(6)(d), the plan shall contain findings, recommendations and plans for ground water monitoring derived from site specific information. For the type of information to be considered in the development and assessment of the plan, see page two of this form. In any case, the following items must be included:

1. Location(s) of proposed well(s) to sample natural unaffected background water quality and the intermediate and compliance well(s) in the down gradient direction.
2. Construction details of the monitor well(s), including type of casing material, diameter of casing, depth of casing and location of screens.
3. A water sampling and chemical analysis procedure which can determine the natural unaffected background quality of the ground water, and the quality of the receiving ground water in the downgradient intermediate and compliance wells.

The following information is the type generally required for detailed assessment of the most complex plans, with less complex cases not needing this degree of evaluation:

1. Hydrogeological, physical and chemical data for the site, including:
 - a. Direction and rate of ground water flow, and background ground water quality;
 - b. Porosity, horizontal and vertical permeability for the aquifer(s) and the depth to, and lithology of, the first confining bed(s);
 - c. Vertical permeability, thickness, and extent of any confining beds;
 - d. Topography, soil information and surface water drainage systems surrounding the site;
2. Waste disposal rate and frequency, chemical composition, method of discharge, pond volume, spray-field dimension, or other applicable site specific information;
3. Toxicity of waste;
4. Present and anticipated wastewater volume, seepage rate to the receiving ground water, physical, chemical, microbiological (whichever is applicable) characteristics of the leachate;
5. Disposal system water balance;
6. Present and reasonably expected future pollution sources located within one mile radius of the site;
7. Inventory depth, construction details, and cones of depression of water supply wells and monitor wells located within one mile radius of the site or potentially affected by the discharge;
8. Site specific economic and feasibility considerations;
9. Chronological information on water levels in the monitor wells and water quality data on water supplies collected from the water supply and monitor wells;
10. Type and number of waste disposal facilities within the installation;
11. Chronological information on surface water flows and water quality upstream and downstream from the site;
12. Construction and operation details of disposal facilities;
13. History of construction and land development in the vicinity of the site.

A monitoring program instituted under some other state, federal, or local government regulation or permit may be substituted (or referenced if contained in an existing department permit) if such program is in substantial compliance with Part II.

10.7 LOCAL PERMIT APPLICATIONS OR APPROVALS

10.7.1 St. Johns River Water Management District Water Use Permit Application

Water needs for the Cedar Bay Cogeneration Project are described in Section 3.5 of the SCA. Total average and maximum water requirements are approximately 5.4 mgd and 7 mgd, respectively. Water will be obtained from the existing Seminole Kraft Corporation (SK) well field. SK has current authorization (Permit No. 2-032-0002U) for a maximum annual withdrawal not to exceed 9.13 Bgal/yr (25 mgd). Existing permits are included in Section 10.4. The water use permit application included in this section is a new application for estimated water needs for the proposed cogeneration project.

WATER USE PERMIT APPLICATION
TO THE GOVERNING BOARD OF THE
ST. JOHNS RIVER WATER MANAGEMENT DISTRICT
ENVIRONMENTAL SCIENCES AND REGULATION DEPARTMENT

Mail to: WTP PERMIT DIVISION
P. O. BOX 1429
PALATKA, FLORIDA 32077

DO NOT WRITE IN THIS BOX

APPLICATION	STATUS		DATE
#			
STAFF APPROVAL	Y	N	
PERMIT ISSUED	1	2	
CONDITIONS	1	2	
EXPIRATION DATE			
FEE INCLUDED \$			

Use Ball Point Pen - Check and/or fill in all boxes on this form - PRESS HARD!!
Permit Application is not complete unless current application fee is included.

	PERMIT IS FOR:	NEW APPLICATION ☐	MODIFICATION ☐	RENEWAL ☐	
APPLICANT	NAME OF APPLICANT	LAST FIRST SWAIN JEFFREY			
	ADDRESS	1001 N 19th ST. SUITE 2000			
	CITY	ARLINGTON			
	STATE	ZIP CODE	TELEPHONE NO.		
	VA	22209	703/522-1315		
SITE LOCATION	GIVE NAME AND ADDRESS OF OWNER IF OTHER THAN APPLICANT IN ABOVE BLOCK				
	ADDRESS	9469 EASTPORT ROAD			
	CITY	SECTION	TOWNSHIP	RANGE	
QUANTITY	MAXIMUM QUANTITY OF WATER APPLIED FOR:		IN/YR		
	CUMULATIVE INSTALLED CAPACITY		AREA TO BE SERVED		
	WATER SOURCE:	CANAL	LAKE	RIVER	
	OTHER	(SPECIFY)			
USE	AGRICULTURAL IRRIGATION	DRAINAGE	EMERGENCY SERVICE	INDUSTRIAL	
	LIVESTOCK	MINING	POWER	PERISHABLE GOODS PROCESSING	
	PUBLIC WATER SUPPLY	RECREATIONAL (POOLS, GOLF, ETC.)	OTHER	(SPECIFY)	

If this Permit is for the modification or renewal - give previous Permit Number NA
And Previous Owner's Name _____
Describe Modification _____

In compliance with the provisions of Ch. 373, Florida Statutes, 1973, and applicable rules and regulations of St. Johns River Water Management District, application is hereby made for a permit as identified above, and in accordance with support data and incidental information filed with this application and made a part thereof.

Jeffrey V. Swain
APPLICANT'S NAME (Please print)

Jeffrey V. Swain
APPLICANT'S SIGNATURE

10-9-89
DATE

If person other than applicant has completed this form, that person certifies by his signature below that he is acting as an authorized agent of the applicant and his signature will be certification that he is in fact the authorized agent.

AGENT'S NAME (Please Print)

AGENT'S SIGNATURE

DATE

DO NOT WRITE BELOW THIS LINE

Advert Sec _____ on _____ and _____
Name of Newspaper Date of First Notice Date of Second Notice

Public Hearing on (if required)

Date

Time

Place

WATER USE PERMIT APPLICATION

TO THE GOVERNING BOARD OF THE
ST. JOHNS RIVER WATER MANAGEMENT DISTRICT
ENVIRONMENTAL SCIENCES AND REGULATION DEPARTMENT

Mail to: WWP PERMIT DIVISION
P. O. BOX 1429
PALATKA, FLORIDA 32077

DO NOT WRITE IN THIS BOX

APPLICATION	STATUS	DATE
#		
STAFF APPROVAL	Y N	
PERMIT ISSUED	1 2	
CONDITIONS	1 2	
EXPIRATION DATE		
FEE INCLUDED \$		#

Use Ball Point Pen - Check and/or fill in all boxes on this form - PRESS HARD!!
Permit Application is not complete unless current application fee is included.

	PERMIT IS FOR:	NEW APPLICATION ☒	MODIFICATION ☐	RENEWAL ☐
APPLICANT	NAME OF APPLICANT			
	LAST FIRST			
	ADDRESS			
	CITY			
	STATE ZIP CODE TELEPHONE NO.			
SITE LOCATION	AES CEDAR BAY, INC. (SAME ADDRESS)			
	GIVE NAME AND ADDRESS OF OWNER IF OTHER THAN APPLICANT IN ABOVE BLOCK			
	ADDRESS			
	CITY			
	SECTION TOWNSHIP RANGE			
QUANTITY	MAXIMUM QUANTITY OF WATER APPLIED FOR: IN/YR MGD.			
	CUMULATIVE INSTALLED CAPACITY MGD * AREA TO BE SERVED ACRES.			
	*See attached description			
	WATER SOURCE: CANAL LAKE RIVER SPRING STREAM WELL			
	OTHER (SPECIFY)			
USE	AGRICULTURAL IRRIGATION DRAINAGE EMERGENCY SERVICE INDUSTRIAL LAWNS			
	LIVESTOCK MINING POWER PERISHABLE GOODS PROCESSING PRIVATE WATER SUPPLY			
	PUBLIC WATER SUPPLY RECREATIONAL (POOLS, GOLF, ETC.) OTHER (SPECIFY)			

If this Permit is for the modification or renewal - give previous Permit Number NA
And Previous Owner's Name
Describe Modification

In compliance with the provisions of Ch. 373, Florida Statutes, 1973, and applicable rules and regulations of St. Johns River Water Management District, application is hereby made for a permit as identified above, and in accordance with support data and incidental information filed with this application and made a part thereof.

Jeffrey V. Swain
APPLICANT'S NAME (Please print)

Jeffrey V. Swain
APPLICANT'S SIGNATURE

10-25-88
DATE

If person other than applicant has completed this form, that person certifies by his signature below that he is acting as an authorized agent of the applicant and his signature will be certification that he is in fact the authorized agent.

NA
AGENT'S NAME (Please Print)

AGENT'S SIGNATURE

DATE

DO NOT WRITE BELOW THIS LINE

Advertised in _____ on _____ and _____
Name of Newspaper Date of First Notice Date of Second Notice

Public Hearing on (if required) _____
Date Time Place

SUMMARY DATA SHEET
Please print all information clearly - Complete applicable blocks only
Attach additional list (if necessary) to list all sources/wells

EXISTING SOURCE(S) OF WATER INFORMATION

WATER SOURCE NUMBER	LOCATION OF WITHDRAWAL	MAXIMUM WITHDRAWAL CAPACITY	AVERAGE DAILY USE	NAME OF SOURCE OR AQUIFER
ONE	Existing Seminole Kraft Corporation Well Field (see map in Figure 2.3-28 of SCA)	7* MGD	5.4 MGD	Floridan
TWO		MGD	MGD	
THREE		MGD	MGD	

REASON FOR NEW SOURCE(S) *See attached description. No new source is planned. Existing Seminole Kraft well field has capability of supplying additional needed capacity.

COMPLETE THIS BLOCK ONLY IF NEW SOURCE(S) IS A WELL(S) NA

WELL NUMBER	OPEN HOLE DIAMETER	SURFACE CASING DIAMETER	TOTAL DEPTH IN FT.	CASING DEPTH IN FT.	AVERAGE WITHDRAWAL IN GPM	PUMP CAPACITY IN GPM	PREVIOUS PERMIT NUMBER	NAME OF SOURCE AQUIFER
ONE	IN.	IN.	FT	FT	GPM	GPM		
TWO	IN	IN	FT	FT	GPM	GPM		
THREE	IN	IN	FT	FT	GPM	GPM		

COMPLETE THIS BLOCK ONLY IF NEW SOURCE(S) IS NOT A WELL(S)

SOURCE NUMBER	PUMP CAPACITY	PROPOSED YIELD	CONTINGENT PROPERTY	IMPOUNDED AREA	PREVIOUS PERMIT NUMBER	NAME OF WATER SOURCE
ONE	GPM	GPM	ACRES	ACRES		
TWO	GPM	GPM	ACRES	ACRES		
THREE	GPM	GPM	ACRES	ACRES		

WATER QUALITY INFORMATION - IF AVAILABLE

SOURCE	CHLORIDE	COLIFORM	HARDNESS	PH	DEPTH TO WATER
ONE	PPM	PPM	PPM		FEET
TWO	PPM	PPM	PPM		FEET
THREE	PPM	PPM	PPM		FEET

ADJACENT LAND OWNER(S) INFORMATION *

- | | | |
|---|----------------|---------------------|
| Name | Address | Town or City |
| 1. Seminole Kraft Corporation, c/o Stone Container Corp., 150 N. Michigan Avenue, Chicago, IL 60606 | | |
| 2. Zion Jacksonville Limited Partnership, c/o Abraham Zion, 41 Madison Avenue, New York, NY 10010 | | |
| 3. Champion International Corp., P.O. Box 18020, Jacksonville, FL 32229 | | |

If pump is for modification of a pumping facility which will change quantity withdrawn, indicate.....

OLD PUMP ** HP GPM. NEW PUMP NA HP GP

If well is for agricultural irrigation - Complete Form No. 161-2C-1176

If well is for commercial, industrial or public supply - Complete Form No. 161-2D-1176 (Form attached)

**Seven existing wells, not all used at any one time.

INSTRUCTIONS FOR PREPARATION OF DRAWING

Drawings are required regardless of the purpose of the application. They must be a maximum of 8 1/2 x 14 and four (4) copies must be enclosed. The following should be clearly indicated on the drawings: Refer to Figures 3.2-1, 3.8- , and 3.2-3 in the SCA.

- BOUNDARIES OF PROPERTY OWNED AT SITE(S) OF WITHDRAWAL.
- THE LOCATION OF THE PROPERTY WITH RESPECT TO SECTION LINES, ROADS, CANALS, LEVEES, LAKES, ETC. IDENTIFY KNOWN LANDMARKS BY NAME.
- ANY DRAINAGE OUTLETS FROM THE PROPERTY. INDICATE LENGTH AND DIAMETER OF CULVERTS AND CAPACITY (GPM) OF PUMPS.
- SURFACE WATER INLET CULVERTS INCLUDING LENGTH AND DIAMETER, AND PUMPS FOR IRRIGATION, AND THE CAPACITY (GPM).
- LOCATIONS OF ALL EXISTING AND PROPOSED WELLS AND POINTS OF SURFACE WATER WITHDRAWALS ON YOUR PROPERTY AND NUMBER EACH CORRESPONDING WITH SUPPLEMENTARY DATA SHEETS.
- LOCATE ALL POINTS OF DISCHARGE OFF PROPERTY OR POINTS OF EFFLUENT DISCHARGE

If information provided on this application is insufficient to describe your operation, attach an additional sheet or sheets.

*4 Amerada Hess Corporation, 2617 Heckscher Drive, Jacksonville, FL 32226

COMPLETE THE APPROPRIATE SECTION ONLY

NOTE: If the following information is not considered adequate for a complete review of this application, additional information or a comprehensive engineering report may be required.

COMPLETE THIS SECTION WHEN USE IS FOR PUBLIC SUPPLY NA

Area owned at site of withdrawal _____ Acres Area served _____ Acres
 Estimated population _____ Proposed average daily usage _____ MGD
 Proposed maximum single day usage _____ MGD
 Projected date of maximum capacity use _____ Mo./Yr.
 Location of service area _____

Disposal method(s) and percent of each 1) _____ %
 2) _____ % 3) _____ %

Location of disposal(s) 1) _____ 2) _____
 3) _____

Type of treatment Primary ☐ Secondary ☐ Advanced ☐

Daily average disposal _____ MGD

Method of reuse _____

Quantity reused _____ MGD Future reuse plans _____

Coefficient of transmissivity _____ sq. ft./day

Storage _____ Leakage _____ ft./day

Maximum drawdown at central point of withdrawal _____ ft.

Time of day of maximum pumpage _____

COMPLETE THIS SECTION WHEN USE IS FOR INDUSTRIAL OR COMMERCIAL

(Seminole Kraft Corporation) (Approximately 28 acres will be used for the Cedar Bay Cogeneration Project.)
 Area owned at site of withdrawal 425 Acres

Type of business Cogeneration

Specific use of water Condenser cooling, cycle makeup, service water, potable, fire protection

Average daily requirement during period of use 5.4 MGD

Proposed maximum single daily use 7 MGD

Months of year to be used

J	F	M	A	M	J	J	A	S	O	N	D
X	X	X	X	X	X	X	X	X	X	X	X

1.1 MGD from AES Cedar

Maximum quantity of effluent disposed per day Bay Cogeneration Plant MGD

Method of effluent treatment: Neutralization, oil-water separation, clarification, aeration,

and chlorination

Effluent disposal: On Site ☐ Off Site ☒

Method of disposal: Discharged to St. Johns River

Is effluent quality monitored: ☒ Yes ☐ No If treatment off site, name of

treatment facility: NA

Location of off site treatment facility

Is water reused: ☐ Yes ☐ No If yes, what method:

10.7.2 Jacksonville Bio-Environmental Services Division Construction Noise Permit Application

The Jacksonville Environmental Protection Board's Noise Pollution Control Rule 4.0 (May 11, 1987, Revision 5) states that most construction activities between the hours of 10:00 p.m. and 7:00 a.m. are not allowed unless specifically permitted by the City of Jacksonville. During the construction phase of the proposed project, it may become necessary to conduct some construction activities during the above nighttime hours. Therefore, approval for such activities is requested.

No permit application form is included in this section because the Jacksonville Bio-Environmental Services Division (BESD) noise permit program has never been implemented (personal communication between Steven M. Day of Black & Veatch and James O. Sewell of BESD on September 22, 1988).

10.8 CFB BOILER BEST AVAILABLE CONTROL TECHNOLOGY ANALYSIS

The 1977 Clean Air Act Amendments establish revised conditions for the approval of preconstruction permit applications under the PSD program. One of these requirements is that the best available control technology (BACT) be installed for all pollutants regulated under the Act. Under the revised Act, BACT determinations must be made on a case-by-case basis considering technical, economic, energy, and environmental impacts for various BACT alternatives. To bring consistency to the BACT process, the EPA has authorized development of guidance documents on the use of a "top-down" approach to BACT determinations.*

The first step in a top-down BACT analysis is to determine, for each applicable pollutant, the most stringent control alternative available for a similar source or source category. If it can be shown that this level of control is infeasible on the basis of technical, economic, energy, or environmental impacts for the source in question, then the next most stringent

*Reference US EPA memorandum from J. C. Potter (Assistant Administrator for Air and Radiation) to Regional Administrators dated December 1, 1987.

level of control is identified and similarly evaluated. This process continues until the BACT level under consideration cannot be eliminated by any technical, economic, energy, or environmental consideration.

Subsection 3.4.1 determined that nitrogen oxides, carbon monoxide, lead, and applicable noncriteria pollutants must be analyzed in a BACT analysis. This appendix supplies the detailed BACT analysis for the Cedar Bay Cogeneration Plant for these applicable pollutants. A summary of this analysis is presented in Subsection 3.4.3.

10.8.1 Basis of Analysis

Certain assumptions are made to permit the evaluation of BACT alternatives. To the maximum extent possible, these assumptions are updated as detailed design of the plant progresses. The following is a summary of some directly pertinent requirements and assumptions on which this BACT evaluation is based.

- Federal and state ambient air quality standards, emission limitations, significant deterioration increments, solid waste standards, and the requirements of other applicable regulations will be met.
- Federal New Source Performance Standards (NSPS) establish limiting criteria for pollutant emissions from the Cedar Bay Cogeneration Plant.
- The operating reliability of the air quality control system (AQCS) will not limit the generating capacity of the Cedar Bay Cogeneration Plant.
- The Cedar Bay Cogeneration Plant will generate 2,300,000 lb/h of steam at the maximum design conditions. The largest commercial CFB boiler produces 925,000 lb/h of steam. There are numerous pulverized coal (PC) fired boilers operating that are larger than 2,300,000 lb/h of steam. Consequently, this BACT analysis will consider either three CFB boilers (each providing 33 percent of the total capacity), or a single full-capacity PC boiler.

- The BACT analysis is based on the economic evaluation criteria and the coal quality data listed in Tables 10.8-1 and 10.8-2, respectively.

TABLE 10.8-1. ECONOMIC EVALUATION CRITERIA

Item	Value
Fuel Burn Rate	3,189 MBtu/h
Initial Operation	July 1992
Economic Recovery Period	20 Years
Contingency Cost Factor	10 percent
Escalation Rate	4 percent
Levelized Fixed Charge Rate*	15.4 percent
Present Worth Discount Rate	12 percent
Levelization Factor**	1.29
Indirects Cost Factor	16 percent
Allowance For Funds Used During Construction	12 percent
Capacity Factor	100 percent
1988 Limestone Cost	12 \$/ton
1988 Labor Cost	48,500 \$/man-year
1988 Energy Cost	70 mills/kWh
1988 Waste Disposal Cost	19 \$/ton

*Calculated based on the economic recovery period, cost of money, and margins for insurance and taxes.

**Calculated based on the economic recovery period, escalation rate, and present worth discount rate.

TABLE 10.8-2. DESIGN FUEL QUALITY ANALYSIS

<u>Ultimate Analysis</u>	<u>Typical percent</u>
Carbon	63.60
Hydrogen	4.40
Sulfur	3.30*
Moisture	7.20
Nitrogen	1.30
Chlorine	0.03
Oxygen	5.07
Ash	16.30
Higher Heating Value	11,000 Btu/lb

*For short-term air quality modeling, design sulfur content is 1.70 percent for calculating annual SO₂ emissions.

PAGES 36 THROUGH 56
DELETED

3

10-36

Amendment 3
101089

10.8.2 Cogeneration Plant NO_x and CO Emissions Control

The objective of this analysis is to determine BACT for nitrogen oxides (NO_x) and carbon monoxide (CO) emissions. Due to the mutually dependent formation characteristics of NO_x and CO, it is necessary to consider BACT concurrently for these emissions.

10.8.2.1 Additional Requirements and Assumptions.

- Nitrogen oxide emissions are limited by New Source Performance Standards to 0.60 lb/MBtu of heat input to the boiler for bituminous coal. The coal listed in Table 10.8-2 is a bituminous coal.
- There are no coal fired boiler NSPS limiting the emission of CO.
- A review of information contained in the BACT/LAER Clearinghouse (1985 edition, and first and second supplements) indicates that the most stringent NO_x emission limit issued to date is 0.039 lb/MBtu for a proposed project located in California. The installation will use a CFB boiler with a selective noncatalytic NO_x reduction (SNCR) system. There are several other California CFB boiler permits that require the use of SNCR systems to meet NO_x emission requirements. However, only two of these boilers are operating (the Cogeneration National and Corn Products projects located in California; both plants are currently in startup).
- The most stringent CO emission limit issued to date is a requirement of 0.014 lb/MBtu for a pulverized coal fired boiler project operating in Florida.

10.8.2.2 Formation Characteristics. Nitrogen oxides are formed by the oxidation of nitrogen contained in the fuel (fuel NO_x) and in the combustion air (thermal NO_x). Nitrogen oxide emissions are limited by lowering combustion temperatures, minimizing excess combustion air, and staging combustion. Carbon monoxide emissions are formed by incomplete combustion of coal. Increasing combustion temperatures, increasing excess air, and better fuel/air mixing during combustion minimize CO emissions. Therefore, limiting NO_x emissions by lowering combustion temperatures and excess combustion air are counterproductive relative to CO emissions. Because NO_x is the dominant pollutant in terms of total impact, this BACT analysis establishes BACT for CO based on BACT for NO_x.

10.8.2.3 Emissions Control Alternatives. Nitrogen oxides and CO emission controls are divided into two categories: in-furnace formation control and post-combustion emission reduction. In-furnace combustion control processes reduce the quantity of NO_x and CO formed during the combustion process. Post-combustion NO_x controls reduce a portion of the NO_x exiting the boiler to nitrogen. Post-combustion CO emission controls oxidize a portion of these pollutants to carbon dioxide and water.

In-Furnace Combustion Control

The commercial installation of CFB boilers over the last several years represents an advance in the control of NO_x emissions from coal fired boilers.

In a CFB boiler, low combustion temperatures coupled with staged combustion effectively limit the formation of NO_x. Low combustion temperatures primarily limit the formation of thermal NO_x, and staged combustion (creating a reducing atmosphere in the lower portion of the boiler) inhibits the formation of fuel NO_x.

CFB boilers are a relatively new coal combustion technology. Due to the lack of long-term CFB boiler NO_x and CO emission performance data, it is difficult to predict reliable, day-to-day emission limits. However, a CFB boiler will be able to achieve a NO_x emission rate of 0.36 lb/MBtu (40 percent below NSPS requirements) on a 30-day rolling average basis when burning the coal listed in Table 10.8-2. A CFB boiler could have initial NO_x emissions lower than 0.36 lb/MBtu. However, because of uncertainties regarding long-term boiler performance, these lower initial levels cannot be guaranteed over the life of the plant.

A survey of other facilities and boiler manufacturers indicates that a CFB boiler should be capable of meeting a CO emission rate of 0.19 lb/MBtu while meeting previously discussed NO_x and SO₂ emission requirements.

Post-Combustion Emission Controls

Post-combustion NO_x control processes are based on the reaction of ammonia or urea with conversion of NO_x to form nitrogen and water. Selective noncatalytic reduction and selective catalytic reduction (SCR) NO_x reduction technologies are the only technologies adequately demonstrated to

be considered for installation on CFB boilers. While there is limited experience with these two NO_x control processes on pulverized coal fired boilers in Europe and Japan, oil and natural gas fired boilers account for the majority of post-combustion NO_x control system experience.

In actual operations, both post-combustion NO_x control processes experience common problems. These problems include equipment fouling, poor control and distribution of the ammonia or urea injected, limited equipment service life, and ammonia slip (unreacted ammonia that is subsequently released to the environment). This, combined with the limited amount of experience downstream of a coal fired CFB boiler, results in considerable uncertainty associated with the long-term reliability of these systems for coal fired applications. Despite lack of applicable experience and technical problems, a description and technical assessment of these two alternatives follow and are included for thoroughness of analysis.

Selective Noncatalytic Reduction. Selective noncatalytic reduction is a post-combustion method for controlling NO_x emissions. The process selectively reduces NO_x by reaction with ammonia or urea without the use of a catalyst bed. A SNCR system could potentially reduce NO_x emissions generated by a coal fired CFB boiler by 40 to 60 percent.

The CFB boiler bed temperature required for optimum SO₂ removal is about 1,560 F. This low bed temperature in a CFB boiler helps prevent NO_x formation, but is outside of the optimum performance range for SNCR operation. The optimum temperature range for injection of ammonia or urea is 1,600 to 1,900 F, and the efficiency of the SNCR system falls off rapidly outside this temperature range. Operation at temperatures above this range can actually increase NO_x emissions. Localized injection of hydrogen or other additives can extend this temperature window below the 1,600 F criterion.

A problem encountered with pilot SNCR systems installed on coal fired boilers is the formation of ammonium bisulfate salts in low temperature zones. These salts are produced at low temperatures when unreacted ammonia or urea reacts with sulfur trioxide in the flue gas. These salts form

tenacious deposits on the cold side of the air heater, significantly increasing pressure drops across the air heater. Ammonium bisulfate deposits also have a detrimental effect on fabric filter operation. Consequently, boilers with SNCR must include equipment for frequent washing of the air heater and processing of the resulting wastes.

Ammonia or urea must be uniformly distributed over the entire flue gas flow path at the appropriate flue gas temperature necessary to ensure completion of the SNCR chemical reaction. Failure to achieve uniform distribution of the additive could lead to inadequate NO_x removal rates and increased emission of unreacted ammonia.

One coal fired cyclone boiler in Germany was recently retrofitted with a SNCR system. The system was retrofitted as part of a demonstration program to evaluate the SNCR technology. The design of this boiler permitted ammonia injection into a region where flue gas temperatures ranged from 1,800 F to 1,900 F. Although NO_x removal performance has been acceptable at normal boiler loads, ammonia slip problems have been encountered due to reduced flue gas temperatures at lower loads.

In addition to the lack of commercial coal combustion experience, ammonia slip, and ammonium bisulfate deposit formation, it is not possible to determine the effects which CFB boiler in-bed desulfurization might have on the performance of a SNCR system. The presence of SO_2 removal reaction products and unused desulfurization additive could potentially produce undesirable effects.

Selective Catalytic Reduction. Selective catalytic reduction is a post-combustion method for control of NO_x emissions which is being developed by a number of companies, principally in Japan and Europe.

The SCR process combines vaporized ammonia with NO_x in the presence of a catalyst to form nitrogen and water. The SCR process can achieve between 80 and 90 percent reduction of NO_x . The vaporized ammonia is injected into the exhaust gases prior to passage through a catalyst bed. The optimum flue gas temperature range for SCR operation is approximately 700 to 850 F. The SCR catalyst is housed in a reactor vessel which is separate from the boiler. Therefore, an economizer bypass may be required to maintain the

reactor temperature during low load operation. This would reduce boiler efficiency at lower loads.

The SCR NO_x control technology was first developed for petroleum fueled combustion processes. Stricter NO_x emission requirements, first in Japan, and then in Europe, encouraged development of the SCR technology for oil and gas fired boilers. More recently, significant developmental work has been done to improve this process for use on coal fired boilers in Japan and Europe. As of mid-1986, there were 22 coal fired utility boilers in Japan, either in operation or under construction, which have SCR NO_x control systems. The first SCR system on a coal fired boiler went into operation in 1979. Five full-scale SCR systems on coal fired boilers are currently operating in the Federal Republic of Germany, and two in Austria.

Domestic experience with SCR is limited to natural gas and oil fired units. Pilot scale testing was conducted several years ago at the EPRI Integrated Environmental Control Pilot Plant located at the Arapahoe Generating Station in Colorado. These tests were performed using a 5,000 scfm flue gas slipstream from the Arapahoe station's pulverized coal fired boiler. To date, no SCR systems are installed for use on coal fired CFB boilers.

The SCR process also experiences many of the same problems encountered with the SNCR process. Ammonia injection control systems are continuing to be refined to achieve the desired control accuracy. Ammonia slip continues to be a significant problem and is the focus of ongoing research efforts.

Coal fired SCR systems in Europe and Japan have experienced significant problems with plugging and poisoning of the catalyst by fly ash. In addition, SCR systems in coal fired applications have experienced erosion of the catalyst. Research efforts aimed at solving these problems focus on catalyst configurations and the velocity of the flue gas within the catalytic reactor. The presence of calcined, unreacted limestone and desulfurization reaction products from a CFB boiler could further complicate these problems. At best, maintenance costs would increase significantly.

Carbon Monoxide Emissions Reduction Systems. Lower CO emissions are possible if combustion temperatures are increased. However, SO₂ removal

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efficiency would be reduced and NO_x formation would increase. Therefore, consistent with the approach of evaluating BACT for CO emissions based on BACT with NO_x, increasing combustion temperatures to limit CO emissions is not an option for CO control. Tests on fluidized bed boilers have indicated that additive molar ratios would increase by at least 1.5 for the increased temperature. This results in an incremental CO emission reduction cost of \$4,200 per incremental ton of CO emission avoided due to increased limestone use.

A catalytic CO emissions reduction method is available for use on the exhaust from combustion turbines and petroleum refining operations. The process oxidizes up to 90 percent of the CO, resulting in the emission of carbon dioxide and water. The process is a straight catalytic oxidation/reduction reaction requiring no additives. However, the platinum coated catalyst is extremely expensive.

This process has never been applied to a coal fired power plant. The catalytic reaction is effective at a temperature of approximately 700 F. In PC and CFB boilers, a temperature of 700 F is available just upstream of the air heater. However, because of the potential for erosion and pluggage of the platinum catalyst by abrasive combustion products, this process is unsuited to coal fired applications, and is, therefore, not considered technically feasible for the Cedar Bay Cogeneration Plant.

10.8.2.4 Economic Evaluation of Viable Alternatives. Based on the previous discussion, the following will be the NO_x reduction alternatives evaluated consistent with a top-down approach.

- (1) A SCR system designed for 90 percent NO_x reduction.
- (2) A SNCR system designed for 60 percent NO_x reduction.
- (3) CFB boiler designed to limit NO_x emissions to 0.36 lb/MBtu.

Table 10.8-3 lists estimated NO_x and CO emissions for the various control alternatives.

Table 10.8-4 lists estimated capital costs for NO_x emission reduction systems for the Cedar Bay Cogeneration Plant. No costs are assessed for the alternatives without post-combustion NO_x reduction systems.

TABLE 10.8-3. NITROGEN OXIDES AND CARBON MONOXIDE EMISSIONS

<u>Alternative</u>	<u>Uncontrolled Emission lb/MBtu</u>	<u>Removal Rate percent</u>	<u>Emission Rate lb/MBtu</u>	<u>Annual Emission t/y</u>
Nitrogen Oxides Emissions				
CFB Boiler/SCR System	0.36	90	0.036	503
CFB Boiler/SNCR	0.36	60	0.14	2,011
CFB Boiler	0.36	NA	0.36	5,028
Carbon Monoxide Emissions				
CFB Boiler	0.19	NA	0.19	2,654

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TABLE 10.8-4. NITROGEN OXIDES REDUCTION SYSTEMS CAPITAL COSTS

	90 Percent Reduction <u>SCR System</u> \$1,000	60 Percent Reduction <u>SNCR System</u> \$1,000
SNCR System	0	2,940
SCR Reactor System	9,170	0
SCR Ammonia Storage and Injection	1,050	0
Incremental Air Heater	1,250	0
Incremental ID Fan and Ductwork	1,540	0
Differential Balance-of-Plant	<u>900</u>	<u>680</u>
1988 Capital Cost	13,910	3,620
Contingency	<u>1,390</u>	<u>360</u>
1988 Direct Capital Cost	15,300	3,980
Escalation	<u>1,580</u>	<u>410</u>
Direct Capital Cost*	16,880	4,390
Indirects	2,700	700
Interest During Construction	<u>4,570</u>	<u>1,190</u>
1992 Total Capital Cost	24,150	6,280

*Assumed to be at the midpoint of construction.

The table shows all capital costs for a complete post-combustion NO_x control system. For the selective catalytic reduction process, the capital costs include the catalytic reactor, ammonia additive injection system, balance-of-plant costs, and the incremental air heater and ID fan. Economic criteria used to develop capital costs are listed in Table 10.8-1.

Levelized annual operating costs are presented in Table 10.8-5. Operating costs include operating personnel, maintenance, ammonia additive, and steam and electric energy. For the SCR alternative, operation and maintenance costs include replacement and disposal of spent catalysts. The most significant cost for both the SNCR and the SCR NO_x control system alternatives is for ammonia additive. For the SCR system, ammonia additive and catalyst replacements account for almost 85 percent of the levelized annual costs. This is due to the relatively short service life (two to three year) of the expensive vanadium pentoxide catalyst for coal fired applications. Although the intent in recent SCR research and development is to ultimately recycle the spent catalyst, no recycle facilities are currently in operation. Consequently, the catalyst must be disposed of as a hazardous waste. The potential costs associated with the handling and disposal of the spent catalyst, as a hazardous waste, have not been included in the BACT economic analysis. This results in a more conservative estimate of costs associated with the use of an SCR system.

Installation of an SCR system designed to reduce 90 percent of the NO_x exiting the boiler would add approximately \$24 million to the capital cost of the project for installation downstream of a CFB boiler. Addition of a SCR NO_x control system increases levelized annual costs for the project by \$14 million.

A SNCR system designed to reduce 60 percent of the inlet NO_x would add approximately \$6.3 million to the capital cost of the project. The total levelized annual cost for a SNCR system would be approximately \$3.8 million.

10.8.2.5 Conclusions. Installation of a 90 percent efficient SCR system on a CFB boiler as compared to a 60 percent efficient SNCR system results in an incremental reduction cost of \$6,800 per ton of NO_x emission avoided.

TABLE 10.8-5. NITROGEN OXIDES REDUCTION SYSTEMS LEVELIZED ANNUAL COSTS

	90 Percent Reduction <u>SCR System</u> \$1,000	60 Percent Reduction <u>SNCR System</u> \$1,000		
Levelized Annual Operating Costs				
Operating personnel	110	190		
Maintenance	300	600		
Additive and catalyst	9,100	850		
Energy	1,030	1,500	2	3
Catalyst disposal	<u>90</u>	<u>0</u>		
1992 annual operating costs	10,630	3,140	2	
Levelized Total Annual Costs				
Fixed charges on capital	3,720	970		
Annual operating costs	<u>10,630</u>	<u>3,140</u>	2	
1992 total annual costs	14,350	4,110		

The SNCR system has an incremental reduction cost of \$1,400 per ton as compared to a CFB boiler designed to achieve a NO_x emission of 0.36 lb/MBtu. Addition of a SNCR system would add \$6.3 million to the capital cost of a CFB boiler plant.

Therefore, based on the limited experience with post-combustion NO_x reduction systems installed on coal fired boilers, the additional energy use, and the economies associated with the incremental NO_x removal, BACT for NO_x and CO emissions from the Cedar Bay Cogeneration Plant is a CFB boiler with combustion controls without post-combustion emission controls.

The consideration of environmental factors also supports the selection of combustion controls as BACT. 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. Although ammonia emissions are not regulated nationally, at least one district in California recently set a limit of 10 ppm. Unreacted ammonia emissions would be approximately 10 ppm from a SCR system, and 30 ppm from a SNCR system.

10.8.3 Lead and Non-Criteria Pollutant Emissions Control

An additional benefit of flue gas desulfurization and particulate removal air quality control efforts is the removal of other pollutants from the flue gas stream. Removal occurs as gas temperatures decrease as a result of condensation of gaseous emissions onto fly ash particles and subsequent removal of particulates in the fabric filter.

A BACT review is required for all pollutants which exceed PSD significance levels. Table 10.8-6 lists estimated emissions and PSD significance levels for lead and applicable non-criteria PSD pollutants.

Coal does not contain asbestos or vinyl chloride, and none is formed during combustion. Therefore, asbestos and vinyl chloride emissions will be less than PSD significance levels.

Hydrogen sulfide and reduced sulfur compounds form in a reducing atmosphere. Combustion in a CFB boiler occurs in an oxidizing atmosphere.

TABLE 10.8-6. LEAD AND OTHER NON-CRITERIA POLLUTANT EMISSION*

<u>Trace Element/Compound</u>	<u>Uncontrolled Emission lb/MBtu</u>	<u>Estimated Removal Efficiency percent</u>	<u>Estimated Emission lb/MBtu</u>	<u>Estimated Emission t/yr</u>	<u>PSD Significance Level t/yr</u>
Lead	0.0078	10.0	0.0070	91	0.10
Fluorides	0.17	50.0	0.086	1,122	3
Mercury	0.00029	10.0	0.00026	3.4	0.10
Beryllium	10.0023	95.0	0.00011	1.5	0.0004
Sulfuric acid mist	0.047	50.0	0.024	308	7

*Emissions are total for a three boiler plant at 93 percent capacity factor.

Therefore, emissions of these compounds will be less than PSD significance levels.

Hydrogen sulfide and reduced sulfur compounds form in a reducing atmosphere. Combustion in a CFB boiler occurs in an oxidizing atmosphere. Therefore, emissions of these compounds will be less than PSD significance levels.

Estimated emissions of lead, fluorine (except the wet limestone scrubber AQCS), mercury, beryllium, and sulfuric acid mist exceed PSD significance levels.

Coal trace element quantities are difficult to obtain from coal suppliers. Even though a specific coal has been selected, specific trace element data are not available. Therefore, coal trace element quantities are calculated from values contained in Trace Elements in Coal (Vlado Valkovic, CRC Press, 1983). If the ranges of coal trace quantities in this reference are examined, it becomes evident that there is a large amount of uncertainty in estimating uncontrolled emissions. Trace element emission estimates based upon this published information are considered conservative since high range values are typically used in calculations.

There is also a lack of data regarding removal efficiency of coal trace elements from fluidized bed boiler flue gas. However, estimates can be calculated on the basis of limited test results from other types of coal combustors and control alternatives. Use of these data compounds the uncertainty previously mentioned, but is the best information available to predict emissions.

During combustion, lead forms molten volatile free metal, fluorine volatilizes to hydrogen fluoride, and mercury and beryllium form volatilized metal. As the flue gas cools, lead, fluorine, and beryllium condense onto fly ash and are collected in the fabric filter. Mercury does not tend to condense as readily.

Approximately 1 percent of sulfur dioxide converts to sulfur trioxide (SO_3) in pulverized coal boilers. Sulfur trioxide can combine with moisture in the flue gas to form sulfuric acid mist (H_2SO_4). Removal of sulfuric acid mist with sulfur dioxide can be expected. Tests on a PC boiler with a wet limestone scrubber AQCS indicate that 50 percent removal can be

expected. Lime spray dryers and CFB boilers are expected to perform at similar levels.

Since removal of these pollutants occurs as part of flue gas desulfurization and particulate removal operations, BACT regarding lead, fluorine, mercury, beryllium, and sulfuric acid mist emissions is the operation of the plant in accordance with SO₂ and particulate removal permit requirements.

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10.8.4 Cogeneration Plant Emissions Control Summary

The following is a summary of BACT for the Cedar Bay Cogeneration Plant and the associated emission rates.

- Nitrogen Oxides and Carbon Monoxide--A CFB boiler with combustion controls designed to meet 0.36 lb NO_x/MBtu, and 0.19 lb CO/MBtu emission limits.
- Other Criteria and Non-Criteria Pollutants--Control consistent with flue gas desulfurization and particulate removal systems.

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10.9 KRAFT RECOVERY BOILER BEST AVAILABLE CONTROL TECHNOLOGY ANALYSIS

The 1977 Clean Air Act Amendments establish revised conditions for the approval of preconstruction permit applications under the PSD program. One of these requirements is that the best available control technology (BACT) be installed for all pollutants regulated under the Act. Under the revised Act, BACT determinations must be made on a case-by-case basis considering technical, economic, energy, and environmental impacts for various BACT alternatives. To bring consistency to the BACT process, the EPA has authorized development of guidance documents on the use of a "top-down" approach to BACT determinations.*

The first step in a top-down BACT analysis is to determine, for each applicable pollutant, the most stringent control alternative available for a similar source or source category. If it can be shown that this level of

*Reference US EPA memorandum from J. C. Potter (Assistant Administrator for Air and Radiation) to Regional Administrators dated December 1, 1987.

control is infeasible on the basis of technical, economic, energy, or environmental impacts for the source in question, then the next most stringent level of control is identified and similarly evaluated. This process continues until the BACT level under consideration cannot be eliminated by any technical, economic, energy or environmental consideration.

Subsection 3.4.1 determined that nitrogen oxides, carbon monoxide, lead, and applicable non-criteria pollutants must be analyzed in a BACT analysis. This analysis supports the selection of BACT for the Cedar Bay kraft recovery boiler (KRB) for these applicable pollutants. Emissions of these pollutants from the smelt dissolving tank and the multiple effect evaporator are negligible and therefore, will not be evaluated as part of this BACT analysis.

10.9.1 Basis of Analysis

Certain assumptions are made to permit the evaluation of BACT alternatives. To the maximum extent possible, these assumptions are updated as detailed design of the plant progresses. The following is a summary of some directly pertinent requirements and assumptions on which this BACT evaluation is based.

- Federal and state ambient air quality standards, emission limitations, significant deterioration increments, and the requirements of other applicable regulations will be met.
- Federal NSPS do not set emission limits for NO_x or CO emissions from kraft recovery boilers.
- Black liquor solids do not contain significant quantities of lead, beryllium, fluoride, or mercury.
- The BACT analysis is based on the black liquor analysis listed in Table 10.9-1.
- Due to the mutually dependent formation characteristics of NO_x and CO emissions, it is not possible to consider BACT for these emissions independently. Nitrogen oxides are formed by the oxidation of nitrogen contained in the fuel (fuel NO_x) and in the combustion air (thermal NO_x). Nitrogen oxide emissions are limited by lowering combustion temperatures, minimizing excess

TABLE 10.9-1. DESIGN BLACK LIQUOR ANALYSIS

<u>Ultimate Analysis</u>	<u>Typical percent</u>
Carbon	25.99
Hydrogen	2.72
Sulfur	2.60
Moisture	30.00
Nitrogen	0.04
Chlorine	0.42
Oxygen	23.60
Sodium	14.15
Potassium	0.48
Higher Heating Value	4,522 Btu/lb

combustion air and staging combustion. Carbon monoxide emissions are formed by incomplete combustion of the fuel. Increasing combustion temperatures, increasing excess air, and better fuel/air mixing during combustion minimize CO emissions. Therefore, limiting NO_x emissions by lowering combustion temperatures and excess combustion air are counterproductive relative to CO emissions. For the purposes of this analysis BACT for CO will be based on BACT for NO_x.

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10.9.2 Nitrogen Oxides Emissions Control

A review of information contained in the BACT/LAER Clearinghouse documents indicates that the lowest NO_x emission requirement is 0.073 lb/MBtu (approximately 39 ppmvd) for a proposed KRB located in Texas. In discussions with EPA Region VI, it was found that this plant has never been built and that the permit has expired. The minimum NO_x emission limit that is being met through actual operation is approximately 140 ppmvd at a KRB located in North Charleston, South Carolina.

In general, kraft recovery boilers have relatively low NO_x emissions. Low combustion temperatures and staged combustion (creating a reducing atmosphere in the lower portion of the boiler) inhibit the formation of NO_x. The combustion temperature above the primary air injection is estimated to be approximately 1,800 F. This relatively low combustion temperature is maintained by adjusting the furnace bed height and decreasing the primary air temperature.

KRB manufacturers are willing to guarantee various maximum NO_x emission rates. Emission guarantees vary, not only because of manufacturer differences, but also because of different black liquor fuel qualities. To maintain flexibility in procurement of equipment for the Cedar Bay KRB, it is necessary to propose the lowest NO_x emission guarantee common to all potential manufacturers, plus a small allowance for performance deterioration. Manufacturers indicate that on the basis of the design black liquor fuel analysis listed in Table 10.9-1 they can reliably meet a NO_x emission requirement of 180 ppmvd with appropriate combustion controls.

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In addition to combustion controls, NO_x emissions might be controlled by a postcombustion NO_x reduction system. Review of BACT/LAER Clearing-house documents did not indicate any kraft recovery boilers using NO_x reduction systems. Consequently, there is no operating experience with NO_x reduction systems operating downstream of a kraft recovery boiler. However, to comply with the requirements for a "top-down" BACT analysis, NO_x reduction systems will be considered for use downstream of the KRB.

Performance of a selective catalytic reduction system (described in Subsection 10.8.3.3) downstream of a kraft recovery boiler is difficult to predict. This NO_x reduction system relies heavily on a vanadium pentoxide catalyst to ensure a complete efficient reaction of the ammonia with the NO_x. The presence of sodium compounds is likely to cause a multitude of catalyst fouling (plugging) problems. In addition, the formation of ammonia bisulfate would compound the uncertainty associated with this NO_x reduction system. Therefore, it appears that this NO_x reduction system is poorly suited for installation on a KRB and will not be considered further.

The SNCR system (described in Subsection 10.8.3.3) does not rely on the use of a catalyst, but relies mainly on the chemical/ temperature reaction between ammonia and NO_x. A large amount of uncertainty is associated with the use of this NO_x reduction technology downstream of a KRB, but conceptually it is likely to be a more effective NO_x control technology than a SCR system. Ammonia bisulfate deposits downstream of the boiler are still likely to present operational/maintenance problems. In addition, it is not possible to determine the catalytic effects that the presence of sodium compounds might have on the reaction efficiency of the chemical reduction process.

Ammonia is also fairly soluble and is likely to be absorbed by water in the bottom of the wet bottom precipitator. Blowdown from the wet bottom precipitator will be returned to the pulping process loop. Therefore, absorbed ammonia could ultimately contaminate the pulp product with an ammonia smell. However, despite the uncertainties, for the purposes of this evaluation it will be assumed that a SNCR system would be adapted for this application. A SNCR system designed for 60 percent NO_x reduction would result in a NO_x emission of approximately 72 ppmvd.

Table 10.9-1b lists the estimated capital and levelized annual costs for a SNCR system located downstream of a KRB. A SNCR system designed for 60 percent NO_x reduction would add approximately \$3.5 million to the capital cost and \$2.0 million to the annual cost of the kraft recovery boiler. Capital costs include costs for additive storage, ammonia additive injection system, and balance-of-plant costs. Annual costs include fixed charges on capital investment, operating personnel, ammonia additive, maintenance, and energy. Annual costs do not account for any costs associated with pulp process loop impacts from ammonia contamination.

A levelized annual cost of \$2.0 million results in an incremental NO_x emissions reduction cost of \$2,000 per ton of NO_x reduced. The SNCR system would consume electrical energy equivalent to approximately 1 percent of the KRB fuel consumption rate.

The consideration of environmental factors also supports the selection of combustion controls as BACT. Use of 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. As previously discussed in Subsection 10.8.3, although ammonia emissions are not regulated nationally, at least one district in California recently set a limit of 10 ppm. Unreacted ammonia emissions from a SNCR system would be between 30 and 40 ppm.

Therefore, based on economics, energy, and environmental considerations, a NO_x emission limit of 180 ppmvd corrected to 8 percent oxygen is proposed as BACT for the Cedar Bay KRB.

10.9.3 Carbon Monoxide Emissions Control

A review of information contained in the BACT/LAER Clearinghouse documents indicates that the lowest CO emission requirement is 0.09 lb/MBtu (approximately 78 ppmvd) for a proposed KRB located in Texas. In discussions with EPA Region VI, it was found that this plant has never been built and that the permit has expired.

TABLE 10.9-1b. NITROGEN OXIDES REDUCTION SYSTEM CAPITAL AND ANNUAL COSTS

	<u>SNCR</u> <u>\$1,000</u>
Capital Costs	
NO _x Reduction Equipment	1,730
Differential Balance-of-Plant	<u>400</u>
1988 Capital Cost	2,130
Contingency	<u>210</u>
1988 Direct Capital Cost	2,340
Escalation	<u>240</u>
Direct Capital Cost	2,580
Indirects	410
Interest During Construction	<u>550</u>
1992 Total Capital Cost	3,540
Levelized Annual Operating Cost	
Operating Personnel	210
Maintenance	350
Additive	330
Energy	<u>590</u>
1992 Annual Operating Cost	1,480
Fixed Charges on Capital	<u>550</u>
1992 Total Annual Cost	2,030

Due to the pyrolytic nature of kraft recovery boiler combustion, carbon monoxide emissions are relatively high. Maintaining low combustion temperatures and staged combustion for NO_x emissions control is counter-productive with regard to CO emissions. Therefore, by being consistent with the approach of evaluating BACT for CO emissions based on BACT for NO_x, increasing combustion temperatures to limit CO emissions is not an option for CO control. Manufacturers predict that a properly designed KRB could consistently meet a CO emission limit of 400 ppmvd while maintaining previously mentioned SO₂ and NO_x emission limits.

With no experimental or commercial operating experience downstream of KRB boilers, CO reduction technologies such as catalytic reduction are insufficiently developed to consider for use. Therefore, BACT for CO emissions from the KRB is proper boiler design and operation (consistent with meeting previously proposed NO_x and SO₂ emission requirements) to meet a CO emission limit of 400 ppmvd corrected to 8 percent oxygen.

10.9.4 KRB Emissions Control Summary

The following is a summary of BACT for the Cedar Bay kraft recovery boiler.

- Nitrogen Oxides--A KRB designed to meet a 180 ppmvd (corrected to 8 percent oxygen) NO_x emission limit.
- Carbon Monoxide--A KRB designed to meet a 400 ppmvd (corrected to 8 percent oxygen) CO emission limit.

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10.10 SITE SUBSURFACE DATA

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101089



LAW ENGINEERING

GEOTECHNICAL, ENVIRONMENTAL
& CONSTRUCTION MATERIALS
CONSULTANTS

June 16, 1978

St. Regis Paper Company
P. O. Box 18020
Jacksonville, Florida 32229

Attention: Mr. Cliff Mattox

Subject: Report of Subsurface Investigation
Canal Road Pavement Design
St. Regis Paper Co.
Jacksonville, Florida
Job No. J-3066

Gentlemen:

Law Engineering Testing Company has completed a subsurface investigation for the proposed paving program of the canal road within the St. Regis Paper Co. mill in Jacksonville, Florida. This investigation was made in accordance with our Proposal No. 78-837S, dated April 18, 1978 and your Construction/ Maintenance Agreement No. 4527-JK, dated April 24, 1978. This report briefly outlines the investigative procedures we employed along with documenting the data collected. Included in Part IV of this report are our recommendations for site preparation and pavement design for the canal road.

We appreciate the opportunity to be of continued service as your geotechnical consultant. If you have any questions regarding this report or if we may be of further service, please contact us.

Very truly yours,

LAW ENGINEERING TESTING COMPANY

Terrill V. Smith, E.I.
Civil Engineer

Randy A. Knott, P.E.
Senior Engineer
Registered, Florida 20340

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PROJECT INFORMATION & STRUCTURAL CONDITIONS

As indicated on the Site Location Map and the Field Investigation Plan, both in the Appendix, the canal road extends westerly from the mill to the Broward River. The road is bounded on the north by the cooling towers and the settling pond and on the south by the lime waste area. The road turns (approximately 90°) at the Atlantic Coast Line Railroad spur and proceeds to the north adjacent to the spur. The roadway is approximately 700 feet in length prior to the turn and about 15 to 20 feet wide. We understand that the roadway was constructed of dredge soils obtained from the construction of the settling pond and other nearby ponds adjacent to Broward River.

Initial traffic conditions on the roadway consisted of light truck traffic. Present traffic conditions on the roadway, however, consist of 18 cubic yard capacity dump trucks and a 100 ton capacity rubber-tired crane. The crane is used to remove lime deposits from the settling pond and stockpile this material in the lime waste area. During this operation, water is dropped on the roadway resulting in inundated conditions which result in potholes and washouts. When the lime material has sufficiently dried out in the lime waste area, the crane is used to place the lime material into the dump trucks for removal. During the stockpiling and removing operations, considerable deterioration of the roadway has occurred.

The pavement design recommendations given in Part IV of this report will provide guidance in the paving of the road. The roadway at the turn will be widened and extended shortly, we have assumed not more than a 100 foot extension to the north for a traffic turn-around area.

PART II: FIELD AND LABORATORY INVESTIGATION

Field Investigation

To investigate the subsurface soil conditions along the roadway, 10 auger borings were made to depths ranging from 3 to 9 feet below the existing ground surface. The locations of the borings are indicated on the Field Investigation Plan in the Appendix. The borings were located by an engineer and field crew using tape measurements from the existing concrete block structure adjacent to the cooling towers. The borings were made on April 12, 27, and May 22, 1978.

The Auger Boring Records, in the Appendix, tabulate the results of the auger borings. Ground surface elevations at the boring locations have not been firmly established. Detailed descriptions of the drilling, sampling, and testing techniques used by our field personnel are given in the Appendix in the Field and Laboratory Test Procedures section.

In addition to the above investigative work, an engineer inspected the site to determine the general surface conditions along the roadway. This inspection was made on April 12, 1978.

Laboratory Investigation

Laboratory testing was performed on representative samples of the upper surface soils encountered in the auger

borings. The laboratory tests determined the bearing ratio of the tested soils when compacted according to the Modified Proctor maximum dry density and optimum moisture content. In addition, the Modified Proctor compaction characteristics and grain size distribution of the tested soils were determined. These tests were necessary in order to properly classify the soils and determine their compaction and strength characteristics for pavement design.

The laboratory results are indicated on the Bearing Ratio, Compaction, and Grain Size Distribution Test results in the Appendix. A brief description of the laboratory test procedures is given in the Appendix in the Field and Laboratory Test Procedures section.

PART III: SITE AND SUBSURFACE CONDITIONS

Site Conditions

From our site inspection, we noted that the roadway surface has deteriorated in some areas resulting in pot holes in the roadway. The majority of the roadway has been covered with approximately 6 to 12 inches of wood chips and tree bark. The crown along the centerline of the roadway is very low giving the appearance of a flat road resulting in minimal surface runoff. A slight vertical rise in the roadway, however, does exist at about the middle of the roadway. In areas where wood chips and tree bark have not been deposited upon the roadway surface, the surface soils were composed primarily of loose to firm grey fine sands.

Subsurface Conditions

General - A graphical representation of the subsurface conditions along the roadway is indicated on the Generalized Subsurface Profile in the Appendix. This profile and the soil conditions outlined below highlight the major subsurface stratification. For a detailed description of the soil conditions encountered, please refer to the Auger Boring Records in the Appendix. When reviewing these records and the soil profile, it should be understood that the soil conditions could vary between the boring locations.

Soils - As previously stated, the majority of the roadway is covered with wood chips and tree bark. Beneath this fill material, the upper surface soil layer which is approximately 3 to 4 feet thick is composed primarily of loose to firm grey slightly silty fine sands. The next soil layer encountered to the maximum boring depth of approximately 9 feet below the existing ground surface, was composed primarily of loose to firm grey to dark grey slightly silty to silty fine sands with gravel and cemented fine grained particles.

In auger boring A-7, we encountered a soft blue-grey sandy silt (lime waste) beneath the upper wood chips layer. The lime waste was encountered from approximately one foot to 5½ feet below the existing ground surface and underlain by a loose grey to dark grey silty fine sand. The approximate 4½ feet of lime waste appears to have been deposited in a depression on the roadway during the lime waste removal operations.

Groundwater - The groundwater level was recorded at all auger boring locations at the time of drilling, except at auger boring A-8. The levels as recorded are indicated on the Auger Boring Records in the Appendix. The groundwater level was generally encountered at a depth of approximately 4½ feet below the existing ground surface of the roadway. The groundwater level encountered during this investigation,

however, should be expected to vary according to seasonal climatic conditions and tidal fluctuations in the adjacent Broward River.

PART IV: RECOMMENDATIONS FOR PAVEMENT DESIGN
AND SITE PREPARATION

General Evaluation

The following recommendations are based upon the previously presented project information and structural conditions along with the data obtained in this investigation. The field and laboratory test data have been compared with previous correlations of soil classification, bearing capacities, and settlements for soils similar to those at this site. If the structural information is incorrect, please contact us so that our recommendations can be reviewed. In addition, the discovery of any site and/or subsurface condition during construction which deviates from the data obtained in this investigation should also be reported to us for our evaluation.

In general, we consider the upper surface soils beneath the existing wood chips and tree bark layer suitable to support the roadway pavement structure. Site preparation will be required, however, in order to obtain uniform support and to minimize erosion and washouts of the roadway during and after construction.

Pavement Design

The pavement structure should consist of the following:

- (1) Asphalt Wearing Surface
- (2) Base Course

(3) Subbase Course or Prepared Subgrade

The asphalt wearing surface should be a Type S-1 asphalt concrete (AC) as defined in the Florida D.O.T. Standard Specifications for Road and Bridge Construction (1977). We recommend that the wearing surface be at least 3 inches in thickness. Placement and compaction of the asphalt wearing surface should be governed by the specifications within the above referenced manual.

We recommend that the base course consist of either (1) Florida limerock, (2) crushed stone or gravel, or (3) an approved alternative. The limerock should meet the specifications outlined in the previously stated manual. Crushed stone or gravel should be adequately graded and comply with the specifications pertaining to coarse aggregate as outlined in Section 901 of the Florida D.O.T. Standard Specifications for Road and Bridge Construction (1977). We recommend, however, that 100% of the crushed stone or gravel pass a $1\frac{1}{2}$ " square sieve and not more than 10% pass the No. 4 (4.74 mm square) sieve. The base course should be at least 8 inches thick.

Following placement of the base course, the base course surface should be "primed" with any of the following cut-back asphalt grades: RC-70, RC-250, MC-70, or MC-250. At least 0.2 gallons per square yard should be applied to the base course surface. Care should be taken to prevent over

priming the base course surface. Prior to asphalt placement, the prime coat should be fully set and cured.

The primed base course should be sanded if: (1) more than one day (24 hours) will elapse prior to laying the asphalt wearing surface and excess prime is not absorbed, or (2) construction equipment will operate over the unprotected primed base course. If sanding is required, approximately 0.15 cubic feet of sand per square yard of surface (i.e. about $\frac{1}{4}$ inch of sand) should be spread over the primed base course. The sand surface coating should contain less than 10 percent fines (material passing the No. 200 sieve) and be composed of non-plastic, inorganic soil.

The specifications governing the placement of prime coats on pavement base course surfaces and sanding as outlined in Section 300 of the Florida D.O.T. Standard Specifications for Road and Bridge Construction (1977) should be followed.

It is our opinion that the majority of the existing upper surface soils beneath the surface wood chips and tree bark layer are suitable for use as the subbase course of the pavement structure, however, some preparation of these soils is required in order to obtain uniform support beneath the pavement base. Isolated areas of these soils are very silty, as indicated in auger boring A-7, and will require removal and backfilling with structural fill during the preparation of these soils.

The pavement surface may be sloped, either towards the settling pond or away from it or crowned in the center. The slope of the pavement surface should be approximately 3%, i.e. about three-eighths of an inch rise per foot of run. This slope should allow rapid runoff of water which drops on the roadway during removal of lime waste from the settling pond or during rainfall.

A drainage ditch should be provided, regardless of the slope direction of the pavement surface, between the roadway and the lime waste area. This ditch should be graded to drain toward an existing ditch at the southeast end of the roadway. The ditch should have the following minimum dimensions: (1) depth - 3 feet, (2) bottom width - one foot, (3) side slopes - minimum 2:1 (H to V) and (4) drainage slope - 0.2%. Periodic maintenance of this ditch will be required to keep it free flowing.

In addition to the ditch, the roadway should have side shoulders at least 3 feet wide. These non-paved shoulders should have the same slope or a slightly steeper slope than the pavement surface. The roadway embankments should have side slopes no steeper than 2:1 (H to V), however, slopes of 3:1 (H to V) or less should enable easier maintenance. In order to reduce washouts, bank erosion, and continual maintenance work, we recommend the placement of "jute" or similar

mesh or material covering over the roadway shoulder and embankment to minimize surface erosion. Concrete or soil cement filled bags could be used on the roadway embankment adjacent to the settling pond and drainage ditch.

Site Preparation

Initial site preparation of the roadway will include the removal of the surface wood chips and tree bark layer. Following this clearing operation, the roadway should be graded, if necessary, to the base course bottom elevation. Any surface soils removed should be stockpiled for use as backfill in any areas which may require further excavation and subsequent backfilling.

Following the clearing and grading operation, an engineer from our office should inspect the exposed soils. This inspection is recommended in order to verify and isolate any soft silty subgrade soils requiring further removal. Any areas excavated, as recommended by our engineer, should be backfilled with suitable soils from the stockpile. Suitability of stockpiled soils can be determined by our engineer during his inspection. If limited grading work is performed or the quantity of the stockpiled soils is insufficient, structural fill should be used in the excavated areas. Structural fill is defined as a non-plastic, inorganic, granular soil (relatively clean sand) containing less than 10 percent fines (material passing the No. 200 sieve).

Following any excavation and backfill work, the exposed surface soils should be proof-rolled with a 3 to 5 ton static at drum weight vibratory roller. The initial proof rolling operation should be performed with the vibratory action disengaged. Some pumping or strength loss of some of the exposed soils may be caused by engaging the vibratory action of the roller. Since the vibratory action enables deeper compaction, our engineer should witness the initial proof rolling operation in order to recommend areas of the roadway where the vibratory action should be engaged.

All exposed soils within the roadway, excluding those soils which are slightly cemented by dessicated lime, should be compacted to densities of at least 95% of the Modified Proctor maximum dry density (ASTM D-1557). Stockpiled soils or structural fill used to raise the roadway to grade should be compacted to similar densities, however, all soil (excluding the slightly cemented soil) within one foot of the base course bottom should be compacted to densities of at least 100 percent of the Modified Proctor maximum dry density. The compacted surface soils and structural fill should have a bearing ratio value of at least 20. Densities of at least 100 percent of the Modified Proctor, based on laboratory testing, should result in bearing ratio values of at least 20. Uncompacted fill lift thicknesses, when using the recommended roller, should not exceed 12 inches.

In-place field density tests should be performed in order to verify that the recommended densities are obtained. At least one density test should be made in each 200 feet of roadway in the exposed surface soils and any fill soils.

The base course may be placed in uncompacted lifts not exceeding 4 inches in thickness. If Florida limerock is used, densities of at least 98 percent of the Modified Proctor maximum dry density should be obtained. Density tests in the limerock base should be taken in every 150 feet of the roadway. If crushed stone or gravel is used, a minimum of 6 complete coverages of each lift with the recommended roller (no vibratory action) should be performed. After placement and compaction of the base course, the surface should be primed and sanded, if required, as previously outlined.

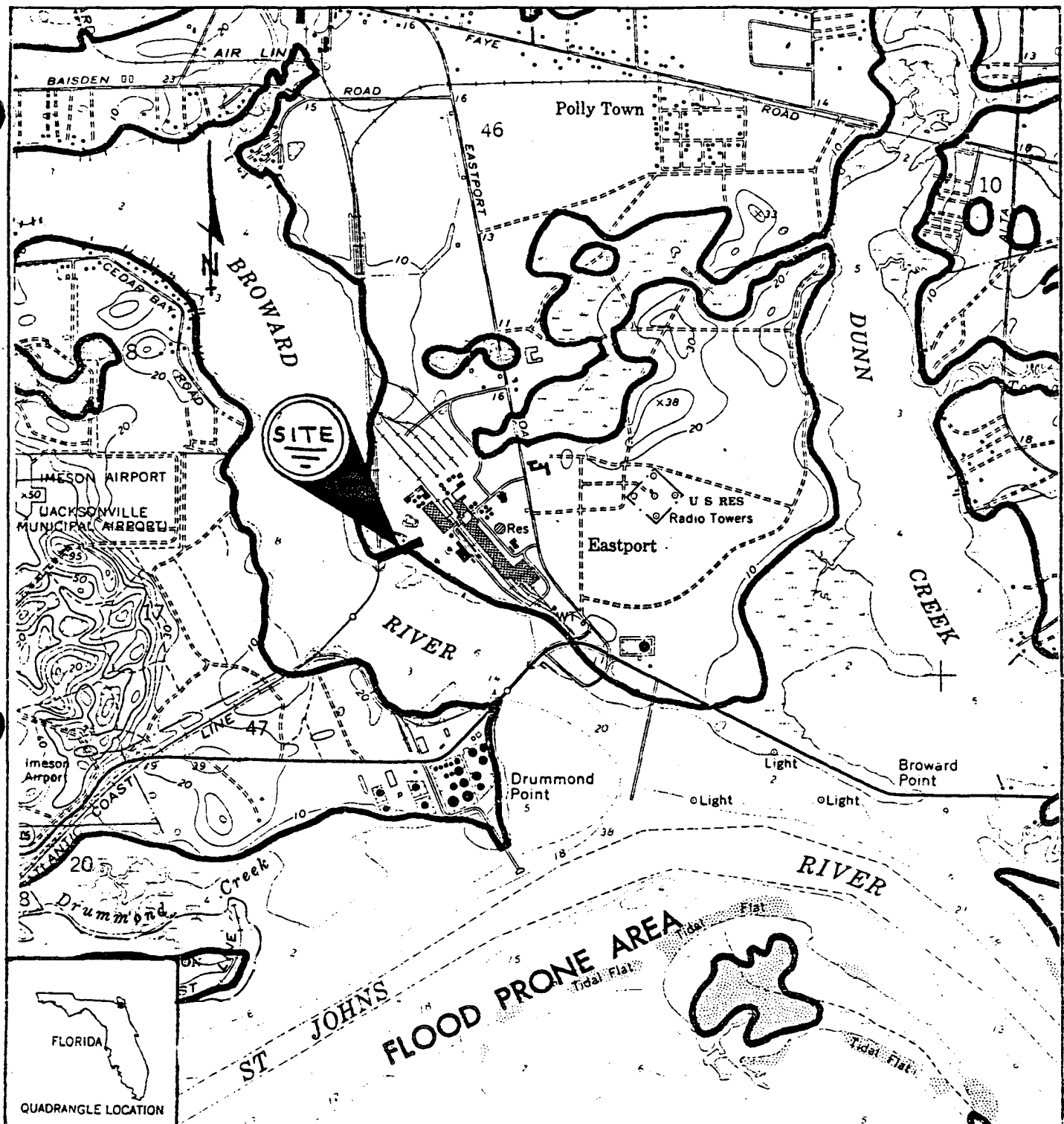
Prior to placement of the asphalt wearing surface, any sanded base course surface should be broomed of excess loose sand. Asphalt placement and compaction should be governed by Section 330 in the Florida D.O.T. Standard Specifications for Road and Bridge Construction (1977). Coring of the asphalt wearing surface for thickness verification and density testing should be made every 200 feet of the roadway.

Following the placement and compaction of the asphalt wearing surface, the pavement shoulders may be prepared. If

fill soils are required to build up the shoulders to the pavement surface, these soils should be compacted to densities of at least 95 percent of the Modified Proctor maximum dry density. The erosion control measures, such as the jute mesh, should then be placed and adequately secured to the shoulder.

During the preparation of the shoulder adjacent to the lime waste area, preparation of the drainage ditch may also be performed. Care should be taken so that construction equipment is not allowed to operate on the new roadway until the asphalt wearing surface has had proper time to cure (harden). A period of at least one week should expire prior to allowing vehicular traffic on the roadway.

APPENDIX



LEGEND

Reference: Eastport Quadrangle
Florida, (1964)
Map of Flood Prone Areas
U.S. Geological Survey

SITE LOCATION MAP

Canal Road Pavement Design
St. Regis Paper Company
Jacksonville, Florida

DRAWN: JMG

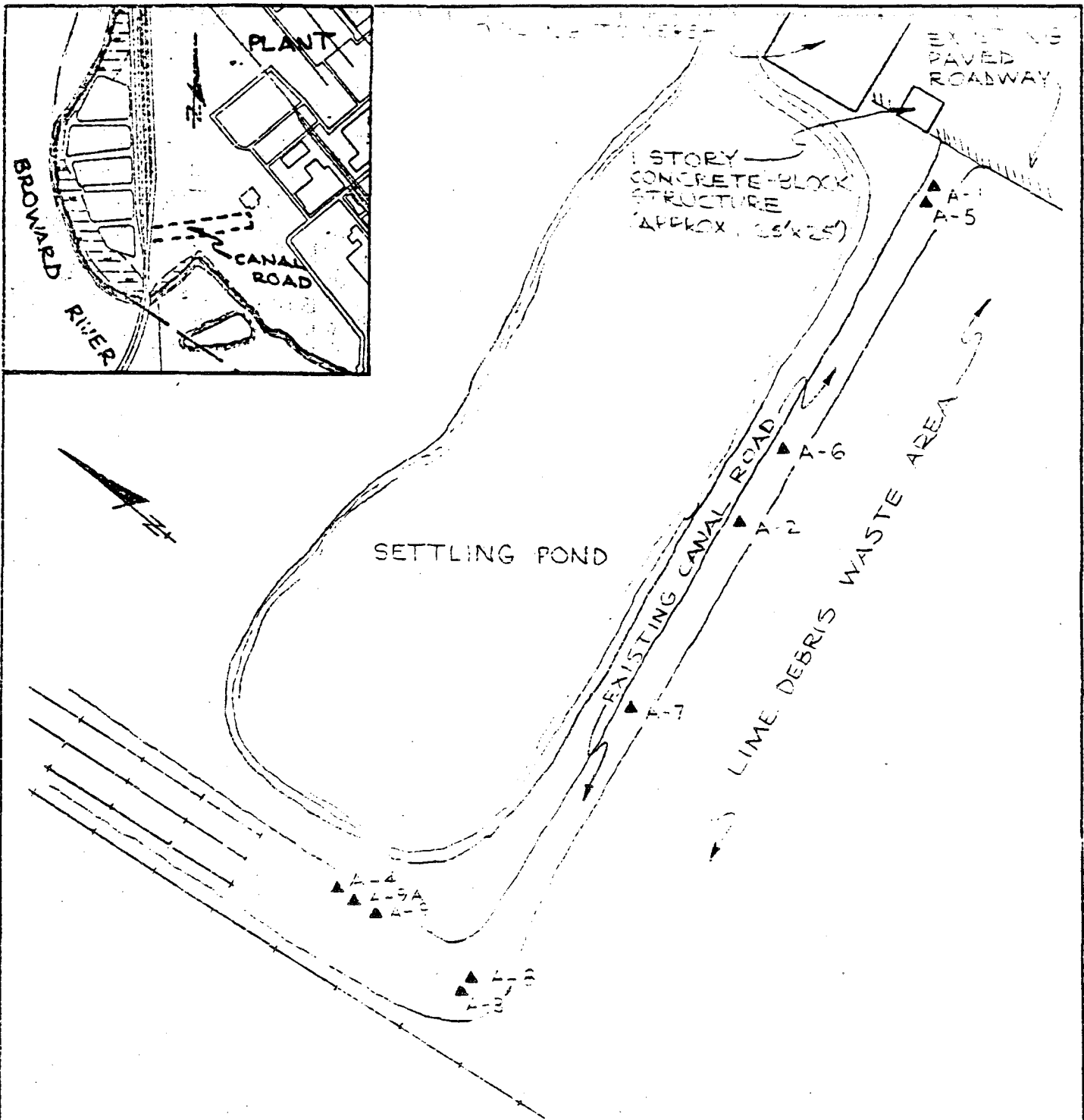
CHECKED: TVS

DATE: 6/6/78

JOB NO: J-3066

SCALE: 1"=2000' (Approx.)

LAW ENGINEERING JACKSONVILLE, FLORIDA



LEGEND

▲ - Auger Boring Location

FIELD INVESTIGATION PLAN

Canal Road Pavement Design

St. Regis Paper Company

Jacksonville, Florida

DRAWN: JMG *JMG*

CHECKED: TVS *TVS*

DATE: 6/7/78

JOB NO: J-3066

SCALE: 1"=100'

LAW ENGINEERING JACKSONVILLE, FLORIDA

AUGER BORING RECORDS

CANAL ROAD PAVEMENT DESIGN
ST. REGIS PAPER COMPANY
JACKSONVILLE, FLORIDA

JOB NO. J-3066

AUGER BORING NUMBER	DEPTH (FEET)	S O I L D E S C R I P T I O N
A-1	0.0-0.6	LOOSE dark grey slightly silty fine SAND
	0.6-2.8	FIRM to LOOSE dark grey to grey slightly silty to silty fine SAND
	2.8-3.0	LOOSE light grey-tan fine SAND
	3.0-4.0	LOOSE dark grey-black silty fine SAND
	4.0-4.3	FIRM to VERY FIRM dark grey fine SAND w/gravel & few wood chips
	A.B.T.*	GWL** not encountered
A-2	0.0-1.3	LOOSE WOOD CHIPS
	1.3-1.8	LOOSE grey tan slightly silty fine SAND w/traces of organics
	1.8-2.0	VERY FIRM to DENSE dark grey slightly cemented fine SAND w/some gravel
	2.0-2.8	LOOSE grey slightly silty fine SAND
	2.8-3.2	FIRM grey slightly silty fine SAND
	3.2-3.5	FIRM dark grey brown slightly silty fine SAND w/decayed wood chips and tree bark
	3.5-3.6	FIRM to VERY FIRM dark grey fine SAND w/gravel
	A.B.T.	GWL not encountered
A-3	0.0-1.8	LOOSE WOOD CHIPS
	1.8-2.5	FIRM grey slightly cemented slightly silty fine SAND
	2.5-2.7	VERY FIRM dark grey fine SAND w/gravel
	A.B.T.	GWL not encountered
A-4	0.0-0.7	LOOSE tan fine SAND
	0.7-1.2	FIRM dark grey slightly silty fine SAND
	1.2-2.8	FIRM brown fine SAND w/gravel
	2.8-3.3	LOOSE grey slightly silty fine SAND
	A.B.T.	GWL @ 3.2'

AUGER BORING RECORDS

CANAL ROAD PAVEMENT DESIGN
ST. REGIS PAPER COMPANY
JACKSONVILLE, FLORIDA

JOB NO. J-3066

AUGER BORING NUMBER	DEPTH (FEET)	S O I L D E S C R I P T I O N
A-5	0.0-0.3	VERY LOOSE grey fine SAND w/some wood chips
	0.3-8.0	LOOSE to FIRM blue-grey slightly silty fine SAND w/gravel
	A.B.T.	GWL @ 6.0'
A-6	0.0-0.3	VERY LOOSE grey fine SAND w/some wood chips
	0.3-3.0	LOOSE blue-grey fine SAND w/gravel
	3.0-9.0	LOOSE to FIRM grey to dark grey silty fine SAND w/gravel and organic odor
	A.B.T.	GWL @ 4.1'
A-7	0.0-1.0	LOOSE WOOD CHIPS
	1.0-5.5	SOFT blue-grey slightly sandy SILT (Lime Waste)
	5.5-9.0	LOOSE grey to dark grey silty fine SAND
	A.B.T.	GWL @ 4.5'
A-8	0.0-1.5	LOOSE WOOD CHIPS
	1.5-3.0	LOOSE blue-grey fine SAND
	3.0-5.0	LOOSE to FIRM grey brown slightly silty fine SAND w/some wood chips and limeroc fragments
	5.0-7.0	LOOSE grey brown slightly silty fine SAND w/some small cemented fine grained particles
	A.B.T.	GWL not recorded
A-9	0.0-1.0	LOOSE blue-grey fine SAND w/wood chips
	1.0-3.0	LOOSE grey slightly silty fine to medium SAND w/gravel
	3.0-7.0	LOOSE to FIRM grey fine SAND
	A.B.T.	GWL @ 4.8'

AUGER BORING RECORDS

CANAL ROAD PAVEMENT DESIGN
ST. REGIS PAPER COMPANY
JACKSONVILLE, FLORIDA

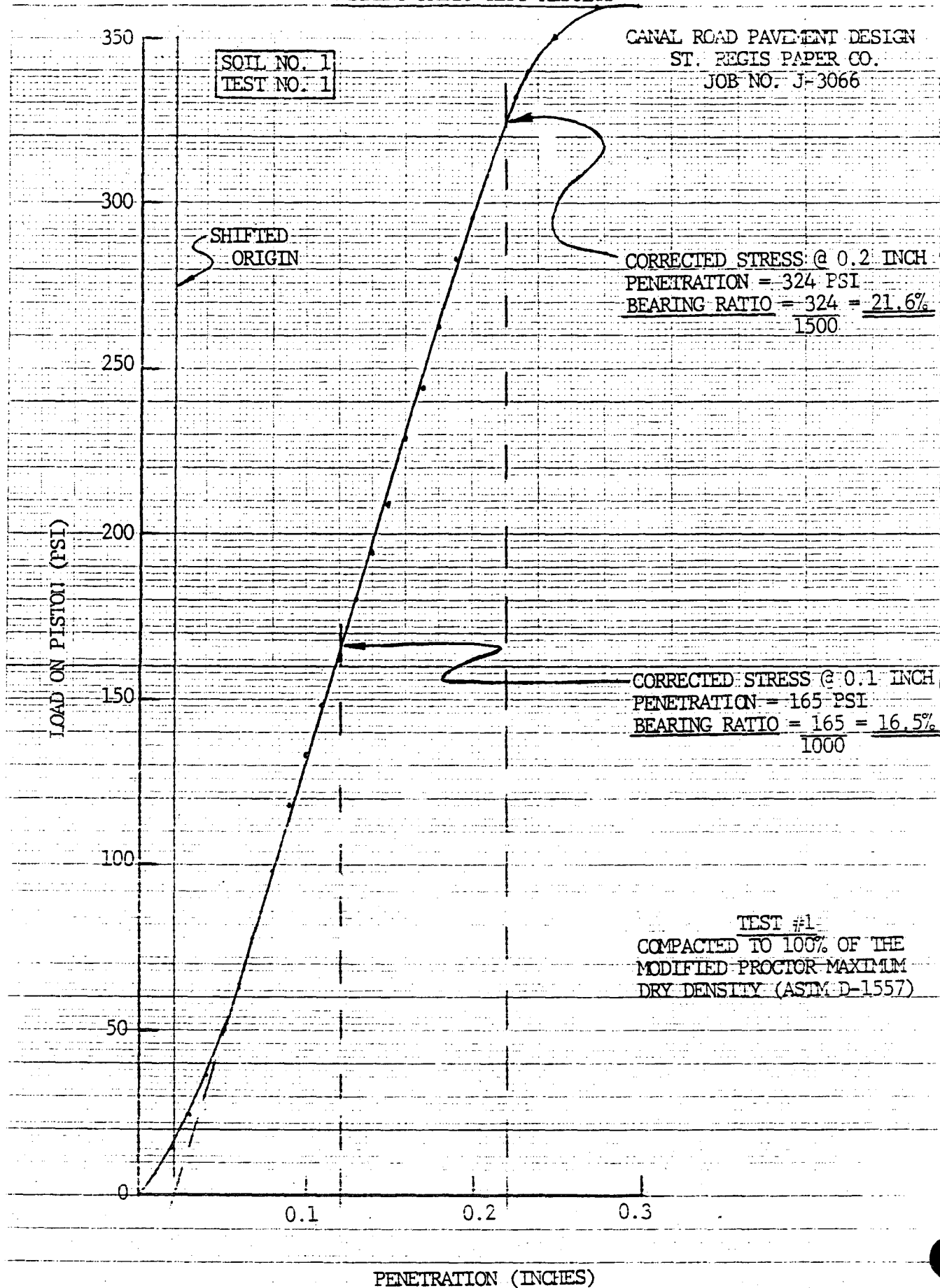
JOB NO. J-3066

AUGER BORING NUMBER	DEPTH (FEET)	S O I L D E S C R I P T I O N
A-9A	0.0-1.5	LOOSE grey slightly silty fine SAND w/some small wood chips
	1.5-2.0	LOOSE grey brown slightly silty fine SAND w/some gravel
	2.0-7.0	LOOSE blue grey silty fine SAND
	A.B.T.	GWL @ 4.5'

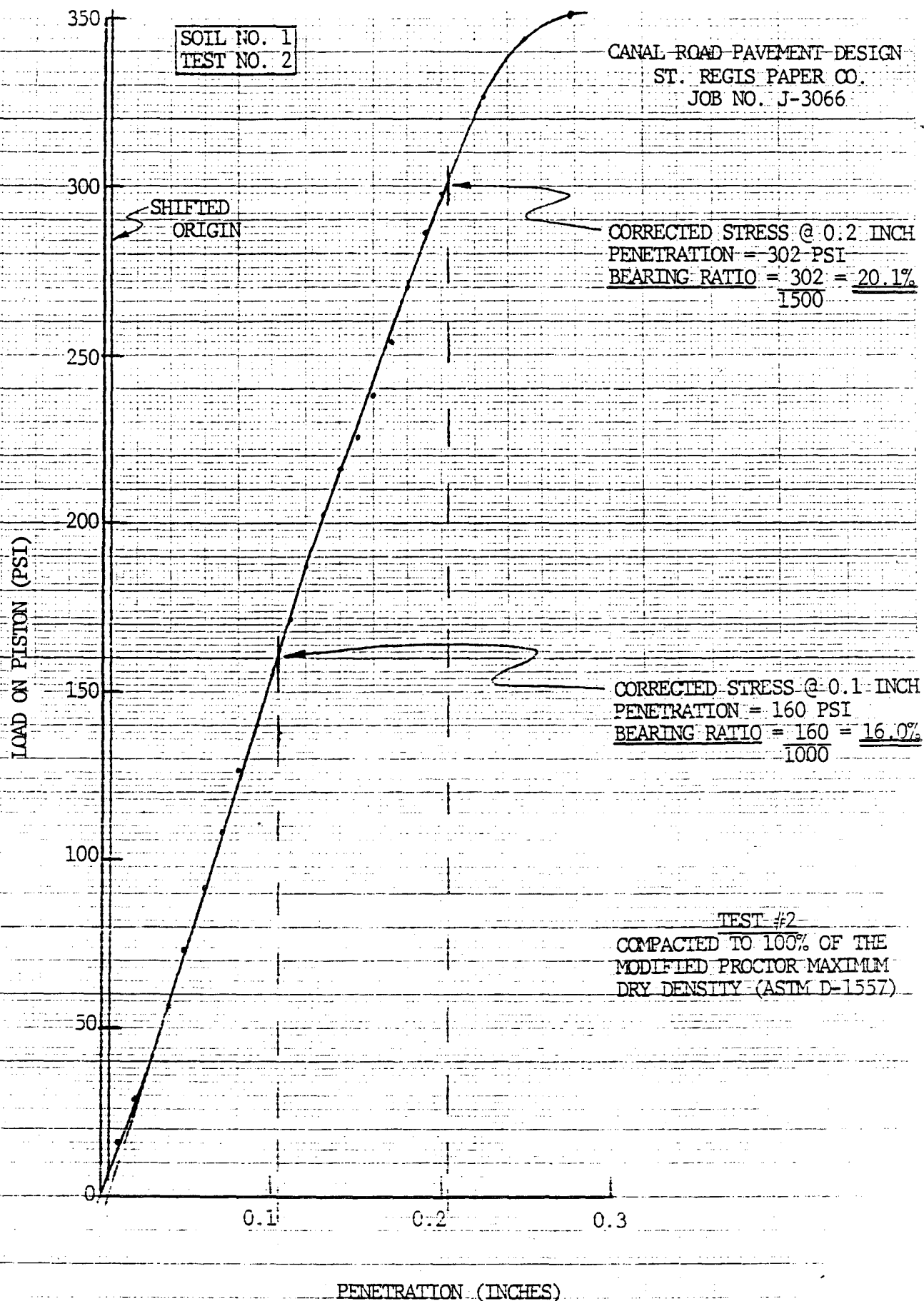
* A.B.T. - Auger Boring Terminated

** GWL - Groundwater Level at Time of Boring

BEARING RATIO TEST RESULTS



BEARING RATIO TEST RESULTS

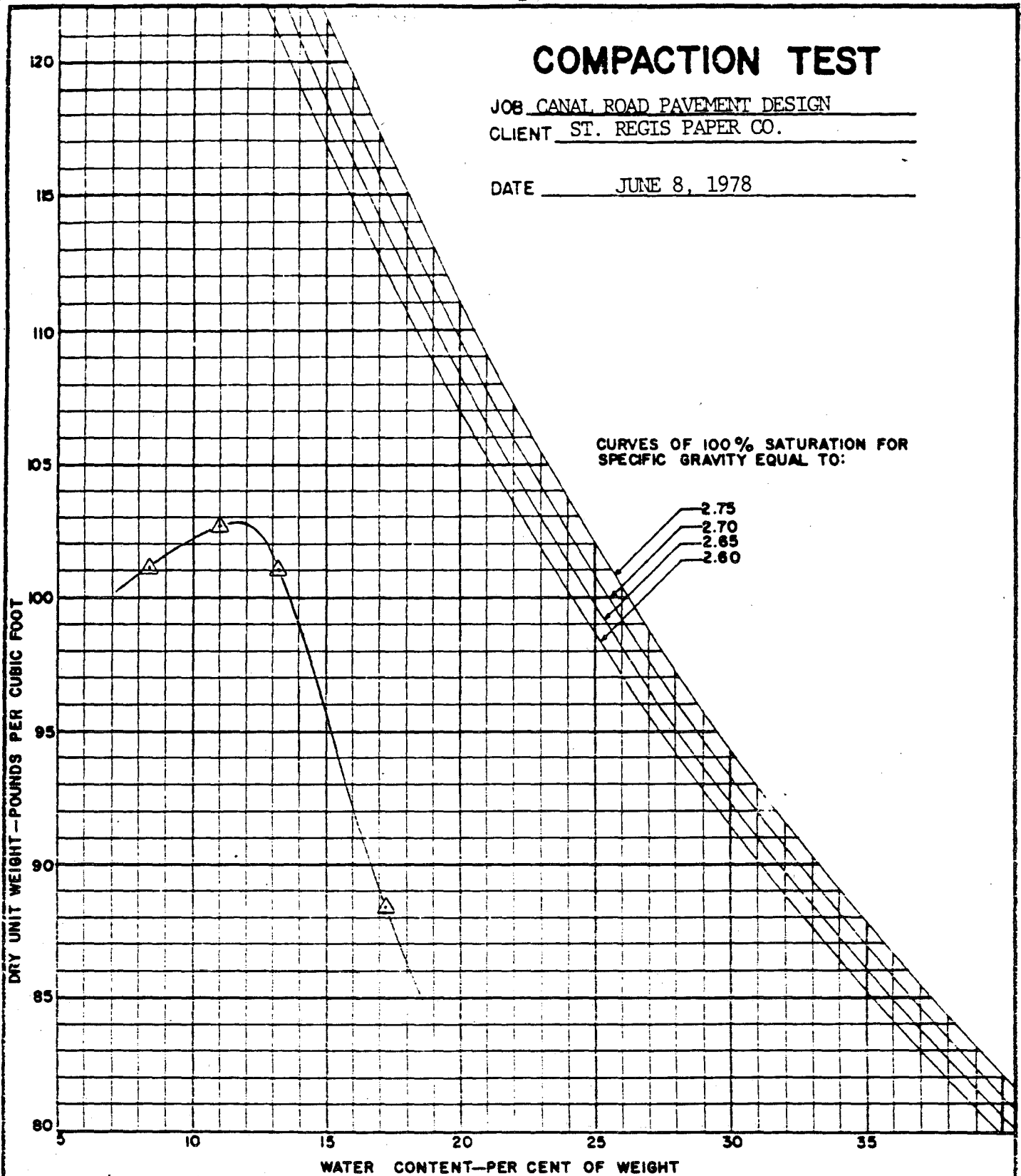


COMPACTION TEST

JOB CANAL ROAD PAVEMENT DESIGN

CLIENT ST. REGIS PAPER CO.

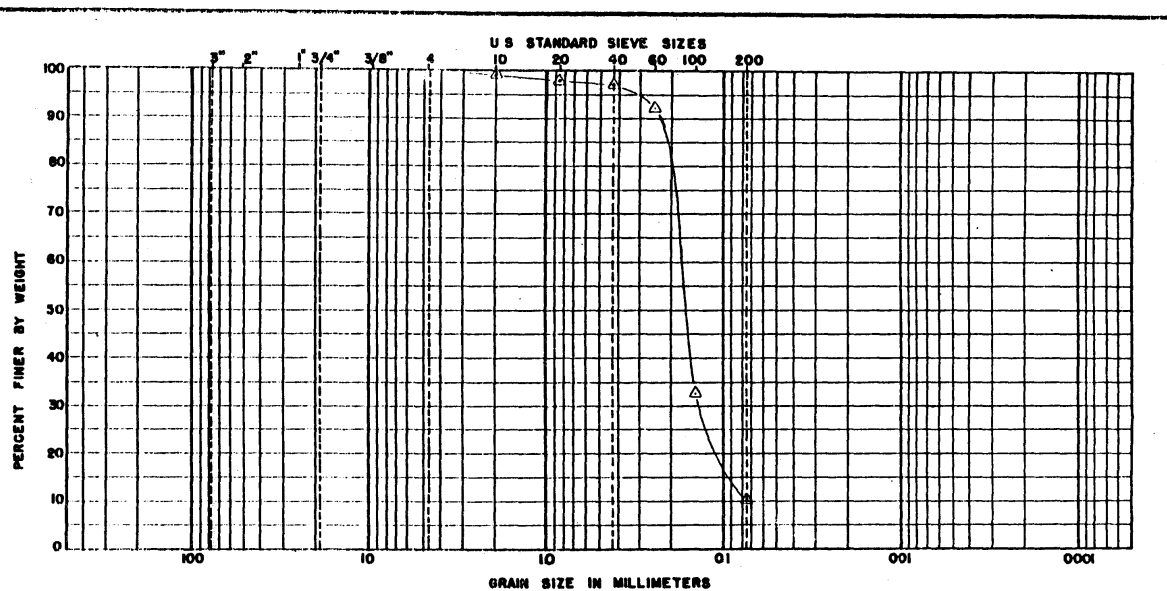
DATE JUNE 8, 1978



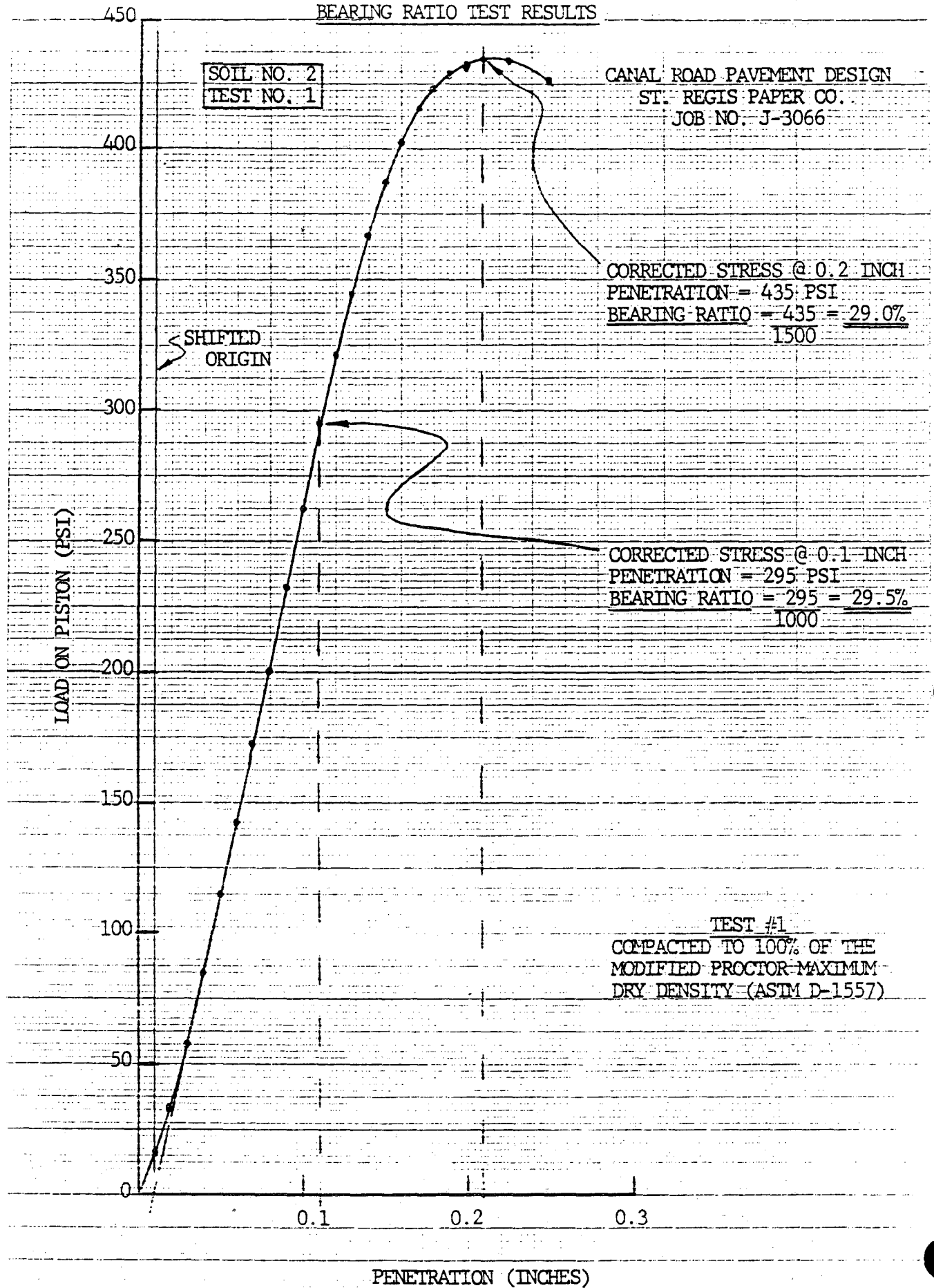
CURVES OF 100% SATURATION FOR
SPECIFIC GRAVITY EQUAL TO:

2.75
2.70
2.65
2.60

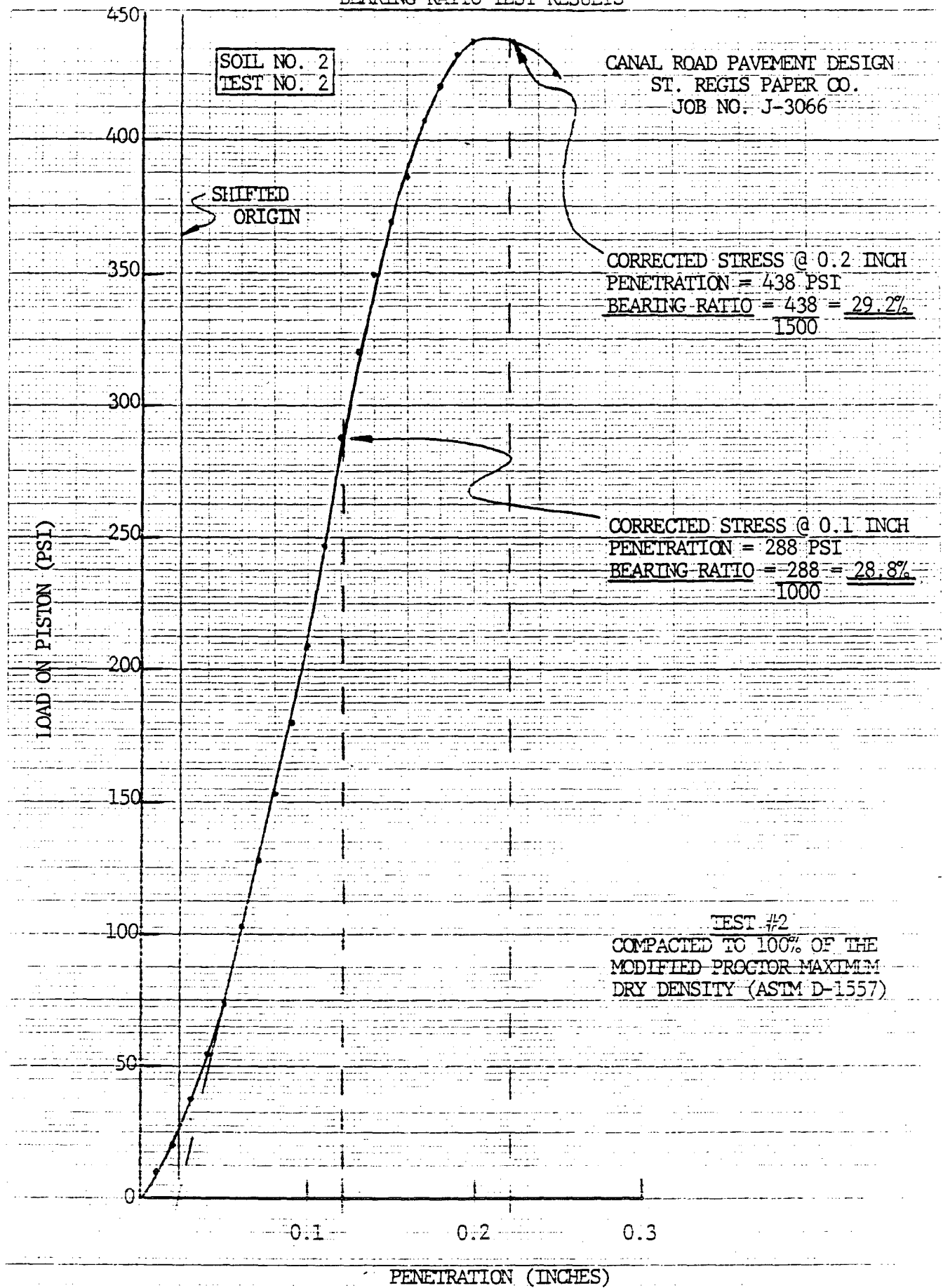
MOISTURE DENSITY RELATION	METHOD OF TEST	MAX. DRY DENSITY PC F	OPTIMUM MOISTURE CONTENT %	SOIL DESCRIPTION OR CLASSIFICATION AND SAMPLE LOCATION
Soil No 1	ASTM D-1557 METHOD-D	102.8	11.8	Grey to dark grey slightly silty fine SAND



BEARING RATIO TEST RESULTS



- 21 -
BEARING RATIO TEST RESULTS



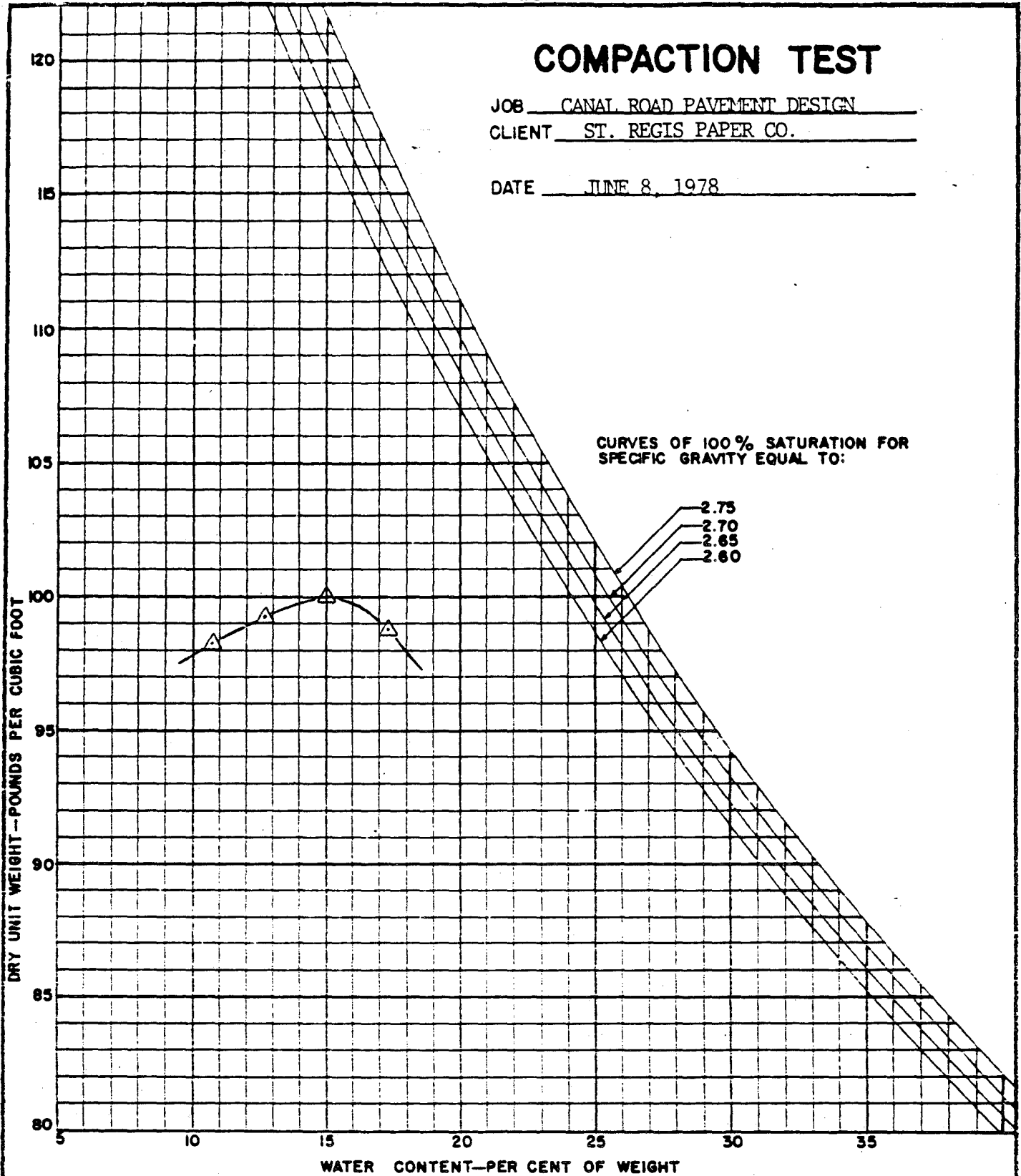
COMPACTION TEST

JOB CANAL ROAD PAVEMENT DESIGN

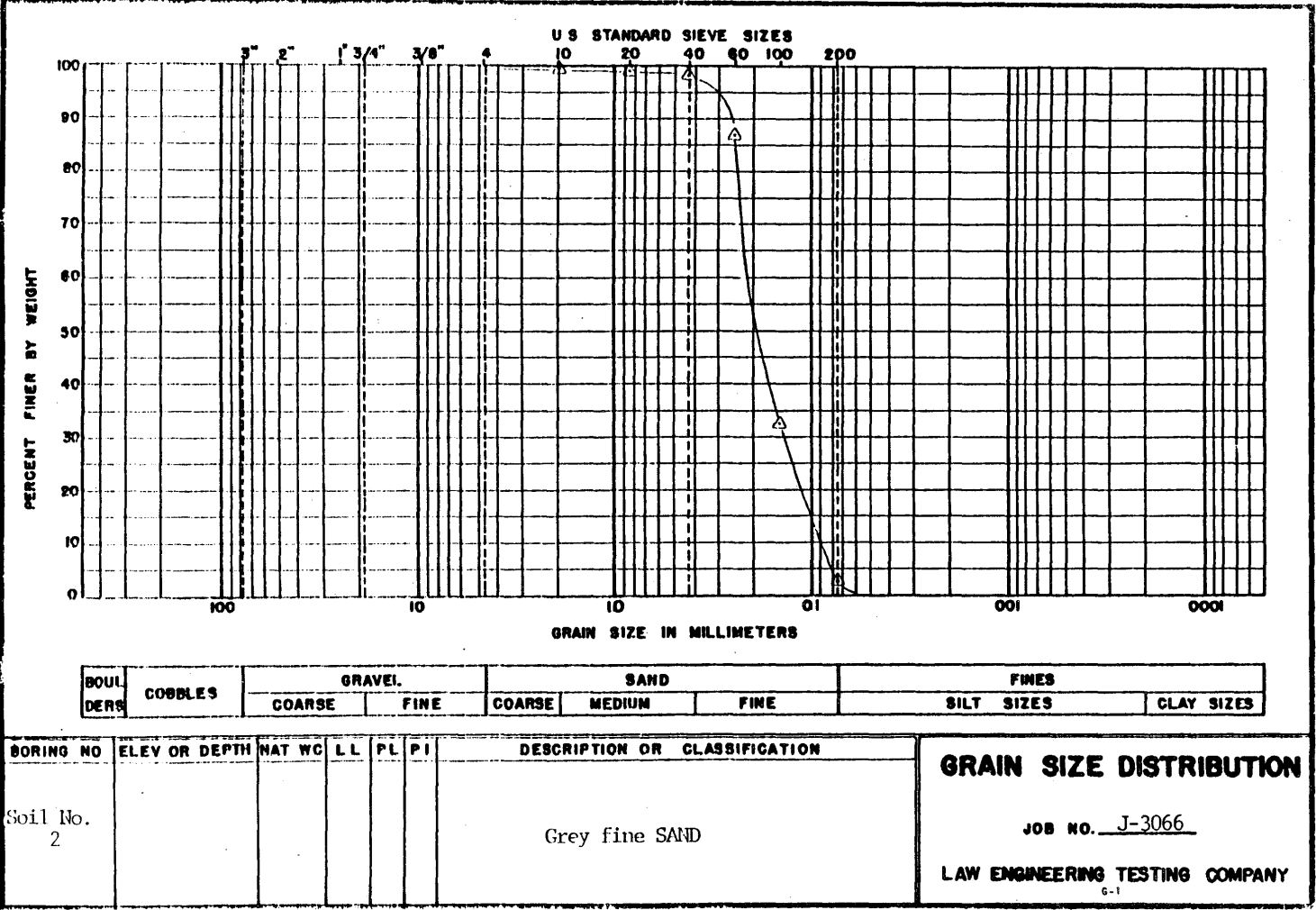
CLIENT ST. REGIS PAPER CO.

DATE JUNE 8, 1978

CURVES OF 100% SATURATION FOR
SPECIFIC GRAVITY EQUAL TO:



MOISTURE DENSITY RELATION	METHOD OF TEST	MAX DRY DENSITY PCF	OPTIMUM MOISTURE CONTENT %	SOIL DESCRIPTION OR CLASSIFICATION AND SAMPLE LOCATION
Soil No. 2	ASTM D-1557 METHOD-D	100.0	15.0	Grey fine SAND



FIELD AND LABORATORY TEST PROCEDURES

Field Procedures

Auger Borings - Ten auger borings were made on the site. Four auger borings were advanced manually by a post-hole auger and six auger borings were advanced mechanically by a continuous flight auger attached to the drill rig. The soils encountered from both augering methods were identified, in the field, from cuttings brought to the surface by the augering process. Representative soil samples were placed in glass jars and transported to our laboratory where the samples were examined by an engineer in order to verify the field classification. Soil consistencies were estimated from the relative difficulty of the augering process.

Laboratory Procedures

Bearing Ratio - To conduct the Bearing Ratio Test, a Modified Proctor compaction test is first performed on the soil in order to obtain its maximum dry density and optimum moisture content. Using these test results, two molds were filled with the soil in compacted layers to approximately 100 percent of the Modified Proctor maximum dry density. The soil-filled molds were then submerged and completely inundated for a period of four days. Following the saturation period, the soil-filled molds were penetrated with a 1.95

inch diameter piston at a rate of approximately 0.05 inches per minute. The load applied to the piston was recorded during the penetration. This test is similar to that described by ASTM D-1883, "Bearing Ratio of Laboratory Compacted Soils".

Compaction - Representative samples of the upper surface soils were obtained for laboratory compaction testing. Modified Proctor compaction tests (ASTM D-1557), Method D, were performed on the soils to determine their compaction characteristics, including their maximum dry density and optimum moisture content.

Grain Size Distribution - Grain size test or a sieve analysis was performed on the soil samples selected for compaction testing to determine their particle size and distribution of the soil particles. The grain size distribution of soils coarser than a No. 200 sieve was determined by passing the samples through a standard set of nested sieves. The material retained on the No. 200 sieve was washed over this sieve in order to determine the percentage passing the No. 200 sieve. The soil which passes a No. 200 sieve is classified in the silt and clay size range. This test is similar to that described by ASTM D-422.

KEY TO SOIL CLASSIFICATION

Correlation of Penetration Resistance with Relative Density and Consistency

<u>Sands and Gravels</u>		<u>Silts and Clays</u>	
<u>No. of Blows, N</u>	<u>Relative Density</u>	<u>No. of Blows, N</u>	<u>Consistency</u>
0 - 4	Very Loose	0 - 2	Very Soft
5 - 10	Loose	3 - 4	Soft
11 - 20	Firm	5 - 8	Firm
21 - 30	Very Firm	9 - 15	Stiff
31 - 50	Dense	16 - 30	Very Stiff
Over 50	Very Dense	31 - 50	Hard
		Over 50	Very Hard

Particle Size Identification (Unified Classification System)

Boulders -	Diameter exceeds 8 inches
Cobbles -	3 to 8 inches diameter
Gravel:	Coarse - 3/4 to 3 inches diameter
	Fine - 4.76 mm to 3/4 inch diameter
Sand:	Coarse - 2.0 mm to 4.76 mm diameter
	Medium - 0.42 mm to 2.0 mm diameter
	Fine - 0.074 mm to 0.42 mm diameter
Silt and Clay:	Less than 0.07 mm (Particles cannot be seen with naked eye)

Modifiers

The modifiers provide our estimate of the amount of fines (silt or clay size particles) in the soil sample.

<u>Approximate Fines Content</u>
5% Fines 12%
12% Fines 30%
30% Fines 50%

<u>Modifiers</u>
Slightly silty or slightly clayey
Silty or clayey
Very silty or very clayey



LAW ENGINEERING

GEOTECHNICAL, ENVIRONMENTAL
& CONSTRUCTION MATERIALS
CONSULTANTS

March 10, 1978

St. Regis Paper Company
P. O. Box 18020
Jacksonville, Florida 32229

Attention: Mr. Bill Dufner

Subject: Report of Subsurface Investigation
Proposed Railroad Spur Relocation
St. Regis Paper Company - Jacksonville Mill
Jacksonville, Florida
Job No. J-3027

Gentlemen:

Law Engineering Testing Company has completed a subsurface investigation for the proposed railroad spur relocation for St. Regis Paper Company in Jacksonville, Florida. This investigation was made in accordance with our Proposal No. 78-813S, dated February 28, 1978, and your Purchase Order, No. 4284-JK, dated March 7, 1978. This report briefly outlines the investigative procedures used along with the findings of this investigation. Included in PART IV of this report are our recommendations for site preparation and railroad subbed design for the relocated railroad spur.

We appreciate the opportunity to be of assistance to you as your geotechnical consultant. If you have any questions regarding this report or if we may be of further service, please contact us.

Very truly yours,

LAW ENGINEERING TESTING COMPANY

Terrill V. Smith, E.I.
Civil Engineer

TVS/EWL/s

E. W. Lingo, P.E.
Chief Engineer
Registered, Fla. 9326

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PART I: PROJECT INFORMATION AND
STRUCTURAL CONDITIONS

As indicated on the Site Location Map and the Field Investigation Plan, both in the Appendix, the proposed railroad spur relocation will be located within the St. Regis Paper Company property at Jacksonville, Florida. We understand that the relocated railroad spur will be approximately 1300 feet in length and will extend from the Seaboard Coast Line mainline rail into the mill. We understand that the relocated railroad spur will extend over a low area which is often inundated. Approximately one-half of the new spur will will be located over this area with the remainder extending over a filled area. We understand that the fill/debris is composed of wood chips, tree bark, and pulp refuse from the mill.

We have assumed that rail loads will have freight traffic consisting primarily of open cars loaded with wood chips and cut timber. The maximum anticipated length of these cars is 60 feet. We have assumed that the railroad bed will be constructed using a conventional soil subgrade and ballast system.

PART II: FIELD AND LABORATORY INVESTIGATION

Field Investigation

To investigate the subsurface conditions, four soil test borings were drilled to depths of approximately 20 feet within the fill/debris area of the site. In addition, hand-probe borings were made in the low inundated areas to depths of approximately 2 to 4 feet along the railroad relocation line. The boring locations are shown on the Field Investigation Plan in the Appendix. The borings were located and made by our field crew on March 6-8, 1978. Ground surface elevations for the boring locations were not established.

The results of the soil test and probe borings are indicated on the Test Boring and Probe Boring Records that are given in the Appendix. The stratification lines on the Test Boring Records represent in some cases the approximate boundary between soil types and the transition may be gradual. For detailed descriptions of the drilling and sampling techniques used, please see the Field and Laboratory Test Procedures section in the Appendix.

In addition to the above soil test and probe borings, the site was inspected by an engineer from our office on

March 6, 1978. During this inspection, the surface soils, topographic features, drainage conditions, and the condition of adjacent rail lines were noted.

Laboratory Investigation

Laboratory tests were performed on two samples of the fill/debris material encountered in the soil test borings. The laboratory tests enabled us to determine the natural water content, the percentage of fines, and the organic content of the tested soils.

The results of these tests are given on the Summary of Laboratory Test Data sheet in the Appendix. A brief description of each laboratory test procedure is also given in the Appendix in the Field and Laboratory Test Procedures section.

PART III: SITE AND SUBSURFACE CONDITIONS

Site Conditions

From our site inspection on February 6, 1978, we noted that two different surface conditions exist along the proposed railroad relocation line. These are: 1) natural low, wet area, and 2) the elevated, filled area.

Approximately 600 feet of the 1300 foot long relocated railroad spur is covered with the fill/debris material. The waste fill material is generally composed of wood chips, tree bark, pulp fibers, and some fine sands and very soft silts. The filled area along the railroad spur line has recently been leveled and is approximately 1 to 2 feet lower than the elevation of the adjacent railroad line. The generally level topography of the filled area appears to inhibit surface runoff although the fill/debris composition appears to allow some drainage through percolation.

The remaining approximate 700 feet along the proposed relocated railroad spur extends over a pond that had about 2 feet of water and a ground surface elevation approximately 7 to 10 feet lower than the debris area. The ground surface within the low area slopes downward abruptly to the southwest resulting in the pond which is empounded by the

existing railroad spur. The vegetation within the pond is primarily marsh grass with a few trees. Due to the low ground surface elevation, this area retains nearly all the runoff from the adjoining higher land.

The existing adjacent railroad tracks have experienced some settlement and misalignment. The condition of the ballast roadbed, cross-ties and attachment of the tracks to the ties is very poor in some areas of the section of spur that will be replaced. These conditions and the increasing length of the wood cars have resulted in several derailments of the wood cars in recent months.

Subsurface Conditions

General - A graphical representation of the subsurface conditions in the filled area of the relocated spur is given on the Generalized Subsurface Profile in the Appendix. This profile and the soil conditions outlined below highlight the major subsurface stratification. For a detailed description of the soil conditions encountered, please refer to the Test Boring and Probe Boring Records in the Appendix. When reviewing these records and the soil profile, it should be understood that the soil conditions will vary somewhat between the boring locations.

Soils - In general, the fill areas contain approximately 4 to 8 feet of wood chips, tree bark, discarded pulp fiber, and general debris underlain by a loose to firm grey and brown slightly silty to slightly clayey slightly silty fine sand. The probe borings in the low pond area indicated that the upper 2 to 3 feet of surface soils were loose to firm in consistency and were composed primarily of brown fine sands.

Ground Water - The ground water level was recorded at all of the soil test boring locations at the time of drilling. The ground water level generally varied from about 3 to 4½ feet below the ground surface, although it was encountered at the surface in boring B-3. The ground water level will fluctuate depending upon rainfall and runoff and the tidal fluctuations in the Broward River, which is directly west of the existing Seaboard Coast Line mainline.

PART IV: RECOMMENDATIONS FOR RAILROAD SUBBED
DESIGN AND SITE PREPARATION

General Evaluation

The following recommendations are based upon the previously presented project information and structural conditions along with the data obtained in this investigation. The field and laboratory test data have been compared with previous correlations of foundation bearing capacities and settlements for soils similar to those at this site. If the project information is incorrect or if the alignment changes significantly, please contact us so that our recommendations can be reviewed. In addition, the discovery of any site and/or subsurface conditions during construction which deviate from the data obtained in this investigation should also be reported to us for our evaluation.

We consider the subsurface soils at the site suitable to support the relocated railroad spur following removal of the debris materials along the new roadbed alignment. If these fill materials were left in-place, settlement of the tracks would occur. This settlement problem, if not continually corrected could result in car derailments. Due to recent derailments along the existing spur and your desire to eliminate such occurrences, we recommend that all of the waste debris along the relocated spur alignment be excavated

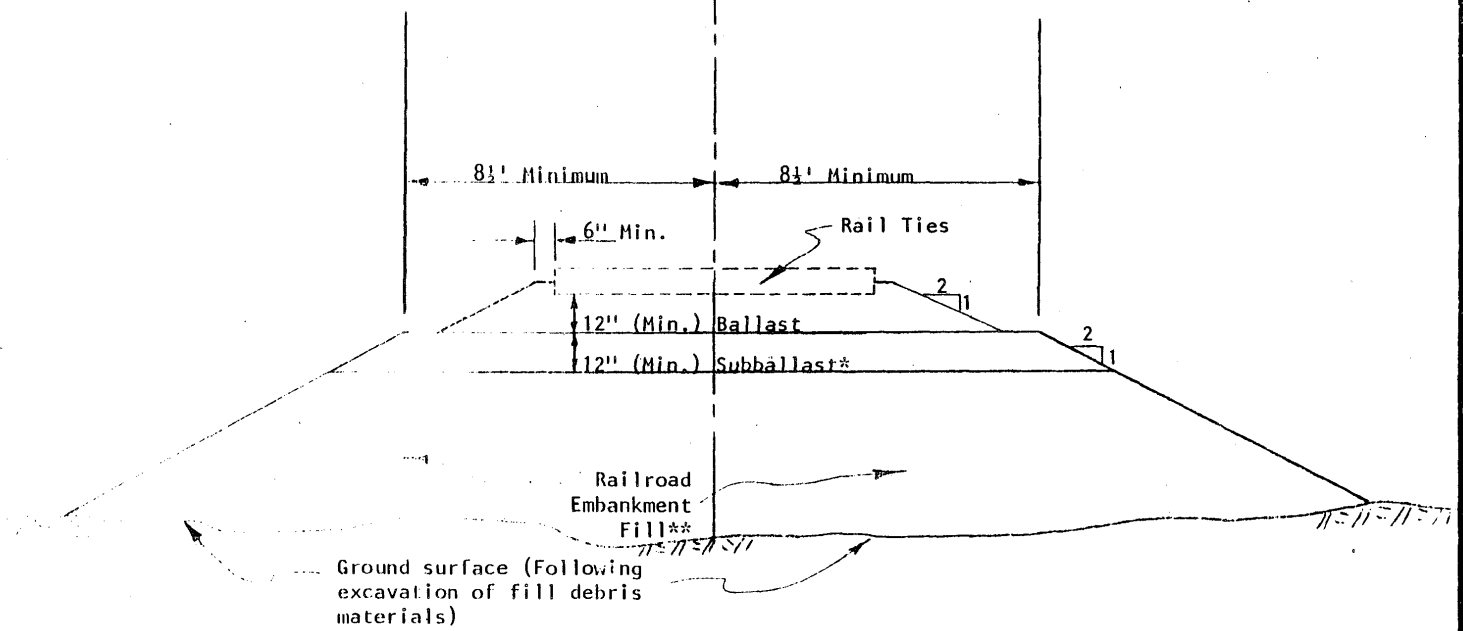
and removed from the roadbed.

Railroad Subbed Design

We recommend that the railroad subbed be constructed using a conventional subballast-ballast layered system. Subballast and ballast material layers should each be at least 12 inches thick and compacted to adequate densities.

We recommend that the subballast be a suitable structural fill which is a non-plastic, inorganic, granular soil containing less than 10 percent fines (material passing the No. 200 mesh sieve). The ballast course may be a conventional crushed rock or crushed gravel that provides a sufficient quantity of angular material to prevent excessive movement of the ballast layer. Ballast course material should be well graded with at least 90 percent passing a $1\frac{1}{2}$ inch square sieve and no more than 5 percent passing a No. 4 sieve (4.76 millimeter square sieve).

A profile of the recommended railroad bedding cross-section is shown on the following page. The railroad subbed profile shows a side slope of 2:1 (H-to-V) in the subballast and embankment soils. This slope is considered a maximum for permanent construction in fine sandy soils. Some maintenance of the slopes of the sandy soils should be expected.



* Densities at least 98% of the Modified Proctor maximum dry density (ASTM D1557).

** Densities at least 95% of the Modified Proctor maximum dry density (ASTM D1557).

LEGEND

Scale: 1" = 4'

$\dot{q}$: Center Line of Track

LAW ENGINEERING TESTING COMPANY

Jacksonville, Florida

RAILROAD SUBBED PROFILE

St. Regis Railroad Relocation

St. Regis Paper Co.

Jacksonville, Florida

Job No. J-3027

To minimize erosion and to provide better access, side slopes no steeper than 3:1 (H-to-V) are recommended. Grassing of the slopes on 2 to 1 or flatter will also minimize erosion.

Site Preparation

Site preparation should initially include the removal of the heavy vegetation within the pond along the area where fill is to be placed and all existing debris in the higher area where the new track is to be constructed. Due to the relatively high ground water level and loose condition of the upper few feet of debris, excavation with a dragline will probably be required in the elevated area.

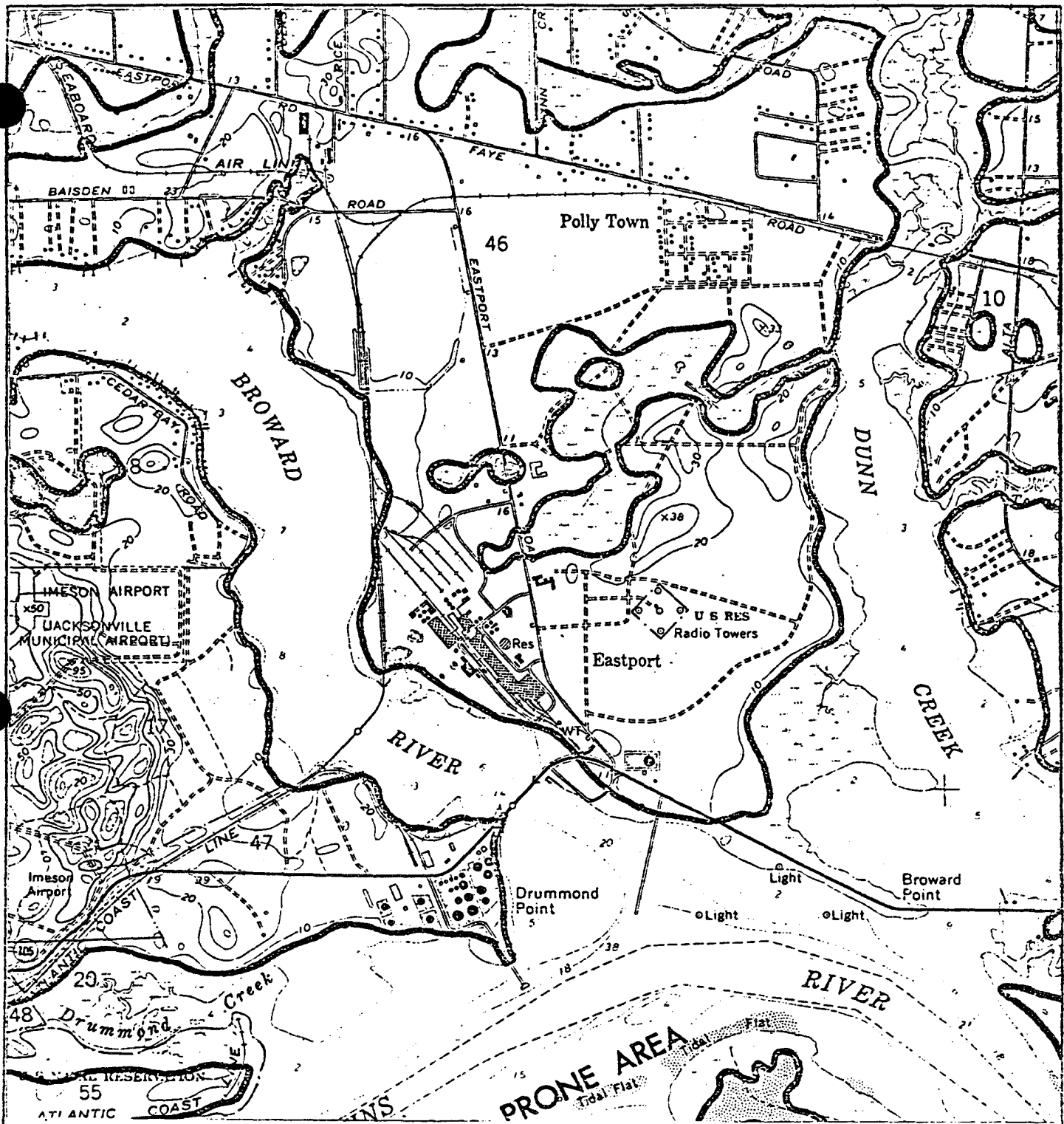
Following the removal of all vegetation and debris, structural fill may be placed in the standing water by end dumping methods. It would be beneficial to the compaction efforts to drain as much of the ponded and trapped water as possible by ditching, diking and sump pumping prior to fill placement. Following placement of structural fill to not more than 1 foot above the standing water level, it should be compacted to densities of at least 93 percent of the Modified Proctor maximum dry density (ASTM D1557). All structural fill subsequently placed above this level should be compacted to densities not less than 95 percent of the Modified Proctor. The one foot of structural fill immediately beneath the ballast rock course should be compacted to densities of at least 98 percent of the Modified Proctor

maximum dry density (ASTM D1557).

To obtain the previously recommended densities, we suggest the use of a 3 to 5 ton, static at drum weight, vibratory roller. Maximum fill lift thicknesses should be no more than 12 inches when using this roller. Six coverages of each lift with this roller should achieve the recommended densities, however, additional passes should be performed as required to obtain the desired compaction.

We have assumed that the track ties and rails will be placed prior to the placement of the ballast course. Ballast will then be placed over the tracks, the tracks jacked to grade, and the ballast placed to secure the track at grade. If this method of track construction is used, we recommend that the ballast course be sufficiently tamped in order to adequately support the track ties and rails. An alternative is to place the ballast subsequent to the subballast in lifts not greater than 6 inches thick and then compacted with a minimum of 6 coverages with the previously recommended roller. We recommend that the vibratory action of the vibratory drum roller be disengaged during compaction of the railroad ballast course.

APPENDIX



LEGEND

Scale: 1" = 2000' (Approximate)

Reference: Eastport Quadrangle
Florida (1964)
Map of Flood Prone Areas
U.S. Geological Survey

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Jacksonville, Florida

SITE LOCATION MAP

St. Regis Railroad Relocation

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Jacksonville, Florida

Job No. J-3027

BROWARD RIVER

Seaboard Coast Line Main Rail Line

Pond Area

SP-5
SP-4
SP-3
SP-2
SP-1

B-1 (Not drilled)

B-2

Relocation
Railroad Spur

B-3

B-4

B-5

Existing Railroad
Spurs

Fill Area

N

LEGEND

Scale: 1" = 200' (Approximate)



Soil Test Boring Location



Hand Probe Boring Location

LAW ENGINEERING TESTING COMPANY
Jacksonville, Florida

FIELD INVESTIGATION PLAN

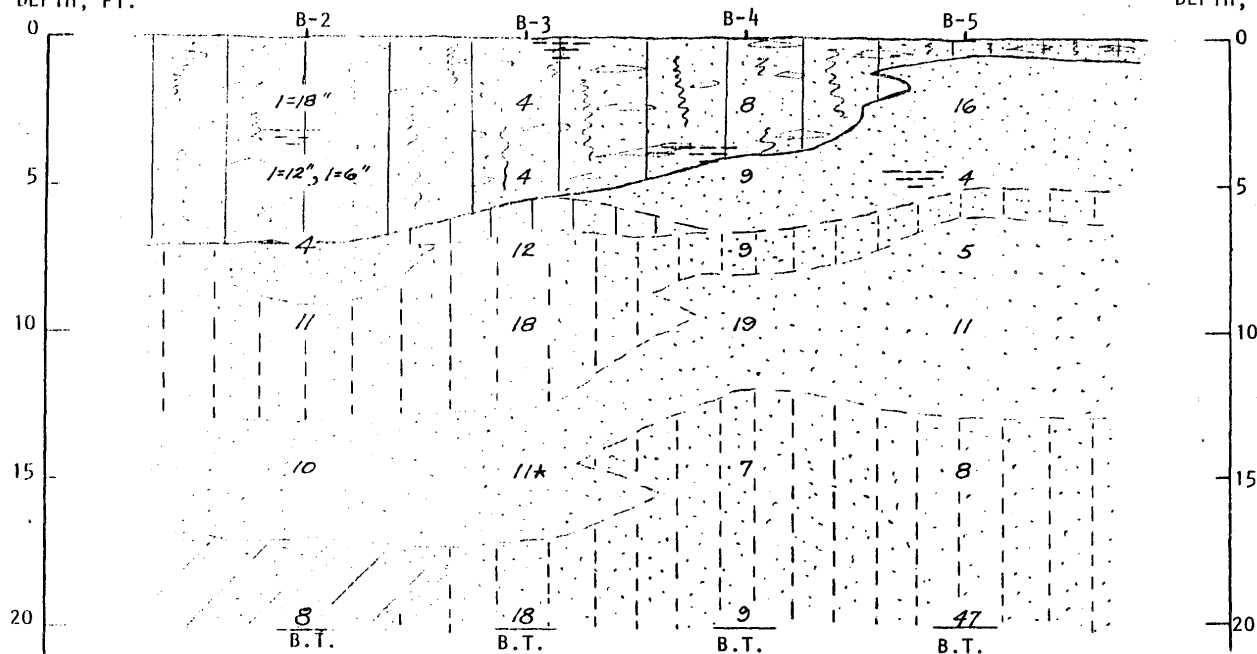
St. Regis Railroad Relocation
St. Regis Paper Co.

Jacksonville, Florida

JOB No. J-3027

DEPTH, FT.

DEPTH, FT.



B.T. - Boring Terminated

--- Ground Water Level at Time of Boring

* - Penetration Resistance, blows/ft.



Fine SAND



Clayey silty fine SAND



Slightly silty to slightly clayey slightly silty fine SAND



Wood Chips, Tree Bark, Pulp Fibers, Silt w/ some fine sand



Silty fine SAND

LAW ENGINEERING TESTING COMPANY

Jacksonville, Florida

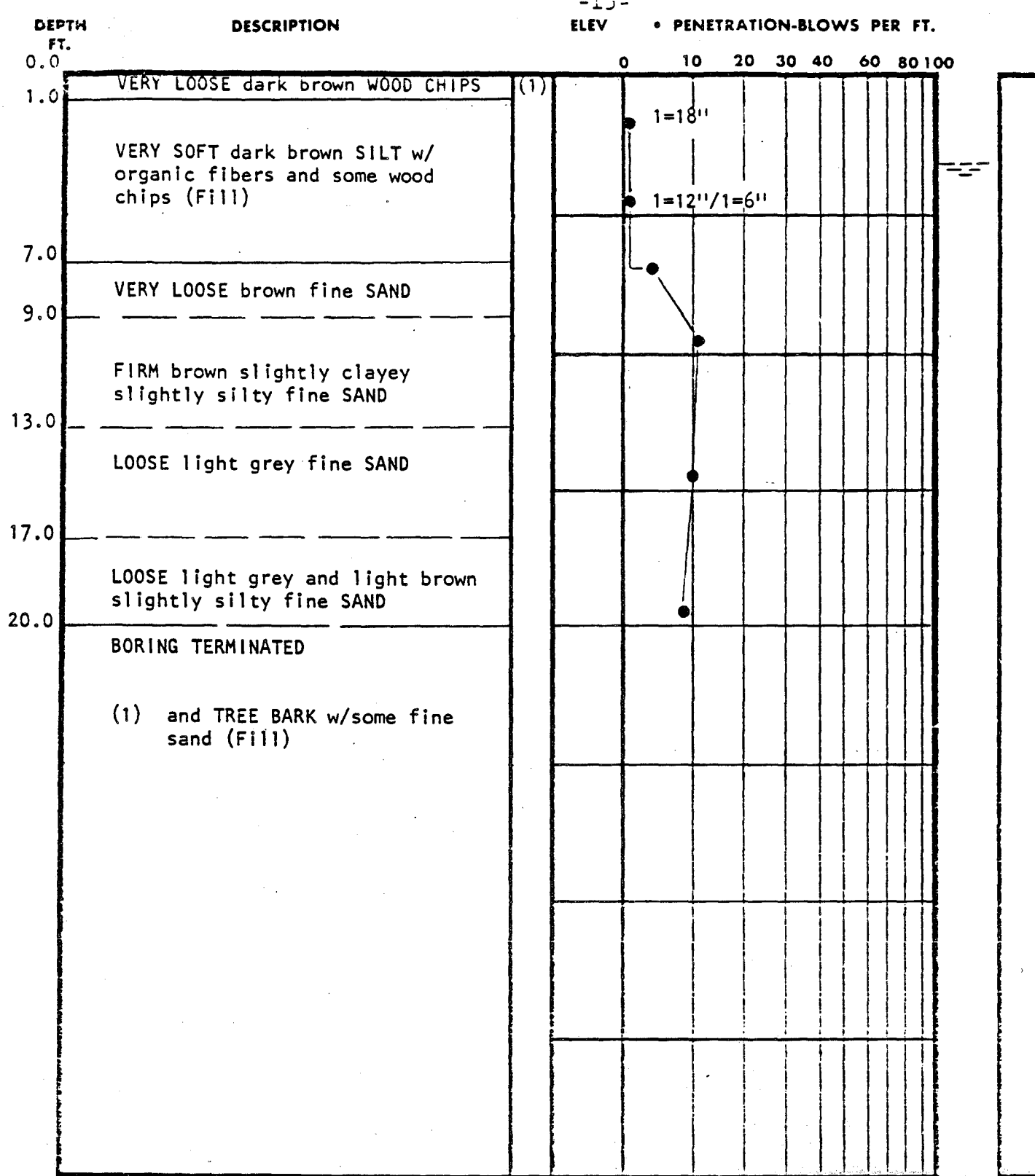
GENERALIZED SUBSURFACE PROFILE

St. Regis Railroad Relocation

St. Regis Paper Co.

Jacksonville, Florida

Job No. J-3027



TEST BORING RECORD

BORING AND SAMPLING MEETS ASTM D-1586
CORE DRILLING MEETS ASTM D-2113

PENETRATION IS THE NUMBER OF BLOWS OF 140 LB. HAMMER
FALLING 30 IN. REQUIRED TO DRIVE 1.4 IN. I.D. SAMPLER 1 FT.

BORING NO. B-2

DATE DRILLED 3/7/78

JOB NO. J-3027

 UNDISTURBED SAMPLE

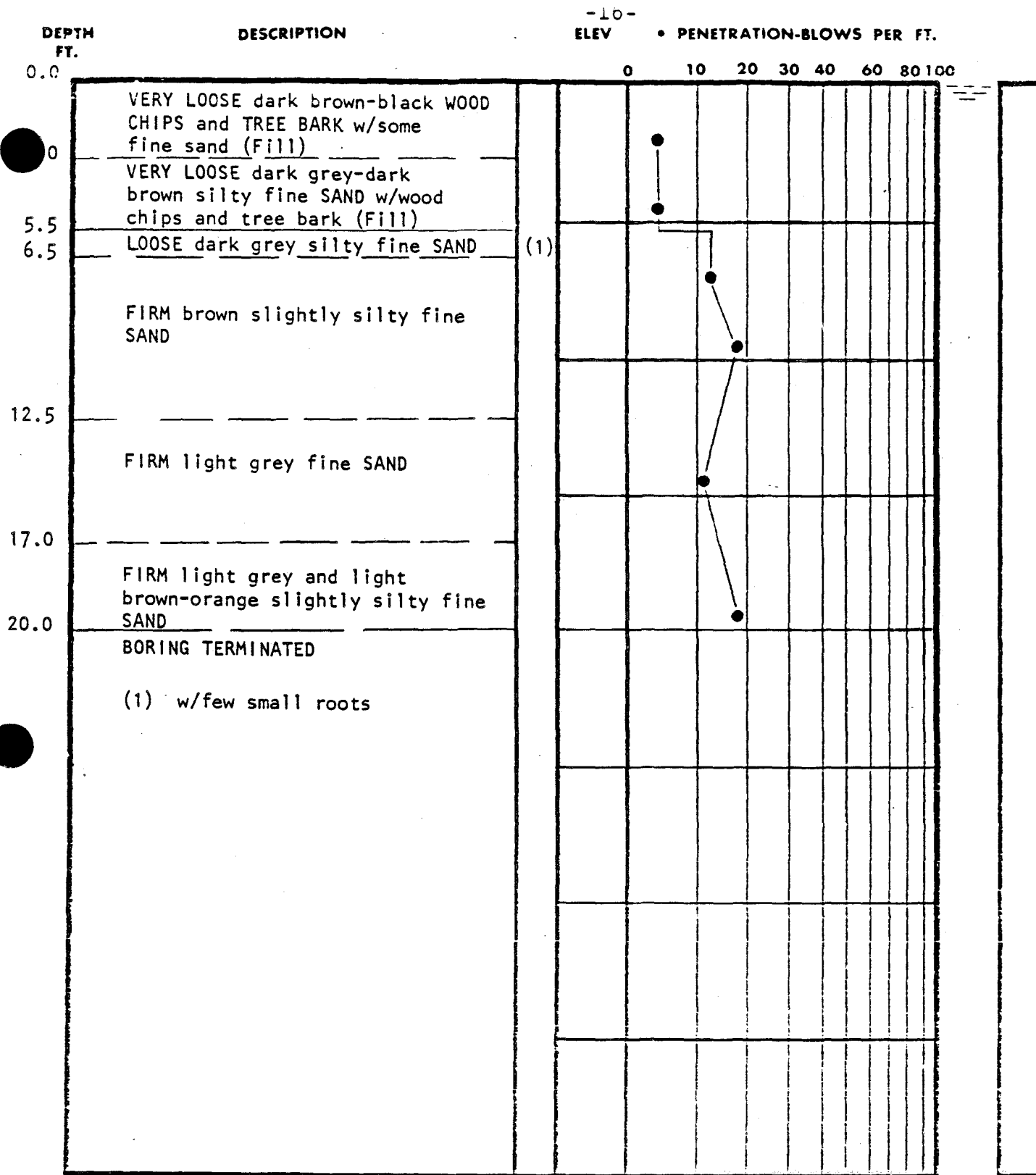
 WATER TABLE, 24 HR.

 WATER TABLE, 1 HR.

 % ROCK CORE RECOVERY

 LOSS OF DRILLING WATER

LAW ENGINEERING TESTING CO.



TEST BORING RECORD

BORING AND SAMPLING MEETS ASTM D-1586
CORE DRILLING MEETS ASTM D-2113

PENETRATION IS THE NUMBER OF BLOWS OF 140 LB. HAMMER
FALLING 30 IN. REQUIRED TO DRIVE 1.4 IN. I.D. SAMPLER 1 FT.

BORING NO. B-3

DATE DRILLED 3/6/78

JOB NO. J-3027

 UNDISTURBED SAMPLE

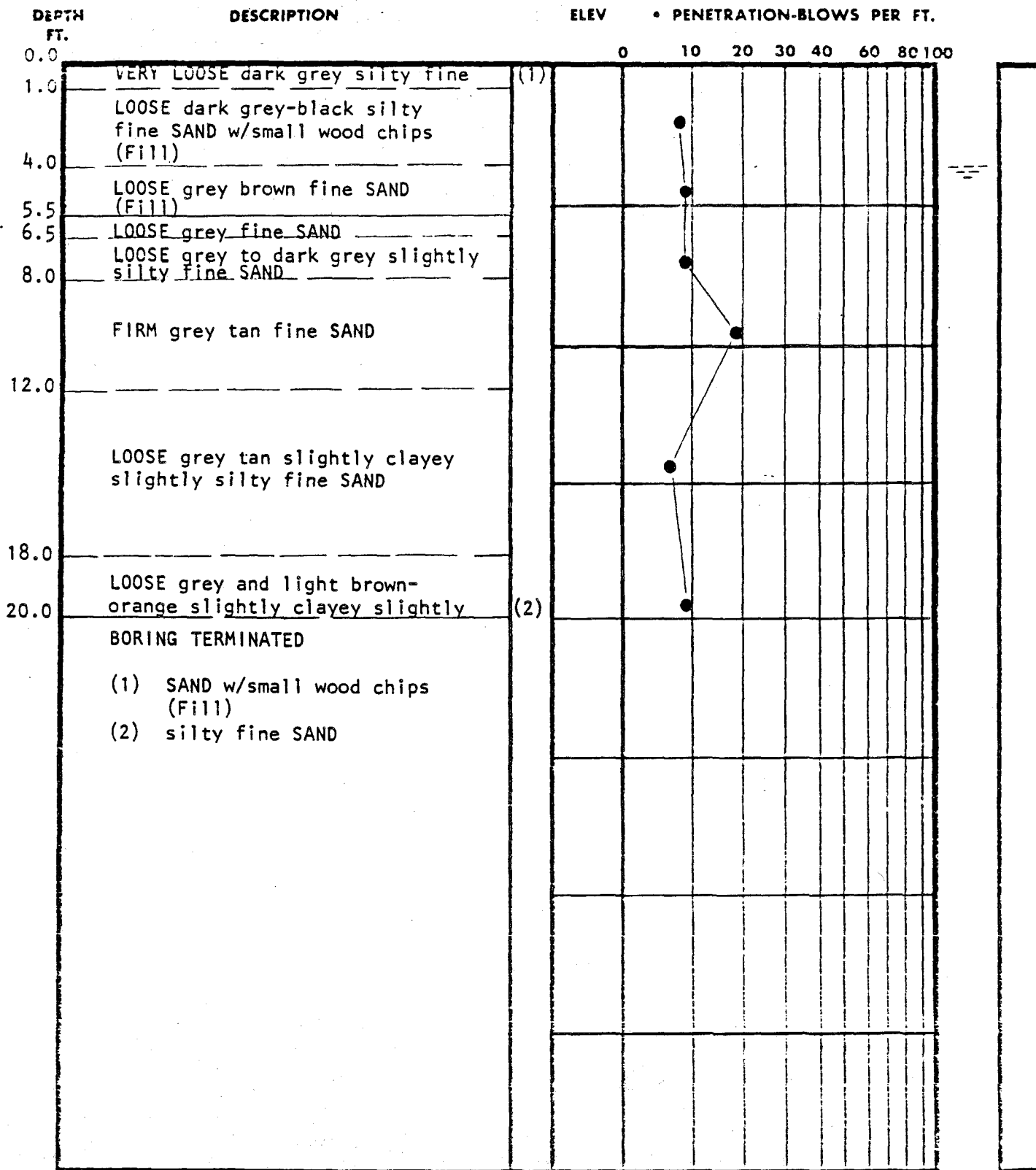
 WATER TABLE, 24 HR.

 WATER TABLE, 1 HR.

 % ROCK CORE RECOVERY

 LOSS OF DRILLING WATER

LAW ENGINEERING TESTING CO.



TEST BORING RECORD

BORING AND SAMPLING MEETS ASTM D-1586
CORE DRILLING MEETS ASTM D-2113

PENETRATION IS THE NUMBER OF BLOWS OF 140 LB. HAMMER
FALLING 30 IN. REQUIRED TO DRIVE 1.4 IN. I.D. SAMPLER 1 FT.

UNDISTURBED SAMPLE

WATER TABLE, 24 HR.
WATER TABLE, 1 HR.

50% ROCK CORE RECOVERY

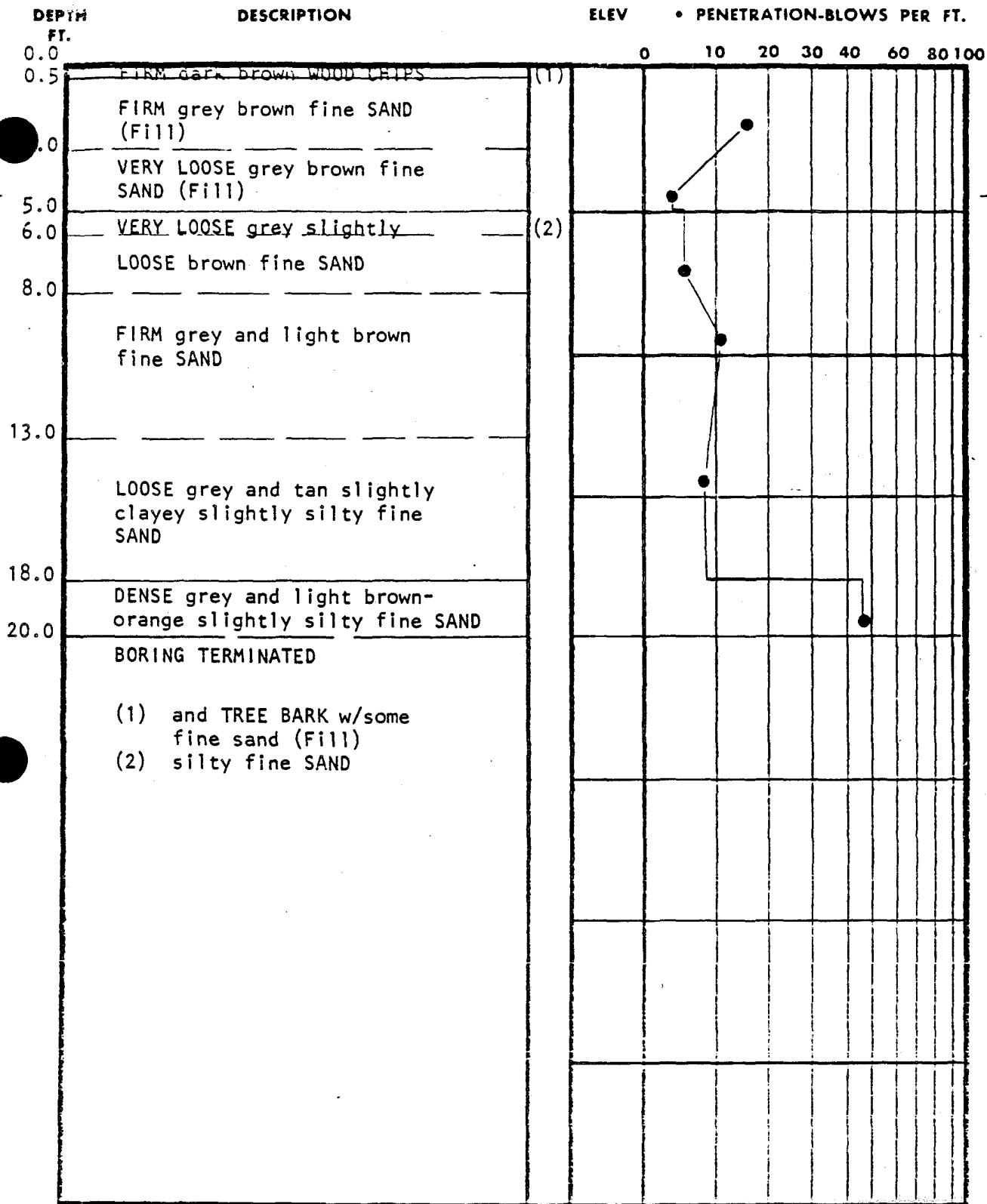
LOSS OF DRILLING WATER

BORING NO. E-4

DATE DRILLED 3/6/78

JOB NO. J-3027

LAW ENGINEERING TESTING CO.



TEST BORING RECORD

BORING AND SAMPLING MEETS ASTM D-1586
CORE DRILLING MEETS ASTM D-2113

PENETRATION IS THE NUMBER OF BLOWS OF 140 LB. HAMMER
FALLING 30 IN. REQUIRED TO DRIVE 1.4 IN. I.D. SAMPLER 1 FT.

BORING NO. E-5
DATE DRILLED 3/6/78
JOB NO. J-3027

 UNDISTURBED SAMPLE

 WATER TABLE, 24 HR.
 WATER TABLE, 1 HR.

 50% ROCK CORE RECOVERY

 LOSS OF DRILLING WATER

LAW ENGINEERING TESTING CO.

PROBE BORING RECORDS

St. Regis Railroad Relocation
St. Regis Paper Co.
Jacksonville, Florida

<u>Probe Boring Number</u>	<u>Depth(feet)</u>	<u>Soil Description</u>
P-1	0.0 - 0.8 0.8 - 2.0 P.T.	WATER VERY LOOSE to LOOSE brown fine SAND
P-2	0.0 - 1.5 1.5 - 2.0 2.0 - 3.0 P.T.	WATER VERY SOFT brown SILT w/ wood fiber LOOSE to FIRM light brown fine SAND
P-3	0.0 - 1.5 1.5 - 2.8 P.T.	WATER LOOSE to FIRM light brown fine SAND
P-4	0.0 - 0.7 0.7 - 2.8 P.T.	WATER VERY LOOSE to FIRM light brown fine SAND
P-5	0.0 - 2.0 2.0 - 4.0 P.T.	WATER VERY LOOSE to FIRM light brown fine SAND

P.T. - Probe Terminated

Boring No.	Sample No.	Depth - Ft.	Unified Soil Classification Symbol	Natural Water Content, w - %	Liquid Limit LL - %	Plastic Limit PL - %	Plasticity Index PI - %	Water Plasticity Ratio, Rw - %	Specific Gravity G	Grain Size			Organic Loss on Ignition, O - %	Dry Unit Weight Yd - PCF
										Gravel %	Sand %	Fines %		
B-2	#1	1.0 to 2.5	Pt	293									71	
B-3	#3	6.0 to 7.5	SP-SM	28								5	1	

FIELD AND LABORATORY TEST PROCEDURES

Field Procedures

Soil Test Borings - The soil test borings were made in accordance with ASTM Designation D1586-67, "Penetration Test and Split-Barrel Sampling of Soils". The borings were initially advanced by augering. A rotary drilling process was subsequently used and bentonite drilling fluid was circulated in the bore holes to stabilize the sides and flush the cuttings. At regular intervals the drilling tools were removed and soil samples were obtained with a standard 1.4 inch I.D., 2.0 inch O.D., split-tube sampler. The sampler was first seated six inches and then driven an additional foot with blows of a 140 pound hammer falling 30 inches. The number of hammer blows required to drive the sampler the final foot is designated the "Penetration Resistance". The penetration resistance when properly interpreted is an index to the soil strength and density.

Representative portions of the soil samples, obtained from the sampler, were placed in glass jars and transported to our laboratory. The samples were then examined by an engineer to verify the driller's field classifications.

Probe Borings - The probe borings were advanced manually with a probe rod until refusal was encountered. The penetration depth of the probe rod into the soil was noted. Soils which can be penetrated by pushing a probe rod are usually very loose or very soft to soft in consistency. The penetration depth of the rod into the underlying soil, therefore, yields a determination of the thickness of low strength surface soils present.

Laboratory Procedures

Water Content - The water content is the ratio expressed as a percentage of the weight of water in a given mass of soil to the weight of the solid particles. This test was conducted in accordance with ASTM D2216-66.

Percent Fines - In this test the sample is dried and then washed over a No. 200 mesh sieve. The percentage of soil by weight passing the sieve is the percentage of fines or portion of the sample in the silt and clay size range. This test was conducted in accordance with ASTM Designation D1140-54.

Organic Loss on Ignition (Percent Organics) - The amount of organic material in a sample is determined in this

test. The sample is first dried and weighed, then ignited and reweighed. The amount of organic material is expressed as a percentage.

KEY TO SOIL CLASSIFICATION

Correlation of Penetration Resistance with Relative Density and Consistency

<u>Sands and Gravels</u>		<u>Silts and Clays</u>	
<u>No. of Blows, N</u>	<u>Relative Density</u>	<u>No. of Blows, N</u>	<u>Consistency</u>
0 - 4	Very Loose	0 - 2	Very Soft
5 - 10	Loose	3 - 4	Soft
11 - 20	Firm	5 - 8	Firm
21 - 30	Very Firm	9 - 15	Stiff
31 - 50	Dense	16 - 30	Very Stiff
Over 50	Very Dense	31 - 50	Hard
		Over 50	Very Hard

Particle Size Identification (Unified Classification System)

Boulders -	Diameter exceeds 8 inches
Cobbles -	3 to 8 inches diameter
Gravel:	Coarse - 3/4 to 3 inches diameter
	Fine - 4.75 mm to 3/4 inch diameter
Sand:	Coarse - 2.0 mm to 4.75 mm diameter
	Medium - 0.42 mm to 2.0 mm diameter
	Fine - 0.074 mm to 0.42 mm diameter
Silt and Clay:	Less than 0.07 mm (Particles cannot be seen with naked eye)

Modifiers

The modifiers provide our estimate of the amount of fines (silt or clay size particles) in the soil sample.

<u>Approximate Fines Content</u>
5% Fines 12%
12% Fines 30%
30% Fines 50%

<u>Modifiers</u>
Slightly silty or slightly clayey
Silty or clayey
Very silty or very clayey



LAW ENGINEERING

GEOTECHNICAL, ENVIRONMENTAL
& CONSTRUCTION MATERIALS
CONSULTANTS

March 9, 1972

St. Regis Paper Company
P. O. Box 18020
Jacksonville, Florida 32229

Attention: Mr. Ronald B. Spencer

Subject: Report of Subsurface Investigation
500,000 Gallon Demineralized Water
Storage Tank
St. Regis Plant
Jacksonville, Florida
LETCO Job No. J-1571

Gentlemen:

As authorized by your Purchase Order Number 52553-JK, dated February 8, 1972, Law Engineering Testing Company has completed a subsurface investigation at the subject site. This report describes the work performed and presents the findings together with our recommendations for foundation design and site preparation.

FIELD INVESTIGATION

A total of two soil test borings were made at locations which we selected. The locations of these borings are shown on the attached Boring Plan. The manner in which the borings were made is outlined in the Appendix.

SITE AND SUBSURFACE CONDITIONS

The site for the proposed storage tank is located at the St. Regis Plant in Jacksonville. It is a relatively level and

cleared area. There is a low grass ground cover. The borings were located by using a preliminary plan, St. Regis Drawing Number C-JZ-2015, dated January 14, 1972, that was furnished to us by your office. Ground surface elevations were not provided.

Initially, boring B-1 encountered a few inches of topsoil. Both of the borings then generally penetrated 10.5 to 13 feet of firm to loose fine sands. Firm to very dense fine sands then generally extend to about 45 feet. Very loose to loose fine to coarse sands next continue to about 58 feet. Very firm to very dense partially cemented and cemented calcareous silty fine sands were then penetrated to the boring termination depth of 60 feet. The attached Generalized Subsurface Profile graphically depicts these conditions. A more detailed description of the soil conditions is given in the individual Test Boring Records.

Water checks in the borings at the time of drilling indicated the groundwater to be at about 8 feet below the ground surface. No stabilized groundwater checks were made. It is noted that the groundwater level will be influenced by seasonal rainfall variations and that the stabilized groundwater levels may be slightly higher than indicated.

STRUCTURAL INFORMATION

We understand that the steel tank will have a diameter of 52 feet and it will be 32 feet high. The estimated weight of the tank when empty is 125 kips and the total weight when loaded will be about 4366 kips. The estimated maximum unit contact pressure is 2100 psf.

The following recommendations are based on the above structural information and the data obtained in the borings. The soil penetration data has been compared with previous correlations of penetration resistance and allowable soil bearing pressures where similar conditions exist.

FOUNDATION RECOMMENDATIONS

The proposed 500,000 gallon tank can be soil supported. The continuous exterior ring footing should have a minimum width of 18 inches. It is recommended that this footing bear at about 18 inches below the existing grade. An allowable soil bearing pressure in excess of 3000 psf will exist in the tank area if the requirements outlined below are achieved.

Initially, the topsoil and any vegetation at the surface should be stripped from the tank area and to a distance of 5 feet beyond the perimeter. The exposed surface should then be proof-rolled with a medium weight (4000 to 6000 lb. static weight) vibratory roller to improve the uniformity of the upper loose sands. At least, six complete coverages should be made with this towed drum roller. The required fill below the tank bottom can then be placed in lifts 8 to 12 inches thick and densified by making at least six coverages over each lift. The bottom of the footing excavation should be tightened by making at least six passes with a hand-operated vibratory sled.

A density of at least 95 percent of the Modified Proctor maximum dry density (ASTM D1557-67) should be obtained at least one foot below the bottom of the initial rolled surface and throughout any fill. This requirement should be verified by an adequate number of in-place density tests made during the compacting operation.

Groundwater should not be encountered as the water level was 8 feet below grade at the time of drilling. We recommend, however, that the groundwater level be checked immediately prior to construction.

If you have any questions regarding this report, please contact this office. We would be pleased to provide engineering inspection and testing services during construction of

St. Regis Paper Company
Jacksonville, Florida 32229

March 9, 1972
Page 4

this project.

Very truly yours,

LAW ENGINEERING TESTING COMPANY

Jon H. Gould, E.I.T.
Civil Engineer

E. W. Lingo, P. E.
Civil Engineer
Registered, Florida 9326

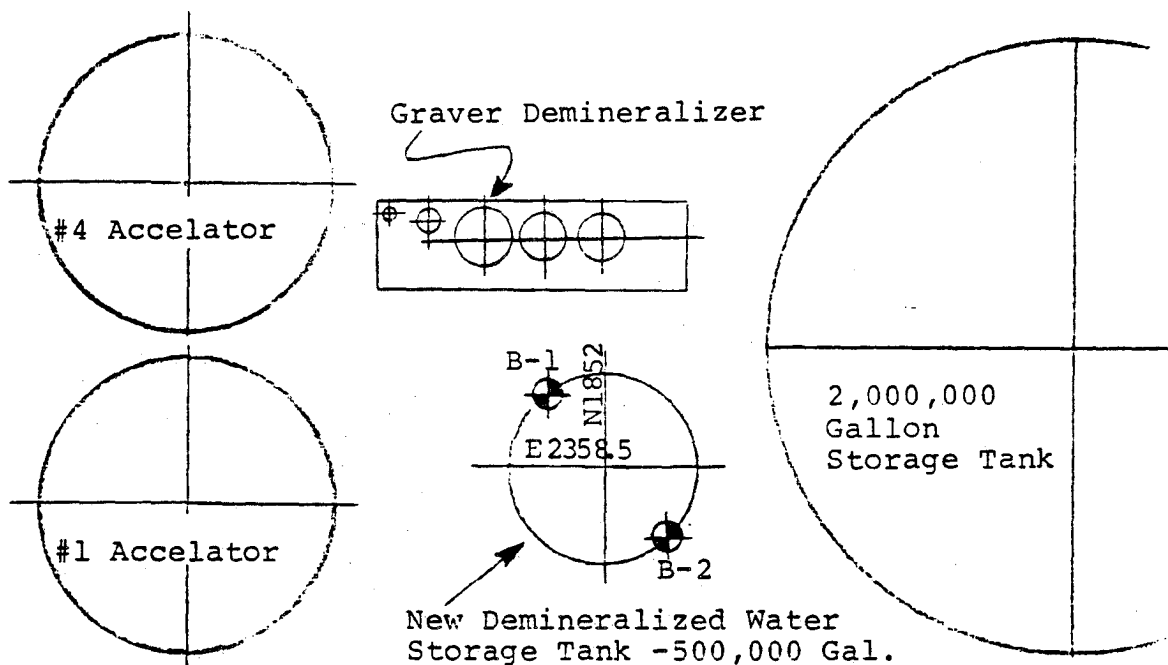
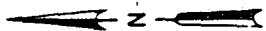
JHG/EWL/f

APPENDIX
FIELD TESTING

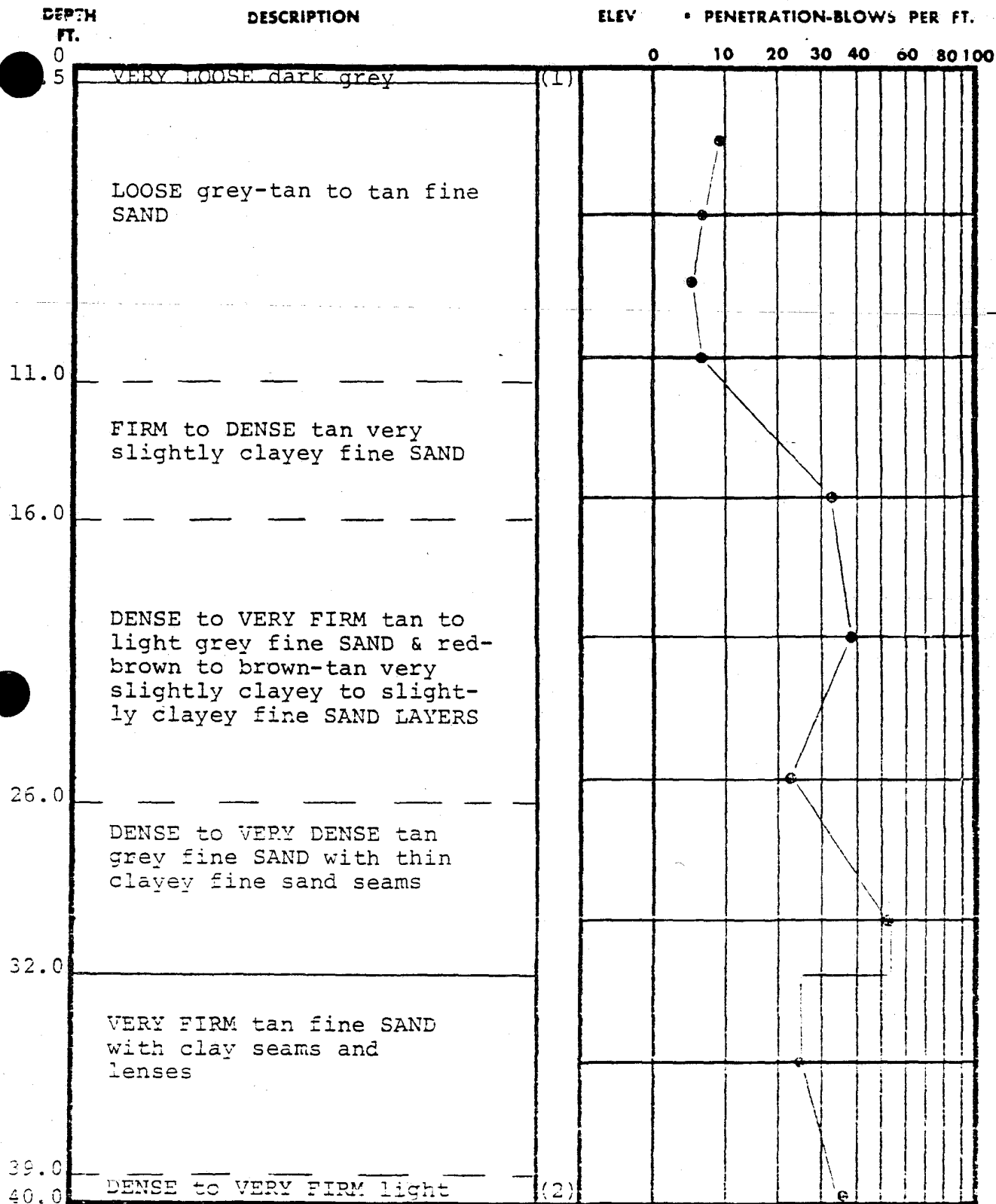
SOIL TEST BORINGS

The soil test borings were made in accordance with ASTM Designation D1586-67, Penetration Test and Split-Barrel Sampling of Soils. The test borings were initially advanced to a depth of about nine feet by augering. Below this level the borings were extended by utilizing rotary drilling techniques. Bentonite drilling fluid was circulated in the bore holes to stabilize the sides and flush the cuttings. At regular intervals the drilling tools were removed and soil samples were obtained with a standard 1.4 inch I.D., 2 inch O.D., split-tube sampler. The sampler was first seated six inches and then driven an additional foot with blows of a 140 pound hammer, falling 30 inches. The number of hammer blows required to drive the sampler the final foot is designated the "penetration resistance". The penetration resistance is an index to the soil strength and density.

Representative portions of the samples, thus obtained, were placed in glass jars and transported to our laboratory. The samples were then examined by an engineer to verify the driller's field classifications. The attached Test Boring Records graphically show the soil descriptions and penetration resistances.



 Soil Test Boring Scale: 1" = 50' LAW ENGINEERING TESTING COMPANY Jacksonville, Florida LETCO Job No. J-1571	BORING PLAN 500,000 Gallon Demineralized Water Storage Tank St. Regis Plant Jacksonville, Florida
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(1) slightly organic slightly silty fine SAND with small grass roots (Topsoil)

TEST BORING RECORD

(Page 1 of 2 Pages)

BORING NO. B-1

DATE DRILLED 2/17/72

JOB NO. J-1571

BORING AND SAMPLING MEETS ASTM D-1586
CORE DRILLING MEETS ASTM D-2113

PENETRATION IS THE NUMBER OF BLOWS OF 140 LB. HAMMER
FALLING 30 IN. REQUIRED TO DRIVE 1.4 IN. I.D. SAMPLER 1 FT.

 UNDISTURBED SAMPLE

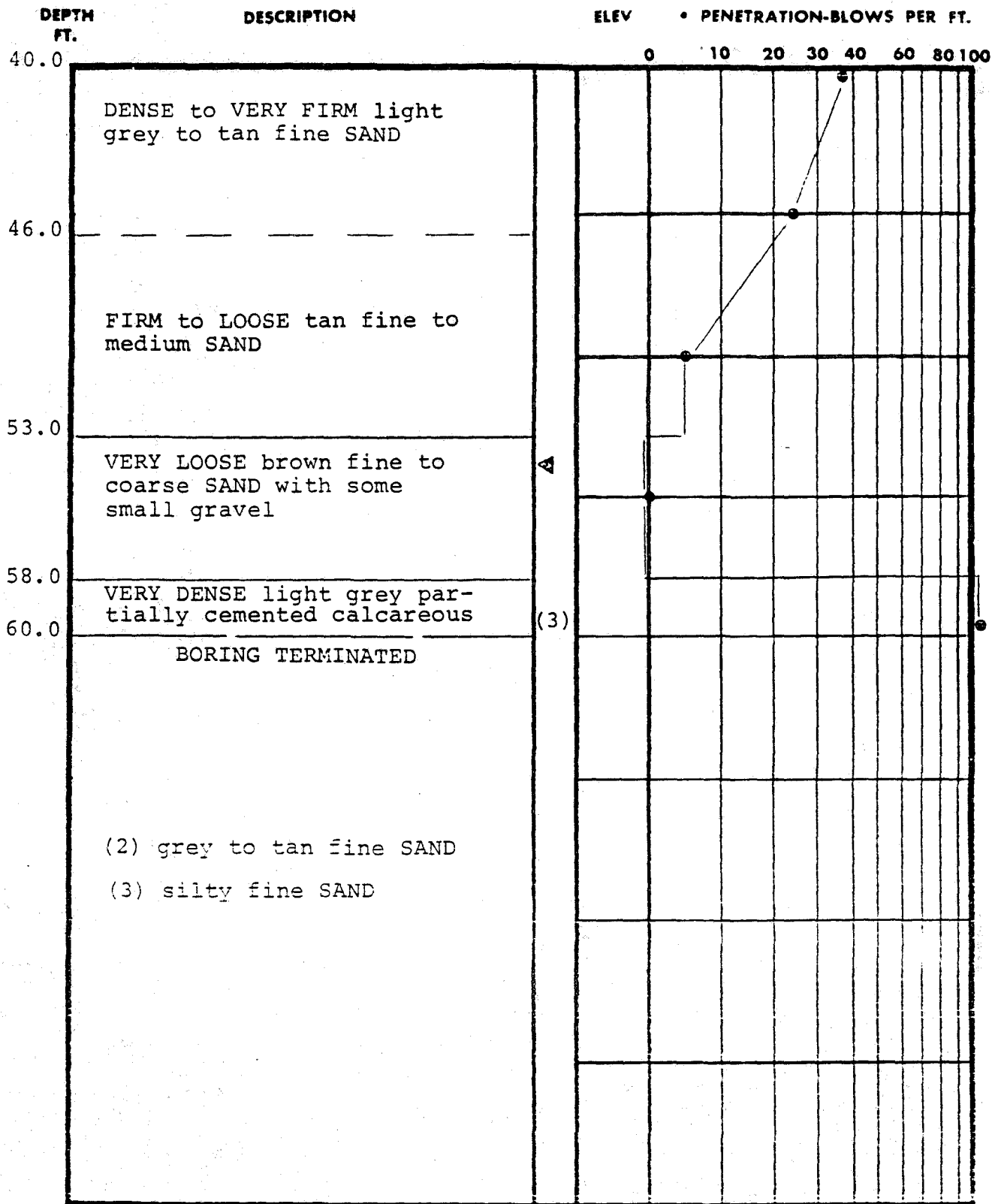
 WATER TABLE, 24 HR.

 WATER TABLE, 1 HR.

 100% ROCK CORE RECOVERY

 LOSS OF DRILLING WATER

LAW ENGINEERING TESTING CO.



TEST BORING RECORD

(Page 2 of 2 Pages)

BORING AND SAMPLING MEETS ASTM D-1586
CORE DRILLING MEETS ASTM D-2113

PENETRATION IS THE NUMBER OF BLOWS OF 140 LB. HAMMER
FALLING 30 IN. REQUIRED TO DRIVE 1.4 IN. I.D. SAMPLER 1 FT.

BORING NO. B-1

DATE DRILLED 2/17/72

JOB NO. J-1571

 UNDISTURBED SAMPLE

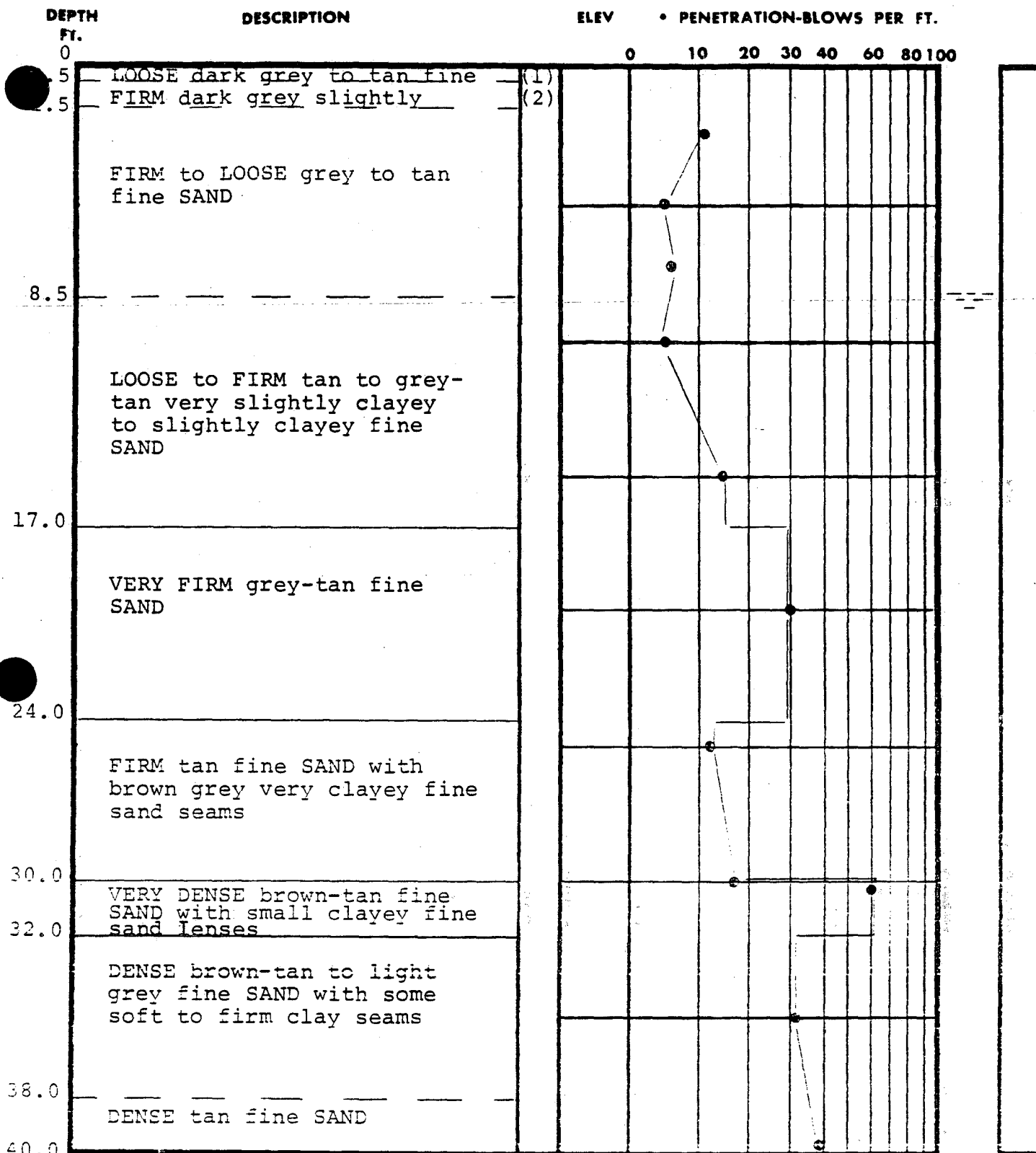
 WATER TABLE, 24 HR.

 WATER TABLE, 1 HR.

 % ROCK CORE RECOVERY

 LOSS OF DRILLING WATER

LAW ENGINEERING TESTING CO.



- (1) SAND
(2) silty fine SAND

TEST BORING RECORD

(Page 1 of 2 Pages)

BORING NO. B-2

DATE DRILLED 2/17/72

JOB NO. J-1571

LAW ENGINEERING TESTING CO.

BORING AND SAMPLING MEETS ASTM D-1586
CORE DRILLING MEETS ASTM D-2113

PENETRATION IS THE NUMBER OF BLOWS OF 140 LB. HAMMER
FALLING 30 IN. REQUIRED TO DRIVE 1.4 IN. I.D. SAMPLER 1 FT.

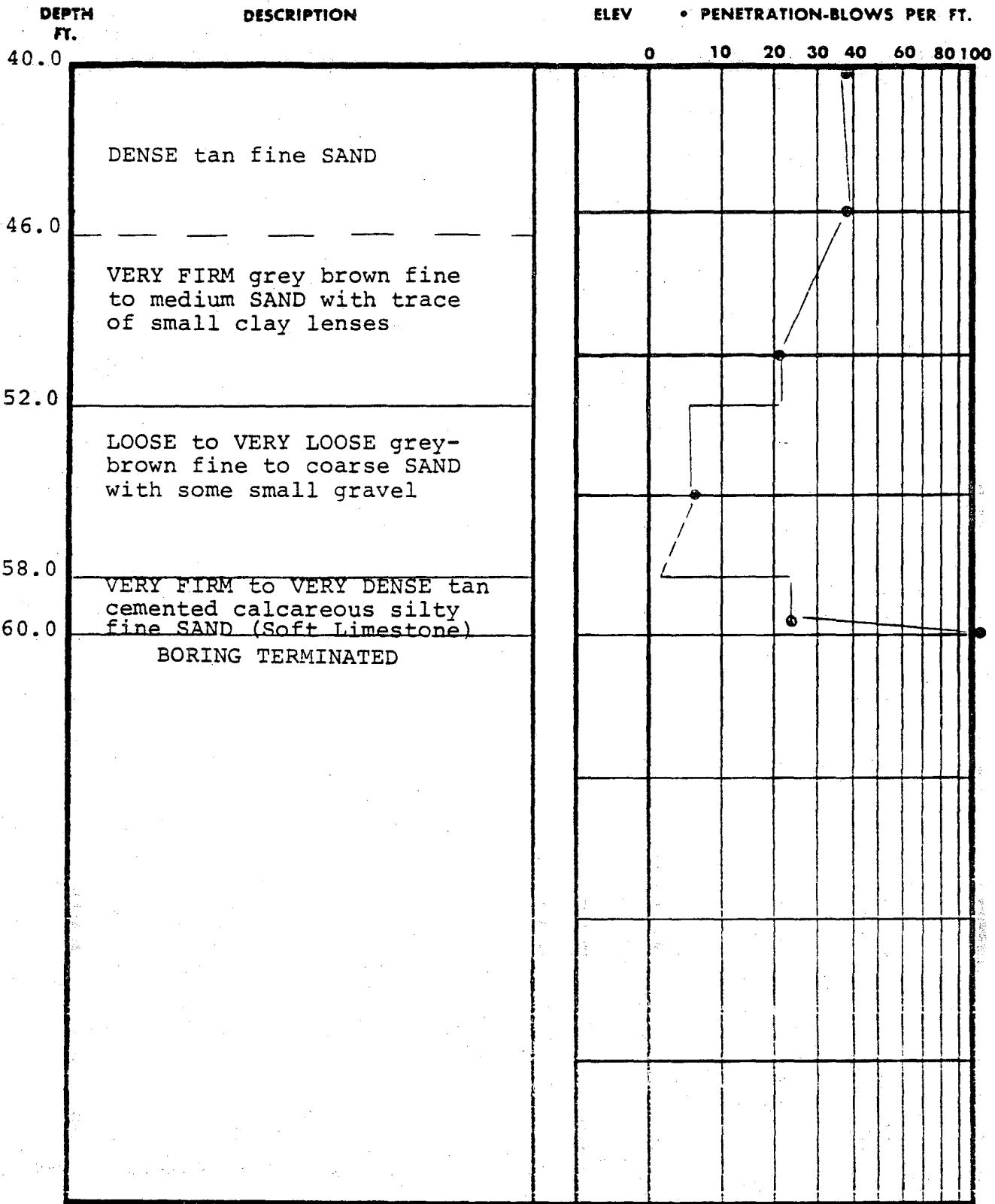
 UNDISTURBED SAMPLE

 % ROCK CORE RECOVERY

 WATER TABLE, 24 HR.

 WATER TABLE, 1 HR.

 LOSS OF DRILLING WATER



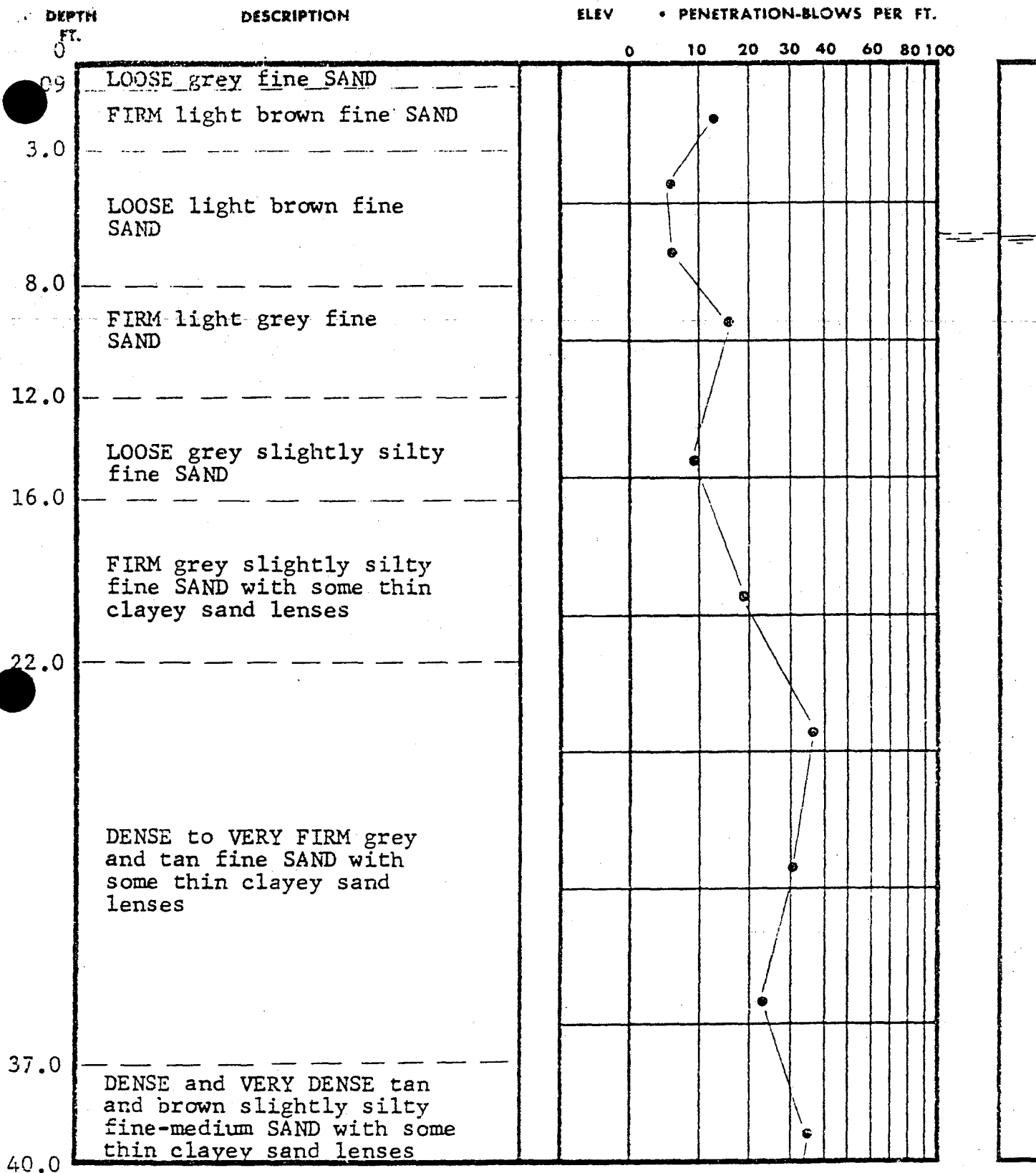
TEST BORING RECORD
(Page 2 of 2 Pages)

BORING AND SAMPLING MEETS ASTM D-1586
CORE DRILLING MEETS ASTM D-2113

PENETRATION IS THE NUMBER OF BLOWS OF 140 LB. HAMMER
FALLING 30 IN. REQUIRED TO DRIVE 1.4 IN. I.D. SAMPLER 1 FT.

BORING NO. B-2
DATE DRILLED 2/17/72
JOB NO. J-1571

 UNDISTURBED SAMPLE
 WATER TABLE, 24 HR.
 WATER TABLE, 1 HR.
 % ROCK CORE RECOVERY
 LOSS OF DRILLING WATER



TEST BORING RECORD

Page 1 of 2 Pages

BORING NO. B-1

DATE DRILLED 8/3/70

JOB NO. J-1371

BORING AND SAMPLING MEETS ASTM D-1586
CORE DRILLING MEETS ASTM D-2113

PENETRATION IS THE NUMBER OF BLOWS OF 140 LB. HAMMER
FALLING 30 IN. REQUIRED TO DRIVE 1.4 IN. I.D. SAMPLER 1 FT.

 UNDISTURBED SAMPLE

 WATER TABLE, 24 HR.

 WATER TABLE, 1 HR.

 % ROCK CORE RECOVERY

 LOSS OF DRILLING WATER

LAW ENGINEERING TESTING CO.

DEPTH
FT.

DESCRIPTION

ELEV • PENETRATION-BLOWS PER FT.

0 10 20 30 40 60 80 100

40.0

DENSE and VERY DENSE tan
and brown slightly silty
fine-medium SAND with some
thin clayey sand lenses

57.5

Moderate HARD brown broken
LIMESTONE

61.0

STIFF grey calcareous silty
CLAY

68.5

VERY DENSE grey cemented
SAND and SHELL with some
silty sand layers

80.0

BORING TERMINATED

TEST BORING RECORD

Page 2 of 2 Pages

BORING AND SAMPLING MEETS ASTM D-1586
CORE DRILLING MEETS ASTM D-2113

PENETRATION IS THE NUMBER OF BLOWS OF 140 LB. HAMMER
FALLING 30 IN. REQUIRED TO DRIVE 1.4 IN. I.D. SAMPLER 1 FT.

BORING NO. B-1

DATE DRILLED 8/3/70

JOB NO. J-1371

 UNDISTURBED SAMPLE

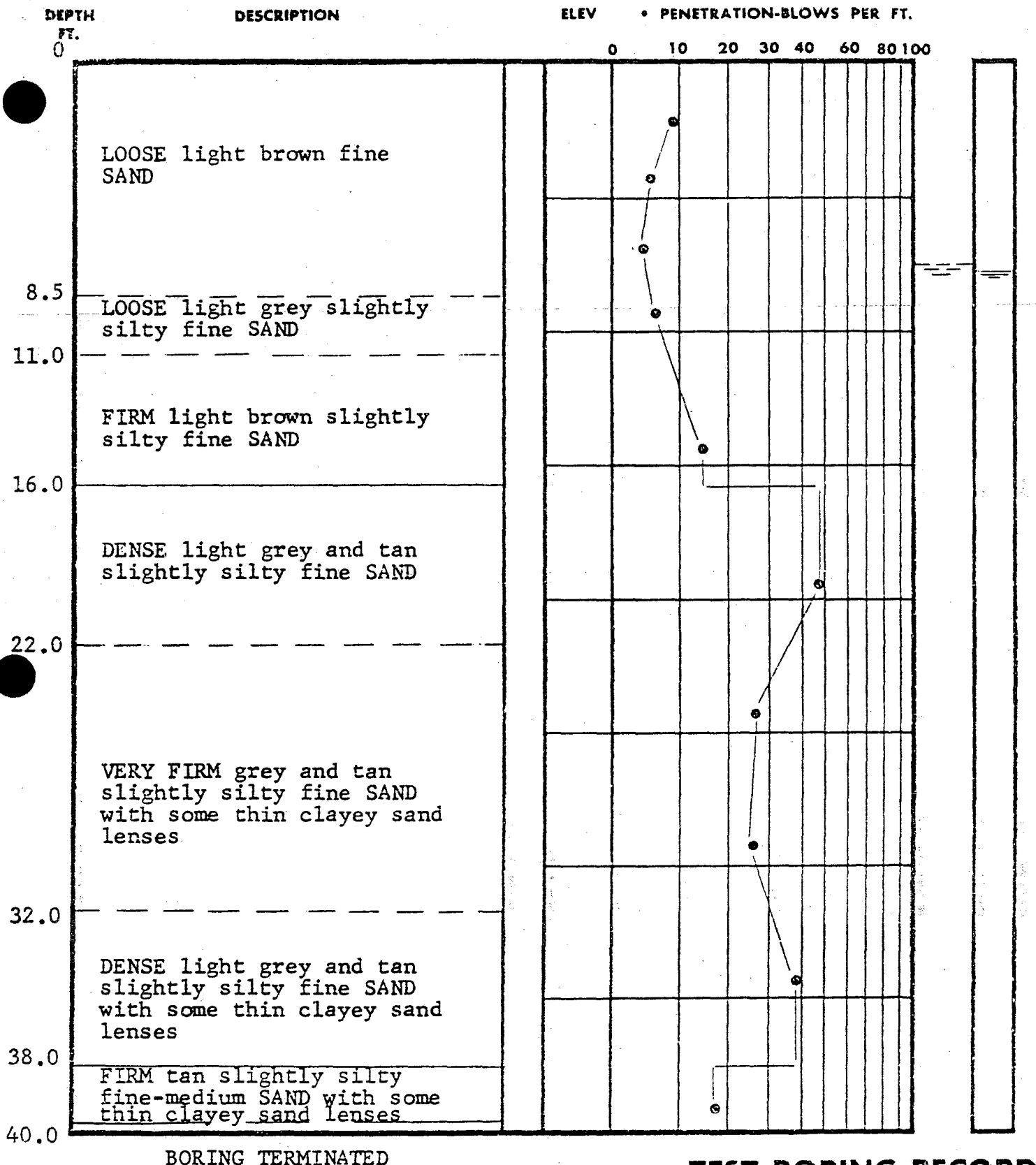
 WATER TABLE, 24 HR.

 WATER TABLE, 1 HR.

 % ROCK CORE RECOVERY

 LOSS OF DRILLING WATER

LAW ENGINEERING TESTING CO.



TEST BORING RECORD

BORING AND SAMPLING MEETS ASTM D-1586
CORE DRILLING MEETS ASTM D-2113

PENETRATION IS THE NUMBER OF BLOWS OF 140 LB. HAMMER
FALLING 30 IN. REQUIRED TO DRIVE 1.4 IN. L.D. SAMPLER 1 FT.

BORING NO. B-2

DATE DRILLED 8/4/70

JOB NO. J-1371

 UNDISTURBED SAMPLE

 WATER TABLE, 24 HR.

 WATER TABLE, 1 HR.

 % ROCK CORE RECOVERY

 LOSS OF DRILLING WATER

LAW ENGINEERING TESTING CO.

DEPTH
FT.

DESCRIPTION

ELEV

• PENETRATION-BLOWS PER FT.

0

0 10 20 30 40 60 80 100

3.0

LOOSE dark grey and brown
slightly silty fine SAND
(Fill)

8.0

FIRM light brown fine
SAND

18.0

LOOSE grey-brown slightly
silty fine SAND

23.0

FIRM light grey fine SAND
with some thin clayey
sand lenses

32.0

VERY FIRM grey and tan
fine-medium SAND with some
thin clayey sand lenses

40.0

DENSE tan and brown fine-
medium SAND with some thin
clayey sand lenses

BORING TERMINATED

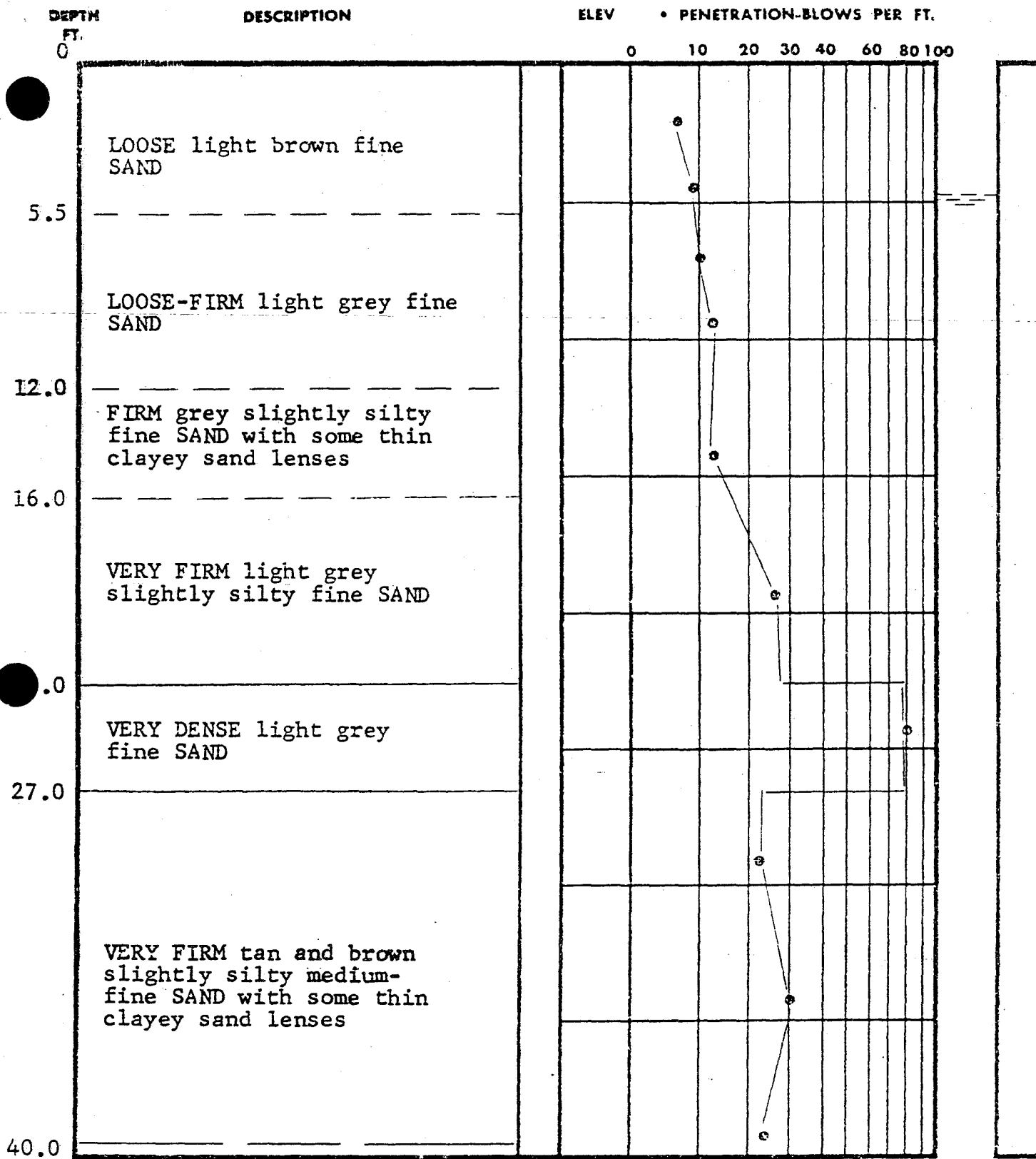
TEST BORING RECORD

BORING AND SAMPLING MEETS ASTM D-1586
CORE DRILLING MEETS ASTM D-2113PENETRATION IS THE NUMBER OF BLOWS OF 140 LB. HAMMER
FALLING 30 IN. REQUIRED TO DRIVE 1.4 IN. I.D. SAMPLER 1 FT. UNDISTURBED SAMPLE

50 % ROCK CORE RECOVERY

 WATER TABLE, 24 HR. WATER TABLE, 1 HR. LOSS OF DRILLING WATERBORING NO. B-3DATE DRILLED 8/4/70JOB NO. J-1371

LAW ENGINEERING TESTING CO.



BORING TERMINATED

TEST BORING RECORD

BORING AND SAMPLING MEETS ASTM D-1586
CORE DRILLING MEETS ASTM D-2113

PENETRATION IS THE NUMBER OF BLOWS OF 140 LB. HAMMER
FALLING 30 IN. REQUIRED TO DRIVE 1.4 IN. I.D. SAMPLER 1 FT.

 UNDISTURBED SAMPLE

 WATER TABLE, 24 HR.

 WATER TABLE, 1 HR.

 % ROCK CORE RECOVERY

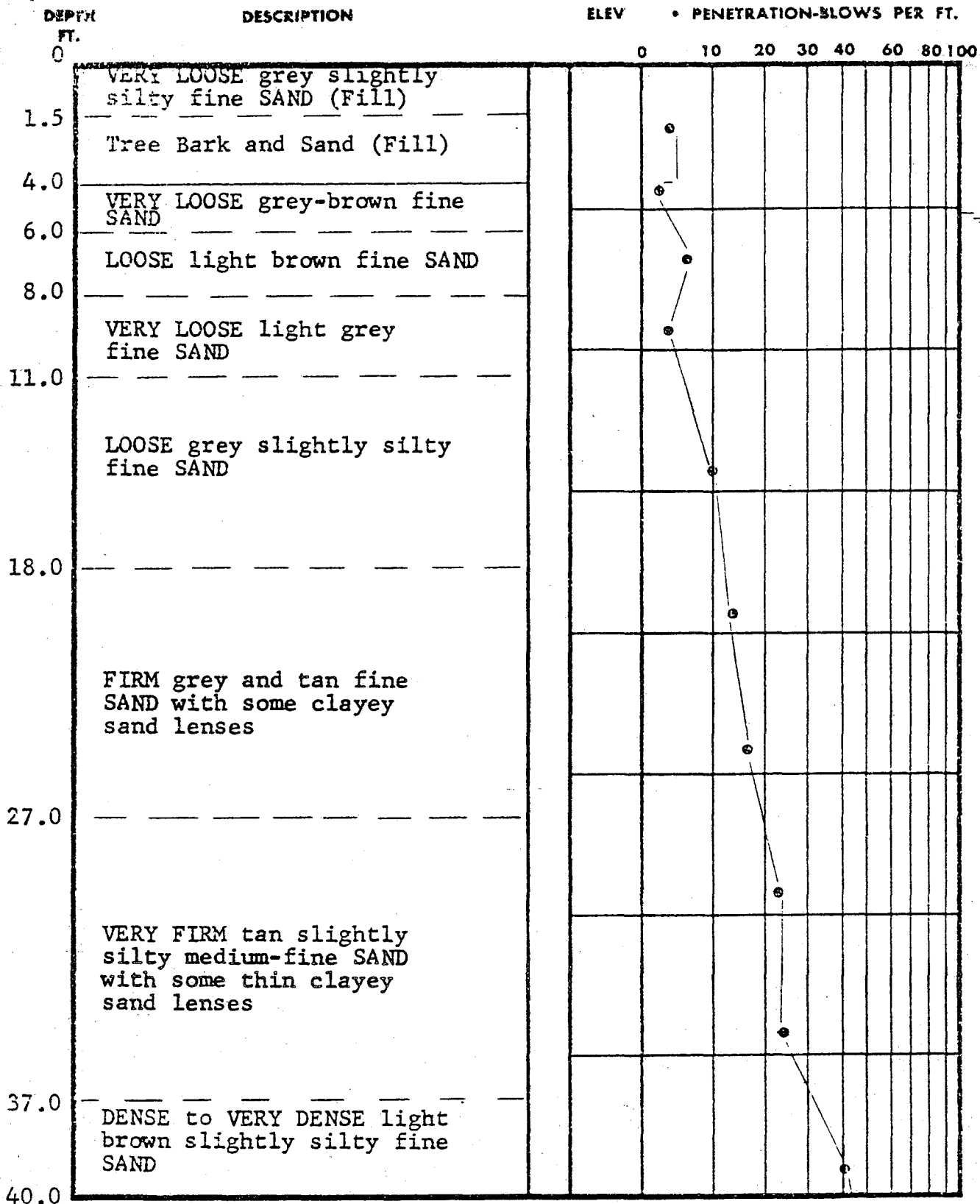
 LOSS OF DRILLING WATER

BORING NO. B-4

DATE DRILLED 8/5/70

JOB NO. J-1371

LAW ENGINEERING TESTING CO.



TEST BORING RECORD

Page 1 of 2 Pages

BORING AND SAMPLING MEETS ASTM D-1586
CORE DRILLING MEETS ASTM D-2113

PENETRATION IS THE NUMBER OF BLOWS OF 140 LB. HAMMER
FALLING 30 IN. REQUIRED TO DRIVE 1.4 IN. L.D. SAMPLER 1 FT.

BORING NO. B-5

DATE DRILLED 8/5/70

JOB NO. J-1371

 UNDISTURBED SAMPLE

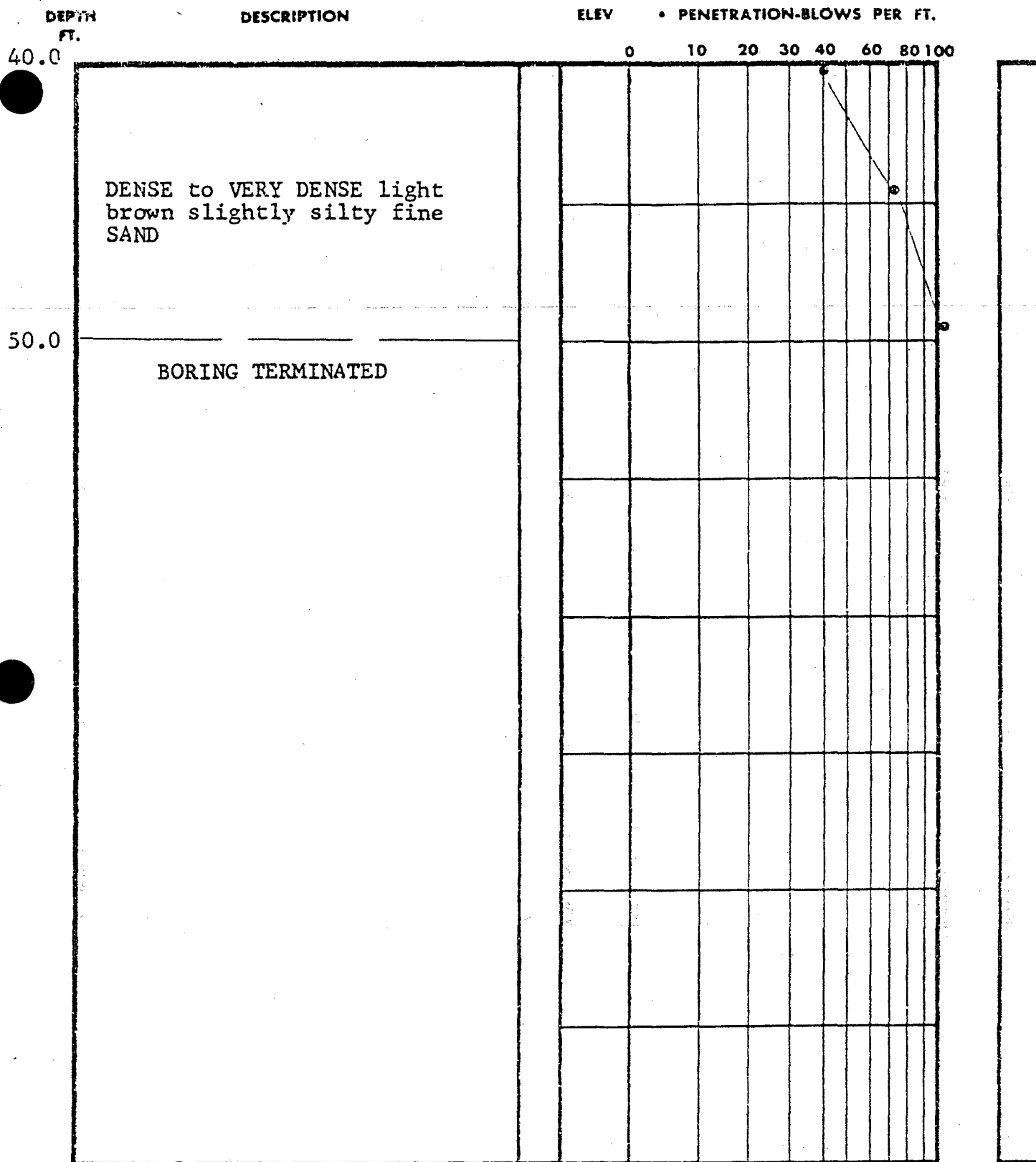
 WATER TABLE, 24 HR.

 WATER TABLE, 1 HR.

 % ROCK CORE RECOVERY

 LOSS OF DRILLING WATER

LAW ENGINEERING TESTING CO.



TEST BORING RECORD

Page 2 of 2 Pages

BORING NO. B-5

DATE DRILLED 8/5/70

JOB NO. J-1371

BORING AND SAMPLING MEETS ASTM D-1586
CORE DRILLING MEETS ASTM D-2113

PENETRATION IS THE NUMBER OF BLOWS OF 140 LB. HAMMER
FALLING 30 IN. REQUIRED TO DRIVE 1.4 IN. I.D. SAMPLEX 1 FT.

 UNDISTURBED SAMPLE

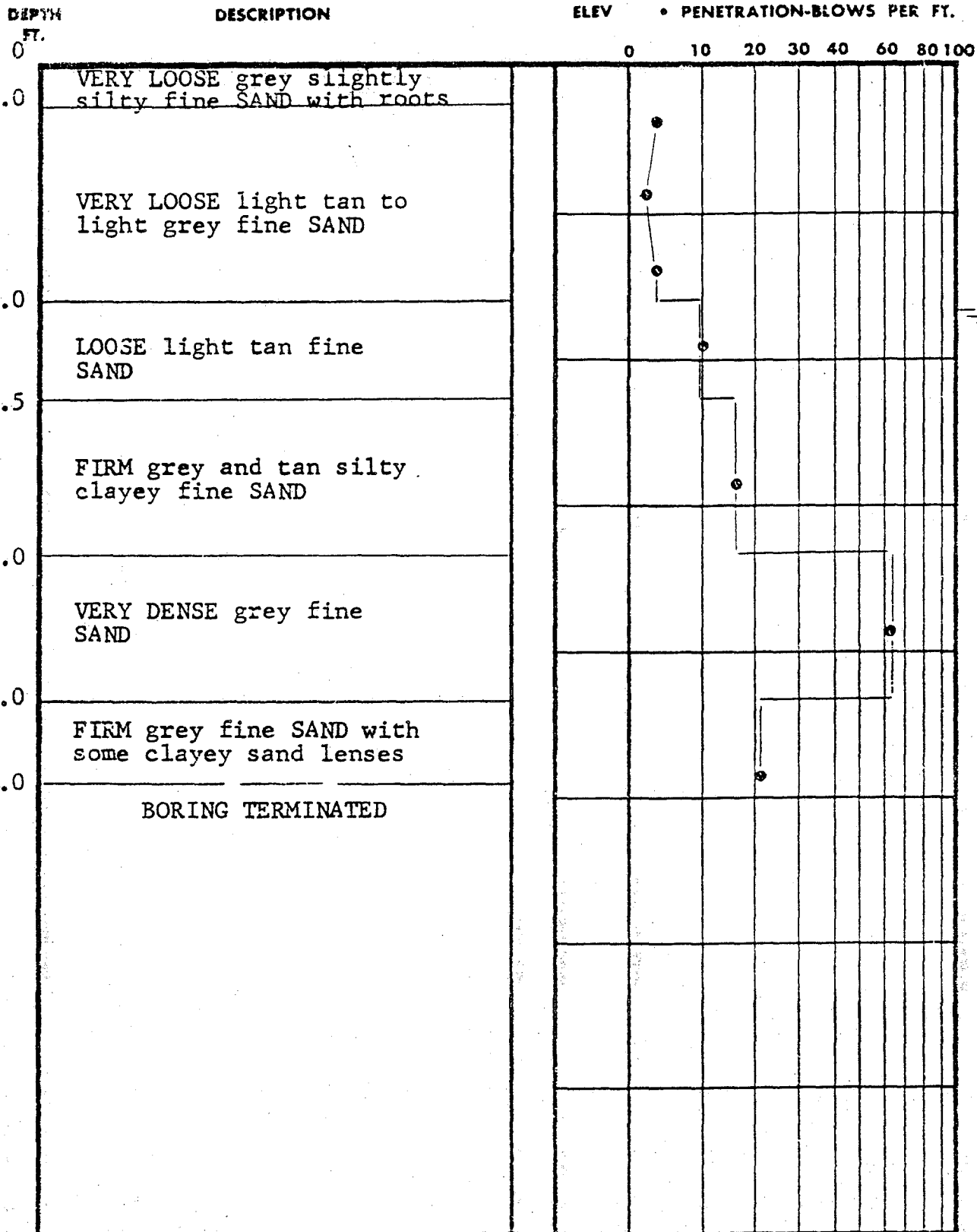
 WATER TABLE, 24 HR.

 WATER TABLE, 1 HR.

 % ROCK CORE RECOVERY

 LOSS OF DRILLING WATER

LAW ENGINEERING TESTING CO.



Location- East End of Aerated Basin.

TEST BORING RECORD

BORING AND SAMPLING MEETS ASTM D-1586
CORE DRILLING MEETS ASTM D-2113

PENETRATION IS THE NUMBER OF BLOWS OF 140 LB. HAMMER
FALLING 30 IN. REQUIRED TO DRIVE 1.4 IN. I.D. SAMPLER 1 FT.

BORING NO. B-6

DATE DRILLED 8/15/70

JOB NO. J-1371

UNDISTURBED SAMPLE

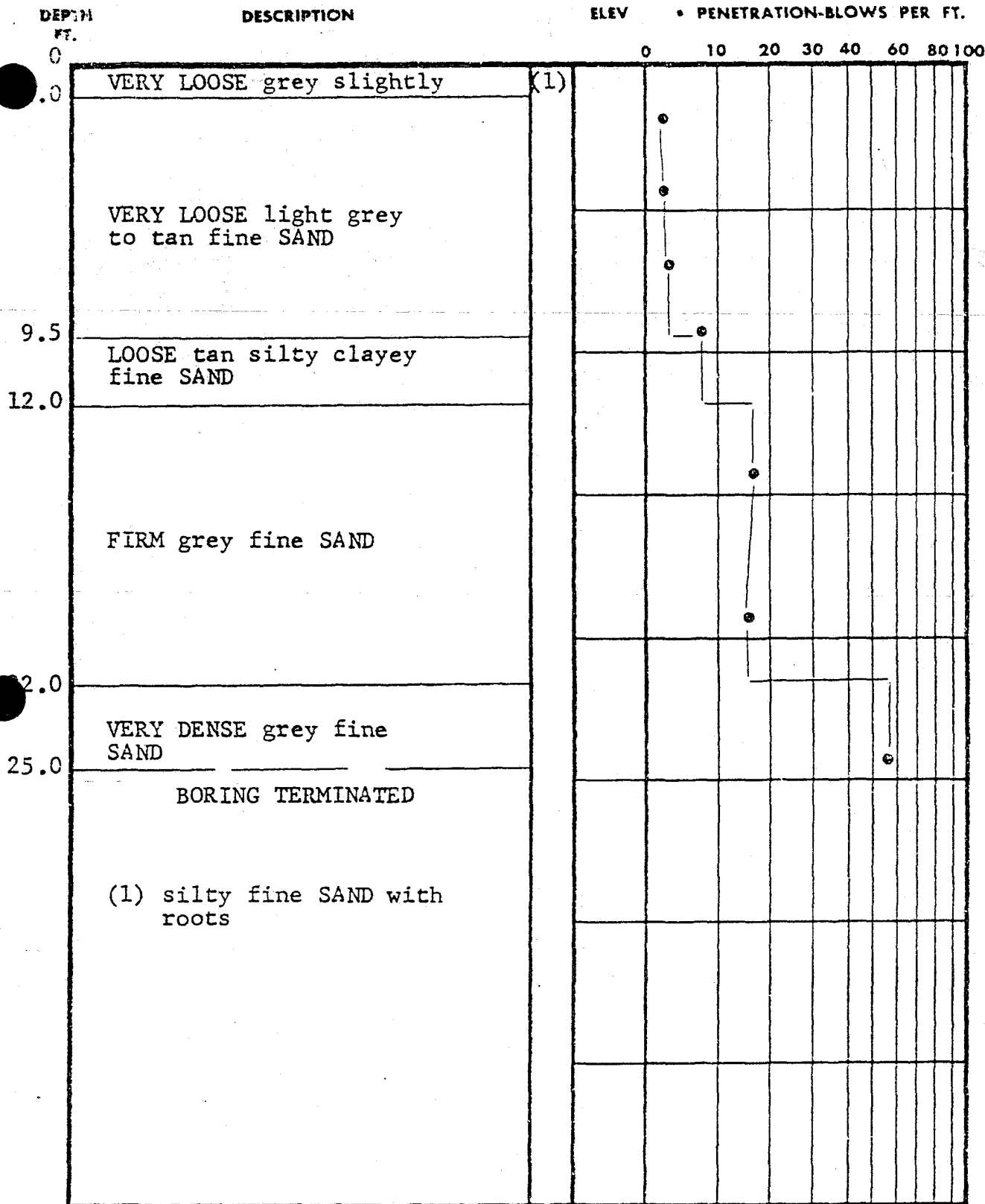
WATER TABLE, 24 HR.

WATER TABLE, 1 HR.

% ROCK CORE RECOVERY

LOSS OF DRILLING WATER

LAW ENGINEERING TESTING CO.



Location- West End of Settling Pond Area.

TEST BORING RECORD

BORING AND SAMPLING MEETS ASTM D-1586
CORE DRILLING MEETS ASTM D-2113

PENETRATION IS THE NUMBER OF BLOWS OF 140 LB. HAMMER
FALLING 30 IN. REQUIRED TO DRIVE 1.4 IN. I.D. SAMPLER 1 FT.

 UNDISTURBED SAMPLE

 WATER TABLE, 24 HR.

 WATER TABLE, 1 HR.

 % ROCK CORE RECOVERY

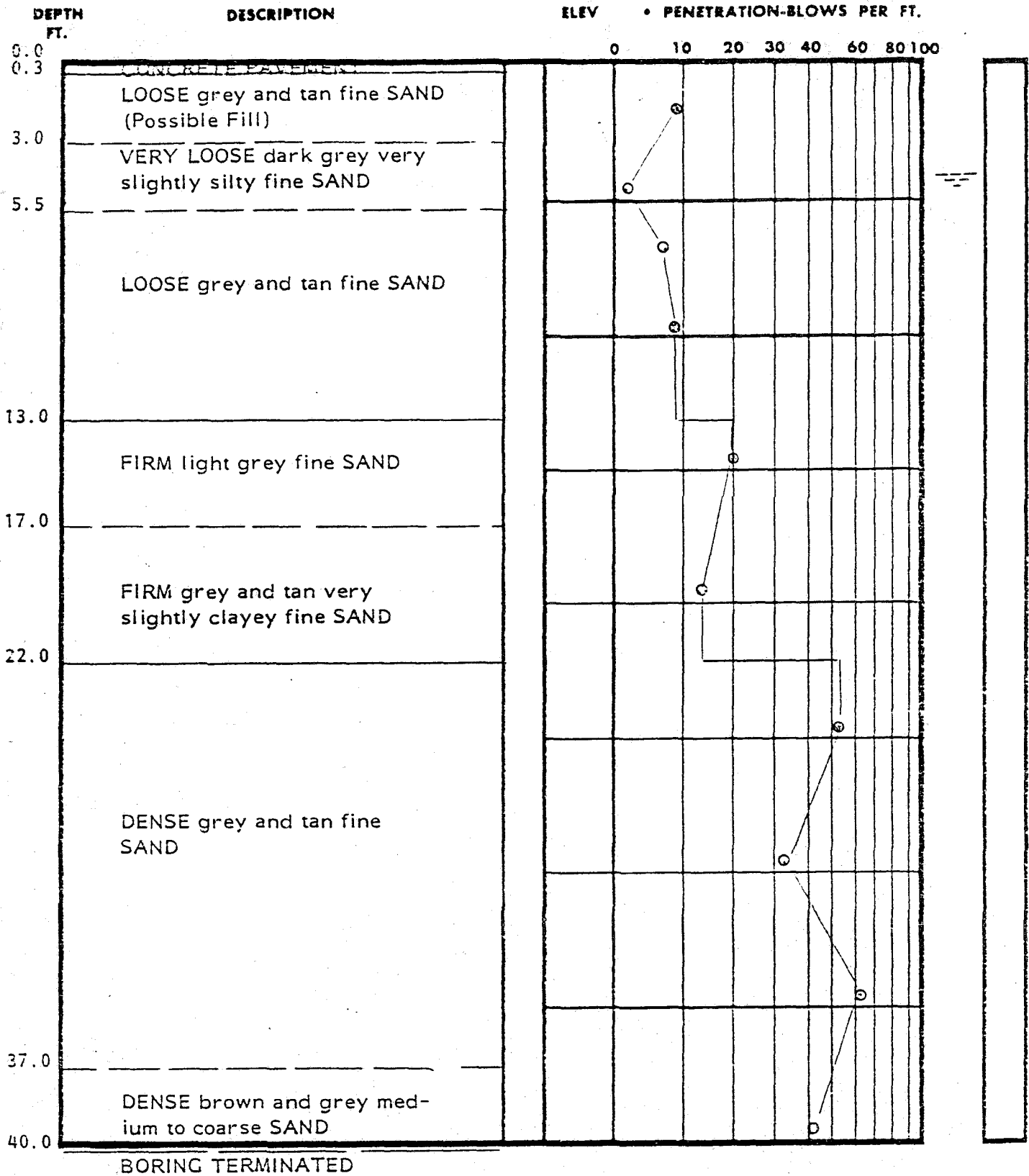
 LOSS OF DRILLING WATER

BORING NO. B-7

DATE DRILLED 8/15/70

JOB NO. J-1371

LAW ENGINEERING TESTING CO.



TEST BORING RECORD

BORING AND SAMPLING METHODS ASTM D-1586
CORE DRILLING METHODS ASTM D-2113

PENETRATION IS THE NUMBER OF BLOWS OF 140 LB. HAMMER
FALLING 30 IN. REQUIRED TO DRIVE 1.4 IN. I.D. SAMPLER 1 FT.

UNDISTURBED SAMPLE

100% ROCK CORE RECOVERY

WATER TABLE, 24 HR.

WATER TABLE, 1 HR.

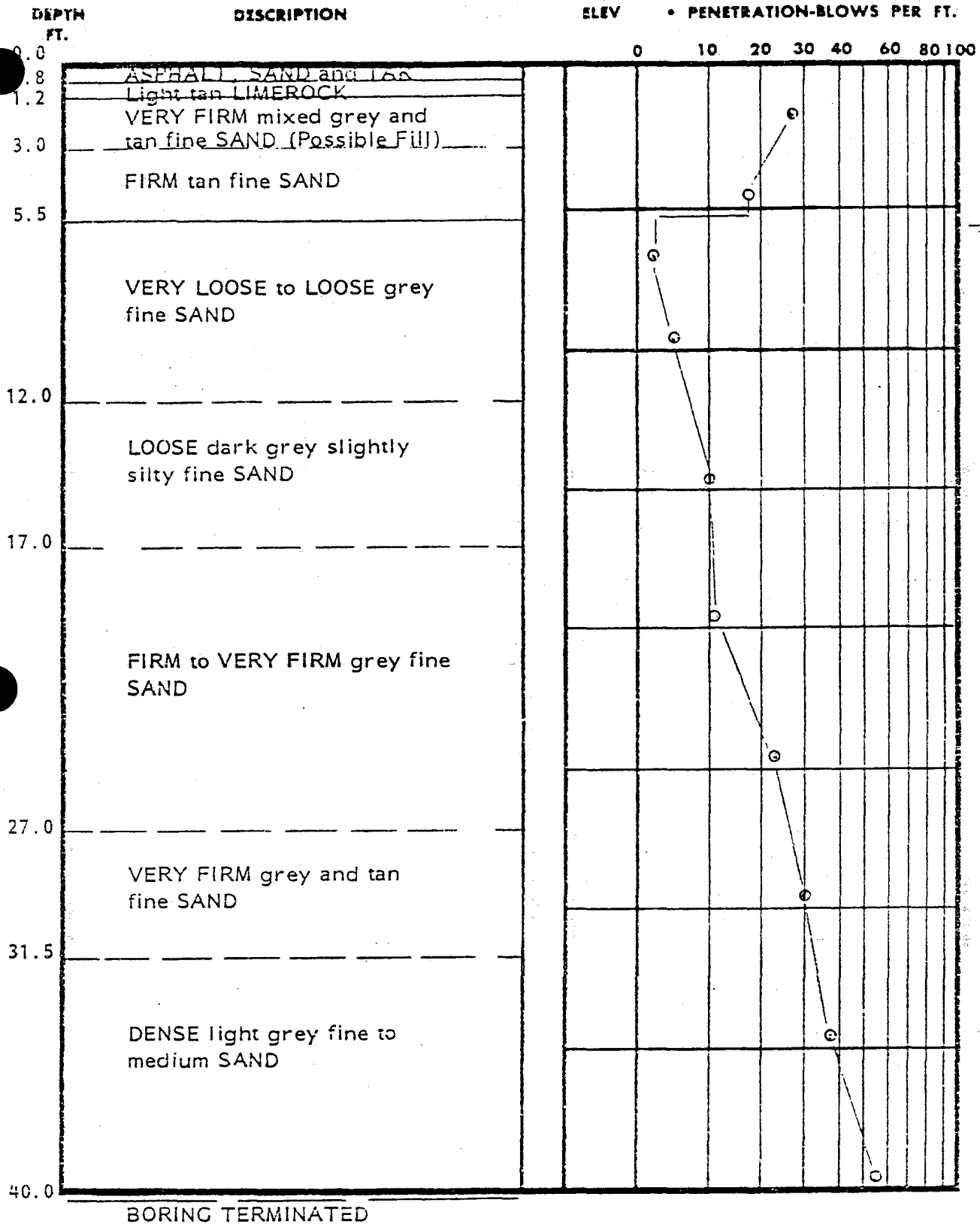
LOSS OF DRILLING WATER

BORING NO. B-1

DATE DRILLED 4/12/77

JOB NO. J-2778

LAW ENGINEERING TESTING CO.



TEST BORING RECORD

BORING AND SAMPLING MEETS ASTM D-1586
 CORE DRILLING MEETS ASTM D-2113
 PENETRATION IS THE NUMBER OF BLOWS OF 140 LB. HAMMER
 FALLING 30 IN. REQUIRED TO DRIVE 1.4 IN. I.D. SAMPLER 1 FT.

UNDISTURBED SAMPLE

% ROCK CORE RECOVERY

WATER TABLE, 24 HR.

WATER TABLE, 1 HR.

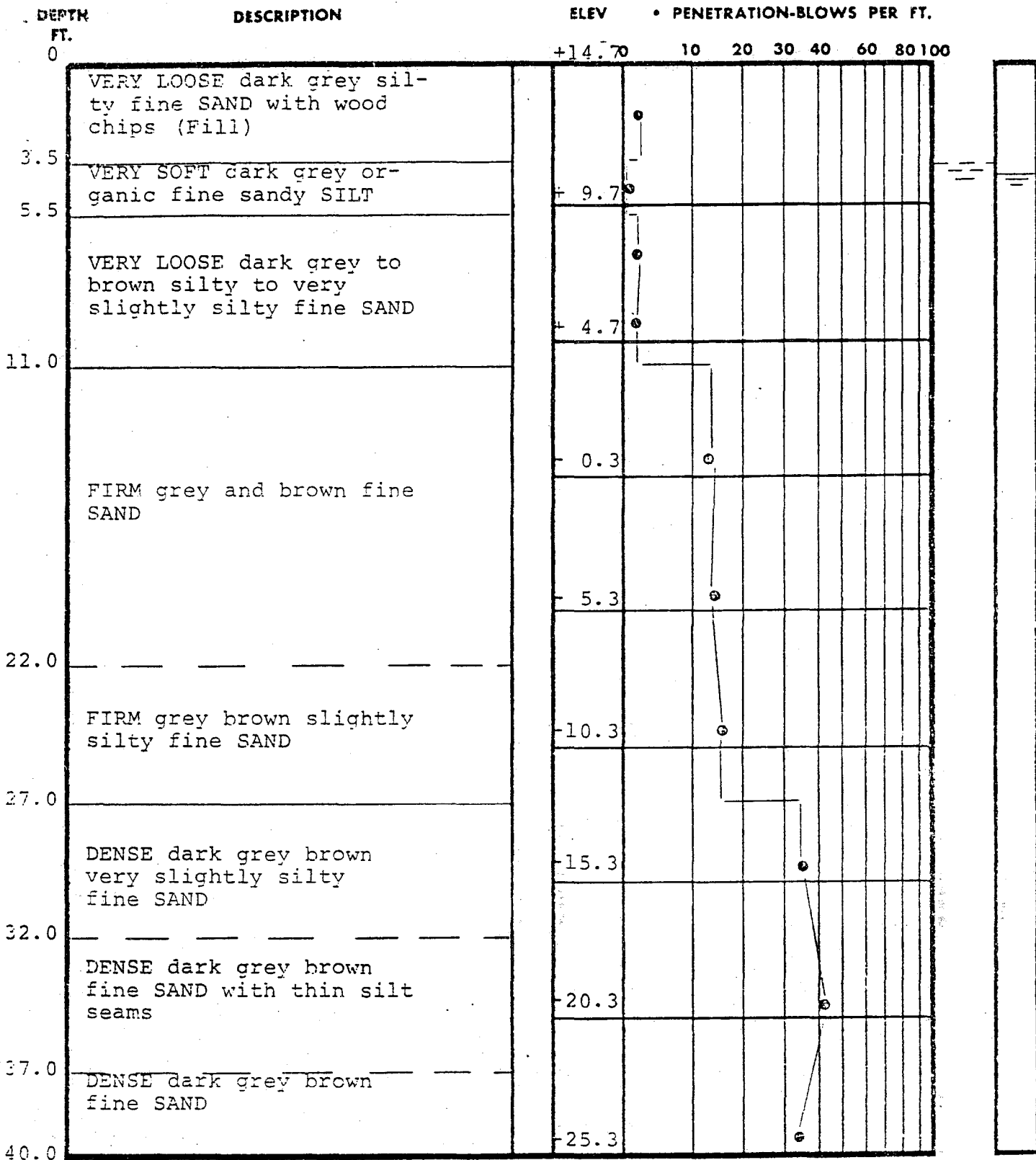
LOSS OF DRILLING WATER

BORING NO. B-2

DATE DRILLED 4/11/77

JOB NO. J-2778

LAW ENGINEERING TESTING CO.



TEST BORING RECORD

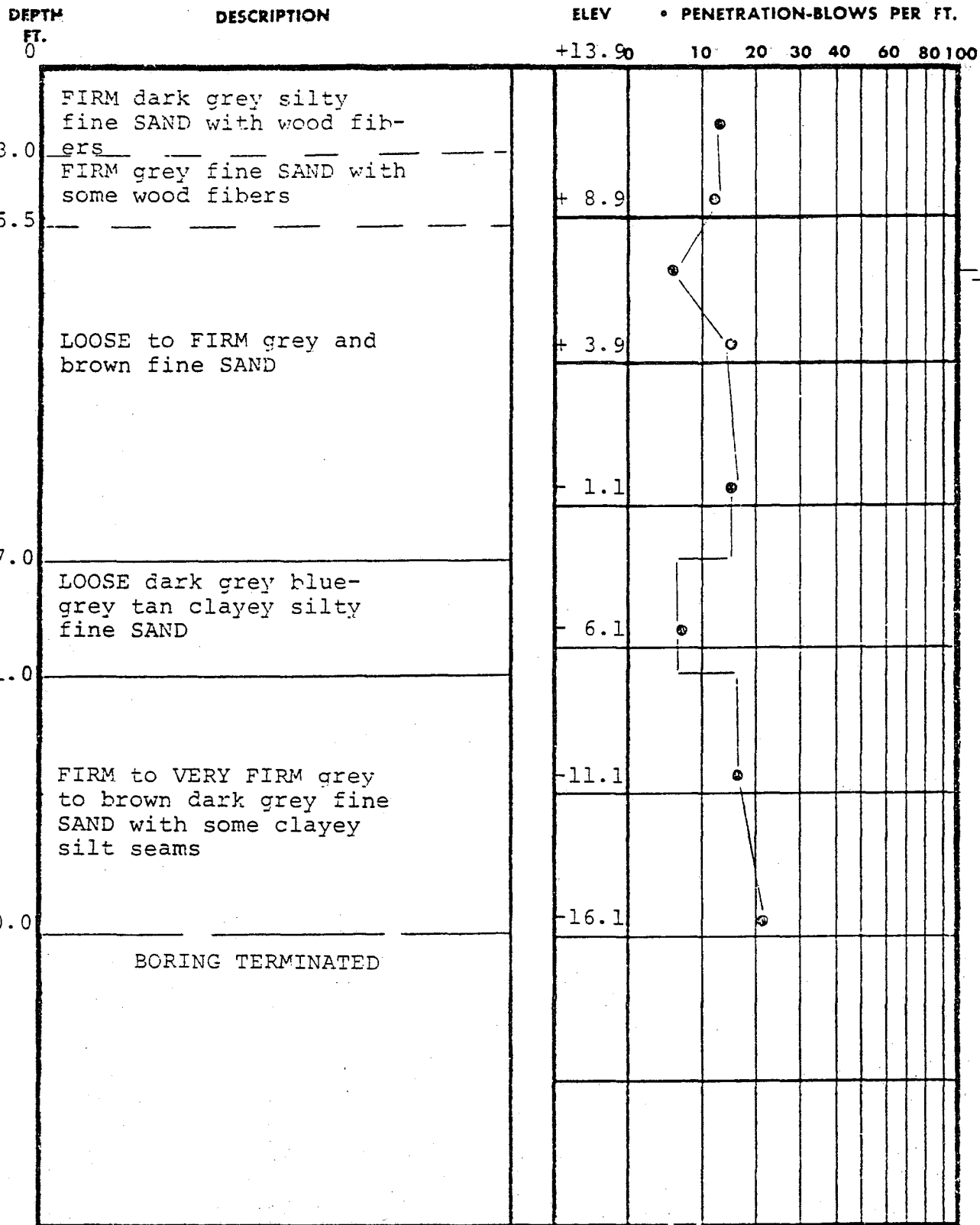
Page 1 of 2 Pages

BORING AND SAMPLING MEETS ASTM D-1586
CORE DRILLING MEETS ASTM D-2113
PENETRATION IS THE NUMBER OF BLOWS OF 140 LB. HAMMER
FALLING 30 IN. REQUIRED TO DRIVE 1.4 IN. I.D. SAMPLER 1 FT.

BORING NO. B-4
DATE DRILLED 6/4/71
JOB NO. J-1468A

 UNDISTURBED SAMPLE
 WATER TABLE, 24 HR.
 WATER TABLE, 1 HR.
 50% ROCK CORE RECOVERY
 LOSS OF DRILLING WATER

LAW ENGINEERING TESTING CO.



TEST BORING RECORD

BORING AND SAMPLING MEETS ASTM D-1586
CORE DRILLING MEETS ASTM D-2113

PENETRATION IS THE NUMBER OF BLOWS OF 140 LB. HAMMER
FALLING 30 IN. REQUIRED TO DRIVE 1.4 IN. I.D. SAMPLER 1 FT.

BORING NO. B-5

DATE DRILLED 6/7/71

JOB NO. J-1468A

 UNDISTURBED SAMPLE

 WATER TABLE, 24 HR.

 WATER TABLE, 1 HR.

 % ROCK CORE RECOVERY

 LOSS OF DRILLING WATER

LAW ENGINEERING TESTING CO.

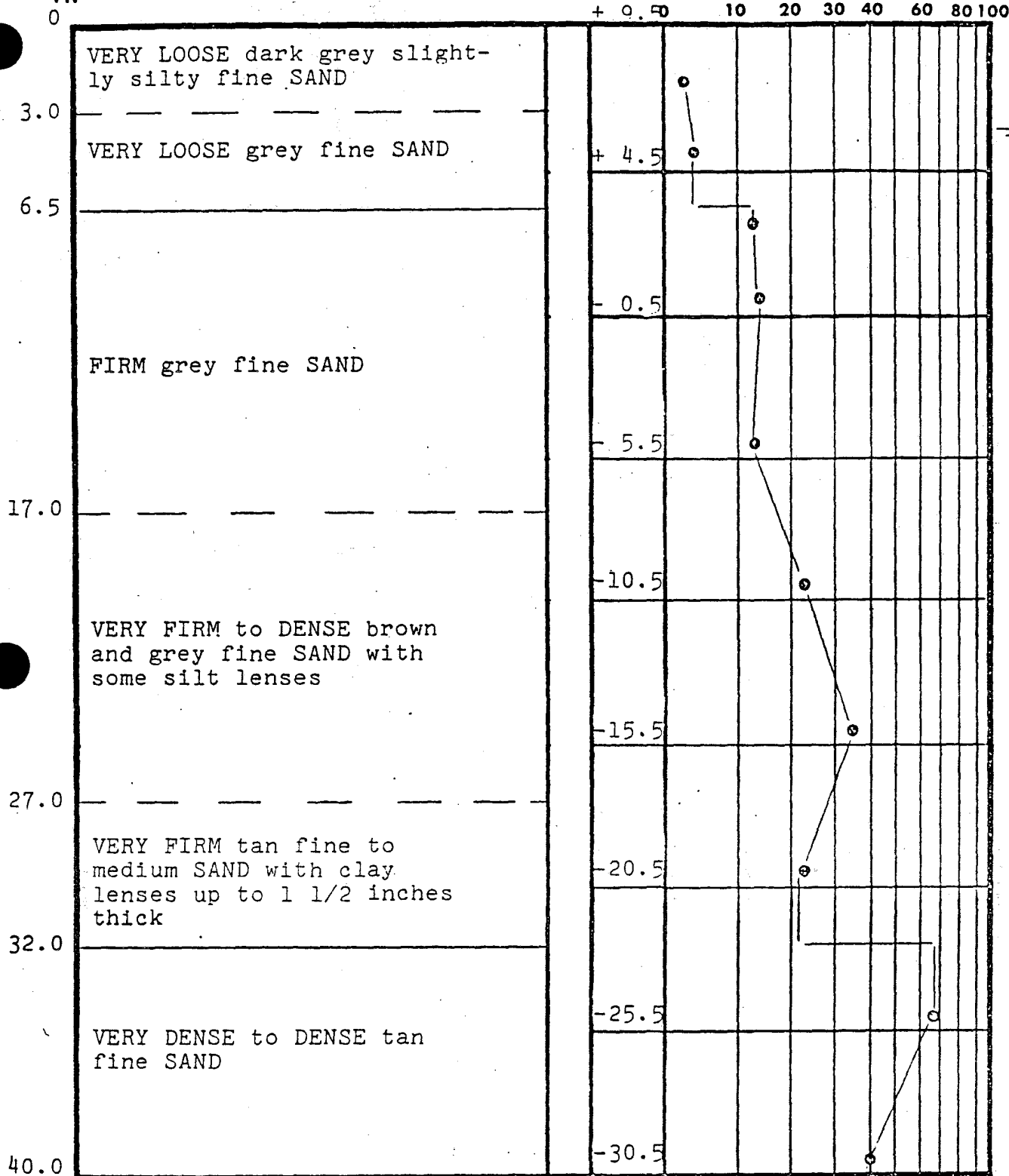
DEPTH
FT.

DESCRIPTION

ELEV

• PENETRATION-BLOWS PER FT.

+ 0.50 10 20 30 40 60 80 100



TEST BORING RECORD

Page 1 of 2 Pages

BORING AND SAMPLING MEETS ASTM D-1586
CORE DRILLING MEETS ASTM D-2113PENETRATION IS THE NUMBER OF BLOWS OF 140 LB. HAMMER
FALLING 30 IN. REQUIRED TO DRIVE 1.4 IN. I.D. SAMPLER 1 FT.

BORING NO. B-1

DATE DRILLED 4/28/71

JOB NO. J-1468

UNDISTURBED SAMPLE

WATER TABLE, 24 HR.

WATER TABLE, 1 HR.

50 % ROCK CORE RECOVERY

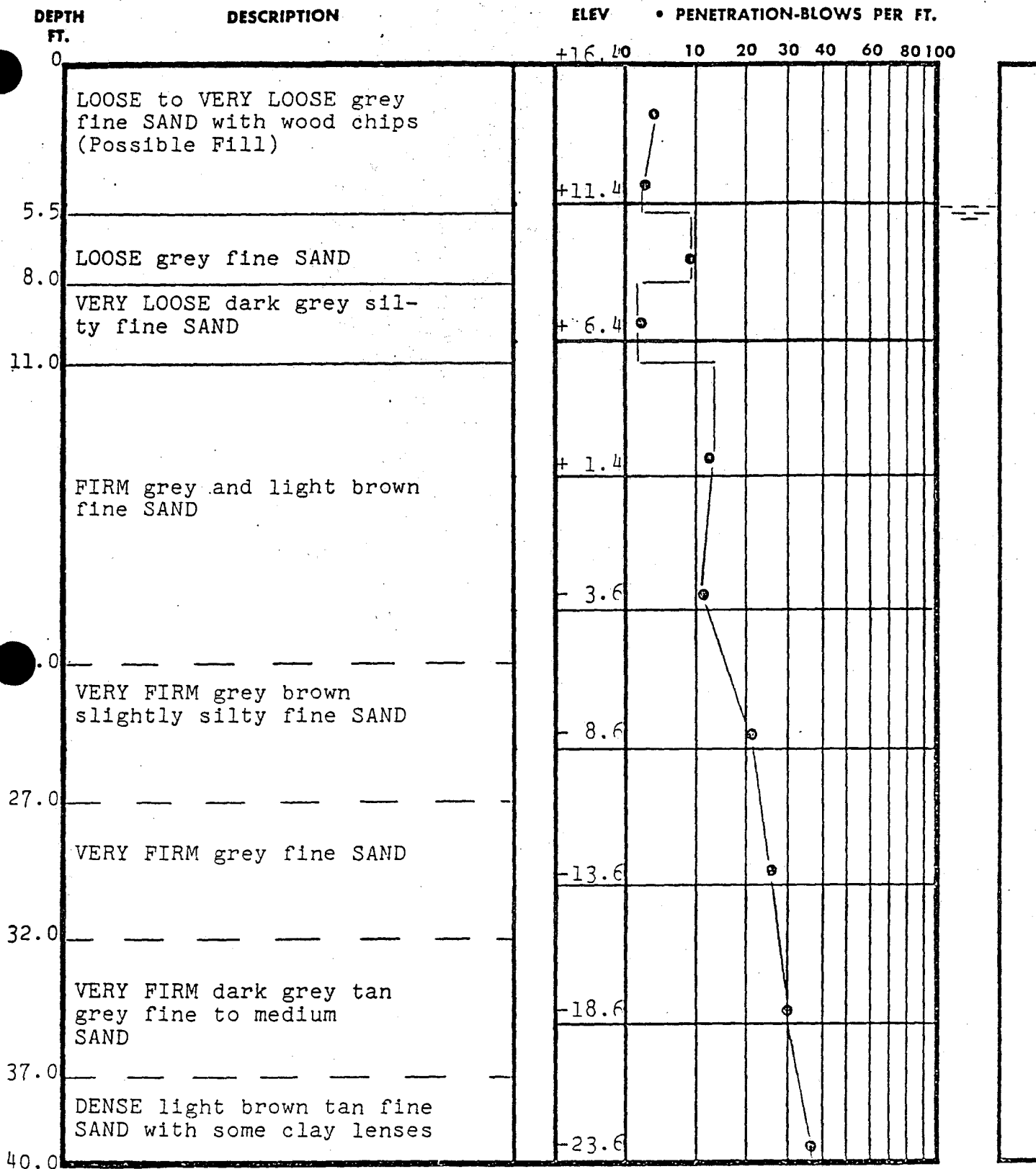
LOSS OF DRILLING WATER

DEPTH FT.	DESCRIPTION	ELEV	* PENETRATION-BLOWS PER FT.
40.0	VERY DENSE to DENSE tan fine SAND	-30.50	10 20 30 40 60 80 100
42.0	FIRM brown fine to medium SAND	-35.5	
47.0	VERY DENSE light brown fine SAND with some small clay lenses	-40.5	
50.0	BORING TERMINATED		

TEST BORING RECORD
Page 2 of 2 Pages

UNDISTURBED SAMPLE

56 ROCK CORE RECOVERY



TEST BORING RECORD

Page 1 of 2 Pages

BORING AND SAMPLING MEETS ASTM D-1586
CORE DRILLING MEETS ASTM D-2113

PENETRATION IS THE NUMBER OF BLOWS OF 140 LB. HAMMER
FALLING 30 IN. REQUIRED TO DRIVE 1.4 IN. I.D. SAMPLER 1 FT.

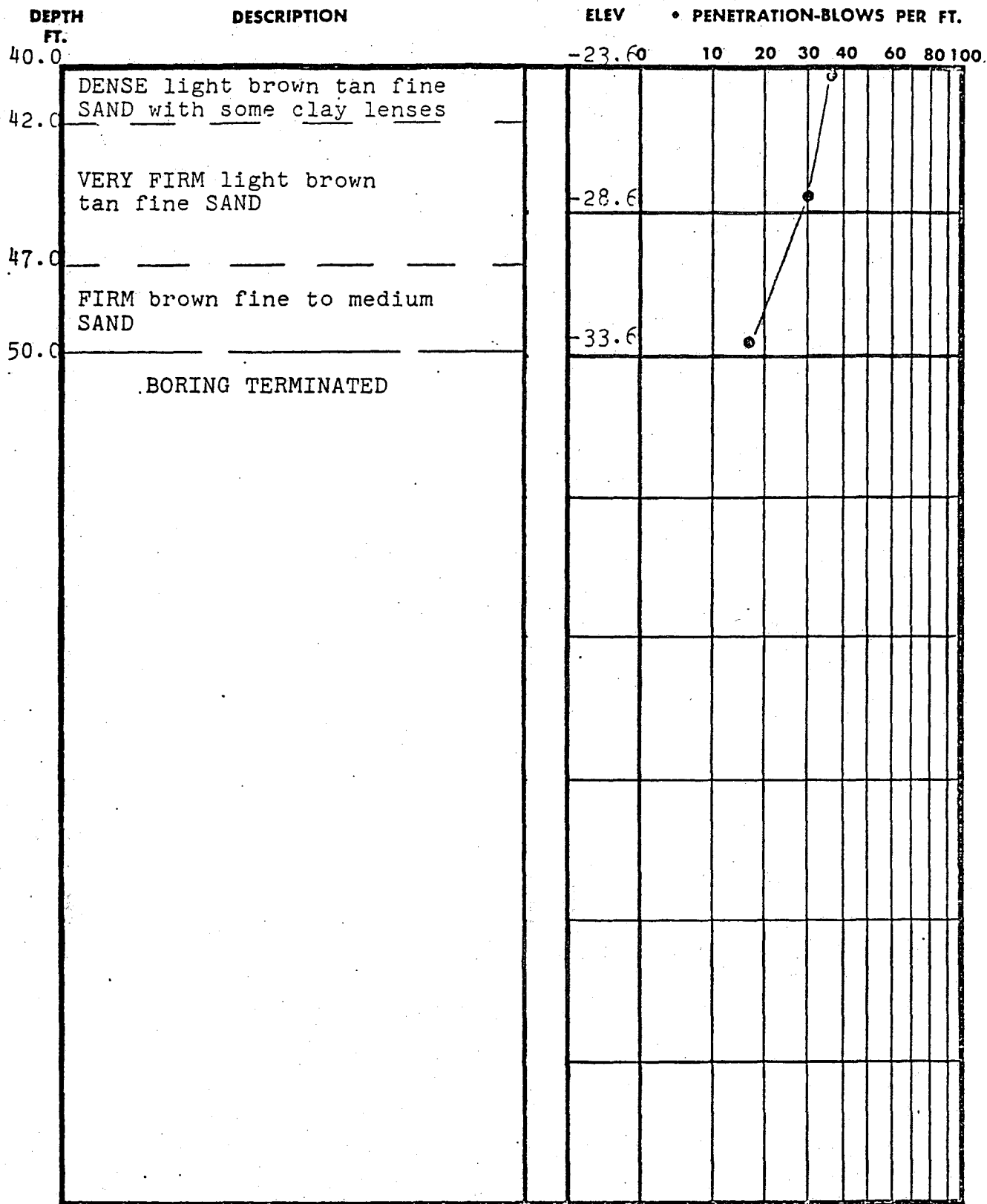
BORING NO. B-2

DATE DRILLED 4/29/71

JOB NO. J-1468

 UNDISTURBED SAMPLE

 WATER TABLE, 24 HR.
 WATER TABLE, 1 HR.



TEST BORING RECORD

Page 2 of 2 Pages

BORING AND SAMPLING MEETS ASTM D-1586
CORE DRILLING MEETS ASTM D-2113

PENETRATION IS THE NUMBER OF BLOWS OF 140 LB. HAMMER
FALLING 30 IN. REQUIRED TO DRIVE 1.4 IN. I.D. SAMPLER 1 FT.

 UNDISTURBED SAMPLE

 WATER TABLE, 24 HR.

 WATER TABLE, 1 HR.

BORING NO. B-2

DATE DRILLED 4/20/71

JOB NO. J-1468

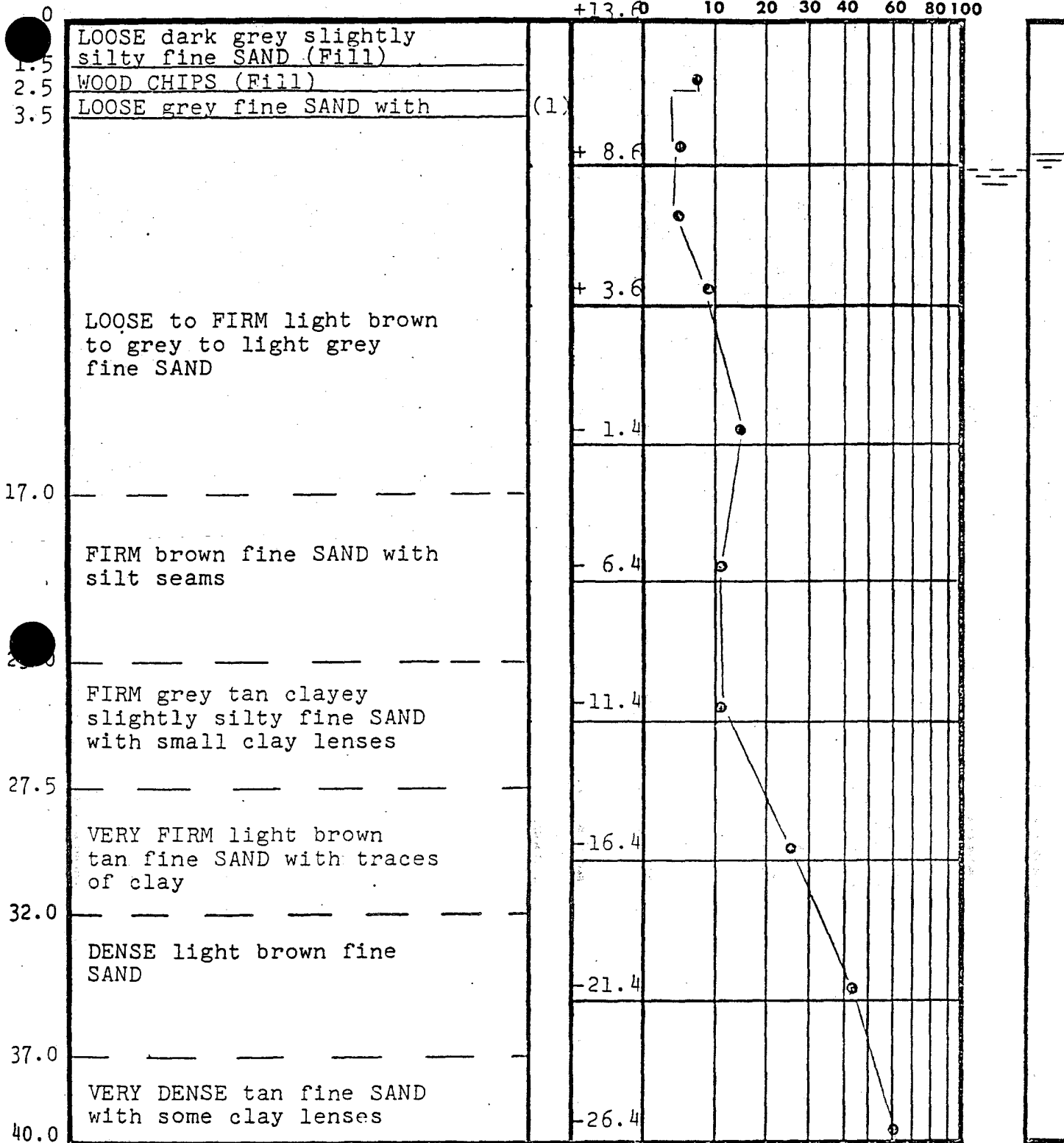
DEPTH
FT.

DESCRIPTION

ELEV

• PENETRATION-BLOWS PER FT.

+13.6 10 20 30 40 60 80 100



TEST BORING RECORD

Page 1 of 2 Pages

BORING NO. B-3

DATE DRILLED 4/28/71

JOB NO. J-1468

BORING AND SAMPLING MEETS ASTM D-1586
CORE DRILLING MEETS ASTM D-2113

PENETRATION IS THE NUMBER OF BLOWS OF 140 LB. HAMMER
FALLING 30 IN. REQUIRED TO DRIVE 1.4 IN. I.D. SAMPLER 1 FT.

UNDISTURBED SAMPLE

WATER TABLE, 24 HR.

WATER TABLE, 1 HR.

50% ROCK CORE RECOVERY

LOSS OF DRILLING WATER

DEPTH
FT.

DESCRIPTION

ELEV

• PENETRATION-BLOWS PER FT.

-26.4 10 20 30 40 60 80 100

40.0

VERY DENSE tan fine SAND
with some clay lenses

42.0

DENSE to VERY DENSE light
brown and brown fine
SAND

-31.4

50.0

BORING TERMINATED

-36.4

(1) wood chips (Possible Fill)

TEST BORING RECORD

Page 2 of 2 Pages

BORING AND SAMPLING MEETS ASTM D-1586
CORE DRILLING MEETS ASTM D-2113

PENETRATION IS THE NUMBER OF BLOWS OF 140 LB. HAMMER
FALLING 30 IN. REQUIRED TO DRIVE 1.4 IN. I.D. SAMPLER 1 FT.

UNDISTURBED SAMPLE

WATER TABLE, 24 HR.

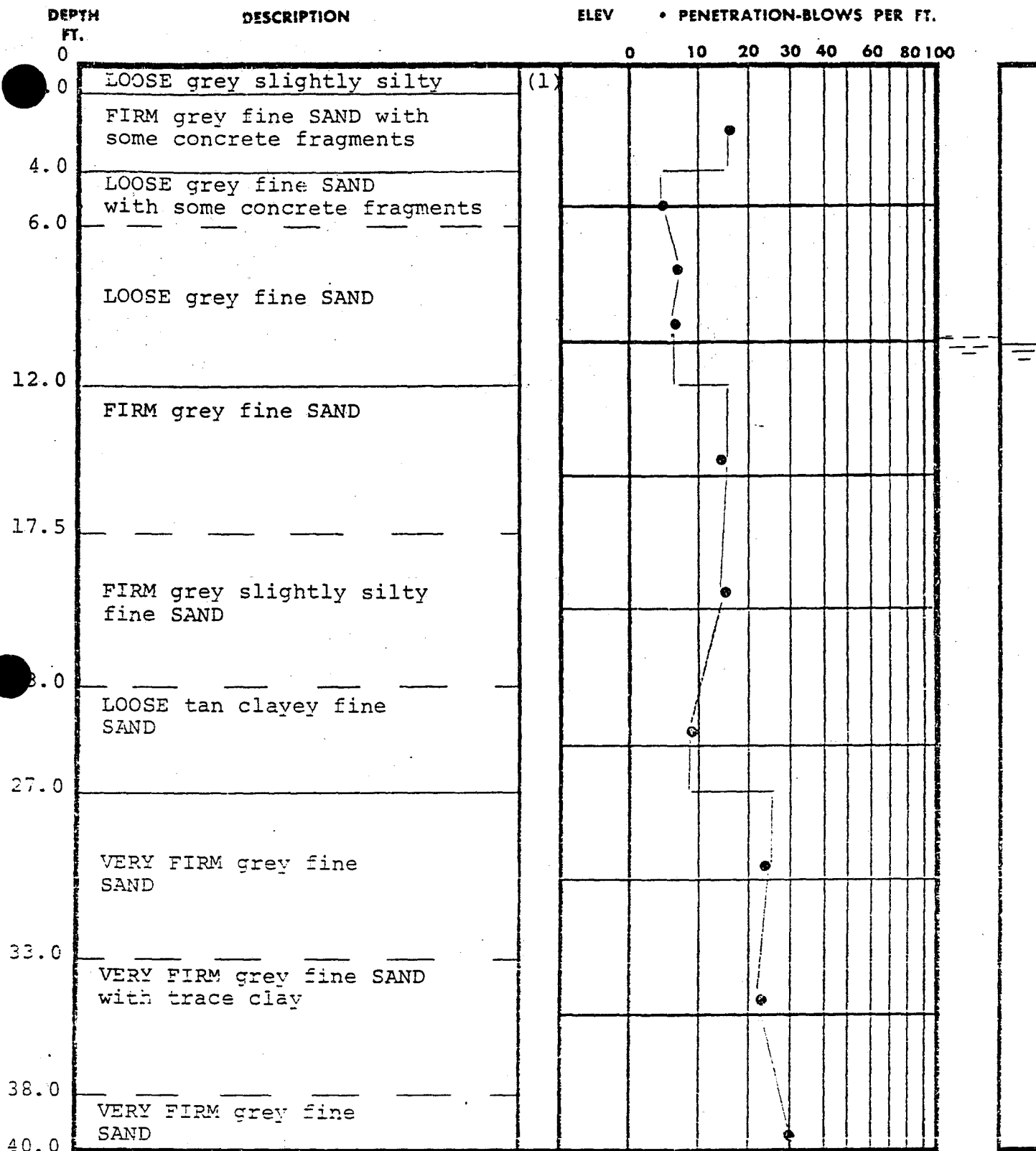
WATER TABLE, 1 HR.

50% ROCK CORE RECOVERY

BORING NO. B-3

DATE DRILLED 4/28/71

JOB NO. J-1468



(1) fine SAND with concrete fragments (Fill)

TEST BORING RECORD

Page 1 of 2 Pages

BORING NO. B-1

DATE DRILLED 8/3/71

JOB NO. J-1513

BORING AND SAMPLING MEETS ASTM D-1586
CORE DRILLING MEETS ASTM D-2113

PENETRATION IS THE NUMBER OF BLOWS OF 140 LB. HAMMER
FALLING 30 IN. REQUIRED TO DRIVE 1.4 IN. I.D. SAMPLES 1 FT.

 UNDISTURBED SAMPLE

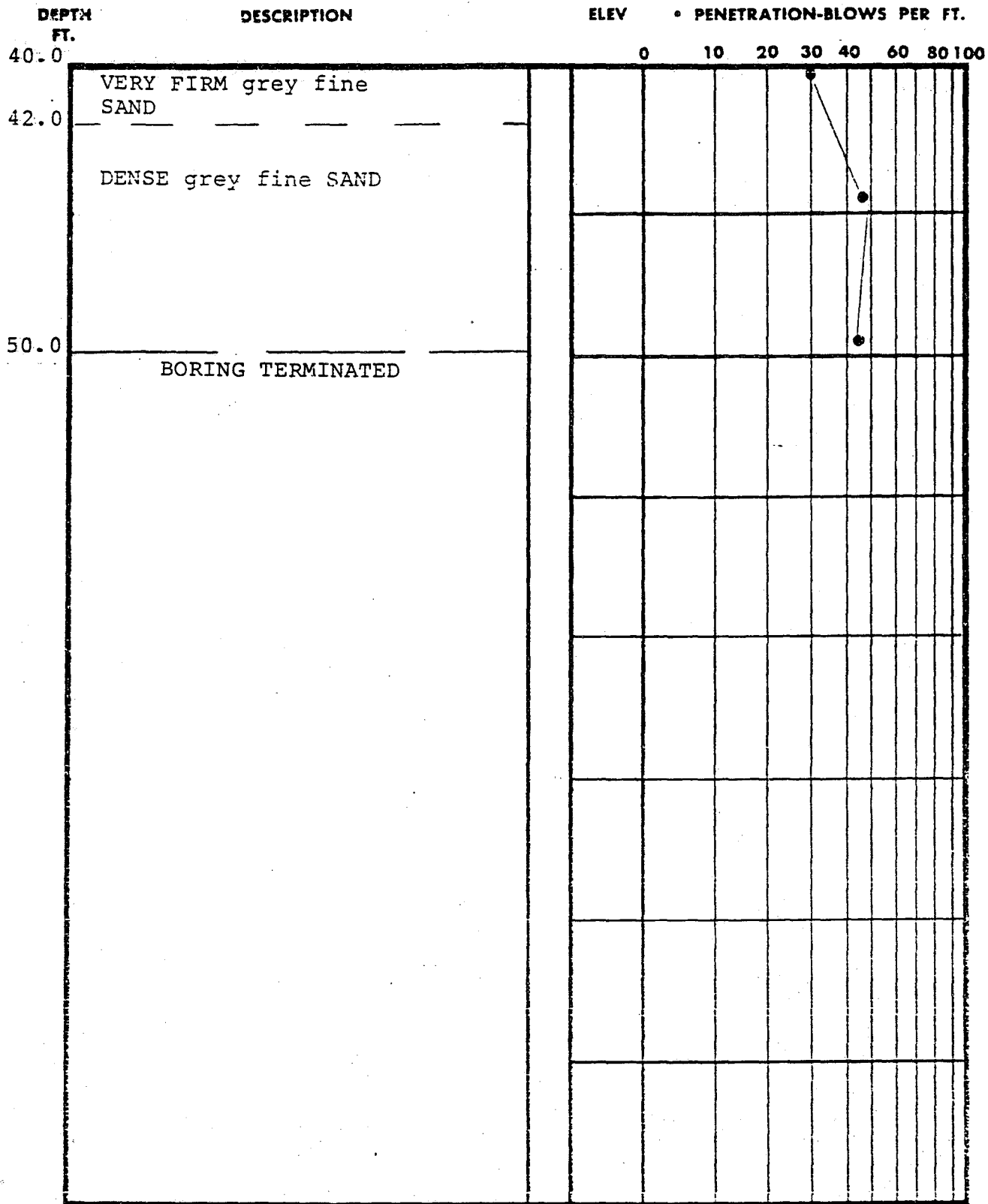
 WATER LINE, 24 HR.

 WATER TABLE, 1 HR.

 50% ROCK CORE RECOVERY

 LOSS OF DRILLING WATER

LAW ENGINEERING TESTING CO.



TEST BORING RECORD

Page 2 of 2 Pages

BORING NO. B-1

DATE DRILLED 8/3/71

JOB NO. J-1513

BORING AND SAMPLING MEETS ASTM D-1586
CORE DRILLING MEETS ASTM D-2113

PENETRATION IS THE NUMBER OF BLOWS OF 140 LB. HAMMER
FALLING 30 IN. REQUIRED TO DRIVE 1.4 IN. I.D. SAMPLER 1 FT.

 UNDISTURBED SAMPLE

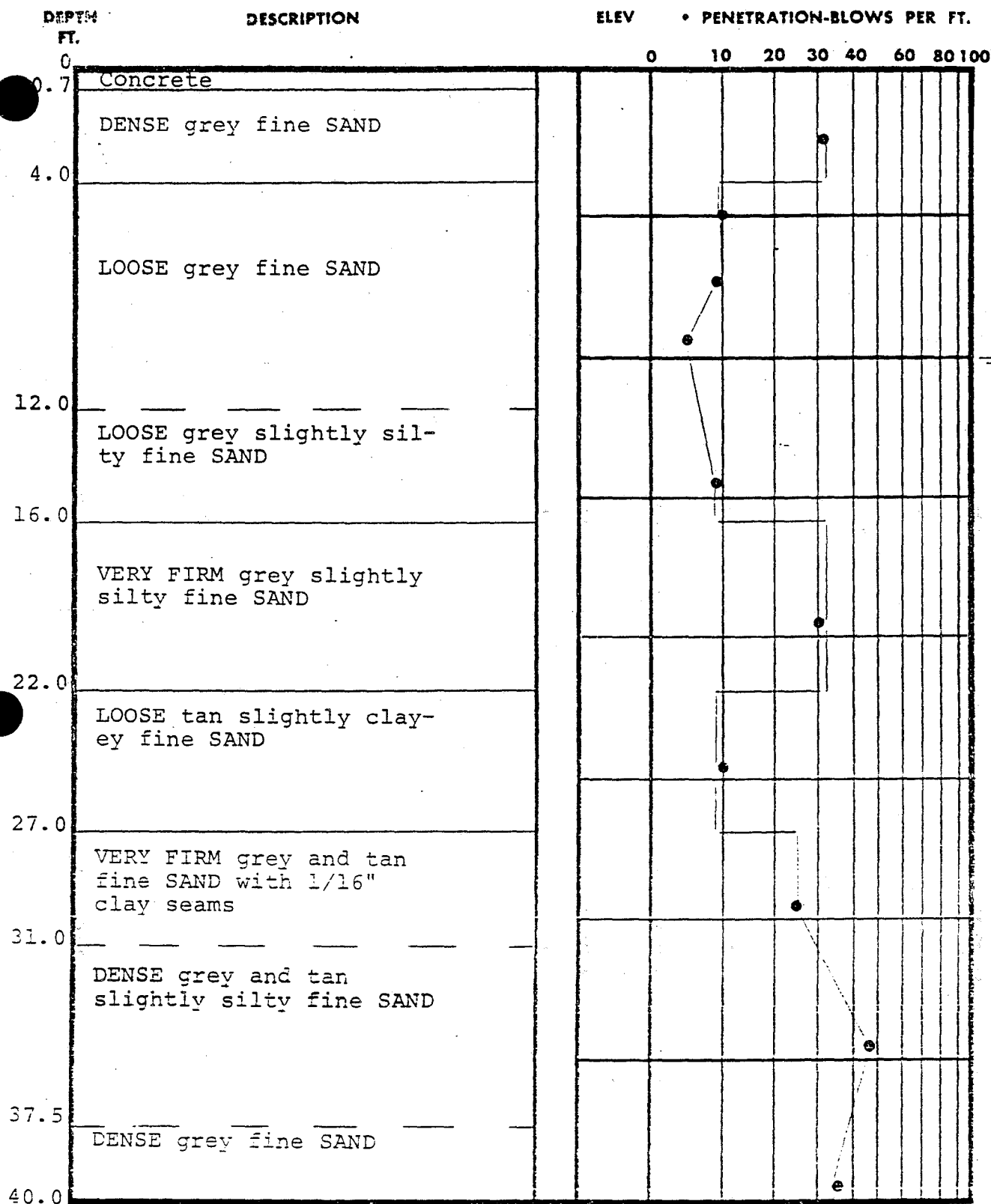
 WATER TABLE, 24 HR.

 WATER TABLE, 1 HR.

 % ROCK CORE RECOVERY

 LOSS OF DRILLING WATER

LAW ENGINEERING TESTING CO.



TEST BORING RECORD

Page 1 of 2 Pages

BORING AND SAMPLING MEETS ASTM D-1586
CORE DRILLING MEETS ASTM D-2113

PENETRATION IS THE NUMBER OF BLOWS OF 140 LB. HAMMER
FALLING 30 IN. REQUIRED TO DRIVE 1.4 IN. I.D. SAMPLER 1 FT.

BORING NO. B-2

DATE DRILLED 8/3/71

JOB NO. J-153

 UNDISTURBED SAMPLE

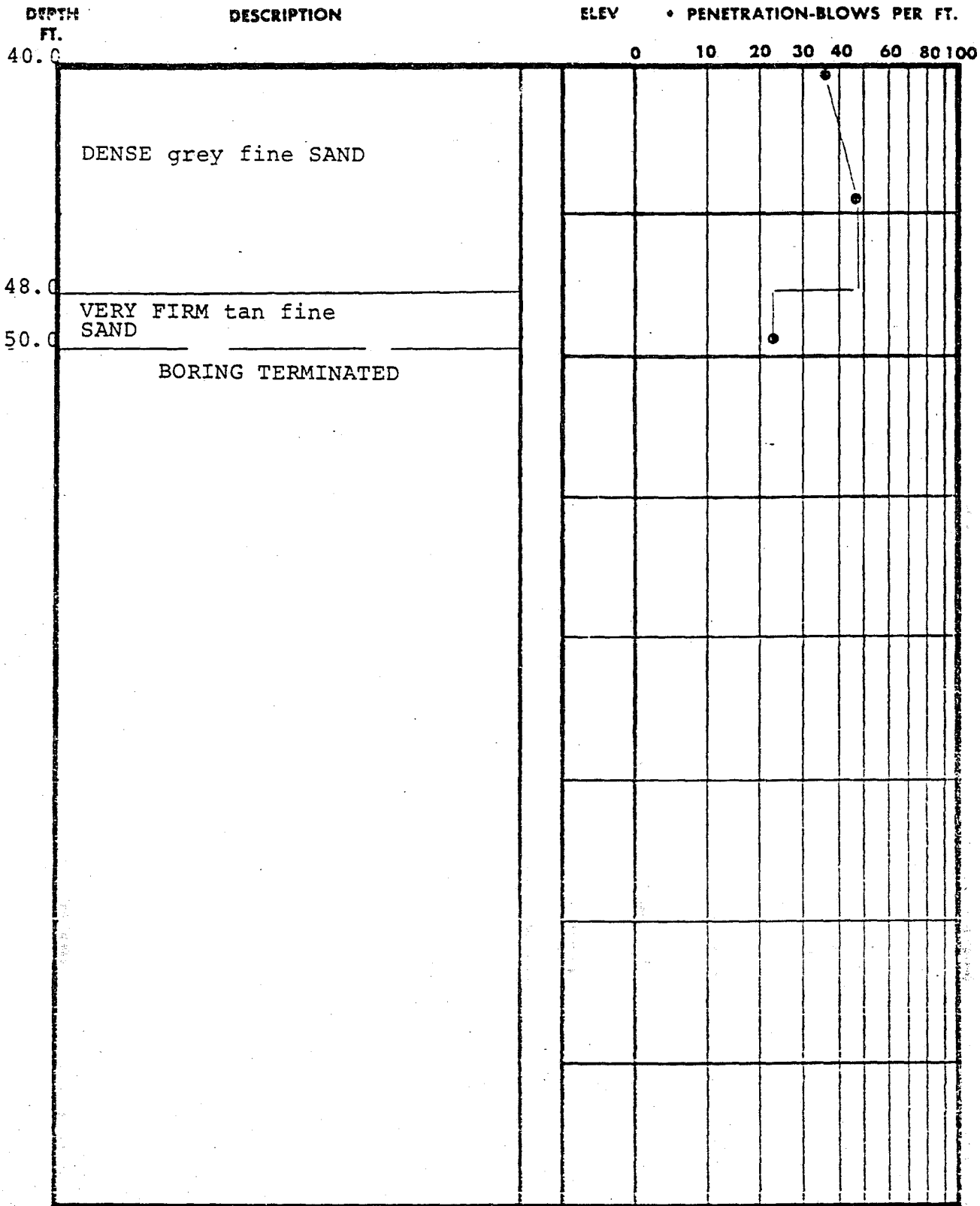
 WATER TABLE, 24 HR.

 WATER TABLE, 1 HR.

 % ROCK CORE RECOVERY

 LOSS OF DRILLING WATER

LAW ENGINEERING TESTING CO.



TEST BORING RECORD

Page 2 of 2 Pages

BORING AND SAMPLING MEETS ASTM D-1586
CORE DRILLING MEETS ASTM D-2113

PENETRATION IS THE NUMBER OF BLOWS OF 140 LB. HAMMER
FALLING 30 IN. REQUIRED TO DRIVE 1.4 IN. I.D. SAMPLER 1 FT.

BORING NO. B-2

DATE DRILLED 8/3/71

JOB NO. J-1513

 UNDISTURBED SAMPLE

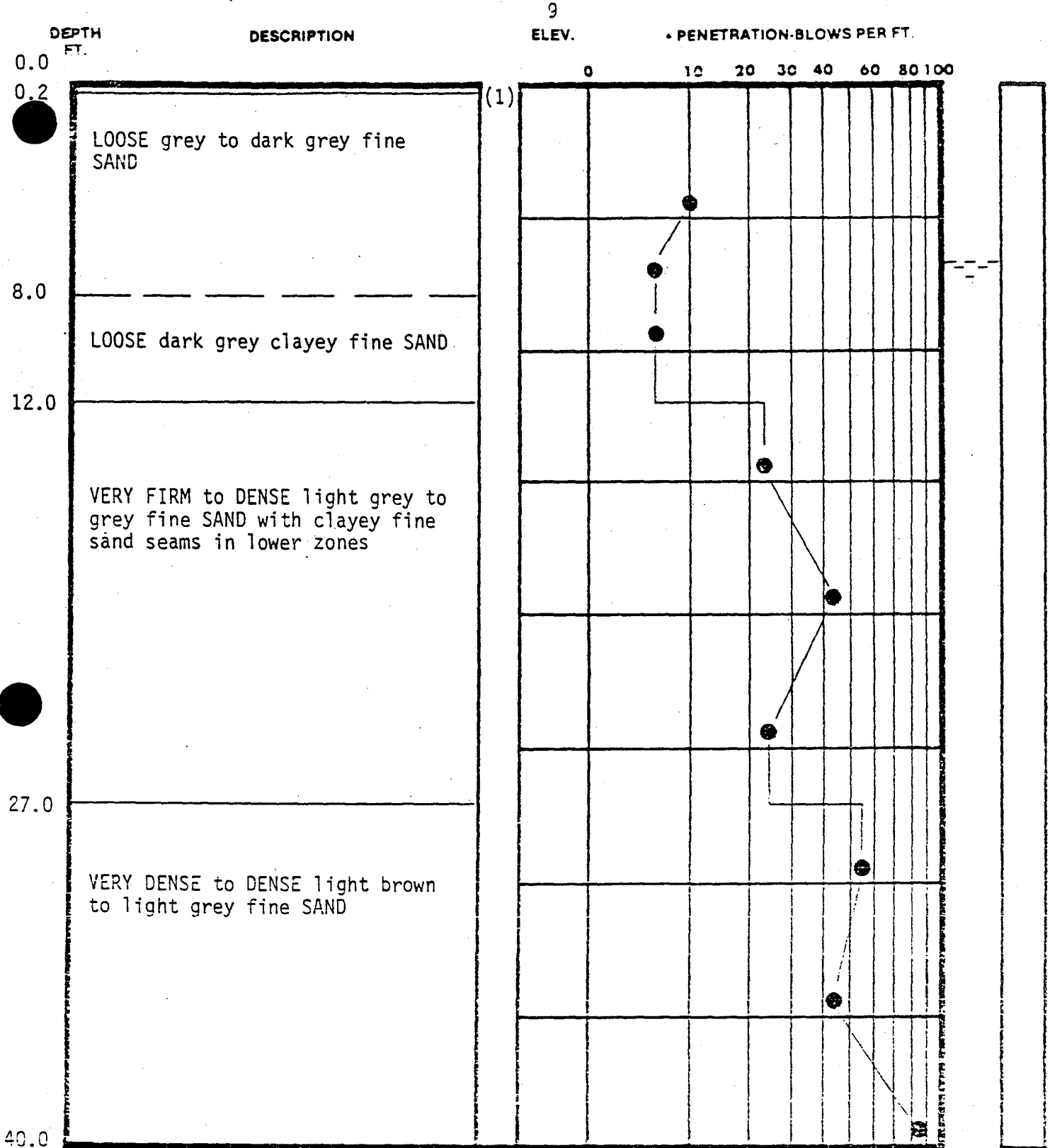
 WATER TABLE, 24 HR.

 WATER TABLE, 1 HR.

 100% ROCK CORE RECOVERY

 LOSS OF DRILLING WATER

LAW ENGINEERING TESTING CO.



(1) ASPHALT PAVEMENT

TEST BORING RECORD

BORING AND SAMPLING MEETS ASTM D-1586
CORE DRILLING MEETS ASTM D-2113

PENETRATION IS THE NUMBER OF BLOWS OF 140 LB. HAMMER
FALLING 30 IN. REQUIRED TO DRIVE 1.4 IN. I.D. SAMPLER 1 FT.

 UNDISTURBED SAMPLE

 WATER TABLE, 24 HR.

 WATER TABLE AT TIME OF DRILLING

 % ROCK CORE RECOVERY

 LOSS OF DRILLING WATER

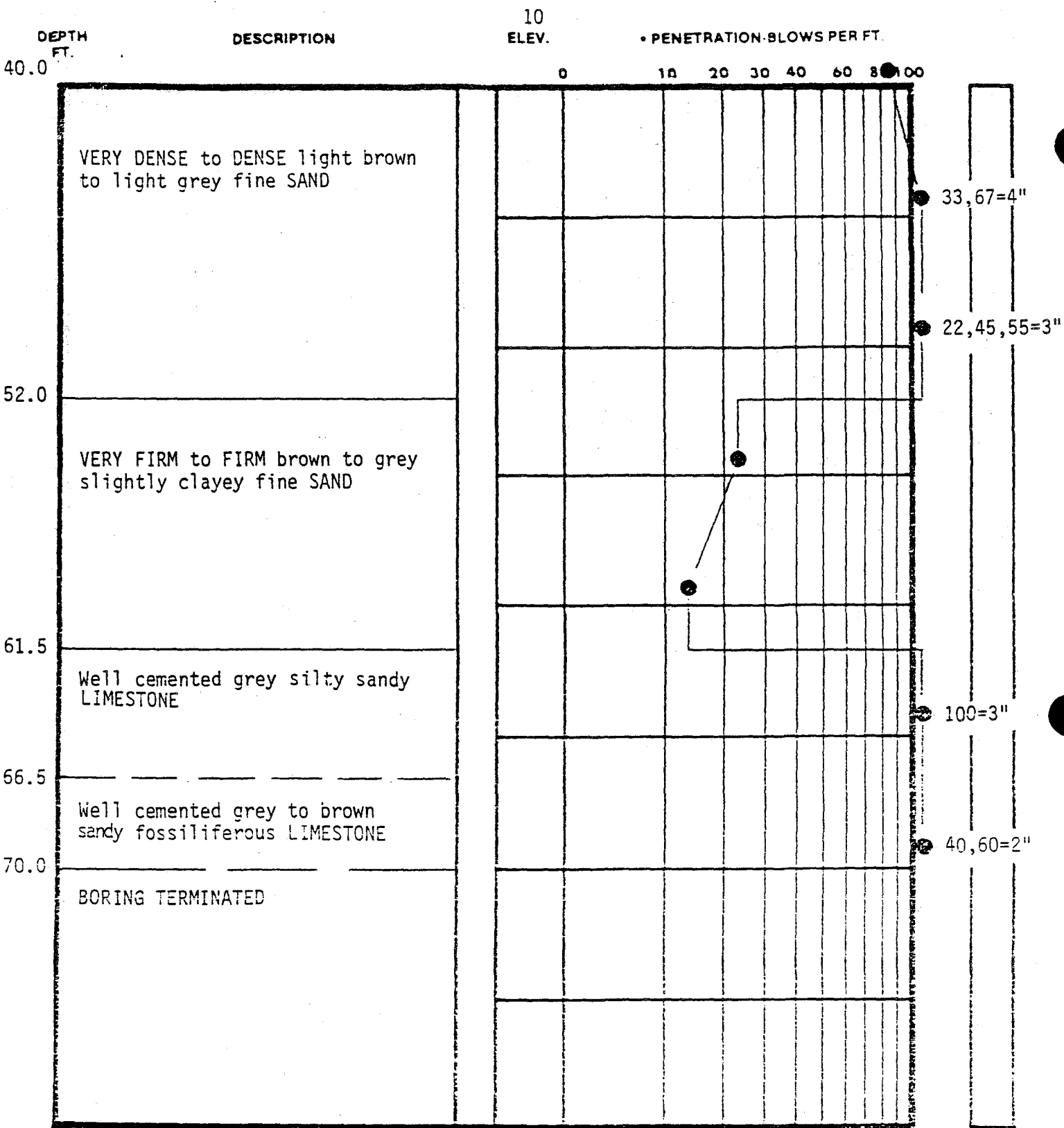
BORING NO. B-1

DATE DRILLED 12-18-84

JOB NO. J-4570

Page 1 of 2

LAW ENGINEERING TESTING CO.



TEST BORING RECORD

BORING AND SAMPLING MEETS ASTM D-1586
CORE DRILLING MEETS ASTM D-2113

PENETRATION IS THE NUMBER OF BLOWS OF 140 LB. HAMMER
FALLING 30 IN. REQUIRED TO DRIVE 1.4 IN. I.D. SAMPLER 1 FT.

UNDISTURBED SAMPLE



WATER TABLE, 24 HR.

WATER TABLE AT TIME OF DRILLING

% ROCK CORE RECOVERY



LOSS OF DRILLING WATER

BORING NO. B-1

DATE DRILLED 12-16-84

JOB NO. J-4570

Page 2 of 2

LAW ENGINEERING TESTING CO.

12901.01/SAPTOC.AES/BAI/083088

APPENDIX B

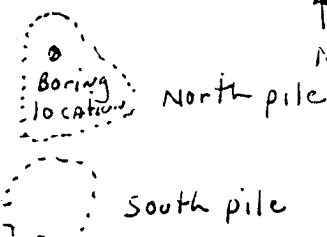
DRILLING LOGS OF SPOIL PILES

Environmental Resources Management

Drilling Log

Project AES Owner NA
 Location North Lime Pile W.O. Number 12902-01
 Well Number NA Total Depth 26' Diameter NA
 Surface Elevation NA Water Level: Initial 23' 24-hrs. NA
 Screen: Dia. NA Length NA Slot Size NA
 Casing: Dia. NA Length NA Type NA
 Drilling Company ATEC Drilling Method Hollow Stem
 Driller LARRY GARRISON Log By MARK HAMPTON Date Drilled 7/6/88

Sketch Map



Notes

Depth (Feet)	Graphic Log	Well Construction	Sample Number	Description/Soil Classification (Color, Texture, Structures)
1				0-2' light gray lime mud, dry (24" recovery)
2				2-4' light gray to green gray lime mud, dry, (24" recovery)
3				
4				4-6' light gray lime mud, dry (24" recovery)
5				6-8' light gray lime mud, moist (24" recovery)
6				8-10' light gray to green and gray to light brown lime mud, moist, contact with green mud at about 9', contact with light brown mud at 9.5' (24" recovery)
7				
8				
9				
10				10-12' light gray lime mud, moist, (24" recovery)
11				12-14' as above (24" recovery)
12				14-16' as above (24" recovery)
13				16-18' light gray lime mud, white lense at 17' moist, soft (24" recovery)
14				
15				18-20' light gray lime mud to 19', Brown fine sand beginning 19', moist (24" recovery)
16				
17				20-22' TAN fine sand, dense, moist
18				22-24' light Brown fine sand, saturated, dense
19				24-26' TAN fine sand, saturated, dense
20				
21				
22				
23				
24				
25				
26				

Environmental Resources Management

Drilling Log

Project AES Owner NA
 Location South Line Pile W.O. Number 12902-01
 Well Number NA Total Depth 16' Diameter NA
 Surface Elevation NA Water Level: Initial 10' 24-hrs. NA
 Screen: Dia. NA Length NA Slot Size NA
 Casing: Dia. NA Length NA Type NA
 Drilling Company ATEC Drilling Method Hollow stem
 Driller LARRY GARRISON Log By MARK HAMPTON Date Drilled 7/6/88

Sketch Map

Notes

Depth (Feet)	Graphic Log	Well Construction	Sample Number	Description/Soil Classification (Color, Texture, Structures)
0				0-2' medium gray lime mud, dry (14" recovery)
1				2-4' gray lime mud to 2.5', Black mud with gray stringers, soft, saturated (24" recovery)
2				4-6' As above with white to light gray lenses, white lense (2") at 5', saturated, soft (8" recovery)
3				6-8' wood chips from 6' to 7', rods dropped from 7' to 8', possible void (12" recovery)
4				8-10' DARK BROWN sand, saturated, (8" recovery)
5				10'-12' BROWN sand, clean, saturated (6" recovery)
6				12'-14' BROWN sand, saturated
7				14'-16' BROWN to gray sand, saturated
8				
9				
10				
11				
12				
13				
14				
15				
16	EOB			

10.11 GROUND WATER QUALITY DATA

10-79

Amendment 3
101089

GROUND-WATER MONITORING PLAN

JACKSONVILLE KRAFT PAPER
COMPANY MILL

FOR

ST. REGIS CORPORATION

JULY 1983

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1.0 Objectives	1
2.0 Site Description	2
3.0 Hydrogeologic Data	7
4.0 Data Analysis	15
5.0 Findings	20
6.0 Monitoring Plan	22

APPENDIX

LIST OF FIGURES

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2	Waste Sites and Water Supply Wells	4
3	Generalized Hydrogeologic Column of Surficial Aquifer	8
4	Ground-Water Monitoring Well Locations	10
5	Ground-Water Contours	16
6	Conceptual View of Ground-Water Flow Lines	17

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1	Current NPDES Permit	6
2	Summary of 1972 - 1975 Periodic Monitoring	11
3	Summary of 1972 - 1975 Laboratory Results	13
4	Results of 1983 Monitoring Program	14

1.0 OBJECTIVES

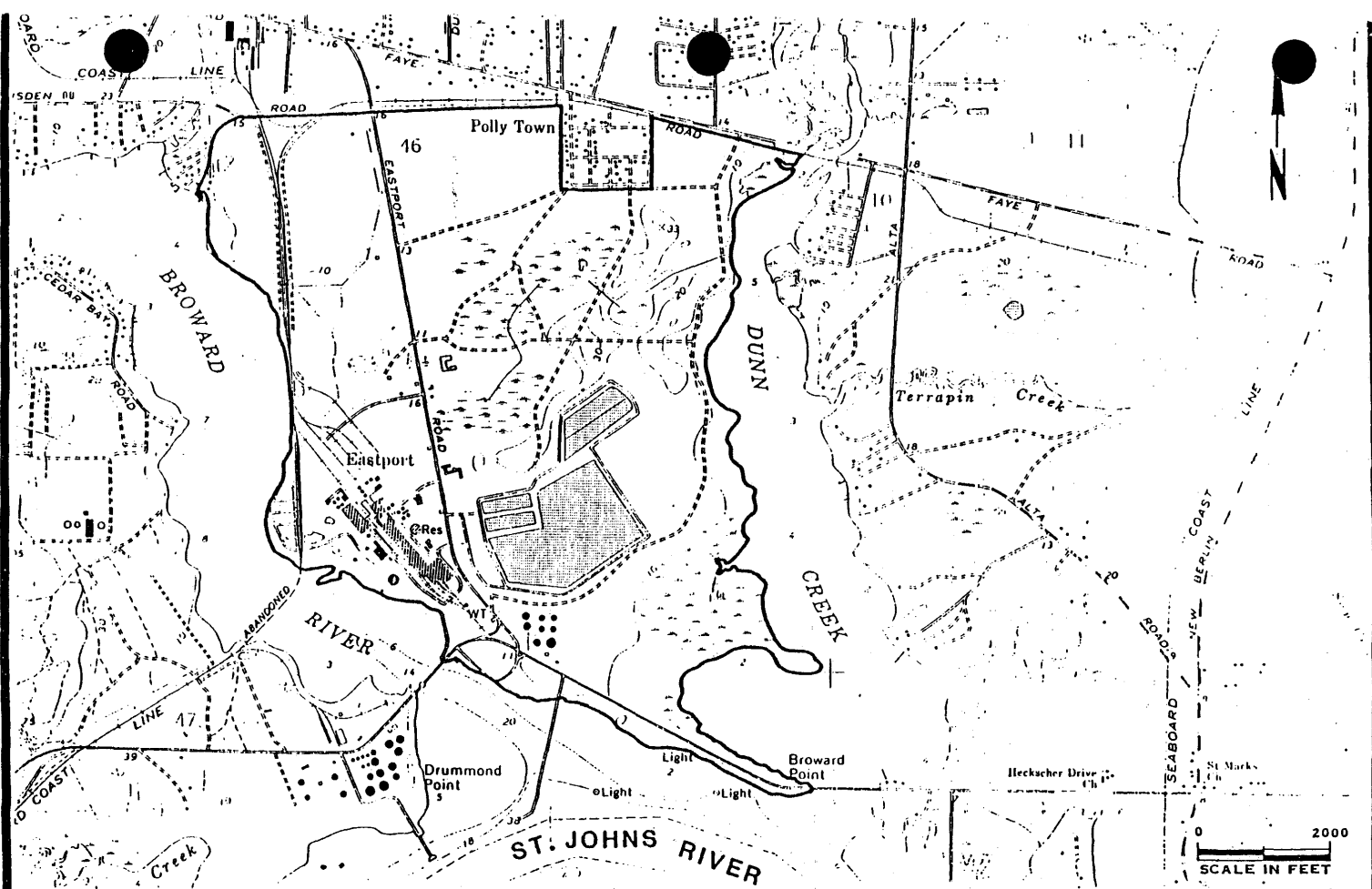
Chapter 17-4.245(6)(B)E, FAC, requires existing pulp and paper facilities to submit a ground-water monitoring plan by August 1983. The following report, which describes the Mill and its waste facilities and analyzes the effects of the waste facilities on the contiguous ground and surface water, is submitted as the Jacksonville Kraft Paper Company's ground-water monitoring plan.

2.0 SITE DESCRIPTION

The Jacksonville Kraft Paper Company, Inc. Mill (formerly the St. Regis Corporation Mill) is located on the St. Johns River in north Jacksonville, Florida. The property, shown in Figure 1, is bounded on the north by Kraft Road, Eastport Gardens, Roberts Subdivision, and Faye Road; on the east by Dunn Creek; on the south by the St. Johns River; and on the west by the Broward River.

The plant complex consists of the mill site, several natural ponds, a waste treatment pond and several disposal areas as shown in Figure 2. The Mill was constructed in two phases, the first phase was completed in about 1953 and the second phase was completed in about 1956. In 1972 the Mill installed facilities to treat the wastewater stream prior to discharge into the St. Johns River.

The waste sites on the Mill property, as shown in Figure 2, include lime recovery ponds, an aeration basin, sludge drying beds and a solid waste disposal area. The wastewaters from the production processes are first given primary treatment to remove solids. The process wastewater passes through a bar screen, grit chamber and then a clarifier before final treatment in the aeration basin. The wastewater from the causticizing area is first discharged to the lime recovery ponds where the water is decanted. From the lime ponds it is discharged to the aeration basin. The aeration basin provides additional sedimentation and biotreatment prior to discharge to the St. Johns River. The



GROUNDWATER PERMITTING STUDY
FOR
ST. REGIS CORPORATION



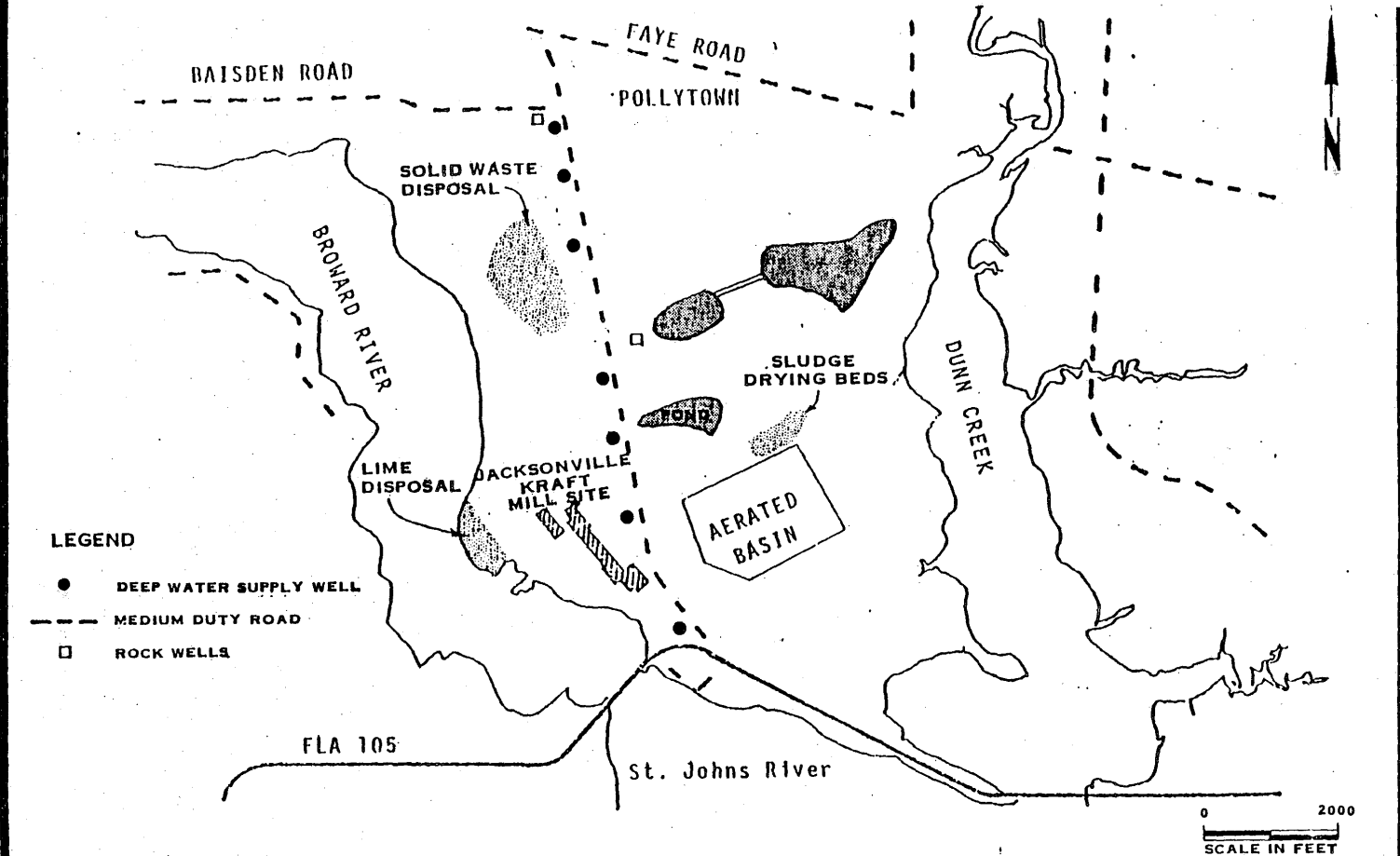
LAW ENGINEERING TESTING COMPANY

MARIETTA, GEORGIA

SITE LOCATION MAP

JOB NO. NR3297

FIGURE 1



GROUNDWATER PERMITTING STUDY
FOR
ST. REGIS CORPORATION



LAW ENGINEERING TESTING COMPANY

MARIETTA, GEORGIA

WASTE SITES AND WATER
SUPPLY WELLS

JOB NO. NR3297

FIGURE 2

current NPDES permit (Table 1) authorizes the Jacksonville Kraft Paper Company Mill to continuously discharge daily averages of Total Suspended Solids (TSS) and BOD₅ of 13,000 and 8,350 lbs/day, respectively, with daily maximum BOD₅ and TSS of 17,068 and 36,576 lbs/day, respectively.

The solid waste disposal area receives about 50 - 60 tons of waste each day. The solid waste is predominantly sludge from the primary clarifiers (about 25 tons/day) and the lime recovery ponds (about 25 tons/day). In addition dried sludge from the aeration pond, trash (wood, paper, etc.) from the plant (about 1 ton/day), and waste (primarily sand) from the ash silo (about 10 tons/day) are taken to the disposal area. This solid waste is either inert or has similar chemical characteristics as the effluent from the aeration basin. Since the disposal area does not intersect the water table, any leachate is due to rainwater and sludge dewatering during drying.

The only known water supply wells in the vicinity of the waste sites are located on Jacksonville Kraft Paper Company Mill property. These wells include 7 deep (approximately 1400 feet) wells to provide process water to the mill and two approximately 80 feet deep rock wells which supply water to St. Regis Woodlands Garage and to the surrounding facilities. The locations of the water supply wells are shown in Figure 2.

2. During the period beginning on the effective date and lasting through March 31, 1981, the permittee is authorized to discharge from outfall(s) serial number(s) 001 - process wastewater.

Such discharges shall be limited and monitored by the permittee as specified below:

<u>Effluent Characteristic</u>	<u>Discharge Limitations</u>		<u>Monitoring Requirements</u>	
	kg/day (lbs/day)		<u>Measurement Frequency</u>	<u>Sample Type</u>
	<u>Daily Average</u>	<u>Daily Maximum</u>		
Flow—m ³ /Day (MGD)				Continuous
BOD ₅	3788 (8350)	7742 (17068)	Daily	Composite
Total Suspended Solids	5897 (13,000)	16,591 (36,576)	Daily	Composite

The pH shall not be less than 6.0 standard units nor greater than 9.0 standard units and shall be monitored by continuous recorder.

There shall be no discharge of floating solids or visible foam in other than trace amounts.

Samples taken in compliance with the monitoring requirements specified above shall be taken at the following location(s):

at the nearest accessible point after final treatment but prior to actual discharge or mixing with the receiving waters.

PART I
Page 2 of 9
Permit No. FL0000040C

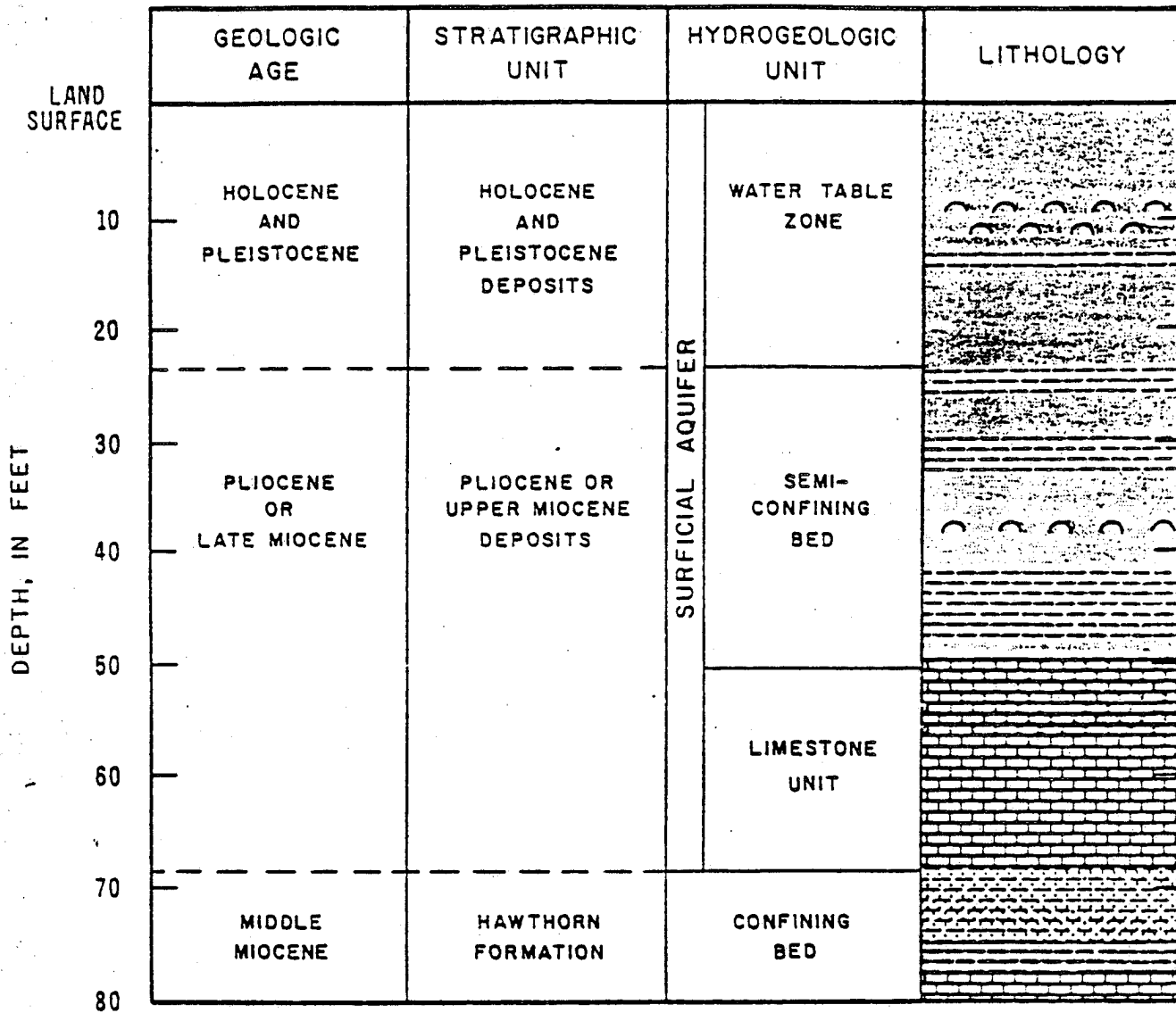
3.0 HYDROGEOLOGIC DATA

The topography of the property is gently rolling and the surface elevation varies from about +7 msl to +38 msl. The upper land form is probably associated with old beach and dune structures. Previous investigations indicate that sands and clayey sands are encountered to a depth of about 55' and are underlain by soft limestone and then by calcareous silts and marls.

Examination of soil samples during Law Engineering's 1972 study showed that there is about a foot of sandy topsoil lying on 8 to 12 feet of very loose to loose fine sands which do not contain significant fines. Penetration resistance of two to six blows per foot is typical of this material. A firm to very firm sand (greater than 10 blows per foot) layer is found beneath the loose sands to a depth of about 30 feet. The sands below 30 feet are dense to very dense and contain some clayey sand lenses. A test boring record from a 1970 study by Law Engineering is included in the appendix to illustrate typical soil conditions. This boring was made in the vicinity of the aeration basin dike.

The USGS¹ reports that the local surficial aquifer is divided into three zones as shown in Figure 3. The water table zone occurs in the upper part of the aquifer where water is in an unconfined condition. Below the water table is a discontinuous semi-confining zone of sediments with lower permeability which

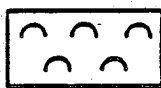
¹ Spechler, R. M. and Stone, R. B., "Appraisal of the Inter-connection Between the St. Johns River and the Surficial Aquifer, East-Central Duval County, Florida", USGS Water Resources Investigation Report 82-4109, 1983.



EXPLANATION



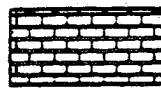
SAND



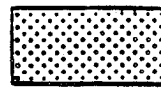
SHELL



CLAY



LIMESTONE



PHOSPHATE

FIGURE OBTAINED FROM THE FOLLOWING U.S.G.S. PUBLICATION: SPECHLER, R. M. AND STONE, R. B., APPRAISAL OF THE INTERCONNECTION BETWEEN THE ST. JOHNS RIVER AND THE SURFICIAL AQUIFER, EAST-CENTRAL DUVAL COUNTY, FLORIDA", U.S.G.S. WATER RESOURCES INVESTIGATION REPORT 82-4109, 1983.

GROUNDWATER
PERMITTING STUDY
FOR
ST. REGIS CORPORATION



LAW ENGINEERING TESTING
COMPANY

MARIETTA, GEORGIA

GENERALIZED HYDROGEOLOGIC
COLUMN OF THE SURFICIAL
AQUIFER

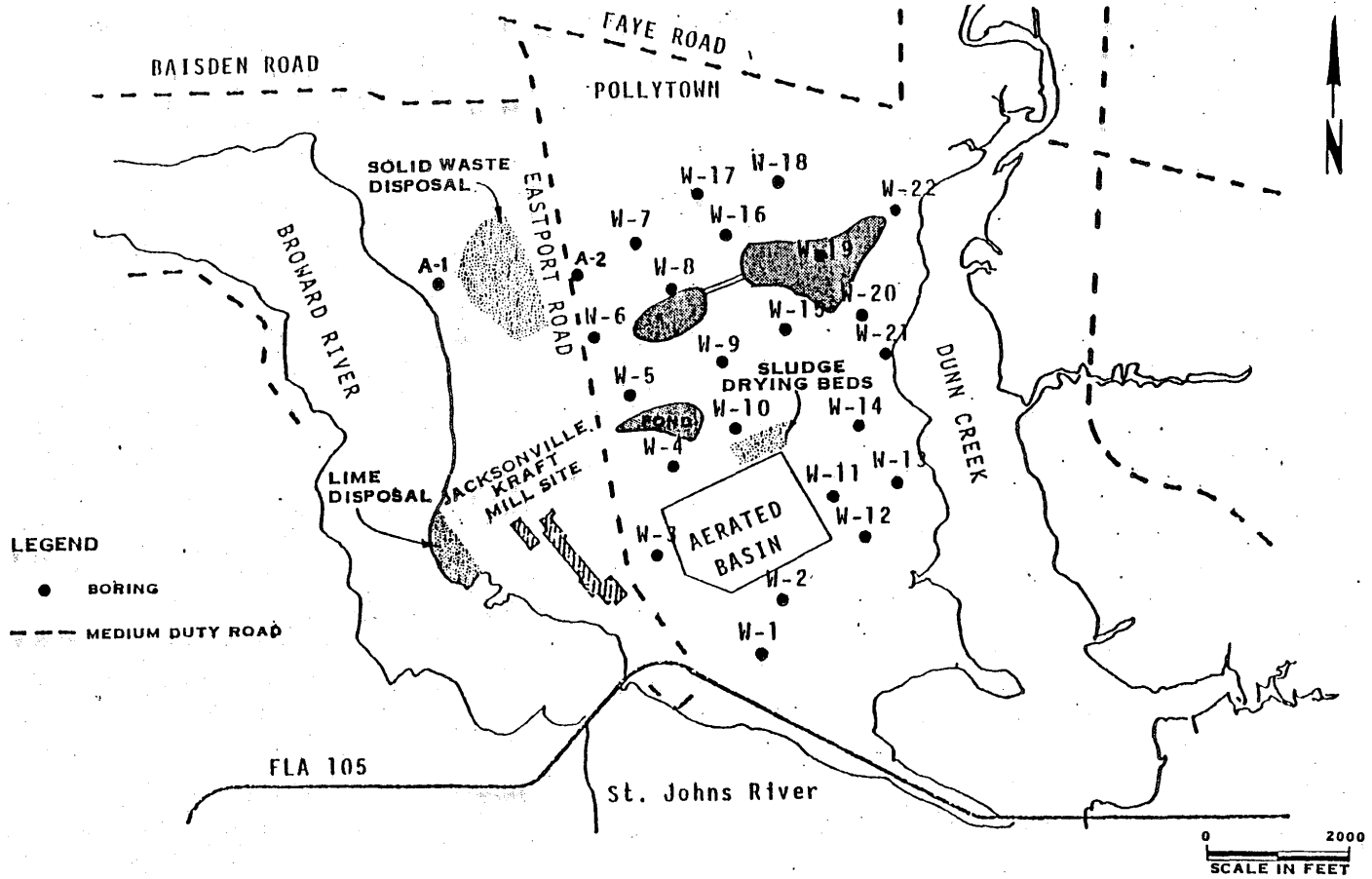
JOB NO. NR3297

FIGURE 3

partially confines water in the lowest (limestone) unit. Just below the limestone unit is the upper Hawthorne Formation which has low permeability and therefore acts as a confining bed to severely limit movement of water between the surficial aquifer and the underlying Floridian aquifer.

Law Engineering conducted a hydrogeologic study in 1972 in conjunction with the construction of the aeration basin. During this study, 22 ground-water monitoring wells in the surficial aquifer were installed to provide data to aid in estimating the effects the aeration basin would have on the ground-water conditions. The locations of these ground-water wells are shown in Figure 4. Inflow tests performed on Wells W-2, W-9, and W-18 during Law Engineering's 1972 study resulted in permeabilities of 200, 7850, and 2000 feet per year, respectively, as compared to a permeability of about 12,000 feet per year as reported in the aforementioned USGS report¹.

From July 1972 to September 1975 all the ground-water wells (except Nos. 12, 15 and 19) were periodically monitored for conductivity, pH and water level. Well Nos. 12, 15, and 19 were inadvertently destroyed during construction on the site. Well No. 1 was vandalized in 1975, Well No. 20 is partially obstructed, thus permitting only water level measurement, and Well No. 5 could not be monitored after April, 1973. The ranges of pH, conductivity and water levels observed at each well during this periodic monitoring program are shown in Table 2. In conjunction with the above in situ monitoring program, samples were collected Well Nos. 2, 9, 10 and 18 for laboratory analyses. The



GROUNDWATER PERMITTING STUDY
FOR
ST. REGIS CORPORATION



LAW ENGINEERING TESTING COMPANY

MARIETTA, GEORGIA

GROUNDWATER MONITORING
WELL LOCATIONS

JOB NO. NR3297

FIGURE 4

Table 2

Summary of 1972 - 1975 Periodic Monitoring

Ground-Water Well No.	Range of Measurements		
	Water Level (ft-msl)	Conductivity (umhos/cm)	pH
1	8.5 - 13.0	---	---
2	11.0 - 17.2	200 - 900	5.6 - 7.8
3	3.8 - 9.6	240 - 1200	5.5 - 10.1
4	12.0 - 14.9	180 - 380	6.3 - 8.6
5*	7.9 - 8.8	340 - 4000	7.1 - 8.4
6	3.3 - 13.2	150 - 1450	5.3 - 8.8
7	3.8 - 7.5	140 - 480	5.2 - 7.4
8	2.9 - 5.5	160 - 1400	5.0 - 11.8
9	4.8 - 6.7	150 - 950	9.4 - 11.5
10	22.0 - 25.6	150 - 1000	9.4 - 11.0
11	6.0 - 11.3	100 - 350	5.9 - 8.1
12	---	---	---
13	7.3 - 9.9	50 - 300	5.1 - 7.2
14	7.3 - 10.3	100 - 250	4.7 - 6.7
15	---	---	---
16	3.3 - 6.9	200 - 350	6.3 - 9.4
17	2.0 - 6.1	100 - 1300	6.7 - 11.3
18	6.8 - 11.1	50 - 180	5.7 - 8.4
19	---	---	---
20	24.3 - 27.2	100 - 1600	6.6 - 11.4
21	7.6 - 9.9	60 - 500	5.9 - 7.7
22	11.3 - 14.8	100 - 300	6.9 - 7.8

* Monitoring Period - July 1972 to April 1973

samples were typically analyzed for alkalinity, chemical and biochemical (5 day) oxygen demand, ammonia, Kjeldhal nitrogen, nitrate, total phosphorus, total solids, dissolved solids, suspended solids and sodium. Table 3 is a summary of the laboratory analyses showing the range of measured values. In general, these 1972 to 1975 data did not show any systematic change in the concentrations of the above parameters with the exception of a gradual increase in conductivity, dissolved and total solids, sodium, five day BOD and COD at well No. 2. These data can be made available upon request.

Law Engineering monitored the ground-water wells on June 27 - 28, 1983 for water level, pH and conductivity. In addition, the two shallow monitoring wells (A-1 and A-2) shown in Figure 4 were installed near the disposal site. Well No. A-1 was not deep enough to intersect the water table, therefore, only an estimate of the water table was obtained. The results of the 1983 monitoring program are shown in Table 4.

In addition to the above referenced ground-water studies, the Duval County Bio-Environmental Services Department conducted biological and water quality studies on the St. Johns River in 1980 and 1982. The study segment extended from the Atlantic Ocean upstream to a point approximately midway between the Jacksonville Naval Air Station and San Jose Estates at Buoy No. 5. The mill site is located approximately in the middle of the study segment. The results of these studies did not indicate any significant differences in the biological or water quality conditions between stations near the mill site and those upstream and downstream from the Mill.

Table 3
Summary of Laboratory Results*

<u>Water Quality Parameter</u>	<u>Well No. 2</u>	<u>Well No. 9</u>	<u>Well No. 10</u>	<u>Well No. 18</u>
Alkalinity, as CaCO ₃	15-73	9-195	18-122	7-56
Oxygen Demand, Chemical	8-368	2-24	0.5-135	2-44
Ammonia, as N	0.0-0.7	0.0-0.4	0.0-1.0	0.0-0.6
Kjeldahl Nitrogen	0.4-2.2	0.4-2.5	0.8-4.5	0.4-1.2
Nitrate, as N	0.02-3.9	0.02-1.5	0.02-0.45	0.02-1.5
Total Phosphorus, as P	0.04-2.0	0.03-1.1	0.04-0.59	0.02-2.8
Oxygen Demand, Biochemical	3-22	1-15	3-48	1-22
Total Solids	161-781	92-277	113-335	43-95
Dissolved Solids	143-720	88-255	110-270	36-76
Suspended Solids	18-39	4-47	19-140	4-51
Sodium	9-154	7-16	10-16	6-74

* Data from August 23, 1972 through December 17, 1976

Table 4

Results of 1983 Monitoring Program

<u>Well No.</u>	<u>Water Surface Elevation (ft-msl)</u>	<u>Conductivity (umhos/cm)</u>	<u>pH</u>
1	---	---	---
2	3.86	1250	6.55
3	6.80	1100	6.61
4	7.78	100	7.5
5	6.92	200	---
6	7.28	70	5.03
7	9.09	150	6.75
8	7.57	150	5.94
9	7.73	150	5.65
10	7.49	150	9.10
11	4.68	60	5.41
12	---	---	---
13	3.39	145	6.12
14	4.01	170	5.95
15	---	---	---
16	7.47	110	5.85
17	9.83	100	5.25
18	9.22	60	5.15
19	---	---	---
20	4.69	---	---
21	2.88	60	5.7
22	5.43	100	6.73
A-1	<3.5	---	---
A-2	8.91	190	---

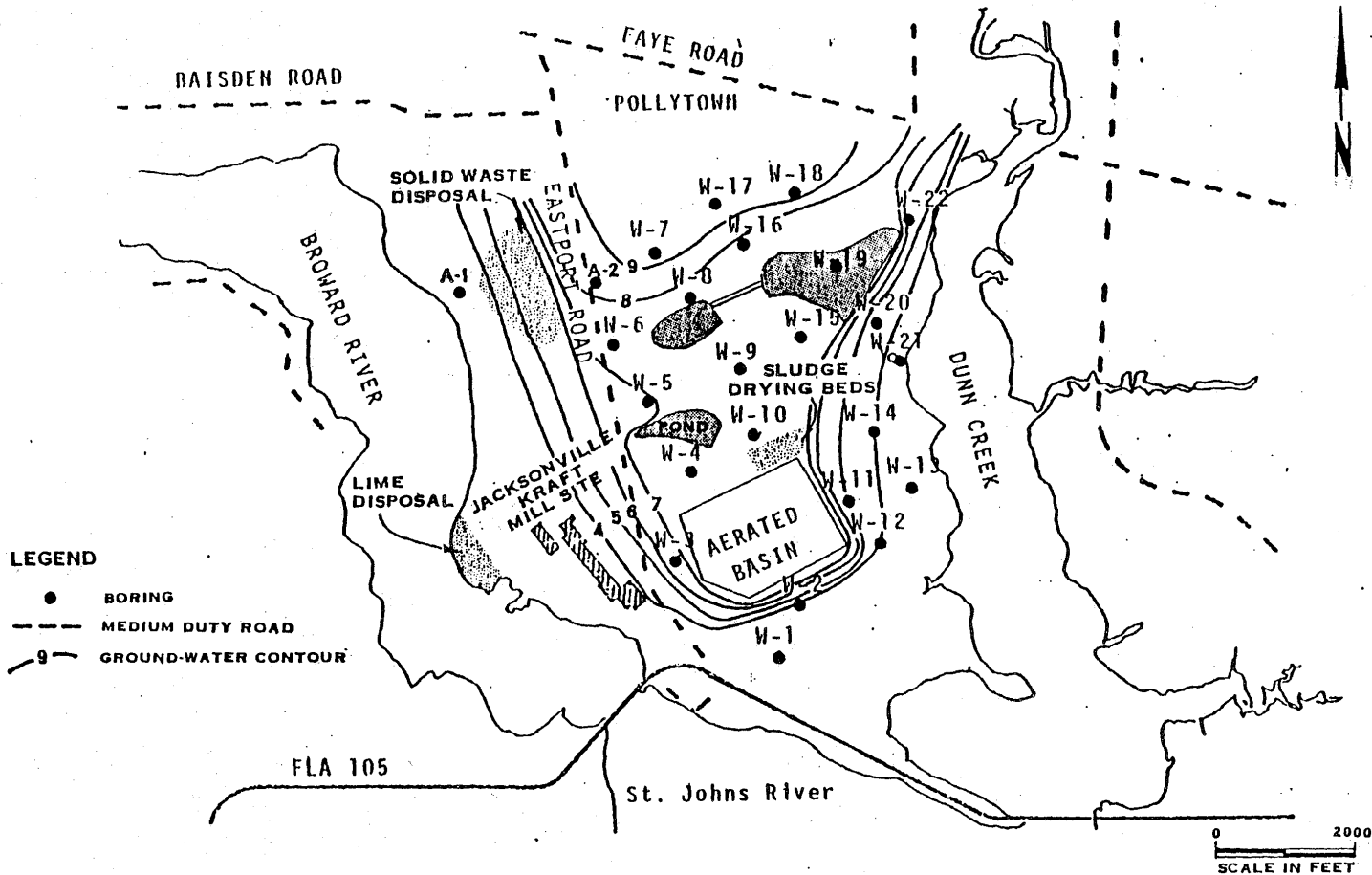
4.0 DATA ANALYSIS

The water levels observed in 1983 (Table 4) are graphically displayed in Figure 5. As expected, these ground-water contours and flow paths show that any shallow ground water on the Jacksonville Kraft Paper Company property discharges to the contiguous surface water bodies (St. Johns River, Broward River and Dunn Creek). As is shown in Figure 5, the flow beneath the solid waste disposal area travels approximately 500 feet to the Broward River, flow from the aeration basin and sludge drying beds travels approximately 2000 feet before discharging into the Broward River, St. Johns River or Dunn Creek, and any flow from the lime recovery ponds travels about 30 to 40 feet before discharging into the Broward River.

The confining and semi-confining beds in the surficial aquifer and the boundary conditions around the site will tend to provide a predominantly horizontal direction to any wastewater which seeps into the water table zone and minimize vertically downward flow. It is probable that the flow lines beneath the Jacksonville Kraft Paper Company Mill are similar to those shown by the USGS in Figure 6. Based on these flow lines, any wastewater seepage into the upper portion of the water table zone will discharge into the contiguous surface water bodies.

Assuming a permeability of 5000 feet per year, a porosity of 0.3, and an average hydraulic gradient of about 0.004 ft/ft, the water discharging near the aeration basin will have a velocity of about 70 feet per year towards the St. Johns River, Broward River

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GROUNDWATER PERMITTING STUDY
FOR
ST. REGIS CORPORATION



LAW ENGINEERING TESTING COMPANY

MARIETTA, GEORGIA

GROUNDWATER CONTOURS

JOB NO. NR3297

FIGURE 5

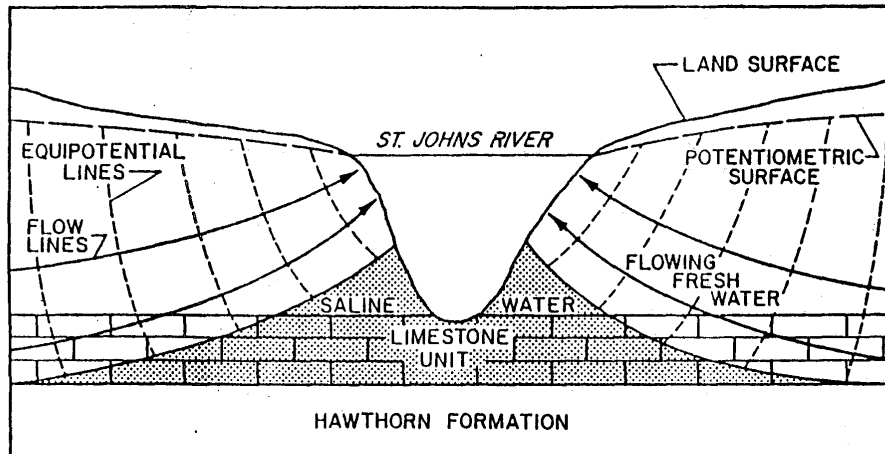


FIGURE OBTAINED FROM THE FOLLOWING U.S.G.S. PUBLICATION: SPECHLER, R. M. AND STONE, R. B., "APPRAISAL OF THE INTERCONNECTION BETWEEN THE ST. JOHNS RIVER AND THE SURFICIAL AQUIFER, EAST-CENTRAL DUVAL COUNTY, FLORIDA", U.S.G.S. WATER RESOURCES INVESTIGATION REPORT 82-4109, 1983.

GROUNDWATER PERMITTING STUDY
FOR
ST. REGIS CORPORATION



LAW ENGINEERING TESTING COMPANY

MARIETTA, GEORGIA

CONCEPTUAL VIEW OF GROUNDWATER
FLOW LINES

JOB NO. NR3297

FIGURE 6

and Dunn Creek. Using the same permeability and porosity and a hydraulic gradient of 0.003 ft/ft the velocity across the solid waste disposal area is approximately 50 ft per year toward the Broward River.

Law Engineering's experience with permeabilities beneath existing paper mill waste ponds show that over the years the permeability will drastically reduce due to voids being filled with the fine settleable silts in the ponds. It is expected that the precipitant in the lime recovery ponds (mainly CaCO_3) has effectively produced an impermeable layer beneath these ponds.

The water quality data listed in Tables 2 - 4 verifies the flow directions of Figure 5 and 6. Typically, pulp and paper wastewater effluents have concentrations of sodium, total dissolved solids, and specific conductance greater than would naturally occur in the ground water. These data show that the downgradient well (No. 2) has higher mean concentrations of sodium (mean - 71 mg/l) than the upgradient wells (mean - 10, 13 and 15 mg/l). Also, the specific conductance and total dissolved solids are higher than observed at the upgradient wells. More importantly, these data (in particular the 1983 pH and conductivity) show that in 11 years of operation there is only a slow downgradient movement of the basin wastewater seepage.

The laboratory results for the samples collected on October 8, 1975 showed BOD_5 and suspended solids (SS) concentrations for the downgradient well No. 2 of 18 and 39 mg/l, respectively, and BOD_5 and SS concentrations for upgradient well No. 18 of 12 and 37 mg/l, respectively. Based on its location with respect to

the waste sites, Well No. 18 is considered a background well. Therefore, the difference in downgradient and background BOD₅ is slight while there is no detectible difference in suspended solids.

Since the leakage from the waste sites has undoubtedly been reduced over time, the concentrations of the measured parameters at Well No. 2 will also have been reduced. Even if the leakage has not been reduced, the waste loading to the contiguous surface water bodies will be minimal. The incremental (that in excess of the background loading rate) BOD₅ loading rate to the contiguous rivers can be calculated using the 70 ft/year ground-water velocity, 6 mg/l BOD₅ concentration (based on measured values assuming no subsequent degradation), the 5000 feet downgradient perimeter of the basin and assuming a saturated transport thickness of 15 feet. Assuming the BOD₅ is not assimilated prior to discharge into the St. Johns, the resulting incremental BOD₅ loading rate due to ground-water transport is approximately 80 pounds per day or less than one (1) percent of the authorized NPDES discharge.

5.0 FINDINGS

The following findings summarize the data analyzed in this report.

- o The Jacksonville Kraft Paper Company Mill is bounded on its downgradient side by the St. Johns River, Broward River and Dunn Creek.
- o The property is underlain by a water table zone, a semi-confining bed, a limestone unit and a confining bed (Hawthorne formation).
- o The semi-confining and confining beds tend to provide a predominantly horizontal direction to the ground-water flow and minimize vertically downward flow.
- o The seepage from the waste ponds has probably been drastically reduced as voids in the underlying water table zone have filled with fine settleable silts from the ponds. The ground-water water quality data shows that in 11 years of operation there is only a slow downgradient movement of the basin wastewater seepage.
- o Any ground water leaving the Jacksonville Kraft Paper Company Mill property discharges immediately into the contiguous surface water bodies.
- o The water quality data and biological data for the contiguous surface water bodies did not indicate any adverse effects from plant site ground-water seepage or from direct surface water discharge through the NPDES effluent line.

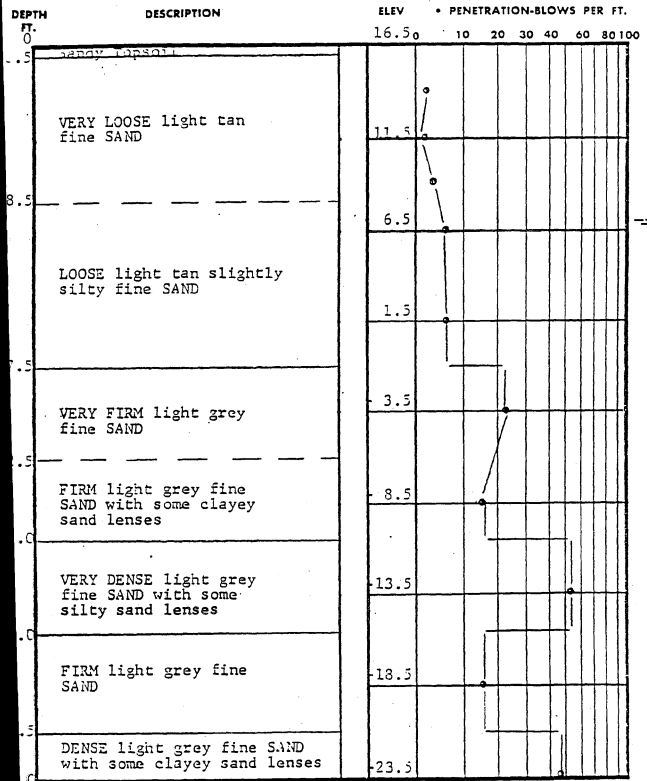
- o Since the leakage from the waste sites has undoubtedly been reduced over time the concentrations of the measured parameters in the ground water will also have been reduced. Even if the leakage has not been reduced, the waste loading to the contiguous surface water bodies will be less than 1 percent of the loading rates authorized by the NPDES Permit.

6.0 MONITORING PLAN

As stated in the Section 17-4.245(1)(C) of the F.A.C., the Jacksonville Kraft Paper Company Mill is an "Existing Installation." Based on the findings in this report, which indicate no detrimental effects to the ground water or contiguous surface waters, the zone of discharge for this installation should be established at the property boundary line.

Since all ground water leaving the property discharges to surface water bodies, there is minimal waste loading and no observed detrimental effects to the contiguous rivers, and there are no ground-water supply wells which will be adversely affected, we recommend that no 17-4 ground-water monitoring program is necessary.

APPENDIX



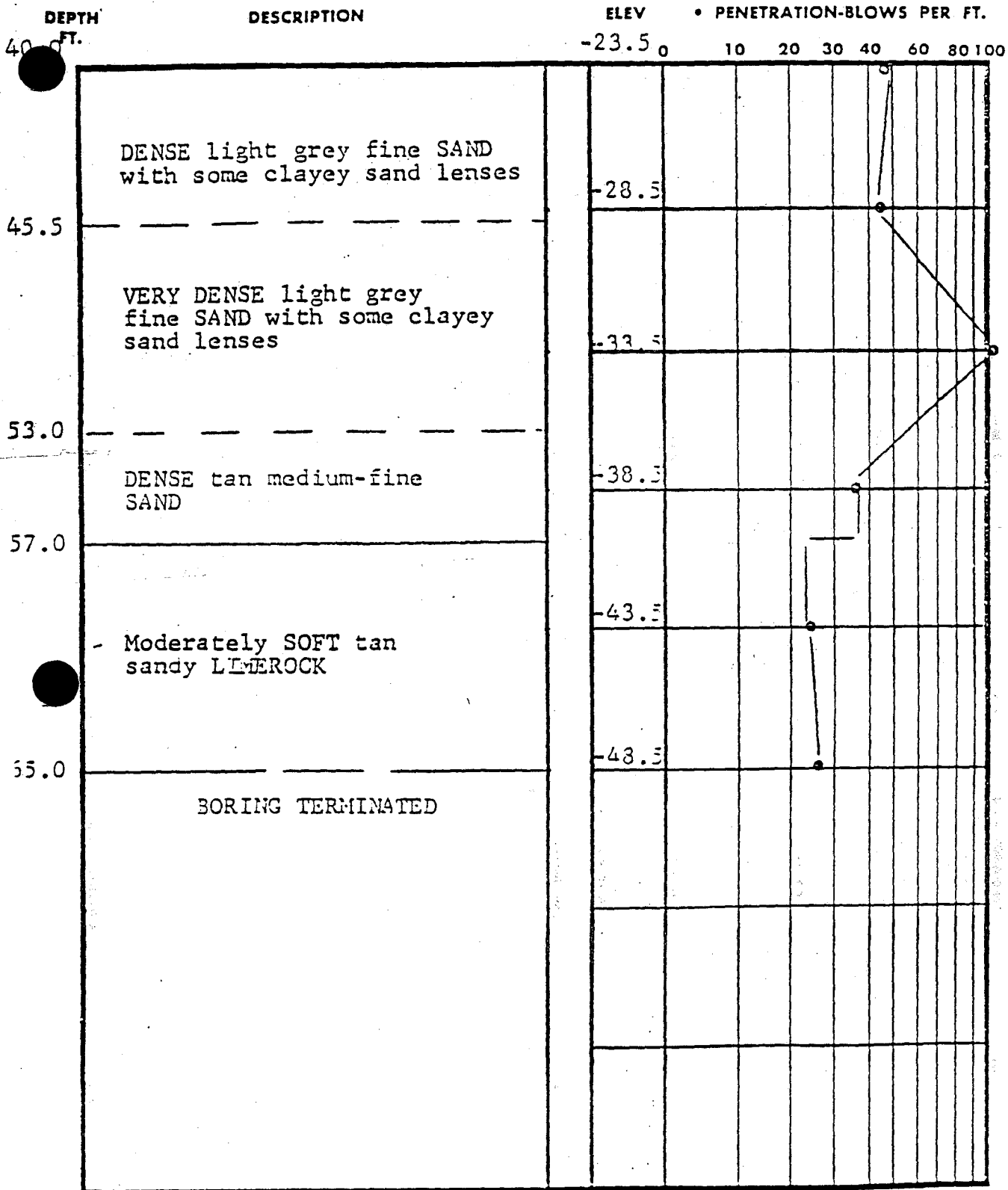
TEST BORING RECORD Page 1 of 2 Pages

BORING AND SAMPLING MEETS ASTM D-1586
CORE DRILLING MEETS ASTM D-2112
PENETRATION IS THE NUMBER OF BLOWS OF 140 LB. HAMMER
FALLING 30 IN. REQUIRED TO DRIVE 1.4 IN. I.D. SAMPLER 1 FT.

BORING NO. 3-17
DATE DRILLED 10/3/77
JOB NO. J-13715

UNDISTURBED SAMPLE

WATER TABLE, 24 HR.
WATER TABLE, 1 HR.



TEST BORING RECORD

Page 2 of 2 Pages

BORING NO. 3-17
 DATE DRILLED 10/3/70
 JOB NO. J-13713

DRILLING MEETS ASTM D-2113

PENETRATION IS THE NUMBER OF BLOWS OF 140 LB. HAMMER
 FALLING 30 IN. REQUIRED TO DRIVE 1.4 IN. I.D. SAMPLER 1 FT.

UNDISTURBED SAMPLE

WATER TABLE, 24 HR.

WATER TABLE, 1 HR.

1201 14. ROCK CORE RECOVERY

November 10, 1982

Property Owners
Within 2640 Feet of No. 9 Well

	<u>TAX ROLL NUMBER</u>	<u>NAME AND ADDRESS</u>
1.	109570-0000 109685-0000	Seaboard Coast Line Railroad Company Tax Department c/o Seaboard Coast Line Railroad Company 500 Water Street Jacksonville, Florida 32202
2.	109619-0000	J. K. MacDonald Media Marketing Services Inc. 70 Perimeter Center East, N.E. Suite 7005 Atlanta, Georgia 30346
3.	109649-0000	Thomas Gelaro, Junior 15 Hyatt Lane Jacksonville, Florida 32218
4.	109650-0000	Mary E. Forbes 1638 Geraldine Drive Jacksonville, Florida 32205
5.	109656-0000	Osavell C. Odom 1433 Eastport Road Jacksonville, Florida 32218
6.	109657-0000	Marvin V. Odom Route 2, Box 136A Keystone Heights, Florida 32656
7.	109657-0010	Warren C. Lowe 2962 West 16th Street Jacksonville, Florida 32205
8.	109658-0000	Duval County Mosquito Control District 1321 Eastport Road Jacksonville, Florida 32218

November 10, 1982

Within 2640 Feet of No. 9 Well - continued
Page 2

9.	109659-0000	Mary J. Joseph 1001 Tanglewood Drive Greenville, Texas 75401
10.	109660-0000	Edward E. Hiatt 1577 Faye Road Jacksonville, Florida 32218
11.	109660-0010 109660-0020	Mickey L. Mullis 1509 Faye Road Jacksonville, Florida 32218
12.	109672-0000	Clara S. Dykes 1506 Howard Road Jacksonville, Florida 32218
13.	109676-0000	Simplex Paper Corporation Adrian, Michigan 49221
14.	109677-0000	Clyde Walker 1438 Fred Gray Road Jacksonville, Florida 32218
15.	109681-0000	Port Carriers, Inc. P.O. Box 26344 Jacksonville, Florida 32218
16.	109682-0000	Kenneth Conner 1416 Fred Gray Road Jacksonville, Florida 32218
17.	109683-0000	Jehovah Witnesses Northeast Unit 1451 Eastport Road Jacksonville, Florida 32218
18.	109684-0000	J. B. Mallard Investment Corporation c/o Emily M. Acree 1840 Shadowlawn Street Jacksonville, Florida 32205

November 10, 1982

Within 2640 Feet of No. 9 Well - continued
Page 3

19.	109685-0010	Simplex Industries Inc. 1302 Eastport Road Jacksonville, Florida	32218
20.	109719-0000 109721-0000 109727-0000	Vernon A. Davis 1015 Kraft Road Jacksonville, Florida	32218
21.	109720-0000	Vonnie O. Gibson 1001 Kraft Road Jacksonville, Florida	32218
22.	109720-0010	Elva L. Hurdle 1057 Kraft Road Jacksonville, Florida	32218
23.	109723-0000	Betty L. Bryant, et al. 1000 Kraft Road Jacksonville, Florida	32218
24.	109728-0000	David C. Faircloth 1043 Kraft Road Jacksonville, Florida	32218
25.	109733-0000	Allie K. Bourbeau 1005 Kraft Road Jacksonville, Florida	32218
26.	100614-0000	Isabell Dukes 1889 Faye Road Jacksonville, Florida	32218
27.	110616-0000	William C. Sapp, Junior 1861 Faye Road Jacksonville, Florida	32218
28.	110620-0000	John H. Newton 1781 Faye Road Jacksonville, Florida	32218

Within 2640 Feet of No. 9 Well - continued
Page 4

29.	110615-0000	Ethel M. Hess 1903 Faye Road Jacksonville, Florida	32218
30.	110617-0000	Dorothy B. Hammond 1807 Faye Road Jacksonville, Florida	32218
31.	110617-0010	David S. Black 1807 Faye Road Jacksonville, Florida	32218
32.	110618-0000	William H. Johnson 1823 Faye Road Jacksonville, Florida	32218
33.	110619-0000	David L. Corns, et al. 1841 Faye Road Jacksonville, Florida	32218
34.	110621-0000	Alden R. Carlson 8 Farragut Drive Piscataway, New Jersey	08854
35.	110622-0000	Melvin W. Henderson 11269 Locke Lane Jacksonville, Florida	32218
36.	110623-0000 110623-0100	Jarmal L. Fussell 1733 Faye Road Jacksonville, Florida	32218
37.	110624-0000	Betty F. Pickren 1721 Faye Road Jacksonville, Florida	32218
38.	110691-0000	Richard G. Lane 1527 Faye Road Jacksonville, Florida	32218

November 10, 1982

Within 2640 Feet of No. 9 Well - continued
Page 5

39.	110693-0000	Andrew F. Ussery 11610 Dewitt Road Jacksonville, Florida	32218
40.	110694-0000	Sabine R. Landry 4034 Barmer Road Jacksonville, Florida	32210
41.	110695-0000	Paul Smith 11646 Dewitt Road Jacksonville, Florida	32218
42.	110697-0000 110698-0000	Sandra K. Parker 11660 Dewitt Road Jacksonville, Florida	32218
43.	110699-0000	George H. Dewitt 11661 Dewitt Road Jacksonville, Florida	32218
44.	110700-0000	Walter Tyson 11653 Dewitt Road Jacksonville, Florida	32218
45.	110702-0000 110703-0000	Nancy Mae Polk 8880 Old Kings Road, Apartment 121 Jacksonville, Florida	32217
46.	110705-0000 110706-0000	Eastport Baptist Church 1322 Eastport Road Jacksonville, Florida	32218
47.	110707-0000	Essie B. Conner 1360 Eastport Road Jacksonville, Florida	32218
48.	110708-0000	Ila Creech 1400 Eastport Road Jacksonville, Florida	32218

November 10, 1982

Within 2640 Feet of No. 9 Well - continued
Page 6

49.	110708-0010	William C. Creech 1401 Eastport Road Jacksonville, Florida 32218
50.	110709-0000	H. R. Turbot P.O. Box 26216 Oceanway Branch Jacksonville, Florida 32218
51.	110710-0000	Clinton C. Scott 2103 Dunn Creek Cemetery Road Jacksonville, Florida 32218
52.	110711-0000	Cleo Chesser 1438 Eastport Road Jacksonville, Florida 32218
53.	110712-0000	Flagship Bank of Jacksonville Prudential Building General Mail Service Jacksonville, Florida 32207
54.	110714-0000	State Bank of Jacksonville Prudential Building Jacksonville, Florida 32207
55.	110715-0000	George W. Burnsed, Junior 1509 Eastport Road Jacksonville, Florida 32218
56.	110716-0000	Mattie J. Burnsed 1534 Faye Road Jacksonville, Florida 32218
57.	110718-0000	Blaine O. Conn 1682 Faye Road Jacksonville, Florida 32218

Within 2640 Feet of No. 9 Well - continued
Page 7

58.	110719-0000	Charles C. Dicenso 1714 Faye Road Jacksonville, Florida	32218
59.	110720-0000	Lucious C. Robinson 1756 Faye Road Jacksonville, Florida	32218
60.	110721-0000 110725-0000	James D. Smith 462 New Berlin Road Jacksonville, Florida	32218
61.	110722-0000	Joe W. Adams 1778 Faye Road Jacksonville, Florida	32218
62.	110723-0000	Grace P. Lehman 1806 Faye Road Jacksonville, Florida	32218
63.	110724-0000	John Dailey 1842 Faye Road Jacksonville, Florida	32218
64.	110726-0000	Velda L. Gordon 1900 Faye Road Jacksonville, Florida	32218
65.	110726-0010	Jack Gordon 1886 Faye Road Jacksonville, Florida	32218
66.	110727-0000	Clinton C. Scott 1938 Faye Road Jacksonville, Florida	32218

November 10, 1982

Within 2640 Feet of Well No. 1

TAX ROLL NUMBER

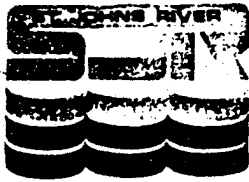
NAME AND ADDRESS

67. 109742-0000

Hess Fuel Oils, Inc.
Attention Tax Department
1 Hess Plaza
Woodridge, New Jersey 07095

68. 111059-0000

Gulf Oil Corporation
P.O. Box 7245 Station C
Atlanta, Georgia 30309



**WATER
MANAGEMENT
DISTRICT**

Henry Dean, Executive Director
Midred G. Horton, Assistant Executive Director

POST OFFICE BOX 1429 • PALATKA, FLORIDA 32078-1429
904/328-8321

November 3, 1987

□ 2133 N. Wickham Rd.
Melbourne, FL 32935-8109
(305) 254-1761

□ 7775 Baymeadows Way
Suite 201
Jacksonville, FL 32216
(904) 359-6521

□ 618 E. South St.
Orlando, FL 32801
(305) 894-5423

Mr. Richard Cashen
ES&E
6737 South Point Drive South
Jacksonville, FL 32216

SUBJECT: Seminole Kraft Corporation
Consumptive Use Permits
#2-031-0001U and 2-031-0002U

Dear Mr. Cashen:

As requested, enclosed are copies of the applications received in this office on January 4, 1983 for the above referenced permits.

Also provided are copies of the Technical Staff Reports and the Permits which were issued on March 8, 1983.

These applications were originally received in the name of St. Regis Paper Company, and have hence been transferred to Seminole Kraft Corporation. A copy of the request for transfer is attached.

If we can be of any further assistance, please do not hesitate to contact this office.

Sincerely,

Dannise T. Kemp
Dannise T. Kemp, Director
Division of Records

Enclosures

DTK:RP:rp

cc: District Permit Files

*Consumptive Use Permit
application*

KN

**RECEIVED
BLACK & VEATCH**

MAR 17 1988

**SYSTEMS ENG. DEPT
LEGAL ENV. GROUP**

*Copier G. Gunn
L. Alford
K. Weiss
File 14573
Water Supply*

RALPHE. SIMMONS
Chairman - Fernandina Beach

JOHN J. SMITH
Vice Chairman - Cocoa

CYNNE CAPEHART
Secretary - Gainesville

JOHN L. MINTON
Treasurer - Vero Beach

IDWAL H. OWEN, JR.
Jacksonville

FRANCES S. PIGNONE
Orlando

KELLEY R. SMITH, JR.
Palatka

SAM L. SWETT
Jacksonville

SAUNDRA H. GRAY
DeBary

SEMINOLE KRAFT CORPORATION
P.O. Box 26998
Jacksonville, FL 32218

November 4, 1986

MS. Dannise T. Kemp
Director
Division of Records
St. Johns River Water
Management District
P.O. Box 1429
Palatka, FL 32077

Re: Consumptive Water Use Permits 2-031-0001U and 2-031-0002U

Dear Ms. Kemp:

This letter is to request transfer of the above referred permits from Jacksonville Kraft Paper Company, Inc. to Seminole Kraft Corporation. Enclosed herewith are documents consummating the transaction transferring the assets of Jacksonville Kraft to Seminole Kraft.

On behalf of Seminole Kraft I wish to inform you that the Corporation will assume all obligations, responsibilities and duties under the above referred permits and intends to fully comply with statutes and regulations of the State of Florida as well as requirements of the St. Johns River Water Management District.

If you have questions, please contact me.

Sincerely yours,



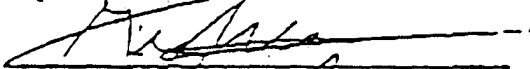
Frank Lee

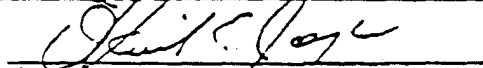
ah

BILL OF SALE

Jacksonville Kraft Paper Co., Inc., a corporation organized and existing under the laws of the State of Florida ("Seller"), for valuable consideration received from Seminole Kraft Corporation, a Delaware corporation ("Buyer"), hereby, on this 31st day of October, 1986, sells to Buyer all of the Scheduled Assets as defined and set forth in the Asset Purchase Agreement (the "Agreement") dated as of October 31, 1986, which by this reference is made a part hereof. Seller makes no representation or warranty as to the condition of the Seminole Assets or their fitness for any purpose.

Signed, sealed and
delivered in the
presence of

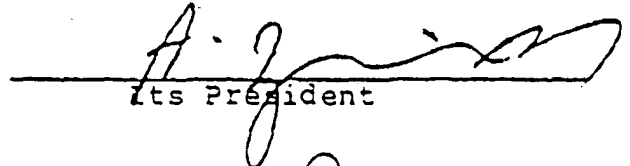




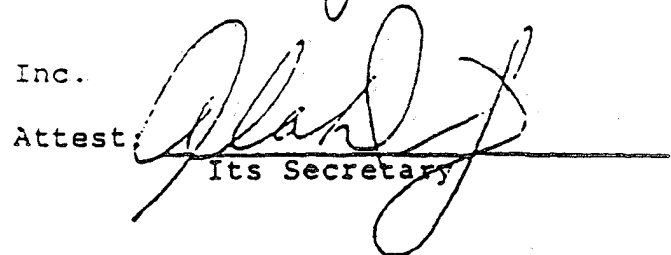
Witnesses as to
Jacksonville Kraft Paper Co., Inc.

JACKSONVILLE KRAFT PAPER CO., INC.

By:


Its President

Attest:


Its Secretary

[THIS SPACE FOR RECORDER'S USE ONLY]

STATE OF Illinois
COUNTY OF Cook

The foregoing instrument was
acknowledged before me this
date by Blusham Zou
and Alan Benouly
as President
and Secretary
respectively, of Jacksonville
Kraft Paper Co., Inc., on
behalf of the corporation.

Dated this 31st day of
October, 1986.

Beatrice M. Chodura
Notary Public duly authorized
in the State and County afore-
said.

My Commission expires:

11-27-88

SCHEDULED ASSETS

Buildings. All buildings located on the Plant site appearing on the survey attached hereto as Attachment A (the "Plant Site").

Land. Land included on the Plant Site (and all related easements including any and all rail sidings and other rights in the land and water, but excluding, in the case of the land fill area, the land fill thereon) as specified on Attachment A.

Machinery, Etc. Subject to the immediately following paragraph, all items of machinery and manufacturing equipment, vehicles, computer equipment, process equipment and office furniture and equipment which are now owned by JKP (other than the assets located at 41 Madison Avenue, New York, New York).

Off-Site Spare Parts. All spare parts and rolling stock which JKP owns and which are not located on the Plant Site and which are in the possession of third parties if, and only if, Seminole satisfies all of JKP's obligations in respect thereof and to the person holding such spare parts and rolling stock by November 30, 1986.

Spare Parts. Spare Parts and storeroom inventory, which JKP owns and which are located on the Plant Site.

Insurance. Any insurance proceeds received by JKP in respect of any casualty to any of the foregoing subsequent to August 19, 1986.

IDB Assets. The assets subject to the Agreement of Sale between The Jacksonville Port Authority (Florida) and St. Regis Paper Company dated August 1, 1974 which are not otherwise included in the foregoing.

None of the assets being purchased constitute "materials, supplies, merchandise or other inventory" within the meaning of Section 676.102(1), Florida Statutes (1985) nor do they constitute "raw materials, work in process or materials used or consumed in a business" within the meaning of Section 679.109(4), Florida Statutes (1985).

WARRANTY DEED

This Warranty Deed, made this 31st day of October, 1986, between Jacksonville Kraft Paper Co., Inc., a Florida corporation (Grantor"), and Seminole Kraft Corporation, a Delaware corporation ("Grantee"), whose post office address is: c/o Stone Container Corporation, 150 North Michigan Avenue, Chicago, Illinois 60601.

WITNESSETH: Grantor, for good and valuable consideration paid by the Grantee, the receipt of which is hereby acknowledged, hereby grants, bargains, and sells to Grantee and to Grantee's heirs, successors or assigns forever, the land lying and being in the County of Duval, State of Florida, more particularly described in Exhibit A annexed hereto and made a part hereof, together with all improvements and all fixtures on the Land, tenements hereditaments and appurtenances thereto belonging or in anywise appertaining (collectively the "Land"), to have and to hold the Land in fee simple forever.

Grantor hereby covenants with Grantee that it is lawfully seized of the Land in fee simple; that it has good right and lawful authority to sell and convey the Land; that it hereby fully warrants the title to the Land and will defend the same against the lawful claims of all persons whosoever; and that the Land is free of all encumbrances except Permitted Exceptions set forth in Exhibit E to the Asset Purchase Agreement dated as of October 31, 1986, between Grantor and Grantee.

Prepared by and return to:

PJW/KRAFT WARRANTY DEED

Mr. Richard Schwalbe
Rogers, Towers, Bailey, Jones & Gay
1300 Gulf Life Drive
Jacksonville, Florida 32207

Grantor and Grantee have entered into a License Agreement (the "License Agreement") relative to a portion of the Land, an executed copy of which is annexed hereto as Exhibit B and made a part hereof for all purposes. Grantor's conveyance herein of the Fill Area as defined and described in the License Agreement is expressly made subject to the right of reverter set forth in paragraph 15 of the License Agreement.

IN WITNESS WHEREOF, Grantor has executed this deed the day and year first above written.

Signed, sealed and delivered
in the presence of:

JACKSONVILLE KRAFT PAPER CO.,
INC.

[Signature]

By: [Signature]
Its President

[Signature]
Witnesses as to Jacksonville
Kraft Paper Co., Inc.

Attest: [Signature]
Its Secretary

[THIS SPACE FOR RECORDERS USE ONLY]

STATE OF ILLINOIS
COUNTY OF COOK

The foregoing instrument was
acknowledged before me
this date by

Abraham Zion and
Alan Dinowitz as
President and
Secretary, respectively
of Jacksonville Kraft Paper
Co., Inc., on behalf of the
corporation.

Dated this 31st day of
October, 1966.

[Signature]
Notary Public duly authorized
in the State and County aforesaid
My Commission Expires: 11-27-88

LEGAL DESCRIPTION
PARCEL "A":

Portions of Sections 19, 22, 24, and Webb Place, Subdivision of the John Broward Grant, Section 46, Township 1 South, Range 27 East, according to Plat recorded in Plat Book 1, Pages 7 and 8, former Public Records of Jacksonville, Duval County, Florida, being more particularly described as follows:

For point of reference, commence at a concrete monument located at the point of intersection of the North line of said Section 22 of said Subdivision, with the East line of Webb Place of said Subdivision, said monument lying S-89°57'56"W. a distance of 1,325.83 feet from a concrete monument located at the Northeast corner of said Section 22; run thence S-89°57'56"W., along the Westerly prolongation of said Northerly line of Section 22, a distance of 578.30 feet to a point on the Westerly right of way line of Eastport Road (a 66-foot right of way, as now established); run thence N-10°23'56"W., along said Westerly right of way line, a distance of 3,231.34 feet to a point; run thence S-89°21'22"W., parallel with the Southerly right of way line of Kraft Road (a 60-foot right of way, as now established), a distance of 1,639.56 feet to a point; run thence S-2°51'06"E. a distance of 1,845.0 feet to a point for point of beginning.

From the point of beginning thus described, run N-2°51'06"W. a distance of 1,845.0 feet to a point; run thence N-89°21'22"E., parallel with said Southerly right of way line of Kraft Road, a distance of 1,639.56 feet to a

EXHIBIT A

ROBERT M. ANDAS ASSOCIATES
JACKSONVILLE, FLORIDA 32207-0350

point on said Westerly right of way line of Eastport Road; run thence S-10°23'56"E., along said Westerly right of way line, a distance of 4,796.00 feet to a concrete monument at the point of curvaturé; run thence in a Southeasterly direction, along the arc of a curve in the Southwesterly right of way line of said Eastport Road, said curve being concave to the Northeast and having a radius of 592.89 feet, an arc distance of 317.83 feet to a concrete monument at the point of tangency, the aforementioned arc having a chord bearing and distance of S-25°45'21"E., 314.04 feet; run thence S-41°06'46"E., along said Southwesterly right of way line, a distance of 806.21 feet to a concrete monument; run thence in a Southwesterly direction, along the arc of a curve in said Westerly right of way line, not tangent to last described line, said curve being concave to the Northwest and having a radius of 113.24 feet, an arc distance of 201.17 feet to a concrete monument at the point of tangency, the aforementioned arc having a chord bearing and distance of S-22°59'46"W., 175.74 feet; run thence S-75°53'14"W., along the Northerly right of way line of said Eastport Road, a distance of 166.73 feet to a concrete monument at the intersection of said Northerly right of way line, with the Northerly right of way line of Hecksher Drive, as now established; run thence in a Westerly direction, along the arc of a curve in last mentioned Northerly right of way line, said curve not being tangent to last described line, said curve being concave to the South

Parcel "A"
Page 1
Seminole Kraft

ROBERT M. ANGAS ASSOCIATES
JACKSONVILLE, FLORIDA 32207-2558

and having a radius of 766.78 feet, an arc distance of 387.82 feet to a concrete monument at a point on a second non-tangent curve, the aforementioned arc having a chord bearing and distance of S-72°37'12"W., 383.70 feet; run thence in a Southwesterly direction, along the arc of a curve in the Northwestern right of way line of said Hecksher Drive, said curve being concave to the Southeast and having a radius of 483.06 feet, an arc distance of 275.68 feet to the point of tangency, the aforementioned arc having a chord bearing and distance of S-59°21'27"W., 271.95 feet; run thence S-43°00'30"W., along said Northwestern right of way line, a distance of 129.62 feet to a point on the Southwesterly line of lands described in deed recorded in Official Records Volume 1344, Page 261, Public Records of said County; run thence N-56°55'00"W., along said Southwesterly line, a distance of 2,485.40 feet to the point of curvature; run thence in a Northwestern direction, along the arc of a curve in said Southwesterly deed line, said curve being concave to the Northeast and having a radius of 1000.00 feet, an arc distance of 122.00 feet to the Westerly corner of said deed, the aforementioned arc having a chord bearing and distance of N-53°25'18"W., 121.92 feet; run thence in a Northerly direction, along the waters of the Broward River, following the meanderings of same, a distance of 3,150 feet, more or less, to a point which bears S-87°08'54"W. from the point of beginning; run thence N-87°08'54"E. a distance of 40 feet, more or less, to the point of beginning. The land thus described contains 277 acres, more or less.

Parcel "A"
Page 3
Seminole Kraft
October 27, 1986
RMA 96D-4C

LEGAL DESCRIPTION
PARCEL "B":

Portions of Sections 18, 19, 22, 23, and Webb Place, Subdivision of the John Broward Grant, Section 46, Township 1 South, Range 27 East, according to plat recorded in Plat Book 1, Pages 7 and 8, former Public Records of Jacksonville, Duval County, Florida, being more particularly described as follows:

For point of reference, commence at a concrete monument located at the point of intersection of the North line of said Section 22 of said Subdivision, with the East line of Webb Place of said Subdivision, said monument lying S-89°57'56"W. a distance of 1,325.83 feet from a concrete monument located at the Northeast corner of said Section 22; run thence N-89°57'56"E., along said North line, a distance of 1,325.83 feet to said concrete monument located at the Northeast corner of said Section 22; run thence S-76°37'10"W. a distance of 146.58 feet to a point for point of beginning.

From the point of beginning thus described, run N-00°24'12"W. a distance of 682.91 feet to a point; run thence N-53°56'47"E. a distance of 1,076.13 feet to a point; run thence S-60°07'28"E. a distance of 417.67 feet to a point; run thence S-36°36'37"E. a distance of 454.27 feet to a point; run thence S-43°25'48"W. a distance of 871.81 feet to a point; run thence S-35°36'59"E. a distance of 1,515.38 feet to a point; run thence S-54°38'17"W. a distance of 1,833.10 feet to a point lying on the Easterly prolongation of the Northerly line of lands described in Official Records Volume 365, Page 583, Public Records of said County; run

thence S-89°57'39"W., along said Easterly prolongation and along said Northerly line, a distance of 742.41 feet to the Northwesterly corner of said lands; run thence S-0°02'21"E., along the Westerly line of said lands, a distance of 202.96 feet to the Easterly corner of lands described in Official Records Volume 3204, Page 401, Public Records of said County; run thence S-54°56'50"W., along the Southeasterly line of said lands, a distance of 210.95 feet to a point lying on the Northeasterly right of way line of Eastport Road (a 66-foot right of way, as now established); run thence N-41°06'46"W., along said Northeasterly right of way line, a distance of 200.02 feet to a point lying on the Northwesterly line of said lands described in Official Records Volume 3204, Page 401; run thence N-54°56'50"E., along said Northwesterly line, a distance of 211.16 feet to the Northerly corner thereof; run thence N-51°36'05"W. a distance of 346.25 feet to a point; run thence N-26°44'44"W. a distance of 905.69 feet to a point; run thence N-10°06'08"W. a distance of 778.33 feet to a point; run thence S-79°36'04"W., perpendicular to the Easterly right of way line of said Eastport Road, a distance of 200.85 feet to a point lying on said Easterly right of way line; run thence N-10°23'56"W., along said Easterly right of way line, a distance of 434.92 feet to a point; run thence N-79°36'04"E., perpendicular to said Easterly right of way line, a distance of 418.55 feet to a point; run thence S-10°23'56"E., parallel to said Easterly right of way line, a distance of 432.27 feet to a point; run thence N-79°28'07"E. a distance of 751.68 feet to a point; run thence N-53°38'14"E. a distance of 226.55 feet to a point; run thence N-63°51'10"E. a distance of 297.92 feet to the point of beginning. The land thus described contains 147.61 acres, more or less.

RMA 96D-4C
Seminole Kraft
October 24, 1986

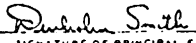
**NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM
DISCHARGE MONITORING REPORT**

Form Approved
OMB NO. 158-R0073

INSTRUCTIONS

1. Provide dates for period covered by this report in spaces marked "REPORTING PERIOD".
2. Enter reported minimum, average and maximum values under "QUANTITY" and "CONCENTRATION" in the units specified for each parameter as appropriate. Do not enter values in boxes containing asterisks. "AVERAGE" is average computed over actual time discharge is operating. "MAXIMUM" and "MINIMUM" are extreme values observed during the reporting period.
3. Specify the number of analyzed samples that exceed the maximum (and/or minimum as appropriate) permit conditions in the columns labeled "No. Ex." If none, enter "0".
4. Specify frequency of analysis for each parameter as No. analyses/No. days. (e.g., "3/7" is equivalent to 3 analyses performed every 7 days.) If continuous enter "CONT."
5. Specify sample type ("grab" or "24 hr. composite") as applicable. If frequency was continuous, enter "NA".
6. Appropriate signature is required on bottom of this form.
7. Remove carbon and retain copy for your records.
8. Fold along dotted lines, staple and mail Original to office specified in permit.

12-29 FL ST	12-101 FL 0000 400 PERMIT NUMBER	117-101 001 DIS	2621 2631 SIG	30° 24' 55" LATITUDE	081° 35' 45" LONGITUDE
REPORTING PERIOD: FROM		12-211 7/4 YEAR	12-212 1/1 MO	12-213 0/1 DAY	TO
		12-211 7/4 YEAR	12-212 1/1 MO	12-213 3/0 DAY	

PARAMETER		QUANTITY				UNITS	NO. EX	CONCENTRATION				UNITS	NO. EX	FREQUENCY OF ANALYSIS	SAMPLE TYPE
		MINIMUM	AVERAGE	MAXIMUM				MINIMUM	AVERAGE	MAXIMUM					
Brackish Cooling Water Flow	REPORTED	43.2	48.0	61.2			0							CONT.	Based on pumping Ca.
	PERMIT CONDITION	NONE	NONE	NONE		MGD								CONT.	Based on pumping Ca.
Brackish Cooling Water Discharge Temp.	REPORTED	70	73	74			0							2/7	Grab
	PERMIT CONDITION	NONE	93	NONE		° F								2/7	Grab
Process Effluent Flow	REPORTED	9.8	16.2	18.6			0							CONT.	Integrator Recorder
	PERMIT CONDITION	NONE	NONE	NONE		MGD								CONT.	Recorder & 24 Hr. Comp.
Process Effluent pH	REPORTED	7.7	8.1	8.8			0							CONT.	Recorder
	PERMIT CONDITION	6.0	NONE	9.0		STD. UNITS								CONT.	Recorder
Process Effluent Temperature	REPORTED	77	81	86			0							Daily	Grab
	PERMIT CONDITION	NONE	NONE	NONE		° F								2/7	Grab
Process Effluent BOD ₅	REPORTED	2,800	5,100	7,200			0	21	38	57				Daily	24 Hour Composite
	PERMIT CONDITION	NONE	10,000	32,000		LBS./DAY		NONE	NONE	NONE				Daily	24 Hour Composite
Process Effluent TSS	REPORTED	4,200	10,300	39,500			0	51	77	103				Daily	24 Hour Composite
	PERMIT CONDITION	NONE	13,000	39,000		LBS./DAY		NONE	NONE	NONE				Daily	24 Hour Composite
	REPORTED														
	PERMIT CONDITION														
NAME OF PRINCIPAL EXECUTIVE OFFICER		TITLE OF THE OFFICER				DATE		I certify that I am familiar with the information contained in this report and that to the best of my knowledge and belief such information is true, complete, and accurate.				SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT			
Johnson, Clark S.		Vice President - Kraft Div.				7/4 1/2 1/0						 SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT			
LAST FIRST MI		TITLE				YEAR MO DAY									

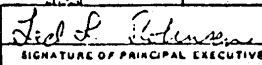
NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM
DISCHARGE MONITORING REPORT

Approved
OMB NO. LM-R0073

INSTRUCTIONS

1. Provide dates for period covered by this report in spaces marked "REPORTING PERIOD".
2. Enter reported minimum, average and maximum values under "QUANTITY" and "CONCENTRATION" in the units specified for each parameter as appropriate. Do not enter values in boxes containing asterisks. "AVERAGE" is average computed over actual time discharge is operating. "MAXIMUM" and "MINIMUM" are extreme values observed during the reporting period.
3. Specify the number of analyzed samples that exceed the maximum (and/or minimum as appropriate) permit conditions in the columns labeled "No. Ex." If none, enter "0".
4. Specify frequency of analysis for each parameter as No. analyses/No. days (e.g., "2/7" is equivalent to 2 analyses performed every 7 days.) If continuous enter "CONT."
5. Specify sample type ("grab" or "24-hr. composite") as applicable. If frequency was continuous, enter "NA".
6. Appropriate signature is required on bottom of this form.
7. Remove carbon and retain copy for your records.
8. Fold along dotted lines, staple and mail Original to office specified in permit.

13-2 FL	14-101 FL 0000 400	111-101 001	2621 2631	30° 24' 55" 081° 35' 45"
17	PERMIT NUMBER	DIS	MC	LATITUDE LONGITUDE
REPORTING PERIOD: FROM		TO		
7/6 1/1 0/1		7/6 1/1 3/0		
YEAR MO DAY		YEAR MO DAY		

PARAMETER		QUANTITY				UNITS	NO. EX	CONCENTRATION				UNITS	NO. EX	FREQUENCY OF ANALYSIS	SAMPLE TYPE
		MINIMUM	AVERAGE	MAXIMUM				MINIMUM	AVERAGE	MAXIMUM					
Brackish Cooling Water Flow	REPORTED	57.6	61.4	72.0		MCD	0							Cont.	Based on Pumping Capacity
	PERMIT CONDITION	None	None	None										Cont.	Based on Pumping Capacity
Brackish Cooling Water Discharge Temperature	REPORTED	60	69	73		°F	0							2/7	Grab
	PERMIT CONDITION	None	93	None										2/7	Grab
Process Effluent Flow	REPORTED	17.1	18.7	21.3		MCD	0							Cont.	Integrator & Recorder
	PERMIT CONDITION	None	None	None										Cont.	Recorder
Process Effluent pH	REPORTED	7.4	7.6	7.8		STD. UNITS	0							Cont.	Recorder & 24-Hr. Comp.
	PERMIT CONDITION	6.0	None	9.0										Cont.	Recorder
Process Effluent Temperature	REPORTED	78	81	83		°F	0							Daily	Grab
	PERMIT CONDITION	None	None	None										2/7	Grab
Process Effluent BOD ₅	REPORTED	3,700	6,500	9,400		LBS./DAY	0	25	42	64		0	Daily	24-Hour Composite	
	PERMIT CONDITION	None	8,350	25,000				None	None	None	Mg/L		Daily	24-Hour Composite	
Process Effluent TSS	REPORTED	7,800	13,800	19,700		LBS./DAY	1	50	88	117		0	Daily	24-Hour Composite	
	PERMIT CONDITION	None	13,000	39,000				None	None	None	Mg/L		Daily	24-Hour Composite	
	REPORTED														
	PERMIT CONDITION														
NAME OF PRINCIPAL EXECUTIVE OFFICER		TITLE OF THE OFFICER		DATE		I certify that I am familiar with the information contained in this report and that to the best of my knowledge and belief such information is true, complete, and accurate.						SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT			
Falco Henry W		Vice President		7/6 1/1 0/7											
LAST FIRST MI		TITLE		YEAR MO DAY											

**NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM
DISCHARGE MONITORING REPORT**

Form Approved
OMB NO. 155-00073

INSTRUCTIONS

1. Provide data for period covered by this report in spaces marked "REPORTING PERIOD".
2. Enter reported minimum, average and maximum values under "QUANTITY" and "CONCENTRATION" in the units specified for each parameter as appropriate. Do not enter values in boxes containing asterisks. "AVERAGE" is average computed over actual time discharge is operating. "MAXIMUM" and "MINIMUM" are extreme values observed during the reporting period.
3. Specify the number of analyzed samples that exceed the maximum (and/or minimum as appropriate) permit conditions in the columns labeled "No. Ex." If none, enter "0".
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5. Specify sample type ("grab" or "— hr. composite") as applicable. If frequency was continuous, enter "NA".
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8. Fold along dotted lines, staple and mail Original to office specified in permit.

12-2 FL ST	14-101 FL 0000 400 PERMIT NUMBER	157-201 001 DIS	2621 2631 SC	30° 24' 55" LATITUDE	081° 35' 45" LONGITUDE
12-211 REPORTING PERIOD: FROM		12-212 7 8 YEAR	12-213 1 1 MO	12-214 0 1 DAY	TO
		12-215 7 8 YEAR	12-216 1 1 MO	12-217 3 0 DAY	

PARAMETER		QUANTITY				UNITS	NO. EX	CONCENTRATION				UNITS	NO. EX	FREQUENCY OF ANALYSIS	SAMPLE TYPE
		MINIMUM	AVERAGE	MAXIMUM				MINIMUM	AVERAGE	MAXIMUM					
Brackish Cooling Water Flow	REPORTED	43.2	43.2	43.2	MGD	0							Cont.	Based on Pumping Capacity	
	PERMIT CONDITION	None	None	None											
Brackish Cooling Water Discharge Temperature	REPORTED	78	80	82	°F	0							2/7	Grab	
	PERMIT CONDITION	None	93	None											
Process Effluent Flow	REPORTED	15.2	18.8	22.6	MGD	0							Cont.	Integrator & Recorder	
	PERMIT CONDITION	None	None	None											
Process Effluent pH	REPORTED	7.2	7.3	7.5	STD. UNITS	0							Cont.	Recorder & 24 Hr. Comp.	
	PERMIT CONDITION	6.0	None	9.0											
Process Effluent Temperature	REPORTED	78	83	86	°F	0							Daily	Grab	
	PERMIT CONDITION	None	None	None											
Process Effluent SO_4	REPORTED	1,700	4,100	6,200	LBS/DAY	0	18	26	38	Mg/L	0	Daily	24-Hour Composite		
	PERMIT CONDITION	None	8,350	25,000			None	None	None						
Process Effluent TSS	REPORTED	6,100	12,600	18,300	LBS/DAY	0	48	80	112	Mg/L	0	Daily	24-Hour Composite		
	PERMIT CONDITION	None	13,000	39,000			None	None	None						
	REPORTED														
	PERMIT CONDITION														

NAME OF PRINCIPAL EXECUTIVE OFFICER		TITLE OF THE OFFICER		DATE		I certify that I am familiar with the information contained in this report and that to the best of my knowledge and belief such information is true, complete, and accurate.	 SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT
Bowersock, James N.		Vice President		7 8 1 2 2 1			
LAST	FIRST	MI	TITLE	YEAR	MO		

NAME S. S. Paper Company
 ADDRESS P. O. Box 18020
Jacksonville, FL 32229
 FACILITY Jacksonville Mill
 LOCATION 9469 Eastport Road, Jacksonville, FL

PERMIT NUMBER 001
 DISCHARGE NUMBER 001

MONITORING PERIOD
 FROM 11 01 01 TO 01 11 30
 YEAR MONTH DAY YEAR MONTH DAY
 (20-21) (22-23) (24-25) (26-27) (28-29) (30-31)

NOTE: Read instructions before completing this form.

PARAMETER (32-37)	SAMPLE MEASUREMENT PERMIT REQUIREMENT	(3 Card Only) QUANTITY OF LOADING (46-53)			(4 Card Only) QUALITY OR CONCENTRATION (46-53)				NO. EX (62-63)	FREQUENCY OF ANALYSIS (64-68)	SAMPLE TYPE (69-70)
		AVERAGE	MAXIMUM	UNITS	MINIMUM	AVERAGE	MAXIMUM	UNITS			
British Cooling Water Flow		43.2	43.2	MGD					0	Cont.	Based on Sample Copies
British Cooling Water Discharge Temperature		None	None		78	81	84	°F	0	2/7	Grab
Process Effluent Flow		18.0	20.0	MGD					0	Cont.	Integrator Record
Process Effluent pH					7.3	7.5	9.2	STD UNITS	0	Cont.	Record & 24/Hr Comp.
Process Effluent Temperature					68	75	80	°F	0	Daily	Grab
Process Effluent TSS		5,000	8,000	LB/ DAY	22	35	53	Mg/L	0	Daily	24-Hour Comp.
Process Effluent TSS		8,350	25,000	LB/ DAY	None	None	None	Mg/L	0	Daily	24-Hour Comp.
Process Effluent TSS		9,000	14,000	LB/ DAY	30	60	90	Mg/L	0	Daily	24-Hour Comp.
Process Effluent TSS		13,000	39,000	LB/ DAY	None	None	None	Mg/L	0	Daily	24-Hour Comp.

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER
S. S. Paper
 TYPE OR PRINTED

THIS DOCUMENT IS SIGNED WITH RECOGNITION THAT KNOWINGLY MAKING A FALSE CERTIFICATION ON THIS REPORT OR SUPPORTING DOCUMENTS OR INTENTIONALLY TAMPERING WITH ANY MONITORING DEVICE OR METHOD ARE CRIMINAL OFFENSES. SEE 18 U.S.C. § 1001 AND 33 U.S.C. § 1319. (Penalties under these statutes may be fines up to \$10,000 and/or maximum imprisonment of between 6 months and 3 years.)

SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT

TELEPHONE
751-1400

DATE
01 11 12
 YEAR MONTH DAY

COMMENT AND EXPLANATION OF ANY VIOLATIONS (Reference all attachments here)

Facility Name/Location (if different)

DISCHARGE MONITORING REPORT (DMR)

F - FIDAL DATES

PROCESS ANNOTATIONS - 001

NAME UNITED PAPER - 168
 ADDRESS 1000
DEVELOP LL 72271
 FACILITY
 LOCATION

(2-16)		(17-19)	
PERMIT NUMBER		DISCHARGE NUMBER	
MONITORING PERIOD			
YEAR	MO	DAY	YEAR
FROM (10-31)	(11-31)	(12-31)	TO (10-31)

NOTE: Read instructions before completing this form.

PARAMETER (32-37)	X	(3 Card Only) (46-53) QUANTITY OR LOADING (34-41)			(4 Card Only) (38-45) QUALITY OR CONCENTRATION (46-53)			NO. EX (62-63)	FREQUENCY OF ANALYSIS (64-68)	SAMPLE TYPE (69-70)	
		AVERAGE	MAXIMUM	UNITS	MINIMUM	AVERAGE	MAXIMUM				UNITS
0000, 5-DAY (20 SEC. C)		SAMPLE MEASUREMENT	5,400	9,000			39	57		0	
00310 0		PERMIT REQUIREMENT	5,400	9,000	LBS/D					DAILY	COMPO
EFFLUENT GROSS VALUE		SAMPLE MEASUREMENT									
00400 0		PERMIT REQUIREMENT									
EFFLUENT GROSS VALUE		SAMPLE MEASUREMENT					7.5	8.1		0	
00400 0		PERMIT REQUIREMENT									
00500, TOTAL		SAMPLE MEASUREMENT	12,800	21,000			97	152		0	
00500 0		PERMIT REQUIREMENT	12,800	21,000	LBS/D					DAILY	COMPO
EFFLUENT GROSS VALUE		SAMPLE MEASUREMENT									
00600, IN CONDUIT OR		PERMIT REQUIREMENT									
00600 0		SAMPLE MEASUREMENT	16.6	19.3						0	
00600 0		PERMIT REQUIREMENT	16.6	19.3	MGD						
EFFLUENT GROSS VALUE		SAMPLE MEASUREMENT									
		PERMIT REQUIREMENT									
		SAMPLE MEASUREMENT									
		PERMIT REQUIREMENT									
		SAMPLE MEASUREMENT									
		PERMIT REQUIREMENT									

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER

Joe K. Donald, Vice-President

TYPED OR PRINTED

I CERTIFY UNDER PENALTY OF LAW THAT I HAVE PERSONALLY EXAMINED AND AM FAMILIAR WITH THE INFORMATION SUBMITTED HEREIN, AND BASED ON MY INQUIRY OF THOSE INDIVIDUALS IMMEDIATELY RESPONSIBLE FOR OBTAINING THE INFORMATION, I BELIEVE THE SUBMITTED INFORMATION IS TRUE, ACCURATE AND COMPLETE. I AM AWARE THAT THERE ARE SIGNIFICANT PENALTIES FOR SUBMITTING FALSE INFORMATION INCLUDING THE POSSIBILITY OF FINE AND IMPRISONMENT. SEE 18 USC § 1001 AND 33 USC § 1319. (Penalties under these statutes may include fines up to \$10,000 and/or maximum imprisonment of between 6 months and 3 years.)

SIGNATURE OF PRINCIPAL EXECUTIVE
OFFICER OR AUTHORIZED AGENT

TELEPHONE

DATE

704 451-1400

82 15 9

AREA
CODE

NUMBER

YEAR

MO

DAY

COMMENT AND EXPLANATION OF ANY VIOLATIONS (Reference all attachments here)

November 10, 1982

Property Owners

Within 2640 Feet of River Water Intake

	<u>TAX ROLL NUMBER</u>	<u>NAME AND ADDRESS</u>
1.	109742-0000	Hess Fuel Oils, Inc. Attention: Tax Department 1 Hess Plaza Woodridge, New Jersey 07095
2.	111059-0000	Gulf Oil Corporation P.O. Box 7245 Station C Atlanta, Georgia 30309
3.	111060-0000	Amoco Oil Company P.O. Box 5077 Atlanta, Georgia 30302
4.	111060-0500	Dawkins, Glass, & Lee 106 West Jefferson Street Monroe, North Carolina 28110
5.	111063-0000	City National Bank of Miami TRS Land Trust 500-1693 c/o Webb International, Inc. 9601 North Main Street Jacksonville, Florida 32218

EASTPORT

GARDENS

STARGARD AIR LINE RAILROAD NORTH

LITTLE LEAGUE BALLPARK

D-533

ROBERTS SUBDIVISION

TEST WELLS

St. R. #122620
#22620
#32640

Geologic Surveying

#8
D-532

#7
D-69

POND

POND

POND

SEC. 19

WEBB PLACE

D-564

WOODLANDS

CRUITH & DIAL

Brooklyn
BCCAYTON
TAYLOR
ST. REGIS
MILLSITE

#4
D-563

POND

SEC. 19

SEC. 18

SEC. 22

SEC. 23

SEC. 24

SEC. 25

SEC. 26

SEC. 27

SEC. 28

SEC. 29

SEC. 30

SEC. 31

SEC. 32

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SEC. 301

SEC. 302

SEC. 303

R. F. Cashen
J. K. Donald
W. L. Durden
H. R. Emery

R. A. Romnes
F. E. Westmark
R. H. Williams

PAPER COMPANY

KRAFT DIVISION
P.O. Box 18020
Jacksonville, Fla. 32229
904/751-1400

TYPICAL REPORT TO STATE September 21, 1982

Mr. Frank Watkins, Jr., P.E.
Subdistrict Engineer
Department of Environmental Regulation
St. Johns River Subdistrict
3426 Bills Road
Jacksonville, FL 32207

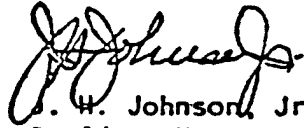
Dear Mr. Watkins:

RE: Permit No. 1016-4984
St. Regis Paper Company

The following information is being submitted in accordance with the above permit conditions for the month of August, 1982.

	<u>Permit Limit</u>
Flow, daily average 13.3 MGD	None
Flow, daily maximum 19.2 MGD	None
Temperature, daily average 84°F	None
Temperature, daily maximum 86°F	None
pH, daily average 7.6	None
pH, daily maximum 8.1	9.0
pH, daily minimum 7.3	6.0
BOD ₅ , daily average 4,700 lbs/day	8,350
BOD ₅ , daily maximum 12,500 lbs/day	17,068
Total Suspended Solids, daily average 3,700 lbs/day	13,000
Total Suspended Solids, daily maximum 8,700 lbs/day	36,576.

Very truly yours,


J. H. Johnson, Jr.
Resident Manager

rm

cc Donald C. Bayly, BES



KRAFT DIVISION
P.O. Box 18020
Jacksonville, Fla. 32229
904/751-1400

December 30, 1982

Consumptive Use Permit Application - Letter of Explanation

St. Regis Paper Company, Jacksonville Mill, is a wholly integrated pulp and paper mill located in Duval county at 9469 Eastport Road. Other divisions also operate in this county.

The Jacksonville Mill operates 24 hours a day, 7 days a week, 361 days a year, economic shutdowns excepted.

The mill has 12 wells as listed. Seven wells are considered production wells and are equipped with pumps. No. 1 and No. 2 are on standby emergency use basis. Nos. 4, 5, 7, 8, and 9 are used on a rotation basis to produce an average of 20 million gallons per day with a maximum capacity of 28 M.G.D. The mill normally uses 20 M.G.D. with a maximum use of about 25 M.G.D. No. 3 and No. 6 wells were never drilled.

Due to the nature of our production and its dependency on water, our recycle pumps control our daily use. If a large recycle pump tears up and requires several days for repair, our use of fresh water will be near the maximum.

Conservation has always been practiced in our mill with recycles approaching 14. We will continue to look for economical ways to improve the conservation measures.

Our waste treatment system is operated under EPA Permit No. FL 0000-400 and State Permit No. 1016-4984.

The attached map shows our well locations and our river water intake.



United States Department of the Interior

GEOLOGICAL SURVEY

Box 35032, Federal Office Bldg.
400 West Bay Street
Jacksonville, Florida 32202

June 26, 1975

J. Bert Rhyne
St. Regis Paper Company
P. O. Box 18020
Jacksonville, FL 32229

Dear Mr. Rhyne:

Listed below are the analyses on the wells which you requested by telephone. There is a question as to the validity of two of these samples.

D-262	Cl 30	CaCO ₃ 144?? Spec. Cond. 250? (75-05-09)
D-263	Cl 20	CaCO ₃ not valid Spec. Cond. 370 (75-05-09)
D-264	Cl 22	CaCO ₃ 228 Spec. Cond. 461 (75-05-09)
D-265	Cl 20	CaCO ₃ 244 Spec. Cond. 500 (75-05-09)

The hardness, chloride, and potentiometric surface maps that you requested will be mailed to you as soon as additional copies are printed.

Please let us know if we can be of further service to you.

Sincerely,


G. W. Leve
Hydrologist-in-charge

GWL:bbm

STREGIS INTER-OFFICE CORRESPONDENCE

GULF LIFE TOWER

JACKSONVILLE, FLORIDA 32207

DATE: November 30, 1972

FROM: G. D. Lyon

TO: Mr. Bert Rhyne
Jacksonville Mill

Subject: Well - North Side Aeration
Ponds CE 30-117-16

Well was drilled for Houdaille Construction Company by O. E. Smith Well Drilling Company and has a total depth of 782 ft. The well has 528 ft. of 6" casing and 108 ft. of 8" casing. The 8" section is at the top. Well capacity is 500 GPM.

APPROX OCT 1971


G. D. Lyon

bh

cc: Messrs.
J. F. Eschner
R. G. Gonzales
J. F. Robbins
R. S. Welch

TR1425 PUMP HEAD

LAYNE & BOWLER, INC
MEMPHIS, TENN.

19 - 8 3/4
10 3/8

9 - 4

29 - 10 3/4

83 7/16"

17
28

SIZE PIPE 1 1/4"

12-18" CORED HOLES

21"

LAYNE

21"



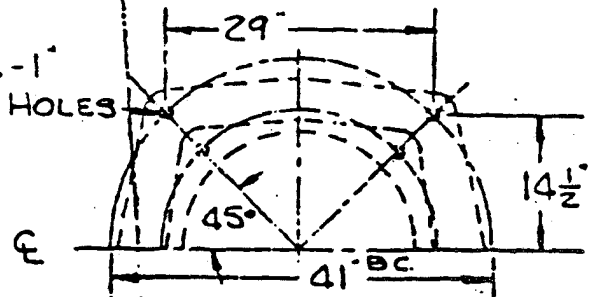
DISCHARGE FLANGE

USE THESE DIMENSIONS ONLY
WHEN CERTIFIED BY FACTORY

38"

ONE PIECE
5'0" LONG

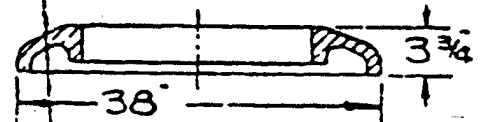
4-1" CORED HOLES



LOCATION OF HOLES IN BASE PLATE

40' 0"

3 - PIECES
10'0" LONG

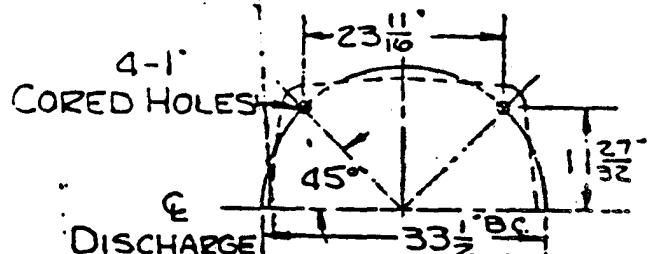


SECTION THRU BASE PLATE

55' 7"

17' 7 7/8"

ONE PIECE
5'0" LONG



DISCHARGE
LOCATION OF HOLES IN BASE OF ELL

5' 7"

HI-RESIS 1

TYPE 18" REE BOWLS

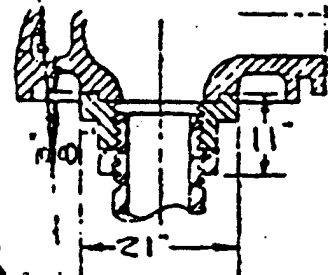
3 - STAGES QNS 4 x 8

4 - STAGES 4 x 9

10 FT OF 14" IN SUCTION

14" Cone Strainer

SECTION THRU BASE OF ELL



NAME Genis Paper Company
 ADDRESS P. O. Box 18020
Jacksonville, FL 32229
 FACILITY Jacksonville Mill
 LOCATION 9469 Eastport Road, Jacksonville, FL

PERMIT NUMBER <u>11-0000000</u>		DISCHARGE NUMBER <u>001</u>	
MONITORING PERIOD			
FROM	TO	FROM	TO
YEAR	MO	DAY	YEAR
11	01	30	11
30	11	30	30
(20-21)	(22-23)	(24-25)	(26-27)

NOTE: Read instructions before completing this form.

PARAMETER (32-37)	SAMPLE MEASUREMENT (38-43)	QUANTITY OF LOADING (44-47)			QUALITY OR CONCENTRATION (48-53)			NO. EX (62-63)	FREQUENCY OF ANALYSIS (64-68)	SAMPLING TYPE (69-7)
		AVERAGE (44-45)	MAXIMUM (46-47)	UNITS (48-49)	MINIMUM (48-49)	AVERAGE (50-51)	MAXIMUM (52-53)			
Brackish Cooling Water Flow	SAMPLE MEASUREMENT	43.2	11.2	MGD				0	Cont.	Base
	PERMIT REQUIREMENT	None	None							
Brackish Cooling Water Discharge Temperature	SAMPLE MEASUREMENT				78	81	84	0	2/7	Grab
	PERMIT REQUIREMENT				None	93	None			
Process Effluent Flow	SAMPLE MEASUREMENT	18.8	20.5	MGD				0	Cont.	Inter
	PERMIT REQUIREMENT	None	None							
Process Effluent pH	SAMPLE MEASUREMENT				7.3	7.5	8.2	0	Cont.	Reco
	PERMIT REQUIREMENT				6.0	None	9.0			
Process Effluent Temperature	SAMPLE MEASUREMENT				68	75	80	0	Daily	Grab
	PERMIT REQUIREMENT				None	None	None			
Process Effluent TSS	SAMPLE MEASUREMENT	5,400	8,500	LBS/DAY	22	35	53	0	Daily	24-hr
	PERMIT REQUIREMENT	8,350	25,000		None	None	None			
Process Effluent TSS	SAMPLE MEASUREMENT	9,600	14,000	LBS/DAY	30	62	99	0	Daily	24-hr
	PERMIT REQUIREMENT	13,000	39,000		None	None	None			

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER
S. J. Smith
 TYPED OR PRINTED

THIS DOCUMENT IS SIGNED WITH RECOGNITION THAT KNOWINGLY MAKING A FALSE CERTIFICATION ON THIS REPORT OR SUPPORTING DOCUMENTS OR INTENTIONALLY TAMPERING WITH ANY MONITORING DEVICE OR METHOD ARE CRIMINAL OFFENSES, SEE 19 U.S.C. § 1001 AND 33 U.S.C. § 1319. (Penalties under these statutes may be fine up to \$10,000 and/or maximum imprisonment of between 5 months and 5 years.)

TELEPHONE
751-1100
 DATE
11/01/00

SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT

AREA CODE
904
 NUMBER
751-1100
 YEAR
00
 MO
11
 DAY
01

COMMENT AND EXPLANATION OF ANY VIOLATIONS (Reference all attachments here)

**NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM
DISCHARGE MONITORING REPORT**

Form Approved
OMB NO. 155-006

INSTRUCTIONS

1. Provide data for period covered by this report in spaces marked "REPORTING PERIOD".
2. Enter reported minimum, average and maximum values under "QUANTITY" and "CONCENTRATION" in the units specified for each parameter as appropriate. Do not enter values in boxes containing asterisks. "AVERAGE" is average computed over actual time discharge is operating. "MAXIMUM" and "MINIMUM" are extreme values observed during the reporting period.
3. Specify the number of analyzed samples that exceed the maximum (and/or minimum as appropriate) permit conditions in the columns labeled "No. Ex." If none, enter "0".
4. Specify frequency of analysis for each parameter as No. analyses/No. days. (e.g., "2/7" is equivalent to 2 analyses performed every 7 days.) If continuous enter "CONT.".
5. Specify sample type ("grab" or "24 hr. composite") as applicable. If frequency was continuous, enter "NA".
6. Appropriate signature is required on bottom of this form.
7. Remove carbon and retain copy for your records.
8. Fold along dotted lines, staple and mail Original to office specified in permit.

12-P FL ST	10-101 FL 0000 400 PERMIT NUMBER	127-701 001 DIS	2621 2631 SIC	30° 24' 55" LATITUDE	081° 35' 45" LONGITUDE
REPORTING PERIOD: FROM		TO			
7 8 1 1 0 1 YEAR MO DAY		7 8 1 1 3 0 YEAR MO DAY			

PARAMETER		QUANTITY			UNITS	NO. EX.	CONCENTRATION			UNITS	NO. EX.	FREQUENCY OF ANALYSIS	SAMPLE TYPE
		MINIMUM	AVERAGE	MAXIMUM			MINIMUM	AVERAGE	MAXIMUM				
Brackish Cooling Water Flow	REPORTED	43.2	43.2	43.2	MGD	0						Cont.	Based on Pumping Cap
	PERMIT CONDITION	None	None	None									
Brackish Cooling Water Discharge Temperature	REPORTED	78	80	82	°F	0						2/7	Grab
	PERMIT CONDITION	None	93	None									
Process Effluent Flow	REPORTED	15.2	18.8	22.6	MGD	0						Cont.	Integrator & Recorder
	PERMIT CONDITION	None	None	None									
Process Effluent pH	REPORTED	7.2	7.3	7.5	STD. UNITS	0						Cont.	Recorder & 24 Hr. Comp
	PERMIT CONDITION	6.0	None	9.0									
Process Effluent Temperature	REPORTED	78	83	86	°F	0						Daily	Grab
	PERMIT CONDITION	None	None	None									
Process Effluent BOD ₅	REPORTED	1,700	4,100	6,200	LBS/DAY	0	18	26	38	Mg/L	0	Daily	24-Hour Composite
	PERMIT CONDITION	None	8,350	25,000			None	None	None				
Process Effluent TSS	REPORTED	6,100	12,600	18,300	LBS/DAY	0	48	80	112	Mg/L	0	Daily	24-Hour Composite
	PERMIT CONDITION	None	13,000	39,000			None	None	None				
	REPORTED												
	PERMIT CONDITION												

NAME OF PRINCIPAL EXECUTIVE OFFICER		TITLE OF THE OFFICER		DATE		I certify that I am familiar with the information contained in this report and that to the best of my knowledge and belief such information is true, complete, and accurate.	 SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT
LAST	FIRST	MI	TITLE	YEAR	MO		
Bowersock,	James N.		Vice President	7	8	12	

**NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM
DISCHARGE MONITORING REPORT**

Approved
OMB NO. L34-R0073

INSTRUCTIONS

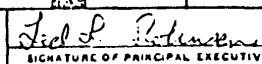
1. Provide dates for period covered by this report in spaces marked "REPORTING PERIOD".
2. Enter reported minimum, average and maximum values under "QUANTITY" and "CONCENTRATION" in the units specified for each parameter as appropriate. Do not enter values in boxes containing asterisks. "AVERAGE" is average computed over actual time discharge is operating. "MAXIMUM" and "MINIMUM" are extreme values observed during the reporting period.
3. Specify the number of analyzed samples that exceed the maximum (and/or minimum as appropriate) permit conditions in the columns labeled "No. Ex." If none, enter "0".
4. Specify frequency of analysis for each parameter as No. analyses/No. days (e.g., "1/7" is equivalent to 3 analyses performed every 7 days.) If continuous enter "CONT."
5. Specify sample type ("grab" or "24-hr. composite") as applicable. If frequency was continuous, enter "NA".
6. Appropriate signature is required on bottom of this form.
7. Remove carbon and retain copy for your records.
8. Fold along dotted lines, staple and mail Original to office specified in permit.

12-2 FL	1-101 FL 0000 400	117-101 001	2621 2631	30° 24' 55" 081° 35' 45"
17 ST	PERMIT NUMBER	DIS	SIC	LATITUDE LONGITUDE

REPORTING PERIOD: FROM 12-21 12-22 12-23 TO 12-27 12-28 12-29

7 6	1 1	0 1	7 6	1 1	3 0
YEAR	MO	DAY	YEAR	MO	DAY

PARAMETER		QUANTITY			UNITS	NO. EX.	CONCENTRATION			UNITS	NO. EX.	FREQUENCY OF ANALYSIS	SAMPLE TYPE
		MINIMUM	AVERAGE	MAXIMUM			MINIMUM	AVERAGE	MAXIMUM				
Brackish Cooling Water Flow	REPORTED	57.6	61.4	72.0	MGD	0						Cont.	Based on Pumping Capacity
	PERMIT CONDITION	None	None	None									
Brackish Cooling Water Discharge Temperature	REPORTED	60	69	73	°F	0						2/7	Grab
	PERMIT CONDITION	None	93	None									
Process Effluent Flow	REPORTED	17.1	18.7	21.3	MGD	0						Cont.	Integrator & Recorder
	PERMIT CONDITION	None	None	None									
Process Effluent pH	REPORTED	7.4	7.6	7.8	STD. UNITS	0						Cont.	Recorder 24-Hr. Comp.
	PERMIT CONDITION	6.0	None	9.0									
Process Effluent Temperature	REPORTED	78	81	83	°F	0						Daily	Grab
	PERMIT CONDITION	None	None	None									
Process Effluent BOD ₅	REPORTED	3,700	6,500	9,400	LBS./DAY	0	25	42	64	Mg/L	0	Daily	24-Hour Composite
	PERMIT CONDITION	None	8,350	25,000			None	None	None				
Process Effluent TSS	REPORTED	7,800	13,800	19,700	LBS./DAY	1	50	88	117	Mg/L	0	Daily	24-Hour Composite
	PERMIT CONDITION	None	13,000	39,000			None	None	None				
	REPORTED												
	PERMIT CONDITION												

NAME OF PRINCIPAL EXECUTIVE OFFICER			TITLE OF THE OFFICER			DATE			I certify that I am familiar with the information contained in this report and that to the best of my knowledge and belief such information is true, complete, and accurate.			 SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT		
LAST	FIRST	MI	TITLE	YEAR	MO	DAY								
Falco	Henry	W	Vice President	7	6	11	0	7						

J. K. Donald
W. L. Durden
H. R. Emery

F. E. Westmark
R. H. Williams

PAPER COMPANY

KRAFT DIVISION
P.O. Box 18020
Jacksonville, Fla. 32229
904/751-1400

TYPICAL REPORT TO STATE September 21, 1982

Mr. Frank Watkins, Jr., P.E.
Subdistrict Engineer
Department of Environmental Regulation
St. Johns River Subdistrict
3426 Bills Road
Jacksonville, FL 32207

Dear Mr. Watkins:

RE: Permit No. 1016-4984
St. Regis Paper Company

The following information is being submitted in accordance with the above permit conditions for the month of August, 1982.

	<u>Permit</u>
Flow, daily average 13.3 MGD	None
Flow, daily maximum 19.2 MGD	None
Temperature, daily average 84°F	None
Temperature, daily maximum 86°F	None
pH, daily average 7.6	None
pH, daily maximum 8.1	9.0
pH, daily minimum 7.3	6.1
BOD ₅ , daily average 4,700 lbs/day	8,350
BOD ₅ , daily maximum 12,500 lbs/day	17,061
Total Suspended Solids, daily average 3,700 lbs/day	13,000
Total Suspended Solids, daily maximum 8,700 lbs/day	36,571

Very truly yours,


J. H. Johnson, Jr.
Resident Manager

rm

cc Donald C. Bayly, BES

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM DISCHARGE MONITORING REPORT

Form Approved
OMB NO. 156-0067

INSTRUCTIONS

1. Provide dates for period covered by this report in spaces marked "REPORTING PERIOD".
2. Enter reported minimum, average and maximum values under "QUANTITY" and "CONCENTRATION" in the units specified for each parameter as appropriate. Do not enter values in boxes containing asterisks. "AVERAGE" is average computed over actual time discharge is operating. "MAXIMUM" and "MINIMUM" are extreme values observed during the reporting period.
3. Specify the number of analyzed samples that exceed the maximum (and/or minimum as appropriate) permit conditions in the columns labeled "No. Ex." If none, enter "0".
4. Specify frequency of analysis for each parameter as No. analyses/No. days. (e.g., "3/7" is equivalent to 3 analyses performed every 7 days.) If continuous enter "CONT."
5. Specify sample type ("Grab" or "24 hr. composite") as applicable. If frequency was continuous, enter "NA".
6. Appropriate signature is required on bottom of this form.
7. Remove carbon and retain copy for your records.
8. Fold along dotted lines, staple and mail Original to office specified in permit.

12-B	12-100	122-101	2621	2631	30° 24' 55"	081° 35' 45"
FL ST	FL 0000 400 PERMIT NUMBER	001 DIS	2621 SIC		LATITUDE	LONGITUDE
		122-101	122-101	122-101		
		7/4	1/1	0/1		
		YEAR	MO	DAY		
		TO				
		7/4	1/1	3/0		
		YEAR	MO	DAY		

REPORTING PERIOD: FROM

TO

PARAMETER		QUANTITY				CONCENTRATION				FREQUENCY OF ANALYSIS	SAMPLE TYPE
		MINIMUM	AVERAGE	MAXIMUM	UNITS	MINIMUM	AVERAGE	MAXIMUM	UNITS		
Brackish Cooling Water Flow	REPORTED	43.2	48.0	61.2						Cont.	Based on pumping Cap.
	PERMIT CONDITION	NONE	NONE	NONE	MGD					Cont.	Based on pumping Cap.
Brackish Cooling Water Discharge Temp.	REPORTED	70	73	74						2/7	Grab
	PERMIT CONDITION	NONE	93	NONE	° F					2/7	Grab
Process Effluent Flow	REPORTED	9.8	16.2	18.6						Cont.	Integrating Recorder
	PERMIT CONDITION	NONE	NONE	NONE	MGD					Cont.	Recorder
Process Effluent pH	REPORTED	7.7	8.1	8.8						Cont.	Recorder & 24 Hr. Comp.
	PERMIT CONDITION	6.0	NONE	9.0	STD. UNITS					Cont.	Recorder
Process Effluent Temperature	REPORTED	77	81	86						Daily	Grab
	PERMIT CONDITION	NONE	NONE	NONE	° F					2/7	Grab
Process Effluent RODs	REPORTED	2,800	5,100	7,700		21	38	57		Daily	24 Hour Composite
	PERMIT CONDITION	NONE	10,000	32,000	LBS./DAY	NONE	NONE	NONE	Mg/L	Daily	24 Hour Composite
Process Effluent TSS	REPORTED	4,200	10,300	13,500		51	77	103		Daily	24 Hour Composite
	PERMIT CONDITION	NONE	13,000	32,000	LBS./DAY	NONE	NONE	NONE	Mg/L	Daily	24 Hour Composite
	REPORTED										
	PERMIT CONDITION										

NAME OF PRINCIPAL EXECUTIVE OFFICER	TITLE OF THE OFFICER	DATE	I certify that I am familiar with the information contained in this report and that to the best of my knowledge and belief such information is true, complete, and accurate.
Signature of Principal Executive Officer: <i>Deborah Smith</i>			Signature of Authorized Agent: _____



KRAFT DIVISION
P.O. Box 18020
Jacksonville, Fla. 32229
904/751-1400

December 30, 1982

Consumptive Use Permit Application - Letter of Explanation

St. Regis Paper Company, Jacksonville Mill, is a wholly integrated pulp and paper mill located in Duval county at 9469 Eastport Road. Other divisions also operate in this county.

The Jacksonville Mill operates 24 hours a day, 7 days a week, 361 days a year, economic shutdowns excepted.

The mill has 12 wells as listed. Seven wells are considered production wells and are equipped with pumps. No. 1 and No. 2 are on standby emergency use basis. Nos. 4, 5, 7, 8, and 9 are used on a rotation basis to produce an average of 20 million gallons per day with a maximum capacity of 28 M.G.D. The mill normally uses 20 M.G.D. with a maximum use of about 25 M.G.D. No. 3 and No. 6 wells were never drilled.

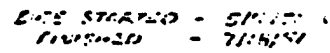
Due to the nature of our production and its dependency on water, our recycle pumps control our daily use. If a large recycle pump tears up and requires several days for repair, our use of fresh water will be near the maximum.

Conservation has always been practiced in our mill with recycles approaching 14. We will continue to look for economical ways to improve the conservation measures.

Our waste treatment system is operated under EPA Permit No. FL 0000-400 and State Permit No. 1016-4984.

The attached map shows our well locations and our river water intake.

19

[illegible]

U. S. DEPT. OF AGRICULTURE

WELL SCHEDULE

ZOOLOGICAL SURVEY

WATER(PLACES DIVISION

ST.R. No.1

Well No. 302510 Npp13E02.1

... 302510N0473602

30.2510 Dofila

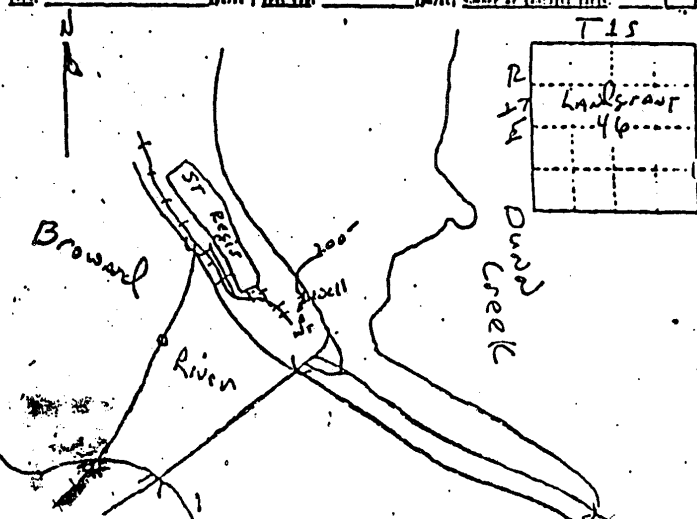
MATTER CASE

[illegible]

WELL-DESCRIPTION CARD

[illegible]

HYDROGEOLOGIC CAMP

[illegible]

FROM:
ST. REGIS
JACKSONVILLE, FLORIDA

ANALYSIS NO. C497954
DATE SAMPLED 12/16/74
DATE RECEIVED 12/30/74
DATE PRINTED 1/ 9/75

SAMPLE MARKED:
NO. 1 WELL

CATIONS:

	PPM
CALCIUM (CACO3) - SOLUBLE	120.
MAGNESIUM (CACO3) - SOLUBLE	100.
SODIUM (CACO3)	29.
AMMONIA (CACO3)	0.8

ANIONS:

	PPM
BICARBONATE ALKALINITY (CACO3)	132.
CARBONATE ALKALINITY (CACO3)	24.
CHLORIDE (CACO3)	31.
SULFATE (CACO3)	93.
NITRATE (CACO3)	*ND (1.)
SILICA (SI02) - SOLUBLE	26.

OTHERS:

	PPM
PH (PH UNITS)	8.3
ALKALINITY (CACO3) - TOTAL	156.
ALKALINITY (CACO3) - PHENOLPHTHALEIN	12.
ALKALINITY (CACO3) - P-BACL2	*ND (2.)
CONDUCTIVITY (MICROMHOS PER CM)	460.
CALCIUM (CACO3) - SOLUBLE AND INSOLUBLE	120.
MAGNESIUM (CACO3) - SOLUBLE AND INSOLUBLE	110.
IRON (FE) - SOLUBLE AND INSOLUBLE	0.2
TOTAL ORGANIC CARBON (C)	4.

*NOT DETECTED (BELOW INDICATED LIMIT OF DETECTION)

James J. Hickey

NALCO

LABORATORY REPORT WATER ANALYSIS

FROM:
ST. REGIS PULP AND PAPER COMPANY
JACKSONVILLE, FLORIDA

ANALYSIS NO. 5
DATE SAMPLED 3
DATE RECEIVED 3
DATE PRINTED 3

SAMPLE MARKED:
WELL NO. 1

CATIONS: PPM
CALCIUM (CACO3) - SOLUBLE 130.
MAGNESIUM (CACO3) - SOLUBLE 88.
SODIUM (CACO3) 35.
AMMONIA (CACO3) *ND (0.

ANIONS: PPM
BICARBONATE ALKALINITY (CACO3) 146.
CHLORIDE (CACO3) 36.
SULFATE (CACO3) 94.
NITRATE (CACO3) *ND (1.
SILICA (SIO2) - SOLUBLE 21.

OTHERS: PPM
PH (PH UNITS) 8.0
ALKALINITY (CACO3) - TOTAL 146.
ALKALINITY (CACO3) - PHENOLPHTHALEIN *ND (2.)
ALKALINITY (CACO3) - P-BACL2 *ND (2.)
CONDUCTIVITY (MICROMHOS PER CM) 490.
CONDUCTIVITY (MICROMHOS PER CM) - NEUTRALIZED 490.
CALCIUM (CACO3) - SOLUBLE AND INSOLUBLE 130.
MAGNESIUM (CACO3) - SOLUBLE AND INSOLUBLE 88.
IRON (FE) - SOLUBLE AND INSOLUBLE 3.8

*NOT DETECTED (BELOW INDICATED LIMIT OF DETECTION)

Arthur P. Gant

P. O. BOX 87 • SUGAR LAND, TEXAS 77478

 trademarks of Nalco Chemical Company.

NALCO CHEMICAL COMPANY
REGIONAL ANALYTICAL LABORATORIES

2111 E. Dominguez St.
Carson, CA 90745

6216 W. 66th Place
Chicago, Illinois 60638

Box 16A
Paulsboro, NJ 08066

Box 87
Sugar Land, TX 77478

ST. REGIS KRAFT CORP.
JACKSONVILLE, FLORIDA

Identification and Description:

Lab. No. P-8596 (G) - Water test well #1 well at 1216' below grd. level.
Sampled 6/4/51. Very pale amber, clear.

Lab. No. P-8905 (P) - Water well No. 1 640' deep. Sampled 6/12/51.

Lab. No. P-8904 (P) - Water well # 1-1045' deep. Sampled 6/14/51. Water white, clear.

Chemical Analysis:

Laboratory No.	P-8596		P-8905		P-8904	
	Hall		Hall		Hall	
pH Value	7.2		9.3		7.5	
Titration, ml.						
A reading	0.0		0.7		0.0	
B reading						
M. O. reading	10.1		2.4		9.0	
Hardness as CaCO ₃						
Concentrations	ppm	epm	ppm	epm	ppm	epm
Hydroxide (OH)	0	0.00	0		0	0.00
Carbonate (CO ₃)	0	0.00	14		0	0.00
Bicarbonate (HCO ₃)	206	3.37	20		183	3.00
Iodine Demand as Na ₂ SO ₃						
Sulfate (SO ₄)	75	1.56	85		80	1.66
Chloride (Cl)	23	0.65	21		24	0.68
Nitrate (NO ₃)	1	0.02	< 1		1	0.02
Phosphate (PO ₄)						
Silica (SiO ₂)	31		26		30	
Iron (Fe)	0.27		0.37		0.06	
Aluminum (Al)	0.05		No evid.		No evid.	
Calcium (Ca)	54	2.70	filt. 36		58	2.90
Magnesium (Mg)	26	2.10	filt. 3		22	1.78
Sodium (Na)						
Potassium (K)						
Dissolved Solids						
Suspended Solids	est. 6-8		est. 10-12		est. 2-4	
Total Solids						
Hardness as CaCO ₃	240	4.80	filt. 104		234	4.68
Organic (Ether Soluble)						
Conductivity at 77°F			Micromhos/cm			
Manganese	< 0.1		< 0.1		< 0.1	
Color	15-20					
Total Calcium			44			
Total Hardness			130			
Total Magnesium			5			
Free Carbon Dioxide (CO ₂)						
Ammonia (NH ₃)						
Dissolved Solids from Conductivity						

Identification and Description:

RENUMBERED #2

Lab. No. P-9131 (G) - Water test well No. 3 658 feet. Sampled 6/20/51.
Water white, clear

Lab. No. P-9166 (P) - Water well No. 1 1378 " deep. Sampled 6/21/51. Water
white, clear.

Chemical Analysis:

Laboratory No.	P-9131		P-9166	
	Hall		Hall	
pH Value	7.4		7.6	
Titration, ml.				
A reading	0.0		0.0	
B reading				
M. O. reading	9.7		9.6	
Hardness as CaCO ₃				
Concentrations	ppm	cpm	ppm	cpm
Hydroxide (OH)	0	0.00	0	0.00
Carbonate (CO ₃)	0	0.00	0	0.00
Bicarbonate (HCO ₃)	197	3.23	195	3.20
Iodine Demand as Na ₂ SO ₃				
Sulfate (SO ₄)	80	1.66	80	1.66
Chloride (Cl)	24	0.68	24	0.68
Nitrate (NO ₃)	1	0.02	1	0.02
Phosphate (PO ₄)				
Silica (SiO ₂)	31		29	
Iron (Fe)	< 0.05		< 0.05	
Aluminum (Al)	No evid.		No evid.	
Calcium (Ca)	58	2.90	58	2.90
Magnesium (Mg)	23	1.90	21	1.74
Sodium (Na)				
Potassium (K)				
Dissolved Solids				
Suspended Solids	ast. 2-4		Negligible	
Total Solids				
Hardness as CaCO ₃	240	4.80	232	4.64
Organic (Ether Soluble)				
Conductivity at 77°F			Micromhos/cm	
Manganese	< 0.1		< 0.1	
Color			< 5	

Free Carbon Dioxide (CO₂)

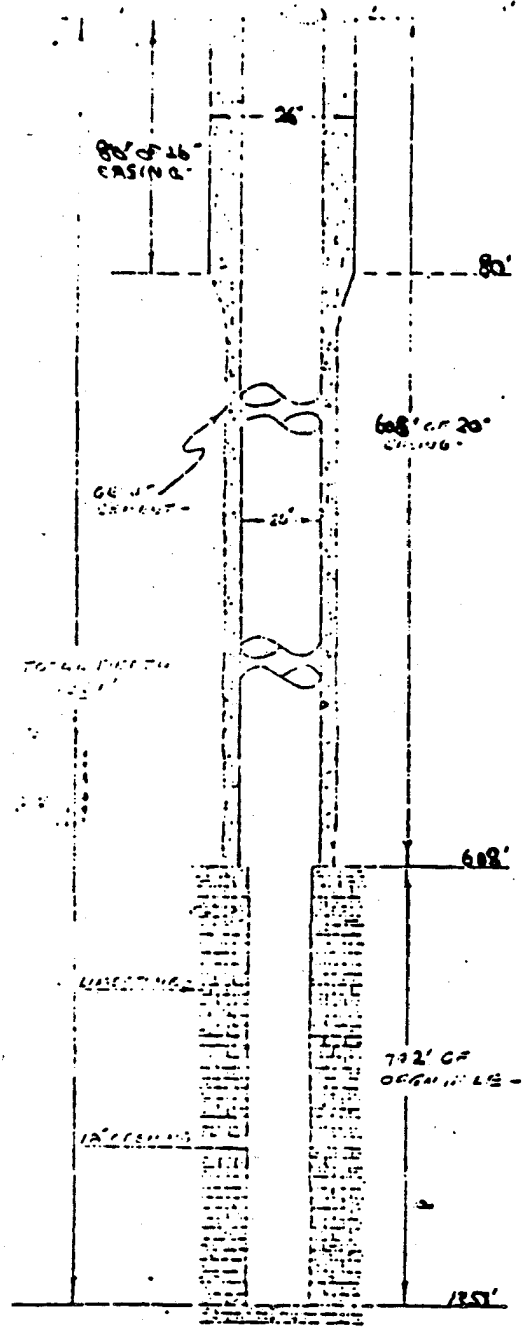
Ammonia (NH₃)

Dissolved Solids from
Conductivity

RECEIVED
JUN 21 1951

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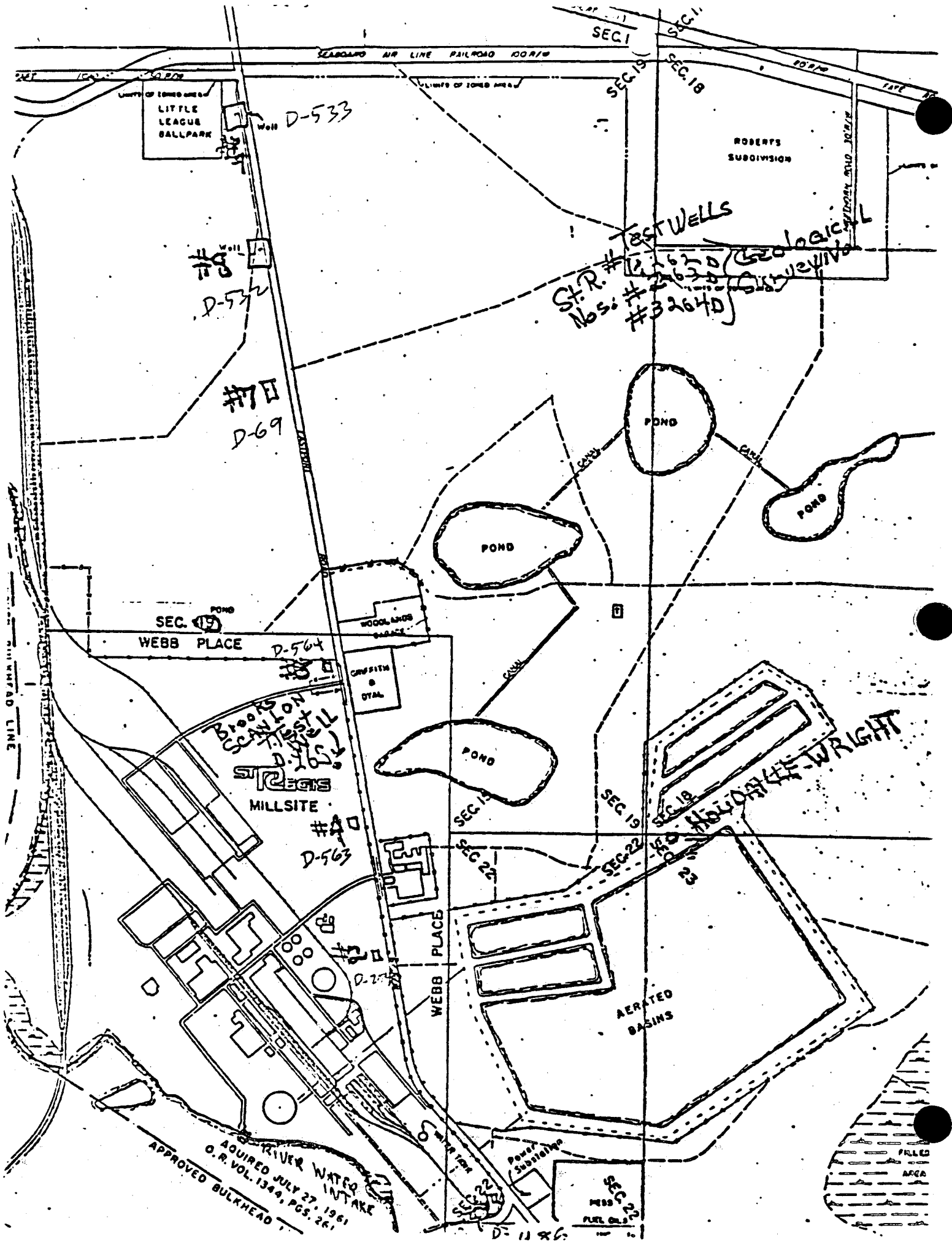
WELL NO 2
PRODUCTION



DATE DRILLING STARTED - 6/21/51
FINISHED DRILLING - 7/16/51

DATE STARTED - 5/16/51
FINISHED - 7/12/51

DATE		REVISION		NO		BY		DATE		REVISION	
ST. REGIS PAPER CO. Jacksonville, Fla. SK											



ST. REGIS BRISTOL TATION
JACKSON

Identification and Description:

Lab. No. P-9650 (P) - Water, well
Water white, c

Chemical Analysis:

Laboratory No. _____

pH Value _____

Titrations, ml _____

A reading _____

B reading _____

M. O. reading _____

Hardness as CaCO_3 _____

Concentrations _____

Hydroxide (OH) _____Carbonate (CO_3) _____Bicarbonate (HCO_3) _____Iodine Demand as Na_2SO_3 _____Sulfate (SO_4) _____Chloride (Cl) _____Nitrate (NO_3) _____Phosphate (PO_4) _____Silica (SiO_2) _____Iron (Fe) _____Aluminum (Al) _____Calcium (Ca) _____Magnesium (Mg) _____Sodium (Na) _____Potassium (K) _____

Dissolved Solids _____

Suspended Solids _____

Total Solids _____

Hardness as CaCO_3 _____

Organic (Ether Soluble) _____

Conductivity at 77°F _____

Manganese (mn) _____

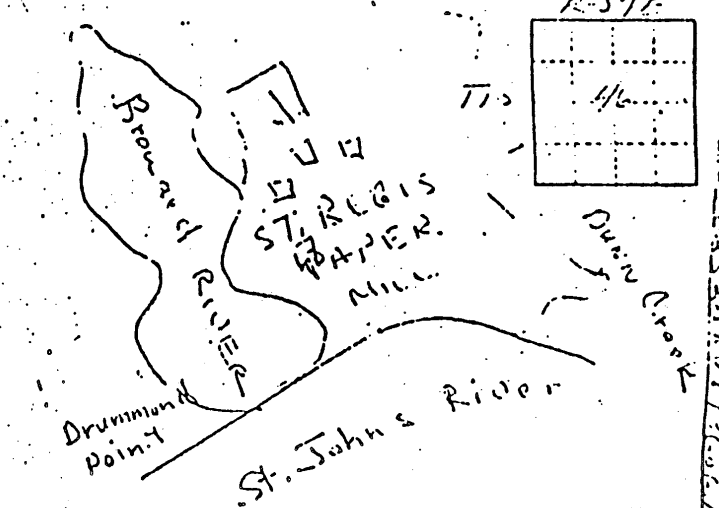
Free Carbon Dioxide (CO_2) _____Ammonia (NH_3) _____Dissolved Solids from
Conductivity _____

WELL SCHEDULE
ST. NO. 2

MAINTENANCE CARD
Location: Florida St. Johns River Eastport Quad
Date: 3/13/54 0.7 Dunal 6.5
Elevation: 21.1 27.0 76 Chapel Tella
Well No.: 0-274 0-324 0-274
Well Name: St. Johns River Eastport Fla.
Company: Corporation Industrial
Type of Well: Drill Hand Other
Depth: 139.0 139.0 139.0
Diameter: 6.0 6.0 6.0
Casing: Steel Concrete Other
Pump: Electric Hand Other
Notes: Drilling log 3269

WELL DESCRIPTION CARD
Date: 3/13/54 0.7 Dunal 6.5
Elevation: 21.1 27.0 76 Chapel Tella
Well No.: 0-274 0-324 0-274
Well Name: St. Johns River Eastport Fla.
Company: Corporation Industrial
Type of Well: Drill Hand Other
Depth: 139.0 139.0 139.0
Diameter: 6.0 6.0 6.0
Casing: Steel Concrete Other
Pump: Electric Hand Other
Notes: Drilling log 3269

HYDROGEOLOGIC CARD
Location: Florida St. Johns River Eastport Quad
Date: 3/13/54 0.7 Dunal 6.5
Elevation: 21.1 27.0 76 Chapel Tella
Well No.: 0-274 0-324 0-274
Well Name: St. Johns River Eastport Fla.
Company: Corporation Industrial
Type of Well: Drill Hand Other
Depth: 139.0 139.0 139.0
Diameter: 6.0 6.0 6.0
Casing: Steel Concrete Other
Pump: Electric Hand Other
Notes: Drilling log 3269





REPORT OF

WATER ANALYSIS

FROM:
ST. REGIS
JACKSONVILLE, FLORIDA

SAMPLE MARKED:
NO. 2 WELL

ANALYSIS NO. C001955
DATE SAMPLED 12/16/74
DATE RECEIVED 12/30/74
DATE PRINTED 1/1/75

CATIONS:

CALCIUM (CAC03) - SOLUBLE
MAGNESIUM (CAC03) - SOLUBLE
SODIUM (CAC03)
AMMONIA (CAC03)

29.
0.2

ANIONS:

BICARBONATE ALKALINITY (CAC
CARBONATE ALKALINITY (CAC03
CHLORIDE (CAC03)
SULFATE (CAC03)
NITRATE (CAC03)
SILICA (SI02) - SOLUBLE

PPM.
100
100
100
100
100

OTHERS:

PH (PH UNITS)
ALKALINITY (CAC03) - TOTAL
ALKALINITY (CAC03) - PHENO
ALKALINITY (CAC03) - P-BAC
CONDUCTIVITY (MICROMHOS PE
CALCIUM (CAC03) - SOLUBLE
MAGNESIUM (CAC03) - SOLUBLE
IRON (FE) - SOLUBLE AND IN
TOTAL ORGANIC CARBON (C)

0.15

*NOT DETECTED (BELOW INSTR

ST. REGIS KRAFT CORPORATION
EASTPORT, FLORIDA

Identification and Description:

Lab. No. P-9642 (G) - Water, test well No. 2 - 1025' deep. Sampled 7/9/51.
Water white, clear.

Lab. No. P-9551 (P) - Water, well No. 2 - 740' deep. Sampled 7/3/51.
Water white, clear.

Lab. No. P-9552 (P) - Water, well No. 2 - 1136' deep. Sampled 7/5/51.
Water white, clear.

Chemical Analysis:

Laboratory No.	P-9642	P-9551	P-9552
	Hall	Hall	Hall
pH Value	7.5	7.8	7.8
Titration, ml.			
A reading	0.0	0.0	0.0
B reading			
M. O. reading	9.0	9.3	9.9
Hardness as CaCO ₃			
Concentrations	ppm epm	ppm epm	ppm epm
Hydroxide (OH)	0 0.00	0 0.00	0 0.00
Carbonate (CO ₃)	0 0.00	0 0.00	0 0.00
Bicarbonate (HCO ₃)	183 3.00	199 3.27	203 3.30
Iodine Demand as Na ₂ SO ₃			
Sulfate (SO ₄)	30 1.66	70 1.46	75 1.56
Chloride (Cl)	24 0.68	23 0.65	23 0.6
Nitrate (NO ₃)	2 0.03	1	1
Phosphate (PO ₄)			
Silica (SiO ₂)	32	31	30
Iron (Fe)	< 0.05	< 0.05	< 0.05
Aluminum (Al)	No evid.	< 0.1	No evid.
Calcium (Ca)	57 2.85	56 2.80	56 2.80
Magnesium (Mg)	23 1.87	22 1.76	23 1.87
Sodium (Na)			
Potassium (K)			
Dissolved Solids			
Suspended Solids	est. 24	Negligible	Negligible
Total Solids		76	
Hardness as CaCO ₃	236 4.72	288 4.56	282 4.6
Organic (Ether Soluble)			
Conductivity at 77°F		Micromhos/cm	
Manganese (Mn)	< 0.1	< 0.1	< 0.1

Free Carbon Dioxide (CO₂)

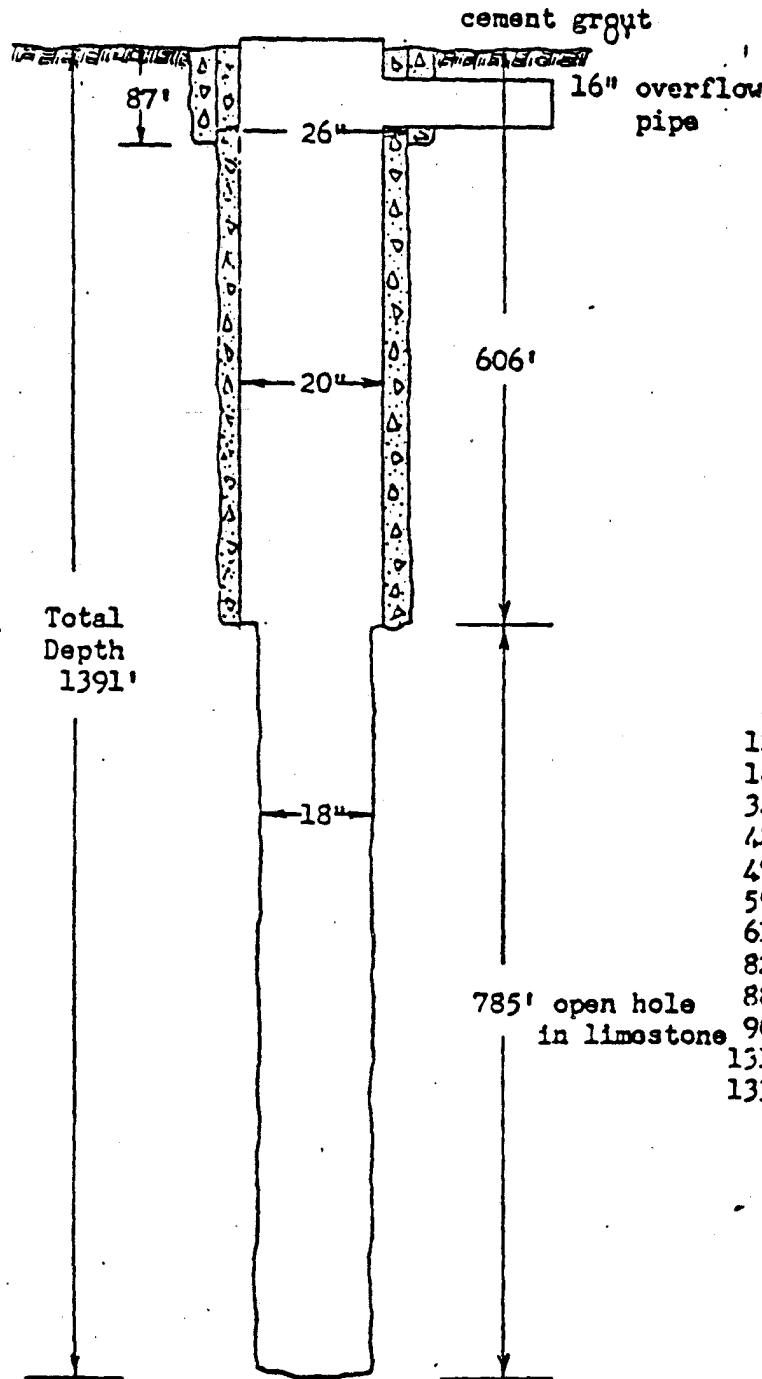
Ammonia (NH₃)

Dissolved Solids from
Conductivity

WELL NO. 4

WELL DIAGRAM

WELL DATA



Total depth of well 1391'
 Casing 606' of 20" steel cas:
 87' of 26" pit cas:
 Cement 400 bags pumped arou:
 cas:--

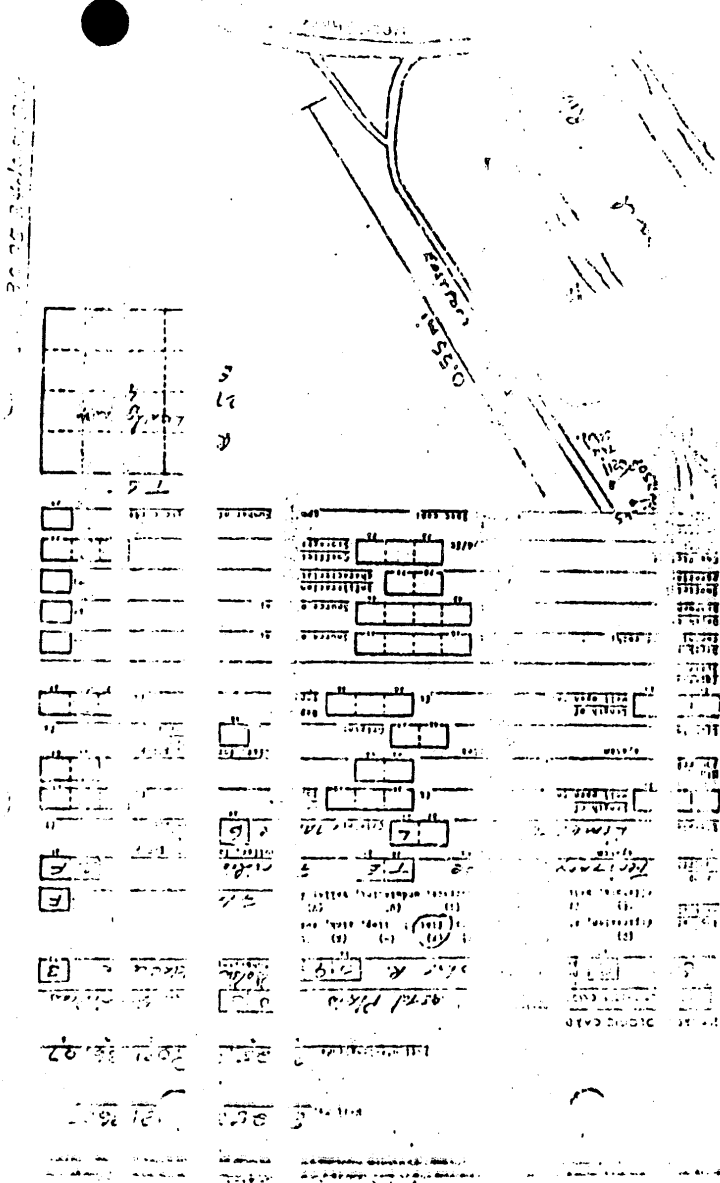
PUMP

Static water level
 Pumping level
 Drawdown
 Production

PUMP

FORMATION

0-87 Sand
 87-128 White limestone
 128-189 Limestone and clay
 189-342 Blue clay, soft and med.
 342-420 Blue clay and rock
 420-490 Blue clay and rock, hard
 490-595 Blue clay and limestone
 595-617 White limestone, med.
 617-828 Limestone, med. and hard
 828-887 Br. limestone, soft and med.
 887-960 White limestone, med.
 960-1310 Br. limestone, med. drill
 1310-1330 Br. limestone, very hard
 1330-1391 Br. limestone and flint
 drill very hard



1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200
201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239	240	241	242	243	244	245	246	247	248	249	250	251	252	253	254	255	256	257	258	259	260	261	262	263	264	265	266	267	268	269	270	271	272	273	274	275	276	277	278	279	280	281	282	283	284	285	286	287	288	289	290	291	292	293	294	295	296	297	298	299	300
301	302	303	304	305	306	307	308	309	310	311	312	313	314	315	316	317	318	319	320	321	322	323	324	325	326	327	328	329	330	331	332	333	334	335	336	337	338	339	340	341	342	343	344	345	346	347	348	349	350	351	352	353	354	355	356	357	358	359	360	361	362	363	364	365	366	367	368	369	370	371	372	373	374	375	376	377	378	379	380	381	382	383	384	385	386	387	388	389	390	391	392	393	394	395	396	397	398	399	400
401	402	403	404	405	406	407	408	409	410	411	412	413	414	415	416	417	418	419	420	421	422	423	424	425	426	427	428	429	430	431	432	433	434	435	436	437	438	439	440	441	442	443	444	445	446	447	448	449	450	451	452	453	454	455	456	457	458	459	460	461	462	463	464	465	466	467	468	469	470	471	472	473	474	475	476	477	478	479	480	481	482	483	484	485	486	487	488	489	490	491	492	493	494	495	496	497	498	499	500
501	502	503	504	505	506	507	508	509	510	511	512	513	514	515	516	517	518	519	520	521	522	523	524	525	526	527	528	529	530	531	532	533	534	535	536	537	538	539	540	541	542	543	544	545	546	547	548	549	550	551	552	553	554	555	556	557	558	559	560	561	562	563	564	565	566	567	568	569	570	571	572	573	574	575	576	577	578	579	580	581	582	583	584	585	586	587	588	589	590	591	592	593	594	595	596	597	598	599	600
601	602	603	604	605	606	607	608	609	610	611	612	613	614	615	616	617	618	619	620	621	622	623	624	625	626	627	628	629	630	631	632	633	634	635	636	637	638	639	640	641	642	643	644	645	646	647	648	649	650	651	652	653	654	655	656	657	658	659	660	661	662	663	664	665	666	667	668	669	670	671	672	673	674	675	676	677	678	679	680	681	682	683	684	685	686	687	688	689	690	691	692	693	694	695	696	697	698	699	700
701	702	703	704	705	706	707	708	709	710	711	712	713	714	715	716	717	718	719	720	721	722	723	724	725	726	727	728	729	730	731	732	733	734	735	736	737	738	739	740	741	742	743	744	745	746	747	748	749	750	751	752	753	754	755	756	757	758	759	760	761	762	763	764	765	766	767	768	769	770	771	772	773	774	775	776	777	778	779	780	781	782	783	784	785	786	787	788	789	790	791	792	793	794	795	796	797	798	799	800
801	802	803	804	805	806	807	808	809	810	811	812	813	814	815	816	817	818	819	820	821	822	823	824	825	826	827	828	829	830	831	832	833	834	835	836	837	838	839	840	841	842	843	844	845	846	847	848	849	850	851	852	853	854	855	856	857	858	859	860	861	862	863	864	865	866	867	868	869	870	871	872	873	874	875	876	877	878	879	880	881	882	883	884	885	886	887	888	889	890	891	892	893	894	895	896	897	898	899	900
901	902	903	904	905	906	907	908	909	910	911	912	913	914	915	916	917	918	919	920	921	922	923	924	925	926	927	928	929	930	931	932	933	934	935	936	937	938	939	940	941	942	943	944	945	946	947	948	949	950	951	952	953	954	955	956	957	958	959	960	961	962	963	964	965	966	967	968	969	970	971	972	973	974	975	976	977	978	979	980	981	982	983	984	985	986	987	988	989	990	991	992	993	994	995	996	997	998	999	1000



REPORT OF WATER ANALYSIS

FROM:
ST. REGIS
JACKSONVILLE, FLORIDA

SAMPLE MARKED:
NO. 4 WELL

ANALYSIS NO. C497885
DATE SAMPLED 12/16/74
DATE RECEIVED 12/27/74
DATE PRINTED 1/ 7/75

CATIONS:	PPM
CALCIUM (CACO ₃) - SOLUBLE	140.
MAGNESIUM (CACO ₃) - SOLUBLE	100.
SODIUM (CACO ₃)	28.
AMMONIA (CACO ₃)	0.8

ANIONS:	PPM
BICARBONATE ALKALINITY (CACO ₃)	126.
CARBONATE ALKALINITY (CACO ₃)	32.
CHLORIDE (CACO ₃)	31.
SULFATE (CACO ₃)	89.
NITRATE (CACO ₃)	*ND (1.)
SILICA (SiO ₂) - SOLUBLE	28.

OTHERS:	PPM
PH (PH UNITS)	8.4
ALKALINITY (CACO ₃) - TOTAL	158.
ALKALINITY (CACO ₃) - PHENOLPHTHALEIN	16.
ALKALINITY (CACO ₃) - P-BACL ₂	*ND (2.)
CONDUCTIVITY (MICROMHOS PER CM)	440.
CALCIUM (CACO ₃) - SOLUBLE AND INSOLUBLE	150.
MAGNESIUM (CACO ₃) - SOLUBLE AND INSOLUBLE	120.
IRON (FE) - SOLUBLE AND INSOLUBLE	*ND (0.1)

*NOT DETECTED (BELOW INDICATED LIMIT OF DETECTION)

James J. Hickey



ANALYTICAL SERVICE LABORATORY REPORT WATER ANALYSIS

FROM:

ST. REGIS PULP AND PAPER COMPANY
JACKSONVILLE, FLORIDA

ANALYSIS NO. S 48699
DATE SAMPLED 3/ 9/78
DATE RECEIVED 3/16/78
DATE PRINTED 3/22/78

SAMPLE MARKED:
WELL NO. 4

CATIONS:

CALCIUM (CACO3) - SOLUBLE
MAGNESIUM (CACO3) - SOLUBLE
SODIUM (CACO3)
AMMONIA (CACO3)

PPM
140.
88.
35.
*ND (0.6)

ANIONS:

BICARBONATE ALKALINITY (CACO3)
CHLORIDE (CACO3)
SULFATE (CACO3)
NITRATE (CACO3)
SILICA (SIO2) - SOLUBLE

PPM
140.
30.
110.
*ND (1.)
24.

OTHERS:

PH (PH UNITS)
ALKALINITY (CACO3) - TOTAL
ALKALINITY (CACO3) - PHENOLPHTHALEIN
ALKALINITY (CACO3) - P-BACL2
CONDUCTIVITY (MICROMHOS PER CM)
CONDUCTIVITY (MICROMHOS PER CM) - NEUTRALIZED
CALCIUM (CACO3) - SOLUBLE AND INSOLUBLE
MAGNESIUM (CACO3) - SOLUBLE AND INSOLUBLE
IRON (FE) - SOLUBLE AND INSOLUBLE

PPM
7.6
140.
*ND (2.)
*ND (2.)
530.
530.
140.
88.
5.5

*NOT DETECTED (BELOW INDICATED LIMIT OF DETECTION)

P. O. BOX 87 • SUGAR LAND, TEXAS 77478

trademarks of Nalco Chemical Company.

NALCO CHEMICAL COMPANY
REGIONAL ANALYTICAL LABORATORIES

2111 E. Dominguez St.
Carson, CA 90745

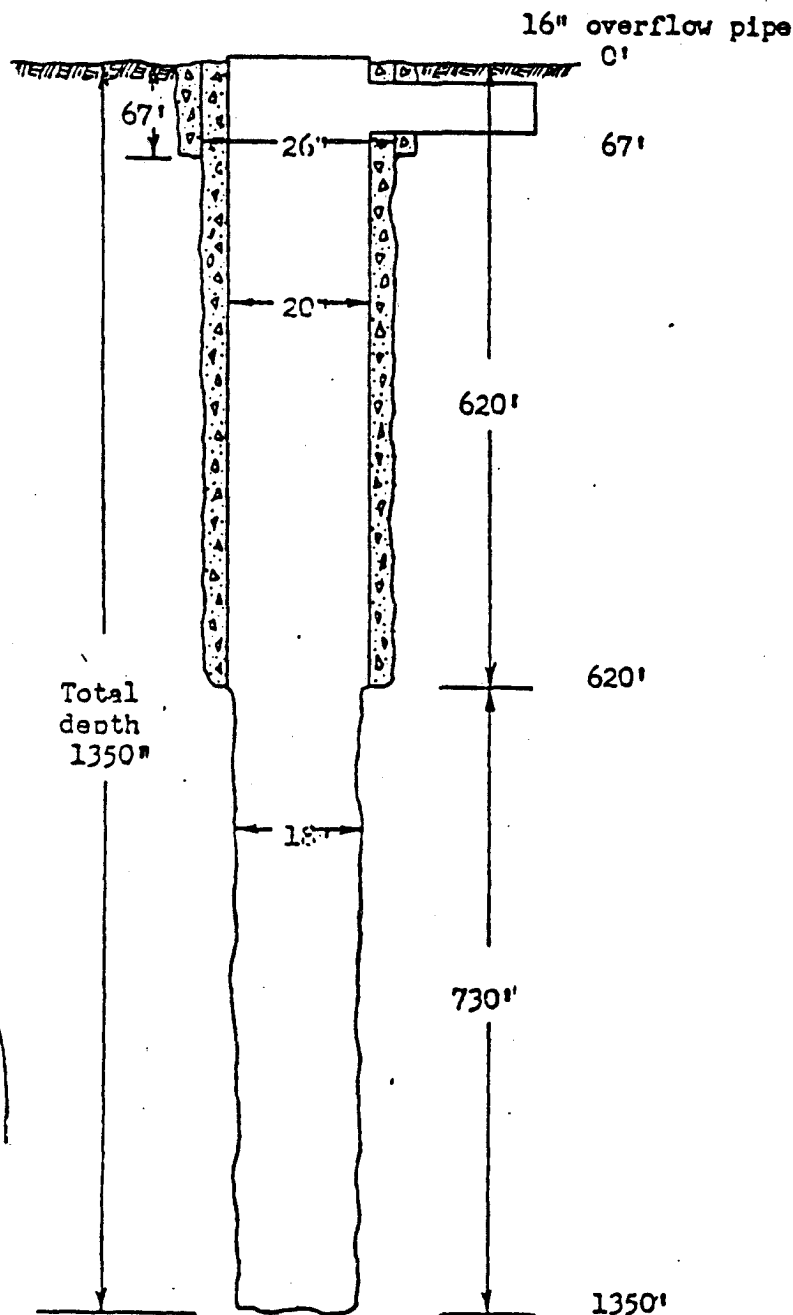
6216 W. 66th Place
Chicago, Illinois 60638

Box 16A
Paulsboro, NJ 08066

Box 87
Sugar Land, TX 77478

WELL No. 5

WELL DIAGRAM



WELL DATA

Total depth of well 1350'
Casing 67' of 26" pit casing
620' of 20" steel casing
Cement 400 bags pumped around casing

PUMPING DATA

Static water level flowing
Pumping level 22.5'
Drawdown 22.5'
Production 7500 gpm(app.)

PUMP# 33692

FORMATION DATA

0-67	Sand
67-145	Brown limestone, hard &
145-230	Fine sand
230-305	Sandy gray and white cla
305-338	Gray and white clay
338-368	Blue clay
368-400	Sandy clay
400-418	Sandy clay
418-430	Blue clay and rock
430-461	Sand and limestone
461-532	Blue sandy clay
532-584	Sandy clay, limestone
584-608	Limestone and blue clay
608-630	Limestone, white
630-666	White limestone, soft
666-690	White limestone, med.
690-880	White limestone
880-978	Gray limestone
978-1256	Brown limestone, hard an soft streaks.
1256-1350	White limestone and flin rock, drilled very hard



ANALYTICAL SERVICE LABORATORY REPORT WATER ANALYSIS

FROM:
ST. REGIS PULP AND PAPER COMPANY
JACKSONVILLE, FLORIDA

ANALYSIS NO. S 48700
DATE SAMPLED 3/ 9/78
DATE RECEIVED 3/16/78
DATE PRINTED 3/22/78

SAMPLE MARKED:
WELL NO. 5

CATIONS:	PPM
CALCIUM (CACO3) - SOLUBLE	140.
MAGNESIUM (CACO3) - SOLUBLE	88.
SODIUM (CACO3)	35.
AMMONIA (CACO3)	*ND (0.6)

ANIONS:	PPM
BICARBONATE ALKALINITY (CACO3)	144.
CHLORIDE (CACO3)	38.
SULFATE (CACO3)	100.
NITRATE (CACO3)	*ND (1.)
SILICA (SIO2) - SOLUBLE	25.

OTHERS:	PPM
PH (PH UNITS)	7.6
ALKALINITY (CACO3) - TOTAL	144.
ALKALINITY (CACO3) - PHENOLPHTHALEIN	*ND (2.)
ALKALINITY (CACO3) - P-BACL2	*ND (2.)
CONDUCTIVITY (MICROMHOS PER CM)	520.
CONDUCTIVITY (MICROMHOS PER CM) - NEUTRALIZED	520.
CALCIUM (CACO3) - SOLUBLE AND INSOLUBLE	140.
MAGNESIUM (CACO3) - SOLUBLE AND INSOLUBLE	88.
IRON (FE) - SOLUBLE AND INSOLUBLE	*ND (0.1)

*NOT DETECTED (BELOW INDICATED LIMIT OF DETECTION)

P. O. BOX 87 • SUGAR LAND, TEXAS 77478



trademarks of Nalco Chemical Company.

NALCO CHEMICAL COMPANY
REGIONAL ANALYTICAL LABORATORIES

2111 E. Dominguez St.
Carson, CA 90745

6216 W. 66th Place
Chicago, Illinois 60638

Box 16A
Paulsboro, NJ 08066

Box 87
Sugar Land, TX 77478



REPORT OF WATER ANALYSIS

FROM:

ST. REGIS
JACKSONVILLE, FLORIDA

ANALYSIS NO. C497957

DATE SAMPLED 12/16/74

DATE RECEIVED 12/30/74

DATE PRINTED 1/ 9/75

SAMPLE MARKED:

NO. 5 WELL

CATIONS:

- CALCIUM (CACO₃) - SOLUBLE
MAGNESIUM (CACO₃) - SOLUBLE
SODIUM (CACO₃)
AMMONIA (CACO₃)

PPM
130.
99.
29.
0.9

ANIONS:

CHLORIDE (CACO₃)
SULFATE (CACO₃)
NITRATE (CACO₃)
- SILICA (SI₂O₂) - SOLUBLE

PPM
29.
95.
*ND (1.)
31.

OTHERS:

PH (PH UNITS)
ALKALINITY (CACO₃) - TOTAL
ALKALINITY (CACO₃) - PHENOLPHTHALEIN
ALKALINITY (CACO₃) - P-8ACL2
CONDUCTIVITY (MICROMHOS PER CM)
CALCIUM (CACO₃) - SOLUBLE AND INSOLUBLE
MAGNESIUM (CACO₃) - SOLUBLE AND INSOLUBLE
IRON (FE) - SOLUBLE AND INSOLUBLE

PPM
8.1
98.
*ND (2.)
*ND (2.)
480.
140.
110.
0.1

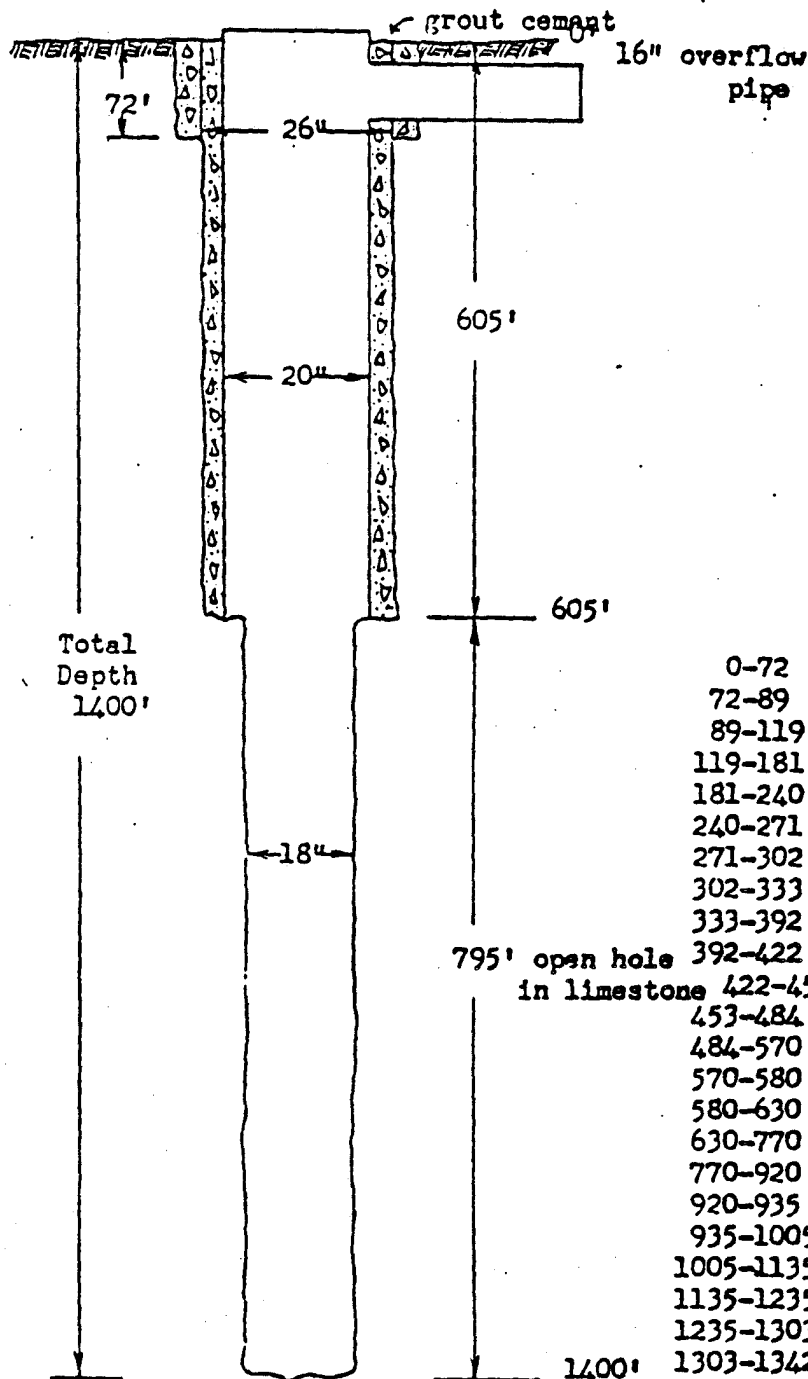
*NOT DETECTED (BELOW INDICATED LIMIT OF DETECTION)

James J. Hickey

WELL NO. 7

WELL DIAGRAM

WELL DATA



Total depth of well 1400'
Casing 72' of 26" pit cas
605' of 20" steel c
Cement 350 bags pumped around casing

PUMPING DATA

Static water level
Pumping level
Drawdown
Production 7600 gpm flow

PUMP# 30259

FORMATION DATA

0-72	Yellow sand
72-89	White sand, shells
89-119	Limestone, streaks clay
119-181	Blue clay streaks limestone
181-240	Blue clay with streaks sand
240-271	Fine pepper sand
271-302	Fine sand, soft
302-333	Fine sand streaks blue clay
333-392	Blue sandy clay and rock
392-422	Blue and white clay with sand
422-453	Blue clay and sand in limestone
453-484	Blue clay and rock, hard
484-570	Blue clay and limestone
570-580	Limestone, soft
580-630	Limestone, hard
630-770	Gray limestone
770-920	Brown limestone, soft
920-935	Br. limestone, med. hard
935-1005	Br. limestone, hard
1005-1135	Br. limestone, soft
1135-1235	Br. limestone, hard and soft
1235-1303	Br. limestone streaks sand
1303-1342	Br. and white limestone
1342-1355	Br. limestone streaks sand
1355-1387	Br. limestone, hard and soft
1387-1400	Br. limestone, very hard drill

MSB Rep. (OV)
April 1966

U. S. DEPT. OF THE INTERIOR

GEOLOGICAL SURVEY

WATER RESOURCES DIVISION

Well No. 30260740813616.1

Well No. 30260740813616.1

Latitude-Longitude 30.26.07 North 86.16.1

MASTER CARD M.H.

Drilled by G.W.H. Well Log 8-7-69 7.5 mi. Quad

State Florida 019 Duval 1A

Latitude 30.26.07 N Longitude 86.16.1 W

Well No. 30260740813616.1

Well Name D-1621

Well Depth 113.3

Well Status W-3974

Well Owner ST. REGIS PAPER CO.

Well Location Jacksonville, Fla.

Well County Duval

Well Section 1A

Well Township 27 S

Well Range 46 E

Well Section 1A

Well Township 27 S

Well Range 46 E

Well Section 1A

Well Township 27 S

Well Range 46 E

Well Section 1A

Well Township 27 S

Well Range 46 E

Well Section 1A

Well Township 27 S

Well Range 46 E

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Well Range 46 E

Well Section 1A

Well Township 27 S

Well Range 46 E

Well Section 1A

Well Township 27 S

Well Range 46 E

Well Section 1A

Well Township 27 S

HYDROGEOLOGIC CARD

Area as on Master Card Coastal Plain 0.3

Section C 0.9

Well No. 30260740813616.1

Well Name D-1621

Well Depth 113.3

Well Status W-3974

Well Owner ST. REGIS PAPER CO.

Well Location Jacksonville, Fla.

Well County Duval

Well Section 1A

Well Township 27 S

Well Range 46 E

Well Section 1A

Well Township 27 S

Well Range 46 E

Well Section 1A

Well Township 27 S

Well Range 46 E

Well Section 1A

Well Township 27 S

Well Range 46 E

Well Section 1A

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Well Range 46 E

Well Section 1A

Well Township 27 S

Well Range 46 E

Well Section 1A

Well Township 27 S

Well Range 46 E

Well Section 1A

Well Township 27 S

Well Range 46 E



REPORT OF WATER ANALYSIS

FROM:
ST. REGIS
JACKSONVILLE, FLORIDA

ANALYSIS NO. C49894R
DATE SAMPLED 12/18/74
DATE RECEIVED 12/30/74
DATE PRINTED 1/19/75

SAMPLE MARKED:
NO. 7 WELL

CATIONS:

CALCIUM (CAC03) - SOLUBLE
MAGNESIUM (CAC03) - SOLUBLE
SODIUM (CAC03)
AMMONIA (CAC03)

PPM
140.
110.
32.
0.5

ANIONS:

BICARBONATE ALKALINITY (CAC03)
CARBONATE ALKALINITY (CAC03)
CHLORIDE (CAC03)
SULFATE (CAC03)
NITRATE (CAC03)
SILICA (SiO2) - SOLUBLE

PP
130
24
30
120
*ND (1)
21

OTHERS:

PH (PH UNITS)
ALKALINITY (CAC03) - TOTAL
ALKALINITY (CAC03) - PHENOLPHTHALEIN
ALKALINITY (CAC03) - P-BACL2
CONDUCTIVITY (MICROMHOS PER CM)
CALCIUM (CAC03) - SOLUBLE AND INSOLUBLE
MAGNESIUM (CAC03) - SOLUBLE AND INSOLUBLE
IRON (FE) - SOLUBLE AND INSOLUBLE

PPM
8.1
1.5
12.
*ND (2)
500.
240.
110.
0.2

*NOT DETECTED (BELOW INDICATED LIMIT OF DETECTION)

James J. Hickey

NALCO CHEMICAL COMPANY
NATIONAL CHEMICAL NOIS 60638



ANALYTICAL SERVICE LABORATORY REPORT WATER ANALYSIS

FROM:

ST. REGIS PULP AND PAPER COMPANY
JACKSONVILLE, FLORIDA

SAMPLE MARKED:
WELL NO. 7

ANALYSIS NO. 8

DATE SAMPLED 3/15/78

DATE RECEIVED 3/16/78

DATE PRINTED 3/22/78

CATIONS:

CALCIUM (CACO3) - SOLUBLE
MAGNESIUM (CACO3) - SOLUBLE
SODIUM (CACO3)
AMMONIA (CACO3)

PPM
7.0
146.
146.
*ND (0.5)

ANIONS:

BICARBONATE ALKALINITY (CACO3)
CHLORIDE (CACO3)
SULFATE (CACO3)
NITRATE (CACO3)
SILICA (SIO2) - SOLUBLE

PPM
7.0
146.
146.
24.

OTHERS:

PH (PH UNITS)
ALKALINITY (CACO3) - TOTAL
ALKALINITY (CACO3) - PHENOLPHTHALEIN
ALKALINITY (CACO3) - P-BACL2
CONDUCTIVITY (MICROMHOS PER CM)
CONDUCTIVITY (MICROMHOS PER CM) - NEUTRALIZED
CALCIUM (CACO3) - SOLUBLE AND INSOLUBLE
MAGNESIUM (CACO3) - SOLUBLE AND INSOLUBLE
IRON (FE) - SOLUBLE AND INSOLUBLE

PPM
7.0
146.
146.
146.
540.
540.
150.
71.
*ND (0.1)

*NOT DETECTED (BELOW INDICATED LIMIT OF DETECTION)

NO. BY DATE

COMPANY JACKSONVILLE FLORIDA

JOB NO. 968

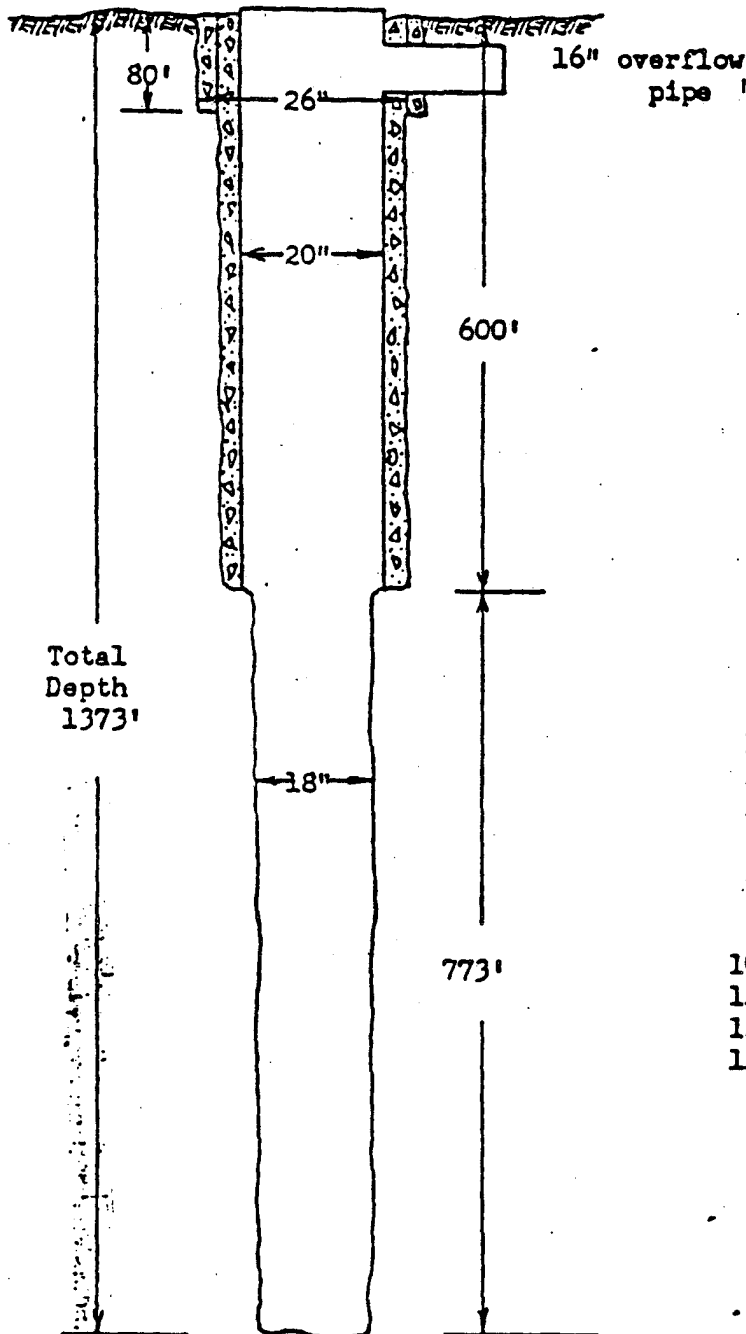
BY: LAYNE ATLANTIC CO.

MARCH 19, 19

WELL NO. 8

WELL DIAGRAM

WELL DATA



Total depth of well 1373'
Casing 80' of 26" pit casin
600' of 20" steel cas
Cement 350 bags pumped aroun
casing

PUMPING DATA

Static water level
Pumping level
Drawdown
Production

PUMP# 33694

FORMATION DATA

0-80 Sand
80-100 White sand, soft
100-180 Grey limestone, hard sc
180-210 Clay streaks limestone
210-300 Blue clay and sand
300-360 Blue clay and shell, ha
360-520 Blue clay and sand
520-590 Blue and white clay, li
590-1054 Limestone, med. hard
1054-1263 Br. limestone, hard and
1268-1282 Br. limestone, hard
1283-1293 Limestone and flint roc
1293-1373 Brown limestone and fli
rock, drilled very hard



REPORT OF WATER ANALYSIS

From
ST. REGIS
JACKSONVILLE, FLORIDA

Analysis No. 433311
Sampling Date 7/26/72
Date Sample Rec'd. 8/ 7/72

Sample Marked
WELL NO. 8

(To convert parts per million to grains per gallon, divide by 17.1)

Parts per million		Parts per m	
Total Dis. Solids.....	380.	Chloride (NaCl).....	25 42.
Suspended Solids.....		Sulfate (Na ₂ SO ₄).....	94 139
Total Hard. (CaCO ₃).....	247.	Ortho. PO ₄	0.
Ca. Hard. (CaCO ₃).....	144.	Total PO ₄	0.
Mg. Hard. (CaCO ₃).....	103.	Total Filtered PO ₄	0.
Phr. Alk. (CaCO ₃).....	0.	Silica (SiO ₂).....	34.
P(BaCl ₂) Alk. (CaCO ₃).....		Total Iron (Fe).....	TRACE <
Total Alk. (CaCO ₃).....	164.	Alumina (Al ₂ O ₃).....	
Total (Calc.) Alk. (CaCO ₃).....		Nitrate (NO ₃).....	
		Total Extractable.....	

• ESTIMATED

pH 7.6

Color No.

James J. Hickey



ANALYTICAL SERVICE LABORATORY REPORT WATER ANALYSIS

FROM:

ST. REGIS PULP AND PAPER COMPANY
JACKSONVILLE, FLORIDA

SAMPLE MARKED:
WELL NO. 8

ANALYSIS NO. S 48702
DATE SAMPLED 3/ 9/78
DATE RECEIVED 3/16/78
DATE PRINTED 3/22/78

CATIONS:

	PPM
CALCIUM (CACO3) - SOLUBLE	150.
MAGNESIUM (CACO3) - SOLUBLE	92.
SODIUM (CACO3)	35.
AMMONIA (CACO3)	*ND (0.6)

ANIONS:

	PPM
BICARBONATE ALKALINITY (CACO3)	156.
CHLORIDE (CACO3)	38.
SULFATE (CACO3)	98.
NITRATE (CACO3)	*ND (1.)
SILICA (SIO2) - SOLUBLE	25.

OTHERS:

	PPM
PH (PH UNITS)	8.0
ALKALINITY (CACO3) - TOTAL	156.
ALKALINITY (CACO3) - PHENOLPHTHALEIN	*ND (2.)
ALKALINITY (CACO3) - P-BACL2	*ND (2.)
CONDUCTIVITY (MICROMHOS PER CM)	530.
CONDUCTIVITY (MICROMHOS PER CM) - NEUTRALIZED	530.
CALCIUM (CACO3) - SOLUBLE AND INSOLUBLE	150.
MAGNESIUM (CACO3) - SOLUBLE AND INSOLUBLE	92.
IRON (FE) - SOLUBLE AND INSOLUBLE	0.1

*NOT DETECTED (BELOW INDICATED LIMIT OF DETECTION)

P. O. BOX 87 • SUGAR LAND, TEXAS 77478

trademarks of Nalco Chemical Company.

NALCO CHEMICAL COMPANY
REGIONAL ANALYTICAL LABORATORIES

2111 E. Dominguez St.
Dallas, CA 95245

6216 W. 66th Place
Chicago, Illinois 60638

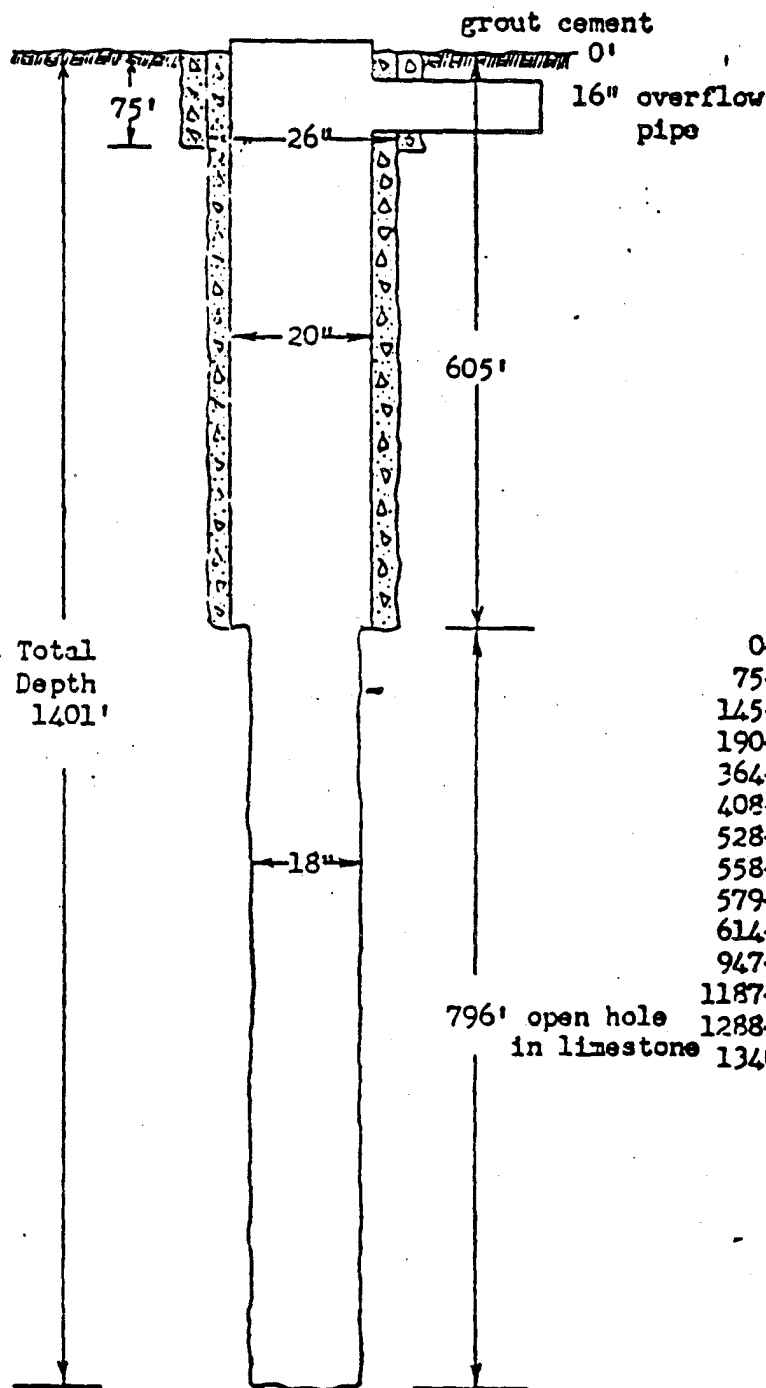
Box 3A
Paulsboro, NJ 08066

Box 87
Sugar Land, TX 77478

WELL NO. 9

WELL DIAGRAM

WELL DATA



Total depth of well 1401'
 Casing 75' of 26" pit casi
 605' Of 20" steel ca
 Cement 400 bags pumped arc
 casing

PUMPING DATA

Static water level
 Pumping level
 Drawdown
 Production 7600 gpm flowing

PUMP# 33695

FORMATION DATA

0-75	Sand
75-145	Limestone, streaks blue cl
145-190	Blue clay streaks limestor
190-364	Blue clay streaks sand
364-408	Blue clay, soft
408-528	Blue clay, sand and shell
528-558	Sand and shell, med.
558-579	Sand and streaks limestone
579-614	Limestone, med.
614-947	White limestone, hard and
947-1187	Br. limestone, med. hard
1187-1288	Br. limestone streaks whit
1288-1340	Br. limestone, hard
1340-1401	Br. limestone and flint r drilled very hard

Total
 Depth
 1401'

796' open hole

in limestone



REPORT OF WATER ANALYSIS

FROM:

ST. REGIS
JACKSONVILLE, FLORIDA

SAMPLE MARKED:

NO. 9 WELL

ANALYSIS NO. C497960

DATE SAMPLED 12/16/74

DATE RECEIVED 12/30/74

DATE PRINTED 1/ 9/75

CATIONS:

CALCIUM (CAC03) - SOLUBLE
MAGNESIUM (CAC03) - SOLUBLE
SODIUM (CAC03)
AMMONIA (CAC03)

PPM

140.

120.

36.

0.7

ANIONS:

BICARBONATE ALKALINITY (CAC03)
CARBONATE ALKALINITY (CAC03)
CHLORIDE (CAC03)
SULFATE (CAC03)
NITRATE (CAC03)
SILICA (SI02) - SOLUBLE

PPM

130.

28.

33.

130.

*ND (1.)

31.

OTHERS:

PH (PH UNITS)
ALKALINITY (CAC03) - TOTAL
ALKALINITY (CAC03) - PHENOLPHTHALEIN
ALKALINITY (CAC03) - P-BACL2
CONDUCTIVITY (MICROMHOS PER CM)
CALCIUM (CAC03) - SOLUBLE AND INSOLUBLE
MAGNESIUM (CAC03) - SOLUBLE AND INSOLUBLE
IRON (FE) - SOLUBLE AND INSOLUBLE
TOTAL ORGANIC CARBON (C)

PPM

8.2

158.

14.

*ND (2.)

500.

140.

120.

0.7

16.

*NOT DETECTED (BELOW INDICATED LIMIT OF DETECTION)

James J. Hickey



ANALYTICAL SERVICE LABORATORY REPORT WATER ANALYSIS

FROM:
ST. REGIS PULP AND PAPER COMPANY
JACKSONVILLE, FLORIDA

ANALYSIS NO. S 48703
DATE SAMPLED 3/ 9/78
DATE RECEIVED 3/16/78
DATE PRINTED 3/22/78

SAMPLE MARKED:
WELL NO. 9

CATIONS:	PPM
CALCIUM (CACO3) - SOLUBLE	150.
MAGNESIUM (CACO3) - SOLUBLE	92.
SODIUM (CACO3)	35.
AMMONIA (CACO3)	*ND (0.6)

ANIONS:	PPM
BICARBONATE ALKALINITY (CACO3)	148.
CHLORIDE (CACO3)	41.
SULFATE (CACO3)	110.
NITRATE (CACO3)	*ND (1.)
SILICA (SIO2) - SOLUBLE	25.

OTHERS:	PPM
PH (PH UNITS)	7.6
ALKALINITY (CACO3) - TOTAL	148.
ALKALINITY (CACO3) - PHENOLPHTHALEIN	*ND (2.)
ALKALINITY (CACO3) - P-BACL2	*ND (2.)
CONDUCTIVITY (MICROMHOS PER CM)	540.
CONDUCTIVITY (MICROMHOS PER CM) - NEUTRALIZED	540.
CALCIUM (CACO3) - SOLUBLE AND INSOLUBLE	150.
MAGNESIUM (CACO3) - SOLUBLE AND INSOLUBLE	92.
IRON (FE) - SOLUBLE AND INSOLUBLE	*ND (0.1)

*NOT DETECTED (BELOW INDICATED LIMIT OF DETECTION)

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NALCO CHEMICAL COMPANY
REGIONAL ANALYTICAL LABORATORIES

2111 E. Dominguez St.

6216 W. 66th Place

Box 16A

Box 87

GEOLOGICAL SURVEY

U. S. DEPT. OF THE INTERIOR

WATER RESOURCES DIVISION

2.5" Quad

MASTER CARD[illegible]**WELL-DESCRIPTION CARD**[illegible]

• AFTESIAN Flow 236 GPM

HYDROGEOLOGIC CARD

SITE AS ON PASTER CARD

Geographic
Location

COSTAL PLAIN D-3 Section FLORIDA

SECTION C ST JOHNS R 0978 Subsite BELOW O-6 F

Type of
Well Filter

(B) (C) (D) (E) (F) (G)
depression, stream channel, dune, flat, hilltop, sink, swamp,
(H) (I) (J) (K) (L) (M)
offshore, pediment, alluvial, terrace, undulating, valley floor

FLAT F

MAJOR
Aquifers

Aquifer formation group

Hydrogeology

Depth of
Well Open to

Water
Quality

Aquifer formation group

Hydrogeology

Depth of
Well Open to

Intermittent
Stream

Source of Data

Depth of
Open end

Source of Data

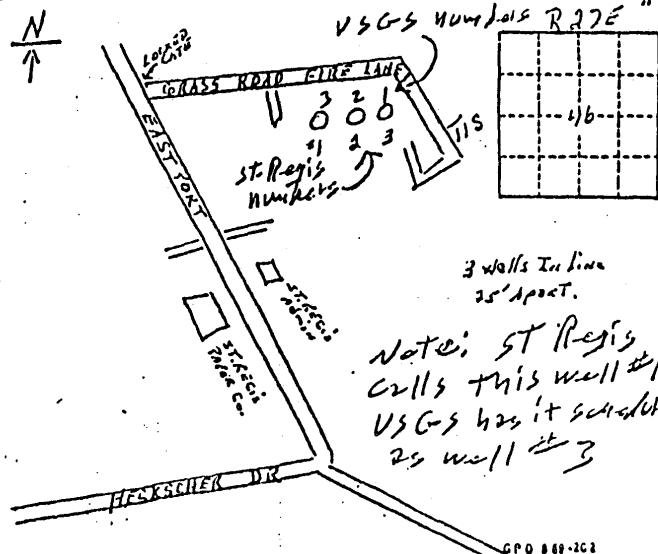
Infiltration
Characteristics

Confidence
Rating

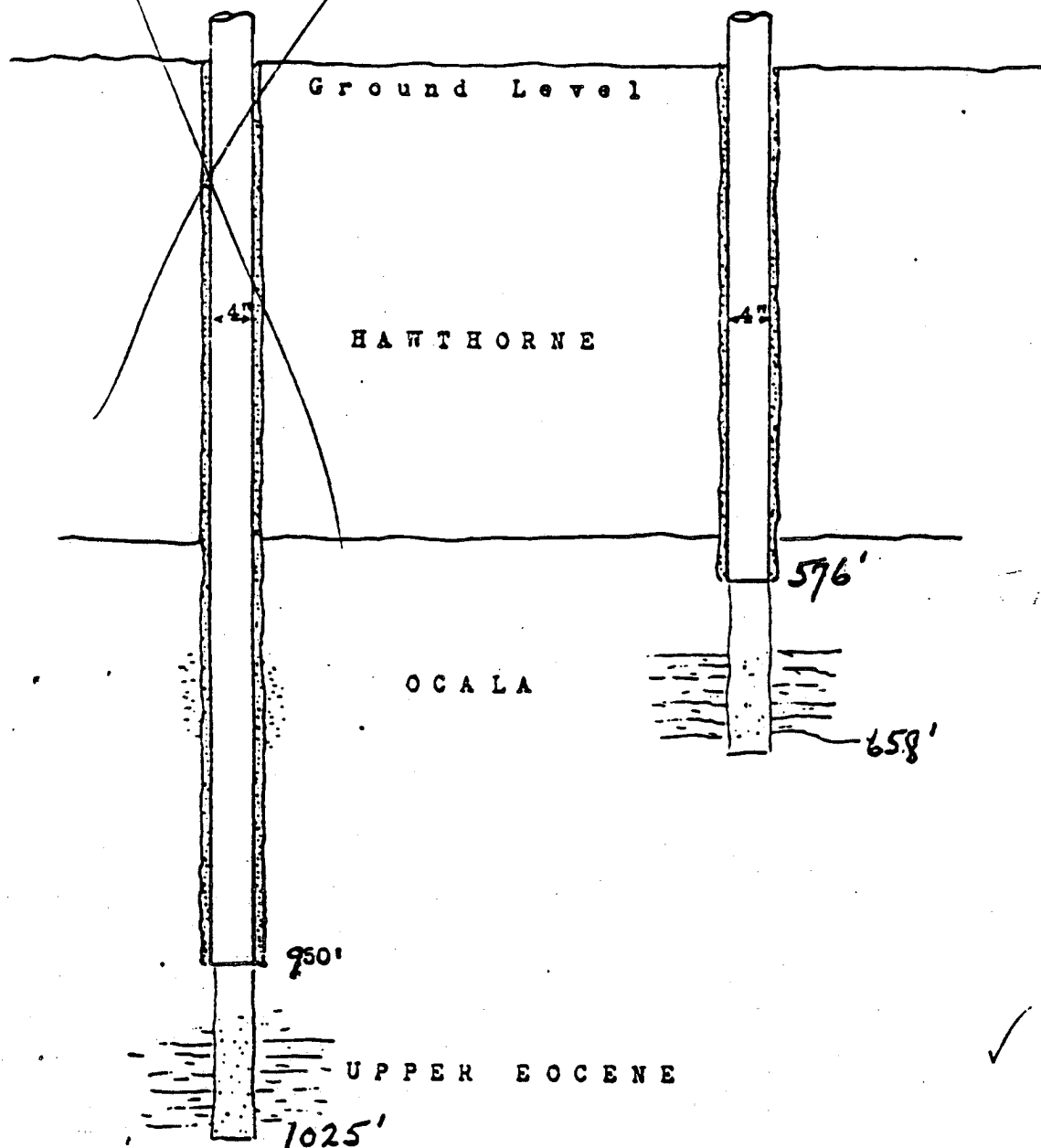
Confidence
Limit

Confidence
Rating

Number of potentiometer



D263
CENTER
TEST Well No. 2 sealed
into Upper Eocene only. 168 p.p.m.
HARDNESS TEST WEST
Well No. 1 sealed
into Ocala only. 240 p.p.m.



(All vertical dimensions are estimates, location and extent of principle aquifers will be determined by cores and test.)

U. S. DEPARTMENT OF THE INTERIOR

GEOLOGICAL SURVEY

Water Resources Division Well Schedule Form

1:24,000

1951 ?
RICHARD W. (Clark) at 4418 Schwaibler Road 11-18-66
Florida Duval
09 135-27
08135419
21027
21027
ST REGIS PAPER CO.
Eastport, Fla.
Paper Co. "N"
Unread "U"
Semi-Annually "S"COMPLETE
REG 5-26-65

WELL-DESCRIPTION CARD

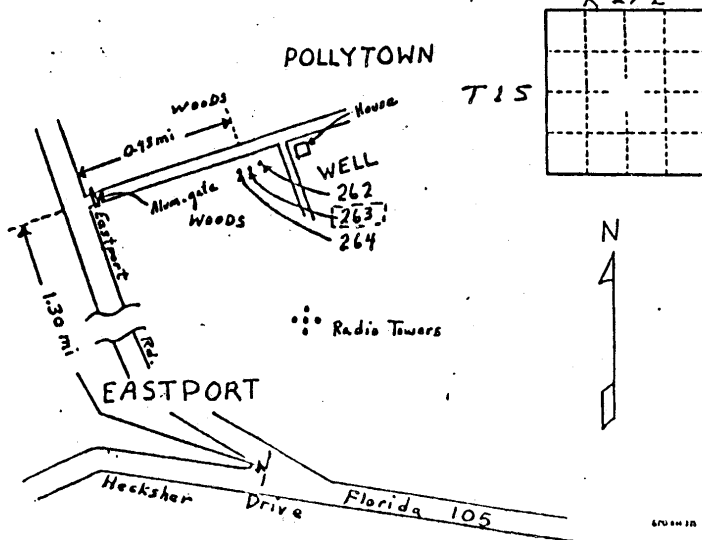
[illegible]

Roll Number 30.26.08^Q 081.35.49.2

HYDROGEOLOGIC MAP

[illegible]

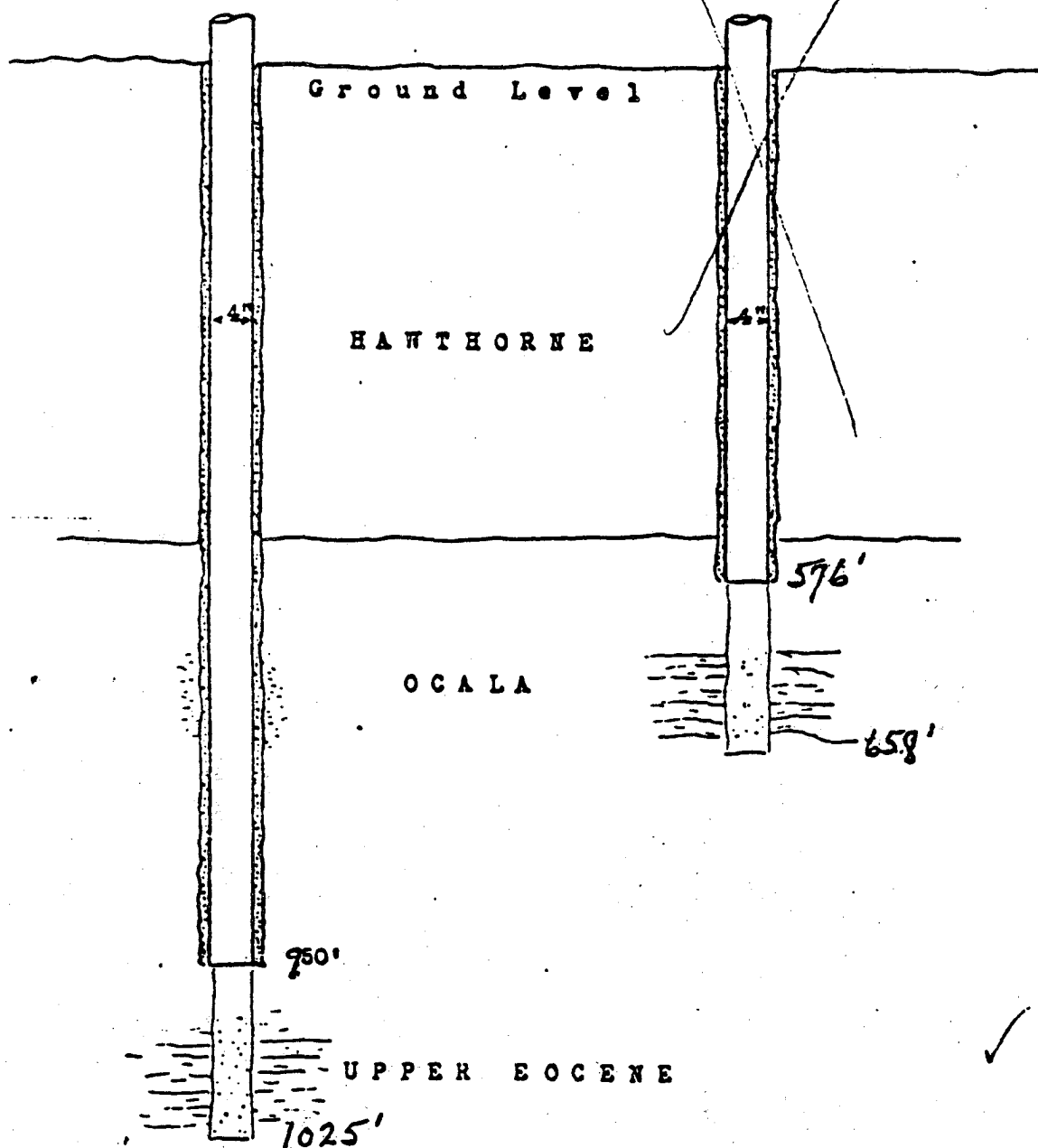
R 27 E



Eastport, Florida

D263
CENTER
TEST Well No. 2 sealed HARDNESS TEST into Upper Eocene only. 168 p.p.m.

D262
WEST
TEST Well No. 1 sealed HARDNESS 240 p.p.m. into Ocala only.



(All vertical dimensions are estimates, location and extent of principle aquifers will be determined by cores and test.)

BY DATE
CHKD. BY DATE

SUBJECT OBSERVATION WELL
St. Regis-Florida Pulp and Paper Corp.
Eastport, Florida

SHEET NO.
JOB NO.

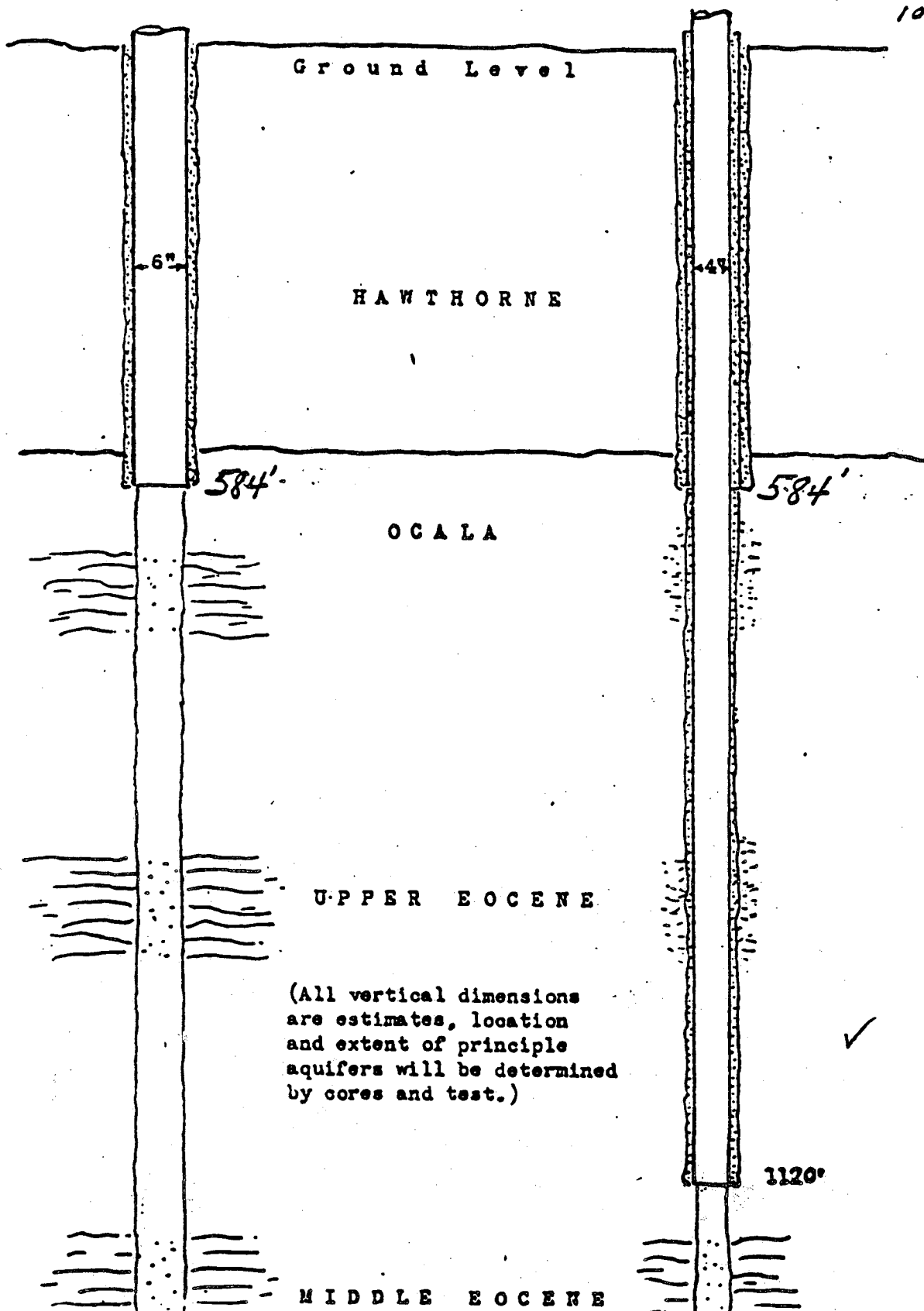
TEST WELL D264

EAST

First stage to recover cores,
record flow between aquifers,
electric log for resistivity.

Completed No. 3 observation
Well connected to middle
Eocene only.

HARDNESS
106 P.P.M.



Recorded by

Essex

U.S. DEPT. OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION
GROUND WATER SITE INVENTORY
SITE SCHEDULE

Date

20 Dec 76

Check One

☒ English☐ Metric Units

GENERAL SITE DATA (10)

Site Ident No. 302525081371101 RG Number R-01 Transmission T- (A) O- M- V-
 Site Type 2- C O H I M P T (M) Data 3- (C) U L M- Reporting Agency 4- FLA39
 Project No. 5- District 6- 121 State 7- 12 County (or town) DUVHL 8- 031
 Latitude 9- 302525 Longitude 10- 0813711 Lat-Long Accuracy 11- S O T M-
 Land Number 12- J-1017 Land Not Loc. 13- UNDERST. 47 T. 1 S. R. 27 E.
 Location Map 14- EASTPORT Scale 15- 24000
 Altitude 16- 200 Method of Measurement 17- A L (M) Accuracy 18- 5
 Top Setting 19- C (C) F- H- E- L- S- P- S- T- U- V- W- Hydrologic Unit (OWOC) 20- 03080103
 Date of First Construction/Completion 21- 12/01/1976 Use of Site 22- A D E G H S M P R S T U (M) X Z
 Use of Water 23- A B C D E F H I M (M) P R S T U Y Z
 Secondary Water Use 24- Tertiary Use of Water 25- Depth of Hole 26- 1285 Depth of Well 27- 1285 Source of Depth Data 28- D
 Water Level 29- 19.6 Date Measured 30- 12/17/1976 Source 31- S
 Method of Measurement 32- A C E (C) H L M R S T V Z
 Site System 33- D F G H S P R S T V X Z
 Source of Geohydrologic Data 34- Pump Used 35- Measuring Point 36- 0 Measuring Point Date 37- 12/17/1976

OWNER IDENTIFICATION (1)

Owner 18- T- (A) D- M- Date of Ownership 19- 12/01/1976
 Name Last 19- JACKSON, L. First 20- CITY OF Middle Initial 21- 163

OTHER SITE IDENTIFICATION NUMBERS (1)

R-189 T- (A) D- M- Ident 190- ST Assigner 191- FLA WMR
 New Card Same-R & T Ident 192- CEDAR BAY Assigner 193- FLA39

SITE VISIT DATA (1)

R-186 T- (A) D- M- Date of Visit 187- 12/17/1976 Name of Person 188- ESSEX

FIELD WATER QUALITY MEASUREMENTS (1)

R-192 T- (A) D- M- Date 193- 12/17/1976 Geohydrologic Unit 194-
 New Card Same-R & T Temperature 195- 0.0, 0.1, 0.2 Degrees C 196- 52.0 (L26)
 Conductance 197- 0.0, 0.9, 5.0 uMhos 198- 20.1
 Other (STORET) Parameter 199- 0.0, 9.40 Value 199- 2.66
 Other (STORET) Parameter 200- 9.00 Value 200- 2.66

FOOT NOTES:

① Source of Data Listed

S O G A R L G Z
 reporting, direct, owner, other govt, other local, personnel, other agency, reserves

Plotted

Header

Local #

Keypunched

WELL CONSTRUCTION DATA (1)

R-59- T-60 M- Add, delete, modify Entry No. 59-001 Date of Construction Completion 60-12/00/1976 Source of 64-12
 Name of Contractor/Owner 63-SOUTHERN Southern Drillers
 Method of Construction 65-A B C D E F G H I J K L M N O P Q R S T U V W X Y Z
 Finish 66-C F G H I J K L M N O P Q R S T U V W X Y Z Type of Seal 67-B C D E F G H I J K L M N O P Q R S T U V W X Y Z
 Bottom of Seal 68- Method of Development 69-A B C D E F G H I J K L M N O P Q R S T U V W X Y Z Number of Hours in Development 70-
 Special Treatment During Development 71-C D E F G H I J K L M N O P Q R S T U V W X Y Z
 chemical, dry ice, explosives, deflocculant, hydrofracturing, mechanical, other

DIMENSIONS OF THE HOLE CONSTRUCTED (2)

R-72- T-60 M- Add, delete, modify Construction Entry No. 59-001
 Top of Hole Segment Below LSD 73- 74- 75-
 Bottom of Hole Segment Below LSD 74- 75-
 Diameter of Hole Segment 75-
 New Card for Each Hole Segment Same R, T & Field 59

CASING SCHEDULE (2)

R-78- T-60 M- Add, delete, modify Construction Entry No. 59-001
 Top of Casing Segment Below LSD 77- 78- 79- 80- 81-
 Bottom of Casing Segment Below LSD 78- 79- 80- 81-
 Diameter of Casing Segment 79- 80- 81-
 Casing Material 80- 81-
 Thickness of Casing 81-
 New Card for Each Casing With Same R, T & Field 59

OPENINGS SCHEDULE (2)

R-82- T-60 M- Add, delete, modify Construction Entry No. 59-001
 Top of Section Below LSD 83- 84- 85- 86- 87- 88- 89-
 Bottom of Section Below LSD 84- 85- 86- 87- 88- 89-
 Type of Opening 85- 86- 87- 88- 89-
 Type of Material 86- 87- 88- 89-
 Diameter of Open Section 87- 88- 89-
 Width of Opening 88- 89-
 Length of Opening 89-
 New Card for Each Open Section With Same R, T and Field 59

FOOT NOTES:

① Source of Data Codes:

S D B A R L G Z
 reagent, drifter, corner, other part, other logs, geological, other reagent

② Casing Material Codes

B C G I M P R S T U W Z
 brick, concrete, galv, wrought, other, PVC or, rock or, steel, tile, natural, wood, other

③ Type of Openings Codes

F L M P R S T W X Z
 fracture, horizontal, mesh, perforated, wire, screen, sand, sealed, open, other

④ Type of Material Codes for Open Sections

B C G I M P R S T Z
 brass or, aluminum, galv, wrought, other, PVC or, concrete, steel, rls, other

PRODUCTION DATA (1P)

R=134#148# T=ADM# Entry No 147#001# Date 148=12/17/1976#

Discharge: 150=1442.36# Source of Data 151=S#

Method of Measurement 152=C# F M O P R T U V W Z#

Production Level 153=# Stable Level 154=# Source of Data 155=# Specific Capacity 272=

Method of Measurement 156=A C E G H L M R S T V Z# Pumping Period 157=

LIFT DATA (1)

R=42# T=ADM# Type of Lift 43#A B C J P R S T U 2# Entry No 254#001#

Pump Intake Setting 44=# Type of Power 45=D E G H L N W Z#

Date 38=12/17/1976# Horsepower 46=

MAJOR PUMP DATA (2)

R=47# T=ADM# Type of Lift 43#A# Lift Entry No 254# Manufacturer of Pump 48=

Serial No of Pump 49= Name of Power Company 50=

Power Company 51= Power Meter No 52= Pump Rating 53=

Person or Company Who Maintains the Pump 54= Additional Lift 256= Rated Pump Capacity 268=

STANDBY POWER DATA (2)

(See LIFT DATA for codes of fields 43 and 56 below)

R=55# T=ADM# Type of Lift 43#A# Type of Power 56= Horsepower 57= Lift Entry No 254#

AVAILABLE LOG DATA (1)

R=198# T=ADM# New Card for Each Log Type Same R & T

Type of Log	Begin Depth	End Depth	Source of Data
199#	200=	201=	202=
199#	200=	201=	202=
199#	200=	201=	202=
199#	200=	201=	202=

WATER QUALITY DATA COLLECTION (1)

R=114# T=ADM# Begin Year 115# End Year 116= Source Agency 117=

Frequency of Collection 118= Network Site 257= Type of Analysis 120=

WATER LEVEL DATA COLLECTION (1)

R=121# T=ADM# Begin Year 122# End Year 123= Source Agency 124=

Frequency of Collection 125= Network Site 258=

WATER PUMPAGE/WITHDRAWAL DATA COLLECTION (1)

R=127# T=ADM# Begin Year 128# End Year 129= Source Agency 130=

Frequency of Collection 131= Network Site 259= Method of Collection 133=C E M U Z#

OTHER DATA AVAILABLE (1)

R=180# T=ADM# Type of Data 181# 182=C D Z# 201=F M P Z#

New Card Same R & T Type of Data 181# 182=C D Z# 201=F M P Z#

FOOT NOTES:

① Source of Data Codes

S D G A R L G Z

② Type of Log Codes

A B C D E F G H I J K L M N P Q

③ Frequency of Collection Codes

A B C D F I M S W Z

④ Type of Quality Analysis Codes

A B C D E F G H J K L M Z

GEOHYDROLOGIC UNIT DESCRIPTIONS (1)

R=90 T=ADM Entry No 258 # 00 Depth to Top 91 Depth to Bottom 92

Unit Identifier 93=120FLRD Lithology 96=LUSN Lithologic Modifier 97=MARINE

AQUIFER DATA (2)

R=94 T=ADM

Geohydrologic Unit Entry No 258 #

Date 96 # / /

Water Level 128

% Water Contributed 132

GEOHYDROLOGIC UNIT DESCRIPTIONS (1)

R=90 T=ADM Entry No 258 # Depth to Top 91 Depth to Bottom 92

Unit Identifier 93= Lithology 96= Lithologic Modifier 97=

AQUIFER DATA (2)

R=94 T=ADM

Geohydrologic Unit Entry No 258 #

Date 96 # / /

Water Level 128

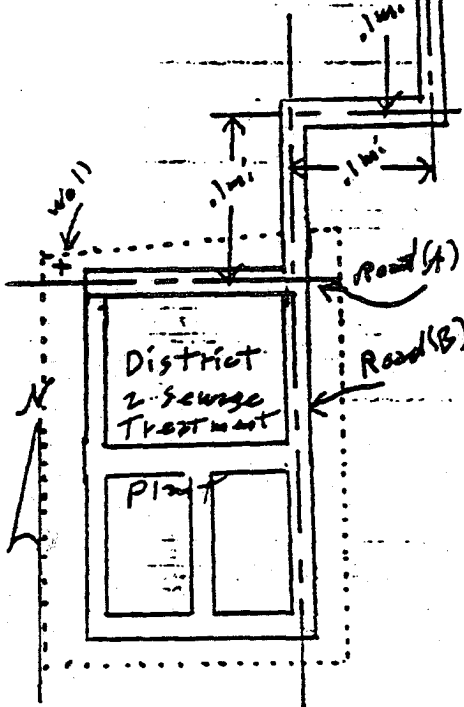
% Water Contributed 132

PERTINENT REMARKS

R=183 T= A 185
New Card Same R&T 185

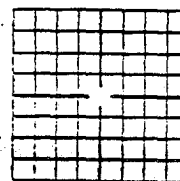
NOTES

Center Bay Rd
End of hard road
Shows on USGS
Topo map
1964 photo revised
1970

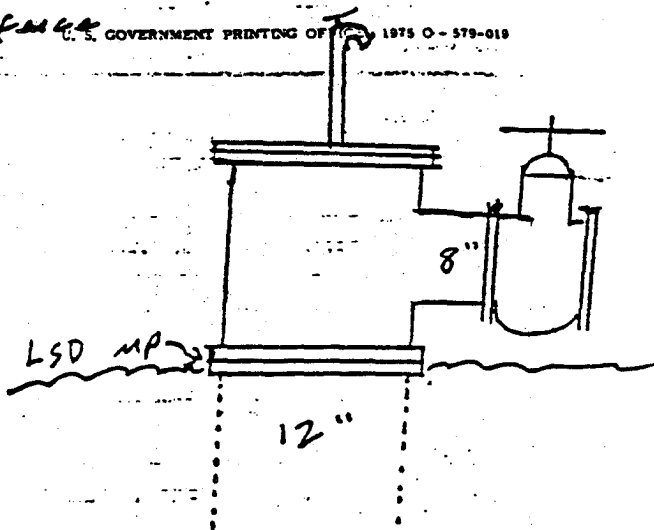


Well is:
40' N of Rd (A)
791' W of Rd (B)

15' S and 10' E
of corner of
chain link fence



U.S. GOVERNMENT PRINTING OFFICE: 1975 O-579-019



Recorded by E. BALDUCCIU.S. DEPT. OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION
GROUND WATER SITE INVENTORY
SITE SCHEDULEDate 11/12/1976Check One ☒ English ☐ Metric Units

GENERAL SITE DATA (I)

Site Ident No 30 24 51 081 36 34 01 RG Number R-0 Transaction T-1 A D M V

Site Type 2 C O H I M P T V Data 3 U L M Reliability 1 0 Reporting Agency 4 F L O 3 9

Project No. 5 District 5 1 2 1 State 7 1 2 County (or town) DUVAL 8 10 3 3

Latitude 9 30 24 51 Longitude 10 08 13 34 Lat-Long Accuracy 11 S D T M

Local Number 12 11 129 Land Net 13 L N D G R T S 47 T 1 S R 27 E

Location Map 14 EASTPORT Scale 15 24000

Altitude 16 15 Method of Measurement 17 A L M Accuracy 18 5

Type Setting 19 D C E F H K L G P S T U V W Hydrologic Unit (OWDC) 20 0 3 0 9 0 1 0 3

Date of First Construction/Completion 21 0 9 25 1976 Use of Site 23 A D E G H G M P R S T U W X Z

Use of Water 24 A B C D E F H I M N P R S T U Y Z

Secondary Water Use 25 1 Tertiary Use of Water 26 1 Depth of Hole 27 660 Depth of Well 28 660 Source of Depth Data 29 D

Water Level 30 1 Date Measured 31 1 Source 33 1

Method of Measurement 34 A C E G H L M R S T V Z

Site Status 37 D F G H J P R S T V X Z

Source of Geohydrologic Data 38 1 Pump Used 35 1 Measuring Point 36 - 2.12 Measuring Point Date 37 0 9 30 1976

OWNER IDENTIFICATION (I)

R-158 T-1 A D M Date of Ownership 159 0 9 25 1976

Name: Last 161 DICKERSON First 162 I N C Middle Initial 163

OTHER SITE IDENTIFICATION NUMBERS (I)

R-189 T-1 A D M Ident 190 3 J Assigner 191 F L A W M D

New Card Same R & T Ident 190 H E C K S C H E R Assigner 191 F L O 3 9

SITE VISIT DATA (I)

R-186 T-1 A D M Date of Visit 187 0 9 30 1976 Name of Person 188 B A L D U C C I

FIELD WATER QUALITY MEASUREMENTS (I)

R-192 T-1 A D M Date 193 1 1 1976 Geohydrologic Unit 195

New Card Same R & T 194 195

Temperature 196 0 0 0 1 0 Degrees C 197

Conductance 198 0 0 0 9 5 u Mhos 199

Other (STORET) Parameter 199 Value 197

Other (STORET) Parameter 196 Value 197

FOOT NOTES:

① Source of Data Codes:

S O O A R L G Z

reporting, driller, owner, state govt, other inst, geologist, other agency reported

WELL CONSTRUCTION DATA (1)

R = 58 * T = A D M * Entry No. 59 = 001 * Date of Construction Completion 50 = 09 / 25 / 1976 * Source of ① Const. Data 64 = D *

Name of Contractor/Driller W. E. FLOYD & SON

Method of Construction 65 = A B C D H J P R T V W Z *
air rotary, rotary, or surface, cable tool, J-2, hydraulic, rotary, jetted, air-perc., cushion, reverse, rotary, trenching, driven, driven, wash, other

Finish 66 = C F G H I P S T W X Z * Type of Seal 67 = B C X Z *
porous, gravel w. concrete, surf., gravel, screen, horizontal, open, perforated, screen, sand point, waited, open, other hole

Bottom of Seal 68 = * Method of Development 69 = A B C J N P S Z * Number of Hours in Development 70 = *
air lift, bailed, compressed, jetted, none, other, surged, other pump

Special Treatment During Development 71 = C D E F H M Z *
chemically, dry ice, explosives, deflocculant, hydrofracturing, mechanical, other

DIMENSIONS OF THE HOLE CONSTRUCTED (2)

R = 72 * T = A D M * Construction Entry No. 59 = 001 *

New Card for Each Hole Segment Same R, T & Field 59

Top of Hole Segment Below LSD	Bottom of Hole Segment below LSD	Diameter of Hole Segment
73 = <u>0</u> * *	74 = <u>6.60</u> * *	75 = <u>3</u> * *
73 = * *	74 = * *	75 = * *
73 = * *	74 = * *	75 = * *
73 = * *	74 = * *	75 = * *
73 = * *	74 = * *	75 = * *

CASING SCHEDULE (2)

R = 75 * T = A D M * Construction Entry No. 59 = 001 *

New Card for Each Casing With Same R, T & Field 59

Top of Casing Segment Below LSD	Bottom of Casing Segment Below LSD	Diameter of Casing Segment	Casing Material ⑥	Thickness of Casing
77 = <u>0</u> * *	78 = <u>5.50</u> * *	79 = <u>3</u> * *	80 = <u>S</u> * *	81 = * *
77 = * *	78 = * *	79 = * *	80 = * *	81 = * *
77 = * *	78 = * *	79 = * *	80 = * *	81 = * *
77 = * *	78 = * *	79 = * *	80 = * *	81 = * *
77 = * *	78 = * *	79 = * *	80 = * *	81 = * *

OPENINGS SCHEDULE (2)

R = 82 * T = A D M * Construction Entry No. 59 = 001 *

New Card for Each Open Section With Same R, T and Field 59

Top of Section Below LSD	Bottom of Section Below LSD	Type of Openings ⑦	Type of Material ⑧	Diameter of Open Section	Width of Opening	Length of Opening
83 = <u>5.50</u> * *	84 = <u>6.60</u> * *	85 = <u>X</u> * *	86 = * *	87 = <u>3</u> * *	88 = * *	89 = * *
83 = * *	84 = * *	85 = * *	86 = * *	87 = * *	88 = * *	89 = * *
83 = * *	84 = * *	85 = * *	86 = * *	87 = * *	88 = * *	89 = * *
83 = * *	84 = * *	85 = * *	86 = * *	87 = * *	88 = * *	89 = * *
83 = * *	84 = * *	85 = * *	86 = * *	87 = * *	88 = * *	89 = * *

FOOT NOTES:

① Source of Data Codes:

S D B A R L G Z
reporting, driller, owner, other gov't, other logs, geologist, other agency

③ Casing Material Codes

B C G I M P R S T U W Z
brass, concrete, galv., wrought, other, PVC or, rust or, wood, tile, covered, wood, other

⑤ Type of Openings Codes

F L M P R S T W X Z
fracture, rounded, man, perforated, wire, screen, sand, waited, open, other

⑦ Type of Material Codes for Open Sections

B C G I M P R S T Z
brass or, concrete, galv., wrought, other, PVC or, stainless, steel, tin, other

PRODUCTION DATA (1)

R=133 148 T= A D M Entry No 147 Date 148 / /

Discharge 150 Source of Data 151

Method of Measurement 152 B C E F M O P R T U V W Z

Production Level 153 Static Level 154 Source of Data 155 Specific Capacity 272

Method of Measurement 156 A C E G H L M R S T V Z

Pumping Period 157

LIFT DATA (1)

R=42 T= A D M Type of Lift 43 A B C J P R S T U Z

Pump Intake Setting 44 Type of Power 45 D E G H L N W Z

Date 46 Horsepower 46

MAJOR PUMP DATA (2)

R=47 T= A D M Type of Lift 43

Serial No. of Pump 49 Name of Power Company 50

Power Company Account No. 51 Power Meter No. 52 Pump Rating 53

Person or Company Who Maintains the Pump 54 Additional Lift 255 Rated Pump Capacity 268

STAND-BY POWER DATA (2)

R=55 T= A D M Type of Lift 43 Type of Power 56 Horsepower 57 Lift Entry No 254

AVAILABLE LOG DATA (1)

R=198 T= A D M

New Card for Each Log Type Same R & T

Type of Log 199

Begin Depth 200

End Depth 201

Source of Data 202

WATER QUALITY DATA COLLECTION (1)

R=114 T= A D M

Begin Year 115 End Year 116 Source Agency 117

Frequency of Collection 118 Network Site 257 Type of Analysis 120

WATER LEVEL DATA COLLECTION (1)

R=121 T= A D M

Begin Year 122 End Year 123 Source Agency 124

Frequency of Collection 125 Network Site 258

WATER PUMPAGE WITHDRAWAL DATA COLLECTION (1)

R=127 T= A D M

Begin Year 128 End Year 129 Source Agency 130

Frequency of Collection 131 Network Site 259 Method of Collection 133 C E M U Z

OTHER DATA AVAILABLE (1)

R=180 T= A D M Type of Data 181

New Card Same R & T Type of Data 181

Loc 182 C D Z

Format 261 F M P Z

FOOT NOTES:

① Source of Data Codes

S	O	O	A	R	L	G	Z
reporting, driller, owner, other gov't, other agency	loss, geologist, other reported						

② Type of Log Codes

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
time, collar, caliper, driller's, electric, fluid, geologist, magnetic, induction, gamma, dipmeter, laterolog, microlog, neutron, mu later, photo, radio, sonar																
S	T	U	V	Z												
sonic, temp, gamma, fluid, other gamma velocity																

③ Frequency of Collection Codes

A	B	C	D	F	I	M	O	Q	S	W	Z
annual, bi-monthly, continuous, daily, semi, intermittent, monthly, one time, quarterly, semi, weekly, other monthly											

④ Type of Quality Analysis Codes

A	B	C	D	E	F	G	H	J	K	L	M	Z
physical, chemical, trace, pesticides, nutrients, secondary, gases, radio, chem, other, other												
SAG	SGG	SGF	SGH	SGI	SGJ	SGK	SGL	SGM	SGN	SGO	SGP	SGQ

GEOHYDROLOGIC UNIT DESCRIPTIONS (1)

H=90 T=100M Entry No 758 E 001 Depth to Top 91 Depth to Bottom 92

Unit Identifier 93 120FLRD Lithology 96 LMSN Lithologic Modifier 97 MARINE

AQUIFER DATA (2)

R=04 T=ADM GeoHydrologic Unit Entry No 256 Date 95 Water Level 125 % Water Contributed 132

GEOHYDROLOGIC UNIT DESCRIPTIONS (1)

R=90 T=ADM Entry No 256 Depth to Top 91 Depth to Bottom 92

Unit Identifier 93 Lithology 96 Lithologic Modifier 97

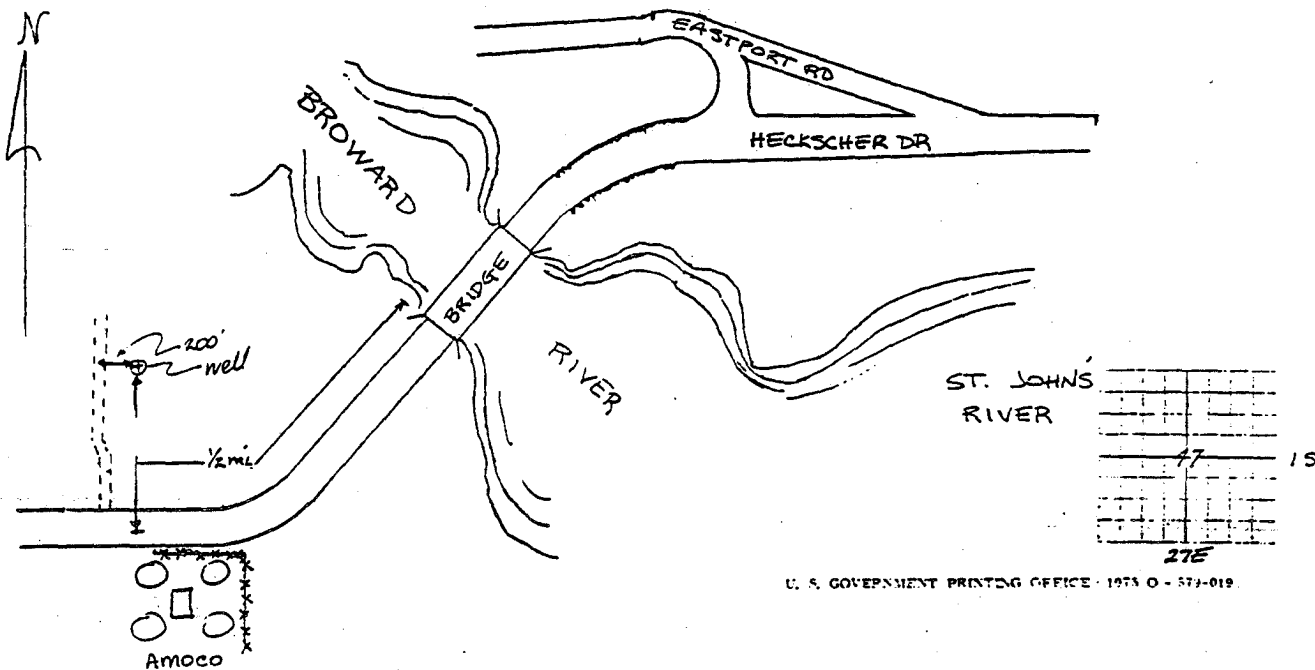
AQUIFER DATA (2)

R=04 T=ADM GeoHydrologic Unit Entry No 256 Date 95 Water Level 125 % Water Contributed 132

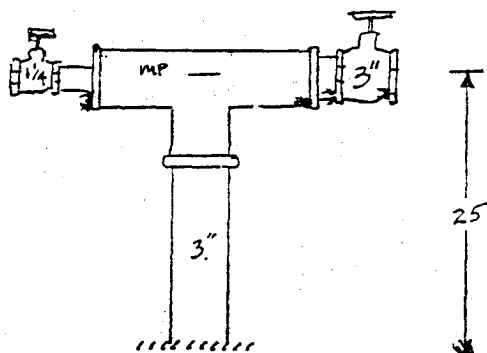
PERTINENT REMARKS

R=183 T=ADM 185
New Card Same R&T
185

NOTES:



U. S. GOVERNMENT PRINTING OFFICE : 1973 O - 577-019



Recorded by ESSEXU.S. DEPT. OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION
GROUND WATER SITE INVENTORY
SITE SCHEDULEDate 6-23-80Check One ☒ English ☐ Metric Units

GENERAL SITE DATA (I)

Site Ident No 302538081365501 RG Number R=0 Transaction T= (A) D M V *
 Site-Type 2= C D H I M P T (W) * Data 3= (C) U L M * Reporting Agency 4= FLO.39 *
 Project No. 5= District 6= 121 * State 7= 12 * County (or town) DUV21 8= 031 *
 Latitude 9= 302538 * Longitude 10= 0813655 * Lat-Long Accuracy 11= S (P) T M *
 Local Number 12= Land Net Loc. 13= S E S W S E S 8 T 1 S R 27 E *
 Location Map 14= EAST POINT * Scale 15= 24000 *
 Altitude 16= 10 * Method of Measurement 17= A L (M) * Accuracy 18= 5 *
 Topo Setting 19= D C E F H K L O P (S) T U V W * Hydrologic Unit (OWDC) 20= 03080103 *
 Date of First Construction/Completion 21= 00/00/1970 * Use of Site 23= A D E G H O M P R S T U (W) X Z *
 Use of Water 24= A B C D E F H I M N P R S T (U) Y Z *
 Secondary Water Use 25= * Tertiary Use of Water 26= * Depth of Hole 27= * Depth of Well 28= * Source of Depth Data 29= *
 Water Level 30= * Date Measured 31= / / * Source 33= *
 Method of Measurement 34= A C E G H L M R S T V Z *
 Site Status 37= D F G H O P R S T V X Z *
 Source of Geohydrologic Data 36= * Pump Used 35= * Measuring Point 266= * Measuring Point Date 267= / / *

OWNER IDENTIFICATION (I)

R=158 * T= (A) D M * Date of Ownership 159= 00/00/1970 *
 Name: Last 161= ROCKAWAY * First 162= BETCH * Middle Initial 163= *

OTHER SITE IDENTIFICATION NUMBERS (I)

R=189 * T= (A) D M * Ident 190= S.W. * Assigner 191= FLOWAD *
 New Card Same R & T. Ident 190= CEDAR BAY * Assigner 191= FLO39 *

SITE VISIT DATA (I)

R=186 * T= (A) D M * Date of Visit 187= 05/19/1975 * Name of Person 188= ESSEX *

FIELD WATER QUALITY MEASUREMENTS (I)

R=192 * T= A D M * Date 193= / / * Geohydro-logic Unit 195= *
 New Card Same R thru 195
 Temperature 196= 00.01.01 * Degrees C 197= *
 Conductance 196= 00.00.95 * u Mhos 197= *
 Other (STORET) Parameter 196= * Value 197= *
 Other (STORET) Parameter 196= * Value 197= *

FOOT NOTES:

① Source of Data Codes:

S O O A R L G Z
 reporting, driller, owner, other geol., other logs, geologist, other agency reported.

Plotted _____
 Header _____
 Local # _____
 Key punched _____

GEOHYDROLOGIC UNIT DESCRIPTIONS (1)

R = 90 * T = ① D M * Entry No 256 # 001 * Depth to Top 91 = * Depth to Bottom 92 = *

add, delete, modify

Unit Identifier 93 = 120 FLRD * Lithology 96 = LMSM * Lithologic Modifier 97 = MARINE *

AQUIFER DATA (2)

R = 94 * T = A D M * Geohydrologic Unit Entry No 256 # * *

add, delete, modify

Date 95 # / / *
month day year

Water Level 126 = * *

% Water Contributed 132 = * *

GEOHYDROLOGIC UNIT DESCRIPTIONS (1)

R = 90 * T = A D M * Entry No 256 # * * Depth to Top 91 = * Depth to Bottom 92 = *

add, delete, modify

Unit Identifier 93 = * Lithology 96 = * Lithologic Modifier 97 = * *

AQUIFER DATA (2)

R = 94 * T = A D M * Geohydrologic Unit Entry No 256 # * *

add, delete, modify

Date 95 # / / *
month day year

Water Level 126 = * *

% Water Contributed 132 = * *

PERTINENT REMARKS

R = 183 * T = A * 185 = *

add

New Card Same R&T

185 = *

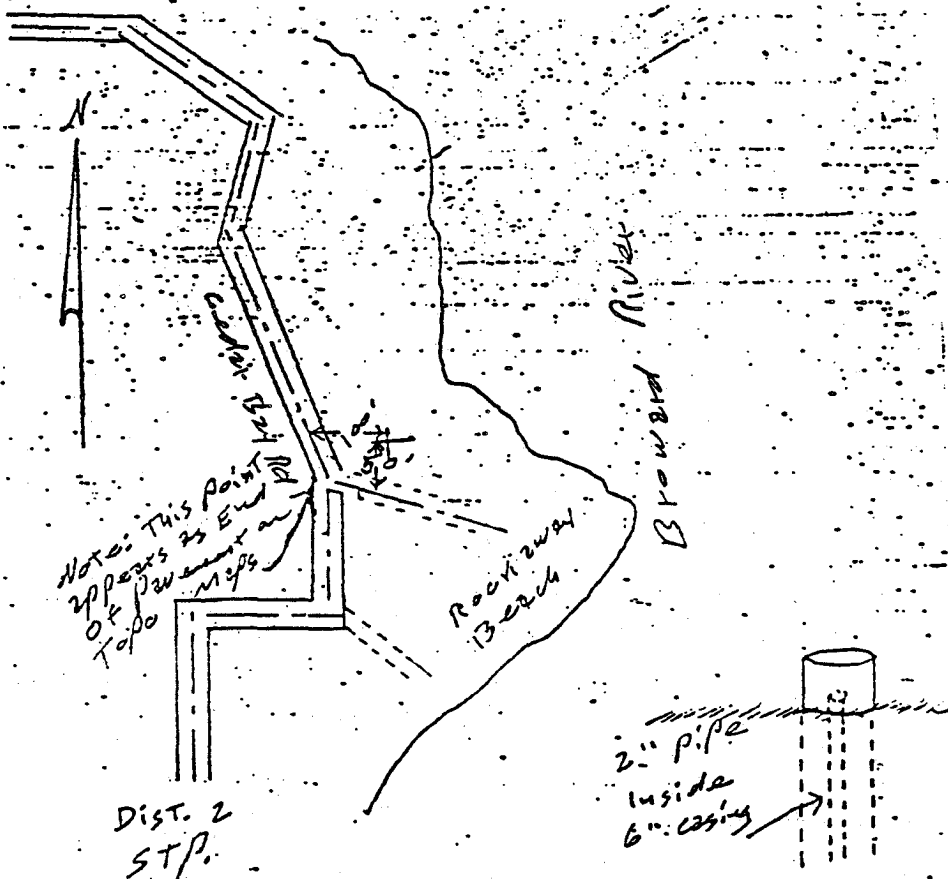
185 = *

NOTES:

R = 22 *

T = A *

22 = LAST CURVE CEDAR BAY RD.



WATER RESOURCES DIVISION

HYDROGEOLOGIC CARD

HYDROGEOLOGIC CARD

NAME AS OF JAWAS CARBONATE

Geologic (1) Coastal plain (2) Section: B Florida

Sec C (3) ST. Johns R (4) 0.9 E (5) Subbasin: OKlawaha (6) 3

Top of (7) (8) (9) (10) (11) (12) depression, stream channel, dunes, hilltop, sink, swamp, wall sites

(13) (14) (15) (16) (17) (18) offshore, padiment, hillside, terrace, undulating, valley flat First F

MAJOR Aquifer: Tertiary Escarpment T E Floridian I F

system aquifer, formation, group

Lithology: Limestone L (19) Origin: Marine M (20) Aquifer thickness: ft

Length of (21) Depth to (22) well open to top of ft

MAJOR Aquifer: system (23) surface (24) aquifer, formation, group (25) Aquifer thickness: ft

Lithology: (26) Origin: (27) Depth to (28) well open to top of ft

General (29) (30) (31) (32) (33) (34) (35) (36) (37) (38) (39) (40) (41) (42) (43) (44) (45) (46) (47) (48) (49) (50) (51) (52) (53) (54) (55) (56) (57) (58) (59) (60) (61) (62) (63) (64) (65) (66) (67) (68) (69) (70) (71) (72) (73) (74) (75) (76) (77) (78) (79) (80) (81) (82) (83) (84) (85) (86) (87) (88) (89) (90) (91) (92) (93) (94) (95) (96) (97) (98) (99) (100)

Depth to (101) Source of data: (102) (103) (104) (105) (106) (107) (108) (109) (110) (111) (112) (113) (114) (115) (116) (117) (118) (119) (120) (121) (122) (123) (124) (125) (126) (127) (128) (129) (130) (131) (132) (133) (134) (135) (136) (137) (138) (139) (140) (141) (142) (143) (144) (145) (146) (147) (148) (149) (150) (151) (152) (153) (154) (155) (156) (157) (158) (159) (160) (161) (162) (163) (164) (165) (166) (167) (168) (169) (170) (171) (172) (173) (174) (175) (176) (177) (178) (179) (180) (181) (182) (183) (184) (185) (186) (187) (188) (189) (190) (191) (192) (193) (194) (195) (196) (197) (198) (199) (200)

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ST. Regis Paper CO.

D-105

EAST RPT

O.75 mi. rd.

HECKSHORE DR.

T 15

R 29 E

Lindgren

46

D-105

ST. Regis Paper CO.

Latitude Longitude 30.24.52° 08' 36.12

MASTER CARD (H. H. C. 9/12/40)

Record by Sandi Price Bureau Office Record 2/17/74 File # Eastport 7.5'

State Florida (1) (2) (3) (4) (5) (6) (7) (8) (9) (10) (11) (12) Duval 7.6

Latitude: 30 24 52 N Longitude: 81 13 21 W Landgrant Talla.

Lat-long 21 1 0 27 0 47 520 162

Local well number: D-1520 Other number: D-520 162

Local use: 01827E47 Owner or title: Foley Lumber Co.

Owner or name: FOLEY LUMBER CO. Jacksonville, Fla.

Use: (C) (F) (H) (M) (P) (U) (W) Corp or Co W

Use of: (A) (B) (C) (D) (E) (F) (G) (H) (I) (J) (K) (L) (M) (N) (O) (P) (Q) (R) (S) (T) (U) (V) (W) (X) (Y) (Z) (AA) (AB) (AC) (AD) (AE) (AF) (AG) (AH) (AI) (AJ) (AK) (AL) (AM) (AN) (AO) (AP) (AQ) (AR) (AS) (AT) (AU) (AV) (AW) (AX) (AY) (AZ) (BA) (BB) (BC) (BD) (BE) (BF) (BG) (BH) (BI) (BJ) (BK) (BL) (BM) (BN) (BO) (BP) (BQ) (BR) (BS) (BT) (BU) (BV) (BW) (BX) (BY) (BZ) (CA) (CB) (CC) (CD) (CE) (CF) (CG) (CH) (CI) (CJ) (CK) (CL) (CM) (CN) (CO) (CP) (CQ) (CR) (CS) (CT) (CU) (CV) (CW) (CX) (CY) (CZ) (DA) (DB) (DC) (DD) (DE) (DF) (DG) (DH) (DI) (DJ) (DK) (DL) (DM) (DN) (DO) (DP) (DQ) (DR) (DS) (DT) (DU) (DV) (DW) (DX) (DY) (DZ) (EA) (EB) (EC) (ED) (EE) (EF) (EG) (EH) (EI) (EJ) (EK) (EL) (EM) (EN) (EO) (EP) (EQ) (ER) (ES) (ET) (EU) (EV) (EW) (EX) (EY) (EZ) (FA) (FB) (FC) (FD) (FE) (FF) (FG) (FH) (FI) (FJ) (FK) (FL) (FM) (FN) (FO) (FP) (FQ) (FR) (FS) (FT) (FU) (FV) (FW) (FX) (FY) (FZ) (GA) (GB) (GC) (GD) (GE) (GF) (GG) (GH) (GI) (GJ) (GK) (GL) (GM) (GN) (GO) (GP) (GQ) (GR) (GS) (GT) (GU) (GV) (GW) (GX) (GY) (GZ) (HA) (HB) (HC) (HD) (HE) (HF) (HG) (HH) (HI) (HJ) (HK) (HL) (HM) (HN) (HO) (HP) (HQ) (HR) (HS) (HT) (HU) (HV) (HW) (HX) (HY) (HZ) (IA) (IB) (IC) (ID) (IE) (IF) (IG) (IH) (II) (IJ) (IK) (IL) (IM) (IN) (IO) (IP) (IQ) (IR) (IS) (IT) (IU) (IV) (IW) (IX) (IY) (IZ) (JA) (JB) (JC) (JD) (JE) (JF) (JG) (JH) (JI) (JJ) (JK) (JL) (JM) (JN) (JO) (JP) (JQ) (JR) (JS) (JT) (JU) (JV) (JW) (JX) (JY) (JZ) (KA) (KB) (KC) (KD) (KE) (KF) (KG) (KH) (KI) (KJ) (KK) (KL) (KM) (KN) (KO) (KP) (KQ) (KR) (KS) (KT) (KU) (KV) (KW) (KX) (KY) (KZ) (LA) (LB) (LC) (LD) (LE) (LF) (LG) (LH) (LI) (LJ) (LK) (LL) (LM) (LN) (LO) (LP) (LQ) (LR) (LS) (LT) (LU) (LV) (LW) (LX) (LY) (LZ) (MA) (MB) (MC) (MD) (ME) (MF) (MG) (MH) (MI) (MJ) (MK) (ML) (MM) (MN) (MO) (MP) (MQ) (MR) (MS) (MT) (MU) (MV) (MW) (MX) (MY) (MZ) (NA) (NB) (NC) (ND) (NE) (NF) (NG) (NH) (NI) (NJ) (NK) (NL) (NM) (NN) (NO) (NP) (NQ) (NR) (NS) (NT) (NU) (NV) (NW) (NX) (NY) (NZ) (OA) (OB) (OC) (OD) (OE) (OF) (OG) (OH) (OI) (OJ) (OK) (OL) (OM) (ON) (OO) (OP) (OQ) (OR) (OS) (OT) (OU) (OV) (OW) (OX) (OY) (OZ) (PA) (PB) (PC) (PD) (PE) (PF) (PG) (PH) (PI) (PJ) (PK) (PL) (PM) (PN) (PO) (PP) (PQ) (PR) (PS) (PT) (PU) (PV) (PW) (PX) (PY) (PZ) (QA) (QB) (QC) (QD) (QE) (QF) (QG) (QH) (QI) (QJ) (QK) (QL) (QM) (QN) (QO) (QP) (QQ) (QR) (QS) (QT) (QU) (QV) (QW) (QX) (QY) (QZ) (RA) (RB) (RC) (RD) (RE) (RF) (RG) (RH) (RI) (RJ) (RK) (RL) (RM) (RN) (RO) (RP) (RQ) (RR) (RS) (RT) (RU) (RV) (RW) (RX) (RY) (RZ) (SA) (SB) (SC) (SD) (SE) (SF) (SG) (SH) (SI) (SJ) (SK) (SL) (SM) (SN) (SO) (SP) (SQ) (SR) (SS) (ST) (SU) (SV) (SW) (SX) (SY) (SZ) (TA) (TB) (TC) (TD) (TE) (TF) (TG) (TH) (TI) (TJ) (TK) (TL) (TM) (TN) (TO) (TP) (TQ) (TR) (TS) (TT) (TU) (TV) (TW) (TX) (TY) (TZ) (UA) (UB) (UC) (UD) (UE) (UF) (UG) (UH) (UI) (UJ) (UK) (UL) (UM) (UN) (UO) (UP) (UQ) (UR) (US) (UT) (UU) (UV) (UW) (UX) (UY) (UZ) (VA) (VB) (VC) (VD) (VE) (VF) (VG) (VH) (VI) (VJ) (VK) (VL) (VM) (VN) (VO) (VP) (VQ) (VR) (VS) (VT) (VU) (VV) (VW) (VX) (VY) (VZ) (WA) (WB) (WC) (WD) (WE) (WF) (WG) (WH) (WI) (WJ) (WK) (WL) (WM) (WN) (WO) (WP) (WQ) (WR) (WS) (WT) (WU) (WV) (WW) (WX) (WY) (WZ) (XA) (XB) (XC) (XD) (XE) (XF) (XG) (XH) (XI) (XJ) (XK) (XL) (XM) (XN) (XO) (XP) (XQ) (XR) (XS) (XT) (XU) (XV) (XW) (XX) (XY) (XZ) (YA) (YB) (YC) (YD) (YE) (YF) (YG) (YH) (YI) (YJ) (YK) (YL) (YM) (YN) (YO) (YP) (YQ) (YR) (YS) (YT) (YU) (YV) (YW) (YX) (YY) (YZ) (ZA) (ZB) (ZC) (ZD) (ZE) (ZF) (ZG) (ZH) (ZI) (ZJ) (ZK) (ZL) (ZM) (ZN) (ZO) (ZP) (ZQ) (ZR) (ZS) (ZT) (ZU) (ZV) (ZW) (ZX) (ZY) (ZZ)

DATA AVAILABLE: Well data 0 Log data 0 Field geologic char. 0

Field data: 0

Qual. water data: 0

Field sampling: 0

Geologic cards: 0

Log data: 0

[illegible]

HYDROGEOLOGIC CARD

STATE OF OKLAHOMA
Geographic Province: Coastal Plain
Section: 0.3
Region: Florida

Section: 0
Basin: St. Johns River
Subbasin: Below OKla. 2

(1) depression, stream channel, dunes
(2) flat, hilltop, slope, swamp
(3) (4) (5) (6) (7)
of shore, pediment, alluvial, terrace, undulating, valley flat
Tertiary Eocene T.E. Florida
aquifer, formation, group
Lithology: Limestone
Origin: Marine
Length of well open to: ft
Depth to top of: ft
Interval screened: ft
Depth to consolidated rock: ft
Depth to sandstone: ft
Surficial materials: ft
Coefficient of transmissibility: ft²/ft
Coefficient of storage: ft
Perm.: ft
ap/ft: ft
ap/ft: Number of geologic cards:

A hand-drawn map showing the Atlantic Coast Line, Dryumond Point, and St. Johns River. The map includes a scale bar indicating 0.520 miles and a grid with the number 47.

Atlantic Coast Line

Dryumond Point

St. Johns River

0.520 miles

47

Grid:

7	2	7	8
Landgrant			
47			

Well No. 202452/10813612.

MAILED CARD

[illegible]

WELL-DESCRIPTION CARD

[illegible]

HYDROGEOLOGIC CARO

[illegible]

Hand-drawn map of the St. Regis Paper Mill area. The map shows Brown and River, Drummond Point, St. John's River, and the St. Regis Paper Mill. A dashed line indicates a boundary or path. A small inset map in the top right corner shows the location of the area within a larger grid, with the number 46 in the top right cell.

WELL SCHEDULE
GEOLOGICAL SURVEY

MASTER CARD (H. H. C. 9/12/40)

Recorded by Sandi Price Date of entry 2/17/74 File # Eastport 7.5
 State Florida 112 County Duval 116
 Latitude: 30 24 15 2N Longitude: 083 13 61 2 Stream/river name: J
 Locality: 21 27 C Sec. 47 Land grant: Talla.
 Local well number: D-520 Other numbers: D-520 to #162
 Local use: 16 3 27 47 Name of owner: Foley Lumber Co.
 Owner or name: FOLEY LUMBER CO. Address: Jacksonville, Fla
 Ownership: (C) (F) (N) (P) (S) (W) Company, Fed Gov't, City, Corp of Co, Private, State Agency, Water Dist
 County: (A) (C) (H) (S) (M) (I) (H) (M) (I) (K) Co or Co M
 Use of water: (A) (C) (H) (S) (M) (I) (H) (M) (I) (K) Use of water
 Stock, Incult, Lousad, Repressure, Recharge, Deasl-7 S, Deasl-other, Other Unused U
 Use of well: (A) (C) (H) (S) (M) (I) (H) (M) (I) (K) Use of well
 Arnds, Drain, Selsaic, Heat Sec, Obs, Oil-gas, Recharge, Test, Unuse, Viticidaw, Waats, Destroyed U
 DATA AVAILABLE: Well data 0 Freq. W/L meas. Observation 0 Field equifer char. 0
 Hyd. lab. data: 4/11/74
 Qual. water data: type: yes
 Freq. sampling: yes no: period:
 Apert. use cards: yes

WELL-DESCRIPTION CARD

NAME AS ON "ACIER CAR" _____ ft _____ Hoss. sept. _____ Accuracy _____

Depth cord: _____ ft _____ Casita _____ Diam. _____ In _____

(first: part: _____ ft _____) _____

Fi-fish: (C) (F) (C) (K) (O) (P) (S) (T) (W) (A) _____
(G) gravel v. gravel v. harle. (B) _____
(concrete, (ref.) _____, gallery, end, _____

Method (A) (S) (C) (D) (H) (J) (R) (T) (V) (W) other _____
Aft. bored, cable, dia. hyd. jetted, air reverse tranching, driven, drive _____
Drilled: rot, _____, percussion, rotary, wash, _____

Date _____

Drilled: _____ Pump intake setting: _____ ft _____

Driller: _____

Lifts (A) (S) (C) (S) (L) (N) all sorts _____
(type): alf., bucket, cart, jet, (cont.) (mult.), goose, piston, rot, submerg., turo, other _____ Deep _____ Shallow _____

Power: _____ nat _____ l? _____

(type): diesel, elec., gas, gasoline, hand, gas, wind; H.P. _____

Receipt: MP _____ 3.3 (above) LSD, Alt. NP _____ 17
Top of 6" valve

Alt. LSD: _____ 13.70 _____ 1.4 Accuracy: _____ Instrument + Level _____

Meter _____ 30.9 _____ 1.34 Accuracy: _____ Pressure Gauge _____

Date _____ 9/14/40 _____ 9.40 Yield: _____ gpm _____ Method _____
_____ _____ _____ _____

Drawings: _____ Accuracy: _____ _____ Pumping _____
_____ _____ _____ _____

QUALITY OF _____
WATER DATA: Iron _____ Sulfate _____ Chloride _____ Hard. _____
_____ _____ _____ _____

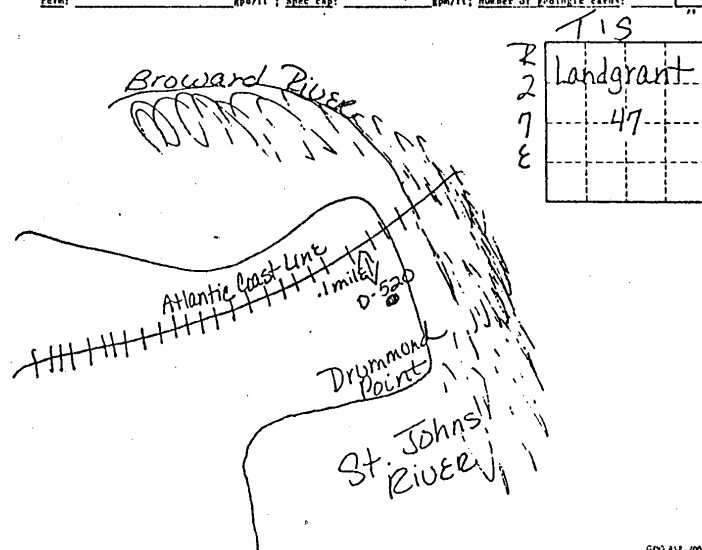
Sp. Cond. cc _____ K x 10 _____ Temp. _____ °F _____ gpm _____
_____ _____ _____ _____

Taste, color, etc. _____

762

HYDROGEOLOGIC CARD

SAY AN AN INCH CARD Photographic Scale: Coastal Plain 0.3 New York Floridan
 Prints: St. Johns River 0.9 E Subsided Below OKla. 2
 Section (1) (2) (3) (4) (5) (6) (7) (8) (9) (10) (11) (12) (13) (14) (15) (16) (17) (18) (19) (20) (21) (22) (23) (24) (25) (26) (27) (28) (29) (30) (31) (32) (33) (34) (35) (36) (37) (38) (39) (40) (41) (42) (43) (44) (45) (46) (47) (48) (49) (50) (51) (52) (53) (54) (55) (56) (57) (58) (59) (60) (61) (62) (63) (64) (65) (66) (67) (68) (69) (70) (71) (72) (73) (74) (75) (76) (77) (78) (79) (80) (81) (82) (83) (84) (85) (86) (87) (88) (89) (90) (91) (92) (93) (94) (95) (96) (97) (98) (99) (100) (101) (102) (103) (104) (105) (106) (107) (108) (109) (110) (111) (112) (113) (114) (115) (116) (117) (118) (119) (120) (121) (122) (123) (124) (125) (126) (127) (128) (129) (130) (131) (132) (133) (134) (135) (136) (137) (138) (139) (140) (141) (142) (143) (144) (145) (146) (147) (148) (149) (150) (151) (152) (153) (154) (155) (156) (157) (158) (159) (160) (161) (162) (163) (164) (165) (166) (167) (168) (169) (170) (171) (172) (173) (174) (175) (176) (177) (178) (179) (180) (181) (182) (183) (184) (185) (186) (187) (188) (189) (190) (191) (192) (193) (194) (195) (196) (197) (198) (199) (200) (201) (202) (203) (204) (205) (206) (207) (208) (209) (210) (211)



5213

CONTENTS OF THE INTERCOM

GEOLOGICAL SURVEY

Water Resources Division Nat Schedule Form

7-25-40 (PAX)

1:24,000 F. 1

[illegible]

KEY-DESCRIPTION CARD

[illegible]

302441N0813649.

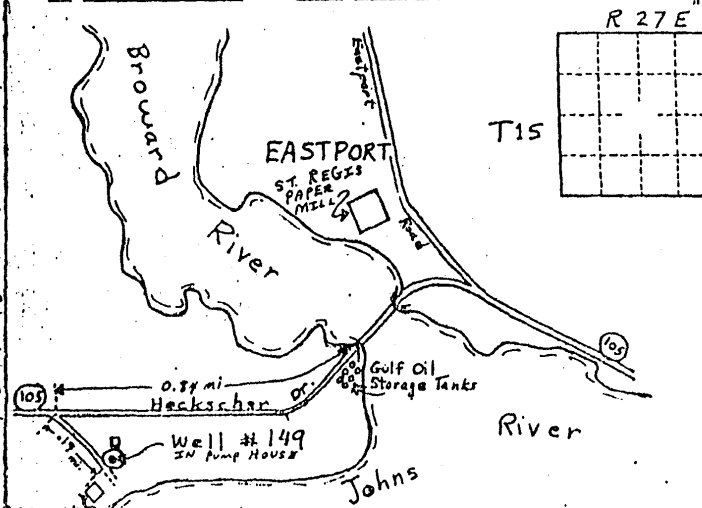
3649.1

1.

HYDROGEOLOGIC CARD

Jail Number 82 2441 ① 081 36 49.1

HYDROGEOLOGIC CARD

[illegible]

U. S. DEPT. OF THE INTERIOR

GEOLOGICAL SURVEY

MASTER CARD (ALC) Field

Record by: H.H. Cooper Date: 3/24/74

Source: Records

State: FLA. County: Duval

Latitude: 30.0559N Longitude: 081.4555W

Section: 10-1-25 Sec 41

Address: Land Grant, Talla.

Well number: 10-568

Local use: 0155E41

Owner or name: Mrs. Hilderbrandt

Owner of land: City, Corp of Private State Agency, Water Dist

Use of well: Air cond, Bottling, Com, Dewater, Power, Fite, Dum, Irr, Med, Ind, P S, Rec, Stock, Unltd, Unreused, Recharge, Deseal-P S, Seals-other

Use of well: Anode, Drain, Salenic, Heat, Sea, Gas, Oil-gas, Recharge, Test, Unused, Wtdown, Waste, Destroyed

Data available: Well data: Fing. W/L Desc: Original 3/24/74

Field squitter char.

Hyd. lab. data:

Qual. water data: Type:

Freq. sampling:

Apperture cards:

Log data:

WELL-DESCRIPTION CARD

[illegible]

HYDROGEOLOGIC CARD

NAME AS ON MASTER CARD Phylogenic Coastal Plain 0:3 Section: Floridian
Province: St. Johns R. 0:9 E Bellevue Okmulgee 3
SPC 0 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31

Type of (D) (C) (A) (S) (U) (L) (L)
depression, stream channel, dunes, flats, hilltop, sink, swamp,
well site (E) (V) (S) (T) (U) (V) 7147 1 F
offshore, piedmont, hillside, terrace, undulating, valley flat

MAJOR Aquifer: Tertiary, Eocene T.E. Floridian 1 F
system series 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
aquifer, formation, group
aquifer

Lithology: limestone 1 F Origin: marine 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
Thickness: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31

Length of Depth to
Well open to: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
ft. 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31

MINOR Aquifer: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
system series 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
aquifer, formation, group
aquifer

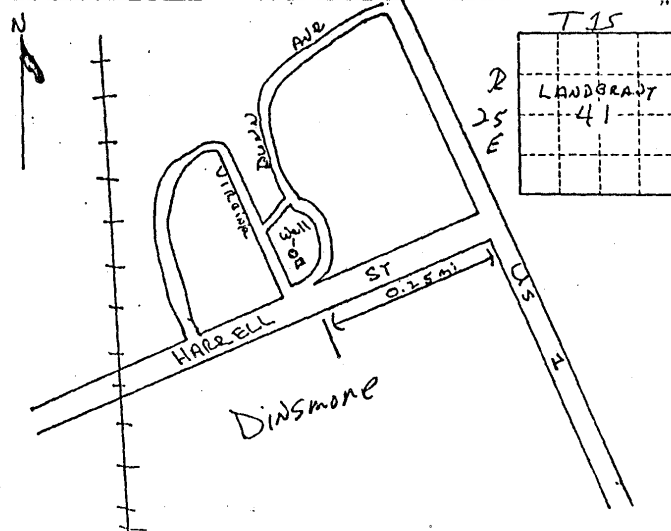
Lithology: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
Thickness: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31

Length of Depth to
Well open to: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
ft. 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31

Interstrata
Stranded: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31

Depth to Coastal dated rock: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
ft. 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31

Depth to basement: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
ft. 1 2 3 4 5



CPA 869-202

WATER SOURCES DIVISION

GEOLOGICAL SURVEY

WELL-DESCRIPTION CARD

NAME AS AN MASTER CARD _____ Depth well: _____ ft _____

Depth tested: _____ Casting _____ Accuracy _____
(first pref.) (ft) _____ (type) _____ (ft) _____

Finish: (C) (P) (H) (P) (S) (N) (N) (N)
gravel, gravel, v. gravel, v. bgn. open
concrete, (pref.), (accrete) gallery, end. part., accret. ad. pt., shored, open

Method (A) (N) (C) (D) (H) (J) (N) (Y) (V) (N)
air bored, cable, dug, hyd. jetted, air reverse trenching, driven, drive

Drilled: (ft) _____ (ft) _____
rot., rot., percussion, rotary, wash.

Date _____
Drilled: _____ ft _____

Pump intake setting: _____ ft _____

Diagrams: _____ name _____ address _____

Use (A) (N) (C) (L) (N) (N) _____ Deep _____
(type): air, bucket, cont. jet, multiple, multiple, nose, piston, rei, submerg. tur, other _____

Power: _____ LP _____ Jumps, RT _____
(type): diesel, elec, gas, gasoline, hand, gas, wind, B.E. _____ water no. _____

Remarks: NP _____ above _____
ft below L.S.D., Alt. NP _____

Alt. L.S.D.: _____ Accuracy: _____
_____ (source) _____

Water _____
Level: _____ ft above NP; Ft below L.S.D. _____ Accuracy: _____

Date _____ Method _____
Notes: _____ Yield: _____ gpm _____ determined _____

Drawings: _____ ft _____ Accuracy: _____
_____ (ft) _____ (ft) _____ Pumping _____
_____ (ft) _____ (ft) _____ period _____ hrs _____

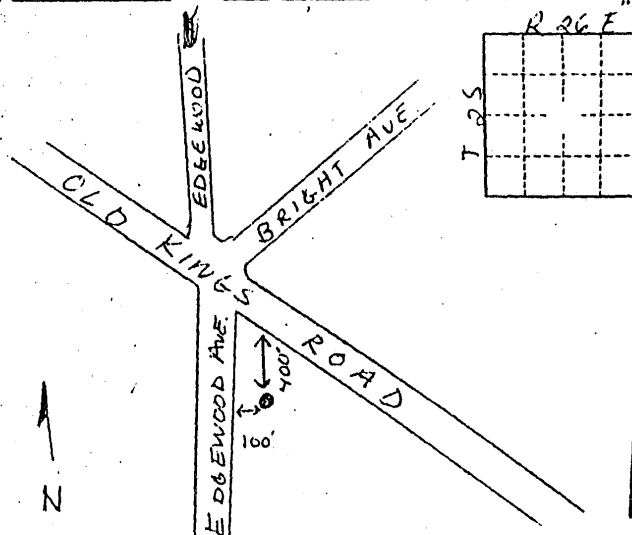
QUALITY OF _____
WATER RATING: _____ gpm _____ Chloride _____ ft _____
_____ Sulfate _____ ft _____ Hard. _____
_____ _____ Date _____
_____ sampled _____

Sp. Conduct _____ ft _____
_____ x 10³ _____ Temp. _____ _____
_____ _____

Notes, notes, etc. _____

Texte, color, etc.

332

[illegible]

WATER RESOURCES DIVISION

GEOLOGICAL SURVEY

100

St. Johns River

MAYPORT MARINA

OLD ICE HOUSE

Well

(JANUARY 1907)

MAYPORT RD

A14

TIS

29

P

E

[illegible]

N

Eastport

Fay Rd.

Broward River

1/2 mi

1/2 mi

1/2 mi

Well D-69

St. Regis Paper Co.

R 27 E

46

T15

MASTER CARD

Record by D. BLICKALL Source of data DER LOG Date July 9, 1935 Map EASTPORT
State FLORIDA County DUVAL Section 16
Latitude: 30° 26' 08" N Longitude: 081° 13' 54" W Sequential number: 3
Lat-long accuracy: 27 Sec 46 LAND GRANT TALLA
Local well number: 23 Other number: D 262
Local use: _____
Owner or name: ST. REGIS PAPER CO. Address: EASTPORT RD.
Ownership: (C) County, (F) Fed Gov't, (M) Corp or Co., (P) Private, (S) State Agency, (W) Water Dist. N
Use of well: (A) Air cond., (B) Bottling, (C) Com., (D) Devel., (E) Fire, (F) Irr., (G) Ind., (H) P. S., (I) Rec., (J) Stock, (K) Unused, (L) Repressure, (M) Recharge, (N) Desal-P S., (O) Desal-other, (P) Other N
Use of well: (A) Anode, (B) Drain, (C) Selsol, (D) Heat Res., (E) Obs., (F) Oil-gas, (G) Recharge, (H) Test, (I) Unused, (J) Withdraw, (K) Waste, (L) Destroyed 7
DATA AVAILABLE: Well data 10 Freq. W/L meas.: ORIGINAL 7-11-75 Field aquifer char. 3
Hyd. lab. data: _____
Qual. water data: Type: CHI
Freq. sampling: _____ Pumpage inventory: yes period: _____
Aperture cards: _____
Log data: DER

WELL-DESCRIPTION CARD

SAVE AS ON MASTER CARD Depth well: 654 ft. 654 ft. accuracy 0
Depth casing: 574 ft. 574 ft. casing STEEL Diam. 4 in. 4
Finish: (C) concrete, (F) gravel, (H) hole, (M) open, (P) perf., (S) screen, (U) pt., (W) shored, (X) other X
Method: (A) air, (B) bored, (C) cable, (D) aug., (E) hyd. jetted, (F) air, (G) reverse trenching, (H) driven, (I) wash, (J) other 3
Date: _____
Drilled: _____ Pump intake setting: _____ ft. _____
Driller: _____
Type: (A) air, (B) bucket, (C) cont., (D) multiple, (E) multiple, (F) none, (G) piston, (H) rot., (I) submerg., (J) turb., (K) other 3
Power: (L) diesel, (M) elec., (N) gas, (O) gasoline, (P) hand, (Q) gas, (R) wind, (S) H.P. 3
Direction: NP TOP OF WELL FLANGE 1 ft. above LSD, Alt. MP 11.4
Alt. LSD: 1.04 Accuracy: 1.0 Accuracy: TOPO MAP 3
Water level: 20.4 ft. above MP; Ft. below LSD 2.7 Accuracy: GAGE 4
Date: 7-9-75 Yield: _____ gpm _____
Drawdown: _____ ft. _____ Accuracy: _____
Quality of water: Iron _____ Sulfate _____ Chloride 55 Hard. _____
Sp. Conduct: _____ K x 10³ Temp. 78 °F 78 °F 7-9-75 7-25
Tests, colors, etc. _____

4 APPLICABLE Flow 236 GPM

HYDROGEOLOGIC CARD

SAVE AS ON MASTER CARD Physiographic Province: COASTAL PLAIN Section: FLORIDIAN
SECTION C Drainage basin: ST. JAMES R Subbasin: BELOW OKL 3
Top of well site: (D) depression, (E) stream channel, (F) dunes, (G) flat, (H) hilltop, (I) sink, (J) swamp, (K) offshore, (L) pediment, (M) hillside, (N) terrace, (O) undulating, (P) valley flat FLAT E
MAJOR AQUIFER: _____ system _____ series _____ aquifer, formation, group _____
Lithology: _____ Length of well open to: _____ ft. _____ Depth to top of: _____ ft. _____
MINOR AQUIFER: _____ system _____ series _____ aquifer, formation, group _____
Lithology: _____ Length of well open to: _____ ft. _____ Depth to top of: _____ ft. _____
Interval screened: _____ Depth to consolidated rock: _____ ft. _____ Source of data: _____
Depth to basement: _____ ft. _____ Source of data: _____
Surficial material: _____ Infiltration characteristics: _____
Coefficients: _____ Trans. _____ spd/ft. _____ Coefficient storage: _____
Coefficient perm.: _____ spd/ft. _____ Spec. cap.: _____ spd/ft. Number of pebbles: _____

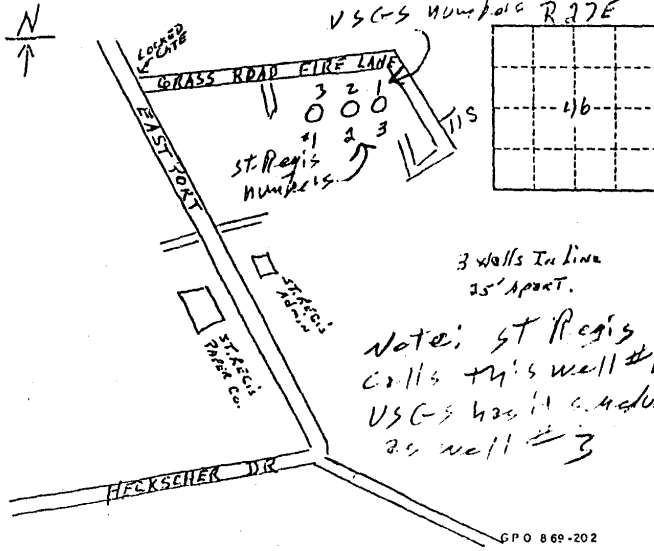


FIGURE 3
SAMPLING LOCATIONS
SEMINOLE KRAFT MILL
JACKSONVILLE, FLORIDA

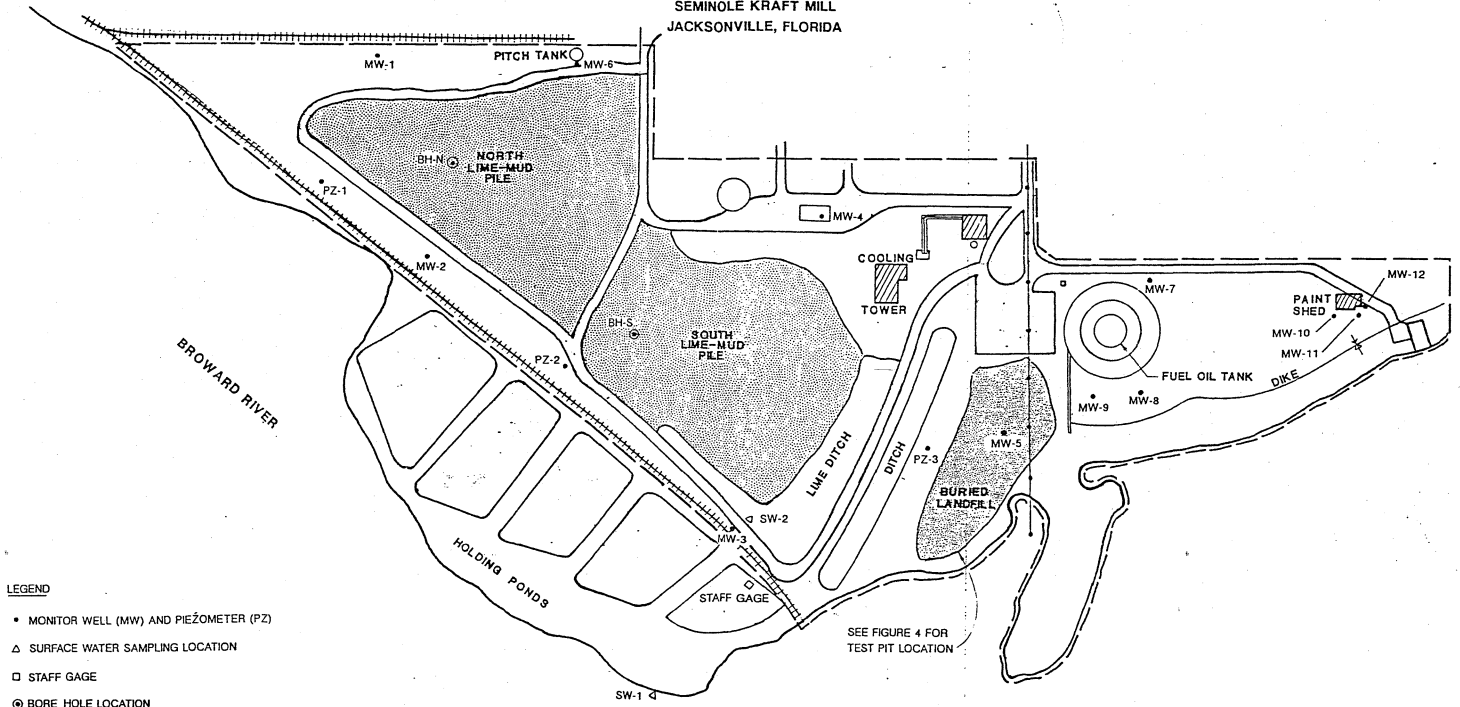
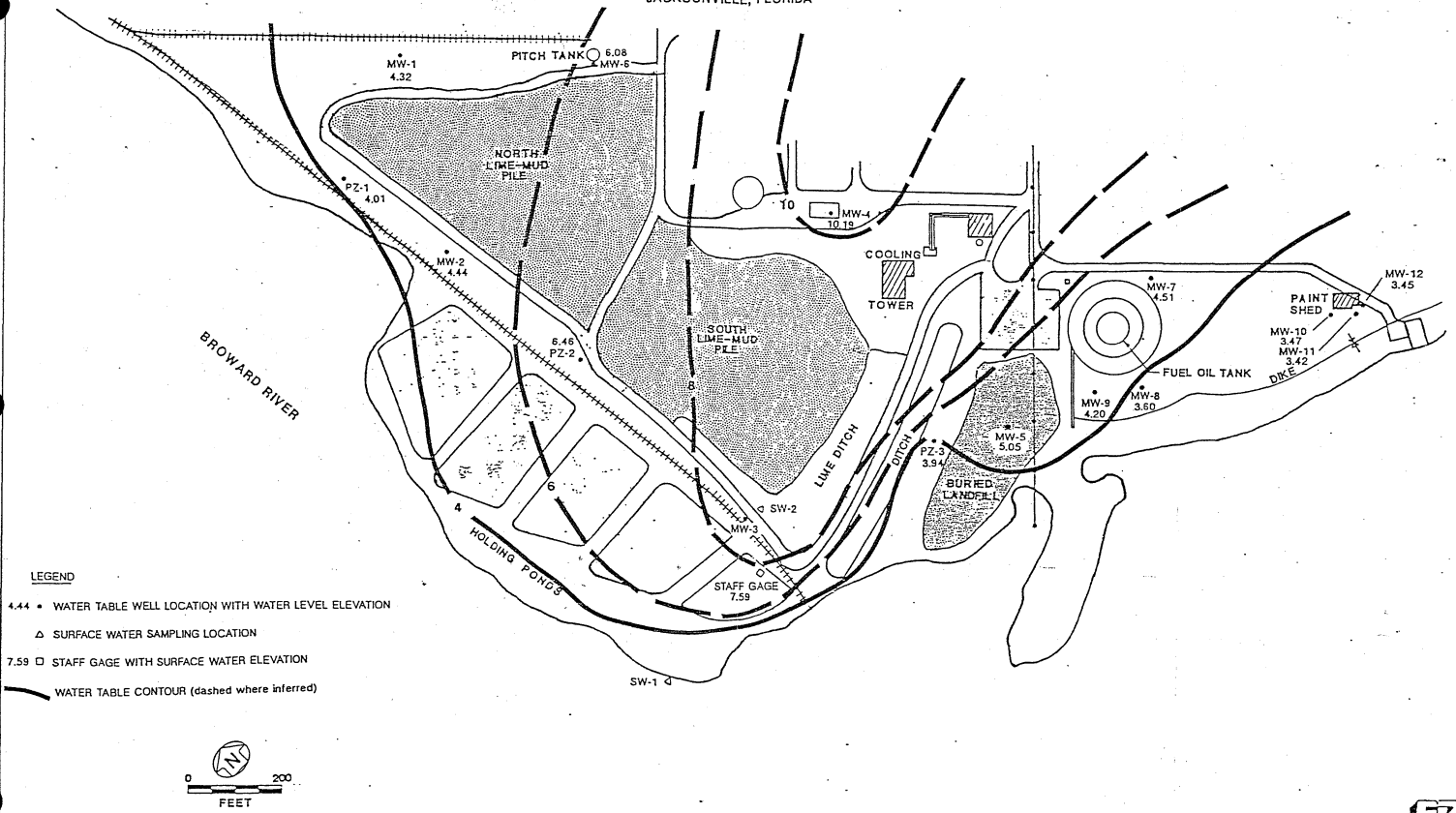


FIGURE 6
WATER TABLE MAP 7-9-88
SEMINOLE KRAFT MILL
JACKSONVILLE, FLORIDA



12901.01/SAPTOC.AES/BAI/083088

APPENDIX A
WELL SAMPLE RECORDS

WELL SAMPLE RECORD

 PROJECT AES

 DATE 7/20/88

 PROJECT NO. 12902-01

 SAMPLED BY P. Shumate, M. Hampton

WELL I.D.	DEPTH TO WATER (FT. BMP)	TOTAL WELL DEPTH (FT. BMP)	WELL TYPE AND DIAMETER	WATER VOLUME IN WELL (GAL.)	PURGE RATE (GPM)	DURATION OF PURGING (MIN.)	VOLUME PURGED (GAL.)	PURGE METHOD	METHOD OF SAMPLE COLLECTION	DATE OF SAMPLE COLLECTION	TIME OF SAMPLE COLLECTION	SAMPLE TEMP. (°C)	SAMPLE PH	SAMPLE CONDUCTIVITY UMHO/CM	COMMENTS (ODOR, COLOR, ETC.)
mw1	11.96	20.30	2" PVC	1.36	2	13	26	C	TB	7/8/88	915	25°C	9.90	700	
mw2	8.41	15.33	2" PVC	1.13	1.5	25	37.5	C	TB	7/8/88	1045	25°C	11.70	22000	
mw3	4.92	10.35	2" PVC	.89	1.5	15	22.5	C	TB	7/8/88	1155	26°C	8.00	3500	
mw4	5.47	9.65	2" PVC	.68	1.2	10	12	C	TB	7/8/88	1855	28°C	11.55	NA	metce broken
mw5	11.01	20.50	2" PVC	1.54	2.0	27	54	C	TB	7/8/88	1815	26°C	8.10	4000	
mw6	13.53	20.13	2" PVC	1.08	.25	12	3	B	TB	7/8/88	1930	25°C	10.40	NA	metce broken
mw7	11.18	13.37	2" PVC	.36	.25	10	2.5	C	TB	7/8/88	1440	29°C	7.03	130	
mw8	5.91	8.30	2" PVC	.38	.08	15	1.2	C	TB	7/8/88	1540	27°C	6.60	540	
mw9	4.89	7.33	2" PVC	.40	.18	8	1.5	B	TB	7/8/88	1605	27°C	6.90	1200	
mw10	6.18	8.35	2" PVC	.35	.10	20	2.0	P	TB	7/8/88	1655	27°C	6.70	480	
mw11	6.41	9.0	2" PVC	.42	.13	20	2.5	P	TB	7/8/88	1715	27°C	6.70	620	
mw12	6.88	8.5	2" PVC	.26	.13	15	2.0	P	TB	7/8/88	1735	27°C	6.80	210	

PURGE AND COLLECTION METHODS: C = CENTRIFUGAL PUMP
P = PERISTALTIC PUMP

TB = TEFLON BAILER
PB = PVC BAILER

X = OTHER

WELL SAMPLE RECORD

PROJECT AES

DATE 7/20/88

PROJECT NO. 12902-01

SAMPLED BY NA

WELL I.D.	DEPTH TO WATER (FT. BMP)	TOTAL WELL DEPTH (FT. BMP)	WELL TYPE AND DIAMETER	WATER VOLUME IN WELL (GAL.)	PURGE RATE (GPM)	DURATION OF PURGING (MIN.)	VOLUME PURGED (GAL.)	PURGE METHOD	METHOD OF SAMPLE COLLECTION	DATE OF SAMPLE COLLECTION	TIME OF SAMPLE COLLECTION	SAMPLE TEMP. (°C)	SAMPLE PH	SAMPLE CONDUCTIVITY UMHOS/CM	COMMENTS (ODOR, COLOR, ETC.)
PZ 1	10.84	13.85	2" PVC	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	water level only
PZ 2	6.40	9.73	2" PVC	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	water level only
PZ 3	10.69	20.32	2" PVC	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	water level only
Staff gauge	gauge reading 2.86	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	total depth of gauge = 6.66

PURGE AND COLLECTION METHODS: C = CENTRIFUGAL PUMP
P = PERISTALTIC PUMP

TB = TEFLON BAILER
PB = PVC BAILER

X = OTHER

12901.01/SAPTOC.AES/BAI/083088

APPENDIX C-1

ANALYTICAL DATA SUMMARY TABLES

PAINT SHED GROUND WATER SAMPLES

AES CEDAR BAY

PARAMETERS	UNITS	MW-10	MW-11	MW-12
EPA METHOD 601				
Bromodichloromethane	ug/L	<1.0	<1.0	<1.0
Bromoform	ug/L	<1.0	<1.0	<1.0
Bromomethane	ug/L	<1.0	<1.0	<1.0
Carbon Tetrachloride	ug/L	<1.0	<1.0	<1.0
Chlorobenzene	ug/L	<1.0	<1.0	<1.0
Chloroethane	ug/L	<1.0	<1.0	<1.0
Chloroform	ug/L	<1.0	<1.0	<1.0
Chloromethane	ug/L	<1.0	<1.0	<1.0
Cis-1,3-Dichloropropene	ug/L	<1.0	<1.0	<1.0
Dibromochloromethane	ug/L	<1.0	<1.0	<1.0
Dichlorodifluoromethane	ug/L	<1.0	<1.0	<1.0
Methylene Chloride	ug/L	<1.0	<1.0	<1.0
Tetrachloroethene	ug/L	<1.0	<1.0	<1.0
Trans-1,2-Dichloroethene	ug/L	<1.0	<1.0	<1.0
Trans-1,3-Dichloropropene	ug/L	<1.0	<1.0	<1.0
Trichloroethene	ug/L	<1.0	<1.0	<1.0
Trichlorofluoromethane	ug/L	<1.0	<1.0	<1.0
Vinyl Chloride	ug/L	<1.0	<1.0	<1.0
1,1-Dichloroethane	ug/L	<1.0	<1.0	<1.0
1,1-Dichloroethene	ug/L	<1.0	<1.0	<1.0
1,1,1-Trichloroethane	ug/L	<1.0	<1.0	<1.0
1,1,2-Trichloroethane	ug/L	<1.0	<1.0	<1.0
1,1,2,2-Tetrachloroethane	ug/L	<1.0	<1.0	<1.0
1,2-Dichlorobenzene	ug/L	<1.0	<1.0	<1.0
1,2-Dichloroethane	ug/L	<1.0	<1.0	<1.0
1,2-Dichloropropane	ug/L	<1.0	<1.0	<1.0
1,3-Dichlorobenzene	ug/L	<1.0	<1.0	<1.0
1,4-Dichlorobenzene	ug/L	<1.0	<1.0	<1.0
2-Chloroethylvinyl Ether	ug/L	<1.0	<1.0	<1.0
EPA METHOD 602				
Benzene	ug/L	<1.0	<1.0	<1.0
Chlorobenzene	ug/L	<1.0	<1.0	<1.0
Ethyl Benzene	ug/L	<1.0	<1.0	<1.0
Toluene	ug/L	<1.0	<1.0	<1.0
Xylene	ug/L	<2.0	<2.0	<2.0
1,2-Dichlorobenzene	ug/L	<1.0	<1.0	<1.0
1,3-Dichlorobenzene	ug/L	<1.0	<1.0	<1.0
1,4-Dichlorobenzene	ug/L	<1.0	<1.0	<1.0
SOLVENT				
Methyl Ethyl Ketone	ug/L	<30	<30	<30
DISSOLVED METALS				
Cadmium	ng/L	<0.005	<0.005	<0.005
Chromium	ng/L	<0.01	<0.01	<0.01
Lead	ng/L	<5	<5	<5
Nickel	ng/L	<0.02	<0.02	<0.02
Zinc	ng/L	0.07	0.42	0.22

12902.01/VOC2.WR1/HH/SB/080888

PITCH AND FUEL OIL TANK GROUND WATER SAMPLES

ABS CEDAR BAY

PARAMETERS	UNITS	MW-6	MW-7	MW-8	MW-9
<u>EPA METHOD 610</u>					
Acenaphthene	ng/L	<0.005	<0.005	<0.005	<0.005
Acenaphthylene	ng/L	<0.005	<0.005	<0.005	<0.005
Benzo (a) Anthracene	ng/L	<0.005	<0.005	<0.005	<0.005
Benzo (a) Pyrene	ng/L	<0.005	<0.005	<0.005	<0.005
Benzo (b) Fluoranthene	ng/L	<0.005	<0.005	<0.005	<0.005
Benzo (g,h,i) Perylene	ng/L	<0.005	<0.005	<0.005	<0.005
Benzo (k) Fluoranthene	ng/L	<0.005	<0.005	<0.005	<0.005
Chrysene	ng/L	<0.005	<0.005	<0.005	<0.005
Dibenzo(a,b)Anthracene	ng/L	<0.005	<0.005	<0.005	<0.005
Fluoranthene	ng/L	<0.005	<0.005	<0.005	<0.005
Fluorene	ng/L	<0.005	<0.005	<0.005	<0.005
Ideno(1,2,3-cd)Pyrene	ng/L	<0.005	<0.005	<0.005	<0.005
Naphthalene	ng/L	<0.005	<0.005	<0.005	0.014
Phenanthrene & Anthracene	ng/L	<0.005	<0.005	<0.005	<0.005
Pyrene	ng/L	<0.005	<0.005	<0.005	<0.005

SPOIL PILES, GROUND WATER SAMPLES AND SURFACE WATER SAMPLES

AES CEDAR BAY

PARAMETERS	UNITS	MW-1	MW-2	MW-3	MW-4	SW-1	SW-2
<u>EPA METHOD 624</u>							
Acrolein	ug/L	<250	<250	<250	<250	<25	<25
Acrylonitrile	ug/L	<250	<250	<250	<250	<25	<25
Benzene	ug/L	<10	<10	<10	<10	<1.0	<1.0
Bromodichloromethane	ug/L	<10	<10	<10	<10	<1.0	<1.0
Bromoform	ug/L	<10	<10	<10	<10	<1.0	<1.0
Bromomethane	ug/L	<10	<10	<10	<10	<1.0	<1.0
Carbon Tetrachloride	ug/L	<10	<10	<10	<10	<1.0	<1.0
Chlorobenzene	ug/L	<10	<10	<10	<10	<1.0	<1.0
Chloroethane	ug/L	<10	<10	<10	<10	<1.0	<1.0
Chloroform	ug/L	<10	<10	<10	<10	<1.0	1.4
Chloromethane	ug/L	<10	<10	<10	<10	<1.0	<1.0
Cis-1,3,-Dichloropropene	ug/L	<10	<10	<10	<10	<1.0	<1.0
Ethyl Benzene	ug/L	<10	<10	<10	<10	<1.0	<1.0
Methylene Chloride	ug/L	<10	<10	<10	<10	<1.0	<1.0
Tetrachloroethene	ug/L	<10	<10	<10	<10	<1.0	<1.0
Toluene	ug/L	<10	<10	<10	<10	<1.0	<1.0
Trans-1,2-Dichloroethene	ug/L	<10	<10	<10	<10	<1.0	<1.0
Trans-1,3-Dichloropropene	ug/L	<10	<10	<10	<10	<1.0	<1.0
Trichloroethene	ug/L	<10	<10	<10	<10	<1.0	<1.0
Trichlorofluoromethane	ug/L	<10	<10	<10	<10	<1.0	<1.0
Vinyl Chloride	ug/L	<10	<10	<10	<10	<1.0	<1.0
Xylene	ug/L	<10	<10	<10	<10	<1.0	<1.0
1,1-Dichloroethene	ug/L	<10	<10	<10	<10	<1.0	<1.0
1,1,1-Trichloroethane	ug/L	<10	<10	<10	<10	<1.0	<1.0
1,1,2-Trichloroethane	ug/L	<10	<10	<10	<10	<1.0	<1.0
1,1,2,2-Tetrachloroethane	ug/L	<10	<10	<10	<10	<1.0	<1.0
1,2-Dichlorobenzene	ug/L	<10	<10	<10	<10	<1.0	<1.0
1,2-Dichloroethane	ug/L	<10	<10	<10	<10	<1.0	<1.0
1,2-Dichloropropane	ug/L	<10	<10	<10	<10	<1.0	<1.0
1,3-Dichlorobenzene	ug/L	<10	<10	<10	<10	<1.0	<1.0
1,4-Dichlorobenzene	ug/L	<10	<10	<10	<10	<1.0	<1.0
2-Chloroethylvinyl Ether	ug/L	<10	<10	<10	<10	<1.0	<1.0

(Continued)

SPOIL PILES, GROUND WATER SAMPLES AND SURFACE WATER SAMPLES

AES CEDAR BAY

PARAMETERS	UNITS	MW-1	MW-2	MW-3	MW-4	SW-1	SW-2
KPA METHOD 625							
a-BHC	ug/L	<50	<50	<50	<50	<50	<50
b-BHC	ug/L	<50	<50	<50	<50	<50	<50
d-BHC	ug/L	<50	<50	<50	<50	<50	<50
g-BHC	ug/L	<50	<50	<50	<50	<50	<50
Acenaphthene	ug/L	<100	<100	<100	<100	<100	<100
Acenaphthylene	ug/L	<100	<100	<100	<100	<100	<100
Aldrin	ug/L	<50	<50	<50	<50	<50	<50
Anthracene	ug/L	<100	<100	<100	<100	<100	<100
Benzidine	ug/L	<100	<100	<100	<100	<100	<100
Benzo (a) Anthracene	ug/L	<100	<100	<100	<100	<100	<100
Benzo (a) Pyrene	ug/L	<100	<100	<100	<100	<100	<100
Benzo (b) Fluoranthene	ug/L	<100	<100	<100	<100	<100	<100
Benzo (g,h,i) Perylene	ug/L	<250	<250	<250	<250	<250	<250
Benzo (k) Fluoranthene	ug/L	<100	<100	<100	<100	<100	<100
Benzyl Butyl Phthalate	ug/L	<100	<100	<100	<100	<100	<100
Bis (2-chloroisopropyl) Ether	ug/L	<100	<100	<100	<100	<100	<100
Bis (2-chloroethyl) Ether	ug/L	<100	<100	<100	<100	<100	<100
Bis (2-chloroethoxy) Methane	ug/L	<100	<100	<100	<100	<100	<100
Bis (2-ethyl hexyl) Phthalate	ug/L	<100	<100	<100	<100	<100	<100
Chlordane	ug/L	<400	<400	<400	<400	<400	<400
Chrysene	ug/L	<100	<100	<100	<100	<100	<100
Di-n-butylphthalate	ug/L	<100	<100	<100	<100	<100	<100
Di-n-octylphthalate	ug/L	<100	<100	<100	<100	<100	<100
Dibenzo(a,h)Anthracene	ug/L	<100	<100	<100	<100	<100	<100
Dieldrin	ug/L	<100	<100	<100	<100	<100	<100
Diethyl Phthalate	ug/L	<100	<100	<100	<100	<100	<100
Dimethyl Phthalate	ug/L	<100	<100	<100	<100	<100	<100
Endosulfan I	ug/L	<50	<50	<50	<50	<50	<50
Endosulfan II	ug/L	<50	<50	<50	<50	<50	<50
Endosulfan Sulfate	ug/L	<50	<50	<50	<50	<50	<50
Endrin	ug/L	<50	<50	<50	<50	<50	<50
Endrin Aldehyde	ug/L	<50	<50	<50	<50	<50	<50
Fluoranthene	ug/L	<100	<100	<100	<100	<100	<100
Fluorene	ug/L	<100	<100	<100	<100	<100	<100
Heptachlor	ug/L	<50	<50	<50	<50	<50	<50
Heptachlor Epoxide	ug/L	<50	<50	<50	<50	<50	<50
Hexachlorobenzene	ug/L	<100	<100	<100	<100	<100	<100
Hexachlorobutadiene	ug/L	<100	<100	<100	<100	<100	<100
Hexachlorocyclopentadiene	ug/L	<100	<100	<100	<100	<100	<100
Hexachloroethane	ug/L	<100	<100	<100	<100	<100	<100
Ideno(1,2,3-cd)Pyrene	ug/L	<250	<250	<250	<250	<250	<250
Isophorone	ug/L	<100	<100	<100	<100	<100	<100

(Continued)

- SPOIL PILES, LANDFILL GROUND WATER SAMPLES AND SURFACE WATER SAMPLES

AES CEDAR BAY

PARAMETERS	UNITS	MW-1	MW-2	MW-3	MW-4	SW-1	SW-2
<u>EPA METHOD 625</u>							
N-Nitrosodiphenylamine	ug/L	<100	<100	<100	<100	<100	<100
Naphthalene	ug/L	<100	<100	<100	<100	<100	<100
Nitrobenzene	ug/L	<100	<100	<100	<100	<100	<100
Pentachlorophenol	ug/L	<100	<100	<100	<100	<100	<100
Phenanthrene	ug/L	<100	<100	<100	<100	<100	<100
Phenol	ug/L	72	<50	<50	<50	<50	<50
Pyrene	ug/L	<100	<100	<100	<100	<100	<100
PCB-1016	ug/L	<400	<400	<400	<400	<400	<400
PCB-1221	ug/L	<400	<400	<400	<400	<400	<400
PCB-1232	ug/L	<400	<400	<400	<400	<400	<400
PCB-1242	ug/L	<400	<400	<400	<400	<400	<400
PCB-1248	ug/L	<400	<400	<400	<400	<400	<400
PCB-1254	ug/L	<400	<400	<400	<400	<400	<400
PCB-1260	ug/L	<400	<400	<400	<400	<400	<400
Toxaphene	ug/L	<100	<100	<100	<100	<100	<100
1,2-Dichlorobenzene	ug/L	<100	<100	<100	<100	<100	<100
1,2,3-Trichlorobenzene	ug/L	<100	<100	<100	<100	<100	<100
1,3-Dichlorobenzene	ug/L	<100	<100	<100	<100	<100	<100
1,4-Dichlorobenzene	ug/L	<100	<100	<100	<100	<100	<100
2-Chloronaphthalene	ug/L	<100	<100	<100	<100	<100	<100
2-Chlorophenol	ug/L	<50	<50	<50	<50	<50	<50
2-Methyl-4,6-Dinitrophenol	ug/L	<150	<150	<150	<150	<150	<150
2-Nitrophenol	ug/L	<50	<50	<150	<50	<50	<50
2,4-Dichlorophenol	ug/L	<50	<50	<50	<50	<50	<50
2,4-Dimethylphenol	ug/L	<50	<50	<50	<50	<50	<50
2,4-Dinitrophenol	ug/L	<200	<200	<200	<200	<200	<200
2,4-Dinitrotoluene	ug/L	<100	<100	<100	<100	<100	<100
2,4,6-Dinitrotoluene	ug/L	<50	<50	<50	<50	<50	<50
2,6-Dinitrotoluene	ug/L	<100	<100	<100	<100	<100	<100
3,3-Dichlorobenzidine	ug/L	<100	<100	<100	<100	<100	<100
4-Bromophenyl Phenyl Ether	ug/L	<100	<100	<100	<100	<100	<100
4-Chloro-3-Methylphenol	ug/L	<50	<50	<50	<50	<50	<50
4-Chlorophenyl Phenyl Ether	ug/L	<100	<100	<100	<100	<100	<100
4-Nitrophenol	ug/L	<150	<150	<150	<150	<150	<150
4,4'-DDD	ug/L	<50	<50	<50	<50	<50	<50
4,4'-DDE	ug/L	<50	<50	<50	<50	<50	<50
4,4'-DDT	ug/L	<50	<50	<50	<50	<50	<50
<u>OTHER</u>							
Sulfate	mg/L				1197		
Total Dissolved Solids	mg/L	4520	12606	1402	6108	29212	4024
PR		9.9	11.7	8	11.5	---	---

12902.01/VOC2.WR1/MH/SB/080888

(Continued)

SPOIL PILES, LANDFILL GROUND WATER SAMPLES AND SURFACE WATER SAMPLES

ABS CEDAR BAY

PARAMETERS	UNITS	MW-1	MW-2	MW-3	MW-4	SW-1	SW-2
<u>PRIORITY POLLUTANT METALS</u>							
Antimony	ng/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Arsenic	ng/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Beryllium	ng/L	0.007	<0.005	<0.005	<0.005	<0.005	<0.005
Cadmium	ng/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Chromium	ng/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Copper	ng/L	0.07	<0.01	<0.01	0.04	<0.01	<0.01
Lead	ng/L	0.12	<0.02	<0.02	0.05	<0.02	<0.02
Mercury	ug/L	0.78	<0.50	<0.50	1.22	7.73	<0.50
Nickel	ng/L	0.09	0.02	<0.02	0.08	<0.02	<0.02
Selenium	ng/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Silver	ng/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Thallium	ng/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Zinc	ng/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01

12902.01/VOC2.WR1/MH/SB/080888

OLD LANDFILL GROUND WATER SAMPLE

AES CEDAR BAY

PARAMETERS	UNITS	MW-5
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EPA METHOD 624

Acrolein	ug/L	<250
Acrylonitrile	ug/L	<250
Benzene	ug/L	<10
Bromodichloromethane	ug/L	<10
Bromoform	ug/L	<10
Bromomethane	ug/L	<10
Carbon Tetrachloride	ug/L	<10
Chlorobenzene	ug/L	<10
Chloroethane	ug/L	<10
Chloroform	ug/L	<10
Chloromethane	ug/L	<10
Cis-1,3,-Dichloropropene	ug/L	<10
Ethyl Benzene	ug/L	<10
Methylene Chloride	ug/L	<10
Tetrachloroethene	ug/L	<10
Toluene	ug/L	<10
Trans-1,2-Dichloroethene	ug/L	<10
Trans-1,3-Dichloropropene	ug/L	<10
Trichloroethene	ug/L	<10
Trichlorofluoromethane	ug/L	<10
Vinyl Chloride	ug/L	<10
Xylene	ug/L	<10
1,1-Dichloroethene	ug/L	<10
1,1,1-Trichloroethane	ug/L	<10
1,1,2-Trichloroethane	ug/L	<10
1,1,2,2-Tetrachloroethane	ug/L	<10
1,2-Dichlorobenzene	ug/L	<10
1,2-Dichloroethane	ug/L	<10
1,2-Dichloropropane	ug/L	<10
1,3-Dichlorobenzene	ug/L	<10
1,4-Dichlorobenzene	ug/L	<10
2-Chloroethylvinyl Ether	ug/L	<10

(Continued)

OLD LANDFILL GROUND WATER SAMPLE

AES CEDAR BAY

PARAMETERS	UNITS	MN-5
EPA METHOD 625		
N-Nitrosodiphenylamine	ug/L	<100
Naphthalene	ug/L	<100
Nitrobenzene	ug/L	<100
Pentachlorophenol	ug/L	<100
Phenanthrene	ug/L	<100
Phenol	ug/L	<50
Pyrene	ug/L	<100
PCB-1016	ug/L	<400
PCB-1221	ug/L	<400
PCB-1232	ug/L	<400
PCB-1242	ug/L	<400
PCB-1248	ug/L	<400
PCB-1254	ug/L	<400
PCB-1260	ug/L	<400
Toxaphene	ug/L	<100
1,2-Dichlorobenzene	ug/L	<100
1,2,3-Trichlorobenzene	ug/L	<100
1,3-Dichlorobenzene	ug/L	<100
1,4-Dichlorobenzene	ug/L	<100
2-Chloronaphthalene	ug/L	<100
2-Chlorophenol	ug/L	<50
2-Methyl-4,6-Dinitrophenol	ug/L	<150
2-Nitrophenol	ug/L	<50
2,4-Dichlorophenol	ug/L	<50
2,4-Dimethylphenol	ug/L	<50
2,4-Dinitrophenol	ug/L	<200
2,4-Dinitrotoluene	ug/L	<100
2,4,6-Dinitrotoluene	ug/L	<50
2,6-Dinitrotoluene	ug/L	<100
3,3-Dichlorobenzidine	ug/L	<100
4-Bromophenyl Phenyl Ether	ug/L	<100
4-Chloro-3-Methylphenol	ug/L	<50
4-Chlorophenyl Phenyl Ether	ug/L	<100
4-Nitrophenol	ug/L	<150
4,4'-DDD	ug/L	<50
4,4'-DDE	ug/L	<50
4,4'-DDT	ug/L	<50
Sulfate	mg/L	12.4
Total Dissolved Solids	mg/L	3106
PH		8.1

(Continued)

OLD LANDFILL GROUND WATER SAMPLE

AES CEDAR BAY

PARAMETERS	UNITS	MW-5
<u>EEA METHOD 625</u>		
a-BHC	ug/L	<50
b-BHC	ug/L	<50
d-BHC	ug/L	<50
g-BHC	ug/L	<50
Acenaphthene	ug/L	<100
Acenaphthylene	ug/L	<100
Aldrin	ug/L	<50
Anthracene	ug/L	<100
Benzidine	ug/L	<100
Benzo (a) Anthracene	ug/L	<100
Benzo (a) Pyrene	ug/L	<100
Benzo (b) Fluoranthene	ug/L	<100
Benzo (g,h,i) Perylene	ug/L	<250
Benzo (k) Fluoranthene	ug/L	<100
Benzyl Butyl Phthalate	ug/L	<100
Bis (2-chloroisopropyl) Ether	ug/L	<100
Bis (2-chloroethyl) Ether	ug/L	<100
Bis (2-chloroethoxy) Methane	ug/L	<100
Bis (2-ethyl hexyl) Phthalate	ug/L	<100
Chlordane	ug/L	<400
Chrysene	ug/L	<100
Di-n-butylphthalate	ug/L	<100
Di-n-octylphthalate	ug/L	<100
Dibenzo(a,h)Anthracene	ug/L	<100
Dieldrin	ug/L	<100
Diethyl Phthalate	ug/L	<100
Dimethyl Phthalate	ug/L	<100
Endosulfan I	ug/L	<50
Endosulfan II	ug/L	<50
Endosulfan Sulfate	ug/L	<50
Endrin	ug/L	<50
Endrin Aldehyde	ug/L	<50
Fluoranthene	ug/L	<100
Fluorene	ug/L	<100
Heptachlor	ug/L	<50
Heptachlor Epoxide	ug/L	<50
Hexachlorobenzene	ug/L	<100
Hexachlorobutadiene	ug/L	<100
Hexachlorocyclopentadiene	ug/L	<100
Hexachloroethane	ug/L	<100
Ideno(1,2,3-cd)Pyrene	ug/L	<250
Isophorone	ug/L	<100

12902.01/VOC2.WR1/MH/SB/080888

(Continued)

OLD LANDFILL GROUND WATER SAMPLE

AES CEDAR BAY

PARAMETERS	UNITS	MW-5
------------	-------	------

PRIORITY POLLUTANT METALS

Antimony	ng/L	<0.05
Arsenic	ng/L	<0.005
Beryllium	ng/L	<0.005
Cadmium	ng/L	<0.005
Chromium	ng/L	0.054
Copper	ng/L	0.03
Lead	ng/L	0.09
Mercury	ng/L	<.50
Nickel	ng/L	0.04
Selenium	ng/L	<0.005
Silver	ng/L	<0.01
Thallium	ng/L	<0.01
Zinc	ng/L	<0.01

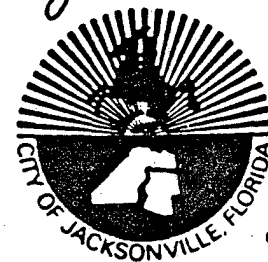
10.12 SURFACE WATER QUALITY DATA

10-80

Amendment 3
101089

S Day (for B&V dist)

DEPARTMENT OF HEALTH, WELFARE
& BIO-ENVIRONMENTAL SERVICES
Bio-Environmental Services Division
Air and Water Pollution Control



June 23, 1988

Mr. Kerry Varkonda
1925 North Lynn Street, Suite 1200
Arlington, VA 22209

Dear Mr. Varkonda:

Enclosed is the Broward River Water Quality Data you requested from Ms. Deuerling on May 31, 1988. The data is for two monitoring stations. The designated numbers are 2 and 12. Station 2 is located at the mouth of the Broward River, slightly upstream of its confluence with the St. Johns River. Station 12 is located at the U.S. Highway 17 Bridge (North Main Street). Stations 2 and 12 can be found on U.S.G.S. topographic map quadrangles Eastport, FL and Trout River, respectively.

Both sites are considered to be Class III waters and are generally marine. A copy of applicable state water quality standards are attached. The copying charges for this material is \$2.10. Please send a check for this amount, made payable to the City of Jacksonville, to this office, attention Ms. Corrine Harris, at your convenience.

If you have any questions concerning how the data is collected or analyzed, please call Mr. Lou Grant or Ms. Betsy Deuerling, Ambient Water Quality Specialist, at (904) 630-3666.

Very truly yours,

W. Louis Grant

W. Louis Grant
Engineering Technician II

WLG/mh

disc 9/28

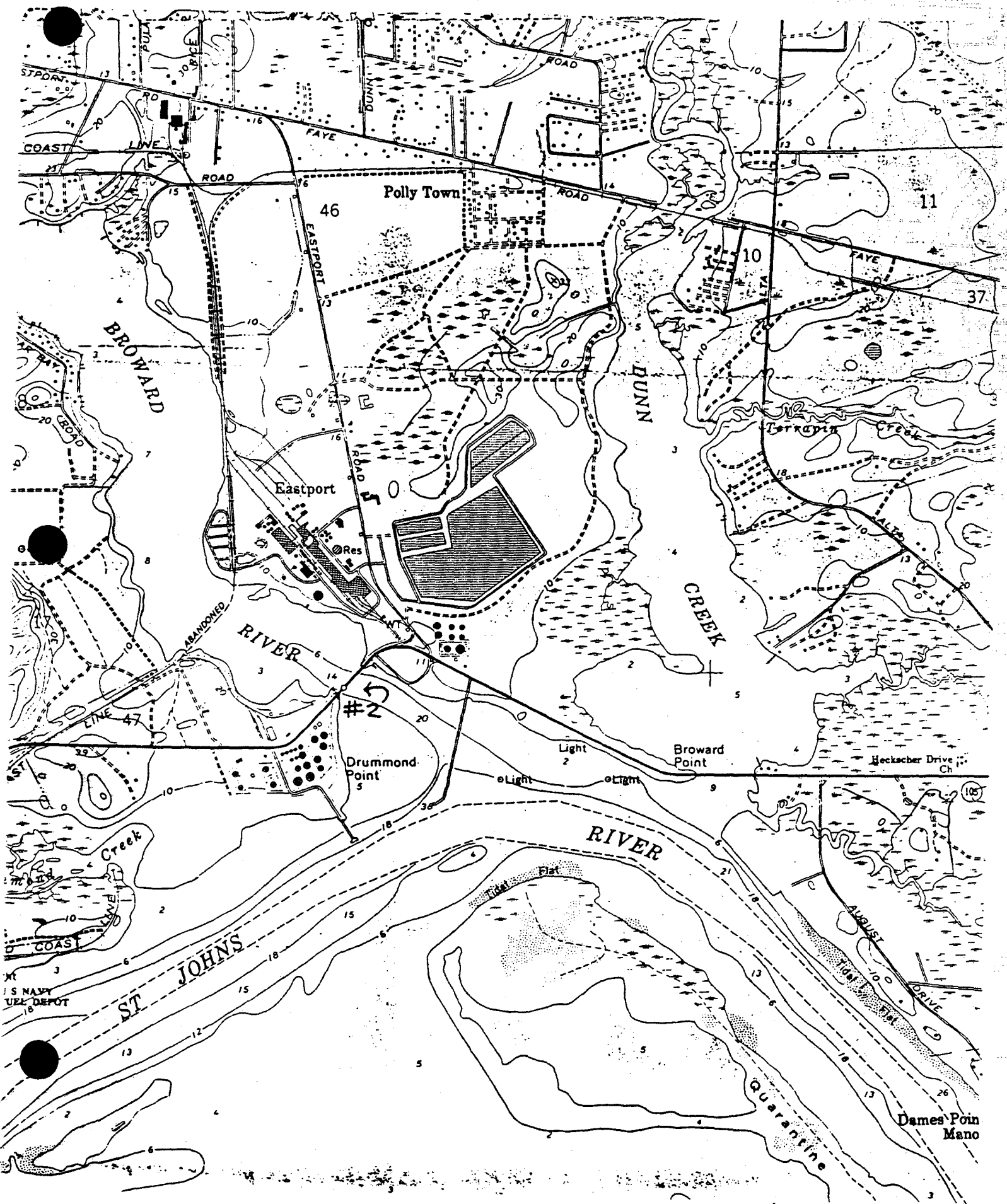
AES JACKSONVILLE			
FILE 14573	41.0602		
REC'D		JUL 19 1988	B&V
R. F. CARVAJAL		J. M. MORNER	
S. M. DAY		R. I. JACOB	
M. R. GOANS		M. L. JACOB	
G. Y. GUNN		K. R. WEISS	
G. J. HART		M. A. STIKES	
ACTN	1070	ACTN	1040



PARAMETER	CLASS II	CLASS III FRESH	CLASS III MARINE
Alkalinity	-	> 20 mg/l as CaCO ₃	-
Aluminum	1.5 mg/l	-	1.5 mg/l
Ammonia, Un-ionized	-	0.02 mg/l	-
Antimony	0.2 mg/l	-	0.2 mg/l
Arsenic	0.05 mg/l	0.05 mg/l	0.05 mg/l
Beryllium	-	0.011 mg/l if hardness ≤ 150 mg/l CaCO ₃ 1.10 mg/l if hardness > 150 mg/l CaCO ₃	-
Biological Integrity	Shannon-Weaver Diversity Index (H) of benthic macroinvertebrates shall not be reduced to less than 75% of established back- ground.	Shannon-Weaver Diversity Index (H) of benthic macroinvertebrates shall not be reduced to less than 75% of established background	-
Bromates	100 mg/l	-	100 mg/l
Bromine (Free Molecular)	0.1 mg/l	-	0.1 mg/l
Cadmium	5.0 ug/l	0.8 ug/l if hardness ≤ 150 mg/l CaCO ₃ 1.2 ug/l if hardness ≥ 150 mg/l CaCO ₃	5.0 ug/l
Chlorides	<10% increase over normal background levels in pre- dominantly marine waters	-	<10% increase over normal background levels in pre- dominantly marine waters
Chlorine (Total Residual)	0.01 mg/l	0.01 mg/l	0.01 mg/l
(After Mixing) → Chromium, Total	0.05 mg/l	0.05 mg/l	0.05 mg/l
Coliforms, Fecal	14 counts/100 ml median; 43 counts/100 ml <10% of samples	200 counts/100 ml monthly average; 400 counts/100 ml <10% of samples per month; 800 counts/100 ml on any 1 day	200 counts/100 ml monthly average; 400 counts/100 ml <10% of samples per month; 800 counts/100 ml on any 1 day.
Coliforms, Total	70 counts/100 ml median; 230 counts <10% of samples	1,000 counts/100 ml monthly average; 1,000 counts/100 ml <20% of samples per month; 2,400 counts/100 ml at any time	1,000 counts/100 ml monthly average; 1,000 counts/100 ml <20% of samples per month; 2,400 counts/100 ml at any time
Copper	15 ug/l	30 ug/l	15 ug/l
Cyanide	5.0 ug/l	5.0 ug/l	5.0 ug/l
Detergents	0.5 mg/l	0.5 mg/l	0.5 mg/l
Dissolved Gases, Total	<110% saturation	<110% saturation	<110% saturation
Dissolved Oxygen	>5.0 mg/l 24 hour average; >4.0 mg/l instantaneous	>5.0 mg/l	>5.0 mg/l 24 hour average; >4.0 mg/l instantaneous
Fluoride	1.5 mg/l	10 mg/l	5.0 mg/l
Iron	0.3 mg/l	1.0 mg/l	0.3 mg/l
Lead	50 ug/l	30 ug/l	50 ug/l
Manganese	100 ug/l	-	-
Mercury	0.1 ug/l	0.2 ug/l	0.1 ug/l
Nickel	100 ug/l	100 ug/l	100 ug/l
Nutrients	Shall not be altered so as to cause an im- balance in natural populations of aquatic flora and fauna	Shall not be altered so as to cause an imbalance in natural populations of aquatic flora and fauna	Shall not be altered so as to cause an im- balance in natural populations of aquatic flora and fauna

PARAMETER	CLASS II	CLASS III	CLASS III
		FRESH	MARINE
		Chloride Conc. < 1,500 mg/l	Chloride Conc. ≥ 1,500 mg/l
Oil and Grease			
Dissolved or Emulsified	5.0 mg/l	5.0 mg/l	5.0 mg/l
Undissolved	No visible oil to interfere with beneficial use	No visible oil to interfere with beneficial use	No visible oil to interfere with beneficial use
Pesticides and Herbicides			
Aldrin Plus			
Dieldrin	0.003 ug/l	0.003 ug/l	0.003 ug/l
Chlordane	0.004 ug/l	0.01 ug/l	0.004 ug/l
DDT	0.001 ug/l	0.001 ug/l	0.001 ug/l
Demeton	0.1 ug/l	0.1 ug/l	0.1 ug/l
Endosulfan	0.001 ug/l	0.003 ug/l	0.001 ug/l
Endrin	0.004 ug/l	0.004 ug/l	0.004 ug/l
Guthion	0.01 ug/l	0.01 ug/l	0.01 ug/l
Heptachlor	0.001 ug/l	0.001 ug/l	0.001 ug/l
Lindane	0.004 ug/l	0.01 ug/l	0.004 ug/l
Malathion	0.1 ug/l	0.1 ug/l	0.1 ug/l
Methoxychlor	0.03 ug/l	0.03 ug/l	0.03 ug/l
Mirex	0.001 ug/l	0.001 ug/l	0.001 ug/l
Parathion	0.04 ug/l	0.04 ug/l	0.04 ug/l
Toxaphene	0.005 ug/l	0.005 ug/l	0.005 ug/l
pH range	6.5 to 8.5	6.0 to 8.5	6.5 to 8.5
pH Variation from Background	±1.0	±1.0	±1.0
Phenolic Compounds	1.0 ug/l	1.0 ug/l	1.0 ug/l
Phosphorous (Elemental)	0.1 ug/l	-	0.1 ug/l
Phthalate Esters	-	3.0 ug/l	-
Polychlorinated Biphenyls	0.001 ug/l	0.001 ug/l	0.001 ug/l
Radioactive Substances			
Radium 226 & 228	<5 pCi/l	<5 pCi/l	<5 pCi/l
Gross Alpha	<15 pCi/l	<15 pCi/l	<15 pCi/l
Selenium	25 ug/l	25 ug/l	25 ug/l
Silver	0.05 ug/l	0.07 ug/l	0.05 ug/l
Specific Conductance		Shall not be increased more than 50% above background or to 1275 umhos/cm, whichever is greater.	
Transparency	<10% reduction from background	<10% reduction from background	<10% reduction from background
Turbidity	<29 NTU increase from background	<29 NTU increase from background	<29 NTU increase from background
Zinc	1.0 mg/l	30 ug/l	1.0 mg/l





PARAMETERS	UNITS	AMBIENT WATER QUALITY STANDARDS (a) (CLASS III)	SAMPLE STATION DATA (b)					
			DATE	DATE	DATE	DATE	DATE	DATE
			10/5/83	12/14/83	3/14/84	6/26/84	8/14/84	
				am			9:15 AM	
Temperature	°C			15.5	18.5		28°C	High-Incoming
		(6) 6.5-(8.5)		6			6.0	
Dissolved Oxygen	mg/l	(5.0) (4.0)	5.7	5.7	6.8		[3.25]	
	mg/l		3.3	2.3				
Salinity	NTU		10	11	7	11	26	
Suspended Solids	mg/l		65	19	24	37	87	
Conductivity	umhos/cm	5,000						
Chlorides	mg/l		8,300	58	2,250	6,600	1,000	
Ortho-Phosphorous	mg/l							
Total Phosphorous	mg/l			0.264	0.133	0.138	0.360	
Ammonia	mg/l	(0.02)		0.059	0.06	< 0.013	0.066	
	mg/l			0.68	0.54			
Nitrate-Nitrite	mg/l			0.089	0.09	< 0.022	0.106	
	ug/l	(1000) 300	[390]	600	178	260		
	ug/l	300- (30) 50	< 40	< 40	[52]	< 10	< 10	
	ug/l	(30) 15	< 10	5	< 7	< 10	< 10	
	ug/l	(0.8) 5	< 2	< 10	< 2		< 10	
	ug/l	[300] (30) 1000	20	30	< 240	40	20	
Uniform	#/100 ml	300-2400/100 ml	[> 2,400]		60	[> 2,400]	[> 2400]	
Org. Nitrogen	mg/l			0.62			< 10	
Collector								
Allyst								
	ug/l					< 10		

Notes:

(a) Standards shown in parentheses are for "Predominantly Fresh Water." Standards not in parentheses are for "Predominant Marine Water," defined by conductivity equal to or greater than 5000 micromhos per centimeter. The Main St. Bridge is an approximate geographical divisor of predominantly fresh and predominantly marine waters in Duval County Florida.

(b) Values shown in brackets are violations of A.W.Q. Standards.

STREAM

St. Johns River

STATION #

12 Broward River @ Main St. Bridge

PARAMETERS	UNITS	AMBIENT WATER QUALITY STANDARDS (a) (CLASS III)	SAMPLE STATION DATA (b)					
			DATE	DATE	DATE	DATE	DATE	DATE
			10/23/84	12/5/84	2/19/85	4/10/85	6/11/85	10/15/85
Time					0910	0845	1025	9:15 AM
Tide						Dead Low	High Outgoing	
Temperature	°C		25.0°	17.5°	14.0	21°/21°	29.7/29.7°	25.0
pH		(6) 6.5-(8.5)		6.6	6.9	6.0	7.3	6.0
Dissolved Oxygen	mg/l	(5.0) (4.0)	5.4	2.2	10.6	7.5/7.0	5.5/5.2	4.1
DOB5	mg/l							
Turbidity	NTU		18	4	6	8	14.0	4
Suspended Solids	mg/l		66	26	45	35	99	15
Conductivity	umhos/cm	5,000				90,000/90,000	25,800/25,800	N/A
Chlorides	mg/l		3,300	5,300	7,490	3,800	10,400	2,400
Ortho-Phosphorous	mg/l							
Total Phosphorous	mg/l		0.147	0.077	0.143	0.286	0.318	0.226
Ammonia	mg/l	(0.02)	<0.012	0.025	0.017	<0.013	<0.014	<0.014
TKN	mg/l							
Nitrate-Nitrite	mg/l		0.145	0.223	0.133	<0.013	<0.015	0.129
Fe	ug/l	(1000) 300	[56.0]	220	210	[490]	[440]	880
Pb	ug/l	300: (30) 50	<10	48	<1	<4	<9	12.9
Cu	ug/l	(30) 15	[18]	8	10	10	30	130
Cd	ug/l	(0.8) 5	2	2	1	<1	<1	<3.8
Zn	ug/l	(300) (30) 1000	50	<19	<24	<17	20	38
Coliform	/100 ml	<2400/100 ml	480	[2400]	240	[2400]	[2400]	13,000
Cr.								
Collector			TC TH, WR	BE, KH, AC	BD, KH, AC	KG	KG	KH, JR, B.
Analyst			Malcomb	Malcomb	Malcomb	SH, JM	JH, JM	
SAMPLE DEPTH								SURFACE

Notes:

(a) Standards shown in parentheses are for "Predominantly Fresh Water." Standards not in parentheses are for "Predominantly Marine Water," defined by conductivity equal to or greater than 5000 micromhos per centimeter. The Main St. Bridge is an approximate geographical divisor of predominantly fresh and predominantly marine waters in Duval County Florida.

(b) Values shown in brackets are violations of A.W.Q. Standards.

WATERBODY ST. JOHNS RIVER

STATION

BROWARD RIVER AT MAIN ST. BRIDGE

PARAMETERS	UNITS	CLASS III WATER QUALITY STANDARDS (a)	SAMPLE STATION DATA (b)					
			DATE	DATE	DATE	DATE	DATE	DATE
			12/3/85	2/26/86	5/21/86	7/8/86	9/8/86	11/4/8
Time			9:00	8:52	8:55	9:20	9:00	9:10
Tide					OUTGOING	INCOMING	LOW	INCOMING
Temperature	°C		17.5	13.0	24.0	29.5	27.0	21.2
pH		(6.0-8.5) 6.5-8.5	6.2	6.6	7.0	7.0	6.6	6.7
Dissolved Oxygen	mg/l	(5.0) 4.0	5.1	7.9	5.5	6.2	3.7	5.9
BOD5	mg/l							
Turbidity	NTU	inc. bkgd. <29	6.8	10	6.2	13	4.9	9.0
Suspended Solids	mg/l		18	47	53	75	38	52
Conductivity	umhos/cm			6,600	12,000	6,900	7,000	
Chlorides	mg/l		300	3,600	9,900	6,900	4,500	10,700
Ortho-Phosphorous	mg/l							
Total Phosphorous	mg/l		0.505	0.227	0.299	0.291	0.161	0.120
Ammonia Nitrogen	mg/l		0.188	0.086	<0.013	0.016	<0.015	0.084
Ammonia, Unionized	mg/L	(0.02) -						
TKN	mg/l							
Nitrate-Nitrite	mg/l		0.241	0.178	<0.016	<0.013	0.078	0.104
Fe	ug/l	(1000) 300	1000	660	413	540	609	330
Pb	ug/l	(30) 50	<9.6	<8.4	<5	<20	24.8	38.5
Cu	ug/l	(30) 15	<8.0	<11.3	60.4	30.8	41	44
Cd	ug/l	(1.2) 5	<1	<1	<6	<6	<6	<6
Zn	ug/l	(30) 1000	16	3.9	<24	39	23	<44
Cr	ug/L	(50) 50						19.6
Coliform - Total	#/100 ml	(2400) 2400				>2400	>1600	>1600
Coliform - Fecal	#/100 ml	(800) 800	>2400	>2400	>2400	920	>1600	500
PCB's	ug/L	(0.001) 0.001						
Pesticides								
Hg	ug/L					N.D.		
Collector			AC, JK, KH	AC, TH, RD	LG, AC, KG	LG, AC, RD	LG, AC, BD	BD
Analyst			JH, JM	JH, JM	JH, JM	JH, JM	JH, JM	JH, JM
Comments								

Notes:

- (a) Standards shown in parentheses are for "Predominantly Fresh Water." Standards not in parentheses are for "Predominantly Marine Water," defined by chlorides equal to or greater than 1500 milligrams per liter. The Main St. Bridge is an approximate geographical divisor of predominantly fresh and predominantly marine waters in Duval County Florida.

(b) Values shown in brackets are violations of A.W.Q. Standards.

Notes:

(a) Standards shown in parentheses are for "Predominantly Fresh Water." Standards not in parentheses are for "Predominantly Marine Water," defined by chlorides equal to or greater than 1500 milligrams per liter. The Main St. Bridge is an approximate geographical divisor of predominantly fresh and predominantly marine waters in Duval County Florida.

ANNEX C - Appendix A - Banknotes are violations of A W O Standards

PARAMETERS	UNITS	CLASS III WATER QUALITY STANDARDS (a)	SAMPLE STATION DATA (b)					
			DATE	DATE	DATE	DATE	DATE	DATE
			2/4/87	3/31/87	6/2/87	9/15/87	1/12/88	
As	ug/L	(50) 50	<1	<1				
Se	ug/L	(25) 25	<1	<1				
Hg	ug/L	(0.2) 0.1	<1	0.25	0.09			
Ni	ug/L	(100) 100			260	8.30	<5	

Notes:

(a) Standards shown in parentheses are for "Predominantly Fresh Water." Standards not in parentheses are for "Predominant Marine Water," defined by chlorides equal to or greater than 1500 milligrams per liter. The Main St. Bridge is an approximate geographical divisor of predominantly fresh and predominantly marine waters in Duval County Florida.

(b) Values shown in brackets are violations of A.W.Q. Standards.

PARAMETERS	UNITS	AMBIENT WATER QUALITY STANDARDS (a) (CLASS III)	SAMPLE STATION DATA (b)					
			DATE	DATE	DATE	DATE	DATE	DATE
			10/5/83	12/14/83	3/14/84	6/26/84	8/14/84	
Time		(Fresh) Marine	9:45am	9:40am	11:05am	10:55am	11:50 PM	
Temperature	°C		high inc	out	outgoing	outgoing	High-incoming	
			27	18.0	16	29	29.8	
Dissolved Oxygen	mg/l	(6) 6.5-(8.5)	7.0	5.8	6.0	6.0	7.5	
pH	mg/l	(5.0) (4.0)	5.8	8.8	8.0	7.0	5.5	
Chloride	mg/l		3.2	0.5				
Appended Solids	NTU		3	6	6	7	13	
Conductivity	mg/l		22	42	32	45	23	
Chlorides	umhos/cm	5,000	26,000		12,000	34,000	21,000	
Ortho-Phosphorous	mg/l		8,600	4,100	4,800	10,800	6,800	
Total Phosphorous	mg/l			0.137	0.115	0.062	0.059	
Ammonia	mg/l	(0.02)	(0.067)	(0.101)	(0.10)	< 0.013	< 0.013	
Nitrate-Nitrite	mg/l		0.081	0.218	0.16	< 0.022	0.327	
Copper	ug/l	(1000) 300	170	280	32	260		
Lead	ug/l	300 (30) 50	< 40	< 40	[61]	< 10	10	
Cadmium	ug/l	(30) 15	< 10	< 4	< 7	< 10	< 10	
Chromium	ug/l	(0.8) 5	< 2	< 10	< 2		< 10	
Zinc	ug/l	(300) (30) 1000	20	40	< 240	140	30	
Formaldehyde	#/100 ml	2400/100 ml 800	23		40	49	(1600)	
Total Nitrogen	mg/l			0.30			< 10	
Depth of Stream	feet					4	6	
Collector								
Analyst								
Residue	ug/l					< 10		

Notes:

(a) Standards shown in parentheses are for "Predominantly Fresh Water." Standards not in parentheses are for "Predominant Marine Water," defined by conductivity equal to or greater than 5000 micromhos per centimeter. The Main St. Bridge is an approximate geographical divisor of predominantly fresh and predominantly marine waters in Duval County, Florida.

(b) Values shown in brackets are violations of A.W.Q. Standards.

DATE 2/10/84 BY ()

ENCLOSURE

ST. JOHN'S RIVER

STATION 15 BROWARD R. SOUTH OF ST. REGIS PA. CO.

PARAMETERS	UNITS	CLASS III WATER QUALITY STANDARDS (a)	SAMPLE STATION DATA (b)					
			DATE	DATE	DATE	DATE	DATE	DATE
			12/3/85	2/26/86	5/21/86	7/8/86	9/8/86	11/4/86
Time			10:10	10:25	10:35	11:00	10:15	9:43
Tide			OUTGOING		OUTGOING	Low Outgoing	Outgoing	INCOMING
Temperature	°C		21.2/22.0	13.0/13.0	22.5/23.0	30.0/30.0	28.5/28.5	21.5/21.5
pH		(6.0-8.5) 6.5-8.5	6.3	6.8	7.0	6.9	7.2	7.1
Dissolved Oxygen	mg/l	(5.0) 4.0	8.4/8.2	8.8/8.8	6.7/6.7	6.3/6.1	6.5/6.2	7.5/7.5
BOD5	mg/l							
Turbidity	NTU	inc. bkgd. < 29	4.3	4.3	4.0	1.6	2.9	7.0
Suspended Solids	mg/l		43	85	44	69	53	38
Conductivity	umhos/cm		15,400/17,000	16,500/16,500	22,100/22,000	27,000/28,000	28,200/28,000	8,300/8
Chlorides	mg/l		5,800	11,900	11,000	10,300	11,900	14,800
Ortho-Phosphorous	mg/l							
Total Phosphorous	mg/l		0.211	0.80	0.115	0.189	0.169	0.089
Ammonia Nitrogen	mg/l		< 0.013	< 0.015	0.016	< 0.014	< 0.015	0.028
Ammonia, Unionized	mg/L	(0.02) -						
TKN	mg/l							
Nitrate-Nitrite	mg/l		0.383	0.141	0.077	0.242	0.320	0.124
Fe	ug/l	(1000) 300	360	200	274	130	81	218
Pb	ug/l	(30) 50	< 9.6	10	< 5	< 20	50.6	36.4
Cu	ug/l	(30) 15	8.4	< 11.3	109	43.5	60	64
Cd	ug/l	(1.2) 5	< 1.0	< 1	< 6	< 6	< 6	< 6
Zn	ug/l	(30) 1000	< 13	< 1	< 24	< 15	23	< 44
Cr	ug/L	(50) 50						8.35
Coliform - Total	#/100 ml	(2400) 2400				130	170	180
Coliform - Fecal	#/100 ml	(800) 800	> 2400	79	170	49	50	30
PCB's	ug/L	(0.001) 0.001						
Pesticides								
Hg	ug/L					0.73		
Collector			KH, JR, AL	TH, AC, BD	LG, AC, EG	LG, AC, BD	LG, AC, BD	LG, AC, BD
Analyst			JM, JH	JM, JH	JM, JH	JM, JH	JM, JH	JM, JH
Comments						Surface/5' depth	Surface/6'	SURFACE

Notes:

- (a) Standards shown in parentheses are for "Predominantly Fresh Water." Standards not in parentheses are for "Predominant Marine Water," defined by chlorides equal to or greater than 1500 milligrams per liter. The Main St. Bridge is an approximate geographical divisor of predominantly fresh and predominantly marine waters in Duval County Florida.

- (b) Values shown in brackets are violations of A.W.Q. Standards.

RIVER FLOW

ST. JOHN'S RIVER

Jacksonville, Florida

21 year Mean Discharge - 5546 CFS

Typical Ratio (Mean/99% Exceedance) - 5

Estimated Design Low Flow - 1110 CFS
720 MGD

RECEIVED BY: [illegible] DATE: [illegible] TIME: [illegible]

TABLE I
Water Quality Analysis
St. John's River
Jacksonville, Florida

Upstream of Mill							Downstream of Mill					Does Mill Discharge Cause Violation of WQS?
Parameter	WQS	Marker 59 1970-77	Marker 60/61 1986-88	Drummond PT 1986-88	Broward R. 1981-83	Broward Dunn R. 1973-1983	Marker 53 1970-1983	Marker 51 1986-88	4 1983	Marker 43 1986-88	Heck. Dr. 1986-88	
Dissolved Oxygen	Avg. 5.0 mg/l Min. 4.0 mg/l	See Special Dissolved Oxygen Sheet										no
pH	6.0-8.5	6.9-8.0	7.2-8.2	7.5-7.9	7.15-8.00	6.0-8.1	7.0-7.9	7.2-8.3	--	7.5-8.1	6.9-8.0	no
Turbidity (Hach-FTU)	--	4-33	3-21	10-15	0-15	0-25	8-22	1-44	8.0	5-17	0-15	no
Transparency	--	--	0.6-1.2	.65-1.0	.9-1.5	0.7-1.1	--	.5-1.1	1.1	.7-1.1	.9-1.5	no
(Not Reduce 10% Below Background)												
(Secchi-meters)												
Diversity	--	--	1.792-2.750	1.792-2.750	1.304-2.496	.914-2.071	1.000-2.750	--	--	1.717-2.390	1.304-2.496	no
National Substrate Index	--	--	--	--	--	--	--	--	--	--	--	no
Diversity	--	--	4-12	4-12	6-15	3-12	2-9	--	--	9-11	6-15	no
No. of Species	--	--	--	--	--	--	--	--	--	--	--	no
Oil & Grease	5.0 mg/l	No Water Quality Data - See Attachment A										no
Flourides	10 mg/l	--	.13-.83	.23-.84	.60-.71	--	--	.18-.79	--	.13-.84	.60-.71	no
Bacteriological	800/100 ml	--	ND(2)-1600	--	29-150	20-92,000	33	2-170	70	50-300	33-150	no
Fecal (Daily)	--	--	--	--	--	--	--	--	--	--	--	no
Arsenic	.05 mg/l	--	No Water Quality Data - See Attachment A									no
Aluminum	1.5 mg/l	--	No Water Quality Data - See Attachment A									no
Antimony	0.2 mg/l	--	No Water Quality Data - See Attachment A									no
Cadmium	5 ug/l	--	ND-35	ND-(5.0)	ND(5.0)-41	ND(5.0)-160	--	ND(5.0)-44	--	ND(5.0)-51	ND(5.0)-41	no
Copper	.05 mg/l	--	.089-.145	.046-.132	.100-.140	ND-.267	--	.072-.137	--	.097-.127	.104-.140	no
Cyanide	5 ug/l	--	No Water Quality Data - See Attachment A									no
Chromium (Hex)	50 ug/l	--	No Water Quality Data - See Attachment A									no
(Total)	1.0 mg/l	--	No Water Quality Data - See Attachment A									no
Iron	0.3 mg/l	--	.224-.311	.3-.5	.15-.35	ND31.1	--	.13-.328	--	.2-.5	0-.346	no
Lead	.05 mg/l	--	ND(.10)	ND(.10)	ND(.10)	ND(.10)-.392	--	ND(.10)	--	ND(.10)	ND(.10)-.152	no
Mercury	0.1 ug/l	--	No Water Quality Data - See Attachment A									no
Nickel	0.1 mg/l	--	ND(.04)	ND(.04)	ND(.04)-.048	ND(.04)	--	ND(.04)	--	ND(.04)-.045	ND(.04)-.048	no
Selenium	.025 mg/l	--	No Water Quality Data - See Attachment A									no
Zinc	1.0 mg/l	--	No Water Quality Data - See Attachment A									no

Total Residual CL2	0.01 mg/l	--	No Water Quality Data - See Attachment A
Detergents	0.5 mg/l	--	No Water Quality Data - See Attachment A
PCB's	.001 ug/l	--	No Water Quality Data - See Attachment A
Trichlorophenol	1.0 ug/l	--	No Water Quality Data - See Attachment A
Chlorinated Creosol	1.0 ug/l	--	No Water Quality Data - See Attachment A
2 Chlorophenol	1.0 ug/l	--	No Water Quality Data - See Attachment A
2,4 diChlorophenol	1.0 ug/l	--	No Water Quality Data - See Attachment A
Penta Chlorophenol	1.0 ug/l	--	No Water Quality Data - See Attachment A
Pesticides	--	--	No Water Quality Data - See Attachment A
Radioactive	--	--	No Water Quality Data - See Attachment A

no
no
no
no
no
no
no
no
no
no

DISSOLVED OXYGEN (mg/l)
St. John's River - Jacksonville, Florida

Dates	Upstream Stations		Downstream Stations		
	Marker 60-61	Drummond Point	Marker 51	Marker 43	Hecksher Drive
8/21/86	5.5	--	5.7	5.7	5.6
10/20/86	7.3	6.9	7.9	8.5	7.6
11/18/86	6.9	--	7.0	7.0	--
12/16/86	7.7	--	7.7	8.0	--
11/14/87	9.4	--	8.5	8.5	--
2/04/87	9.2	9.1	--	--	9.7 (2/17)
2/11/87	9.8	--	9.8	9.8	--
3/10/87	9.0	--	9.2	8.8	--
4/13/87	8.4	7.9	8.8	--	--
4/14/87	8.2	--	8.0	8.0	--
5/26/87	6.0	--	5.9	5.8	--
6/23/87	4.9	--	5.1	5.1	--
7/14/87	5.6	--	5.5	4.8	--
9/22/87	3.9	--	4.2	4.0	--
10/20/87	7.7	--	8.3	8.1	--
11/17/87	7.7	--	7.8	7.9	--
12/15/87	8.5	--	8.6	8.5	--
1/12/88	8.8	--	9.0	9.1	--
2/10/88	9.2	--	9.3	10.0	--
3/08/88	7.8	--	7.5	7.8	--
4/26/88	7.6	--	7.8	7.5	--

100

SPOIL PILES, GROUND WATER SAMPLES AND SURFACE WATER SAMPLES

AES CEDAR BAY

PAGE 031

PARAMETERS	UNITS	NH-1	NH-2	NH-3	NH-4	SW-1	SW-2
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EPA METHOD 624

Acrolein	ug/L	<250	<250	<250	<250	<25	<25
Acrylonitrile	ug/L	<250	<250	<250	<250	<25	<25
Benzene	ug/L	<10	<10	<10	<10	<1.0	<1.0
Bromodichloromethane	ug/L	<10	<10	<10	<10	<1.0	<1.0
Bromoform	ug/L	<10	<10	<10	<10	<1.0	<1.0
Bromomethane	ug/L	<10	<10	<10	<10	<1.0	<1.0
Carbon Tetrachloride	ug/L	<10	<10	<10	<10	<1.0	<1.0
Chlorobenzene	ug/L	<10	<10	<10	<10	<1.0	<1.0
Chloroethane	ug/L	<10	<10	<10	<10	<1.0	<1.0
Chloroform	ug/L	<10	<10	<10	<10	<1.0	1.4
Chloromethane	ug/L	<10	<10	<10	<10	<1.0	<1.0
Cis-1,3-Dichloropropene	ug/L	<10	<10	<10	<10	<1.0	<1.0
Ethyl Benzene	ug/L	<10	<10	<10	<10	<1.0	<1.0
Methylene Chloride	ug/L	<10	<10	<10	<10	<1.0	<1.0
Tetrachloroethene	ug/L	<10	<10	<10	<10	<1.0	<1.0
Toluene	ug/L	<10	<10	<10	<10	<1.0	<1.0
Trans-1,2-Dichloroethene	ug/L	<10	<10	<10	<10	<1.0	<1.0
Trans-1,3-Dichloropropene	ug/L	<10	<10	<10	<10	<1.0	<1.0
Trichloroethene	ug/L	<10	<10	<10	<10	<1.0	<1.0
Trichlorofluoromethane	ug/L	<10	<10	<10	<10	<1.0	<1.0
Vinyl Chloride	ug/L	<10	<10	<10	<10	<1.0	<1.0
Xylene	ug/L	<10	<10	<10	<10	<1.0	<1.0
1,1-Dichloroethene	ug/L	<10	<10	<10	<10	<1.0	<1.0
1,1,1-Trichloroethane	ug/L	<10	<10	<10	<10	<1.0	<1.0
1,1,2-Trichloroethane	ug/L	<10	<10	<10	<10	<1.0	<1.0
1,1,2,2-Tetrachloroethane	ug/L	<10	<10	<10	<10	<1.0	<1.0
1,2-Dichlorobenzene	ug/L	<10	<10	<10	<10	<1.0	<1.0
1,2-Dichloroethane	ug/L	<10	<10	<10	<10	<1.0	<1.0
1,2-Dichloropropane	ug/L	<10	<10	<10	<10	<1.0	<1.0
1,3-Dichlorobenzene	ug/L	<10	<10	<10	<10	<1.0	<1.0
1,4-Dichlorobenzene	ug/L	<10	<10	<10	<10	<1.0	<1.0
2-Chloroethylvinyl Ether	ug/L	<10	<10	<10	<10	<1.0	<1.0

(Continued)

SPOIL PILES, GROUND WATER SAMPLES AND SURFACE WATER SAMPLES

ABS CEDAR BAY

PARAMETERS

UNITS

NW-1

NW-2

NW-3

NW-4

SW-1

SW-2

EPA METHOD 625

a-BHC	ug/L	<50	<50	<50	<50	<50	<50
b-BHC	ug/L	<50	<50	<50	<50	<50	<50
d-BHC	ug/L	<50	<50	<50	<50	<50	<50
g-BHC	ug/L	<50	<50	<50	<50	<50	<50
Acenaphthene	ug/L	<100	<100	<100	<100	<100	<100
Acenaphthylene	ug/L	<100	<100	<100	<100	<100	<100
Aldrin	ug/L	<50	<50	<50	<50	<50	<50
Anthracene	ug/L	<100	<100	<100	<100	<100	<100
Benzidine	ug/L	<100	<100	<100	<100	<100	<100
Benzo (a) Anthracene	ug/L	<100	<100	<100	<100	<100	<100
Benzo (a) Pyrene	ug/L	<100	<100	<100	<100	<100	<100
Benzo (b) Fluoranthene	ug/L	<100	<100	<100	<100	<100	<100
Benzo (g,h,i) Perylene	ug/L	<250	<250	<250	<250	<250	<250
Benzo (k) Fluoranthene	ug/L	<100	<100	<100	<100	<100	<100
Benzyl Butyl Phthalate	ug/L	<100	<100	<100	<100	<100	<100
Bis (2-chloroisopropyl) Ether	ug/L	<100	<100	<100	<100	<100	<100
Bis (2-chloroethyl) Ether	ug/L	<100	<100	<100	<100	<100	<100
Bis (2-chloroethoxy) Methane	ug/L	<100	<100	<100	<100	<100	<100
Bis (2-ethyl hexyl) Phthalate	ug/L	<100	<100	<100	<100	<100	<100
Chlordane	ug/L	<400	<400	<400	<400	<400	<400
Chrysene	ug/L	<100	<100	<100	<100	<100	<100
Di-n-butylphthalate	ug/L	<100	<100	<100	<100	<100	<100
Di-n-octylphthalate	ug/L	<100	<100	<100	<100	<100	<100
Dibenzo(a,h)Anthracene	ug/L	<100	<100	<100	<100	<100	<100
Dieldrin	ug/L	<100	<100	<100	<100	<100	<100
Diethyl Phthalate	ug/L	<100	<100	<100	<100	<100	<100
Dimethyl Phthalate	ug/L	<100	<100	<100	<100	<100	<100
Endosulfan I	ug/L	<50	<50	<50	<50	<50	<50
Endosulfan II	ug/L	<50	<50	<50	<50	<50	<50
Endosulfan Sulfate	ug/L	<50	<50	<50	<50	<50	<50
Endrin	ug/L	<50	<50	<50	<50	<50	<50
Endrin Aldehyde	ug/L	<50	<50	<50	<50	<50	<50
Fluoranthene	ug/L	<100	<100	<100	<100	<100	<100
Fluorene	ug/L	<100	<100	<100	<100	<100	<100
Heptachlor	ug/L	<50	<50	<50	<50	<50	<50
Heptachlor Epoxide	ug/L	<50	<50	<50	<50	<50	<50
Hexachlorobenzene	ug/L	<100	<100	<100	<100	<100	<100
Hexachlorobutadiene	ug/L	<100	<100	<100	<100	<100	<100
Hexachlorocyclopentadiene	ug/L	<100	<100	<100	<100	<100	<100
Hexachloroethane	ug/L	<100	<100	<100	<100	<100	<100
Ideno(1,2,3-cd)Pyrene	ug/L	<250	<250	<250	<250	<250	<250
Isophorone	ug/L	<100	<100	<100	<100	<100	<100

(Continued)

- SPOIL PILES, LANDFILL GROUND WATER SAMPLES AND SURFACE WATER SAMPLES

9802-101

AES CEDAR BAY

PARAMETERS	UNITS	NW-1	NW-2	NW-3	NW-4	SW-1	SW-2
EPA METHOD 625							
N-Nitrosodiphenylamine	ug/L	<100	<100	<100	<100	<100	<100
Naphthalene	ug/L	<100	<100	<100	<100	<100	<100
Nitrobenzene	ug/L	<100	<100	<100	<100	<100	<100
Pentachlorophenol	ug/L	<100	<100	<100	<100	<100	<100
Phenanthrene	ug/L	<100	<100	<100	<100	<100	<100
Phenol	ug/L	72	<50	<50	<50	<50	<50
Pyrene	ug/L	<100	<100	<100	<100	<100	<100
PCB-1016	ug/L	<400	<400	<400	<400	<400	<400
PCB-1221	ug/L	<400	<400	<400	<400	<400	<400
PCB-1232	ug/L	<400	<400	<400	<400	<400	<400
PCB-1242	ug/L	<400	<400	<400	<400	<400	<400
PCB-1248	ug/L	<400	<400	<400	<400	<400	<400
PCB-1254	ug/L	<400	<400	<400	<400	<400	<400
PCB-1260	ug/L	<400	<400	<400	<400	<400	<400
Toxaphene	ug/L	<100	<100	<100	<100	<100	<100
1,2-Dichlorobenzene	ug/L	<100	<100	<100	<100	<100	<100
1,2,3-Trichlorobenzene	ug/L	<100	<100	<100	<100	<100	<100
1,3-Dichlorobenzene	ug/L	<100	<100	<100	<100	<100	<100
1,4-Dichlorobenzene	ug/L	<100	<100	<100	<100	<100	<100
2-Chloronaphthalene	ug/L	<100	<100	<100	<100	<100	<100
2-Chlorophenol	ug/L	<50	<50	<50	<50	<50	<50
2-Methyl-4,6-Dinitrophenol	ug/L	<150	<150	<150	<150	<150	<150
2-Nitrophenol	ug/L	<50	<50	<150	<50	<50	<50
2,4-Dichlorophenol	ug/L	<50	<50	<50	<50	<50	<50
2,4-Diaethylphenol	ug/L	<50	<50	<50	<50	<50	<50
2,4-Dinitrophenol	ug/L	<200	<200	<200	<200	<200	<200
2,4-Dinitrotoluene	ug/L	<100	<100	<100	<100	<100	<100
2,4,6-Dinitrotoluene	ug/L	<50	<50	<50	<50	<50	<50
2,6-Dinitrotoluene	ug/L	<100	<100	<100	<100	<100	<100
3,3-Dichlorobenzidine	ug/L	<100	<100	<100	<100	<100	<100
4-Bromophenyl Phenyl Ether	ug/L	<100	<100	<100	<100	<100	<100
4-Chloro-3-Methylphenol	ug/L	<50	<50	<50	<50	<50	<50
4-Chlorophenyl Phenyl Ether	ug/L	<100	<100	<100	<100	<100	<100
4-Nitrophenol	ug/L	<150	<150	<150	<150	<150	<150
4,4'-DDD	ug/L	<50	<50	<50	<50	<50	<50
4,4'-DDE	ug/L	<50	<50	<50	<50	<50	<50
4,4'-DDT	ug/L	<50	<50	<50	<50	<50	<50

OTHER

Sulfate	ug/L				1197		
Total Dissolved Solids	ug/L	4520	12606	1402	6108	29212	4024
PH		9.9	11.7	8	11.6	---	---

12902.01/VOC2.WR1/HW/SB/080888

(Continued)

SPOIL PILES, LANDFILL GROUND WATER SAMPLES AND SURFACE WATER SAMPLES

AES CEDAR BAY

PARAMETERS	UNITS	HW-1	HW-2	HW-3	HW-4	SW-1	SW-2
PRIORITY POLLUTANT METALS							
Antimony	ng/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Arsenic	ng/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Beryllium	ng/L	<0.007	<0.005	<0.005	<0.005	<0.005	<0.005
Cadmium	ng/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Chromium	ng/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Copper	ng/L	0.07	<0.01	<0.01	0.04	<0.01	<0.01
Lead	ng/L	0.125	<0.02	<0.02	0.05	<0.02	<0.02
Mercury	ug/L	0.78	<0.50	<0.50	1.22	7.73	<0.50
Nickel	ng/L	0.09	0.02	<0.02	0.08	<0.02	<0.02
Selenium	ng/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Silver	ng/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Thallium	ng/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Zinc	ng/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01