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FINAL ENVIRONMENTAL IMPACT STATEMENT
related to the proposed

SEMINOLE PLANT

UNITS 1 and 2

and Associated Transmission Facilities

SEMINOLE ELECTRIC COOPERATIVE, INC.

RURAL ELECTRIFICATION ADMINISTRATION
USDA-REA (ADM) 79-3-F

ROBERT W. FERAGEN
Administrator

RECEIVED
AUG 20 1979
DIV. ENVIRONMENTAL
PERMITTING

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This Final Environmental Impact Statement describes the expected environmental effects of construction and operation of Seminole plant consisting of two 600 MW coal-fired electric generating units and associated 230 kV transmission facilities and includes all comments received from official agencies and the public. It is my judgment that the proposed action by the Rural Electrification Administration in providing financing to SECI for the Seminole plant project will be consistent with the policies set forth in the National Environmental Policy Act.

Administrator
Rural Electrification Administration

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USDA-REA (ADM) 79-3-F

a. Responsible Agencies:

Lead Agency: USDA-Rural Electrification Administration Cooperating Agencies:

U.S. Environmental Protection Agency
U.S. Army Corps of Engineers
U.S. Department of the Interior - U.S. Fish and Wildlife Service
U.S. Department of Commerce - National Marine Fisheries Service

b. Title: Seminole Plant Units 1 and 2
and Associated Transmission Facilities

Rural Electrification Administration may provide guaranteed loan funds.

Corps of Engineers may approve permits for structures to be located in navigable waters of the United States.

Environmental Protection Agency may approve permits to preserve air and water quality.

National Marine Fisheries Service and Fish and Wildlife Service provide for the protection of fish and wildlife resources.

c. Contact: William R. Dalton, Director
Southeast Area - Electric
USDA - REA
South Building, Room 5906
Washington, D.C. 20250
Tel: (202) 447-6151

d. Final Environmental Impact Statement

e. Abstract: Seminole Electric Power Cooperative, Inc., plans to construct and operate two coal-fired electric generating units, each with a generation capacity of 600 net MW, at a new plant site to be located near the City of Palatka, Putnam County, Florida. Stack emissions will be controlled by washed coal, limestone scrubbers, electrostatic precipitators, and boiler design. Condenser cooling will be accomplished by the use of cooling towers. Plant water will come from the St. Johns River and from local aquifers.

Transmission lines may traverse Putnam, Marion, Clay, Bradford, Union, Columbia and Suwannee Counties, all in the State of Florida.

2.0 SUMMARY

This Final Environmental Impact Statement (EIS) has been prepared to conform with existing Council on Environmental Quality (CEQ) guidelines of August 1973 and to the fullest extent practicable with the CEQ regulations for implementing the National Environmental Policy Act (40 CFR 1500). Emphasis has been placed on reducing paperwork, reducing delays and making better decisions. To avoid excessive paperwork, and costly alterations and reproductions, extensive use has been made of supporting documentation through abstracting and extracting information. To reduce delays, a timetable was set at project initiation and early and frequent communications have been held with cooperating agencies, the applicant and the public. And, to make better decisions, the document is organized on the basis of the reviewer's need for information. Chapter 2, Summary, contains the essence of the decision process: it describes two levels of decisionmaking; it summarizes alternatives; discusses how supporting information was developed; identifies concerns or consequences as a result of decisions and presents conclusions. The remainder of the document expands the level of detail and provides the justification upon which the tentative conclusions are based.

2.1 Introduction

The National Environmental Policy Act (NEPA) is the national charter for the protection of the environment. It establishes policy, sets goals and provides means for carrying out the policy through a systematic, interdisciplinary decisionmaking process. On November 29, 1978, the CEQ promulgated regulations to guide Federal agencies in complying with the procedures and achieving the goals of this Act. Section 1500.2 of the CEQ regulations establishes the policy to be followed by Federal agencies for implementing NEPA.

In June 1977, prior to the promulgation of the CEQ regulations, the Rural Electrification Administration (REA) initiated activities which are to the fullest extent practicable consistent with the CEQ regulations. These activities are discussed below in the context of the policies set forth in CEQ Requirements Section 1500.2:

> Interpret and administer the policies, regulations and public laws of the United States in accordance with the policies set forth in the Act and these regulations.

Section 7.1 of this Final Environmental Impact Statement summarizes the specific licensing, permitting, and approval actions required for compliance with State and Federal laws. Additionally, other statutory requirements having special relevance to the National Environmental Policy Act are identified, and the status of the project in conforming with these statutes is discussed.

> Implement procedures to make the NEPA process more useful to decisionmakers and the public; to reduce paperwork and the accumulation of extraneous background data; and to emphasize real environmental issues and alternatives.

As referenced in Section 7.3, REA, in cooperation with the applicant, employed several innovative techniques for making the NEPA process more useful to decisionmakers. These included (1) the early preparation and distribution of a "Plan of Study" used to organize environmental information and encourage an open, orderly atmosphere for decisionmaking; (2) the preparation and distribution of an "Interim Report" to provide a meaningful opportunity for reviewers to focus on site specific issues and alternatives; (3) the convening of interagency coordination and scoping meetings, and use of open interaction with coordinating agencies and the public; and (4) the use, by agreement with the applicant, of an independent environmental consultant to act on behalf of the REA and the applicant, in the preparation of the Environmental Analysis (EA) as the major source of information for the Environmental Impact Statement.

On September 26, 1977, Seminole Electric Cooperative, Inc. entered into an agreement with REA to establish the framework within which the NEPA process would be carried out. The agreement recognized the right for REA, as lead Federal agency, to an early review of and comment on the proposed Plan of Study and scope of the EA to be prepared by Dames and Moore, environmental consultants. The agreement also included REA's right to periodically review all procedures used, data gathered, and preliminary reports generated by Dames and Moore, to insure that the NEPA requirements would be met. All drafts of the final EA prepared by Dames and Moore, and unedited by Seminole, were simultaneously transmitted to REA and Seminole. Seminole, by the agreement, commented on the unedited EA and made suggested changes available to REA for its consideration. This arrangement was carried out throughout the process.

Integrate the requirements of NEPA with other planning and environmental review procedures required by law or by agency practice so that all such procedures run concurrently.

From the initiation of the proposed project, as documented in Section 7.3, coordination among State and Federal agencies has been a primary objective. Examples of this effort are (1) the production of a consolidated document "Site Certification Application and Environmental Analysis, Seminole Plant Units 1 and 2," to meet State and Federal requirements; (2) the simultaneous filing of this document with State and Federal agencies; (3) the preparation of a consolidated notice of public hearing; and (4) the convening of a consolidated public hearing/state certification hearing.

Encourage and facilitate public involvement in decisions which affect the quality of the human environment.

As documented in Section 7.3, Seminole has conducted an assertive, open, public information program including speaking engagements, and general and technical meetings with diverse public interest groups. REA has also held two scoping meetings to directly solicit public participation and comment on project alternatives.

Use the NEPA process to identify and assess the reasonable alternatives to proposed actions that will avoid or minimize adverse effects of these actions upon the quality of the human environment.

Section 4.0 presents the alternatives considered at two levels: (1) those available to REA in deciding what action to take in its role of guaranteeing a loan to Seminole for the construction of the proposed facilities and (2) those alternatives available to Seminole (a) in deciding how to construct and operate a coal-fired generating station to optimize the use of available air, water, land, and social and cultural resources, and (b) in complying with local, State and Federal laws.

> Use all practical means, consistent with the requirements of the Act and other essential considerations of national policy, to restore and enhance the quality of the human environment and avoid or minimize any possible adverse effects of their actions upon the quality of the human environment.

In its consideration for a loan guarantee to Seminole Electric Cooperative, Inc., REA has acted to implement the intent, and to the fullest extent practicable, the letter of the Council on Environmental Quality regulations, to cooperate and coordinate its activities with other State and Federal agencies and the public, to provide guidance to Seminole on methods, procedures and means to avoid or minimize possible adverse effects and where possible to restore and enhance the quality of the human environment.

This Environmental Impact Statement was prepared by the REA as lead Federal agency. It represents the independent evaluation made by REA based upon many sources. These include the applicant's Environmental Analysis, input from Federal, State and local agencies and the general public, comments to the Draft EIS, applicable Federal, State and local laws and regulations, experts within the subordinate agencies of the U.S. Department of Agriculture (USDA), materials from the extensive departmental and law library collections and REA's collection of environmental literature, as well as extensive records of previously approved environmental impact statements and environmental studies.

Prior to making specific decisions on the provision of additional electrical power and high voltage transmission, REA and its borrowers hold planning discussions. This planning comprises a careful review of current load studies and the preparation of long-lead time site selection studies, power cost analyses, and an REA accepted Environmental Analysis.

To assist the REA borrower and its consultant in preparing an acceptable Environmental Analysis, ("Analysis" or "EA"), REA has issued Bulletin 20-21:320-21, with supplements, which was published in the Federal Register on May 19, 1973. Bulletin 20-21:320-21 describes REA requirements, methods and procedures for the preparation of Environmental Impact Statements and guidelines for the preparation of Environmental Analyses.

REA holds periodic conferences with the applicant and its consultants. Initial conferences focus on the specific subject matter to be addressed in the Analysis to identify the various types of specialized studies required to assess the environmental impacts. Discussions usually include the scope of environmental studies and the capabilities of firms or organizations under consideration for

the implementation of the required specialized studies. Subsequent conferences usually involve methods of investigating specific problem areas to identify viable solutions.

REA also holds meetings with other Federal and State agencies to determine lead agency and cooperating agency status and issues of concern, and to request specific input.

Candidate sites are inspected by REA field and central office personnel to the extent deemed necessary. Cooperating agencies are invited to participate in these inspections.

During the preparation of the Analysis, the borrower and consultants are frequently in contact with REA to avoid the expenditure of resources on concepts or practices that may be unacceptable to REA. The REA staff is involved in all phases of the preparation of the Analysis.

REA holds scoping meetings with other governmental or interested organizations and individuals to obtain their opinions and guidance in areas for which they may have special knowledge, authority or concern.

REA prepares its Environmental Impact Statement after it is assured that all areas of significant environmental impact have been identified and investigated so as to avoid or minimize adverse effects to the fullest extent practicable. After acceptance by REA, the applicant's Environmental Analysis may be appended to REA's Environmental Impact Statement.

The Environmental Analysis for the proposed Seminole Units 1 and 2 was prepared by Dames and Moore. After thorough independent evaluation and review, REA has determined that the Analysis represents an accurate, factual description and assessment of the proposed project, alternatives, and environmental impacts and existing conditions.

2.2 Description of Project

The proposed Seminole Electric Cooperative, Inc. ("SECI" or "Seminole") project is a 1200 MW, net, coal-fired steam electric generating station to be located on an approximately 2000 acre site adjacent to the St. Johns River in Putnam County, Florida, Figure F2.1. The two 600 MW generating units are to be in operation in 1983 and 1985.

Major station facilities include two approximately 450 foot high natural draft cooling towers, a wet limestone flue gas desulfurization (FGD) system for removal of sulfur dioxide, electrostatic precipitators for particulates collection, boilers designed to reduce nitrogen oxides, a single approximately 675 foot high stack, a chemical waste treatment system, onsite disposal of FGD wastes as stabilized cake, rail delivery of coal and approximately 69 or 190 miles of double-circuit 230 kV transmission line depending on the transmission alternative chosen.

The project objective is to supply the power generation needs of Seminole Electric Cooperative, Inc. for distribution to eleven member cooperatives.

2.3 Federal and State Actions

Federal and State actions required for the licensing of the proposed project include National Pollutant Discharge Elimination System (NPDES) permitting under the Clean Water Act; Prevention of Significant Deterioration permitting under the Clean Air Act; Section 10 permitting under the Rivers and Harbors Act; compliance with the Endangered Species Act of 1973, as amended; compliance with the National Historic Preservation Act and Executive Order 11593, and site certification under the Florida Electrical Power Plant Siting Act, as amended.

REA has determined that its actions of administering the loan guarantees for the financing of the construction of the proposed project are considered "major Federal actions significantly affecting the quality of the human environment," and as such are subject to the statutory requirements of the National Environmental Policy Act.

Under Section 511(c)(1) of the Clean Water Act, the Environmental Protection Agency also administers new sources NPDES permits as "major Federal actions" under the National Environmental Policy Act. By agreement with REA, EPA has coordinated with REA in the review of the Draft and Final Environmental Impact Statements to carry out its responsibilities under NEPA.

2.4 Alternatives

2.4.1 Federal Agency Action Alternatives

In order for Seminole to construct and operate the proposed electric generating plant and associated transmission facilities, the company must show compliance or conformance with numerous local, State and Federal laws, regulations and ordinances as discussed in Section 7.1: Permits, Approvals, and Actions Required to Construct and Operate the Project.

Alternatives available to REA include: (1) approval of the proposed project; (2) approval of the project with conditions; and (3) disapproval of the project.

2.4.2 Applicant's Project Alternatives

In planning the proposed project, Seminole has consulted with numerous Federal, State and local agencies, independent environmental specialists, and the public. A wide range of alternatives has been investigated by the applicant and from these alternatives Seminole selected the proposed project. This project is, in Seminole's opinion, one which meets its members electrical

requirements, can comply with applicable laws and regulations, and protects environmental quality. Alternatives considered are presented in Section 4.0 of this Final Environmental Impact Statement. These include alternatives not requiring construction of the proposed project, alternative energy sources, alternative power plant sites, alternative plant designs and facilities and alternative transmission systems.

2.5 Major Concerns and Issues

The concerns and issues presented and summarized in this section are considered by REA to be the major concerns and issues raised by agencies and the public throughout the review of the proposed project. The concerns and issues are categorized according to the resources that may be affected by construction and operation of the project: (1) air, (2) water, (3) land, and (4) social and cultural. Within each category a summary is provided on (a) the use of the resource, (b) potential environmental impacts of specific concerns and issues, and (c) regulatory compliance requirements applicable to the allocation and use of the resource. In general, compliance with applicable State and Federal regulations is considered to be protective of the interests of public health and public welfare.

2.5.1 Air Resources

2.5.1.1 Description of Use

During operation of the proposed plant, the combustion of coal will produce by-products some of which will be discharged to the atmosphere through a 675 foot stack. Atmospheric emissions will consist primarily of total suspended particulates, sulfur dioxides and nitrogen oxides. Emissions control equipment will be used to limit the discharges in compliance with State and Federal laws.

2.5.1.2 Environmental Impacts

Sulfate Aerosols. Gaseous sulfur oxides emitted into the atmosphere can be oxidized to form sulfate aerosols. The conversion process is not well known, nor easily evaluated and the relationship between sulfate levels and public health and welfare effects is poorly understood. No national or state ambient air quality standards have been adopted for sulfate aerosols.

Visibility impairment results primarily from the conversion of gaseous sulfur oxides to sulfate aerosols and the transport of these aerosols over long distances. There are no accepted methods for accurately predicting and monitoring the formation, transport and visibility impairment impact of secondary emission products. While the emissions from the proposed plant will probably have some effect on visibility at distances remote from the site, the emission control equipment to be used at the plant will mitigate potential impact.

Another concern is the formation of acidic sulfates in rainwater with adverse consequences on surface water bodies, soils and vegetation. The acid rainfall phenomenon, while actively being researched, is poorly understood in terms of process of formation, geographic distribution and effects. The extent to which the Seminole Station would cause increased rainfall acidity cannot be accurately predicted.

Sulfur Dioxide. Vegetation injury or damage from sulfur dioxide is dependent on ground level concentration, duration of exposure and sensitivity of the vegetation. Vegetable crops in the area of the proposed plant that may be affected are irish potato, cabbage and pine. Damage to cabbage has been observed to occur at 5700 $\mu g/m^3$ for one hour. Injury to irish potato has been shown to occur at SO_2 concentrations above 2100 $\mu g/m^3$ for three hours or 5200 $\mu g/m^3$ for one hour. Yellow pines and southern pines, in general, seem to be tolerant of SO_2. The National Ambient Air Quality Standard for SO_2 is 1300 ug/m^3 for three hour average. The maximum expected three hour ground level concentrations for the proposed plant are 550 $\mu g/m^3$. Consequently, the concentrations of SO^2 emitted from the Seminole Plant should not adversely impact irish potato, cabbage or pines.

2.5.1.3 Regulatory Compliance

- Use of air resources is contingent primarily on compliance with the Federal Clean Air Act Section 110: Implementation Plans, Section 111: Standards of Performance for New Stationary Sources, Section 123: Stack Heights, and Sections 160-169: Prevention of Significant Deterioration of Air Quality.

- National ambient air quality standards have been set for total suspended particulates, sulfur dioxide, and nitrogen oxides at levels sufficient to protect public health and welfare. Based on accepted air quality guideline prediction techniques, construction and operation of the Seminole plant will not violate the national ambient air quality standards.

- New source performance standards for steam electric generating stations were proposed September 19, 1978 to require emission standards and the following emission reductions:

  Sulfur dioxide - 1.2 lbs/MBtu; 85% reduction, except for allowance of three 24-hour periods per month as low as 75%;
  Particulate Matter - 0.03 lb/MBtu; 99% reduction;
  Nitrogen Oxides - 0.6 lb/MBtu; 65% reduction.

(On June 11, 1979 the EPA promulgated final revised New Source Performance Standards. While the EPA has not determined whether these regulations will apply to applications currently under review, Seminole's proposed pollution control equipment will have the capability to comply with the final regulations, if required.)

- Additionally, the source must show compliance with prevention of significant deterioration regulations by: (1) evaluating compliance with the PSD Class II increment; (2) verifying, as practical, that the Class I increment of the nearest Class I area is not exceeded and (3) proving that the preferred emission control equipment represents best available control technology (BACT).

- The U.S. Environmental Protection Agency has conducted a review of compliance of the proposed plant with the national ambient air quality standards, new source performance standards, and prevention of significant deterioration regulations. On March 9, 1979, the Agency issued a "Preliminary Determination" concluding that the systems proposed represent BACT for particulates, SO_2 and nitrogen oxides; that air quality modeling for the facility showed no violations of national ambient air quality standards and PSD increments; and that impacts on visibility, soils, vegetation, and impacts due to growth caused by the proposed source, were minimal.

2.5.2 Water Resources

2.5.2.1 Description of Use

Surface Water Withdrawal. Surface water will be withdrawn from the St. Johns River for condenser cooling (NPDES Serial No. 005, See Draft NPDES Permit in Appendix 8.2). Using two natural draft cooling towers, the two unit plant will withdraw a maximum of 16,127 gallons per minute (gpm). Of this amount about 12,130 gpm will be lost through evaporation, 27 gpm lost through drift, and 3,970 gpm returned to the St. Johns River as blowdown to reduce the buildup of dissolved solids within the towers. Average withdrawal, loss and blowdown rates will be about 68% of the maximum rates.

Withdrawal and use of cooling water requires that it be free of debris. This is done by drawing the water through intake screens. Federal law requires that the intake screens be designed to minimize adverse environmental impact. The proposed intake screen facilities will employ a mechanically-simple, cylindrical wedge-wire screen system designed to achieve a screen approach velocity of 0.5 feet per second. A mesh size of 1 to 2 mm is under study for the smallest feasible mesh size that will minimize the entrainment and impingement of aquatic organisms and avoid excessive fouling and plugging.

Discharges to Surface Waters. Discharges from the central wastewater treatment system (NPDES No. 002), sanitary system (NPDES No. 003), and cooling towers (NPDES No. 004) will be made to the St. Johns River by a single discharge pipe (NPDES No. 001). The discharge outlet will be located about 900 feet offshore, and at least 150 feet from the intake structure to minimize recirculation. To enhance mixing, the outlet nozzle will be designed and operated to maintain a discharge to ambient current velocity ratio of 10 to 1. The nozzle will be directed away from the bottom at an angle of approximately 20 degrees to prevent bottom scour and suspension of sediments.

Chemical waste discharges will be limited to those permitted by State and Federal regulations. The chemical waste system will be designed to neutralize strong wastes at the source, separate oil before pumping, collect and equalize the wastes, then adjust pH and reduce remaining oil, heavy metals and suspended matter by coagulation and sedimentation before monitoring and release.

Chlorine will be used to control biological growth in condensers and cooling towers. The quantity of total residual chlorine discharged in the blowdown from the cooling towers shall not exceed 0.1 mg/l at the point of discharge nor 0.01 mg/l beyond an instantaneous mixing zone of 750 square feet. There will be no limit on the duration of discharge of chlorine.

Heat will be discharged in the cooling tower blowdown. The maximum temperature difference between ambient St. Johns River water and blowdown discharge during plant operation in the summer will be 18°F (10°C) and in the winter 27°F (15°C). The maximum discharge temperature will be limited to 93°F (33.9°C).

Groundwater Withdrawal (Floridan Aquifer). Water for station service will be withdrawn from the Floridan Aquifer by two deep wells, each with a 205 gpm average daily withdrawal. Prior to use as potable water and boiler makeup water, the groundwater will be aerated to oxidize iron and sulfides and remove carbon dioxide, lime-softened and filtered.

Discharges to Groundwater (Water Table Aquifer). Discharges to the water table aquifer on site are expected from leachates originating from (1) disposal by land filling of coal combustion and flue gas desulfurization wastes; (2) disposal by percolation field of stackwash, and preheater wash, boiler fireside wash and boiler blowdown, if boiler blowdown is not recycled; (3) seepage from the coal storage area; and (4) seepage from impounding dredged material from cooling water intake channel.

2.5.2.2 Environmental Impacts

Surface Water Withdrawal. The maximum withdrawal of cooling water from the St. Johns River represents less than one half of one percent (0.5%) of the average river flow. Losses due to evaporation and drift represent 0.38% of the average river flow. Thus the impact of cooling water withdrawal is insignificant.

The operation of cooling water intake facilities can adversely affect aquatic organisms in basically two ways: the first through the impingement or entrapment of organisms on the screening devices; the second, the entrainment of organisms, particularly small, immature life stages, through the cooling system of the plant.

Entrainable organisms include phytoplankton, zooplankton, some smaller macroinvertebrates, fish eggs, larvae, and some juveniles. The size of organisms impacted will be controlled by the mesh size of the screens. The numbers of organisms affected will depend upon the volume of water withdrawn, location of the intake area of intake, hydraulic influence, and abundance and distribution

of the organisms. The impact on entrainable organisms depends largely on the abundance of organisms in the volume of water withdrawn. When water volumes are low, potential impacts are roughly proportional to percentage of water withdrawn from the source.

Section 316(b) of the Clean Water Act requires that "the location, design, construction, and capacity of cooling water intake structures reflect the best technology available for minimizing adverse environmental impact." The proposed cooling water intake system meets these requirements:

1. Location. The facilities are located in a segment of the St. Johns River apart from vegetated bottoms that would provide nursery or spawning areas or habitat for important aquatic organisms, particularly commercially and recreationally valuable fish and shellfish.

2. Design. A cylindrical wedge-wire screen system with 1 to 2 mm screen openings will be used rather than conventional 10 mm (3/8 inch) mesh size providing for through screen water velocity of about 0.15 mps (0.5 fps). Field tests are presently being conducted to determine optimum screen mesh size.

3. Construction. Construction will be done in a manner to minimize turbidity from dredging or pile driving. Turbidity control devices will be used. These and other necessary construction techniques are to assure compliance with State water quality standards are included in the State "Conditions of Certification" and will also be included in the U.S. Army Corps of Engineers section 10 permit.

4. Capacity. The use of cooling towers will reduce cooling water withdrawal to less than 3% of a comparable once-through system. Cooling tower makeup will use less than 0.5% of the average river flow. Additionally, cooling tower blowdown is proposed for use as make-up to the flue gas desulfurization system and bottom ash sluice system, as practicable, thereby further reducing total plant water withdrawal.

Discharges to Surface Water. Plant discharge will contain heat and certain chemical constituents in amounts greater than the ambient levels of the St. Johns River. The major component of plant discharge will be cooling tower blowdown. The thermal content of the blowdown will vary with changing meteorological conditions; greatest temperature differentials will occur during the winter, minimum differentials during the summer. Chemicals in the blowdown will be (1) those naturally occurring in the river, but concentrated about four times by the towers; and (2) chlorine and sulfuric acid as additives to the circulating water systems to prevent scale and biological fouling. Other components of the plant discharge are chemical residuals from the waste treatment system and sanitary waste treatment system.

Heat and chemical wastes will be controlled to comply with Federal effluent limitations and State water quality standards. Impacts were assessed through near-field and far-field hydrodynamic modeling. Residual heat and wastes will

be discharged to the St. Johns River through use of mixing zones approved by the State of Florida and should not adversely impact water quality or indigenous communities of aquatic organisms in the river.

The discharge of total residual chlorine at 0.1 mg/l at the point of discharge will assure compliance with acute toxicity requirements set by Florida regulations. Further, this concentration will be diluted to 0.01 mg/l in less than 0.02 acre.

Groundwater Withdrawal (Floridan Aquifer). Pumping tests and computations were made to evaluate the drawdowns on offsite wells resulting from total withdrawals of 590 gpm from the two Floridan Aquifer production test wells. The nearest offsite wells drawing water from the Floridan Aquifer are a livestock well approximately 3800 feet north of the test wells; a domestic well approximately 5800 feet south; and a domestic well approximately 7000 feet north of the production test wells. The drawdown in each of these offsite wells was computed not to exceed 1.75 feet, 2.5 feet and 1.0 foot, respectively.

These potentially lower potentiometric levels in offsite wells should not cause a measureable increase in power for pumping groundwater; result in significant upconing of salt water beneath the plant service wells; or measureably increase lateral migration of higher chloride Floridan Aquifer water from the Atlantic coastal area.

Discharges to Groundwater (Water Table Aquifer). The onsite disposal of combustion by-products, sludges, various equipment cleaning wastes and dredge spoil and the seepage from the coal pile have the potential for contaminating the water table aquifer with leachates containing trace elements. The Floridan Aquifer, the principal groundwater aquifer is protected from potential contamination due to surface activities by a confining layer, the Hawthorne Formation, and the positive groundwater gradient from the Floridan Aquifer. Therefore, there should be no potential impact to the Floridan Aquifer from waste leachates. The water table aquifer is not protected from surface effects since it receives its principal recharge from infiltration of rainfall.

Evaluation of potential contamination of the water table aquifer was based on site specific field and laboratory studies of geology and soils, the coal characteristics derived from empirical and analytical data, and models of groundwater dynamics. The principal criterion for judging impact was the limits on groundwater quality established by Florida Department of Environmental Regulation water quality standards as measured at the site property boundary in the direction of groundwater flow.

Evaluation of the waste storage area showed all chemical constituents are within State water quality criteria at the site boundary.

Evaluation of coal storage seepage showed all chemical constituents at the property boundary are within State water quality criteria.

Evaluation of percolation of various equipment cleaning wastes showed that all of the constituents are below State water quality criteria except for cadmium

and iron. Cadmium is equal to the criteria, while iron is approximately 3 mg/l above the standard. These constituents, however, are not very mobile in groundwater systems, and should be attenuated by exchange mechanisms in the soil and additional dilution as they migrate downgradient through the aquifer system. To aid attenuation, acidic wash wastes will be neutralized prior to discharge to the percolation pond. Therefore, potential impacts to groundwater beyond the site boundary are not anticipated.

Evaluation of seepage from dredge disposal considered: cadmium, mercury, lead, and zinc. These metals have low solubilities in groundwater systems and are calculated to be within State water quality criteria at the site boundary. Potential impacts are not anticipated beyond the property boundary.

A groundwater monitoring program will be conducted prior to and during plant operation to detect changes in water quality attributable to waste disposal. If monitoring indicates significant off-site impacts are probable, mitigative measures will be taken.

2.5.2.3 Regulatory Compliance

- Discharges to surface waters are regulated primarily by the Clean Water Act. Section 402 of the Act requires permitting of discharges under the National Pollutant Discharge Elimination System (NPDES). Section 401 requires certification by the State that the discharges are in compliance with State water quality standards. Effluent limitations are set out in 40 CFR 423 and water quality standards are set in Florida Administrative Codes 17-3, 17-4, and 17-6. An application for an NPDES permit, filed in October 1978 and amended May 31 and June 13, 1979, is pending completion of the NEPA review. EPA has evaluated waste treatment facilities and procedures proposed by Seminole and expects that proper operation of the facilities will result in compliance with EPA standards of performance for new sources, the Florida Water Quality Standards and requirements of the NPDES permit. A copy of the draft NPDES permit is attached in the Appendix.

- Because ambient concentrations of lead, mercury, zinc and cadmium occasionally exceed water quality standards due to natural background or irreversible man induced conditions, the Applicant has requested and the Florida Department of Environmental Regulation proposes to grant a variance to water quality standards for these elements when background levels in the St. Johns River approach or exceed those standards, (see Appendix 9.2.3, conditions II.A.11 and II.A.12.a). Under Section 303 C of the Clean Water Act, a variance constitutes a water quality standard revision and is subject to EPA review and approval. If the Governor and Cabinet grant the requested variance, the EPA has no objection provided the designated use of the receiving waters is not significantly affected by the discharge.

- Section 316(b) of the Clean Water Act requires that "the location, design, construction, and capacity of cooling water intake structures reflect best technology available for minimizing adverse environmental impact." The Environmental Protection Agency has determined that the proposed cooling water intake structure complies with this requirement.

- Discharges to groundwaters are regulated by Chapter 403 Florida Statutes and Chapter 17-3 FAC. A copy of Conditions of Certification recommended by the Florida Department of Environmental Regulation are included in the Appendix.

- Under Section 10 of the Rivers and Harbors Act, the U.S. Army Corps of Engineers regulates activities in navigable waters of the United States. A permit application was filed in August 1978, amended April 25, 1979, and is pending completion of the NEPA process.

2.5.3 Land Resources

2.5.3.1 Description of Use

The proposed site is located on approximately 2000 acres of undeveloped uplands. It has never been used intensively for agriculture or urban development. The site has been used for foraging operations and has recently been subject to timber harvesting. Natural vegetation consists primarily of pine flatwoods, 46% of the site; sandhill community 25% of the site; managed pine plantation, 8% of the site; bayhead forest community, 7% of the site; hardwood and cypress swamp community, 7% of the site; and oak hammock and cypress head communities the remaining 7% of the site.

Approximately 1254 acres of land will be used for transmission line right-of-way under the preferred alternatives (3450 acres for other acceptable alternatives). Similar types of vegetative communities will be crossed.

2.5.3.2 Environmental Impacts

Terrestrial Impacts. Site preparation and construction activity for the main structures will require approximately 420 acres of land. Of this amount approximately 290 acres is Sandhill community. This is 55% of the Sandhill community on site. Previous lumbering activities, however, have significantly altered the plant life there. The Sandhill community is also a common Florida habitat. Transmission facilities will have negligible impact on grazing and crop production. Trees will be cleared along rights-of-way.

Land Uses. Most of the site lies within an area classified as only fair to poor for food crops, pasture, and woodland uses. Transmission lines associated with the project will have minimal impact on existing land uses.

There are no conflicting uses of the site. As required by the Florida Electrical Power Plant Siting Act, the site and transmission corridors were found to be in conformance with existing land use plans and zoning ordinances.

The upland elevations of the site allow the plant facilities to be located and operated above the 100 year and 500 year floodplains.

2.5.3.3 Regulatory Compliance

- The U.S. Army Corps of Engineers has jurisdiction for regulating activities in wetlands under Section 404 of the Clean Water Act. By letter dated June 22, 1978, the Corps determined that their jurisdiction does not apply to wetlands on the site.

- Executive Order 11990: Protection of Wetlands mandates each Federal agency to take action to minimize the destruction, loss or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands in carrying out the agency's responsibility. The generating station facilities are not located in wetlands. REA has determined that there is no practicable transmission corridor alternative that will completely avoid wetlands. The applicant will consult with appropriate State and Federal agencies to avoid, or where avoidance is not practicable to minimize impact, as practicable on wetland areas in the construction of transmission lines. Mitigative measures would include the strategic placing of transmission structures, to the maximum extent practicable, to avoid wetland areas as much as practicable and the use of existing rights-of-way wherever practicable.

- Executive Order 11988: Floodplain Management directs each Federal agency to take action to reduce the risk of flood loss, minimize the impact of floods on human safety, health and welfare and to restore and preserve the natural and beneficial values served by floodplains. The plant facilities are located above the 100 year and 500 year floodplains. Portions of the associated transmission lines will be sited in floodplains. REA has determined that alternatives have been considered in siting and design of the transmission lines and that there are no practicable alternatives to avoid adverse effects and incompatible development in these areas. The applicant will use all practicable means to minimize adverse impacts on floodplain values. The steel lattice towers to be placed in the floodplains will be designed to withstand a "100-year" flood and will not have significant effect on floodplains.

- Secretary's Memorandum No. 1827, Revised, sets policy which, among others, advocates the retention of Important Farmlands and Forestlands, Prime Rangelands, Wetlands, or other lands designated by State or local governments. By letters dated February 26 and June 26, 1979, the Soil Conservation Service determined (1) there is no prime agricultural land within the site boundaries delineated and (2) although some prime

agricultural land could exist in all transmission line corridors, no significant impact will occur that will prevent continued use of these lands for agricultural purposes. REA has determined that this project will not significantly affect Important Farmlands or Prime Rangelands, but there is no practical transmission corridor alternative that will completely avoid Important Forestlands. Mitigative measures to reduce the effect on Important Forestlands would include the use of existing transmission line rights-of-way wherever practicable, the use of fire lanes or maintenance roads where practicable, and the avoidance of heavily timbered areas where practicable

2.5.4 Social and Cultural Resources

2.5.4.1 Description of Use

The interaction of the proposed project on the people and social systems of the area is expected to be felt mostly (1) during construction, when at the height of construction program, about 1000 personnel may be working at the site and (2) during operation, as fuel is delivered to the plant by 70 to 90 car unit trains; as the plant contributes significantly to the tax base of the county; as the plant changes the landscape by the presence of the 450 foot cooling towers and the 675 foot stack; and as the plant provides the electric energy needs of area consumers.

2.5.4.2 Environmental Impacts

During construction, traffic along U.S. Route 17 is expected to increase in 1980, reach a peak in 1982 and gradually recede until the two unit station is completed in 1985. Station operation will require about 140 people. At the height of construction, approximately 1000 people will be working at the site. Studies have projected that most of these people will commute from distances up to 50 or 75 miles. Traffic congestion associated with the construction force will occur during peak hours; morning arrivals and evening departures. Projections of future traffic volumes with and without the plant, suggest the traffic flow during the construction period would not exceed the highway's absolute capacity as it now exists. Previously planned road construction is scheduled to widen U.S. Route 17 to four lanes from County Road C209 to Palatka, beginning in 1981 and ending in 1982. While there may be some overlap in construction periods, road construction will not occur in the vicinity of the plant's main access road. In general, the congestion impacts associated with construction labor should not be significant.

Since most construction personnel will commute, these people will not reside in Putnam County. Thus their interim presence will not cause a significant impact on public services or facilities.

Delivery of coal to the plant by 70-90 car unit trains at an average frequency of one train per day is expected to cause some traffic delays at intersections

along the route. Greatest delays may be expected as the trains slow for unloading at the site. The significance of this impact is reduced as the site has been designed to accommodate up to three unit trains in various stages of waiting or unloading.

While an accurate assessment of real and personal property taxes has not been made, an order-of-magnitude generalization has been provided. Using reasonable assumptions, total real and personal property taxes that may accrue to Putnam County from the proposed plant over a 32 year period (1983-2014) may be $190 million. To the extent that trends and assumptions are valid, the contribution would be several times greater than increases in costs of public services that may be required as a result of project-induced changes in population.

Project induced requirements for various public services during the construction phase, while not expected to be significant, will precede the placement on the tax rolls of the assessed value of the plant. Advanced planning may be necessary to anticipate demands. Seminole will consult with County officials on a continuing basis to manage the timing and flow of construction activities in a way that will minimize any adverse effects as practical.

The principal benefits of the project will be to provide electric energy to ultimate consumers under more reliable conditions and at a more economical cost than could be done by continuing the present method of supply. Since 90% of current requirements are provided by rate tariff from outside the Seminole power system, the addition of 1200 megawatts of self-generation would help to secure Seminole's need for reliable service.

2.5.4.3 Regulatory Compliance

Among the Federal laws which may be associated with social and cultural resources are: the Fish and Wildlife Coordination Act, Endangered Species Act of 1973, National Historic Preservation Act and Executive Order 11593, Wild and Scenic Rivers Act, National Energy Conservation Policy Act, and Federal Aviation Act.

- Close coordination has taken place with the U.S. Fish and Wildlife Service, National Marine Fisheries Service, and Florida Game and Fresh Water Fish Commission in managing fish and wildlife resources and consulting on the potential impacts of the proposed project. REA has worked with the U.S. Fish and Wildlife Service under Section 7(c) of the Endangered Species Act, as amended. REA has determined that no listed species, those proposed for listing, or critical habitat will be jeopardized by the proposed site or the associated transmission line corridors. By letter dated January 19, 1979, the National Marine Fisheries Service advised that no listed species, those proposed for listing or critical habitat under its jurisdiction was present in the area of the proposed project. By letters dated April 5, and July 19, 1979, the U.S. Fish and Wildlife Service concluded the proposed project and associated transmission facilities will not jeoparidze the continued existence of the Florida manatee, the red cockaded woodpecker, the

indigo snake, the bald eagle, the American alligator, the ivory-billed woodpecker, or the Florida panther or result in destruction or adverse modification of critical habitat.

- Consultation with the State Historic Preservation Officer revealed, according to letters dated October 23, 1978 and June 21, 1979, and REA has determined that no archeological or historical sites listed, or eligible for listing on the National Register of Historic Places or otherwise of national, state, or local significance occur on or near the site or associated transmission corridors or will be affected by the proposed project. Prior to the construction of the transmission lines, the areas to be impacted will be professionally surveyed for archeological and historic sites and appropriate action taken to avoid or mitigate potential impact.

- The St. Johns River in the region of the site is neither proposed for listing nor listed in the wild and scenic river system.

- Since Seminole does not sell electric energy directly to residential customers, it is not subject to the requirements of Part 1 of the National Energy Conservation Policy Act, which requires the preparation of a residential energy conservation plan. The company is working, however, with REA, member cooperatives and other State electrical utilities to develop and implement a residental energy conservation plan.

- The construction of the 675 foot tall stack and two 450 foot cooling towers has been coordinated with the Federal Aviation Administration.

2.6 Unresolved Concerns and Issues

All unresolved concerns initially listed in this section in the Draft EIS have been resolved. Appropriate changes have been made in this environmental impact statement to reflect the resolution of these concerns and issues.

2.7 Conclusion

On the basis of information provided in this Final Environmental Impact Statement and the supplemental references and appendices to this document, REA has determined that the proposed Putnam County site and associated transmission corridor alignments along Routes 1 and 2 proposed by Seminole Electric Cooperative, Inc. represent the most environmentally acceptable means to provide sufficient reliable electric power to its members. If either transmission corridor, Route 1 or 2, becomes infeasible due to inability to interconnect with neighboring electric utility facilities, Route 3 is an environmentally acceptable alternative to either. This determination is subject to change as a result of comments received during the 30-day waiting period and to satisfactory compliance with other local, State and Federal regulations.

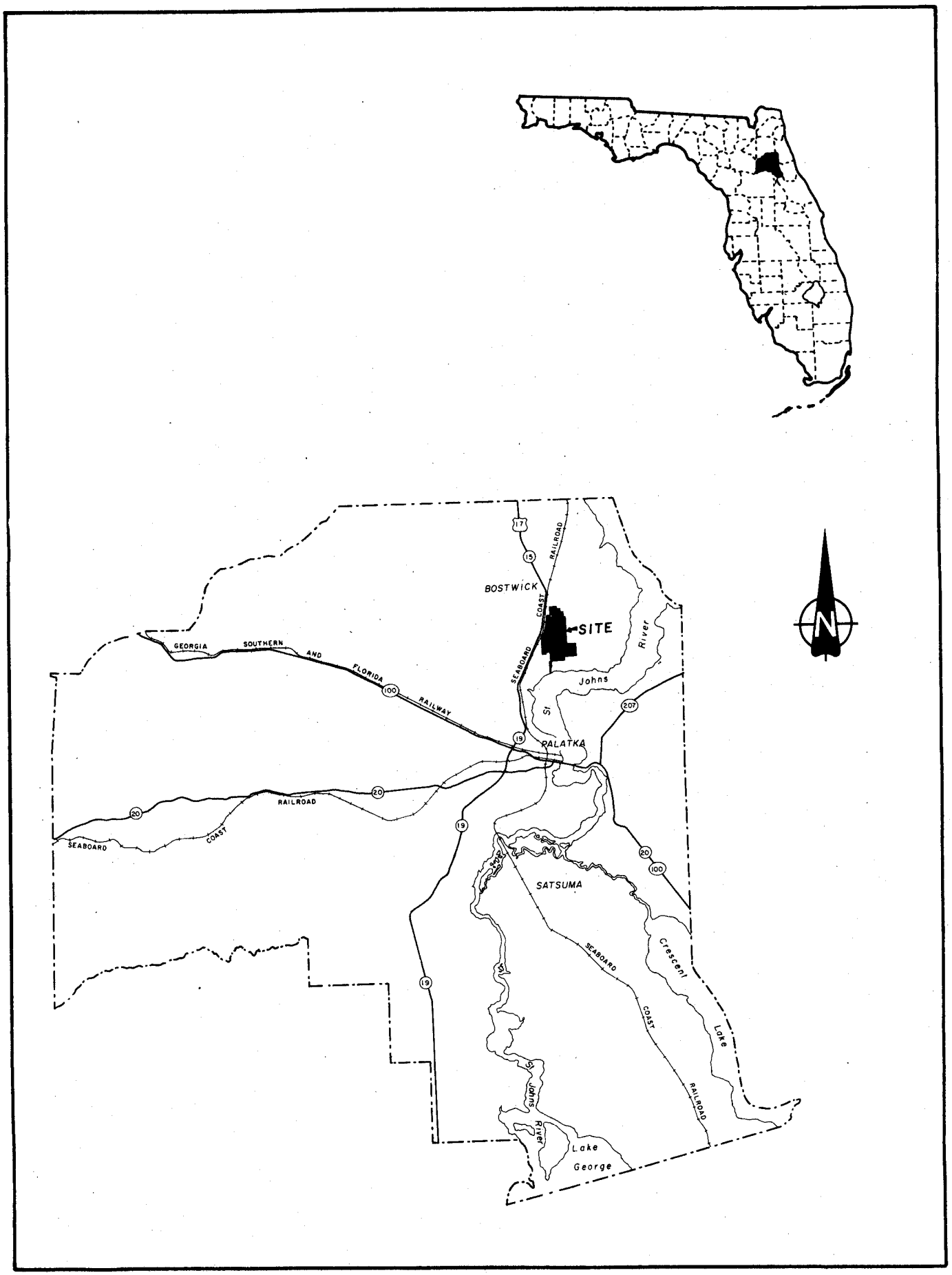

Figure F2.1 Site Location Map.

3.0 PURPOSE AND NEED FOR PROJECT

Seminole has the obligation to provide dependable and reliable sources of electric wholesale power in the most economical and environmentally acceptable manner to its eleven member distribution systems. At present, Seminole's owned generation resources consist of a 14 MW (1.7%) ownership in a 812 MW nuclear unit (Crystal River Unit 3). All other wholesale power requirements of Seminole are purchased from six suppliers. Of these six, Florida Power Corporation (FPC) and Florida Power & Light Company (FP&L) supply more than 90% of the purchased power. This power is purchased through wholesale-for-resale tariffs filed with the Federal Energy Regulatory Commission (FERC). These tariffs can be revised and resubmitted by FPC or FP&L from time-to-time for acceptance by FERC. Seminole anticipates that it can become a 6% owner (approximately 48 MW) of St. Lucie No. 2 nuclear unit, scheduled for in-service operation by 1983, by negotiating a joint ownership and participation agreement with FP&L.

Seminole has completed a Power Requirement Study (PRS) dated March 1977, which gives a projection of its total members' demands and energy requirements. The load projections contained in the PRS reflect an analysis of historical growth trends and anticipated future customer use characteristics, anticipated population growth, anticipated economic development, customer income, and the effect on usage due to cost of electricity and weather. The 1977 PRS was reviewed and approved by the REA. A review was performed in 1978 to check the accuracy of the PRS in relation to the 1977 historical growth. The projected load was found to be a good representation of the actual growth rate from 1976 to 1977.

Seminole's members have experienced significant growth in consumption due to an increasing trend in migration from urban to rural areas, and the increase usage of air conditioners, heat pumps, and resistance heating. Historical population growth of the State of Florida has also influenced member load growth, and projections of future population growth would indicate a continuing influence. Seminole's members have experienced a total growth in energy consumption which averaged 14.5% per year for the period 1968 through 1977. Demand growth averaged 17.1% during the same period. The following table contains the projected growth rates for demand and energy as presented in the 1977 PRS with the exception that 1977 and 1978 was based on historical data.

Period	Projected Growth in Demand Per Year	Projected Growth in Energy Per Year
1977-1981	9.45%	10.63%
1981-1987	10.35%	10.36%
1987-1992	9.50%	9.50%
1992-1995	8.50%	8.50%

Seminole's energy demand has increased from 1020 GWH in 1968 to 3452 GWH in 1977, with a peak load of 1007 MW in February 1978. Table 3.1 shows the history and forecast of seasonal peak demand and annual energy requirements of Seminole and it provides an indication of the role of the proposed two-600 MW units compared to Seminole's projected peak demand.

The proposed units' capacity is planned to be dispatched in a gradually increasing rate to supply a portion of Seminole's members' load requirements in the FPC power supply area. Additional power requirements for the FPC area will continue to be purchased from FPC. This mode of operation will allow Seminole to assume its load gradually while having slight impact upon FPC as an existing supplier. The proposed generation schedule will provide for continued purchases on an orderly basis and for Seminole to meet increasing load requirements on an orderly basis. It will improve Seminole's ability to meet its objective of providing assured power supply with known cost factors.

Seminole needs the proposed two-600 MW units to provide a more dependable source of wholesale power supply for its distribution members. In addition, the proposed units would have a substantial favorable financial impact on Seminole and its members. Not continuing with this project would have substantial economic consequences and could adversely affect Seminole's ability to provide adequate power and energy to its members. As a wholesale purchaser of power for over 90% of its power requirements under rate tariffs, Seminole has a need to develop substantial generation resources of its own.

The addition of Seminole's proposed units would also provide much needed additional generating capacity to improve system reliability of the bulk generation and transmission system serving the State of Florida "peninsula" area. These new units may also reduce requirements that are placed on older, less environmentally acceptable units. These benefits will flow not only to consumers of Seminole's member cooperatives, but also to consumers of other utilities in the peninsula of Florida.

TABLE 3.1

History and Forecast of Capacity, Demand & Annual Energy Requirements

Summer[a]				Winter[b]		
Year	Total Installed Capacity-MW	Peak Demand MW	Net Energy For Load-GWH	Year	Total Installed Capacity-MW	Peak Demand MW
1968		220	1020.4	1968-69		230
1969		268	1210.5	1969-70		305
1970		320	1441.2	1970-71		351
1971		365	1676.6	1971-72		371
1972		466	2000.9	1972-73		519
1973		556	2462.0	1973-74		589
1974		602	2598.4	1974-75		650
1975		628	2818.9	1975-76		802
1976		702	3104.8	1976-77		952
1977	13.8	767	3452.0	1977-78	13.8	1007
1978	13.8	835	3785.0	1978-79	13.8	1069
1979	13.8	982	4216.4	1979-80	13.8	1228
1980	13.8	1093	4669.4	1980-81	13.8	1366
1981	13.8	1206	5171.0	1981-82	13.8	1507
1982	13.8	1330	5706.6	1982-83	13.8	1663
1983	61.9[c]	1468	6297.6	1983-84	661.9[c]	1835
1984	661.9	1620	6949.8	1984-85	661.9	2025
1985	661.9	1788	7669.6	1985-86	1261.9	2235
1986	1261.9	1973	8464.0	1986-87	1261.9	2465
1987	1261.9	2177	9340.6	1987-88	1261.9	2721

(a) Capacity additions and changes must be made by May 31 to be considered in effect at the time of summer peak.

(b) Capacity additions and changes must be made by November 30 to be considered in effect at the time of the winter peak.

(c) Assumes ownership of 48.1 MW of the nuclear unit St. Lucie No. 2 by 1983.

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4.0 ALTERNATIVES

REA has examined various alternatives available to Seminole to meet the projected need for increased power. Alternative forms of operation and load reduction were examined in relation to the National Energy Policy Act. In part the Act calls for decreased use of oil and natural gas for electrical generation and an increased effort to reduce consumption of electricity.

Alternatives considered in the process of decisionmaking included alternatives to generation, energy source alternatives, power plant site alternatives, power plant facility alternatives and electric transmission alternatives.

The alternatives in Chapter 4, description of the environment of the areas to be affected by the proposed project in Chapter 5 and environmental consequences in Chapter 6 have been condensed from the "Site Certification Application and Environmental Analysis, Seminole Units 1 and 2" prepared by Dames and Moore, environmental consultants.

Additional detail and supporting documentation may be obtained by consulting the "Site Certification Application and Environmental Analysis" which was distributed with copies of the Draft Environmental Impact Statement.

4.1 Alternatives Not Requiring New Generation

4.1.1 No Action

Presently, more than 90 percent of the power obtained by Seminole for delivery to member cooperatives is purchased from investor-owned utilities under rate tariffs rather than guaranteed purchase power contracts. At a time when the power supply in the area has little margin for accommodating the increased demands on electric utilities, Seminole and REA are concerned that Seminole's heavy reliance on the power supplies of others risks the availability and reliability of supplies needed by member cooperatives.

To meet the growth experienced by member cooperatives, the Power Requirements Study approved by REA concludes that a combination of purchase power and generation owned by Seminole is the optimum power supply alternative. If the proposed project was not constructed, either (1) Seminole's electrical needs would be supplied by the construction of new generating capacity by other utilities, thus risking reliability of future supplies and losing the benefits of substantial costs savings to member cooperatives to be accrued from the project or (2) growth within the area served would, by necessity, be curtailed. Other secondary effects which may result from "no action" on the project include: increased unemployment in the area; increased possibility of an area wide system failure; and substitution of natural gas and oil for electrical energy by consumers served by Seminole.

4.1.2 Load Management and Energy Conservation

While Seminole and its member distribution cooperatives have recently been experiencing load growth which exceeds national trends, they and REA are aware of the need to reduce the growth rate. The effects of significant voluntary conservation efforts have been included in Seminole's forecast of load demand and energy requirements.

Seminole and its member cooperatives are encouraging energy conservation and reduction of peak loads (which may reduce the need for additional generating capacity) by such methods as off-peak use of appliances and proper home insulation.

Load management and energy conservation programs are being studied and are still in the early stages of development. Such efforts receive full support and encouragement from REA. REA urges its borrowers to:

1. Eliminate promotional activities which tend to encourage greater uses of energy. This would include off-peak as well as on-peak usage.

2. Direct promotional efforts toward the conservation of energy by discouraging wasteful and unnecesary uses of energy. These activities would encourage improved efficiency in energy-consuming devices, better insulation in buildings, cutting off heat and power uses in unused spaces, and higher and lower thermostatic settings for cooling and heating devices, respectively.

3. Take steps, where appropriate, to encourage substitution of less scarce fuel such as coal, lignite, and nuclear for the more critical fuels such as petroleum products.

4. Examine rate structures and pricing policies (1) with a view toward eliminating promotional-type rates which would tend to encourage greater uses of energy, and (2) which would tend to encourage conservation of energy.

The proposed actions by Seminole are consistent with the objectives of the National Energy Act concerning conservation and fuel efficiency. The availability of additional reliable and economical electrical power supply will encourage consumers to switch to electric power as a source of energy and away from petroleum and natural gas energy sources which are in relatively short domestic and world supply. While conservation efforts will reduce the nation's overall growth rate in energy usage, much of this growth slowdown will occur in petroleum and natural gas applications, while electric power will be called upon to meet some of the demand formerly satisfied by those fuels.

Many conservation and load management techniques show promise for reducing load and energy requirements. However, such benefits will not reduce Seminole's need for electrical power to a level which will obviate the need for the proposed two 600 MW units in the mid 1980's timeframe.

4.1.3 Joint Venture

Seminole has actively investigated the feasibility of participation in electric generation projects contemplated by other Florida utilities. Because of the lead time required for construction of electric generating stations, the only alternatives available to Seminole were those units already under construction and/or scheduled for completion in 1983 to 1985 timeframes. At present, Seminole has a 14 MW (1.7 percent) ownership in a 812 MW nuclear unit, Crystal River Unit 3, jointly owned with Florida Power Corporation and other municipal utilities. Other projects considered were (1) Tampa Electric Company, 425 MW coal-fired unit scheduled for 1985 (Seminole suggested increasing the capacity to 600 MW); (2) Florida Power Corporation, 600 MW coal-fired facility, Crystal River No. 4, scheduled for 1982; (3) Florida Power & Light Company St. Lucie II nuclear facility scheduled for 1983; (4) Florida Power & Light nuclear units identified as "South Dade"; (5) a proposed nuclear plant in central Florida; and (6) Deerhaven Unit No. 2 being constructed by the Gainesville Regional Utility Board and scheduled for operation in 1981.

While Seminole believes that a combination of jointly owned projects, purchase power and self-owned facilities is the optimum way to meet its members' power requirements, its efforts to coordinate with other utilities have been unfruitful for the most part. Seminole will continue to explore the feasibility of participation in a number of long-range projects. Tampa Electric declined Seminole's proposal for an increase in the size of its proposed 425 MW coal-fired unit. Tampa Electric's needs precluded Seminole from securing a portion of the 425 MW capacity. Florida Power Corporation has decided that its Crystal River No. 4 unit will be wholly owned (operation in 1982), and the possibility of joint participation in the Crystal River No. 5 unit is highly unlikely. Seminole is negotiating to acquire a 6 percent (48 MW) share of the St. Lucie II unit scheduled for operation in 1983. This proposed share is the result of entitlements arising from antitrust factors and it is highly unlikely that Seminole will be offered any additional portion of this facility. Florida Power & Light has cancelled its proposed South Dade units in which Seminole had joined in litigation to achieve participation in that project. A joint nuclear project in central Florida is remote at this time (1990 at the earliest). Due to the cost involved, Seminole decided against participation in the Deerhaven Unit No. 2.

While Seminole will continue to pursue the feasibility of joint projects, it does not appear that this avenue will provide sufficient power to Seminole's consumers in the timeframe of the proposed project. REA has tentatively determined that the two proposed 600 MW units scheduled to begin operation in 1983 and 1985, respectively, represent the most reliable, economical and environmentally acceptable means to meet the needs of Seminole's members.

4.2 Generation and Fuels

A range of alternatives is available for power generation, but it is necessary to impose restrictions in order that realistic comparisons can be made. Seminole has determined, in power supply studies acceptable to REA, that additional

capacity is needed in 1983 and that that capacity should be supplied by self generation. The amount of generating capacity required and timeframe established are two important constraints against which all alternatives were judged. Alternatives considered include:

4.2.1 Nuclear Fission

In most current state-of-the-art nuclear reactors, the heat released by nuclear fission is used to create steam, which then drives a turbine generator producing electricity. Licensing and construction of nuclear units takes from 10 to 12 years. The nuclear alternative was eliminated due to the long lead time involved, the substantially increased land and water requirements and the complexity of a solely-owned nuclear facility for a utility such as Seminole.

A nuclear unit could not be available by 1983 with engineering design and environmental evaluation taking place now. However, a portion of Seminole's future load requirements will likely be met through the utilization of participation in nuclear power facilities.

Nuclear plants are well suited for continuous base load operation. Seminole has taken steps to participate in nuclear generation. Seminole has obtained a share of Crystal River Unit No. 3, and anticipates that it can obtain a share of the St. Lucie II facility. Seminole is willing to consider participation in other planned nuclear facilities.

4.2.2 Nuclear Fusion

It is unlikely that a demonstration fusion plant will be built much before 1990, with commercial operation not likely for some time after that. Fusion could not therefore be considered a viable alternative to meet projected generating requirements in 1983.

4.2.3 Fossil-Steam Electric

A fossil fuel-fired, steam-electric generator utilizes the heat formed by the combustion of a fossil fuel (coal, oil, natural gas) to generate steam, which then drives a turbine generator producing electricity. This is the preferred alternative.

4.2.3.1 Oil and Natural Gas

Oil and natural gas are clean burning fuels that produce little air pollution, but the supply situation and increased prices no longer make them attractive for electric power generation. Energy legislation now prohibits natural gas and oil use in new base load power generation. The construction cost advantages of oil or natural gas-fired generating stations as compared to coal-fired generating stations would be offset or exceeded by increased fuel

costs and the need to curtail the use of oil and gas for such generation. The increased use of coal to generate electricity will help reduce unnecessary dependence on foreign oil. A detailed evaluation of an oil or natural gas-fired plant was deemed unnecessary primarily for the fuel-related reasons stated above. For this same reason, the use of gas or oil-fired combustion turbines or combined cycle units to meet the projected capacity and energy requirements of Seminole has been eliminated.

4.2.3.2 Coal

Various grades of coal can be considered as fuel for a coal-fired power generating station. These include lignite, bituminous and anthracite. Bituminous coal is most readily available and in greatest supply. Seminole has actively negotiated with several coal suppliers within the United States. Seminole explored the availability and feasibility of these types of coal and various geographic areas where supplies are available. As a result of studies of the alternatives available, bituminious coal from southern Illinois, Kentucky and Tennessee was evaluated for use in the proposed units. At present, Seminole anticipates that most of the fuel supply will be obtained by long-term purchase agreement from existing mines in southern Illinois and western Kentucky. Long-term purchase agreements offer the most reliable and economical fuel supply arrangement. Seminole has negotiated a long-term purchase agreement, the effectiveness of which will be subject to further review by REA after the procedures required by the National Environmental Policy Act have been complied with. Seminole shall have the right to terminate the agreemment in the event REA does not approve the proposed generating units and the agreement by June 30, 1980.

The coal under negotiated contract will have the following range of specifications:

Coal Property	Specification Range
Moisture	8.0%-10.0% maximum
Ash	8.5% maximum
Sulfur	2.75% maximum
Heat Content	11,700-12,500 Btu/lb. minimum
Ash, Fusion (Fluid temperature reducing)	2,200°F minimum
Grindability	50-60 Hardgrove
Chlorine	0.3% maximum

Alternative coal delivery modes consisted of rail, barge, truck and slurry pipeline. The use of trucks to deliver the large amounts of coal needed by the plant over the long distance from mine to plant makes this mode uneconomical. Participation in a jointly-owned coal slurry pipeline was considered unfeasible to provide the needs of the plant by 1983. Barge delivery by water routes was not attractive because of the additional cost resulting from transloading of the coal among barge and rail carriers at points along the route from the mine to the plant site on the St. Johns River. At the present time, it is anticipated

that coal will be transported under contract from the mines to the plant site by rail. A rail line is located adjacent to the western edge of the site. Rail facility construction will be limited to an on-site rail spur and a loop track for coal unloading.

4.2.4 Other Forms of Fuel and Generation

Alternatives of coal gasification to produce a clean burning gas, wood, solar energy, wind power, magnetohydrodynamics (MHD) generation, and fuel cells have been considered by Seminole for base load generation in the timeframe of the proposed units (1980-1985). Seminole and REA concluded that the above alternatives do not have the technical and economic feasibility and viability within the considered timeframe and were, therefore, eliminated from further study.

Hydroelectric and geothermal power generation were also considered by Seminole. Due to the lack of feasible sites capable for development within the considered timeframe, these alternatives were eliminated from further study. REA concurs in the elimination of these alternatives.

4.3 Alternative Plant Sites

A two phased site selection process involving Federal, State and local agencies and the public, was used to identify a preferred site to the contemplated units. The first phase of the investigation involved the identification and screening of locations which appeared most favorable for further detailed study. As a result of this evaluation, four potential site locations were identified. The second phase involved discriminating among the four sites and selecting one as preferred. (Florida law requires that Seminole designate one of the alternative sites as "preferred.")

Phase One criteria for the selection of suitable locations included: adequate water, reasonable transportation access, air quality, sensitive areas, prime farmland, land use and reasonable transmission access to the Seminole service area. Applied as exclusion criteria, data on the above criteria were accumulated on overlay maps. Initially, 53 36-square mile areas were identified. These areas were screened to 11 locations. A more complete and detailed set of weighted criteria was applied to the group of 11 locations using a group-consensus-among-specialists approach coupled with cursory site inspections. The eleven locations were grouped into three categories based on desirability. The most recommended group consisted of (1) Bostwick (now called "Putnam"); (2) Bradford (Suwannee); (3) Bushnell (Sumter); and (4) Satsuma.

Following recommendations of Phase One, Seminole located specific parcels of land within the search areas which conformed to engineering and economic assumptions for operating two 600 MW coal-fired units. Options were obtained for these properties to enable site specific evaluations to take place.

Dames and Moore, environmental consultants, was retained to conduct Phase Two. The preliminary environmental analyses of the four sites were designed to discover any situation that would result in unacceptable environmental impacts as a result of constructing and operating a coal-fired generating station and/or constitute a condition making successful licensing of the proposed project unlikely.

Field studies were conducted covering air quality, surface and ground water hydrology, terrestrial and aquatic ecology, land use and geology/geotechnical characteristics of the sites.

As an integral part of the site evaluations, scoping meetings were held involving Federal, State and local agencies and the general public. The scoping meetings were held in the vicinity of each of the sites and opportunities for field inspections were available. Comments as a result of these meetings were fully considered in the site evaluations.

In July 1977, results of the Phase Two evaluations indicated that no environmental or licensing problems at the Putnam site were apparent that could not be mitigated and thus would jeopardize the use of this site for power generation. Consequently, Seminole designated the Putnam site as the preferred site.

A comparison of the ecological, hydrological, geotechnical, air quality and land use characteristics of the four potential sites is presented in Table 4.1.

4.4 Power Generation Plant Facilities

4.4.1 Site Utilization

The design and layout of facilities on the preferred Putnam site were influenced significantly by "Environmental Site Layout Guidelines" and from comments of cooperating agencies solicited through the medium of the "Interim Report" published March 1978, midway in the preparation of the Environmental Analysis.

The "Interim Report", transmitted to cooperating agencies in April 1978 was provided to (1) coordinate environmental licensing activities and engineering design, (2) ensure regulatory compliance requirements were incorporated early in engineering design process and (3) assure adequate and orderly opportunity for participation of state and Federal agencies in decisionmaking.

The Interim Report consisted of an overview and update of project activities; discussion of the integration of environmental studies and engineering design; the identification of site specific issues and environmental conditions affecting plant design decisions; and a brief status review of ongoing studies.

The integration of environmental studies and engineering design is uniquely presented as "Environmental Site Layout Guidelines." The guidelines are in the form of recommendations for the onsite arrangement of plant facilities and

appurtenances. They are based on site-specific findings of environmental conditions. The recommendations were implemented in site design.

Figure F4.1, Site Environmental Zone Map, identifies three zones within which certain plant facilities should be placed to optimize the use of site landforms and features to mitigate environmental impacts. A brief explanation follows:

Recommendation 1: Ash and sludge disposal should be confined to Zone A.

Ash and sludge disposal should be confined to Zone A on the basis that groundwater flow is predictable and is in one direction (down/slope toward the north) where few residents are located. Zone A soil is better suited to mitigate movement of waste material leachate than other areas, and this zone will require less site preparation work to confine the wastes should that become necessary. The drawbacks of this area are that it is relatively low, considered flood-prone and is designated a "preservation" area in a coastal zone management atlas. Although this lowland is periodically inundated, the frequency of occurrence is not such that it is likely to be an important aquatic or wetlands resource. This lowland has been extensively disturbed by logging activities, is not located near waterways, and does not contain any critical or unique habitat.

Recommendation 2: The most desirable location for coal storage is in Zone A; the second best area is Zone B.

Coal should be stored in Zone A with Zone B as a possible alternative. Zone B would be acceptable since it has soil types which would mitigate leachate movement and runoff. However, the direction of runoff is more unpredictable than for Zone A.

Recommendation 3: Avoid placing contaminant-contributing facilities on the south slopes of the site.

The southern slopes of the site would be a poor choice for facilities where leachate is likely because most of the residences in the area are located south of the site. Contamination of wells in the water table aquifer may be possible.

Recommendation 4: Heavy structures should be located on flat areas; Zone C is most desirable; Zone B is second-best.

Zone C would be the best site for heavy structures since this area is flat and would require the least amount of earthwork, pose less chance of differential settlement, and lessen construction impact and costs.

Recommendation 5: Maintain maximum distance between cooling towers and local highways.

It is desirable to maintain a separation of 2000 feet or greater between cooling towers and local highways to reduce the potential for safety-related fog development. Cooling towers should also be separated from switch yards to prevent possibility of corrosion and flashover.

Recommendation 6: Maintain 300-foot wide buffer zones around site, particularly along west side of site near Highway 17.

A 300-foot buffer zone with trees should be maintained around the site to significantly attenuate construction and operational noise. The buffer zone also will provide visual screening.

Recommendation 7: Maintain flexibility with regard to location of the intake/discharge pipeline corridor.

The final intake/discharge pipeline corridor selection should be made only after environmental studies have been conducted on the abundance and distribution of fish eggs and larvae, the terrestrial ecology of the corridors, and the archaeological and historic characteristics of the corridors.

4.4.2 Fuel Handling and Transportation

Approximately 3,262,000 tons of coal will be required by the plant annually. To transport this amount of fuel from the mines in Western Kentucky and Southern Illinois will require large capacity carriers. Rail and barge carriers are the most viable options. Direct barge delivery from mine to the site is not attractive because of the requirements for dredging access to the site, navigational improvements, and the engineering and cost requirements for barge unloading and coal conveyance facilities.

Rail access is readily available at the site. Delivery may be made entirely by rail from the mines or in combination with barge transportation at points along the route. Barge-rail and rail-barge-rail are options, but appear to be uneconomical at the current time.

4.4.3 Flue Gas Emissions Control

The air emissions control system consists of three parts: flue gas desulfurization, particulates control and nitrogen oxides control.

4.4.3.1 Flue Gas Desulfurization

The alternative FGD systems have been analyzed on the basis of proposed New Source Performance Standards of 85 percent SO_2 reduction and an

emission limitation of 1.2 lbs. of SO_2 per million Btu of heat input. Three types of FGD systems were primarily studied: non-regenerative limestone scrubbing, non-regenerative lime scrubbing and regenerative systems. They have been analyzed on the basis of being able to meet the 85 percent reduction standard on a 24-hour basis, proven availability and reliability, environmental impact potential, and cost.

Regenerative systems produce a potentially marketable product and a relatively small amount of waste material. Depending on the process used, the by-product may be sulphur or a sulphur compound such as calcium sulfate or sulfuric acid. Although the regenerative system produces significantly less wastes and requires only a fraction of the amount of reactant used by non-regenerative systems, the regenerative system is very expensive in capital and operation (power consumption) costs. Additionally, because regenerative systems are new, their reliability has not been established and the market for their by-product is uncertain. On the basis of the increased expense, lack of established reliability, and uncertain by-product marketability, Seminole chose not to propose a regenerative system.

Non-regenerative systems use relatively large amounts of relatively inexpensive reagents that react with SO_2 in the flue gas. The disadvantage of these systems is that the reagents are only used once and the wet solid waste material must be disposed of. Of the non-regenerative systems, only those using limestone or lime have proven reliable for higher sulfur coals. However, some past installations utilizing lime scrubbing have experienced mechanical problems and plugging affecting reliability. As a result, non-regenerative limestone scrubbing has been selected as the preferred alternative.

4.4.3.2 Particulates Control

Possible emissions controls include electrostatic precipitators, baghouses, cyclones, and combined flue gas/particulate scrubbers.

The proposed alternative is the use of electrostatic precipitators which are the most widely used and proven method for higher sulfur coals to meet specifications of at least 99.6% removal efficiency and comply with 0.03 lb/MBtu Federal New Source Performance Standards. In this process suspended fly ash particles are electrically charged, collected in an electrical field, removed as precipitated ash from the collecting electrodes and disposed of.

A baghouse operates in a manner similar to a vacuum cleaner. Flue gas is forced down through high tubular bags. Baghouses are excellent particulate removers although they are generally used on smaller units and with low sulfur coals. No baghouse of suitable size has sufficient operating experience to prove reliability and availability for higher sulfur coals. Drawbacks with this system include high pressure drops, bag replacement, and higher maintenance costs, given the type of coal to be used.

Cyclones generally cannot provide the degree of particulate removal required to meet current emissions standards.

Combined flue gas/particulate scrubbers may achieve the removal efficiency of electrostatic precipitators or baghouses. However, industry experience to date with this combined system has been limited.

4.4.3.3 Nitrogen Oxides Control

The only proven method of limiting NO_x emissions is to control the combustion process. The boiler will be guaranteed by the manufacturer to limit NO_x emissions to meet Federal NO_x emission limitations of 0.6 lb/MBtu by the use of special oxygen limiting burners to control combustion temperatures.

4.4.4 Heat Dissipation

Three major types of cooling systems which were evaluated include: once-through with and without topping towers, wet-tower evaporative, dry-tower evaporative, and the wet-tower evaporative cooling method selected for the proposed plant.

Once-Through

Once-through cooling is accomplished by passing the cooling water through the condenser and then returning the heated water back to the water source at a point remote from the intake. This type of system requires between 500,000 and 600,000 gpm water use, and returns the water at 15 to 22 °F (8 to 12 °C) higher temperature than the inlet conditions. A once-through system at the Putnam site would likely cause significant impacts to the aquatic environment of the St. Johns River. Modeling of this alternative's effects indicated that once-through cooling would not be able to comply with Florida water quality standards. Use of topping towers would alleviate but not negate the discharge temperature problem.

Wet-Tower Evaporative

Hot water from the condenser is pumped to the top of a cooling tower where the heat is dissipated by evaporation as the water falls through the tower fill and returns to the tower basin. Air flow through a wet-tower can be either by means of a mechanical fan, or a natural draft circulation. Cooling towers generally require significantly less water to be circulated through the condenser than is required in the once-through system.

The evaporative system is a closed system, with the water continuously recirculated. However, water is lost by evaporation, which increases the concentration of dissolved solids within the system. Increased solids induces fouling of the condenser tubes and reduces the effective heat transfer within the condenser, thereby reducing plant efficiency and maximum output, and increasing fuel consumption.

To limit the buildup of the concentration of dissolved solids in the towers, a portion of the recirculating water is drawn off and discharged as blowdown. The volumes of water lost from the cooling tower system through evaporation, drift and blowdown are replaced by withdrawals from the source body of water. Water consumption with this cooling method, including all plant uses, would likely range between 12,000-15,000 gpm for a 1200 MW plant. While the amount of water consumed is greater than once-through cooling, the total amount of water needed for cooling is considerably less because the cooling water is recirculated when using a cooling tower. An advantage of this system is that the plant can be economically located at a greater distance from its water supply. The blowdown water can also be used for ash sluicing and other plant uses. Both mechanical and natural draft towers represent proven technology. Use of this alternative has an aesthetic impact resulting from the approximate 450 foot height of the requisite structures. The natural draft alternative has been proposed due to operating reliability and cost considerations.

Dry-Tower Evaporative

Dry cooling uses an air cooled condenser to remove heat from the turbine exhaust steam. This method requires the least amount of water, but capital costs are approximately six times more than the wet-tower evaporative system. A dry cooling system would consume approximately 750-1500 gpm for a 1200 MW plant. A dry system does not require makeup water since air is the cooling medium. The only water consumption is that required for condenser "pre-spray" at high ambient air temperatures and for other plant uses. This system also requires higher condenser pressures than the others, which result in a loss of efficiency and generating capacity.

The higher condenser pressures and loss of efficiency could result in more coal consumption in order to maintain the same plant output available with the other cooling methods. The fuel and capacity factors for the dry system would be approximately +10 percent and -13 percent, respectively. The increased fuel consumption results, of course, in increased stack emissions. There is presently only minimal use of dry cooling in the United States for central station generation.

4.4.5 Intake/Discharge Pipeline Corridors

Prospective pipeline corridors were identified by Seminole and its consultants on the basis of (1) distance from the St. Johns River navigational channel to avoid barge and boat interference by intake and/or discharge structures, (2) distance between the site and discharge and intake points and (3) proximity to residences. A single narrow corridor appears to be the most environmentally desirable alternative as it confines the area of intrusion and minimizes the amount of land that needs to be utilized. Corridors A, B, and C (shown in Figure F4.2) have been extensively analyzed, including studies of terrestrial ecology, a thorough water sampling program, and an archeological reconnaissance.

The results of the studies indicate that Corridor A is preferred by Seminole on the basis of aquatic and terrestrial biology, land use, archeology and economics. A summary of the relative merits of each corridor is given in Table 4.2. Seminole has selected option A as the preferred alternative for the proposed project.

4.4.6 Intake Structures

Federal law requires that "the location, design, construction, and capacity of cooling water intake structures reflect best technology available for minimizing adverse environmental impact." The mesh size of screening and the intake water velocity through the screens are major factors in determining the number and sizes of fish that will pass into the structure or be trapped on the screens. Only fine-mesh screening, about 0.5 mm, may keep eggs and larvae of certain small fish from passing through. Such a size, however, may not be practical to use because of the likelihood of fouling. Additionally, an intake water velocity of less than 0.5 ft./sec. would probably be needed to protect larvae from being entrapped on the screens. To balance the feasibility and cost of intake structures and the capability of "minimizing adverse environmental impact", six intake structure designs were evaluated for the proposed station.

The first intake design was a conventional intake with standard traveling screens. To aid in fish protection, "flush mounting" of screens and escape passages can be provided. This is a proven reliable design and the shoreline location of the intake structure would make it less visible to river residents. However, of the screen designs considered, it is the one least likely to mitigate entrainment impacts in the Putnam Site area.

The second alternative was generally the same as the first but with the traveling screen modified with a Surry-type, dual-spray fish recovery system. This alternative is believed to be only slightly better from a biological viewpoint than the preceding one, and it is more complex and costly.

The third scheme, was a perforated (or wedge-wire) pipe offshore intake, with pump structure onshore. This scheme has advantages of not requiring dredging or confined channels that may trap fish, assuming water depth offshore is sufficient. It has a proven record of reliability, traveling screens are not required, and it was second best biologically. However, most experience with this design is in fast flowing water. Visible barriers must be placed offshore to protect both the screens and passing boats, mechanical design is more complex, and maintanance may be difficult if small screen sizes are used.

The fourth option was a perforated (or wedge-wire) pipe shoreline intake. A dredged channel would carry water to shore similar to the first two alternatives. This is the third most desirable design biologically. However, it has no history of use except at a test facility.

The fifth scheme was a radial well system. The radial well is a horizontal version of a vertical water well. Water is drawn into it from the river bed at very slight velocities, and consequently it is the most biologically preferred

alternative. It causes minimal environmental disruption during construction as coffer dams or dredging are not needed, and this system has been in reliable service for many years. However, it can be used only if a suitable aquifer is located. The soils and geology beneath the river are not suitable for use of this alternative at the site.

The last option, six, was a cylindrical wedge-wire screen intake. The intake would consist of a 25 foot diameter cofferdam on which will be mounted about 9 cylindrical screens of wedge-wire. Mesh width will be between 1 and 2 mm. Aquatic tests have demonstrated that both the 1 mm and 2 mm submerged screen design have superior environmental characteristics. The intake is designed for an approach velocity of less than 0.5 feet per second. It will be located about 325 feet offshore. Advantages are low capital cost, mechanical simplicity and capability to minimize impingement and entrainment of aquatic organisms. Option six is the preferred alternative.

4.4.7 Discharge Structures

A single discharge pipeline will be used to carry cooling tower blowdown and discharges from the wastewater treatment system to the St. Johns River. The two basic alternatives considered vary as to discharge point with respect to the shoreline. The preferred discharge point is located 900 feet offshore approximately 150 feet downstream of the intake structures. The discharge pipe nozzle will be directed away from the river bottom at an angle of 20 degrees to minimize scour. Additionally rip-rap will be placed on the river bottom in the vicinity of the discharge nozzle to prevent entrainment of sediments. Discharge velocities will be between 10 and 15 fps at the nozzle to cause rapid dilution of the discharge and minimize the size of the mixing zone. To minimize land use for pipelines, a single narrow corridor containing both intake and discharge pipes will be used.

Single and multiport discharge diffusers were considered, but all test model runs showed that a single port, high velocity discharge assured proper dilution.

4.4.8 Chemical Wastes System

The proposed chemical wastewater treatment system provides for neutralizing strong wastes at the source, separating oil before pumping, collecting and equalizing wastes, then adjusting and reducing remaining oil, heavy metals, and suspended matter by coagulation and sedimentation before monitoring and release.

Alternatives include a number of small, labor-intensive batch treatment systems which would probably reduce total system reliability. Well water pretreatment wastes sludge from the softening clarifier could be treated locally. However, the complexity of such a system for the small quantities of water intermittently involved would make the process impractical and perhaps less reliable than the alternative system. Filter backwash water could be handled in a similar manner, but the same difficulties apply. The system for makeup demineralizer system

wastes could be consolidated with batch facilities in the well water pretreatment system. However, that system is remote from the makeup demineralizer system and would require an additional wastewater line that might be used only two to three times per week. Bottom ash sluice wastewater could be discharged to the flue gas desulfurization system rather than handled at the central wastewater treatment facility before release. However, such an alternative may lead to salt-saturated recirculated sluice water. That condition could interfere with operation of the FGD system in the form of plugging and scaling of the water spray system.

4.4.9 Solid Waste Disposal

Seminole proposes to dispose of dry fly ash, wet bottom ash, and flue gas desulfurization sludge at the north end of the site. Five methods of disposal were considered: (1) ash and sludge to unlined ponds; (2) ash and sludge to lined ponds; (3) sludge dewatering and mixing with ash to produce stabilized cake; (4) chemical stabilization to improve handling characteristics of the stabilized cake; and (5) a combination of options 3 and 4. Use of a sludge stabilization option would require the use of about 1200 gpm of makeup water for the FGD system, while the adoption of a ponding system option would require at least 2000 gpm for the FGD system.

The ash and sludge to unlined ponds option would place a 70 percent water mixture containing fly ash and sludge in an unlined pond at the north end of the site. Wet bottom ash would be disposed of in a separate unlined pond. This most probably would be the most economical solution, but there are potential significant groundwater impacts. Leachate from waste produced in the burning of coal is expected to contain varying amounts of trace elements. While the Floridan Aquifer is protected by an impermeable layer of material, the shallow water table aquifer is not so protected. The soil characteristics of the site would permit leachate drainage into this aquifer. Field studies indicate that leachate entering the shallow water table may eventually enter and impact on Cedar Creek and the St. Johns River into which it flows. The trace element composition of the ash and sludge and leachate will depend on the specific source of both coal and limestone. This data is not presently available although Seminole is planning on Southern Illinois, Western Kentucky coal. However, even within that basin trace element composition may vary widely. The potential for adverse environmental impact weighs heavily against this alternative.

The second option explored was ash and sludge to lined ponds and is identical to the first alternative except that a clayey material is used to line the ponds. This will eliminate or largely mitigate seepage. On the other hand, clayey materials are not on site and would have to be transported from a considerable distance. As with the first alternative, diking would be required. Lining of the ponds would make more water available to the flue gas desulfurization system. The FGD would need less makeup water obtained from cooling tower blowdown. As a result more cooling water blowdown would be discharged to impact on the St. Johns River.

The third alternative consists of dewatering bottom ash and mixing it with fly ash and scrubber effluent to create a semi-solid stabilized cake consisting of 50-60 percent solids. This material is easier to handle than the first two alternatives, and the volume of waste material will be reduced by 40-50 percent. Makeup water requirements would be reduced to 1200 gpm. The material would be landfilled at the north end of the site. It is presently unknown whether this material would produce leachate if exposed to rain. If it does, an impermeable liner would be required. This method is relatively costly since a special processing plant must be constructed and maintained. As discussed in the second alternative, less cooling tower blowdown would be needed by the FGD system. Consequently, more water (estimated at 800 gpm) would be discharged into the St. Johns River.

The fourth alternative would involve a process almost identical to the third option with one important variation. A chemical fixation agent would be added to the ash and sludge mixture to produce a solid material with high compressive strength, high chemical stability so that virtually no leachate would be created by rainfall, and low permeability. The effects of this alternative are essentially the same as for the third one with a few important differences. For the fourth alternative, the landfill can be covered with soil and planted with native vegetation creating the possibility of later alternative land use. Leachate would also be virtually eliminated. The cost of chemicals would be mitigated by the lack of need for a liner.

The fifth option, a combination of alternatives 3 and 4 is preferred As in alternative 4, chemically fixed ash and sludge will be used to line the bottom and sides of the disposal area. After fixation, semi-solid stabilized cake, as described in option 3, or the chemically stabilized sludge, as in option 4, would be placed in this lined area.

A test program, during which surface water runoff and leachates will be monitored, will be conducted to determine which pozzolanic technology should be employed and, to determine the optimum use of alternate layers of stabilized and unstabilized sludge to achieve a structurally stable and environmentally suitable disposal area.

4.4.10 Station Service Water

There are three potential water sources at the Putnam Site: the St. Johns River, the Floridan Aquifer, and the water table aquifer. The proposed alternative is (1) use of the St. Johns River for the makeup water needs of the heat rejection system, air preheater and boiler fireside wash and (2) use of the Floridan Aquifer to supply other station water requirements such as fire protection, potable water, boiler water makeup and miscellaneous uses.

Three other alternatives were considered: (1) supplying <u>all</u> water requirements from wells drilled in the Floridan Aquifer, (2) supplying all water from the St. Johns River, and (3) supplying potable and boiler makeup water from the shallow water table aquifer which overlays the Floridan Aquifer. The first alternative would cause a severe drawdown to the Floridan Aquifer and potentially increase salt water intrusion. The second option is inferior because water quality is

quite variable in the river and of poorer quality than the Floridan Aquifer. This would necessitate extensive treatment facilities and create quantities of water waste to supply the potable and boiler makeup needs of the station. The third alternative possesses the same disadvantages as the second option. In addition, the shallow water table may not be a sufficient source of water to supply the stations' potable and boiler makeup needs over a sustained period.

4.5 Transmission Corridors and Facilities

4.5.1 Transmission Corridors

Transmission lines generally create two types of impacts, construction-related and operation-related. Construction impacts include vegetation clearing, noise and dust, erosion due to vegetation removal and influx of construction workers. Operation impacts include possible noise from the line, radio and TV interference, visual intrusion of towers and lines, removal of right-of-way from habitat and other land uses and maintenance of right-of-way. When these impacts cannot be avoided, careful corridor selection, good engineering design, and sound construction practices can mitigate the adverse environmental impacts.

To identify corridor alternatives to tie the Putnam site into the power grid, Seminole, in cooperation with other Florida utilities, conducted a loadflow analysis of existing transmission and projected future transmission and generation needs under various voltage conditions. In the joint study, seven basic transmission alternatives were considered. Three of the alternatives were eliminated because they involved 500 kV transmission, and no other 500 kV transmission is planned in the area of the plant site as a tie in. There is no electrical need for a 500 kV line which would justify the cost of a 500 kV line, supporting structures would be larger and more visually intrusive, and the decision to propose 230 kV transmission was made only after joint planning with other Florida electric utilities. An alternative of 230 kV double circuit from the plant site to Putnam and to Fort White was eliminated for electrical reasons (as shown in load flow studies). The remaining three alternatives consisted of combinations of the following three routes:

Route 1: 230 kV double circuit from Seminole Plant to Putnam
Route 2: 230 kV double circuit from Seminole Plant to Silver Springs
Route 3: 230 kV double circuit from Seminole Plant to Columbia, with single 230 kV circuits from Columbia to Fort White and Suwannee

With these tie points in mind, a corridor selection evaluation was conducted to connect the potential tie points to the Seminole generating site in a manner that would minimize adverse environmental impact. Exclusion area mapping was employed to call attention to areas that were particularly susceptible to serious impact. These criteria included Federal, State and local parks, sites on the National Register of Historic Places and critical habitat for threatened and endangered species among others. Next, limited use areas were mapped on the basis of socioeconomic, environmental and engineering criteria. Examples of

these factors are planned open space, urban areas, intersections of major highways, extensive wetlands, open water where waterfowl may be present, sinkholes, and areas requiring more than 1500 ft. spans. In Florida sinkholes and marshes are hard to avoid because of their frequency. The evaluation also encouraged the use of existing right-of-way (ROW).

Several alternative corridors were identified for Routes 1, 2, and 3 on the basis of:

1. Following existing transmission line ROW where possible.
2. Avoiding restricted areas, unless an existing transmission line already crossed such an area.
3. Avoiding, where possible, limited use areas, unless an existing transmission line already crossed such an area.
4. Avoiding numerous turns and spans of over 1500 feet.
5. Using the most direct routes available.

Each of the corridor alternatives will accomplish the goal of transmitting power from the Seminole generating station to the Florida bulk power electrical grid. However, for each of the routes, certain alternatives have fewer environmental problems and cost less. Each of the potential corridors was examined on the basis of environmental, cost, and socioeconomic factors. The results of these studies are summarized in Table 4.3. The alternative corridors for the three routes are shown in Figures F4.3, F4.4 and F4.5 with the preferred alternatives shown in Figure F4.6.

For Route 1 there are relatively minor differences between the alternatives. While AB'C is shorter, ABB'C, the preferred route, uses more existing right-of-way. The principal advantage of ABB'C is that it is adjacent to an existing Florida Power and Light line crossing the St. Johns River. There are also fewer residences along this route.

A variation of alternative AB'BC is the preferred option for Route 2 because it crosses less populated areas, is shorter and has fewer angles and is not identified as suitable for development by the Marion County Comprehensive Plan. The variation from the specific AB'BC route was taken to avoid crossing the Silver River used by the Silver Springs tourist attraction. The variation would include using 12 miles of Clay Electric transmission corridor between Orange Springs and Fort McCoy, routing the corridor north of the Silver Springs resort and using Florida Power Corporation's 240 kV transmission corridor to cross eastern Ocala. This will reduce biological impact and effects on the tourist attraction.

Route 3 consists of three segments. From the plant site to Columbia ABCDEFHI, the preferred route segment, appears most prudent on environmental and cost grounds. It is one of the shortest routes, crosses relatively little marsh and swamp and uses existing transmission line corridors. Alternative ABEFHI is almost as desirable except a long length of new transmission corridor must be created.

From Columbia to Fort White, HGK seems preferable but only because it doesn't cross Ichetucknee Springs. From Columbia to Suwannee IJLMN is preferable because it is shorter and has fewer angles.

Use of Routes 1 and 2 seems the best combination. Route 3 requires the most new right-of-way, is the longest, crosses two towns and the most highways. The combination of Routes 1 and 2 is also best from an electrical standpoint because: (1) bulk power system reliability is enhanced, (2) the increase in total system losses for the bulk grid was the lowest of the alternatives studied and (3) the least transmission construction is required.

4.5.2 Transmission Facilities

Underground transmission facilities, although perhaps more desirable aesthetically than overhead lines, are not presently feasible. Technology for undergrounding a 230 kV line is limited at this time due to reliability, energy efficiency and many other problems. The few underground 230 kV lines already constructed are very short in length, and present construction costs would be at least ten times that of aerial construction. Environmentally, the right-of-way and visual impact would be less. However, there would be greater impacts to soil, water and vegetation because of the large amount of soil disturbed by the trenching operation. Reliability would be sacrificed since maintenance of underground line would be expensive and time consuming. Moreover, more soil disturbance would be required to repair the line. Potentially, leakage of insulating materials from an underground 230 kV line would create an adverse environmental impact, especially in underwater crossings.

Use of steel lattice structures proposed by Seminole will require fewer structures per mile than use of wooden structures, thereby creating fewer instances of visual impact.

The level terrain precludes the need for specialized construction methods such as the use of helicopters.

4.6 Preferred Alternatives

To supply Seminole's projected energy demands within the 1983 to 1985 timeframe, REA has determined that a 1200 MW (net output) coal-fired steam electric generating station is environmentally acceptable. Coal-fired generation will reduce the cooperative's dependence on natural gas and likely be less costly than oil generation. Environmental impacts of coal-fired generation can be reduced to acceptable limits by the application of existing control technology. REA has also determined that the environmentally preferable coal fired generating configuration will call for Seminole to construct the plant on the Putnam site and employ: rail delivery of coal; wet limestone flue gas desulfurization equipment for the removal of sulfur dioxides; electrostatic precipitators for the removal of particulates; an appropriately designed boiler to reduce nitrogen oxides; two natural draft cooling towers; an intake structure of mechanically-simple design using wedge-wire screening; an in-plant chemical

waste treatment system; on-site disposal of FGD sludge and ash after stabilization; groundwater wells to the Floridan Aquifer to supply water for station service and two double circuit 230 kV bulk power transmission line routes linking the generating station to Silver Springs and Putnam substations. In case Seminole is unable to connect to Putnam or Silver Springs, Route 3 to Fort White and Suwannee would become one of the two preferred routes.

Table 4.1

Environmental Comparison of
Four Alternate Sites

SITE	ECOLOGY	
	Advantages	Disadvantages
PUTNAM (Bostwick L-7)	1. No unique or critical habitat on site. 2. Onsite habitats disturbed by past activities. 3. No "wetlands" as defined by the U.S. Corps of Engineers occur on site.	1. 10 percent of site is wetland. 2. Gopher tortoise, a protected species, is found on site. 3. St. Johns River is inhabited by manatee, an endangered species.
SUWANNEE (Branford L-1)	1. A large portion of the site (about 70 percent) is pasture, crops, or pine plantation. Therefore, the development will cause little change of important habitat on the majority of the site.	1. Part of site (30 percent) is relatively undistubed habitat contiguous to the Santa Fe River. 2. Santa Fe River is a high-quality aquatic resource with an abundant sport fishery.
SUMTER (Bushnell L-6)	1. Highly disturbed by past quarrying activities.	1. None
SATSUMA (Satsume L-9)	1. Much of usable portion of the site has been disturbed by past and present logging/clearing	1. St. Johns River is inhabited by manatee, an endangered species. 2. Wetlands (300 acres) as defined by the U. S. Corps of Engineers occur on site, are relatively undisturbed, and are contiguous to navigable water

Table 4.1 (Continued)

SITE	WATER	
	Advantages	Disadvantages
PUTNAM	1. Adequate surface water source for cooling-cycle makeup (St. Johns River). 2. Adequate ground water source for plant water (Floridan Aquifer). 3. 80 percent (1,700+ acres) is at relatively high elevation and is not flood prone. 4. Proximity to adequate Point of Discharge (POD) of plant blowdown discharge.	1. Surface water source (St. Johns River) is relatively high in dissolved solids.
SUWANNEE	1. Adequate surface water source (Suwannee River or Santa Fe River, minimum flows 1,530 and 609 cfs, respectively). 2. Adequate ground water source for minor plant water (Floridan Aquifer). 3. Large portion (80 percent) of site is not flood prone. 4. Proximity of adequate receiving waters (minimum flows need to be $\geq$1,056); Suwannee River.	1. Limestone comprising the Floridan Aquifer is either exposed or covered by a relatively thin layer of clean sand. Therefore, Floridan Aquifer would be potentially exposed to leachate from coal/waste storage.
SUMTER	1. Adequate ground water source for minor plant water (Floridan Aquifer). 2. Site appears not to be flood prone.	1. Surface water sources are inadequate for cooling water makeup. Ground water may be adequate, but would result in a major stress on the resource. 2. Marginally adequate Point of Discharge would be the Withlacoochee River, 8.5 miles from site.

Table 4.1 (Continued)

SITE	WATER	
	Advantages	Disadvantages
SATSUMA	1. Adequate surface water source for plant cooling water makeup (St. Johns River). 2. Adequate ground water source for minor plant water (Floridan Aquifer). 3. 70 percent (700 acres) of site is not flood prone. 4. Proximity to adequate POD (St. Johns River).	1. Surface water source is relatively high in dissolved solids.

Table 4.1 (Continued)

SITE	LAND USE: Advantages	LAND USE: Disadvantages
PUTNAM	1. No high density residential areas are nearby. 2. Adjacent to rail transportation. 3. Adjacent to water transportation--St. Johns River barge channel. 4. About 50 percent of site designated "development." 5. No unique farmland on site.	1. About 50 percent of site designated "conservation/preservation."
SUWANNEE	1. No high density residential areas are nearby. 2. Adjacent to rail transportation. 3. No known conflicting land uses.	1. No access to water transportation.
SUMTER	1. No high density residential areas are nearby. 2. Adjacent to rail transportation. 3. No known conflicting land uses.	1. No access to water transportation.
SATSUMA	1. Adjacent to rail transportation.	1. No access to water transportation. 2. Several nearby fishing resorts. 3. Large nearby residential development.

Table 4.1 (Continued)

SITE	AIR QUALITY	
	Advantages	Disadvantages
PUTNAM	1. Ambient air quality is good. 2. Site is in a PSD Class II area. 3. Nearest PSD Class I area is Okefenokee National Park, over 100 km distant.	1. Duval County, 43 km from site, is a non-attainment area for particulates. 2. FP&L Palatka station source (13 km) and Hudson Pulp and Paper source (7 km) are competing emission sources; however, these are not situated in a straight line and would not be additive concurrently with proposed station.
SUWANNEE	1. Ambient air quality is excellent. 2. No existing nearby major emission sources. 3. Site is in PSD Class II area. 4. Nearest PSD Class I area is Okefenokee National Park, 80 km distant.	1. None
SUMTER	1. Ambient air quality is good. 2. Site is in a PSD Class II area. 3. Only one moderate-size emission source in area (Dixie Lime Company).	1. Class I PSD area, Chassahowitzka National Wildlife Refuge, is only 50 km distant, and could be impacted by station. 2. Polk County non-attainment area is 50 km from site and could be impacted.
SATSUMA	1. Ambient air quality is good. 2. Site is in a PSD Class II area. 3. Nearest PSD Class I area is Okefenokee National Park, over 100 km distant. 4. Nearest non-attainment area is Duval County, about 63 km distant.	1. FP&L Palatka Station (12 km) and Hudson Pulp and Paper (15 km) are competing emission sources; however, these are not situated in a straight line and would not be additive concurrently with proposed station.

Table 4.1 (Continued)

SITE	GEOTECHNICAL Advantages	Disadvantages
PUTNAM	1. Floridan Aquifer (primary source of potable water) protected by a thick, relatively impervious aquaclude, the Hawthorn Formation. 2. No evidence of solution activity in underlying soils. 3. High permeability of surface soils will allow for percolation of sanitary effluents.	1. Surface soils are clean, poorly graded sand to depth of 40 to 50 feet; there are no onsite construction materials except sand (i.e., no limestone, no fine, cohesive soils). 2. High permeability of soils offers limited opportunity for sealing or containment of liquid wastes. 3. Sands, coupled with high water table, may present excavation, earthmoving, or dewatering problems.
SUWANNEE	1. No high water table onsite to interfere with construction activities. 2. Limestone for scrubber system is available locally. 3. Presence of existing quarries for storage of stabilized wastes.	1. Presence of numerous sinkholes and solution features onsite; potential high foundation costs. 2. Little, if any, fine material on or near the site for construction of dikes.
SUMTER	1. Limestone for scrubber system is available locally. 2. Presence of existing quarries for storage of stabilized wastes.	1. Presence of numerous sinkholes and solution features on site; potential high foundation costs.
SATSUMA	1. Floridan Aquifer protected by Hawthorn Formation on main part of site. 2. No surface expression of solution activity on main part of site. 3. High permeability of surface soils will allow good percolation of sanitary wastes. 4. Apparently low water table conditions in higher site elevations.	1. Onsite surface soils are apparently clean sands with high permeability; little opportunity for sealing or containment of liquid wastes. 2. Waste storage potential appears to be limited on main part of site; presence of sinkholes southeast of site may cause potential leachate impacts to Floridan Aquifer if that area is used for waste storage

Table 4.2

Generic Environmental Comparison
Alternative Pipeline Corridors

	Advantages	Disadvantages
ECOLOGY		
CORRIDOR A	1. The shortest route; disruption kept to a minimum. 2. Aquatic species numbers and diversity are markedly lower than at other corridors. 3. Minimum disruption to wetlands. 4. Almost no presently undisturbed habitats would be affected.	1. Some hardwood forest species would be disturbed along shoreline. 2. Macrophyte beds present within 250 feet of shoreline.
CORRIDOR B	1. None	1. One of the longest routes; would disturb a relatively large area during construction. 2. Aquatic species numbers and diversity were markedly higher than Corridor A (about the same as Corridor C). 3. Some macrophyte beds were observed at the shoreline, indicating possibility of spawning areas. 4. Some minor wetlands may be disturbed. 5. Luxuriant growths of hardwood forest species east of State Route S209; these would be disturbed by construction.
CORRIDOR C	1. None	1. 1 through 4. Same as Corridor B.
LAND USE-SOCIOECONOMICS		
CORRIDOR A	1. Only three residences are within 1,000 feet of intake location; (nearest 600 feet). 2. Shoreline is 2,500 feet from barge channel. 3. Corridor length from powerhouse to shoreline is 7,300 feet.	1. None

Table 4.2 (Continued)

	LAND USE-SOCIOECONOMICS	
	Advantages	Disadvantages
CORRIDOR B	1. Nearest residence over 1,000 feet distant. 2. Shoreline is 2,000 feet distant.	1. Corridor length from powerhouse to shorelines; 19,300 feet. 2. Corridor crosses 14,300 feet of land not under option by SECI. 3. Two archaeological sites (middens) that may be considered eligible for inclusion in the National Register of Historic Places lie within corridor.
CORRIDOR C	1. Nearest residence about 2,000 feet distant. 2. Shoreline is 3,700 feet from barge channel.	1. Corridor length from powerhouse to shorelines; about 19,200 feet. 2. Corridor crosses 14,200 feet of land not under option by SECI.

TABLE 4.3

SUMMARY OF POTENTIAL CORRIDOR CHARACTERISTICS

	Route 1 Site to Putnam		Route 2 Site to Silver Springs			Route 3 Site to Columbia						Columbia to Suwannee		Columbia to Ft. White	
	* ABBC	ABC	ABDE	ABCDE	*(a) ABCE	ABDEFGI	ABDEFHI	ABCDEFGI	* ABCDEFHI	ABEFGI	ABEFHI	* ILMN	IJLMN	IJK	* HGK
Socioeconomics															
Undeveloped Land (miles)															
0-25 Percent	6	6	30	26	39	36	56	32	52	30	44	6	11	12	6
25-100 Percent	8	6	34	32	16	44	28	42	26	48	32	34	26	9	14
Parks, Wildlife Refuges, etc.															
0-25 Percent	14	12	62	56	45	80	84	84	78	72	70	40	37	21	18
25-100 Percent	-	-	2	2	10	-	-	-	-	6	6	-	-	-	2
Parallel Facilities (miles)															
Transmission Lines	9	4	44	8	1/2	78	74	81	78	47	44	16	-	1	1
Pipelines	-	-	-	-	-	7	-	7	-	7	-	-	-	-	-
Railroads	2	-	21	4	4	8	4	5	1	4	-	-	-	-	-
Highways	2	2	33	-	-	9	16	10	13	7	10	-	-	-	-
Crossings															
Major Roads	2	1	3	3	3	7	7	7	7	8	8	8	5	6	2
Secondary Roads	10	6	74	49	30	58	48	60	80	56	46	30	29	19	18
Railroads	1	-	5	4	2	5	5	5	5	5	5	4	3	3	1
Transmission Lines	-	-	1	1	1	4	-	-	-	-	-	-	2	1	0
Telephone Lines	1	1	-	-	-	2	2	4	2	3	1	2	-	1	0
Pipelines	-	-	-	-	-	5	1	5	1	5	1	-	-	1	1
Engineering															
Length (miles)	14	12	64	58	55	80	84	84	78	78	76	40	37	21	20
Depressions and sinkholes (miles)															
0-25 Percent	14	12	54	50	55	80	84	84	78	78	76	36	35	11	12
25-100 Percent	-	-	10	8	-	-	-	-	-	-	-	4	2	10	8
Number of River Crossings	1	1	-	-	1	-	1	-	1	-	1	-	-	1	-
Number of Stream Crossings	3	1	7	16	12	26	21	24	19	36	29	3	4	-	-
Number of Angles															
0-19°	2	1	11	4	7	6	6	7	5	17	15	5	4	2	2
20-44°	1	1	10	10	6	17	15	14	12	13	11	3	4	1	0
45-90°	8	8	12	7	4	26	13	26	13	36	23	4	0	2	1
Environmental															
Miles of Forest	4	4	18	27	47	40	27	31	49	40	44	16	13	11	9
Miles of Marsh	4	-	23	3	3	9	10	8	11	10	11	2	1	3	-
Miles of Open Water	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-

*Denotes Preferred Corridor
(a)A variation of this corridor is preferred.

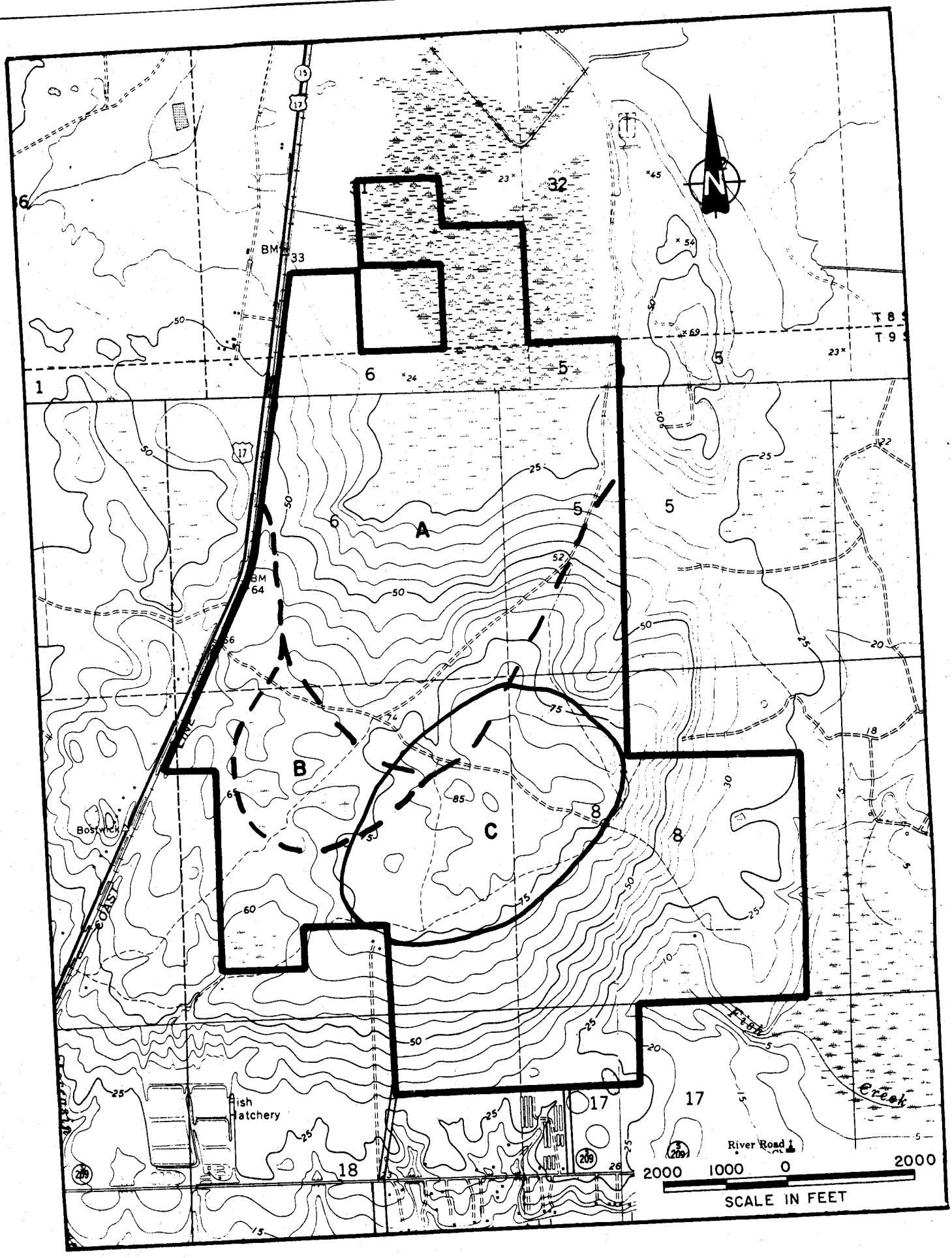

Figure F4.1 Site Environmental Zone Map.

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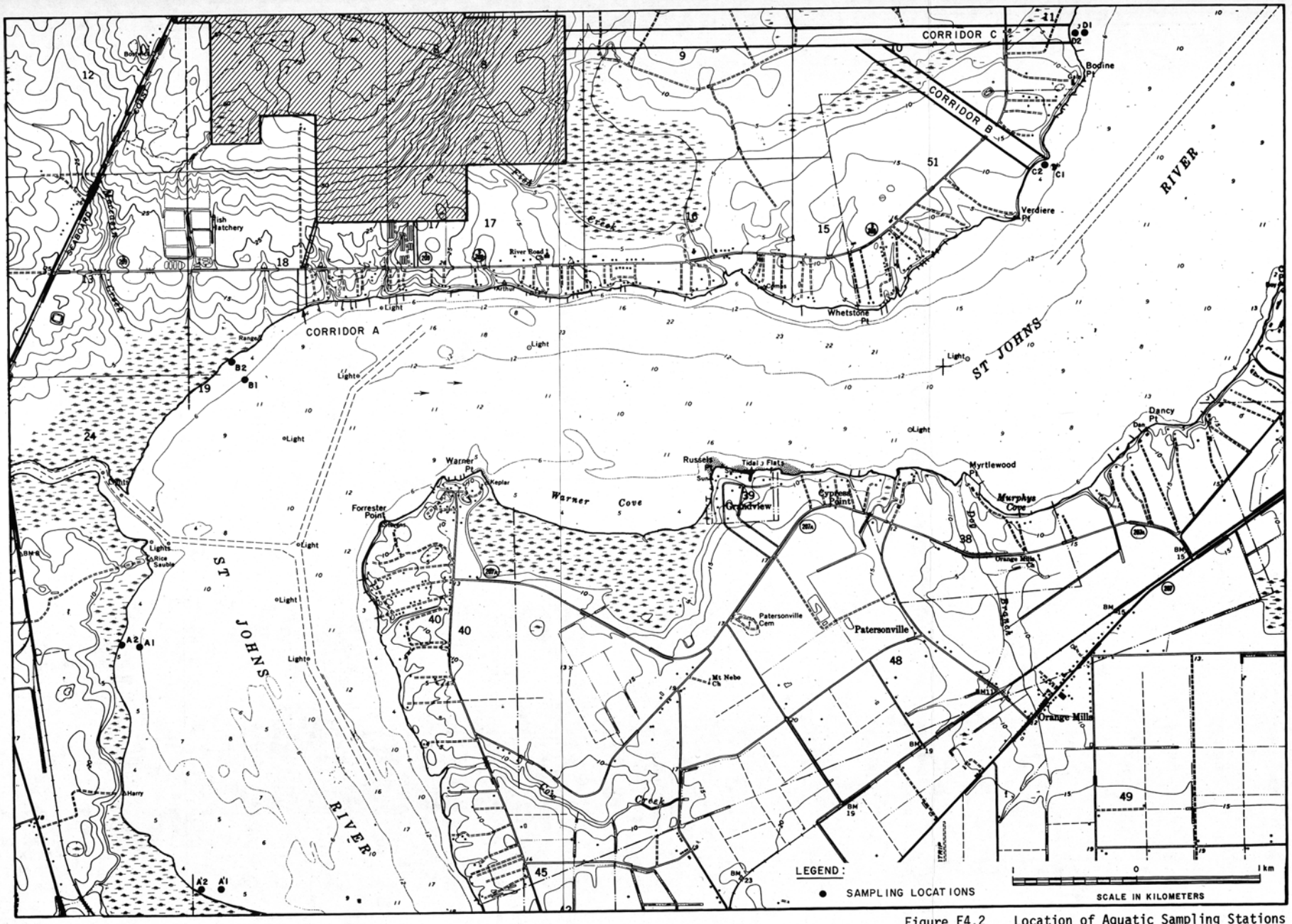
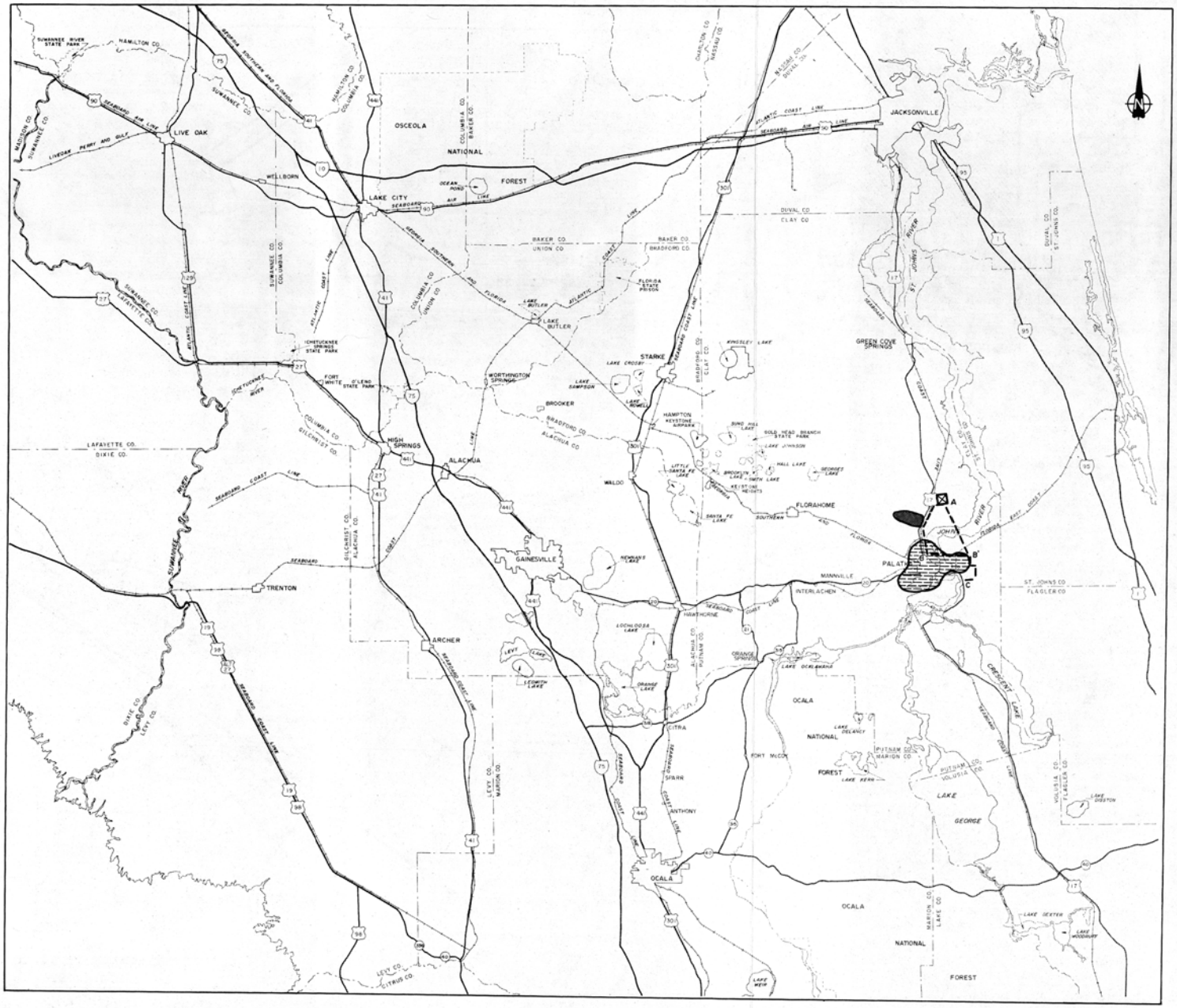
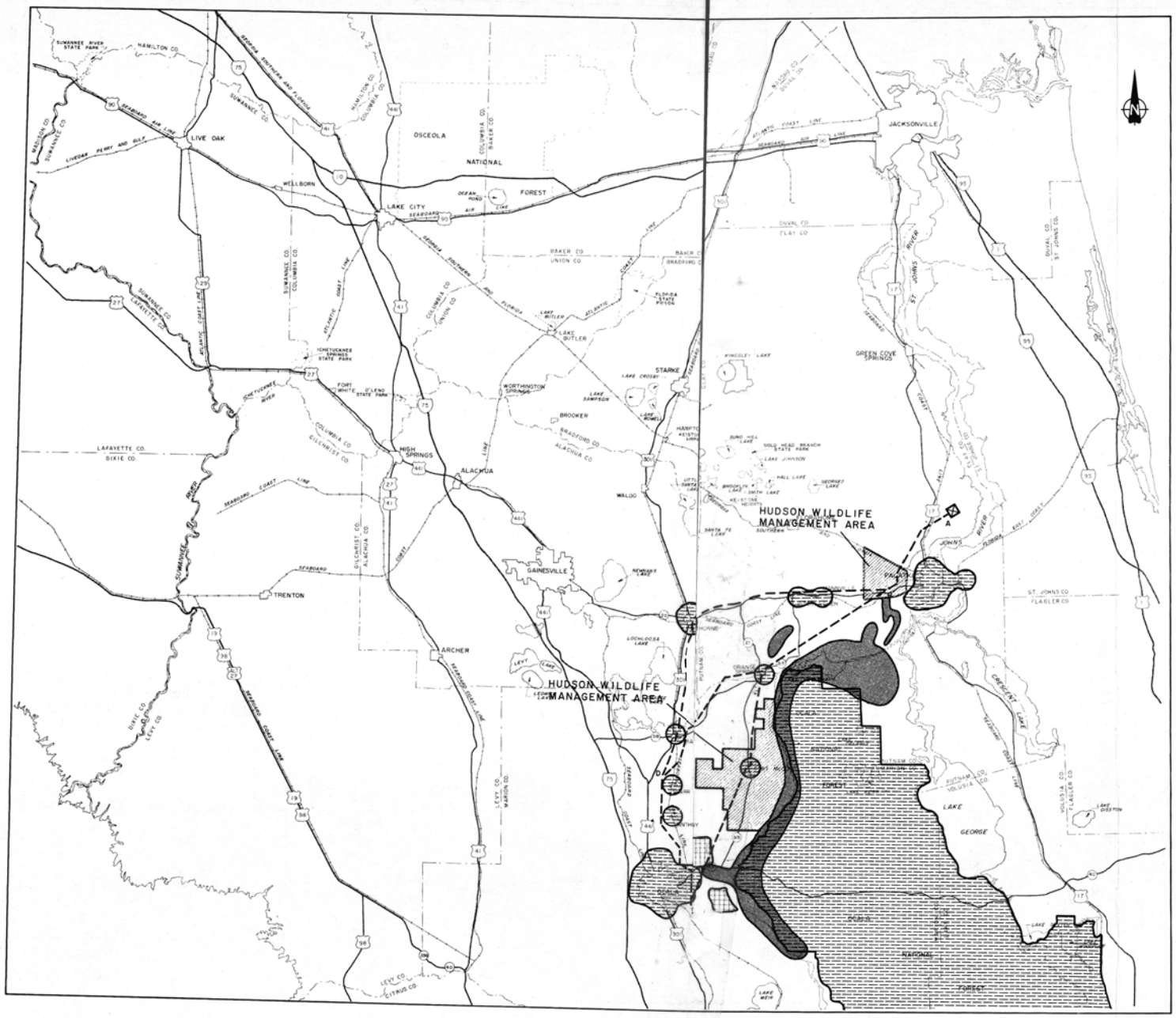


REVISED 3/15/79

Figure F4.2 Location of Aquatic Sampling Stations and Tentative Pipeline Corridors.



POTENTIAL CORRIDORS
ROUTE I
SITE TO PUTNAM
FIGURE F4.3

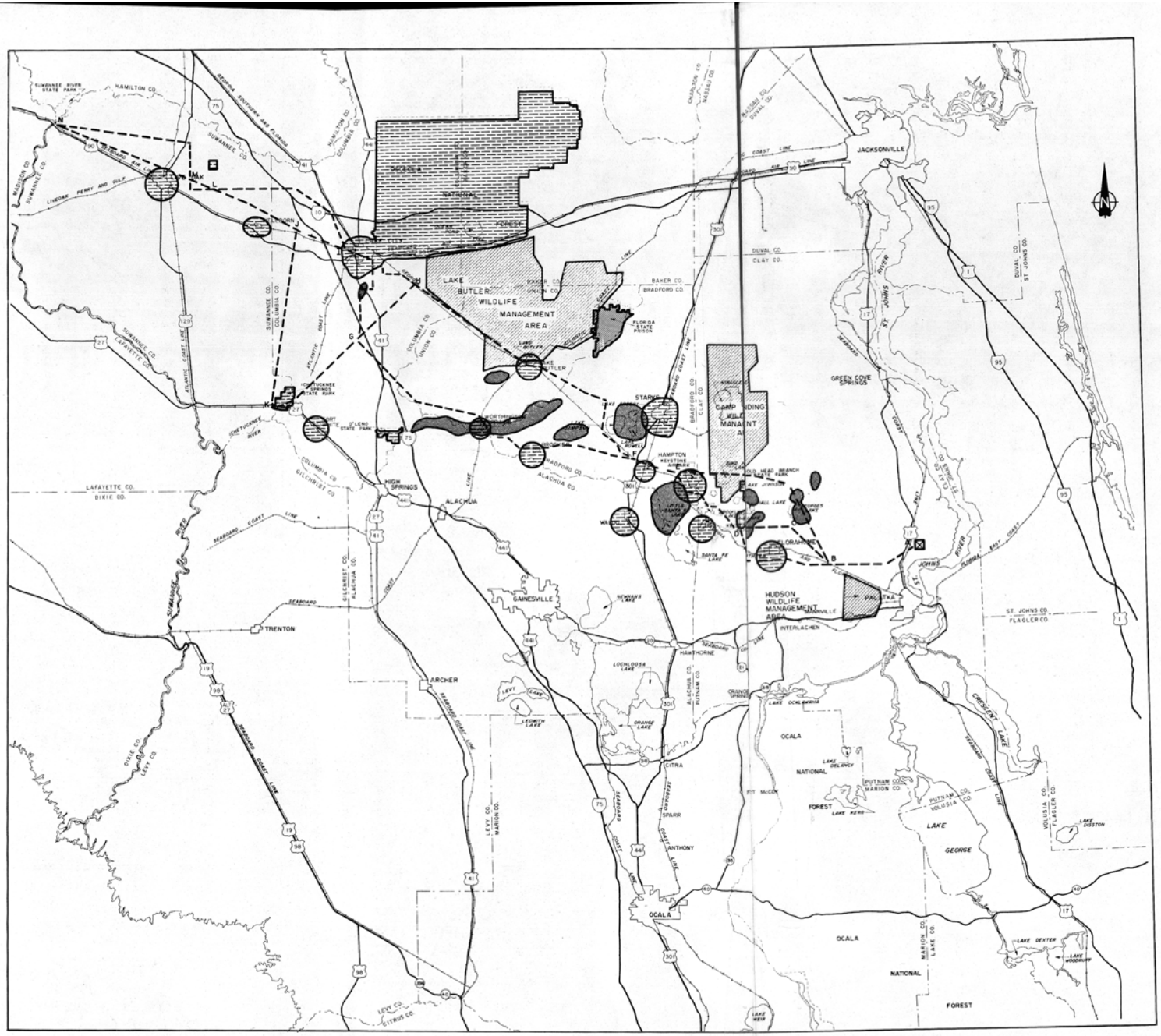


LEGEND:

- WILDLIFE MANAGEMENT AREA
- RESTRICTED AREA
- PLANNED DEVELOPMENT AREA
- BIOLOGICALLY SENSITIVE AREA

5 0 5 10 15 20
SCALE IN MILES

POTENTIAL CORRIDORS
ROUTE 2
SITE TO SILVER SPRINGS
FIGURE F4.4


JACKSONVILLE
OCALA NATIONAL FOREST
LAKE BUTLER WILDLIFE MANAGEMENT AREA
CAMP BLANDING WILDLIFE MANAGMENT AREA
HUDSON WILDLIFE MANAGEMENT AREA
GREEN COVE SPRINGS
PALATKA
GAINESVILLE
ALACHUA
HIGH SPRINGS
TRENTON
ARCHER
CITRA
OCALA
LAKE GEORGE
INTERLACHEN
HAWTHORNE
STARKE
BRADFORD CO.
BAKER CO.
CLAY CO.
DUVAL CO.
ST. JOHNS CO.
FLAGLER CO.
PUTNAM CO.
MARION CO.
VOLUSIA CO.
LAKE CO.
LEVY CO.
CITRUS CO.
LAFAYETTE CO.
DIXIE CO.
GILCHRIST CO.
COLUMBIA CO.
SUWANNEE CO.
HAMILTON CO.
MADISON CO.
UNION CO.
ALACHUA CO.
SUWANNEE RIVER STATE PARK
O'LENO STATE PARK
OCHLOCKNEE RIVER
ST. JOHNS RIVER
ATLANTIC COAST LINE
SEABOARD COAST LINE
SEABOARD AIR LINE
FLORIDA EAST COAST
LIVEOAK PERRY AND GULF
LAKE WEIR
LAKE DEXTER
LAKE WOODRUFF
LAKE OSSTON
LAKE GEORGE
CRESCENT LAKE
LOCHLOOSA LAKE
ORANGE LAKE
LAKE OCKLAWAHA
LAKE GELANCY
LAKE KERR
FT. McCOY
SPURR
ANTHONY
SANFORD
DELAND
ORANGE SPRINGS
LEVY LAKE
LEMON LAKE
NEWNANS LAKE
SANTA FE LAKE
LITTLE ORANGE LAKE
HAMPTON KEYSTONE AIRPARK
FLORIDA STATE PRISON
LAKE BUTLER
LAKE ROWELL
LAKE JENKINS
BIG HEAD BRANCH STATE PARK
LAKE CLARKE
LAKE WINNEMISSETT
LAKE WOODWARD
LAKE GEORGE
LAKE DELAND
LAKE MONROE
LAKE JESUP
LAKE HARNEY
LAKE POINSETT
LAKE MONTICELLO
LAKE ORANGE
LAKE ALTO
LAKE WEKIVA
LAKE DORR
LAKE EUSTIS
LAKE GRIFFIN
LAKE YALE
LAKE WEIR
LAKE DEXTER
LAKE WOODRUFF
LAKE OSSTON
LAKE GEORGE
LAKE CRESCENT
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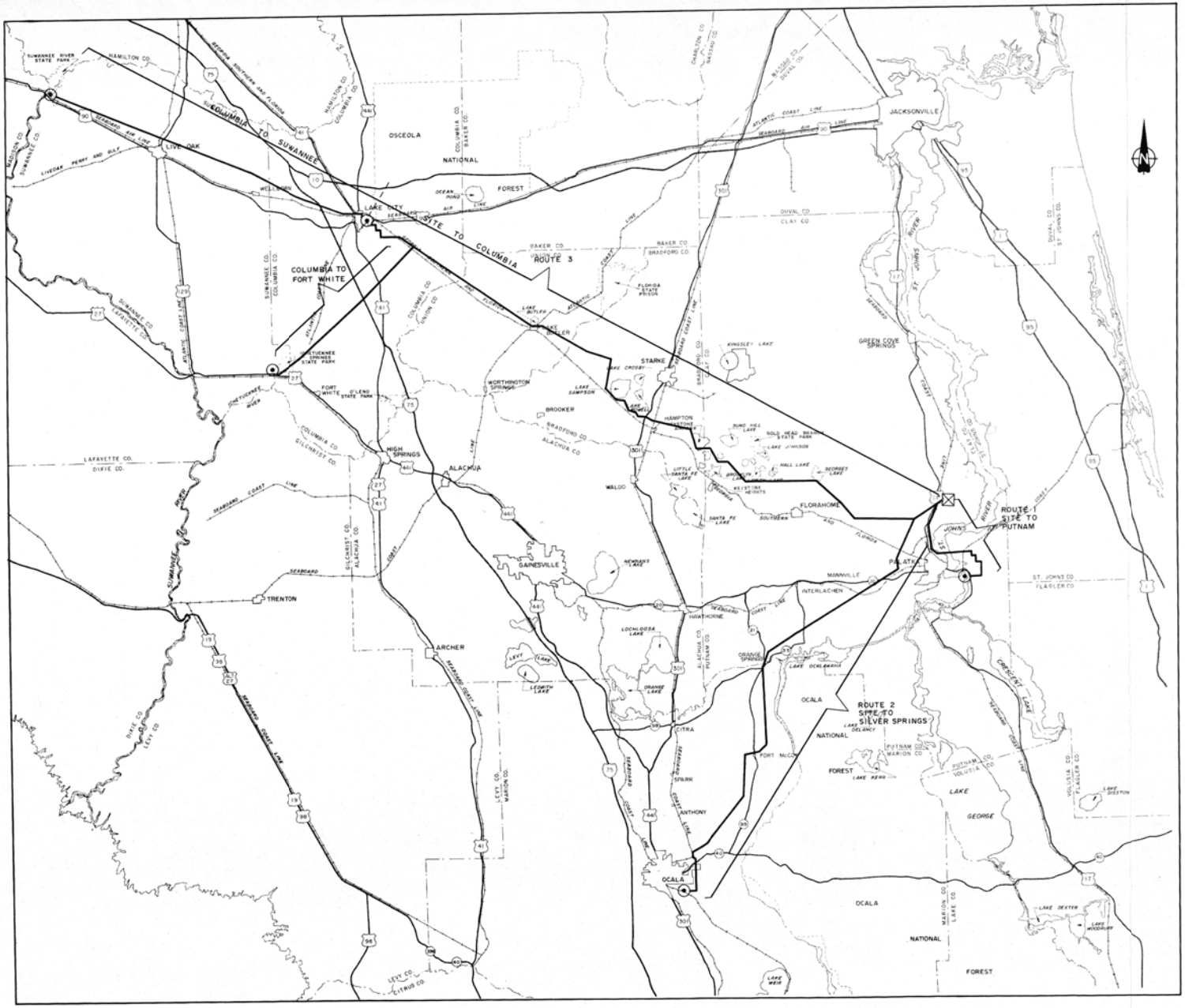
LAKE GEORGE



PREFERRED CORRIDORS
FIGURE F4.6

5.0 AFFECTED ENVIRONMENT

5.1 Meteorology and Air Quality

5.1.1 Meteorology

5.1.1.1 General Climate

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 its 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 and light during the winter. Well developed extra-tropical migratory high and low pressure centers usually travel to the north of the region.

5.1.1.2 Site Climatology

In describing site climatology, frequent reference is made to weather measurements collected at the Jacksonville Airport. Weather patterns for locations not directly on the coastline are generally similar throughout northeastern Florida.

Temperature and Water Vapor. Because the Putnam Site is both further inland and south of Jacksonville Airport, slightly higher temperatures occur there than at Jacksonville. During the period 1941-1970, the mean annual temperature at Palatka was 71.3°F (21.8°C), compared to a mean annual temperature at Jacksonville of 68.4°F (20.2°C).

The atmosphere in northeastern Florida is moist, with an average relative humidity of about 75 percent. Relative humidities are generally highest during the early morning hours, typically ranging between 80 and 90 percent, compared to about 50 to 60 percent during the afternoon. Mean relative humidities tend to be lowest in the spring months and highest in the summer months; however, the seasonal differences are small.

Wind, Stability, and Limited Dispersion Characteristics. Monthly average wind speeds and directions recorded at Jacksonville during the period 1941-1974 indicate that annual average wind speed for this period was 8.6 miles per hour (mph), with northwesterly winds being most common. The most common direction varies from southwesterly in the spring and summer to northwesterly in the fall. The monthly mean wind speed varies from 9.7 mph in February to 7.7 mph in July.

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 rapid diffusion takes place in both the horizontal and vertical directions and is characterized by a sharp decrease in temperature with height. Neutral conditions are associated with moderate dif-

fusion rates and temperatures decrease with height but not as rapidly as under unstable conditions. A stable atmosphere is characterized by slight decreases, or even increases of temperature with height, and greatly reduced diffusion rates.

Seasonal stability distribution indicates that during the summer months there is a high incidence of unstable conditions (39%), while winter has the lowest incidence of unstable conditions (13%) and the highest percentage of neutral conditions (48%). The largest relative percentage of stable conditions (57%) occurs during the fall.

There are also distinct diurnal trends displayed by atmospheric stability. The daytime hours are characterized by very unstable conditions (A,B); moderately stable conditions prevail at night. Atmospheric instability during mid-day is caused by strong incoming solar radiation.

One indication of dispersion capability is mixing height, defined as the vertical extent of the surface layer within which relatively vigorous mixing takes place. Statistical summaries for mixing height at various locations throughout the United States, based on twice-daily balloon soundings, indicate that conditions in northeastern Florida are more favorable to dispersion than are most other areas of the country.

Precipitation. Rainfall in the area surrounding the Putnam Site reaches maximum occurrence during summer months and diminishes during the late fall and winter months. Summer rainfall tends to be in the form of convective showers with large differences in amounts from one location to another on any given day. Winter precipitation is generally associated with frontal activity from migrating low pressure systems.

Severe Weather Thunderstorms. Based on a 33-year period of observation at Jacksonville, thunderstorms can be expected to occur on about 62 days a year in the vicinity of the site. Ninety percent of this thunderstorm activity occurs in the warmest six months of the year, is usually associated with summertime land mass heating and low level convergence of moist air by seabreeze effects, and can also be spawned by tropical storms as they approach the Florida coast. Northeastern Florida's thunderstorm season peaks in July, when such storms can be expected to occur about once every two days.

Windstorms. Winds in excess of 40 mph have been recorded in every month of the year at Jacksonville. Strong, gusty, surface winds often occur in association with severe thunderstorm activity, well-developed cold fronts, and tropical cyclones.

Tornadoes. During the period 1955 through 1967, a total of 16 tornadoes were recorded in the one degree latitude-longitude square containing the Putnam Site. The probability of a tornado hitting the Putnam Site in any given year is 0.00054 with a return frequency of once every 1,839 years.

Tropical Cyclones. For the Coastal sections near the Putnam Site, six tropical cyclones crossed the coastline during the 1886-1970 period of

record. Two were of hurricane strength (winds 74 mph or greater). The average number of years between tropical cyclones was 14, and the average number between hurricanes was 42. These statistics are, however, somewhat misleading since cyclones that remain offshore are not counted and since tropical cyclones crossing other sections of the Florida coast can exert significant effects on the area of the Putnam Site.

5.1.2 Ambient Air Quality

5.1.2.1 Air Quality Standards and Classifications

Ambient Air Quality Standards. Ambient air quality standards define levels of air quality imposed to protect public health and welfare with an adequate margin of safety. Standards applicable to the proposed station, National Ambient Air Quality Standards (NAAQS) and Florida Ambient Air Quality Standards (FAAQS) (Table 5.3), apply directly to the major substances emitted by a coal-fired, steam-electric generating station--sulfur dioxide (SO_2), total suspended particulate matter (TSP), and nitrogen oxides (expressed as nitrogen dioxide, NO_2).

Prevention of Significant Deterioration Requirements. Procedures have been established, in the Clean Air Act Amendments of 1977 and in related regulations, to protect areas where air quality is better than that allowed by NAAQS. A major portion of these Prevention of Significant Deterioration (PSD) requirements is the adoption of restrictions in the increase of ambient concentrations of SO_2 and TSP which can be caused by new emission sources. These PSD increments do not constitute new ambient standards. They do not regulate total ambient concentrations as ambient standards, but rather limit increases in concentration above some baseline level which is unique to each location.

Increments have been established for three different types of areas: Class I areas, in which virtually no new emission sources are permitted; Class II areas, in which a moderate amount of growth is permissible; and Class III areas, in which greater increases in ambient concentrations are possible. Most areas, including the general area around the Putnam Site, are designated as Class II areas. In reference to the Putnam Site, the nearest existing PSD Class I area is the Okefenokee National Wilderness Area located in Georgia approximately 105 kilometers (km) (65 miles) to the north-northwest. Because of the remoteness of this area from the site, impacts attributable to the proposed station are minor. These increments are listed along with the NAAQS and FAAQS in Table 5.3.

Several areas are under consideration for redesignation to Class I status. Congress, through the Clean Air Act (as amended in 1977), has directed Federal land managers to review all national monuments, primitive areas, and national preserves, and recommend appropriate areas for redesignation by 8 August 1978. The Department of Interior (DOI) has published a list in the Federal Register (10 April 1978, 43 FR 10514) of the 82 national monuments and 2 national preserves in the National Park Service and the 11 primitive areas administered by the Bureau of Land Management, and has stated the intention of reviewing these areas to determine whether Class I redesignation should be recommended.

Two of the areas in the DOI review list are located about 30 km (20 mi) from the Putnam Site. One of these is the Castillo de San Marcos National Monument located in Saint Augustine, and the other is the Fort Matanzas National Monument located about 20 km (12 mi) south of St. Augustine. Both of these monument areas are quite small, the first occupying about 20 acres and the second about 300 acres. One of the criteria to be applied by DOI consists of deciding whether an area is of such small size, and characterized by resources interdependent with those of the surrounding region, that redesignation is impractical. Considering that all existing Class I areas are at least 5000 acres in size and typically not located in or adjacent to urban areas, it is unlikely that either of the National Monuments near the Putnam Site will be nominated for Class I Status. As of July 1979, no recommendation has been published.

Nonattainment Status. A nonattainment area is an area in which one or more of the NAAQS are being violated. According to a list published in the Federal Register on 3 March 1978 (43 FR 8961), there are no nonattainment areas within approximately 50 km (30 mi.) of the Putnam Site. The nearest nonattainment areas are Duval County for oxidants and downtown Jacksonville for particulates. The photochemical oxidants problem is not relevant to the proposed plant since it emits only very small quantities of hydrocarbons.

Emission Standards. Emission or performance standards set a minimum level of emissions control which must be achieved by a particular source category. The current State and Federal emission standards applicable to the Seminole Station are listed in Table 5.4. The Federal regulations require application of continuous emission controls which, in addition to achieving compliance with an emission rate standard, also result in a percentage reduction in the emissions resulting from fuel combustion.

5.1.2.2 Background Ambient Air Quality

Description of Available Measurements. Three ambient air quality monitoring stations are being operated in the vicinity of the Putnam Site. One of these is a TSP monitoring station operated at the Kay Larkin Airport by the Florida Department of Environmental Regulation (DER). The other two are stations operated by Florida Power & Light Company (FP&L) measure SO_2, NO_2, and TSP. These stations are referred to as the Yelvington Road and Cracker Swamp Road sites. The locations of all three stations are shown in Figure F5.7.

Total Suspended Particulates. A summary of TSP measurements at all three sampling locations is provided in Table 5.5. These values are based on data supplied by DER. The lower number of samples reported for 1976 at the two FP&L sites represents all of the information currently on file at the DER's St. Johns River Subdistrict Office.

Patterns of annual geometric means at all stations are similar. Based on the information shown, a reasonable value for a current background annual geometric mean TSP concentration in the vicinity of the Putnam Site is in the range of 30 to 40 $\mu g/m^3$. There have been three instances of 24-hour concentrations at the Cracker Swamp Road station above the FAAQS and secondary NAAQS of 150 $\mu g/m^3$,

but in comparison with the annual mean it can be seen that these are anomalous events. The FP&L plant was not even in operation on the day on which the highest 24-hour concentration was measured (information concerning the status of the FP&L plant during the other two exceedance events is not available); so it is likely that this concentration can be attributed to some local activity causing fugitive dust emissions. With the exception of a few measurements at the Cracker Swamp Road station, the annual second-high 24-hour concentration in the general area of the Putnam Site has been less than 80 $\mu g/m^3$.

Sulfur Dioxide. Measured concentrations of SO_2 at both FP&L sites have been extremely low (Table 5.6). In fact, all of the concentrations are probably below the accurate detectability limit of the West-Gaeke method. Low concentrations in 1975 and 1976 can be attributed in part to a lack of temperature control during sample collection, but 1977 measurements continue to show low concentrations. These results are not surprising in light of the relatively non-industrialized nature of the general area. Based on these measurements and the nature of existing emission sources average background concentrations in the vicinity of the Putnam Site can be considered negligible.

Nitrogen Dioxide. A summary of NO_2 measurements at both FP&L sites is shown in Table 5.7. Highest and second highest 24-hour concentrations are listed in addition to annual average concentrations, even though ambient standards for NO_2 are presently expressed in terms of an annual average only. The values presented are based on data supplied by DER. The lower number of samples reported for 1976 represents all of the information currently on file at the DER's St. Johns River Subdistrict Office.

The annual mean concentrations at both sites have been very low. In the absence of heavy traffic flow and concentrated industrial point emission sources, such low concentrations would be expected. Based on these measurements and the nature of existing emission sources, the annual average background NO_2 concentrations in the vicinity of the Putnam Site can be considered negligible.

Other Regulated Pollutants. Pollutants regulated by NAAQS are commonly referred to as criteria pollutants. The three criteria pollutants of greatest concern in an evaluation of the effects of a coal-fired steam-electric station are SO_2, TSP, and NO. The other criteria pollutants are carbon monoxide (CO), hydrocarbons (HC), and photochemical oxidants. HC are usually not considered separately from oxidants. The ambient standard for HC is really not a true standard but a guide to be used in controlling oxidant concentrations.

Measurements of these other criteria pollutants have not been made in the vicinity of the Putnam Site, either by regulatory agencies or industry, primarily because there is no reason to expect that local emission sources would contribute significantly to ambient concentrations. The presence of CO is primarily related to automobile emissions, and CO concentrations are generally not a problem outside major metropolitan areas. Consequently, documenting prevailing concentrations of these pollutants in a non-urbanized area such as that in which the Putnam Site is located is not a typical practice. In any case, the proposed station emissions would not greatly affect these concentrations.

5.1.2.3 Existing Emission Sources

To evaluate potential interactions among the proposed station and other emission sources and to develop a better understanding of present air quality conditions, an inventory was obtained from DER (St. Johns River Subdistrict Office). The inventory contains a listing with stack characteristics of all significant point emission sources within the Putnam Site area of interest, an area extending to a distance of at least 50 km (30 mi) in all directions and taking in all or portions of Clay, Flagler, Putnam, and St. Johns Counties. The only sources excluded from this listing were two hospital incinerators in Clay County; a hospital incinerator and a small concrete batching plant (estimated annual TSP emissions of 1 ton) in Flagler County; a hospital incinerator, an x-ray film incinerator, and a humane society incinerator in St. Johns County; and a hospital incinerator and a small sand dryer (estimated annual TSP emissions of 4 tons) in Putnam County. All of these are very minor intermittent sources that have a negligible effect on local air quality conditions.

The final PSD regulation published in the Federal Register on 19 June 1978 (43 FR 26388) state that emissions from all new "major sources" commencing construction after 6 January 1975 count against the increments, as do increases in emissions from any source which takes place after 7 August 1977. In addition, major modifications of an existing source, after 6 January 1975 must also be considered unless the modification involves no increase in the net amount of emissions and no "adverse air quality impact".

A DER emissions inventory indicates that there have been no new companies with emission sources at new locations since 1974. There have been changes in emissions at two of the companies in existence as of 6 January 1975. The locations of emissions sources within about 50 km (30 mi) of the Putnam Site are shown in Figure F5.18. A listing of specific sources indicating whether or not emissions characteristics have changed since 1974 is provided in Tables 5.8 and 5.9. As can be seen, the only two sources which have changes are Solite and Hudson Pulp and Paper Company. Of these two, only Hudson is within the immediate vicinity of the Putnam Site. [Hudson is about 8 km (5 mi.) from the Site, while Solite is about 38 km (25 mi.) away.]

For the two sources the change has resulted in a net decrease in SO_2 and TSP emissions. At Solite, SO_2 emissions have decreased from an estimated 7,148 tons per year to 2,137 tons per year; TSP emissions have been reduced from 1,250 to 107 tons per year. Annual SO_2 emissions at Hudson Pulp and Paper Company have decreased from 7,650 to 6,982 tons, and annual TSP emissions have dropped from 13,301 to 849 tons. At Hudson, there are three sources (Recovery Boiler #4, Lime Kiln #4, Smelt Dissolve Tank #4) which are new since 1974, but the units replaced by these new sources had greater emission rates and lower plume rise characteristics, and therefore greater ground-level ambient impact. In addition, two of the sources existing in 1974 (Power Boiler #5 and Combination Boiler #4) have been modified so that now total SO_2 emission rates are greater for both sources by about 5 percent, but stack heights have been increased by 92 feet, thereby offsetting any effect on ground-level SO_2 concentrations. Finally, there has been an increase in annual TSP emissions from Combination Boiler #4 since 1974 of about 172 tons, but the increase in stack height of 92 feet for

this source, plus the great decrease in TSP emissions from other sources, means that no increase in ambient TSP concentrations has resulted from this change. The modifications which have taken place at Hudson have therefore not resulted in a net emissions increase or an adverse change in air quality impact.

There are no other sources which count against the PSD increments available for use by the proposed station. Therefore, modeling Seminole's emissions alone is sufficient to demonstrate compliance with PSD increments.

5.2. Geology and Soils

5.2.1 General

The Florida peninsula is the partially emerged portion of a large plateau that extends from the main mass of the North American Continent. The presentday landforms in the vicinity of the site are relatively simple. The Florida peninsula and adjacent continental shelves have been tectonically stable throughout the Mesozoic and Cenozoic Eras. Moreover, the peninsula is one of the most seismically stable areas of the United States.

Figure F5.1, which illustrates the physiographic features of northeastern Florida in greater detail, shows the proposed steam-electric generating station site at the extreme southeastern extension of the Duval upland. The site property includes Teasdale Hill, which rises in elevation to approximately +85 feet Mean Sea Level (MSL). The physiography of the region immediately surrounding the site is dominated by the St. Johns River and a series of marine terraces. The Penholoway, Wicomico, Sunderland and Coharie terraces form the uplands of western Putnam County and range in altitude from approximately 42 feet to 170 feet MSL (Figure F5.2), but for the most part lie between 70 and 170. These uplands are characterized by rolling, well drained hills, and sinkholes partially filled with water to form lakes. Sinkhole topography does not persist eastward and is not evident in the vicinity of the site.

The Penholoway Terraces make up most of the high ground of the site property, a substantial portion of which is at an elevation of +50 feet MSL. Teasdale Hill, however, is a remnant of the higher Wicomico Terrace (70 to 100 feet MSL) while the northern extension of the property falls off to the low-lying, less well drained Pamlico Terrace (10 to 25 feet MSL).

East of the river, in St. Johns County, the ground is lower showing a broad section of the Pamlico Terrace. This is incised opposite the site by a lower terrace which, although shown on Figure F5.2 as the Silver Bluff Terrace, is probably not a true marine terrace, but rather a river terrace formed when the river was at a higher elevation. East of the river valley, elevations rise to the Talbot Terrace then fall off again toward the coast.

The St. Johns River merits attention both because it is a major feature and because of its proximity to the site. This river, some 200 miles in length, and the longest in Florida, has its headwaters in St. Johns Marsh some 20 miles west

of Vero Beach. From here the river flows approximately north-northeasterly along a lake chain until just south of Deland Ridge (Figure F5.1) where it leaves the eastern valley, flows a short distance westward and then parallels the coastline again in what is known as the St. Johns River Offset. It enters the eastern valley again just south of Palatka and from there to its mouth at Mayport exists as a broad, winding estuary.

5.2.2 Stratigraphy

General. Eocene and younger rocks represent the limit of formations penetrated by water wells in the vicinity of the proposed power plant and are thus the best indicators of environmental sensitivity.

A regional geologic map is presented in Figure F5.3, while Figure F5.4 shows a generalized stratigraphic cross-section of the upper formations. Table 5.1 summarizes the geologic and hydrogeologic characteristics of these same stratigraphic units.

In very broad terms, the cover of Mesozoic and Cenozoic sedimentary formations that overlies the Paleozoic basement of Florida varies from approximately 2,500 feet in north central Florida to some 15,000 feet in southern Florida.

In western Putnam County the limestone (Floridan Aquifer) shows surface outcrop. As may be expected this area is characterized by sinkhole topography which diminishes and disappears as the limestones dip beneath the confining Hawthorn Formation eastwards. At the site the limestone is found at a depth of about 200 feet below surface.

Paleozoic Rocks. The Paleozoic Rocks consist of both crystalline and sedimentary rocks. The Applin Line constitutes the contact between the unmetamorphosed sedimentary rocks to the northwest of the line and the crystalline rocks to the southeast.

The crystalline rocks range from granites to basalt flows and pyroclastics, while the sediments are mainly unmetamorphosed to very weakly metamorphosed noncalcareous shales and sandstones.

Mesozoic Rocks. The rocks characterizing this era consist, in northern Florida, of mixed clastics and silty to sandy limestones with some sandstones. In southern Florida the formations are comprised of clean limestones and dolomites with some evaporites. No sediments representing the long interval (+150 million years) between the middle Paleozoic and the Triassic have been identified in Florida thus suggesting erosion of a highland area during this period. During the Jurassic, however, regional subsidence caused a marine transgression with the subsequent deposition of shallow, shelf-type carbonate rocks.

The Peninsular Arch (Figure F5.6) and land to the north were uplifted prior to the end of the Jurassic and large quantities of eroded materials were supplied to depositional basins. Uplift of the Arch intensified during the lower Cretaceous and while terrigenous clastics continued to be deposited on the

flanks of the Peninsular Arch, the coastal plain and offshore parts of the Gulf Basic continued to subside. The sea level then began to rise and the upper Cretaceous witnessed a marine transgression over the Peninsular Arch and the deposition of chalk, limestone and dolomite.

Cenozoic Rocks. The Cenozoic Era is the one most relevant to the geologic framework of the proposed site. In general the Cenozoic strata of Florida consist primarily of shallow-water marine carbonates and evaporites, and indurated to uncemented sands, silts and clays.

Paleocene Rocks. The Paleocene is characterized by both bank-type carbonate sediments and evaporites. The latter were in all probability deposited when a reef formed completely around the edge of the Continental Shelf and restricted seawater exchange with the confined area.

Eocene Rocks. Eocene strata range in depth from an average of approximately 500 feet in northern Florida to more than 300 feet in the extreme southern portion of the state. The series consists mainly of limestones and dolomites with minor amounts of evaporites and carbonaceous material.

The lowest Eocene formation intersected by water wells in the vicinity of the site is the Lake City Limestone, which underlies all of peninsular Florida. The characteristics of this and younger formations are summarized in Table 5.1. The Lake City Limestone consists of alternating beds of brown to buff, soft, porous, fossiliferous limestone; brown to white, hard, dense, massive limestone and bluish-grey to tan, densely indurated crystalline dolomite. The soft, porous beds described above are reported by the same authors to supply water to a few deep wells in the tri-county area: Flagler, Putnam, and St. Johns. The competent, more indurated beds are said to be relatively impermeable, in some areas possibly isolating water-producing zones from the rest of the aquifer.

Wells in Flagler, Putnam, and St. Johns Counties suggest that the contact between the Lake City Limestone and the overlying Avon Park Limestone is unconformable. This formation is described by some as being "poorly permeable," but others consider the Avon Park formation to be similar in lithology to the underlying Lake City Limestone; comprised of alternating beds of differing permeability.

The Avon Park Limestone is unconformably overlain by the Ocala Group. It consists of the Inglis, Williston, and Crystal River Formations. All of these are recognized in Flagler, Putnam, and St. Johns Counties; and, although the Crystal River Formation pinches out east of the St. Johns River further south, it was found to underlie the site.

The Ocala Group is significant in that it comprises the principal water bearing formations in the project area. The formations of the Ocala Group are similar in lithology and hydrologic properties and are treated as a single hydrologic unit.

The Inglis, Williston, and Crystal River Formations underlie the site and consist of tan to buff granular, fragmental marine limestone.

Oligocene. A major regional unconformity followed the deposition of Eocene sediments so that strata of Oligocene age are missing over much of northern and eastern Peninsular Florida.

Miocene. During the Miocene, parts of Florida emerged for the first time since late Cretaceous times. This uplift was accompanied by the deposition of terrestrial sediments, but these were subsequently eroded from a major portion of northwestern Florida. Marine transgression then followed; and, in the vicinity of the site, it is the Hawthorn Formation which lies on the eroded surface of the Ocala Group.

The nonconformity between the Hawthorn Formation and Formations of the Ocala Group is distinguished by a hard, dense, phosphatic, sandy, dolomitic limestone averaging 5 feet in thickness, is gray to green, plastic, phosphatic, sandy clay and marl; interbedded with lenses of phosphorite, pebbles, phosphatic sand; and phosphatic, sandy limestone.

Although in part of the region the more permeable lenses of sand and limestone in the Hawthorn Formation comprise a secondary artesian aquifer, the major significance of the Hawthorn Formation is its ability to confine the artesian water in the underlying Floridan Aquifer formations.

Upper Miocene or Pliocene. In many parts of Florida the Pliocene was a period of uplift and erosion. Inundation by late Miocene or Pliocene seas over the study area contributed to the presence of interbedded lenses of marine fine to medium sand, shell, and green, calcareious, silty clay overlying the Hawthorn Formation in most of eastern Putnam County, central and northern Flagler County, and in all of St. Johns County.

The less permeable beds of these deposits often act as confining layers and contribute to discontinuous secondary aquifers with sand and shell beds yielding, in places, moderate amounts of artesian water to wells.

Pleistocene and Recent. The purpose of the following discussion of Pleistocene and Recent deposits is that these upper materials were particularly important to (1) complete the present description of stratigraphy in time-stratigraphic terms; (2) set the nature of deposits at the site in regional context; and (3) emphasize the variable nature of these deposits.

These deposits are a product of the alternating advances and retreats of worldwide ice sheets and accompanying eustatic sea level changes. Pleistocene deposits are typically discontinuous and variable in lithology and texture both vertically and laterally. The upper sands of these deposits constitute a water-table aquifer and supply moderate amounts of water to screened wells for domestic use.

Borings on the site property showed clean quartz sands to a depth of approximately 40 feet, followed by alternating beds containing increasing percentages of fines (silt and sandy silt) and layers of relatively clean sand (Figure F5.9). Wells of the nearby (less than 5 miles) Hudson Pulp and Paper Company, however, show a markedly different sequence which includes a clay layer between

approximately 15 and 35 feet below surface. Because of the laterally variable nature of these deposits, it is emphasized that, in an environmental appraisal, these materials (and in fact all post-Hawthorn deposits) may be most meaningfully considered in site-specific terms.

5.2.3 Structure

The geologic structural influence on the St. Johns River indicates that faults have been postulated over a significant portion of the river (Figure F5.7). Faulting and other movements associated with the Ocala uplift have played an important role in determining the course of the St. Johns River. However, the structural features shown along the river are incidental to the present project because of their lack of influence on the proposed site.

Trending from the western portion of Lake George approximately northward, the river follows the alignment of this fault from Lake George to just south of Palatka, where it breaks to the east to re-enter the eastern valley. This fault might extend further northward to pass approximately 4 miles west of the site (Figure F5.5). However, as shown in cross-sectional view in Figure F5.4, this fault is certainly earlier than Pliocene ($+10 \times 10^6$ years before present) and is thus considered noncapable. No other structural features were found that could possibly influence the site.

5.2.4 Earthquake History

Seismic considerations and the phenomena generated by seismically induced ground motions, such as liquefaction, are not of major concern to the siting of a fossil-fueled power station. Historic evidence indicates that the Putnam Site has been exposed in only a small way to seismically induced ground motions generated within Florida or in adjacent regions.

5.2.5 Soils and Geotechnical Conditions

The central portion of the site includes approximately 150 acres of relatively level ground above 75 feet MSL, while the highest elevation attained is approximately 85 feet MSL (Figure F5.8). The steepest gradients from this high ground are toward the southeast and northeast. The northern extension of the property includes a lowland bounded by the 25-foot contour, the lowest elevation on site. The St. Johns River is within a mile of the site and meanders east and then north so that it is both south and east of the site.

With the exception of the northern lowland (which shows a surficial cover of organic silt to a depth of approximately 4 feet) and the restricted depressions on the higher ground (which showed abundant organic material to a depth of three feet below surface), the property is underlain by a well drained, loose, sandy cover.

The water table is subject to precipitation fluctuations. Measurements to date have ranged from about 2 feet below surface (in upland depressions) to approximately 15 feet below surface. The northern lowland is damp even in relatively dry weather and is reported to be waterlogged in very wet weather.

Studies undertaken to date suggest that the area surrounding the site is relatively free of major sinkhole or extensive solution-related activity, this being associated more with areas of western and southeastern Putnam County. However, since the general region is characterized in many places by typical karst features, this matter was given considerable attention.

The only surface expressions of possible sinkholes on the property were isolated circular and semi-circular shallow depressions in the southwestern portion of the site. A boring (No. 2-1, Figure F5.8) was located in the most obvious of these features. The correlation of subsurface layers revealed by the boring with the general lithologic profile of the site (Figure F5.9) indicates that these lows are not associated with sinkhole expression at depth, but are rather natural drainage features.

Because of the substantial thickness of overburden and its potential ability to support heavy foundations, the limestones have not been extensively sampled.

The generalized profile consists of approximately 200 feet of unconsolidated sediments (over the high areas of the site property) underlain by a considerable thickness of limestones. This overburden layer showed a "draped" effect over the area sampled. Although the surface elevation of borings differed by some 30 feet, the thicknesses of the upper sediment layers intersected remained essentially constant. This would, in all probability, not extend as such into the lower-lying areas of the site, and the depressed (+25 feet MSL) northern extension of the property may be expected to be underlain by a somewhat lesser thickness of sand.

Over the area sampled, the overburden shows three broad geotechnically distinguishable and horizontally continuous layers (Figure F5.9): a clean medium dense to dense sand to a depth of 40 feet below surface; a transitional zone of increasing fines consisting of interbedded lenses of clean sand and silty or clayey sand between 40 and 100 feet below surface; and finally a very dense or very stiff to hard, relatively impervious layer, the Hawthorn Formation, between 100 and 200 feet below surface (-130 feet MSL).

Some of the more salient conclusions regarding soils and geotechnical conditions are:

1. A preliminary evaluation suggests that, due to the magnitude of seismic events that could affect Florida, foundation stability will not be affected by the loss of shear strength due to liquefaction of the fine sand material at the site.

2. Based on studies to date, with the possible exception of the stacks (the resistance to the high overturning moments due to wind loading were not investigated), structures in the power station complex would be supportable on shallow foundations at economical bearing pressures.

3. Since the groundwater table on-site is relatively high and the upper sands are relatively permeable, major earthwork requiring dewatering would be kept to a minimum.

5.3 Hydrology

5.3.1 Surface Water

5.3.1.1 St. Johns River

Regional Environment. The St. Johns River, with its 300-mile length and 9,430 square mile basin, is the largest watershed entirely within the State of Florida (Figure F5.10). The river rises in a poorly drained swamp in northwestern St. Lucie County, and becomes a discernible channel in southern Brevard County. Downstream of Brevard County, channel widenings give rise to eight lakes: Sawgrass, Washington, Winder, Poinsett, Puzzle, Hardey, Monroe, and George. At Palatka, the river widens to form a virtually continuous estuary with minor tributary bays. It is characterized generally by many extremely deep and wide segments. The low velocities and flow reversals are products of an average hydraulic gradient of only 0.15 feet per mile and a backwater effect from tidal and wind action. Combined wind and tidal effects influence river levels and flow a maximum of 161 miles upstream from the mouth. Although there are normal seasonal flow variations, the large drainage basin and average annual rainfall in excess of 50 inches, coupled with artesian flow and springs produces an estimated average freshwater discharge of 6,000 cubic feet per second (cfs) into the Atlantic Ocean at Jacksonville.

Normal tidal ranges affect river flow up to Deland, Florida; thus this 140-mile river reach may be considered an estuary. However, as indicated by the water quality data base, a salinity wedge has not been observed at Palatka. Therefore, in the Palatka area, the river can be considered to be a freshwater estuary. The water surface area of the estuary reach of the river and its adjoining lakes is 246 square miles. Mean tidal ranges vary from 1.2 feet at Jacksonville and Palatka to 0.5 feet at Welakea to less than 0.5 feet from Lake George to Deland.

Local Environment. The proposed steam-electric generating station will be located near the northwest bank of the St. Johns River, approximately 73 miles from the mouth of the river and five miles downstream of Palatka, Florida. The river reach on which the site is located, the Lower St. Johns River reach, extends 100 miles from the Oklawaha River to the Atlantic Ocean. In the vicinity of th site the St. Johns River is approximately 6,000 feet wide; with an average depth of 10 feet.

Flow records have been collected for the Lower St. Johns River by the USGS at Palatka and Jacksonville. The maximum downstream and upstream flows of record are, respectively, 31,311 cubic feet per second (cfs) on November 5, 1970 and 20,400 cfs on March 24, 1978. Average freshwater discharge at Palatka has been computed as 7,613 cfs with a mean tidal range of 1.2 feet based upon eight years of published records (USGS, 1977). Average velocities are on the order of 0.2 foot per second (fps), with a maximum on the order of 1.0 fps.

Although the long-term average daily flow at Palatka (1.07 cfs per square mile) compares closely with the flows at other stations on the St. Johns River the tremendous storage capacity of the estuary prohibits meaningful substantiation of the daily Palatka station records through comparison of daily records from more reliable upstream stations. In addition, little correlation is evident between the gaging station in Jacksonville and the Palatka station.

The only additional source of streamflow data on the St. Johns River in the project vicinity is the USGS Rice Creek gaging station at U.S. Route 17, with stage records from 1959 to 1972. At this station, located approximately 4,000 feet from the St. Johns River, Rice Creek is a St. Johns backwater, experiencing rapid response to stage fluctuations in the river. The stage records from this station may be used to approximate stages on the St. Johns, thereby increasing the available data for river stages to seventeen consecutive years.

Low Flows. The St. Johns River in the site vicinity normally experiences tide-induced flow reversals twice daily. Consequently, there are instantaneous zero discharges at moments of flow reversal and periods of negative (upstream) flow. The river functions similarly to a reservoir with inflow from both the ocean and the drainage basin being stored through variations in stage. Therefore, even during periods of near zero flow or negative flow, there may be an increase in the volume of water in the estuary if the stage is increasing. Conversely, during periods of high downstream flow there may be a decrease in the volume of water in the estuary if the stage is decreasing. As a result, flow rates in the St. Johns at Palatka do not reflect its water supply potential, and the usual statistical low flow analysis is meaningless.

Additionally, the water supply potential in the St. Johns estuary is directly related to the volume of freshwater in storage which is controlled by the combined effects of freshwater runoff and stages in the Atlantic Ocean. Mean daily freshwater runoff into the estuary is 7,613 cfs. During periods of low freshwater runoff, large volumes of freshwater are maintained by stages on the Atlantic Ocean. Withdrawal of water from the St. Johns, therefore, would be compensated by this ability to maintain a large reservoir of freshwater during periods of low freshwater runoff.

Waste Assimilative Capacity. The waste assimilation capacity of the estuary is dependent on its dilution and dispersion characteristics during a design flow regime. In Florida, the usual design flow regime for waste assimilation on streams not subject to tide-induced flow reversals is normally taken as the seven-consecutive-day, one-in-ten year (7-day Q_{10}) minimum discharge. Since the St. Johns River is subject to tidal effects, this flow condition may not be computed for reasons previously stated. The worst flow condition at the site in terms of effluent dispersion and dilution occurs when a minimum volume of water is discharged past the site in either the upstream or downstream direction. This flow condition, hereinafter referred to as the seven-consecutive-day average daily minimum absolute flow (7-day MAF) represents the 7-day period of record in which there was the least amount of flushing action in the estuary from either upstream or downstream flows. The design flow is usually taken as the once-in-ten-year minimum discharge. The short streamflow record of only eight years at Palatka prohibits a meaningful frequency analysis for a

10-year design flow. However, during the 7-day MAF of record from September 2 to September 8, 1971, there was volumetric flux upstream of only 2522 acre-feet. This represents an average flow rate of 180 cfs or a net rate of movement of the water body of less than 0.004 fps.

High Stages. The highest stage of record was 5.5 feet mean sea level (MSL) which occurred in September 1964 as a result of Hurricane Dora. This is the only hurricane to move inland from the east over extreme northeastern Florida in over 90 years of record. The strong, long duration onshore winds produced unusually high tides on the Atlantic coast from 5 to 8 feet or more above normal. The storm surge up the St. Johns River was further aggravated by increased freshwater flow caused by the storm's total rainfall, in excess of 10 inches over the northern portion of the St. Johns Basin.

Apart from Hurricane Dora, most tropical storms reaching this latitude have tended either to move parallel to the coastline well out to sea, or to lose much of their force by moving overland before reaching this area. As a result, most of the extreme stage events are the result of late summer and fall storms along the northeast Florida coast and are marked by winds of 20 to 30 miles per hour and steady drizzle. The greatest stage at Palatka resulting from such a storm was 3.8 feet MSL, on September 20, 1968.

Hurricane Dora was assumed to be a suitable design hurricane for use in determining hurricane surge elevations in the site vicinity.

The aerial extent of the Flood Hazard Areas and 1964 hurricane flood stages are shown in Figure F5.11.

5.3.1.2 Local Tributaries and Site Hydrologic Characteristics

Tributaries draining the general site area (Figure F5.12) are Rice Creek, draining 353 square miles southwest of the site, and Cedar Creek draining 18 square miles northeast of the site. Discharge records are only available for Rice Creek and are quite poor as the flow is affected by St. Johns River stages and effluent discharges from the Hudson Pulp and Paper Company.

Although records on Rice Creek at the U.S. Route 17 bridge indicate periods of zero discharge, such flows are the result of creek discharges being forced into storage by high stages on the St. Johns River. This is evident by the fact that the minimum discharge of record at the upstream Etonia Creek station is 54 cfs. The net average discharge from the basin is 345 cfs with a maximum net daily discharge of almost 6,500 cfs.

Average discharges of the remaining tributaries range from 18.0 cfs for Cedar Creek to 0.5 cfs for a small unnamed tributary draining the southwest corner of the site.

Site elevations vary from 5 feet MSL in the southeastern corner to 85 feet MSL in the central portion to 25 feet MSL in the north (Figure F5.11). The soils in the central or upland portion of the site are predominately of the Tavares,

Immokalee and Cassia soil series. The Tavares series is a nearly level, moderately wet, acidic, rapidly permeable deep fine sand. The Immokalee series is also nearly level to gently sloping, rapidly permeable fine sand, but is poorly drained. The Cassia series is a permeable fine sand that is moderately well drained. The upland portion of the site is surrounded by nearly level poorly drained fine sands of the St. Johns-Cassia-Adamsville soil series association.

The high rate of infiltration associated with the soils in the upland portion of the site, and the lack of elevation relief with the poorly drained soils surrounding the upland, results in an absence of well defined surface watercourses on the site. Rainfall percolates into the ground in the upland, migrates downslope, and eventually discharges into the lowlands.

The capability of a soil surface to resist erosion is a function of the soil's physical ,and chemical properties, the average rainfall intensity, length and degree of slope, and the vegetative cover. As the site has no defined surface watercourses, soil loss will be principally the result of sheet and rill erosion.

Site erosion is limited primarily to the upland portion of the site. Soils eroded from the upland slopes will be deposited in the surrounding lowlands.

The site area contributing to the sediment production was estimated to be in the order of 1550 acres. This area consists of the Tavares-Immokalee-Cassia soil series association with a vegetative cover of long leaf pine, turkey oak, grasses, and saw palmetto. Soil loss under the above parameters is calculated to be on the order of from 0.2 to 0.4 tons per acre per year. This is a relatively low rate of soil loss. By comparison, the average rate of erosion in the United States is 1.7 tons per acre per year (EPA, 1974); for agricultural areas, the average is 7 tons per acre per year; and unprotected highly erodible soils can yield as much as 350 tons per acre per year. The sediment delivery ratio may be as high as 0.5 resulting in the depositions of from 150 to 300 tons of sediment per year in the lowlands on and surrounding the site.

5.3.1.3 Water Quality

Florida Water Quality Standards. Water Quality standards are statements of the physical, chemical and biological characteristics of any water body which must be maintained if that water is to be acceptable under specific usage classifications.

Except for a portion of the headwaters, the entire length of the St. Johns River has been designated as a Class III water body. These waters are used for recreational purposes, including such body contact activities as swimming and water skiing, and for the maintenance of a well-balanced fish and wildlife population.

Specific standards for discharges of heated effluent into waters of the State of Florida classify the St. Johns River in the vicinity of the proposed site as freshwater and in the Peninsula Florida Climatic Zone.

A "zone of mixing", within which certain standards are not applicable, is according to 17-4.244 F.A.C. "...a volume of surface water containing the point or area of discharge and within which an opportunity for the mixture of water with receiving surface waters has been afforded". The St. Johns in the vicinity of the proposed discharge is an estuary to maximum allowable mixing zone of 125,600 square meters.

State of Florida water quality standards which apply to surface waters beyond the zone of mixing include 17-3.061, F.A.C. criteria that apply to all waters of the state; 17-3.121, F.A.C. criteria that apply to Class III waters; 17-3.05, F.A.C. thermal criteria for surface waters; and 17-4.244, F.A.C. criteria for toxicity.

Ambient Water Quality. The St. Johns River water quality sampling station nearest to the site is located at the U.S. Route 17 bridge at Palatka approximately four miles upstream of the site. Sampling is conducted by the USGS. Measurements of chemical quality parameters began in 1962 and were performed weekly from June to October of 1962 and from November 1966 to July 1973. From January 1974 to present the measurements have been monthly. Water temperature measurements began in October 1970 and were performed on a weekly basis until 1973. From January 1974 through February 1976 temperature measurements were conducted once-daily. Table 5.2 summarizes measurements from the St. Johns River compared with applicable Florida Water Quality Standards.

The St. Johns River in the vicinity of the site is classified as "Effluent Limited" meaning that additional wastewater discharges will be permitted so long as the wastewater meets secondary treatment standards (secondary waste treatment removes no less than 90 percent of BOD-5 and suspended solids). Effluent limited segments, in general, are not greatly affected by additional wastewater discharges provided that existing and new discharges meet specified effluent standards.

In the site vicinity, the St. Johns has relatively high nitrogen concentrations and, as a result, has some dissolved oxygen (DO) problems. Ten samples out of the available 64 had DO concentrations less than the DER standard of 5.0 mg/liter, and a minimum concentration of 2.7 mg/liter has been recorded.

Specific conductance and concentrations of total dissolved solids (TDS) and chlorides are relatively high in the Lower St. Johns, even though the river is classified as freshwater. Four heavy metals--cadmium, lead, mercury, and zinc--have been recorded at concentrations in excess of state standards at the Palatka sampling station. Historical water quality records (STORET Data System) indicated that these elements are exceeded at nearly every St. Johns River station.

Baseline water quality data were collected in September 1977 and January, February, and March 1978 in conjunction with the aquatic ecological monitoring program. Sediment samples were collected in April 1978. Sampling stations are depicted in Figure F5.12. In general, concentrations of various parameters measured were similar to those recorded by the USGS.

Water quality at Rice Creek is not as good as that in the St. Johns River. The creek has been classified as "Water Quality Limited", meaning that unusually stringent effluent limitations are required in order to meet water quality standards. Although water quality data are limited for Rice Creek, samples indicate problems with nitrogen, phosphate and DO.

5.3.2 Groundwater

5.3.2.1 Principal Aquifers

General. Two principal aquifers underlie the site: the water table aquifer and the artesian Floridan Aquifer. The Floridan Aquifer is of much greater local importance.

The water table aquifer consists of unconsolidated sand with some shell beds and some silty sands. Secondary aquifer zones, some of which are under pressure, are associated with this sand aquifer in some areas. However, the secondary artesian aquifers are not always present, and the water table aquifer can in general be thought of as being a single hydrologic unit. The water table aquifer extends from the surface to a depth of about 100 feet.

The Hawthorn Formation separates the water table and Floridan aquifers and is about 100 feet thick. These strata are confining but can locally include some permeable beds which act as secondary artesian zones; however, their primary function in the hydrologic system is that of a confining layer.

Under the confining strata is the Florida Aquifer, the principal and most important aquifer. This hydrologic unit consists of porous limestones with some solution cavities. A generalized stratigraphic column, indicating the principal hydrologic units and their water bearing characteristics, is given in Figure F5.13.

Water Table Aquifer. The unconsolidated sand at the surface of the site, together with somewhat indurated beds below that unit to a depth of approximately 100 feet, constitute a single aquifer. Some discontinuous beds of finer materials below about 45 feet in depth cause localized artesian conditions, but these are the exception. Most of the water in this aquifer exists under unconfined (water table) conditions (Figure F5.13).

The loose uncemented sand forming the top 40- to 50-foot layer is fine-grained and is Recent and Pleistocene in age. The lack of cement within the sand permits interstitial openings allowing moderate to high vertical and horizontal permeabilities. Recharge is from local precipitation.

The top or first layer overlies a second layer of silty sands, silts, clays, and sands of upper Miocene age which are about 50 to 60 feet thick. Shell beds within the second layer provide water supplies locally. The less permeable beds may act as confining beds for the Floridan Aquifer. Recharge can be from the water table aquifer, underlying artesian aquifer, or rainfall.

The water table aquifer is used as a source of water for some sixteen families in the town of Bostwick northwest of the site, and at a few scattered dwellings elsewhere within the five-mile radius of study. Most wells within five miles, however, tap Floridan Aquifer.

The water table aquifer provides adequate water supplies for general domestic uses. During this study, a production well was pumped at 48 gallons per minute (gpm) for 24 hours. A relatively shallow cone of depression was created with a 5.5-foot drawdown at its center. The specific capacity of the well was 9 gpm/foot of drawdown.

The Floridan Aquifer. The Floridan Aquifer is the primary aquifer at the site and is under artesian pressure. Since it is limestone, its waters are generally higher in dissolved calcium carbonate than the waters of the overlying water table aquifer. It is composed of several stratigraphic formations: the Lake City Limestone (oldest), Avon Park Limestone, and the Ocala Group (Inglis Formation, Williston Formation and the Crystal River Formation). In addition, about 10 feet of the lower beds of the Hawthorne Formation may be hydraulically connected to the underlying limestone formations, and, in effect, would be part of the Floridan Aquifer. A test well drilled during the study penetrated a total of 220 feet of the aquifer.

The thickness of the principal water-bearing zone in the Putnam-St. Johns-Flagler County area is about 450 feet. Within that range, the upper 50 to 200 feet of the Floridan Aquifer are more permeable than the lower 200 to 300 feet. An estimate of the average porosity of the upper 400 feet of the Floridan Aquifer is 62 percent.

At the site, the height to which water in a tightly-cased well will rise from the Floridan Aquifer when penetrated by a drill (called the potentiometric head) is about 30 to 28 feet above mean sea level (MSL), and 37 to 44 feet below land surface in wells F-1 and F-2, respectively. These wells, therefore, are non-flowing artesian wells.

Recharge to the Floridan Aquifer is from areas remote from the site. Direct recharge is also through sinkholes in the vicinity of western and southeastern Putnam County.

It is unlikely that percolating water from the onsite land surface could reach the Floridan Aquifer. Movement would be severely, if not completely, retarded by 100 feet of confining materials of very low permeability. Further, under present conditions, the percolating water could not reach the Floridan Aquifer due to the hydraulic gradient from upward artesian pressure of the Floridan Aquifer waters.

The potential for sinkhole development in the site vicinity has also been reviewed. Solutioning of the aquifer at depth, transport of subsurface material, and sink development is unlikely under existing gradients. This is reflected in the lack of topographic expression of recent sink activity in the site area.

5.3.2.2 Groundwater Flow

The topography of the site causes water within the water table aquifer to flow radially from the topographic high. In the northern part of the site, the flow direction is generally toward the lowland area, which is in turn drained by a ditch flowing northeast away from the site. In the southern part of the site, the water table aquifer flow is directly toward the St. Johns River. On the eastern and western areas of the site the flow is away from the site, toward lowlands.

Water table contours for the fall of 1977 are shown in Figure F5.14. Flow occurs at right angles to the contour lines, from higher toward lower elevations.

The flow of the Floridan Aquifer is best evaluated with a regional perspective. The potentiometric contours of the Floridan Aquifer in Putnam and adjacent counties are shown in Figure F5.15. Direction of flow is perpendicular to the contours and from higher to lower pressures.

5.3.2.3 Groundwater Quality

Water Table Aquifer. The quality of the water in the water table aquifer was generally good compared to U.S. Environmental Protection Agency (EPA) and Florida Department of Environmental Regulation (DER) standards. Total dissolved solids (TDS) averages were not over 164 milligrams per liter (mg/liter) on the site, and 310 mg/liter at the offsite well. Individual inorganic chemical constituents are also below the prescribed limits. However, turbidity in Well No. 1 and color in Well No. 3 were above the limits. In Well S-1, average turbidity was also above acceptable levels. Iron content was high enough to be noticed by users, but no EPA or DER standards prescribed iron.

Floridan Aquifer. The quality of water from the Floridan Aquifer is considered to be good. An objectionable odor, mainly due to hydrogen sulfide gas, was above EPA/DER limits in both wells (F-1 and F-2). Well F-1 was above the limits in odor, color and turbidity averages. The average total dissolved solids of Well F-2 is 617 mg/liter, which was above the 500 mg/liter recommended limit. No measured inorganic chemical constituents were above the limits set by EPA/DER. Only minor treatment of this water would be necessary to make it a good potable water supply.

Chloride content was measured in the Floridan Aquifer wells. Average chloride for Well F-1 was 12 mg/liter, whereas it was 189 mg/liter for Well F-2 about one mile east of Well F-1. Both wells produce from the upper 20 to 25 feet of the Floridan Aquifer. The difference was probably caused by the proximity of the brackish water near the bottom of Well F-2. That well is not only nearer the coast, but is also nearer an area across the St. Johns River in which artesian pressures have been lowered by pumping for irrigation. This area apparently has non-potable water located at a higher elevation.

The continuous lowering of artesian pressures in the agricultural area since 1900 has caused increased salt water intrusion. Lowering of the artesian pressures allows both an upward movement of more saline water as well as horizontal movement from the coast.

Regional water quality data (Figure F5.16) indicate that the reported higher chloride content of Well F-2 is to be expected. The depth to the base of potable water is shown to be about 250 feet below the land surface at the site. Chloride content at this elevation is, in part, a result of irrigation pumping and the area's proximity to the coast. Faulting along the St. Johns River may allow water of poorer quality to rise closer to the surface.

5.4 Aquatic Ecology

The St. Johns River emerges from marshes in east central Florida and flows northward for some 300 miles before reaching the Atlantic Ocean at Jacksonville. The northern two-thirds of the river is tidally affected and has dissolved solids content due to groundwater input from the Floridan Aquifer. The southern one-third of the river contains generally high quality fresh water. Agricultural runoff, groundwater discharge, and natural organic impurities progressively lower the water quality downstream. There are many intermittent ponds, swamps, and marshes and a few permanent lakes in the level plains of the upper St. Johns River Basin. Most of these wet areas are connected by sluggish streams or by wide shallow sloughs which drain into the tributaries of the St. Johns River. Several lakes occur along the river to the south; these lakes affect both the water quality and quantity in the St. Johns River in the vicinity of the site.

5.4.1 Site Characteristics

The site is considered to be in the lower basin of the St. Johns River; at this point the river is approximately 1800 meters wide and the average depth slightly more than 3 meters. Net velocity is on the order of 0.2 foot per second (fps) with a maximum on the order of one fps. The river in the vicinity of the site is influenced by tidal changes. The normal tidal range affects river flow to Deland, Florida; this is approximately 140 miles upstream from the mouth at Jacksonville. The entire 140 mile reach may be considered an estuary.

Man's influence is noticeable due to the effluent coming from Rice Creek which is located immediately upstream of the site. Bottom samples included anaerobic decomposition, in the area, and, additionally, contained wood filings. The combination of these characteristics and the lack of aquatic vegetation does not make this a very desirable habitat for aquatic species. Farther downstream along the west bank of the river several homes have boat docks and watercraft which are used primarily for sport fishing and/or pleasure boating. Approximately 750-900 meters offshore of the west bank, in the site vicinity, commercial fishing is much in evidence by the presence of gill and pound nets and crab traps. The most sought after species include several species of catfish, eels

during certain times of the year, and blue crabs. The commercial fish catch from the St. Johns River, Putnam County, amounts to approximately 1 to 2 million pounds per year.

Although transparency limits the euphotic zone, primary production, temperatures, and nutrient supplies are generally high enough to support a fairly high standing crop of biota year-round.

Aquatic biota of the upper St. Johns River Basin are typical of the fresh water habitats of Florida and include: green and blue-green algae, generally in low concentrations that dominate the phytoplankton; zooplankton, most commonly represented by rotifers and copepods; vascular hydrophytes including the water hyacinth and various sedges; and benthic macroinvertebrates including mussels, various crustaceans, dipteran larvae, and oligochaetes.

The fish fauna of the St. Johns River consists of 174 species which include 57 fresh water forms and 117 marine invaders.

5.4.2 Flora

5.4.2.1 Phytoplankton

The phytoplankton of the St. Johns River have been sampled extensively since the 1960's. Some of these studies were conducted near Rice Creek and Palatka. These studies have documented a decrease in species diversity along the river, particularly around the outflow of major lakes. It is commonly recognized that high rigor or stress in an ecosystem is accompanied by low community diversity, that is, dominance by few species. In developed areas this reduced diversity is often indicative of excessive pollution. In the St. Johns River studies, low diversity was commonly associated with high numbers of organisms with tolerance to organic pollution, particularly populations of euglenoids and blue-green algae. Some seasonal variation was observed, with low population densities and dominance by diatoms or blue-greens, especially Anacystis, in the winter; euglenoids, lesser populations of diatoms, and green algae in the spring; and high populations dominated by blue-greens in the summer and fall. The dominance of blue-green algae in this riverine/lake/ estuarine system may indicate a trend towards eutrophication resulting from increased organic pollutants, such as detritus, sewage wastewater, and runoff from agricultural areas. Also, greater light availability, due to removal of water hyacinths and higher temperatures promoting growth of thermophilic algae may contribute to this trend.

The phytoplankton collections of the lower St. Johns River represent 193 species, including 55 diatom species, 39 species of blue-green algae, and 99 species of other algae (green, gold, and miscellaneous other groups).

All algal groups were represented by higher populations at the various transects in September than in January with blue-green algae dominating all sampling stations during both seasons sampled. Diatoms were next highest in density. Overall, the blue-greens comprised 62 percent of the January collection and 64

percent of the phytoplankton obtained in September, while diatoms made up only 23 percent and 20 percent in January and September, respectively. The green, gold, and other algae comprised only about 15 percent of the phytoplankton during both surveys. The algal densities at offshore sampling stations were generally similar to those collected at onshore stations for January. However, onshore stations demonstrated consistently higher densities than offshore sites during the September sampling period, a time when overall population densities were at their highest. These differences in September were most obvious at Transect A where 83 percent of the blue-green algae and 84 percent of the diatoms were obtained from the nearshore sample. The other phytoplankton exhibited no apparent pattern of difference between offshore and onshore samplings.

The dominant blue-green algae at all transects in January were Oscillatoria acutissima (49-57 percent of all blue-greens) and Spirulina laxissima (16-19 percent of all blue-greens). In September, however, this species of Oscillatoria (O. acutissima) was replaced by two others; an unidentified species (16 percent of blue-greens at Transect A and 52 percent of the blue-greens at Transect D) and O. limmetica (29 percent at Transect C). Oscillatoria is listed as the second most pollution tolerant genus of algae. Additionally, Anacystis, another blue-green of importance because of its association with fish kills, was found to be dominant at Transect C in September.

The diatoms with dominant populations in January were an unidentified species of Navicula and Nitzschia gracilis at all transects. Shifts in dominance among the diatoms were evident in September when two species of centric diatoms, Cyclotella meneghiniana and Melosira italica, were dominant species, along with unidentified species of Nitzschia and Cocconeis. Melosira is a filamentous diatom and its prevalence in a population, like that of many filamentous blue-greens, may be a result of being selectively avoided by herbivorous zooplankton which find filaments difficult to ingest. Representatives of Nitzschia, Navicula, and Cyclotella are listed among the top 15 most pollution tolerant algae.

Of the other algae identified in this survey, the dominant species in January was Selenestrum minutum. In September, S. minutum was replaced as dominant by four other algal species including Senedusmus quadricauda and Ankistrodesmus falcatus, representative of genera listed by Palmer as among the top 10 of pollution tolerant algae.

The species diversity indices obtained in this study are consistent with similar values obtained in this same region of the St. Johns River.

In summary, the eutrophic state of the St. Johns River observed in earlier surveys is supported by present findings of this report. Pollution-tolerant, blue-green algae were dominant at every transect during both sampling periods, a generally recognized characteristic of eutrophic conditions. Further, the low nutritional value of these blue-green algae, as well as their association with production of fish toxins and anoxic conditions contribute to the degradation of the river.

5.4.2.2 Macrophytes

The term macrophyte applies to rooted and floating vascular plants that can be easil y seen with the unaided eye.

The flushing of floating plants and plant nutrients, characteristic of fast-moving streams, is absent in the St. Johns River and other Florida streams. Hence, these streams are often eutrophic and have an overabundance of aquatic weeds, particularly water hyacinth (Eichornia crassipes), hydrilla (Hydrilla verticillata), eurasian watermilfoil (Myriophyllum spicatum), and alligator weed (Alternanthera philoxeroidae).

One of the most limiting factors for submerged plants in the St. Johns River may be light penetration. The relatively low Secchi Disc transparency value (0.35 - 0.66M) found at each transect in the present study suggests that light may be a major factor limiting the growth of submerged aquatic vegetation. Additionally, the Corp of Engineers has an aquatic weed control program that includes most of this length of the St. Johns River.

Aquatic macrophytes, the species most common to Transects B, C & D included water celery (Vallisneria americana), common water nymph (Najas quadalupensis), and stonewort (Chara sp.). Vegetation was generally scarce throughout the transect and none was found at depths greater than 1 meter. The predominant vegetation at Transect B, (Intake/Discharge Corridor A) was Vallisneria americana. Vegetation extended about 250 feet offshore.

5.4.3 Fauna

5.4.3.1 Zooplankton

Surveys of Zooplankton in the lower St. Johns River near Palatka and near Rice Creek show a cyclic fluctuation in zooplankton with a dominance of rotifers in August, cladocera in May and copepods and copepod larvae in February. The lowest zooplankton density was in November.

Other investigations have identified 10 species of zooplankton at the Rice Creek station during June 1977, which was the highest number among all samples collected. Additionally, this station produced the highest frequency of occurrence of rotifers and the lowest frequency of cladocera. The dominant zooplankton at the Rice Creek station were cladocera, making up 71 percent of the zooplankton collected, whereas copepods were dominant at all other upstream stations.

Recent collections at the four transects near Rice Creek produced 30 species of zooplankton. As a whole, January and September collections produced almost the same mean number of taxa per station and per transect. Diversity indices showed little difference among stations for each sampling period but measurable difference between periods; the mean index for January was 1.74 while that for September was 2.57. A low diversity index usually denotes a stressed system. This stressed, probably eutrophic, state was further substantiated by the finds, especially during September, of (1) several dominant genera (Brachionus,

Keratella, and Trichocerca) as well as, (2) the presence of several species of the same genus (Brachionus), either condition considered to be indicative of a eutrophic ecosystem.

A substantive difference was noted in the number of organisms sampled during the two seasons investigated. When compared by transect, the offshore samples were higher at Transect B in January and lower at Transect C than the onshore stations, but all transects had higher offshore densities during September.

There were several zooplankton taxa identified in this study with interdependent roles in the aquatic ecosystem. The dominant rotifer in the January sample was a species of Asplanchna. This organism is a first level carnivore that preys especially on rotifers of genus Brachionus.

The population dynamics of these two genera, therefore, are probably mediated by a predator-prey interaction. This may account, in part, for the low populations of Brachionus spp. when Asplanchna was present in January and the high populations of Brachionus when Asplanchna was absent in September. Keratella was another rotifer that dominated the zooplankton in September. Keratella sp., along with the rotifer Filinia, are warm water organisms with reproductive rates closely related to temperature. Thus, the warmer waters of the September sampling period or 84.4°F (29.1°C mean) correlate with high densities for these two organisms, in contrast to the reduced population of Keratella and the absence of Filinia during the cooler January collections or 47.48°F (8.6°C mean).

Seasonal fluctuations of zooplankton densities suggested a positive correlation with densities of the phytoplankton. Population increases of Polyarthra, for example, are reported to show a positive correlation with population increases of the euglenoid, Cryptomonas. In the current study, the highest concentrations of Polyarthra were found in September at Station 1, Transects A, C, and D, the sampling sites where Cryptomonas was obtained.

In summary, characteristics of high densities of rotifers in the zooplankton were reported in earlier studies along the lower portion of the St. Johns River. These reports were substantiated by recent data collections. The identification of 6 rotifer genera in this survey from 9 rotifer genera proposed as indicative of eutrophic conditions suggests an aquatic system under considerable environmental stress.

Effects of season on zooplankton distribution were apparently more important than effects due to variation in station location or proximity to shore. Fall zooplankton increases, however, were greater in offshore populations. This implied possible influences nearshore from increased planktivore activity, increased blue-green algae populations, or absence of suitable substrates.

5.4.3.2 Benthic Macroinvertebrates

Macroinvertebrates in the St. Johns River have been studied generally and in the vicinity of the plant. Since the presence and abundance of macroinvertebrates reflect their sensitivity to edaphic factors, especially the substrate type, and presence of aquatic vegetation, these factors were to be addressed in site-specific sampling of the Putnam Site.

Forty-three taxa of macroinvertebrates were collected during September 1977 and January 1978, representing 21 insect taxa and 22 non-insect taxa. During both of the collecting periods, the major taxa collected were dipterans, crustaceans, and oligochaetes. Of these, the dipterans (the chironomids, in particular) were dominant.

Many of the benthic macroinvertebrates in the St. Johns River are estuarine species and these include a number of those species found at the site, among them Corphium sp., Cyathura polita, and Mysidopsis bigelow.

Only one aquatic organism Procladius sp., occurred at all stations and transects (January 1978). The next most widely distributed macroinvertebrates, a Bythiniid snail and Limnodrius spp., occurred at 7 of the 8 stations and at all transects (September 1977). Gammarus sp., Limnodrilus hoffmeisteri, and immature tubificid worms were well distributed at 6 of the 8 stations (January 1978). Organisms showing limited distribution, occurring at 4 to 5 stations, were Hyalella azteca, Cyathura polita, Coelotanypus condinnus, a Bythiniid snail and Limnodrilus spp. during January 1978.

As classified by EPA for tolerance to organic wastes, these major taxa were all either tolerant or facultative in response to decomposable organic wastes. The presence and wide distribution of pollution tolerant macroinvertebrates at the site generally agree with results of the studies of other organism assemblages.

The greatest abundance of taxa was found along the control transect (Transect A, both Stations 1 and 2 combined). Fewest taxa were found at Transect B (Corridor A) in September 1977 and Transect D (Corridor C) during January 1978. More taxa were collected at inshore than at offshore stations. Also, there were greater numbers of organisms collected nearshore than offshore. The higher numbers of taxa and organisms found inshore may be related to the shallowness of that area; greater penetration of light; less water movement nearshore, and at some locations, the presence of macrophytes providing a more suitable habitat.

Seasonal trends in the numbers of benthic macroinvertebrates were observed during the January survey period; there was a total of 37 species collected, compared to 28 species during the September period. This may be due, in part, to the typically cyclical emergence patterns of most benthic macroinvertebrates. In contrast to the overall stability of oligochaetes and crustacean populations annually, insect species were least abundant during warmer months, but increased during the colder months.

Numbers of macroinvertebrates varied with each transect as well as seasonally although total numbers of macroinvertebrates at each transect were not significantly different. Macroinvertebrates were also collected at the site incidentally with gear primarily used in the collection of nekton, particularly fish. Collections consisted of grass shrimp, blue crab, and an unidentified species of crab. The overall distribution of blue crab was fairly uniform but not the distribution of grass shrimp.

In summary, the macroinvertebrate community in the St. Johns River at the site area is similar to communities in other sections of the river in terms of

species present, levels of abundance, species diversity, and equitability. Organisms were identified as tolerant to moderate or high levels of pollutants. No statistically significant differences were found among any of the potential intake/discharge transects with the exception of grass shrimp distribution. Grass shrimp were far lower in abundance at Corridor A. No unique species, habitats, or associations were noted among the macroinvertebrates.

5.4.3.3 Fish and Ichthyoplankton

The St. Johns River system supports an important fishery resource. Because of the unusual pattern of salinity in the St. Johns River, both marine and freshwater species occur for more than 103 miles upstream. The range of marine species is further extended upriver by mineral springs that increase dissolved solids along the river from Palatka to Lake George.

The St. Johns River system supports a diverse fish fauna of at least 174 species; 57 freshwater and 117 marine invaders. The sport and commercial fisheries of the system were valued at $20 million in 1970. Recently (1973-1976), the commercial fishery alone, in the vicinity of Palatka (Putnam County), was conservatively estimated to have an annual value of more than $1.2 million from the landing of 1 to 2 million pounds of fish.

The commercial fishery of the river is dominated by catfish (White and Channel catfish) landings; however, the American eel, white mullet, striped mullet, red drum, and American shad are also important components of the landings. In 1974, nearly 90 percent of the commercial American shad and 98 percent of the American eel landings in Florida were from the St. Johns River. Blue crabs are also an important commercial fishery resource in the St. Johns River and are sought as far upstream as Lake George.

Major factors which may contribute to changes include municipal and industrial waste, watershed development and decay of water hyacinths, which contribute to eutrophic conditions. Other factors include runoff of pesticides, dredging, waterfront development, and restricted commercial fisheries operations.

Some of the more important game and/or sport fish include American shad and white and channel catfish, which are also major commercial species. Other important sport fish include largemouth bass, black crappie, striped bass, bluegill, redear sunfish, and several other species of sunfish (bream).

Game and food fish (including freshwater catfish, bass, crappie, bream, American shad, mullet, and flounder) accounted for 18 percent by number and 42 percent by weight of fish collected during the survey. By weight, the game and food fish were most abundant at downstream Transects C and D where they made up 45 and 56 percent of the catch, respectively. The abundance of game and food fish at Transects C and D may be due in part to the abundance of submerged aquatic vegetation. Transects near Rice Creek had a somewhat reduced game and food fish population of 32 and 37 percent by weight at Transect A and B, respectively. The reduced game and food fish at these transects may be due in part to the poor water quality (including high nitrogen, specific-conductance and low D.O.) of Rice Creek and lack of submerged aquatic vegetation.

Blue crabs, bluegill, redear sunfish, largemouth bass, and striped mullet were collected at all transects. White catfish and black crappie were common but not taken in collections at Transect D. Non-game fish such as the gizzard shad and Florida gar were also collected from all transects. Largemouth bass of more than 3 pounds were collected from all transects and an 8 pound specimen was collected at Transect C.

Larval fish net surveys were conducted in February, March, and April 1978 to identify spawning and/or nursery areas and to determine their relative spatial and seasonal variation in the vicinity of the site. A total of 11 species of fish were collected during the three month larval fish survey. Approximately 99 percent of the fish were collected at night. The large night catches may be due in part to diurnal activity patterns of the small fish and net avoidance behavior during the day. No night collection was made during February.

Densities of fish from larval net collections were generally higher nearshore than offshore except for one case at Transect C and one at Transect D. Some studies have indicated that larval fish densities in the St. Johns River near Palatka are very low from October through March; significantly higher in April and May and at their highest densities between June and September. Fish collected recently in larval net tows were least abundant at Transect B in March while the second smallest collection was made at the same transect in April. Similar trends were noted during the March seine surveys at Transects A and B where the smallest collections were made. No statistically significant differences in abundance were found comparing total nearshore versus offshore collections.

The larval fish net collections were characterized by marine invaders with the exception of the gizzard shad. The bay anchovy was the most abundant fish collected. The blueback herring was the second most abundant fish in March. The only valuable game and food fishes collected during the survey were the American eel, striped bass, and striped mullet which were never reported in large densities. Similarly the March seine collections were dominated by non-game fish, primarily the blueback herring, bay anchovy and an unidentified shiner. The species composition of the fish during the recent survey was significantly different from that found in studies conducted two years earlier upstream. The threadfin shad, gizzard shad, naked goby, and hogchoker (all non-game fish) comprised more than 82 percent of all the fish collected during the earlier survey. This difference may be attributed to several factors including water quality, seasonal variation, and significant differences in habitat between the two survey areas.

In summary, the submerged beds of aquatic vegetation at Transects C and D seem to contribute the most desirable habitat of the transects sampled for food and game fish. The most abundant game and food fish collected during the survey included the catfish, bass, bream, and mullet; while the non-game fish were generally dominated by shad and gar. The most suitable habitat and highest densities of fish were nearshore in the vicinity of Transects C and D. However, there were no indications of either significant spawning grounds or nusery areas at any transect. Few food and game fish were collected during the larval net survey. The species found did not include threatened or endangered species.

5.4.4 Endangered Species

The only fish species listed as endangered which has been reported from the St. Johns River system is the shortnose sturgeon. This fish is very rare and only two specimens have been reported since 1949; the most recent collections being south of Palatka in 1977. The decline in abundance of this fish has been attributed to pollution, overfishing, and loss of spawning habitat due to navigation and flood control projects. The life history of the fish is not well known, but, it is believed that they reach sexual maturity in about five years and spawn in late April. It is not likely that this fish breeds in the St. Johns River system. Typical spawning habitats of turbulent waters in deep pools and over hard rocky bottoms are not found in the St. Johns River near Palatka.

Two species of fish reported from the St. Johns River system have been given a "threatened status" by the State of Florida, and the Florida Committee on Rare and Endangered Plants and Animals. The threatened fish are the Atlantic sturgeon and the Lake Eustis minnow. The Lake Eustis minnow is the only fish endemic to the St. Johns River system; however, it is not known on the main stem of the river. The Atlantic sturgeon is as rare as the shortnose sturgeon in the St. Johns River system. The most recent collection of this fish in the St. Johns River system was in 1949 during a shad seining operation in Crescent Lake, Flagler County. The reasons for the decline in abundance of this fish are similar to those for the shortnose sturgeon. Its life history is not well known, although it is believed to reach sexual maturity after 10-12 years and spawn in early spring. It is also unlikely that this fish breeds in the St. Johns River system. Typical spawning habitats of turbulent waters in deep pools and over hard rocky bottoms as, noted above, are not located in the St. Johns River near Palatka.

Several species of fish reported from the St. Johns River system have been designated as rare or "of special concern" by the Florida Committee on Rare and Endangered Plants and Animals. The species designated as rare include the sea lamprey, shortnose sturgeon, eastern mudminnow, snail bullhead, opposum pipefish, mud sunfish, blackbanded sunfish, mountain mullet, and the river goby. The dusky shiner and bluenose shiner are designated as "species of special concern". The shortnose sturgeon is the only fish on this list which is also listed by Federal or state agencies. All of these fish are considered to be rare in the St. Johns River system with the exception of the snail bullhead. None of these fish has been reported recently from the St. Johns River near Palatka nor have any been collected in sampling conducted at the site.

The West Indian (Florida) manatee (Trichechus manatus latirostris) is a large aquatic mammal currently listed as a threatened species by the State and an endangered species by the U.S. Fish and Wildlife Service. The range of the manatee on the Atlantic coast extends from the Florida Keys to the St. Marys River. Manatees are most abundant in the area between New Smyrna Beach (Volusia County) to the St. Lucie River (Martin County). Within the St. Johns River they range from Lake Monroe north to the mouth at Jacksonville.

Manatees select habitat locations based on (1) availability of vascular aquatic vegetation, (2) proximity to channels of at least two meters depth, (3) avail-

ability of warm water during cold weather, and (4) a source of fresh water. The presence of vascular aquatic vegetation near the river shoreline at the proposed site could attract manatees. However, the abundance of suitable vascular plants along most of the St. Johns River shoreline suggests that manatees would not be preferentially attracted to the site solely because of vegetation.. The reduction of thermal discharge by the use of cooling towers and the extension of the point of discharge and associated mixing zone well beyond the vegetated area should not further induce attraction to the area. The U.S. Fish and Wildlife Service has determined that the construction and operation of the proposed plant will neither jeopardize the existence of the manatee nor adversely affect its habitat.

5.5 Terrestrial Ecology

5.5.1 Regional Description

The dominant natural feature in this region is the St. Johns River. The St. Johns River together with its tributary, the Oklawaha River, flows from the Central Highlands of Florida northward to the Atlantic Ocean. The St. Johns River is the main water course through the flat coastal plain region paralleling the coastline in the northeastern section of Florida.

The coastal plain east of the Putnam Site is extremely flat, with an elevation less than 25 feet above sea level. The dominant vegetation type is Pine Flatwoods. Pine Flatwoods are characterized by a rather open overstory of one of several pine species with a thick understory of gallberry and palmetto.

5.5.2 Vegetation

On the Putnam Site, 35 tree species, 31 shrub species, 118 herbaceous species, 11 vine species, and 2 epiphyte species were studied. The total number of plant species recorded was 207 indicating diverse vegetative cover. Four major habitats were represented on the Putnam Site: the Sandhill Commuity, Pine Flatwoods, Bayhead Forest, and Hardwood and Cypress Swamp. Pine Plantations, Cypress Heads and scattered Oak Hammocks were present on site to a lesser degree (Figure F5.20).

Sandhill Community. The Sandhill Community may occur in three different forms or phases: (1) turkey oak phase (*Quercus laevis*); (2) southern red oak phase (*Q. falcata*); and (3) sand post oak phase (*Q. margaretta*). All three phases were found in combination with longleaf pine (*Pinus palustris*). In addition, all three phases occur in limited extent on the Putnam Site, but the turkey oak phase characterized the majority of the upland portion of the site which comprises 25 percent of the site. Turkey oak distribution is due to extensive onsite lumbering activities which have removed marketable pines.

The Sandhill Community exhibits a very low diversity. This is due to a number of environmental factors including the rather sterile soils, the xerix edaphic conditions, and inhibitory effects of the longleaf pine (i.e., shading and presence of tannins in needle litter).

Pine Flatwoods Community. Pine Flatwoods are found on the southeast and northeast portions of the Putnam Site and comprise approximately 46 percent of the site. This habitat is an open subclimax forest of slash pine (Pinus elliottii), saw palmetto, and scattered hardwood shrubs. Three awn grass is generally the dominant ground cover.

The Pine Flatwoods is an intermediate stage in succession from open field to hardwood forest. The Bayhead Forest is an onsite example of what much of the Flatwoods would become if not inhibited by factors such as fire and grazing which keep hardwoods from dominating status.

Pine Plantation. Portions of the site have been extensively managed for pine production. Approximately 8 percent of the site is Pine Plantation. These areas have been cleared of all vegetation and planted in slash pine. The southwest portion of the site has recently been clearcut and planted with pine seedlings while the northwestern side of the site is dominated by 10 to 15 year old planted pine. Grasses, forbs, and shrubs have vegetated the clearcut area.

Oak Hammock Community. A few Oak Hamocks occur along the southwestern corner of the site on areas that are fairly well drained. The major overstory species in these areas is live oak (Quercus virginiana) which is strongly dominant.

Bayhead Forest Community. There is an extensive Bayhead Forest in the northwestern portion of the site. This community covers approximately 7 percent of the site. This area was, in the not-too-distant past, a low Pine Flatwood. The suppression of fire as an influencing factor enhanced the development of the successional trend from pond pine (Pinus serotina) to Bayhead Forest. The understory stratum is dominated by a dense growth of palmetto (Sabal minor), but a complex mixture of young trees also occur. The herbaceous stratum was strongly dominated by bracken fern (Pteridium equilinum).

Hardwood and Cypress Swamp Community. A mixed hardwood and cypress swamp occurs in the northern portion of the property and covers 7 percent of the site. The soil in this low-lying area was either inundated or (partly to completely) saturated with water. Large bald cypress (Taxodium distichum) stumps indicating that this species was at one time dominant or at least codominant with the hardwood species prior to extensive logging. The dominant hardwood species were sweetgum (Liquidambar styraciflua), ash (Fraxinus caroliniana), water tupelo (Nyssa aquatica), and red maple (Acer rubrum). Sweetgum is strongly dominant.

The understory stratum is comprised mainly of young ash and maple, and some shrubby growth of chinquapin (Castanea alnifolia) and box elderberry (Sambucus canadensis).

The very wet soil was covered by a low layer of herbaceous growth. Occasional grasses or sedges were present although most of the ground cover consisted of water pennywort (Hydrocotyle sp.), ferns, and lizard's tail (Saururus cernus). A common epiphyte in this habitat was wild pine (Tillandsia fasciculata). Wild pine is usually found attached to cypress trees and except for spanish moss is the most common bromeliad to be found in Florida.

Cypress Head Community. A number of Cypress Heads occur throughout the Putnam County site. These cypress "domes", as they are sometimes called, are very small, seldom more than two or three acres in size. They comprise less than two percent of the site area. Pond cypress (Taxodium ascendens) is virtually monodominant in these stands. Peat moss (Sphagnum sp.) is also very common, as are a number of other species such as pitcher plant (Sarracenia minor) which are characteristically found in acid soil.

5.5.3 Amphibians and Reptiles

Twelve species of herpetiles were collected or observed on the site. These included two species of salamanders, three species of frogs, two species of toads, three species of lizards, one species of tortoise, and one species of snake. These species were found in either the upland habitats or bottomland habitats on site. The upland habitats collectively include the Sandhill Community, Pine Flatwoods, Pine Plantation and Oak Hammocks. The bottomland habitats include the Bayhead Forest, Cypress Heads, and Hardwood and Cypress Swamp.

Upland Habitats. The upland habitats were occupied by the American toad (Bufo americanus), southern toad (Bufo terrestris), southern fence lizard (Sceloporus undulatus undulatus), ground skink (Leiolopisma laterale), green anole (Anolis carolinensis), gopher tortoise (Gopherus polyphemus), and southern black racer (Coluber constrictor priapus).

The American toad occurs in a variety of habitats. It tends to prefer habitats which contain shallow bodies of water used as breeding sites in the early spring. This large toad is commonly observed on warm, rainy nights in the spring and fall but is encountered only occasionally during the hot summer months. This may be due to the toad's practice of estivating during much of the summer.

The southern toad was active on the site throughout most of the summer, especially at night. However, during the hotter months, it confined its activities to the wetter portions of the Putnam Site.

The southern fence lizard is an abundant reptile in the dry open habitats of northern and central Florida. This lizard was commonly seen scurrying along the ground in the Sandhill and Flatwoods. When approached, it rapidly seeks shelter in a nearby tree.

The green anole is a smooth skinned lizard commonly called the "chameleon". This lizard is chiefly aboreal, and is found in any habitat with abundant vegetation and shade. It was abundant in all the habitats on the Putnam Site.

The ground skink is seldom found in trees. The Pine Flatwoods and Sandhill Community is preferred over the more mesic bottomland areas by this skink. This secretive and elusive reptile was found in these dryer habitats under leaf litter and rotten logs.

The black racer was the only snake species found on the site. This alert and active snake is found in most terrestrial habitats and is most common in open woods and forest edges. It was found in the Pine Flatwoods on site.

The gopher tortoise is one of the better known residents of the Sandhill Community yet is becoming increasingly scarce due to overhunting and loss of habitat.

Bottomland Habitats. Five herpetile species found in the bottomland habitats on site included the southern leopard frog (*Rana utricularia*), squirrel treefrog (*Hyla squirella*), little grass frog (*Limnaoedus ocularis*), slimy salamander (*Plethodon glutinosus*), and dwarf salamander (*Eurycea quadridigitata*). The southern leopard frog is found in all aquatic habitats. This alert, active frog is frequently found well away from water during the summer months when lush vegetation offers shade and protection. Leopard frogs were most common on site in the bottomland hardwoods area where there was an abundance of ground vegetation and pools of water in depressions, ditches, and tire tracks.

The squirrel treefrog is a small variable colored frog common to all habitat areas with lush vegetation. Specimens were frequently seen during the night-lighting surveys on site roads after showers.

The little grass frog is the smallest frog in North America. This tiny frog prefers the low grassy vegetation in Pine Flatwoods and Bayhead Forest but was most abundant in the cypress domes on site. This area afforded a wet habitat with grass and marsh plants available for cover.

The slimy salamander is abundant in moist terrestrial habitats in northern and central Florida. This rather large, dark salamander prefers to live in well rotted logs and stumps in areas in which the soil is frequently flooded. This salamander was found in the bottomland hardwood habitat on site. The smaller slender dwarf salamander was also found in this habitat. This salamander lives under logs, boards, and other debris in low Bayhead Forests and swampy areas.

5.5.4 Birds

Forty-four species of birds were observed on the Putnam Site associated with the upland or bottom habitat.

Upland Habitats. The Sandhill Community and Pine Flatwoods are attractive to such species as the bobwhite (*Colinus virginianus*), pine warbler (*Dendroica pinus*), ground dove (*Columbigallina passerina*), kingbird (*Tyrannus tyrannus*), white-throated sparrow (*Zonotrichia albiocollis*), savannah sparrow (*Passerculus sandwichensis*), field sparrow (*Spizella pusilla*), and loggerhead shrike (*Lanius lodovicianus*). Preferred habitat is old field habitat, which is any open relatively clear area in an early successional stage where grasses, sedges and other seed producing ground cover are abundant. This habitat was available in the clearcut area on the southwest portion of the site. Bobwhite were also present in the Pine Flatwoods areas, including those areas with relatively thick understory growth.

The pine warbler is one of the more common birds in any pine habitat. They occur in the upper portions of pines where they search for insects in and on the pine bark. Also found in these upper levels of the pine habitats is the kingbird which acts as a fly-catcher.

The loggerhead shrike is another species which uses trees and overhead wires as perches. Shrikes were present at scattered locations throughout the Flatwoods habitat on site.

The sparrows are found either on the ground or in low, thick vegetation. The white-throated sparrow is found in any habitat that contains thick hedgerows and field edges. The savannah sparrow and field sparrow are birds of fields, pastures, and brushy hedgerows. These sparrows were most commonly observed in the open pinelands on site.

The ground dove is a diminutive resident of sandy habitats throughout the deep south. This dove was common in the Flatwoods and Sandhill Community on the Putnam Site.

Bottomland Habitats. These habitats contained bird species which require moist, lushly vegetated areas for food and cover. Some of the bottomland species observed on the Putnam Site include the yellow-rumped warbler (*Dendroica coronata*), black-and-white warbler (*Mniotilta varia*), brown thrasher (*Toxostoma rufum*), cardinal (*Cardinalis cardinalis*), white-eyed vireo (*Vireo griseus*), rufous-sided towhee (*Pipilo erythrophthalmus*), chuckwills-widow (*Caprimulgus carolinensis*), and pileated woodpecker (*Dryocopus pileatus*). The warblers are abundant migrant visitors to Florida. The yellow-rumped warbler is a low-ranging bird preferring bushes, hedgerows, and thickets rather than taller trees. It is fond of wax myrtle and redcedar, both of which are common in the Bayhead Forest in which it was seen on the Putnam Site. The black-and-white warbler prefers swampy areas. The brown thrasher frequents thick, bushy places. Another bird commonly found scratching around the forest floor is the rufous-sided towhee.

The cardinal is possibly the best-known bird in the state. Thickets and bushes are essential to its well-being; therefore, it is common in hedgerows, bottomland habitats, and swamps. It does not occur in pure pine stands or open praires.

The white-eyed vireo is a common but seldom seen resident of dense, moist deciduous woods.

One common summer resident in this area is the chuck-wills-widow. This large, nocturnal bird is rarely seen. It spends the day perched on the ground in deciduous woods where its mottled, dark brown coloration blends with the forest litter.

The largest of the woodpeckers found in bottomland areas is the pileated woodpecker which has been able to adapt to a changing environment and has extended its range into other localites. It is found in any habitat having large dead or dying trees.

Non-Specific Habitat Preference. Several birds may be expected to occur in almost any habitat in Florida. Those observed onsite include the mockingbird (Mimus polyglottos), common crow (Corvus brachyrhynchos), blue jay (Cyanocitta cristata), and turkey vulture (Cathartes aura). The mockingbird is the State bird of Florida and no portion of the State is without it. It is partial to shrubby areas but is common in any habitat from orange groves and residential areas to hedgerows and deep woods.

The common crow is a wide-ranging bird which has adapted well to man's taming of the land. Flocks of crows may be expected in any habitat.

Another common bird found on the Putnam Site and throughout Florida is the blue jay whose habits are similar to the crow.

The turkey vulture is commonly seen in any region of the south. They are quite important in the elimination of decomposing animal matter and garbage.

Several raptors were observed on the site. These include the red-tailed hawk (Buteo jamaicensis), screech owl (Otus asio), and the barred owl (Strix varis). The red-tailed hawk is the largest of the Florida hawks and is frequently seen soaring over many habitats. The screech owl thrives in open pinelands, palmetto scrub, and hammocks. The barred owl is a common resident of southern swamps and river bottoms.

Three important game bird species which occurred on the Putnam Site were the bobwhite (Colinus virginianus), mourning dove (Zenaidurs macroura), and wild turkey (Meleagris galapavo). The bobwhite prefers sandy, open pineland and old fields as its habitat. The mourning dove is a common resident of the open country, preferring pastures, cultivated fields, and sandy areas. It nests in bottomland forests.

The wild turkey is common in dense hammocks and the drier swamps. It may also be found in Pine Flatwoods and palmetto prairie where the thick scrub offers cover. Turkey tracks were quite numerous in the Hardwood and Cypress Swamp on the north portion of the site and were also common on roads through the Sandhill and Flatwoods.

No evidence of rare or endangered bird species was found on the Putnam Site.

5.5.5 Mammals

Fourteen species of mammals were observed on the Putnam Site. Of these species, the most abundant and obvious mammal on the site was the feral hog (Sus scrofa). Hogs were found in all habitats, but thrive in the Pine Flatwoods. Hogs frequent bottomland habitats where mast from oaks, gums, ash, maple, and other bottomland species is abundant. Tracks and evidence of rooting were abundant in all site habitats.

The whitetail deer (Odocoileus virginianus) is the only other large mammal found on the site. This familiar herbivore is found in any habitat forested enough to

offer cover and food in the form of browse and mast. Bottomland areas are productive habitats for deer. The Pine Flatwoods is the most common habitat in Florida and supports a substantial deer population. Deer were most common in the bottomland areas of Putnam Site. Hunting pressure and disruption on the site probably have caused the deer to move elsewhere for suitable habitat.

The primary carnivore found on the site is the bobcat (Lynx refus). It was identified in the bottomland habitats.

The gray fox (Urocyon cinereoargenteus) is another predator whose presence on the site was common. Tracks and droppings were found on all the roads through the site.

Two additional omnivorous species found on the Putnam Site are the raccoon (Procyon lotor) and opossum (Didelphis marsupialis). These animals prefer the wetter habitats. Signs of activity were especially abundant around any depressions and pools where amphibians might be found.

The armadillo (Dasypus novemcinctus) is a mammal which is now common to most of Florida. It is found in all but the wettest habitats. Armadillos dig underground burrows, usually located in palmetto thickets, for protection. Signs of digging were common in the Sandhill, Flatwoods, and Bayhead Forest habitats on site.

The only rabbit species observed on this site was the eastern cottontail (Sylvilagus floridanus). The cottontail is abundant in habitats containing heavy brush intermixed with open areas. One such area was the recently clearcut pine habitat in the southwest portion of the site.

The eastern gray squirrel (Sciurus carolinensis) is a resident of the bottomland areas. This squirrel is chiefly aboreal and prefers hardwood habitats. The eastern fox squirrel (Sciurus niger) is found in open pine habitats such as the Flatwoods and Sandhill.

The only small rodent captured in 276 trapnights in various habitats during three seasons was the cotton mouse (Peromyscus gossypinus). Two mice were captured in the Bayhead Forest habitat; one young mouse was captured in the drift fence in the same habitat. Cotton mice prefer wooded habitats bordering fields or swampy areas.

Evidence of the eastern mole (Scalopus aquaticus), was found in all habitats except those with standing water. The Bayhead Forest contained the highest number of tunnels, but tunnels were also present in the more moist portions of the Pine Flatwoods habitat.

Two other mammals seen on site which deserve mention are the domestic dog (Canis familiaris) and cat (Felis domesticus). Hunting dogs were observed on the site from time to time.

No rare or endangered mammals were encountered on the Putnam Site. This site has been exposed to frequent disruption by logging, burning, and clearing as

well as competition and general habitat destruction from the introduction of feral hogs. These factors have probably caused a noticeable lack of ground dwelling animals and make the area generally unattractive to species considered endangered or rare.

5.5.6 Endangered Species and Biologically Sensitive Areas

A historic lack of management practices and recent disturbances to the plant communites on the site have greatly reduced the possibility that a population of a threatened or endangered plant species may occur. No species presently on the Federal list of threatened and endangered plants are found in Florida.

Florida has several vegatative communities which are endemic to the state and provide specific habitats to varied wildlife species. Many of these wildlife species are becoming more scarce as their habitats are lost to residential, industrial, or agricultural development, or as an effect of changes brought about in topography or surface and groundwater flow. One such habitat, the Sandhill Community, is disappearing due to development because it is generally a well drained area of slightly higher elevation. Several wildlife species associated with the Sandhill are also disappearing due to this loss of habitat. These species include the Florida gopher frog, gopher tortoise, eastern indigo snake, shorttailed snake, Florida scrub lizard, Florida scrub jay, red-cockaded woodpecker, and Florida mouse. All but the scrub jay and red-cockaded woodpecker are directly associated with the gopher tortoise. This terrestrial turtle is an accomplished burrower and prefers to excavate its burrow in the deep sandy soil of the Sandhill. The burrows provide shelter for a multitude of Sandhill inhabitants such as the ground dwelling species previously mentioned as well as pine snakes, coachwhips, diamondback rattlesnakes, burrowing owls, and numerous arthropods.

Currently, the eastern indigo snake is listed as a threatened species by the State of Florida and the U.S. Fish and Wildlife Service. The gopher tortoise, gopher frog, and Florida mouse are listed as threatened by the State. The tortoise has had the distinction of being listed as a threatened species at the same time it is considered an official game species. The gopher tortoise is undergoing a status determination by the U.S. Fish and Wildlife service. The fact that gopher tortoise burrows are relatively easy to locate due to their association with the Sandhill vegetation type has led to a problem of overhunting.

The Florida scrub jay does not depend on the Sandhill as its primary habitat. It utilizes many other so-called "scrub" areas in which the more xeric oaks and sand pine, saw palmetto, myrtle, and gallberry are found.

The red-cockaded woodpecker is unique in that it nests almost exclusively in living pines infected with the fungus called "red-heart." This fungus weakens the tree's heartwood and enables the bird to excavate its cavity. The longleaf pine, when available, is preferred as a nesting site, and since longleaf pine is the dominant species in the longleaf pine-turkey oak community on the Sandhill, this woodpecker is commonly found in that habitat.

Investigations on the Putnam Site, however, revealed that of the listed endangered or threatened species only the gopher tortoise was present in the Sandhill Community. No other associated species mentioned previously were found. The site has been heavily impacted in the past. The larger longleaf pine has been removed years ago, thus making the site unattractive to the red-cockaded woodpecker. Smaller trees which were left, and have been cut in the past year, were too small to offer nesting opportunities to this species. No scrub jays were found during the survey onsite. Evidence of "gassing" (either for tortoises or rattlesnakes) was found at several tortoise burrows, so it is quite likely that many burrow inhabitants have been removed or perhaps destroyed by this technique. Also the presence of feral hogs on the site has probably adversely affected the residents due to habitat disruption, competition for food, and predation by the hogs.

Three tortoises of different sizes were found on the site. One tortoise was only 5.2 centimeters long (carapace); the other two were adults. The majority of the tortoise burrows observed were in use, but since tortoises may use more than one burrow, it is not possible to determine the number of tortoises present by the number of active burrows.

Other species of special concern have been noted on or near the Putnam Site. The southern bald eagle (Haligeetus l. leucocephalus) is listed as endangered by the U.S. Fish and Wildlife Service. However, the eagle is probably more abundant in Florida than anywhere else in the United States. The recent Cross Florida Barge Canal Restudy Report surveyed eagle populations throughout the state and most specifically along the canal route, beginning in Palatka (5 miles south of the Putnam Site) and continuing south and west for 100 miles. Several active eagle nests were recorded in southern Putnam County.

Habitat requirements for the eagle include living slash pine and cypress for nest sites. Some scattered slash pines large enough to support an eagle's nest were present on the northern portion of the site and cypress was present along the St. Johns River directly south of the site. The site and adjacent areas were scanned by aerial survey for the purpose of searching for large raptor nests. None was observed on the site or along the St. Johns River from Palatka to Federal Point.

An eagle nest is possible on the site, although the site does not represent prime nesting habitat. The Rodman Reservoir, fifteen miles southwest of the site, is much more attractive due to the abundance of old pines and cypresses and its proximity to a large body of water. Active eagle nests were observed there during the Cross Florida Barge Canal Restudy.

The osprey (Pandion haliaetus) is listed as a threatened species by Florida. It was observed feeding in the St. Johns River near the Putnam Site. The aerial survey previously mentioned, and an additional ground survey, failed to locate any osprey nests in cypress trees along the St. Johns River at any of the areas under consideration for sites for water intake/discharge structures. The osprey prefers to nest in the tops of dead trees; few of the trees in these areas were dead, as most were located on residential property from which any dead tree would have been removed. More suitable nesting habitat was probably located in

the Rice Creek swamp area south of the site, although no nests were actually observed there either.

5.6 Social and Cultural Conditions

5.6.1 Regional Overview

The Putnam Site lies within the Southern Florida Flatwoods land resource region, an area of approximately 17,900 square miles. Approximately 90 percent of the southern Florida Flatwoods region is in private ownership with the remainder in State and National forests, game refuges and military facilities. More than 25 percent of the area is in forests which are used extensively for grazing purposes. Approximately 50 percent of the area is used for pasture. The remaining area consists of mixed managed and native rangeland vegetation.

5.6.1.1 Putnam County Land Use

Land use in Putnam County in 1972 was dominated by forest and wetland area classifications (Table 5.12).

Soils. County soil maps indicate that approximately 45 percent of Putnam County is suitable for urban and community development of a general nature. However, much of the development area is not suitable for sanitary facilities such as septic tanks and sewage lagoons normally associated with residential units, therefore limiting development potential for this use. Agricultural development potential of the soils in the county is only moderate, with 57 percent of the soils suitable for improved pasture uses and 37 percent suitable for cropland uses. Approximately 46 percent of the counties' soils have high to moderate potential for pine forest production.

Agriculture. Agriculture in Putnam County is diminishing in importance relative to other economic sectors. For the years 1969 to 1974, the total land used for farms declined by 42 percent and the average size of farms decreased by 40 percent. Similarly, the amount of cropland, pasture, and woodland on farms decreased as did the amount of livestock in the county.

Land Ownership. Putnam County is dominated by large single ownerships of land. Much of the land is owned by pulpwood and paper companies who manage the land for long-term returns on forestry products. It is likely that future expansion of these companies would entail the conversion of more land into tree farming plots.

5.6.1.2 Land Use Within 5 Miles of the Site

Land use within 5 miles of the site is depicted in Figure F5.21. Analysis of the areal extent of the land uses within the five mile radius is shown in Table 5.13. There are no military facilities of major importance within 5 miles of the site.

In the immediate site vicinity, residential areas are the most notable concentrations of urban development. Some intensive agricultural operations occur in the site vicinity.

Industrial Development. The County's largest industrial concern, the Hudson Pulp and Paper Company, is located approximately 3.4 miles southwest of the site. The pulp mill covers approximately 275 acres with 90 acres of associated water treatment reservoirs nearby.

Florida Power & Light's Putnam and Palatka plants, located on the St. Johns River approximately 7 miles south of the proposed site, are the nearest electric power generating facilities. Both plants are oil-fired, but only the Putnam plant is operational.

Recreation. The St. Johns River is a significant recreational attraction of Palatka and Putnam County. Palatka is known as the "Bass Capitol of the World" and has been the site of many bass fishing tournaments. Fishing camps are numerous on the river, but the heaviest concentration occurs south of Palatka rather than in the Putnam Site vicinity. The river also provides recreational opportunities for other water sports such as pleasure boating and water skiing. Residential and second-home development along the river is prominent, and the area is expected to remain an attractive locale for such development.

Onsite Land Use. Historically, the site has never been used intensively for agricultural activities or urban development, but has generally served as rangeland or timberland. The site is presently used for foraging operations and has recently been timbered. No urban uses or intensive agricultural operations occur on the site.

Most of the site has a good potential for forage and timber production, while potential food crop suitability appears lowest. No prime or unique agricultural land is found on the site.

5.6.1.3 Future Land Use

Zoning and Ownership Influences. Land use in the site vicinity is expected to remain much as it is at present. Putnam County is not expected to experience development pressures as intensely as other counties in the coastal zone. Much of the land in the county is owned by pulp and paper companies, assuring perpetuation of this land in a forested state. However, this land may be considered as being unavailable for development, forcing development of acreage now in private ownership. Most of the area north and southwest of the plant is held by private individuals rather than companies or corporations. Those companies owning land east of the site vicinity are mainly concerned with cattle operations, so large-scale development of the property is unlikely.

Since much of the area in the site vicinity is zoned as agricultural or open rural land, rezoning would be necessary for its development. Zoning of the area, then, gives the county the opportunity to control development and to prevent conflicting uses.

Ownership density of lands in the site vicinity and along the St. Johns River is depicted in Figure F5.22. The figure also shows which lands have been platted and are under development for residential uses. It is likely that these areas will be the first lands in the site vicinity to be developed. In general, these areas are sufficiently distant from the site to avoid conflicts.

5.6.1.4 Historic, Scenic, Cultural, and Natural Landmarks

Public Lands. The nearest State Park, Ravine Gardens, is south of the city of Palatka and 7 miles south of the site. The park is 182 acres in area.

The Hudson Wildlife Management Area and the Rice Creek Sanctuary comprise 13,000 acres approximately 4.7 miles southwest of the site.

Archeological and Historical Resources on Site. Between November 1977 and May 1978 a survey was conducted to identify, locate, and assess cultural resources on the Putnam Site in accordance with 36 CFR 800, "Procedures for the Protection of Historic and Cultural Properties." The survey area comprised some 2,380 acres and included the Putnam Site proper as well as three potential outfall corridors to the St. Johns River. Little activity of historical significance has been recorded for the study area, and no sites of National Register importance were indicated by the documents.

Two prehistoric shell middens were found on the bank of the St. Johns River in outfall Corridor B. This site contains intact stratigraphy and, being likely to yield information important in prehistory, must be considered eligible for inclusion in the National Register of Historic Places.

The Putnam Site and outfall Corridors A or C could be used for the proposed purpose without adverse impact upon existing or potential National Register or otherwise significant sites.

National Register Sites. The nearest National Register sites are located in Palatka, approximately 5 miles south of the Putnam site. REA has determined that the proposed generating facilities will not affect sites listed or eligible for listing in the National Register.

5.6.2 Demographic Characteristics

5.6.2.1 General Population Characteristics

In 1970, the nine counties within 50 miles of the Putnam Site varied in size from Duval County's population of 528,865 to Flagler County's population of 4,454 (Table 5.14). With a population density of 690 persons per square mile, Duval County is by far the most densely populated county in the study area. At the other end of the spectrum, Flagler County has a population density of only 9 persons per square mile. Putnam County, with a density of 47

persons per square mile, is the third least densely populated county in the study area.

Migration into Florida has traditionally played a large role in the growth rate. In the study area, with the exception of Clay and Volusia Counties, net migration has been below the state average. Clay County has experienced high rates of positive migration apparently due to its proximity to Jacksonville, while Volusia County's growth rate appears to be due, in part, to the attractiveness of the Daytona Beach area.

In 1970, 97.9 percent of Duval County's population was classified as urban. Putnam County, the primary impact area, had only 25.7 percent of its population classed as urban.

5.6.2.2 Age Distribution of the Population

For the census year 1970, Florida's population had a median age of 32.5 years. Of the study area counties, only Flagler and Volusia Counties had a median age exceeding the state average. Clay County, with a median age of 25.5 years, had the youngest population in 1970; Alachua County had the highest percentage (62 percent) of population in the 18-64 year age group; and Putnam County had a relatively young population, with 28.8 percent being in the 5-17 year age group. In general, the population of Putnam County is younger than that of the State of Florida as a whole.

5.6.2.3 Educational Characteristics of the Population

In 1970, for persons 25 years or older in Florida, the median number of school years completed was 12.1. Within the Seminole impact area, the range for the median number of school years completed varied from lows of 10.3 years in Bradford County, and 10.7 years in Putnam County, to a high of 12.4 years in Alachua County, where the University of Florida is located. For the state as a whole, the percent of population 25 years or older with four years of college or more was 10.3 percent. But within the Seminole impact area, only Alachua County (23.1 percent) and Volusia County (10.7 percent) exceeded the state average in this category. In general, the educational attainment level in Putnam County is below that of the State of Florida as a whole.

5.6.2.4 Population Trends and Baseline Projections

Population projections for the State of Florida and the Seminole impact area counties for the period 1976 through 2020 are presented in Table 5.15.

Over the period 1976 to 2020, the annual rate of population growth in Florida for the medium projection is expected to be about 1.6 percent per year. Of the Seminole impact area counties, only Clay, Flagler and Marion Counties are expected to grow at a faster annual rate than the state as a whole. Flagler

County, with a projected annual growth rate of 2.2 percent in the medium case, leads all counties in the study area. This relatively high projected growth rate is due in part to the expected impact of IIT's Palm Coast community development project in Flagler County. When completed in the 1990's, the Palm Coast development is expected to add over 600,000 people to Flagler County, a prime tourist and retirement area. This development is also expected to have a significant impact on the rate of population growth in southern St. Johns County, which currently relies on tourism in St. Augustine as its primary impetus to growth.

Clay County, with a medium projected annual growth rate of 2.1 percent, currently supplies over 5,000 commuting employees to various businesses in Duval County. Clay County's rate of population increase is expected to remain relatively high.

Only Alachua, Duval, Putnam, and Volusia Counties have medium projected population growth rates lower than the state average.

5.6.2.5 Population Within 5 Miles of the Site

Population distributions and densities within 5 miles of the site are depicted in Figure F5.23. The highest density levels in the vicinity of the site occur in Palatka and East Palatka. Average density for the area surrounding the site is approximately 33 persons per square mile.

Much of the area on the east bank of the St. Johns River and in the Orange Mills vicinity has been subdivided for residential development. The most significant future residential area near the site is a platted and partially developed subdivision along State Route S209 about 2.5 miles east of the site boundary.

Much of the growth in Putnam County since 1970 has occurred around the City of Palatka and the general East Palatka area. It is likely that much of the projected population increase will occur in these areas.

5.6.3 Social and Economic Characteristics

Preliminary estimates indicate that the proposed plant, once all construction is completed in 1986, will require at least 140 permanent employees receiving an annual gross payroll of over $4,126,533 in 1986 dollars.

5.6.3.1 Delineation of Study Area

The site is near Bostwick in Putnam County, Florida (Figure F5.24). Since most of the activities involving construction and operation of the power plant are expected to occur in Putnam County, the primary impact area for the purpose of this study is defined as Putnam County. Palatka, the Putnam County seat, is the major urban center within the primary impact area. A secondary impact area, consisting of the nearby counties of Alachua, Bradford, Clay,

Duval, Flagler, Marion, St. Johns, and Volusia, has been studied as well. The secondary impact area includes a number of major urban centers, all within approximately 50 miles of the site, from which it is expected that much of the skilled labor required for plant construction will come. Table 5.16 briefly summarizes the population characteristics of the study area.

5.6.3.2 Labor Force Characteristics

The size of the civilian labor force in the impact area counties in 1970 varied from a high of 199,101 in Duval County to a low of 1458 in Flagler County, with Putnam County falling in between with 13,049 (Table 5.17). In the same year, unemployment rates varied from a high of 4.4 percent in Putnam County to a low of 1.4 percent in Flagler County, as compared to the Florida average of 3.8 percent. Of the nine impact area counties, only three, (Bradford, Putnam, and Volusia) experienced unemployment rates higher than the state average.

Employment by Occupation. In 1970, 14.1 percent of the labor force in Florida was classified as being employed in manufacturing (Table 5.18). Within the Putnam impact area, Alachua was at the low end of the range with only 7.5 percent employed in manufacturing, while Putnam County had by far the largest percentage with 28.7 percent employed in manufacturing. Putnam County's large percentage of employees in manufacturing occupations is a result of Putnam County's heavy reliance on pulp and paper product manufacturing for its primary source of income. For the study area as a whole, however, only two counties, Clay and Putnam, exceeded the state average of 14.1 percent.

Construction employment in 1970 ranged from a low of 4.9 percent of the labor force in Putnam County to a high of 8.9 percent in Volusia County. The state average in that year was 8.5 percent.

Employment by Industrial Sector. Three sectors appear to constitute Putnam County's economic base: the agricultural, the manufacturing, and the state and local government. (See Table 5.22.)

The manufacturing sector in Putnam County is by far the most important single sector for generating employment. In 1974, this sector accounted for nearly 25 percent of total county employment. Manufacturers of paper and allied products supply the bulk of the jobs in the manufacturing sector, accounting for 2,454 jobs in Putnam County in 1974 or approximately 77 percent of all manufacturing jobs.

The largest single employer in Putnam County in 1974 was the Hudson Pulp and Paper Company with 2,400 employees. The plant accounted for nearly 19 percent of total Putnam County employment in that year. The importance of the Hudson Pulp and Paper Company to the economy of Putnam County is illustrated in Table 5.19, "Putnam County Employment Characteristics". In 1973 the Hudson Pulp and Paper Company employed 2,650 people. By the end of 1974, owing to recession conditions, Hudson had laid off 250 workers, thus reducing employment to 2,400. From the table, it can be seen that Putnam County's unemployment rate jumped from 3.7 percent in 1973 to 6.2 percent in 1974, an increase of 67.6 percent.

It is thus evident that the overall economy of Putnam County is very sensitive to those factors which might affect operations at a single manufacturing plant, Hudson Pulp and Paper Company.

Baseline Employment Projections. Employment projections for Putnam County, prepared by the Jacksonville Area Planning Board (Table 5.20), represent what is likely to happen to employment in Putnam County in the baseline case in which the Seminole Plant is not constructed. All sectors are expected to grow in terms of employment except for the agriculture and mining sectors.

5.6.3.3 General Income Characteristics

Table 5.21 presents data for total personal income and per capita personal income for the nine Putnam Site impact area counties for the years 1974 and 1975. Putnam County had the highest growth rate in both total personal and per capita personal income between 1974 and 1975 of the nine counties. This increase can be partially attributed to the income generated by construction of the Florida Power and Light Company's new generating units in East Palatka. Despite the increases, Putnam County still experienced an extremely low 1975 per capita personal income of $4,018. Only Bradford County, at $3,722 trailed Putnam. These figures are far below the 1975 state average of $5,640 and the impact area high of $5,646 in Duval County.

Percentage increases in per capita personal income for the project area between 1974 and 1975 are rather misleading since income is measured in nominal terms in the Table. When inflation is taken into consideration, and real income changes are measured, real per capita personal income increased by only 2.4 percent from 1974 to 1975, while per capita personal income increased a nominal 12.3 percent.

Sources of Income. Personal income is often classified according to the source of the income. With regard to wage and salary disbursements and proprietor's income, Putnam County appears to be within a few percentage points of the state average. However, from 1970 to 1974, Putnam County's income from dividends, interest, and rent was, on the average, 38 percent below the state level. This evidence further supports the contention that Putnam County's economy shows very little diversity and points out the weakness of the finance, insurance, and real estate sectors within the county. On the other hand, over this same time period, Putnam County's income from transfer payments averaged 31 percent above the state level. Since transfer payments include welfare to unemployed persons and pensions for retired citizens, it becomes apparent that an unusually high percentage of Putnam County's income is derived from federal and state sources.

Average Wage and Salary Income, by Sector. As pointed out previously, the manufacturing sector constitutes the bulk of the economic base in Putnam County. In all industrial sectors, except manufacturing, Putnam County's average wage and salary income has been below both the Florida and national averages.

The importance of the Hudson Pulp and Paper Company, specifically, and of the paper and allied products industry, generally, to the economy of Putnam County is further illustrated by the fact that for the years 1973, 1974, and 1975, in all manufacturing sectors except paper and allied products, Putnam County's average wage and salary income is below the state average for all years. The importance of the paper and allied products center is so great in Putnam County that Putnam County's average wage and salary income in this sector not only exceeds the state averages for all years, it exceeds the average strongly enough to offset the weaknesses of the other sectors, and enables the overall manufacturing wage average and salary income in Putnam County to exceed the state average for all years cited.

Baseline Income Projections. Baseline income projections for Putnam County as prepared by the Bureau of Economic Analysis and the U.S. Corps of Engineers (Table 5.23) represent only one of many possible scenarios for growth in Putnam County. Overall, the growth rate of real personal income for Putnam County over the years 1980-2000 is projected at an annual rate of 3.7 percent per year. The total employment growth rate over the same period is projected to be 1.3 percent per year.

5.6.3.4 Housing

The existing housing situation in the Putnam impact area was investigated to provide a basis for estimating the potential housing pressures that may develop during the proposed station construction and operation phases.

Existing Housing Stock. As of 1970, Duval County had the largest number of year-round housing units in the Seminole impact area, with 174,149 units, and Flagler County had the smallest number of units, with only 1,841. In a 1976 survey of housing, there were 17,220 dwelling units in Putnam County, of which 59 percent were classified as single family structures, 38.6 percent were mobile home residences, and the remaining 2.4 percent were apartment-type structures. 93 percent were considered to be safe and adequate for occupancy.

Recent years have seen a trend toward the use of permanent dwellings and mobile homes for recreational or vacation purposes in Putnam County. As a result, approximately 3,250 units are vacant for much of the year. Therefore, only 13,970 units of the county total of 17,220 should be considered as being available for the use of permanent residents. Data from the 1976 survey indicate that there was an overall 12.3 percent vacancy rate for these 13,970 dwelling units. In other words, 12,252 were occupied and 1,718 were vacant. Of the 1,718 unoccupied units, 1,567 were considered safe and adequate for occupancy.

Building Activity. Between 1960 and 1970, Clay County experienced the largest percentage increase (64.2 percent) in housing stock of the nine Seminole impact area counties. The only other two counties that experienced a change in housing stock greater than the state average of 45.4 percent were Alachua County with a 55 percent increase and Marion County with a 54.1 percent increase.

In July 1973, Putnam County began to issue building permits for new housing in the county. Since record-keeping began in July 1973, 490 single family unit building permits and 2521 mobile home permits were issued through December 1975.

According to the Putnam County building codes, mobile homes can be placed in any appropriately zoned area of the county, as long as the lot size is at least one-half acre in size in order to accommodate the installation of a mandatory septic tank and of an optional well.

Housing Costs. June 1976 data for Putnam County indicate that the average rent for efficiencies was $100/month. For one-bedroom apartments, rents averaged $125-$150/month; for two-bedroom apartments, $185-$200/ month; and for three-bedroom apartments, $210-$225/month. The data also indicated that the availability of two- and three-bedroom apartments in Putnam County appears to be greater than the availability of efficiencies and one-bedroom apartments.

Purchase prices of existing homes in Putnam County ranged from $15,000 for a two-bedroom middle income home to $35,000 for a 4-bedroom middle income home. The availability of small middle income homes and all sizes of low income homes for purchase was rated as very low. Rental prices for the larger middle income homes ranged from $160-$200. The smaller middle income and all low income homes rented for $100-$150/month.

Although rents (of $150-$250 per month) for one- and two-bedroom apartments are higher in the Jacksonville area than the rents for comparable housing in Putnam County, the availability of such apartments appears to be fairly high.

5.6.3.5 Public Services

The discussion of existing public services in this section will focus on Putnam County.

Education. The Putnam County School District consists of eight elementary schools (Kindergarten through fifth grade), four middle schools (grades six to eight), and three high schools grades nine to twelve). The combined student capacity of these fifteen schools is 11,952, which exceeds the 1977-78 combined estimated enrollment of 10,448.

All schools in the district meet the Florida State Department of Education's recommendations that the classroom area per pupil must be at least 35 square feet for Kindergarten through second grade, 30 square feet for grades three through six, 28 square feet for grades five to eight, and 25 square feet for grades nine through twelve. Additionally, all schools in the district meet the Department's recommendations that the student-teacher ratio not exceed 25 for elementary school students and 30 for middle and high school students.

Projections through the accademic year 1981-82 indicate a general trend of decreasing enrollment from 10,567 total students in 1976-1977 to 10,333 total students in 1981-1982. There are no enrollment projections beyond 1982.

Putnam County also has a few private elementary and secondary schools, all of which are located in Palatka.

Six colleges and universities are located within the overall impact area. Vocational technical educational opportunities are available in St. Augustine at the St. Augustine Technical Center.

Five libraries are availale for public use in Putnam County.

Transportation. U.S. Route 17, the major north-south highway between Palatka and Jacksonville, will most likely be the primary access road to the Putnam Site. The U.S. Route 17 - State Route S209 intersecton is very dangerous and heavily congested during morning and evening rush hours, since State Route S209 is the only access to the homes along the riverfront, and since U.S. Route 17 is busy with traffic involving the Hudson Pulp and Paper Company employees and school buses. Additionally, the Rice Creek Bridge on U.S. Route 17, just south of the above-mentioned intersection, is a serious bottleneck during rush hours.

The State Department of Transportation's Five Year Construction Plan is designed to help alleviate the congestion problems in the Rice Creek area of U.S. Route 17, but the date of project completion is still uncertain.

Highway capacity of U.S. Route 17 in the vicinity of the Putnam Site in good weather conditions is approximately 14,000 cars per day at service level C (minimum stable flow rate retaining maneuverability). When the portion of U.S. Route 17 south of Rice Creek Bridge has been widened to four lanes, the basic (level C) capacity of the highway should be 22,500 cars per day with a possible capacity as high as 28,500 cars per day. For State Route S209, the best possible highway capacity at service level C is 10,500 cars per day, with a more conservative figure being 8,500 per day. Existing traffic levels on these highways are well below their rated capacity.

Putnam County is serviced by three major railroads. Approximately 28 passenger and/or freight trains pass through Palatka every 24 hours.

St. Johns River Barge Port is able to accommodate vessels up to 250 feet in length. Professional warehousing, materials handling, stevedoring, and container services are available at the barge port.

Putnam County has one general aviation facility, the Kay-Larkin airport, located about 3 miles from downtown Palatka; however, there is no scheduled passenger or freight service from Kay-Larkin. The Gainesville and Daytona Beach airports have limited scheduled airline services. Jacksonville International Airport, however, is a full facility airport served by major airlines as well as numerous minor airlines.

Medical Facilities. The major medical facility in Putnam County is the Putnam Community Hospital in Palatka. The hospital has 117 beds and an 80 percent occupancy rate, and offers many services including a coronary care unit,

pathology, radiology, physical therapy, electrocardiogram, nuclear medicine, isolation facilities, blood banks, outpatient services, and a 24-hour emergency room. Other medical facilities in Putnam County include two nursing homes.

As of 1975, Putnam County had thirteen general practitioners, one gynecologist, one pediatrician, and twelve other assorted specialists; also, eight general dentists, two orthodontists, and three dental specialists.

Additional medical personnel can be found in Crescent City, and eighteen other hospitals are located within the Seminole impact area.

Fire Fighting Facilities. Putnam County is served by 21 fire companies. In 1976, the County had approximately 7.5 firefighters per 1000 of population; the general minimum standard is 2.4 per 1000.

Police Protection. Putnam County is served by four different law enforcement agencies. In addition, the Florida Highway Patrol maintains a Division office at Palatka. In 1975, these five groups provided approximately 129 law enforcement officers, or about 2.95 officers per 1000 of population, comparing favorably with recognized law enforcement standards of 1.75 - 2.00 officers per 1000 persons.

Recreational Facilities. Recreation in Putnam County includes those activities that make best use of the ample water resources and warm climate of northern Florida: fishing, sailing, swimming, boating, and water skiing. Hiking and camping are also popular activities.

A local concert association sponsors musical events throughout the year, and the Florida School for the Performing Arts presents various dramatic events at the St. Johns River Junior College.

Other attractions include Walt Disney World in Orlando, the famous tourist center at Silver Springs, and the dog races at Orange Park in Clay County.

5.6.3.6 Public Utilities

Electricity and Gas. Putnam County receives its electric power from the Clay Electric Cooperative, a member of Seminole Electric Cooperative, Inc. (SECI), and from Florida Power and Light Co. Natural gas is supplied to the City of Palatka by the Palatka Gas Authority. Rural areas of Putnam County do not receive natural gas, but are served by about ten companies distributing liquid propane gas and fuel oil.

Water Supply Facilities. Putnam County does not presently provide water supply services within the County. Water is supplied, however, by a few of the incorporated municipalities, and by various other small-scale suppliers.

As of 1973, there were approximately 34 existing water systems in Putnam County. The majority of these systems provide disinfection services, but only the City of Palatka provides fluoridation and filtration in addition to disinfection. Individual wells supply water in areas of the County not served by central water systems.

The pulp and paper industry, which is the major industrial consumer of water in Putnam County, supplies its own water.

The City of Palatka maintains water storage facilities consisting of two 750,000 gallon tanks and one 400,000 gallon ground storage tank.

Sewage Treatment Facilities. Putnam County does not presently provide sewer services or maintain a system of storm drains. As of 1973, however, there were 19 separate sewage disposal systems operating in the county. The majority of the structures receiving central sewer service are within the incorporated municipalities of Palatka or Crescent City.

The majority of the County residents not receiving sewer service rely on the use of septic tanks for sewage disposal. However, it appears that much of the soil is poorly suited for the use of septic tanks for sewage disposal.

Solid Waste Disposal. The lack of an extensive collection system for the County as a whole has resulted in widespread roadside dumping despite the existence of three County-operated sanitary landfill sites. However, the use of these landfills may adversely impact ground water quality. No current plans exist to institute a County-wide solid waste collection service.

5.6.4 Water Use

5.6.4.1 Surface Water Use

Withdrawal. There is relatively little withdrawal from the St. Johns River throughout its length. The principal purposes for the withdrawal are domestic, industrial, and irrigation uses. Such uses of the river are, to a degree, limited by poor water quality throughout the entire course of the river.

The only significant domestic withdrawal of the St. Johns River occurs from Lake Washington in its upper reaches. The only significant surface water withdrawal from the St. Johns in the vicinity of the site is the Florida Power & Light Putnam Plant of Palatka, 7.5 miles upstream. This plant withdraws a maximum of about 15.0 cubic feet per second (cfs). Approximately 11.5 cfs of this is lost due to evaporation and drift. The Palatka Plant, adjacent to the Putnam Plant, is designed for once-through cooling, but is presently in cold standby status. Although the potential exists for a greater use of the river for irrigation, only minimal use occurs because of readily available groundwater of better quality.

Water Discharges. Based on the St. Johns River Water Management Plan, the plant site is located on the St. Johns River segment 20.3 FA. This segment extends from the confluence of Rice Creek and the St. Johns River, two miles upstream of the site, to Hibernia, Florida, 31 miles downstream of the site. Segment 20.3 HA extending from Rice Creek upstream through Lake George, and segment 20.3 GA, which encompasses the Rice Creek drainage basin, are the two adjacent upstream segments.

Downstream of the site, twelve wastewater treatment facilities discharge into segment 20.3 FA. The nearest facility downstream of the site is a manufacturing plant eight miles away.

Upstream of the site, seven wastewater treatment facilities discharge into segments 20.3 GA and 20.3 HA.

5.6.4.2 Groundwater Use

Selected wells within a five-mile radius of the center of the site were inventoried for physical characteristics and water use.

Of the 145 domestic, agricultural and industrial wells inventoried, approximately 74% withdrew from the Floridan Aquifer, 16% withdrew from the water table aquifer and 10% were undetermined.

Groundwater withdrawn in Putnam County during 1970 by use included 2.7 mgd for public water supply, (most from the Floridan Aquifer), 9.7 mgd for agriculture, and 15.5 mgd for industry.

5.6.5 Acoustics

5.6.5.1 Introduction

This section contains a description and results of the program conducted to obtain baseline ambient sound quality data at and near the proposed station. To describe sound quality, an ambient sound survey was conducted at six locations (Figure F5.19) to reflect the present sound climates at the site boundary and nearby noise-sensitive areas.

The ambient sound survey was conducted during the period November 17 to November 19, 1977. Sound level recordings were made on typical weekdays and weekend during daytime (0700-1800), evening (1800-2200) and nighttime (2200-0700) periods. The daytime periods from 0700-2200 hours and nighttime periods from 2200-0700 hours are used by the Federal U.S. Environmental Protection Agency (EPA) in its definition of day/night average sound level, L_{dn}.

5.6.5.2 Description of Ambient Sound Environment

The proposed site is located in a sparsely populated area immediately northwest of the St. Johns River. Noise sensitive land use areas adjacent to the site boundaries are scattered along U.S Routes 17 and State Route S209 (West River Road), near survey locations 3, 5, and 6. The dominant noise sources there are traffic along major routes, local traffic, resident activities, train noise along the Seaboard Coast Line Railroad and occasional aircraft overflights. During weekends, traffic along U.S. Route 17, State Route S209 and local roads increases. Resident activity also increases during the same periods. There was no noticeable increase in the number of trains passing along the Seaboard Coast Line Railroad. The largest nearby population concentration is the City of Palatka, approximately five miles south-southwest of the Site.

Location 2 is representative of the sound climate at the north end of town, where Route 17 enters Palatka and intersects with Highway 19. Traffic is the dominant noise source at this location. Activities at the nearby paper and saw mill also contribute to sound levels at this location.

Measurements at location 4 are representative of the existing sound climate on the site. Sound levels at this location are contributed by traffic on U.S. Route 17, train noise, and occasional aircraft overflights.

Present sound levels at Location 1 are predominantly due to local traffic, resident activities, train noise and occasional aircraft overflights. There was no noticeable variation in local traffic and resident activities between weekday and weekend measurement periods.

5.6.5.3 Summary of Sound Levels

Summaries of weekday and weekend ambient sound survey results for the data collected at the six monitoring locations are presented in Tables 5.10 and 5.11, respectively. These tables contain the statistical A-weighted sound levels, L_{95}, L_{90}, L_{50}, L_{10}, and L_5 and average sound level, L_{eq}, for each measurement period and L_d, L_n and L_{dn} at each measurement location. These data represent the background ambient sound levels of the existing environment at and near the proposed site.

5.7 Associated Transmission Facilities

5.7.1 Soils

Soil associations in the vicinity of the three preferred corridor alignments are depicted in Figure F5.25.

Impact on soils from transmission line construction occurs largely from increased runoff associated with removal of vegetative cover and alteration of surface water runoff patterns and velocity. Clearing, stripping, and grading

operations will result in removal/disturbance of top soil and mixing of various soil layers, thereby reducing soil fertility and exposing soil to the erosive elements of wind and water. Construction equipment movement is expected to mix, churn, rut and compact top soil, reducing infiltration of rainfall and surface runoff. This increase in the amount and velocity of runoff is expected to result in soil erosion. Sheet and gully erosion can be expected to occur, resulting in the loss or removal of top soil with formation of rills and gullies. Loss of top soil and soil compaction are expected to reduce soil productivity due either to physical removal of nutrients or by allowing nutrients to leach out.

Soil associations along the corridor that are expected to be highly susceptible to erosion are the Mascotte-Leon-Surrency Association; Chipley-Albany-Rutledge Association; Leefield-Mascotte-Albany Association; Stilson-Pelham-Mascotte Association.

Wetlands (marshes and swamps) are the habitats most vulnerable to construction activities. Wetland characteristics are to a large degree determined by depth and pattern of water circulation. The building of access roads will fill areas of wetland, causing the immediate area to change to a grass on old field community as well as disrupting surface water flow. Borrow pits may create areas of deep stagnant water. Erosion products from the building of the access road will accelerate the filling process. The opening of a corridor in wooded wetlands may cause increased wind damage to the shallow-rooted wetland forest.

5.7.2 Aquatic Ecology

During construction, excavation and other activities of tower construction in a river may increase turbidity in the immediate area. This temporary increase in turbidity, however, may be balanced by an increase in available nutrients downstream. The area of the river bottom actually used by the tower base is, of course, no longer available habitat for bottom-dwelling species, but the surfaces of the tower bases or the shelter they may provide may be attractive to other species. Runoff from clearing and construction could result in increased debris, turbidity, and sedimentation unless appropriate erosion-control measures are used.

The only significant impact after construction would be due to use of herbicides to maintain ROW clearance. When required, Seminole proposes to use only those herbicides approved by state and federal authorities which are safe, nonpersistant, and when applied in accordance with instructions, will not harm untargeted vegetation. Applications will be made in accordance with manufacturer's instructions. Seminole agrees that prior to application of herbicides, it will obtain the approval of the Florida Department of Environmental Regulation.

With the exception of the St. Johns River, the creeks or rivers can be crossed with a single 1500-foot span. It may be necessary to place towers in the St. Johns River. Use of the existing FP&L corridor will not eliminate the need for new towers, but it will confine the towers to an area already impacted.

The use of a submerged cable for river crossing was evaluated. In addition to a ten-to-one first cost differential between a submerged versus an overhead river crossing, there were environmental concerns such as the possibility of an oil loss to the river in the order of 10,000 gallons if, in the case of a submerged crossing, a pipe failure occurred. Seminole requires that the transmission lines carrying power from this plant be very reliable. 230 kV pipe type cable which is submerged has proven to be much less reliable when compared to an overhead line. Lakes within the one-mile wide corridors can be avoided.

5.7.3 Terrestrial Ecology

Description. The major plant communities likely to be encountered by the three preferred corridors are the Pine Flatwood, the Sandhill Community, the Sand Pine-Rosemary Scrub, the Freshwater Marsh, and the Hardwood and Cypress Swamp.

A large portion of the Pine Flatwoods is being managed for the production of pine pulpwood or sawtimber. This form of management calls for the removal of any tree species that might compete with pine for nutrients or growing space. Likewise all ground cover is discouraged; the ultimate result being a stand of pure pine timber. Fire is the primary tool in removing pine competition. Pines are somewhat fire resistant due to their thick, insulating bark, whereas other native plants are readily killed by fire. The monoculture resulting from this practice is unattractive to most wildlife species because of the lack of plant diversity that would offer higher-quality food sources. Also, the frequent burning (usually every three to five years) destroys any wildlife habitat which may exist. Pine stands that are not intensely managed and only infrequently burned can be quite beneficial to wildlife in the early years before the pines reach an age at which their thick canopies eliminate sunlight from the forest floor. Generally, the first seven years of the pine plantation's life are quite productive years for wildlife.

The Sandhill Community is vegetated with a longleaf pine-turkey oak overstory. This community type is disappearing in Florida due to development. Several wildlife species associated with the Sandhill Community are becoming scarce as more and more of this habitat is removed. These wildlife species include the gopher tortoise, eastern indigo snake, short-tailed snake, Florida gopher frog, Florida scrub jay and Florida mouse. All of these species, with the exception of the short-tailed snake, are listed as threatened species by Florida. The short-tailed snake is an endangered species in Florida and the indigo snake is listed as a threatened species by the U.S. Fish and Wildlife Service.

A distinctive plant community that in general appearance resembles the pine-scrub oak forests is the Sand Pine-Rosemary Scrub. This community is well developed in central areas of the State, as well as in other isolated places.

Shallow ponds and backwaters of river margins are usually the beginnings of freshwater marshes. Marshlands are treeless expanses, often with dense growth of herbaceous plants such as cattails, grasses, and sedges. In marsh pools, where the water is deeper, water lilies, pond weeds and other plants become established.

Swamp, a wetland covered with trees and shrubs, is usually developed from a marsh as sediment and plant remains gradually reduce the depth and frequency of flooding. Typically wet and occasionally flooded, swamp forests often persist for a long time, especially when they are associated with streams that periodically overflow. A multitude of animals occurs in the swamp habitat because of the abundance of food, water, heavy cover and a general lack of influence from man.

Impacts on Flora. Various activities involved in the construction of transmission systems have effects on vegetation. Direct impacts through displacement, removal, or damage during construction change the form, composition, and density of vegetative communities. In heavily wooded areas, the clearing of lines of sight for surveys involves cutting brush, branches and trees. ROW clearing removes all trees and brush on and next to the ROW that could interfere with the safe operation of the transmission line.

Forested areas will sustain the greatest impacts among the upland systems. Soil stabilization, nutrient retention, and moderation of environmental factors such as wind and runoff are characteristic of mature forests. When the tree canopy is removed, sunlight penetrates to the now-cleared forest floor, encouraging colonization by herbaceous and shrubby plants. Mature forest is then replaced by a condition approximating an earlier successional stage; the benefits of the forest are lost as it is cleared. However, earlier successional communities do have a higher ratio of food production to utilization than do adjacent forest communities.

The impact of ROW establishment on the forested sections of the alignment may be more substantial due to the clearing necessary in these habitats. All tall vegetation must be removed and controlled within the ROW in order to avoid interference with the power lines. This action introduces a new and not necessarily adverse habitat to the forested area. Once the forest overstory has been removed, grasses, forbs, and shrubs, will become established in the ROW. In the case of overstory removal in moist areas, aquatic plants such as sedges, rushes, and hydrophytes will occur. The establishment of this corridor would create an "edge effect," the tendency for increased variety and density of floral and faunal species at community junctions. The field-like habitat and its resultant edge would act much like natural forest openings, which have been demonstrated to be very important to wildlife. Numerous rodents, rabbits, groundnesting birds, songbirds, raptors, and reptiles would find useful habitat within the maintained ROW.

Adverse impacts may occur where the ROW is built up for access, resulting in restriction or diversion of surface water flow. This could result in the loss of downstream vegetation deprived of necessary water. This effect can be minimized by attempting to avoid disrupting the natural surface water flow, alternate means of ROW construction, and maintenance by other than conventional land vehicles.

Preferred Ranks 1, 2 and 3 cross 4, 3 and 12 miles respectively, of marshlands. REA has determined that there is no practicable alternative to avoid wetlands. Seminole will design and construct the transmission facilities to minimize adverse impact on wetlands.

Impacts on Fauna. The establishment of a transmission line across agricultural land will have very little effect on wildlife. Effects of construction noise and activity will be about the same as those occurring during normal farming operations. The more mobile species, such as birds, may be disturbed and leave the area temporarily, but they should resume normal activities once construction has been completed. The transmission towers may serve as new resting places for such species as blackbirds, vultures, swallows, and flycatchers in this open habitat. Hawks, owls, and shrikes will also perch on support towers, from which they will search for prey in the surrounding fields.

Endangered or Threatened Plants and Wildlife. Presently, no floral species federally listed as endangered and threatened are known to occur in Florida. Both the Florida Game and Fresh Water Fish Commission and the U.S. Fish and Wildlife Service have listed faunal species which may be threatened or endangered. Following is a list of those species which might reasonably be expected to occur in the section of Florida under study:

Endangered Species - species which are in danger of extinction throughout all or a significant portion of its range in Florida:

Short-tailed Snake (*Stilosoma extenuatum*)
Wood Stork (*Mycteria americana*)
*Ivory-billed Woodpecker (*Campephilus principalis*)
*American Peregrine Falcon (*Falco peregrinus anatum*)
*Red-cockaded Woodpecker (*Picoides borealis hylonomus*)
*Bachman's Warbler (*Vermivora bachmanii*)
*Kirtland's Warbler (*Dendroica kirtlandii*)
Florida Grasshopper Sparrow (*Ammondramus savannarum floridanus*)
*Gray Bat (*Myotis grisescens*)
*Florida Panther (*Felis concolor coryi*)

* Listed as an endangered species by U.S. Fish and Wildlife Service.

Threatened Species - species which may become endangered species within the foreseeable future in all or a significant portion of their range in Florida:

*American Alligator (*Alligator mississippiensis*)
Florida Gopher Frog (*Rana areolata aesopus*)
Sand Skink (*Neoseps reynoldsi*)
*Eastern Indigo Snake (*Drymarchon corais couperi*)
Osprey (*Pandion haliaetus*)
Southeastern Kestrel (*Falco sparvelius paulus*)
Florida Scrub Jay (*Aphelocoma coerulescens coerulescens*)
*Bald Eagle (*Haliaeetus leucocephalus*)
Audubon's Caracara (*Caracara cheriway auduboni*)
Great White Heron (*Ardea herodius occidentalis*)
*Arctic Peregrine Falcon (*Falco peregrinus turdrius*)
Florida Sandhill Crane (*Grus canadensis pratensis*)
Florida Mouse (*Peromyscus floridanus*)
*West Indian Manatee (*Trichechus manatus latirostris*)

Florida Black Bear (Ursus americanus floridanus) (Except in Baker and Columbia Counties and in the Apalachicola National Forest).

*Listed as a threatened species by U.S. Fish and Wildlife Service.

On the basis of Section 7(c) consultation with the U.S. Fish and Wildlife Service and the National Marine Fisheries Service, and a biological assessment conducted by Dames and Moore, REA has determined that the three preferred transmission facilities will have no impact upon Federally listed species, those proposed for listing, or their critical habitat.

5.7.4 Social and Cultural Conditions

Table 4.3 (in Chapter 4) summarizes the potential corridor characteristics considered in the alternative evaluations.

5.7.4.1 Land Use

The three preferred corridors cross a variety of land uses. The most prevalent uses are woodlands, agricultural lands, and marsh. There are a number of small residential areas either crossed by or close to the corridors. Table 5.24 provides a land use inventory. A transmission line will remove no land from agricultural use except for the area required for the tower bases; however, transmission lines may limit access by crop dusting aircraft.

Transmission line visibility and noise are considerations when routing near or through developed areas. If a transmission line is adjacent to a community, the primary impact may be visibility. Generally the three corridors are far enough from people for noise to be a minor factor. There are existing transmission lines through Lake Butler, Lake City, Orange Springs, Fort McCoy, and Ocala. It has not yet been established whether these existing transmission line ROWs can accommodate a 230 kV transmission line. If necessary, Fort McCoy, and Orange Springs, may be avoided by rerouting the line - additional cost and environmental impact will be incurred because these routes would require new ROW. Modification to the original corridor through Lake Butler has been made after consultation with representatives from the city. The corridor will pass to the south and west of the city. Ocala and Lake City cannot be avoided because of the location of the interconnection substations.

Sensitive land uses in the vicinity of the three preferred corridors are shown in Table 5.25. Wildlife Management Areas are crossed by corridors. In each case the area is owned by a paper or paper produce company (Hudson Pulp and Paper Company; Rayonier) which is using the land to grow trees for commercial purposes. The preferred corridors can use existing transmission line rights-of-way to cross the Wildlife Management Areas in each case except for Hudson Pulp and Paper Company's Wildlife Management Area east of Palatka (this is the northern Hudson Pulp & Paper Company Management area). The major land use impact through these areas is the removal of the ROW from production. The three preferred corridors do not cross or otherwise impact any lands within the Roadless Area Review Evaluation (RARE) category.

The corridors do not contain any sites listed or proposed for listing in the National Register of Historic Sites. Prior to construction of the transmission lines, the areas to be impacted will be professionally surveyed for archeological and historic sites and appropriate action taken to avoid or mitigate potential impact.

5.7.4.2 Socioeconomics

The socioeconomic impacts of constructing the proposed transmission line are not serious. The number of persons employed in building a line, 30 to 50, is not large enough to result in a regional, economic or social impact. Further, the construction crew is present only a short time in any one place. What may be impacts in terms of socioeconomics are: (a) traffic interference; (b) noise or dust; and (c) construction camps.

Construction camps will be located to minimize any local disruption; further, techniques such as watering will be used to reduce the impacts of construction-generated dust.

The major construction impact is likely to be the crossing of highways. Construction equipment will have to detour traffic temporarily until the transmission line is constructed.

Another impact could occur if all the materials, steel, wire, etc., were purchased locally; however, it is more likely that such materials would be purchased outside the study region. Further, the proximity of Jacksonville, Daytona Beach, Gainesville, St. Augustine, and Orlando will allow construction labor to commute from these urban centers.

Noise from the 230 kV line will result both during construction and operation. Maximum construction noise level is generally from 85 to 95 dBA at 50 ft. from the source. Construction will be generally confined to daylight hours. Noise at any given point will be generally of short duration since construction activity will move along the corridor. During operation, audible noise will be caused by the electrical sources but impact will be insignificant. Under some atmospheric condtions, a slight humming may be noticed directly under the line. The noise should not normally be heard any appreciable distance beyond the right-of-way. Noise from the operation of circuit breakers will have little environmental effect due to the infrequent operation.

An operational 230 kV transmission line can create certain electrical effects such as radio and television interference and potential induced voltage and electrical field effects.

The use of static proof hardware and tension stringing of conductors to prevent surface damage to conductors will make interference with radio and television highly unlikely. In addition, guidelines set forth in "Radio Noise Design Guide for High Voltage Transmission Lines," published by the IEEE in 1971, will be implemented. Should residences encounter interference problems, corrective measures will be taken by Seminole. Induced voltage could pose a problem when high voltage transmission lines parallel other facilities.

In no event will the shock current exceed 5 milliamps for any object (REA Bulletin 62-4). Test measurements of the amount of induced voltage built-up on conductive objects (fences, vehicles, metal structures) which are parallel to the transmission line will be made and corrective measures, such as grounding, will be taken if the corresponding shock current is found to be greater than 5 milliamps. When the proposed line crosses perpendicular to fences, the fence will be grounded at each end of the right-of-way width if it has been determined that the amount of induced voltage build-up may exceed the limits mentioned previously. No published scientific studies to date have shown effects on humans from electrical fields produced by 230 kV lines.

Seminole shall follow, to the extent practicable, the USDA/USDI guidelines contained in the Environmental Criteria for Electrical Transmission Systems (1970) to minimize any adverse environmental effects which may be associated with the construction, operation and maintenance of the line and associated facilities. Moreover, Seminole shall consult with appropriate Federal and/or state agencies as to appropriate mitigation measures to be used.

Table 5.1

GEOLOGIC AND HYDROGEOLOGIC CHARACTERISTICS OF STRATIGRAPHIC UNITS

Geologic age	Stratigraphic unit		Approximate thickness (feet)		General lithologic character		Water-bearing properties
	Western Putnam Co.	Remainder of area	Western Putnam Co.	Remainder of area	Western Putnam Co.	Remainder of area	
Recent and Pleistocene	Post-Hawthorn to Recent deposits	Pleistocene and Recent deposits	40 to 140	20–140	Poorly sorted fine to very coarse sand, kaolin, and sandy clays	Fine to medium quartz sand, coquina, and shell and clay lenses	Nonartesian aquifer; zones of relatively high average permeability, generally supplies small to moderate amounts of water to rural domestic wells and municipal wells tapping coquina or medium to coarse sand beds; yields vary locally depending upon texture and extent of deposits.
Pliocene(?)							
Miocene		Late Miocene or Pliocene deposits		20–100		Fine to medium sand, shell and green calcareous silty clay	Nonartesian and secondary artesian aquifers; zones of relatively low average permeability, locally yield small amounts of nonartesian water to wells tapping medium to fine grained sands in the Pleistocene and Recent deposits, Late Miocene or Pliocene dep sits and in the Hawthorn Formation; locally yield moderate amounts of artesian water to wells tapping shell bed in the late Miocene or Pliocene deposits and sand and limestone lenses in the Hawthorn Formation.
	Hawthorn Formation		0–120		Gray to bluish-green, plastic phosphatic, sandy clay; and thin beds of sand and sandy limestone		Impermeable clays and marls in both the Late Miocene or Pliocene deposits and in the Hawthorn Formation confines the artesian water in the Eocene Limestones and in the thin, lenticular sand, shell, and limestone beds above the Eocene Limestone.
Eocene	Ocala Group[1]	Crystal River Formation	0–120		White to cream, chalky, massive fossiliferous, marine, limestone		Floridan aquifer; yields large quantities of water to wells; utilized as the primary source of ground water in the project area. The formations that comprise the Ocala Group are similar in lithology and hydrologic properties and are considered to be a single hydrologic unit.
		Williston Formation	0–50		Tan to buff, granular, marine limestone		
		Inglis Formation	55(-) – 110		Tan to buff, coarsely granular to mealy, marine limestone; contains thin beds of dolomite and zones of foraminiferal coquina		
	Avon Park Limestone		150–245		White to reddish-brown, hard, dense limestone and dolomite; contains restricted zones of soft, porous, and locally chalky limestone; formation more completely dolomitized west of St. Johns River		Yields large amounts of water from soft, porous zones but dense, indurated zones restrict permeability so that generally yields are not as large as from overlying Ocala Group.
	Lake City Limestone		225+		Alternating beds of brown to buff, porous limestone; brown to white, massive limestone; bluish-gray to tan, dense, crystalline dolomite		

AFTER: B. J. BERMES, G. W. LEVE, AND G. R. TARVER 1963

TABLE 5.2

WATER QUALITY OF THE ST. JOHNS RIVER
AT PALATKA
COMPARED WITH STATE STANDARDS

Parameter[a]	Number of Measurements	State Limitation[b]	Number of Measurements Not Meeting Standards
Alkalinity	48	20[c]	0
Ammonia[d]	54	20[e]	0
Cadmium	23	1.2[e]	3
Copper (total)	12	30[e]	0
Dissolved Oxygen	64	5[c]	10
Iron (total)	16	1	0
Lead (total)	23	30[e]	2
Mercury (total)	25	0.2[e]	6
Nickel (total)	3	0.1	0
pH	51	6.0-8.5[f]	0
Selenium (total)	5	25[e]	0
Zinc (total)	20	30[e]	3

Source: STORET Data File

[a]Units in milligrams/liter unless otherwise noted
[b]Chapter 17-3.121, FAC, effective 3-1-79
[c]Minimum limitation
[d]Un-ionized
[e]Micrograms/liter
[f]Units

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Table 5.3

APPLICABLE AMBIENT AIR QUALITY REQUIREMENTS
FOR PRIMARY POLLUTANTS OF CONCERN

Category and Averaging Period	Sulfur Dioxide, $\mu g/m^3$ (ppm)	Particulate Matter, $\mu g/m^3$	Nitrogen Dioxide, $\mu g/m^3$ (ppm)
Florida Ambient Air Quality Standards			
3-Hour	1300 (0.5)[a]	---	---
24-Hour	260 (0.1)[a]	150[a]	---
Annual Arithmetic	60 (0.02)	---	100 (0.05)
Annual Geometric	---	60	---
National Ambient Air Quality Standards			
3-Hour, Secondary	1300 (0.5)[a]	---	---
24-Hour, Primary	365 (0.14)[a]	260[a]	---
24-Hour, Secondary	---	150[a]	---
Annual Arithmetic, Primary	80 (0.03)	---	100 (0.05)
Annual Arithmetic, Secondary	---	---	100 (0.05)
Annual Geometric, Primary	---	75	---
Annual Geometric, Secondary	---	60[b]	---
National Prevention of Significant Deterioration Increments			
Class II 3-Hour Maximum	512[a]	---	---
Class II 24-Hour Maximum	91[a]	37[a]	---
Class II Annual Arithmetic	20	---	---
Class II Annual Geometric	---	19	---

[a] Not to be exceeded more than once a year.

[b] As a guide to be used in assessing implementation plans to achieve the 24-hour standard.

Table 5.4

EMISSION STANDARDS APPLICABLE
TO COAL-FIRED STEAM GENERATORS

	Proposed Federal New Source Performance Standards [a]	Florida Emission Limiting Standards[b]
Sulfur Dioxide	1.2 lb/10^6 Btu	1.2 lb/10^6 Btu
Particulate Matter	0.03 lb/10^6 Btu	0.1 lb/10^6 Btu
Nitrogen Oxides (as NO_2)	0.6 lb/10^6 Btu	0.7 lb/10^6 Btu

Note: Standards applicable to fossil fuel-fired steam generators with greater than 250 x 10^6 Btu/h heat input.

[a]Federal NPS proposed on 9/19/78 also require the following reductions of defined potential emissions when combusting solid fuel:

Sulfur Dioxide reduction = 85 percent, except may be as low as 75 percent up to three 24-hour periods during any calendar month. Percent reduction can include credit for fuel pretreatment (washing).

Particulate Matter reduction = 99 percent.

Nitrogen Oxides reduction = 65 percent.

[b]Florida standards refer to maximum 2-hour average.

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Table 5.5

PARTICULATE MATTER AMBIENT AIR QUALITY DATA
(All concentrations in $\mu g/m^3$)

Station	Year	Highest 24-Hour	2d High 24-Hour	Annual Geometric Mean	Number of Samples
Kay Larkin Airport (DER)	1973	123	75	40	62
	1974	72	67	34	59
	1975	85	64	34	60
	1976	77	77	28	59
	1977	61	60	30	55
Yelvington Road (FP&L)	1975	87	76	34	48
	1976	68	59	30	31
	1977	92[a]	72	27[a]	121
Cracker Swamp Road (FP&L)	1975	119	113	42	48
	1976	166	75	31	31
	1977	183[a]	154	37[a]	120

[a] Does not include a concentration of 331 $\mu g/m^3$ at Yelvington Road and a concentration of 387 $\mu g/m^3$ at Cracker Swamp Road measured during a major dust storm in February which caused high TSP concentrations throughout much of the U.S. DER has decided that concentrations measured during this episode are not to be included in determining compliance with ambient standards.

Source: Florida DER

Table 5.6

SULFUR DIOXIDE AMBIENT AIR QUALITY DATA
(All concentrations in $\mu g/m^3$)

Station	Year	Highest 24-Hour	2d High 24-Hour	Annual Arithmetic Mean	Number of Samples
Yelvington Road (FP&L)	1975	10	8	3	53
	1976	10	5	1	31
	1977	18	10	1	119
Cracker Swamp Road (FP&L)	1975	15	11	3	54
	1976	10	8	1	33
	1977	17	6	1	121

Note: Temperature control not maintained prior to 1977.

Source: Florida DER

Table 5.7

NITROGEN DIOXIDE AMBIENT AIR QUALITY DATA
(All concentrations in $\mu g/m^3$)

Station	Year	Highest 24-Hour	2d High 24-Hour	Annual Arithmetic Mean	Number of Samples
Yelvington Road (FP&L)	1975	31	17	5	47
	1976	8	5	1	36
	1977	60	20	4	120
Cracker Swamp Road (FP&L)	1975	27	18	5	49
	1976	17	10	3	37
	1977	27	17	3	121

Source: Florida DER

Table 5.8

EMISSION SOURCES WITHIN PUTNAM SITE AREA OF INTEREST

Source	1974	1978	Distance From Putnam Site (km)
CLAY COUNTY			
E.I duPont De Nemours			
Ilmenite Dryer	B	S	43
Zircore Dryer	B	S	43
Zipcon Dryer	B	S	43
Gilman Paper Company			
Kiln Boiler	B	S	61
Johns-Manville Products			
Boiler	B	S	55
Finish End-Transite	B	S	55
Making Machine	B	S	55
PVC Blk Tr #15	B	S	55
Bag Fill	B	S	55
New Florida, Inc.			
Boiler	B	S	42
Solite			
Kiln #1	B	D	38
Kiln #2	B	NO	38
Kiln #3	B	NO	38
Kiln #4	B	NO	38
Kiln #5	B	D	38
Titanium Enterprises			
Rock Dryer #1	B	S	17
Rock Dryer #2	B	S	17
Rock Dryer #3	B	S	17
Rock Dryer #4	B	S	17
FLAGLER COUNTY			
ITT Rayonier			
Boiler	B	S	45
PUTNAM COUNTY			
Edgar Plastic Kaolin Co.			
Sand Dryer	B	S	34
Clay Mill	B	S	34
Sand Glass Dryer	B	S	34
Florida Furniture Co.			
Dryer	B	S	10

Table 5.8 (continued)

Source	1974	1978	Distance From Putnam Site (km)
Florida Power & Light Co.			
Combined Cycle 1A-1B	B	S	12
Combined Cycle 2A-2B	B	S	12
Unit #1	B	S	12
Unit #2	B	S	12
Hudson Pulp & Paper Co.			
Recovery Boiler #1	B	R	8
Recovery Boiler #2	B	R	8
Recovery Boiler #3	B	R	8
Recovery Boiler #4	NE	N	8
Power Boiler #1	B	R	8
Power Boiler #2	B	R	8
Power Boiler #3	B	R	8
Power Boiler #4	B	S	8
Power Boiler #5	B	D	8
Combination Boiler #1	B	R	8
Combination Boiler #4	B	D	8
Lime Kiln #1	B	R	8
Lime Kiln #2	B	R	8
Lime Kiln #3	B	R	8
Lime Kiln #4	NE	N	8
Smelt Dissol. Tk #1	B	R	8
Smelt Dissol. Tk #2	B	R	8
Smelt Dissol. Tk #3	B	R	8
Smelt Dissol. Tk #4	NE	N	8

Legend:

B = In 1974 Baseline
D = Different from 1974 Baseline
N = New since 1974
NE = Not in Existence in 1974
NO = Not Now in Operation
R = Retired since 1974
S = Same as 1974 Baseline

Source: Florida DER

Table 5.9

EMISSION CHARACTERISTICS OF SOURCES WITHIN PUTNAM SITE AREA OF INTEREST

Source[a]	UTM Coordinates East	UTM Coordinates North	SO_2 Emission Rate (ton/yr)	TSP Emission Rate (ton/yr)	NO_2 Emission Rate (ton/yr)	Stack Height (ft)	Exit Temperature (°F)	Volumetric Flow Rate (ft^3/min)
CLAY COUNTY								
E.I. duPont								
Ilm. Dryer	400.2	3308.6	175	28	9	33	240	13,000
Zir. Dryer	"	"	2	2	87	30	311	6,870
Zip. Dryer	"	"	20	2	4	40	300	13,774
Gilman Paper								
Boiler	403.4	3333.6	279	19	50[b]	30	365	9,450
Johns-Manville								
Boiler	434.9	3316.6	213	28	18	34	350	15,098
Fin. End	"	"	-	15	-	32	72	16,000
Mak. Mach.	"	"	-	13	-	33	72	10,000
PVC Blk	"	"	-	1	-	25	72	8,300
Bag Fill	"	"	-	1	-	25	72	8,300
New Florida								
Boiler	426.0	3329.6	71	5	18	30	1,000	11,170
Solite								
Kiln #1 (1974)	428.3	3326.2	1,314	218	c	65	455	22,443
(1978)	"	"	876	48	11[b]	110	145	8,969
Kiln #2 (1974)	"	"	1,314	218	c	65	455	22,443
Kiln #3 (1974)	"	"	1,314	218	c	65	455	22,443
Kiln #4 (1974)	"	"	1,314	218	c	65	455	22,443
Kiln #5 (1974)	"	"	1,892	378	c	75	455	54,286
(1978)	"	"	1,261	59	17[b]	80	150	22,652

Table 5.9 (continued)

Source[a]	UTM Coordinates East	UTM Coordinates North	SO_2 Emission Rate (ton/yr)	TSP Emission Rate (ton/yr)	NO_2 Emission Rate (ton/yr)	Stack Height (ft)	Exit Temperature (°F)	Volumetric Flow Rate (ft^3/min)
Titanium Ent								
Dryer #1	431.9	3304.2	146	128	73	46	320	6,197
Dryer #2	"	"	34	6	20	46	330	2,280
Dryer #3	"	"	21	2	15	46	235	6,044
Dryer #4	"	"	2	1	1	46	300	2,094
FLAGLER COUNTY								
ITT Rayonier								
Boiler	474.0	3261.5	20	196	66	45	500	8,046
PUTNAM COUNTY								
Edgar Plastic Kaolin								
Sand Dryer	407.8	3274.2	175	28	9	33	240	13,000
Clay Mill	"	"	2	2	87	30	311	6,870
Sand Glass Dryer	"	"	20	2	4	40	300	13,774
Florida Furniture								
Dryer	438.2	3278.9	3	26	59	50	491	7,298
Florida Power & Light								
Comb. Cycle 1A-1B	443.4	3277.6	4,380	603	3,869	53	350	414,348
Comb. Cycle 2A-2B	"	"	4,380	603	3,869	53	350	414,348
Unit #1	442.8	3277.6	277	27	607	150	275	248,414
Unit #2	"	"	163	102	2,000[b]	150	275	248,475

Table 5.9 (continued)

Source[a]	UTM Coordinates East	UTM Coordinates North	SO_2 Emission Rate (ton/yr)	TSP Emission Rate (ton/yr)	NO_2 Emission Rate (ton/yr)	Stack Height (ft)	Exit Temperature (°F)	Volumetric Flow Rate (ft^3/min)
Hudson Pulp & Paper								
Rec. Boil. #1 (1974)	434.0	3283.4	156	3,389	c	250	190	76,038
Rec. Boil. #2 (1974)	"	"	297	3,352	c	250	210	120,364
Rec. Boil. #3 (1974)	"	"	311	3,316	c	133	210	112,614
Rec. Boil. #4 (1978)	"	"	107	215	4[b]	230	400	406,000
Pow. Boil. #1 (1974)	"	"	58	4	14	105	425	21,340
Pow. Boil. #2 (1974)	"	"	56	4	14	105	425	21,340
Pow. Boil. #3 (1974)	"	"	82	6	20	105	425	30,450
Pow. Boil. #4	"	"	909	34	185	122	400	36,000
Pow. Boil. #5 (1974)	"	"	4,125	312	1,086	158	450	189,000
(1978)	"	"	4,342	158	963[b]	230	450	189,000
Comb. Boil. #1 (1974)	"	"	86	6	15	250	400	31,283
Comb. Boil. #4 (1974)	"	"	1,570	228	c	158	450	187,151
(1978)	"	"	1,624	400	165	230	420	190,000
Lime Kiln #1 (1974)	"	"	-	788	-	50	263	10,177
Lime Kiln #2 (1974)	"	"	-	416	-	50	154	20,679
Lime Kiln #3 (1974)	"	"	-	445	-	52	157	29,234
Lime Kiln #4 (1978)	"	"	-	59	-	149	171	37,312
SDT #1 (1974)	"	"	-	352	-	100	200	7,285
SDT #2 (1974)	"	"	-	619	-	100	215	13,220
SDT #3 (1974)	"	"	-	30	-	109	205	3,450
SDT #4 (1978)	"	"	-	17	-	222	160	19,000

[a] Characteristics shown are for both 1974 and 1978 unless otherwise indicated by date in parentheses, in which case characteristics apply to either the 1974 baseline only or to current conditions only.

[b] Calculated from information supplied by DER.

[c] Not supplied by DER but not needed since NO_2 concentrations do not have to be known for 1974 baseline.

Source: Florida DER

Table 5.10

Summary of Ambient Sound Levels -dB

Weekdays

Location	Daytime (0700-1800)		Evening (1800-2200)		Nighttime (2200-0700)	
1	11/18/77	1125	11/17/77	1800	11/17/77	2227
L_{95}	35		41		38	
L_{90}	36		42		38	
L_{50}	37		45		39	
L_{10}	43		46		42	
L_{5}	47		46		46	
L_{eq}	40.8		44.7		40.5	
L_{d}						42.2
L_{n}						40.5
L_{dn}						47.1
2	11/18/77	1215	11/17/77	1855	11/17/77	2311
L_{95}	40		42		42	
L_{90}	41		43		43	
L_{50}	47		46		51	
L_{10}	56		53		54	
L_{5}	58		54		56	
L_{eq}	52.1		49.1		51.8	
L_{d}						51.4
L_{n}						51.8
L_{dn}						58.1
3	11/18/77	1255	11/17/77	1931	11/17/77	2347
L_{95}	36		35		28	
L_{90}	37		35		28	
L_{50}	44		41		31	
L_{10}	52		49		41	
L_{5}	54		52		45	
L_{eq}	48.3		44.9		39.0	
L_{d}						47.6
L_{n}						39.0
L_{dn}						48.1

Table 5.10 (Continued)

Location	Weekdays Daytime (0700-1800)		Evening (1800-2200)		Nighttime (2200-0700)	
4	11/18/77	1338	11/17/77	2009	11/18/77	0024
L_{95}	36		29		24	
L_{90}	36		29		24	
L_{50}	39		35		26	
L_{10}	44		44		36	
L_{5}	46		50		41	
L_{eq}	43.7		42.9		35.7	
L_{d}						43.5
L_{n}						35.7
L_{dn}						44.4
5	11/18/77	1430	11/17/77	2054	11/18/77	0104
L_{95}	35		31		27	
L_{90}	36		32		27	
L_{50}	39		39		29	
L_{10}	44		48		38	
L_{5}	46		50		40	
L_{eq}	41.0		43.4		33.6	
L_{d}						41.7
L_{n}						33.6
L_{dn}						42.5
6	11/18/77	1511	11/17/77	2133	11/18/77	0139
L_{95}	40		30		30	
L_{90}	42		32		31	
L_{50}	49		45		36	
L_{10}	62		57		39	
L_{5}	64		61		40	
L_{eq}	58.5		55.1		38.8	
L_{d}						57.8
L_{n}						38.8
L_{dn}						56.0

Table 5.11

Summary of Ambient Sound Levels -dB

Location	Weekend Daytime (0700-1800)		Weekend Evening (1800-2200)		Weekend Nighttime (2200-0700)	
1	11/19/77	1050	11/18/77	1800	11/18/77	2238
L_{95}	36		36		33	
L_{90}	36		36		33	
L_{50}	39		37		35	
L_{10}	48		43		40	
L_5	51		45		41	
L_{eq}	44.1		42.3		37.1	
L_d						443.6
L_n						37.1
L_{dn}						45.2
2	11/19/77	1142	11/18/77	1845	11/18/77	2326
L_{95}	43		40		35	
L_{90}	44		41		36	
L_{50}	49		48		40	
L_{10}	56		56		51	
L_5	59		58		53	
L_{eq}	43.7		52.2		46.3	
L_{dn}						53.3
L_n						46.3
L_{dn}						54.6
3	11/19/77	1216	11/18/77	1925	11/19/77	0002
L_{95}	36		32		25	
L_{90}	37		32		26	
L_{50}	42		40		32	
L_{10}	50		42		43	
L_5	53		52		45	
L_{eq}	47.3		45.6		39.6	
L_d						46.9
L_n						39.6
L_{dn}						48.1

Table 5.11 (Continued)

Location	Weekend Daytime (0700-1800)		Weekend Evening (1800-2200)		Weekend Nighttime (2200-0700)	
4	11/19/77	1403				
L_{95}	39					
L_{90}	40					
L_{50}	41		*		*	
L_{10}	44					
L_5	45					
L_{eq}	42.1					
L_d						
L_n						
L_{dn}						
5	11/19/77	1329	11/18/77	2105	11/19/77	0150
L_{95}	39		36		25	
L_{90}	40		38		25	
L_{50}	44		43		30	
L_{10}	50		50		41	
L_5	52		52		44	
L_{eq}	52.2		47.2		37.8	
L_d						51.3
L_n						37.8
L_{dn}			-			50.2
6	11/19/77	1249	11/18/77	2000	11/19/77	0037
L_{95}	46		28		26	
L_{90}	47		33		27	
L_{50}	52		46		46	
L_{10}	59		60		58	
L_5	61		62		60	
L_{eq}	55.7		56.0		53.8	
L_d						55.7
L_n						53.8
L_{dn}						60.6

*Measurements were not made due to restricted access to the site. Observation indicates that ambient sound levels at this location are similar between weekday and weekend periods.

Table 5.12

Putnam County Land Use, 1972

Level I Classification	Percent of County	Predominant Level II Classification
Urban or Builtup Land	5.3	Residential
Agriculture	13.1	Cropland/Pasture
Rangeland	2.2	Herbaceous
Forest Land	39.9	Evergreen
Water	10.4	Streams/Lakes
Wetland	25.1	Forested
Barren Land	4.0	Transitional Area

Source: Analysis of 1972 Florida Land Use Development Analysis Maps (LUDA) State of Florida Division of State Planning.

Table 5.13

Land Use Within 5 Miles of the Site

Mapping Unit	Classification Level I	Classification Level II	Percent of 5 Mile Area	Acreage
11	Urban & Builtup	Residential	2	1,100
12	Urban & Builtup	Commercial Services	1>	130
13	Urban & Builtup	Industrial	1>	140
17	Urban & Builtup	Other	1>	55
21	Agricultural	Cropland/Pasture	13	6,285
23	Agricultural	Confined Feeding Operations	1>	40
24	Agricultural	Other	1>	65
31	Rangeland	Herbaceous	4>	1,880
42	Forest	Evergreen Forest	32	15,785
51	Water	Streams & Canals	17	8,755
61	Wetland	Forest Wetland	31	15,415
75	Barren Land	Quarries/Gravel Pits	1>	140
76	Barren Land	Transitional Areas	1>	445

Source: Analysis of 1972 Florida Land Use Development Analysis Maps (LUDA). State of Florida Division of State Planning.

Table 5.14

General Population Characteristics - 1970

State or County	Total Population	Population Per Square Mile	Average Annual Percent Population Change (1960-1970)[a]	Average Annual Percent Migration (1960-1970)	Percent Urban Population[b]
United States	203,212,877	57	1.3%	1.7%	73.5%
Florida	6,789,412	126	3.7%	2.7%	80.5%
Alachua	104,764	114	4.1%	2.2%	69.0%
Bradford	14,625	50	1.8%	0.8%	33.3%
Clay	32,059	54	6.4%	4.6%	50.2%
Duval	528,865	690	1.6%	0.1%	97.9%
Flagler	4,454	9	-0.3%	1.2%	0.0%
Marion	69,030	43	3.4%	2.0%	40.4%
Putnam	36,290	47	1.3%	0.0%	25.7%
St. Johns	30,727	51	0.3%	-0.4%	40.2%
Volusia	169,487	160	3.5%	3.4%	70.4%

[a]Computed by dividing the percent decade growth rate by 10.

[b]Urban population includes all persons living in communities of 2500 or greater.

Source: U. S. Department of Commerce, 1972.

Table 5.15

Baseline Population Projections
(Thousands of People)

County or State		Actual 1976	1978	1980	1985	1990	1995	2000	2010	2020	Annual Growth Rate 1976-2020
Florida	Lo		8,799.	9,041.	9,741.	10,506.	11,141.	11,744.	12,600.	13,326.	1.0%
	Med	8,552.	8,908.	9,432.	10,538.	11,722.	12,634.	13,572.	15,271.	16,994.	1.6%
	Hi		9,200.	9,853.	11,340.	12,929.	14,351.	15,728.	17,986.	20,121.	1.9%
Alachua	Lo		133.5	135.5	141.8	152.9	162.1	170.9	183.4	193.9	0.9%
	Med	131.6	135.1	141.4	153.4	170.6	183.9	197.5	222.3	247.3	1.4%
	Hi		139.6	147.7	165.	188.2	208.9	228.9	261.8	292.8	1.8%
Bradford	Lo		16.8	17.4	19.1	20.6	21.8	23.0	24.7	26.1	1.1%
	Med	16.3	17.0	18.1	20.6	23.0	24.7	26.6	29.9	33.3	1.6%
	Hi		17.5	18.9	22.2	25.3	28.1	30.8	35.2	39.4	2.0%
Clay	Lo		53.7	58.2	70.5	76.0	80.6	85.0	91.2	96.4	1.5%
	Med	49.3	54.4	60.7	76.2	84.8	91.4	98.2	110.5	123.0	2.1%
	Hi		56.2	63.4	82.1	93.5	103.8	113.8	130.1	145.6	2.5%
Duval	Lo		582.8	583.7	589.3	635.6	674.0	710.5	762.2	806.2	0.7%
	Med	579.7	590.0	608.9	637.5	709.1	764.3	821.0	923.8	1,028.0	1.3%
	Hi		609.3	636.1	686.0	782.1	868.1	951.5	1,008.0	1,217.0	1.7%
Flagler	Lo		8.1	8.0	10.9	11.8	12.5	13.2	14.2	15.0	1.6%
	Med	7.4	8.2	9.2	11.8	13.2	14.2	15.3	17.2	19.1	2.2%
	Hi		8.5	9.7	12.7	14.5	16.1	17.7	20.2	22.6	2.5%
Marion	Lo		104.6	110.6	127.6	137.6	145.9	153.8	165.0	174.0	1.3%
	Med	98.4	105.9	115.4	138.0	153.5	165.4	177.7	200.0	222.5	1.9%
	Hi		109.3	120.6	148.5	169.3	187.9	206.0	235.5	263.5	2.2%
Putnam	Lo		43.9	44.1	44.9	48.4	51.3	54.1	58.0	61.4	0.8%
	Med	43.7	44.4	46.0	48.5	54.0	58.2	62.5	70.3	78.2	1.3%
	Hi		45.9	48.1	52.2	59.5	66.1	72.4	82.8	92.6	1.7%
St. Johns	Lo		41.4	42.6	46.1	49.7	52.7	55.6	59.7	63.1	1.0%
	Med	40.3	41.9	44.4	49.9	55.5	59.8	64.3	72.3	80.5	1.6%
	Hi		43.2	46.4	53.7	61.2	67.9	74.5	85.2	95.3	2.0%
Volusia	Lo		217.4	221.6	234.4	252.8	268.0	282.5	303.1	320.6	0.9%
	Med	212.9	220.0	231.2	253.5	282.0	304.0	326.5	367.4	408.9	1.6%
	Hi		227.3	241.5	272.8	311.1	345.3	378.4	432.7	484.1	1.9%

Source: University of Florida, Bureau of Economic and Business Research, July 1977, 1978-2020 PROJECTIONS OF FLORIDA POPULATION BY COUNTY, and Dames & Moore, 1977.

Table 5.16

Population Characteristics of the Study Area

County	1970 Population	Major City	1970 Population	Miles From Palatka
Alachua	104,764	Gainesville	64,510	44
Bradford	14,625	Starke	4848	39
Clay	32,059	Green Cove Springs	3857	26
Duval	528,865	Jacksonville	528,865	53
Flagler	4454	Bunnell	1687	30
Marion	69,030	Ocala	22,583	54
Putnam	36,424	Palatka	9444	0
St. Johns	30,727	St. Augustine	12,352	28
Volusia	169,487	Daytona Beach	45,327	53

Source: Putnam County Chamber of Commerce, (no date). Palatka and Putnam County Florida Facts.

Table 5.17

Labor Force Characteristics - 1970

State or County	Total Civilian Labor Force	Female Civilian Labor Force	Percent Unemployed of Total Civilian Labor Force	Percent of Labor Force Using Public Transport to Work	Percent of Labor Force Working Outside County of Residence
Florida	2,521,245	1,010,356	3.8%	4.3%	8.0%
Alachua	41,050	17,544	3.4%	1.9%	5.0%
Bradford	4985	1940	4.5%	0.6%	29.4%
Clay	9531	3694	3.1%	0.2%	53.4%
Duval	199,101	81,874	3.3%	6.7%	2.6%
Flagler	1458	530	1.4%	2.9%	23.8%
Marion	25,307	9944	3.5%	1.9%	8.6%
Putnam	13,049	5119	4.3%	2.6%	12.5%
St. Johns	10,990	4246	3.6%	3.9%	15.7%
Volusia	58,394	24,642	4.0%	2.5%	6.7%

Notes: Labor force includes those workers 16 years old and over.

Source: U. S. Department of Commerce, 1972, County and City Data Book.

Table 5.18

Employment Characteristics by Occupation
1970

County or State	Total Employment	Manufacturing Percent	Wholesale & Retail Trade Percent	Services Percent	Educational Services Percent	Construction Percent	Government Percent	Professional Managerial Percent	Sales & Clerical Percent	Craftsmen & Foreman Percent
Florida	2,426,268	14.1	23.5	11.5	7.4	8.5	16.0	23.3	26.6	14.5
Alachua	39,639	7.5	19.4	7.9	26.6	6.8	42.9	33.9	25.0	10.3
Bradford	4763	13.9	18.2	6.4	7.8	7.9	28.6	18.2	19.2	15.1
Clay	9232	14.9	18.4	6.5	9.0	7.2	27.4	23.5	25.3	17.8
Duval	192,517	12.3	25.2	10.4	6.5	7.3	17.2	21.9	31.7	14.7
Flagler	1437	12.1	17.7	15.0	7.9	7.2	20.6	25.2	14.2	12.0
Marion	24,428	11.9	24.7	10.5	8.1	8.6	16.4	20.3	22.4	13.3
Putnam	12,492	28.7	17.3	9.2	8.8	4.9	15.8	16.9	19.1	12.3
St. Johns	10,596	13.1	20.0	12.6	8.2	7.6	19.7	23.2	20.9	15.8
Volusia	56,054	10.7	25.0	13.7	8.3	8.9	14.1	24.8	25.1	14.1

Note: Percentages for each county do not sum up to 100% due to overlapping classification.

Source: U. S. Depatment of Commerce, 1972, County and City Data Book.

Table 5.19

Putnam County Employment Characteristics

Year	Putnam County Civilian Labor Force	Annual Growth Rate of Labor Force (%)	Unemployment Rates (%) Putnam	Florida	USA
1970	13,400	18.6	2.5	4.3	4.9
1971	13,580	1.3	3.1	4.9	5.9
1972	13,460	-0.8	2.5	4.5	5.6
1973	14,000	4.0	3.7	4.3	4.9
1974	14,740	5.3	6.2	6.3	5.6
1975	16,280	12.5	8.6	10.7	8.5
1976	16,890	3.7	7.6	9.0	7.7
1977	17,201	1.8	6.3	8.0	7.9

Notes: All county data are March figures while Florida and United States data are annual averages.

Sources: Florida Department of Commerce, Division of Employment Security, (no date), as cited in Bureau of Economic Analysis, Division of Economic Development, Florida Department of Commerce, April 1977, Putnam County Economic Data, and Dames & Moore, 1977.

Table 5.20

Putnam County Baseline Employment Projections by Industrial Sector
1980 - 2000

SECTOR 1	1970 ACTUAL	1975 ESTIMATED	1980 PROJECTED	1985 PROJECTED	1990 PROJECTED	1995 PROJECTED	2000 PROJECTED	ANNUAL GROWTH RATE (%) (1970-2000)
Agriculture, forestry and fisheries	1,497	1,540	1,588	1,517	1,464	1,428	1,391	-0.24%
Mining	31	19	5	5	4	4	4	-6.8%
Construction	614	737	872	955	1,017	1,092	1,169	2.1%
Manufacturing	3,585	4,002	4,459	4,797	5,051	5,366	5,686	1.5%
Transportation, Communication, and Public Utilities	558	689	832	937	1,016	1,131	1,248	2.7%
Wholesale and Retail Trade	2,160	2,367	2,593	2,773	2,908	3,092	3,279	1.4%
Finance, Insurance and Real Estate	400	465	537	669	768	883	999	3.1%
Services	2,183	2,380	2,595	2,835	3,015	3,225	3,438	1.5%
Government	1,464	1,781	2,129	2,402	2,606	2,860	3,118	2.5%
Total Employment	12,492	13,980	15,610	16,890	17,849	19,081	20,347	1.6%
Employment-Population Ratio	.34	.36	.38	.386	.39	.395	.41	

Notes: Projections were made by Jacksonville Area Planning Board, which used the OBERS methodology and assumptions. For detailed information on OBERS methodology and assumptions, see U. S. Water Resource Council, April 1974, 1972 OBERS Projections, Volume One, Concepts, Methodology, and Summary Data. For detailed information on Jacksonville Area Planning Board Methodology for adjusting OBERS projections, see Jacksonville Area Planning Board, June 1976, Regional Employment Study.

Source: Jacksonville Area Planning Board, 1976b, Regional Employment Study, and Bureau of the Census, 1970, U. S. Census of Population, and Dames & Moore, 1977.

Table 5.21

Seminole Project Area Income Characteristics

County or State	Total Personal Income (million dollars)			Per Capita Personal Income		
	1974	1975	Percent Change	1974	1975	Percent Change
Florida	43,742	47,069	7.6	5406	5640	4.3
Alachua	568	624	9.9	4545	4813	5.9
Bradford	54	62	14.8	3415	3722	9.0
Clay	212	237	11.8	4459	4709	5.6
Duval	2983	3221	8.0	5322	5646	6.1
Flagler	28	30	7.1	4665	4631	-0.7
Marion	388	422	8.8	4112	4376	6.4
Putnam	151	174	15.2	3579	4018	12.3
St. Johns	174	190	9.2	4703	4888	3.9
Volusia	984	1072	8.9	4855	5110	5.3

Notes: All values are in current dollars.

Sources: Bureau of Economic and Business Research, University of Florida, May 1977, Florida Economic Indicators, as cited in Florida Department of Commerce, (no date), Florida Facts, and Dames & Moore, 1977.

Table 5.22

Putnam County Basic and Non-Basic Income by Sector - 1974
(Millions of Dollars)

Sector	Total Putnam County Income	Total National Income	Basic Putnam Income	Non-Basic Putnam Income
Total Income	90.2	832,687	0	90.2
I. Agriculture	5.6	39,745	1.3	4.3
II. Non-agriculture	84.6	792,942	-1.3	85.9
A. Private Sector	68.6	647,836	-1.6	70.2
1. Mining	D	8,116	D	0.9
2. Construction	5.2	52,679	-0.5	5.7
3. Manufacturing	33.9	222,041	9.8	24.1
4. Transportation, Communication and Public Utilities	3.6	59,928	-2.8	6.4
5. Retail and Wholesale Trade	13.0	134,377	-1.6	14.6
6. Finance, Insurance and Real Estate	2.5	42,848	-2.1	4.6
7. Services	8.6	125,301	-5.0	13.6
8. Other	D	2,546	D	0.3
B. Government Sector	16.0	145,106	0.3	15.7
1. Federal Civilian	2.0	35,134	-1.8	3.8
2. Federal Military	1.1	19,147	-1.0	2.1
3. State and Local	12.9	90,825	3.1	9.8

Note: Basic and Non-basic income is calculated via the location quotient methodology as described in Tiebout, Dec. 1962 (see Appendix I-1).

D = Non-Disclosure Industry.

Source: U. S. Department of Commerce, unpublished data, as cited in Florida Department of Commerce, Division of Economic Development, Bureau of Economic Analysis, Putnam County Economic Data, April 1977, and Dames & Moore, 1977.

Table 5.23

Putnam County Baseline Income Projections by Industrial Sector
1980 - 2020
(In Millions of 1967 Dollars)

Sector	1980	1990	2000	2010	2020	Annual Growth Rate (1980-2020)
Agriculture, Forestry, and Fisheries	1.8	2.1	2.5	3.0	3.5	1.7%
Mining	0.1	0.1	0.2	0.2	0.3	2.7%
Contract Construction	4.1	6.1	8.7	12.0	15.4	3.3%
Manufacturing	43.6	62.5	88.2	122.7	157.4	3.2%
Transportation, Communication, and Public Utilities	3.4	5.3	8.1	12.1	16.6	4.0%
Wholesale and Retail Trade	14.1	20.0	28.3	39.1	50.0	3.2%
Finance, Insurance and Real Estate	3.3	5.9	9.7	15.4	21.7	4.7%
Services	11.3	16.6	23.9	33.8	44.1	3.4%
Government	18.9	29.4	43.9	62.0	85.7	3.8%
Total Personal Income	142.6	209.1	300.6	419.9	546.5	3.4%

Source: U. S. Department of Commerce, Bureau of Economic Analysis, as cited in U. S. Army Corps of Engineers, South Atlantic Division, December 1975, Projections of Economic Activity in Florida, Series E Population, and Dames & Moore, 1977.

Table 5.24

Land Use Inventory in Miles [1]

	Agriculture	Commercial Forest	Non-Commercial Forest	Residential	Commercial or Industrial	Wetland	Other	Total	Acres
Route 1									
Site to Putnam	5	--	4	<1	<1	4	<1[2]	14	252
Route 2									
Site to Silver Springs	9	16	19	2	<1	8	--	55	990
Route 3									
Site to Columbia	13	13	35	4	1	11	--	77	1,386
Columbia to Suwannee	14	--	19	1	1	<1	--	36	648
Columbia to Fort White	9	--	11	<1	--	<1	--	22	396
								135	2,430

[1]Mileage is based on the center line of each route.

[2]Open water (St. Johns River)

[3]18 acres per mile (@150' average width).

Source of land use information: Land Use Department Analysis Maps, United States Geological Survey in coordination with the Florida Department of Planning Tallahassee, Florida.

Table 5.25

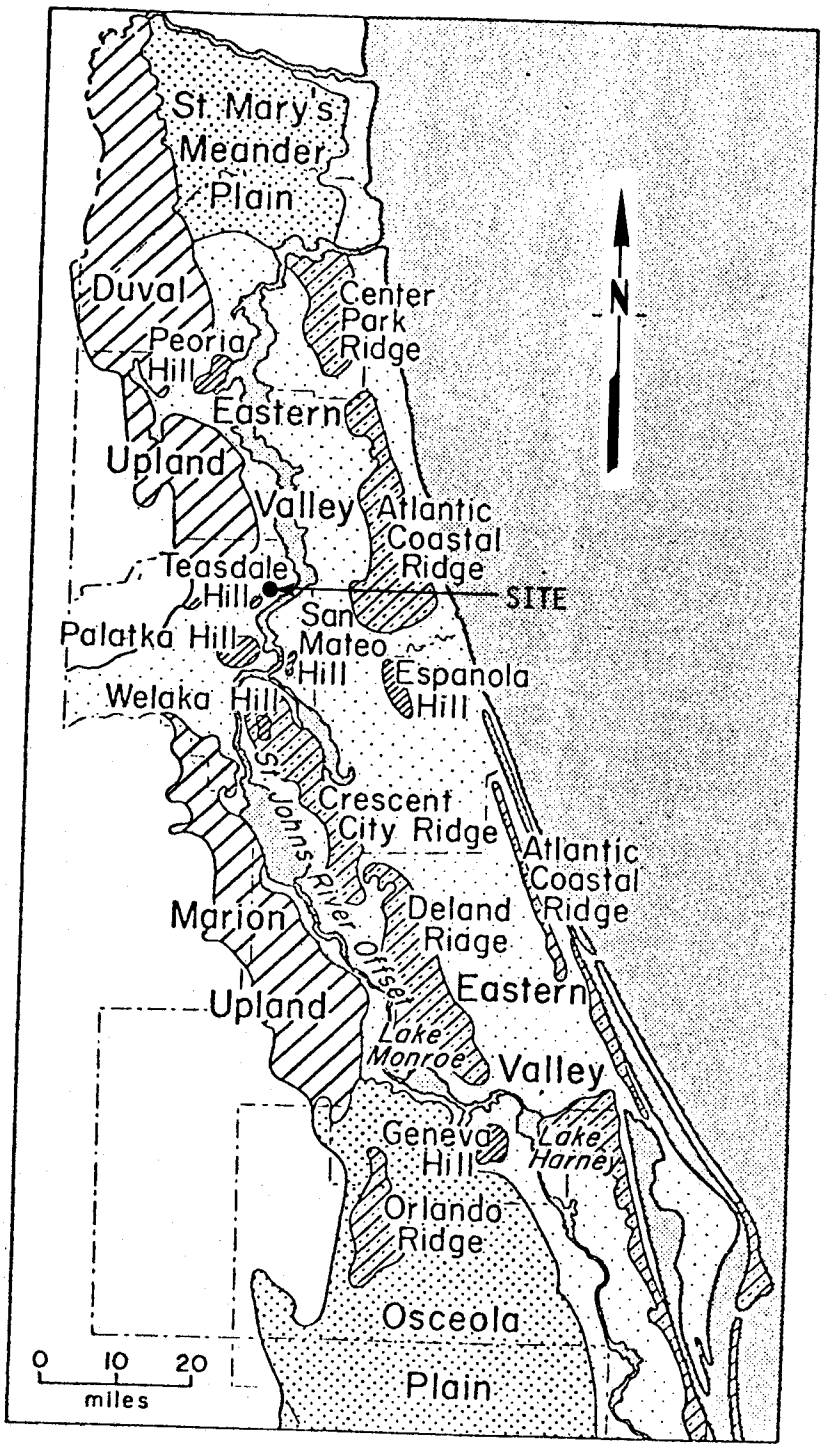
Sensitive Land Uses in Vicinity of
The Preferred Corridors

	Routes		
	1	2	3
State Parks			
Gold Head Branch	--	--	Adjacent[a]
Magnolia	--	--	Adjacent
Ichetucknee Springs	--	--	Adjacent
Suwannee	--	--	Adjacent
Wildlife Management Areas			
Hudson Pulp & Paper Co. - north	--	2[b]	--
Hudson Pulp & Paper Co. - south	--	24[b]	--
Lake Butler	--	--	26[b]
Camp Blanding	--	--	Adjacent
Scenic Rivers[c]			
Suwannee	--	--	Adjacent
Ichetucknee	--	--	Adjacent
National Forests			
Ocala	--	Adjacent	--
Osceola	--	--	Adjacent

[a]"Adjacent" means that the preferred corridor is within several miles of the boundary of the sensitive area, but the corridor does not cross the area.

[b]Miles of Wildlife Management area in corridor.

[c]Under consideration, but not yet officially designated as scenic rivers.



AFTER: PURI AND VERNON, 1964

Figure F5.1 Landforms in the Region of the St. Johns River.

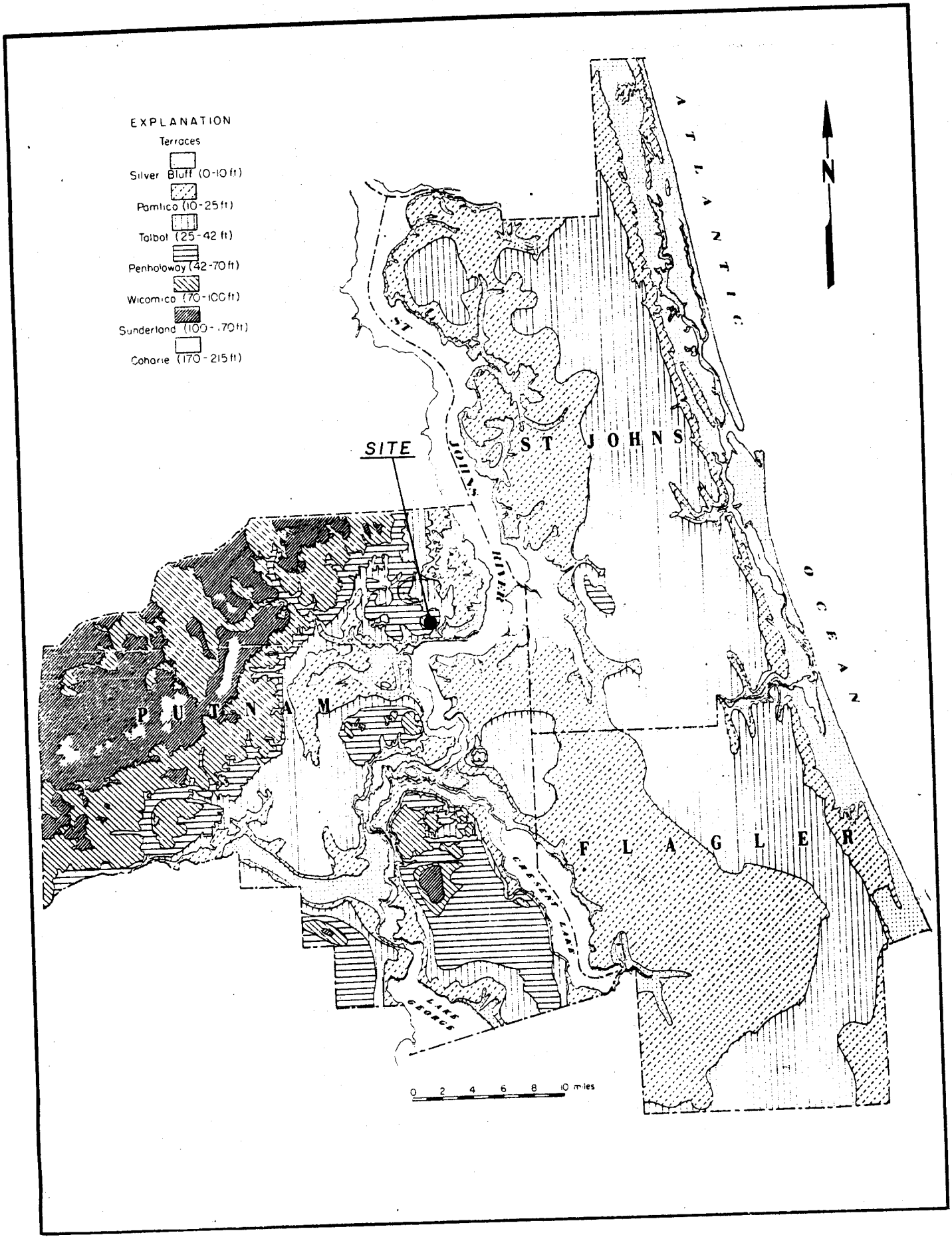
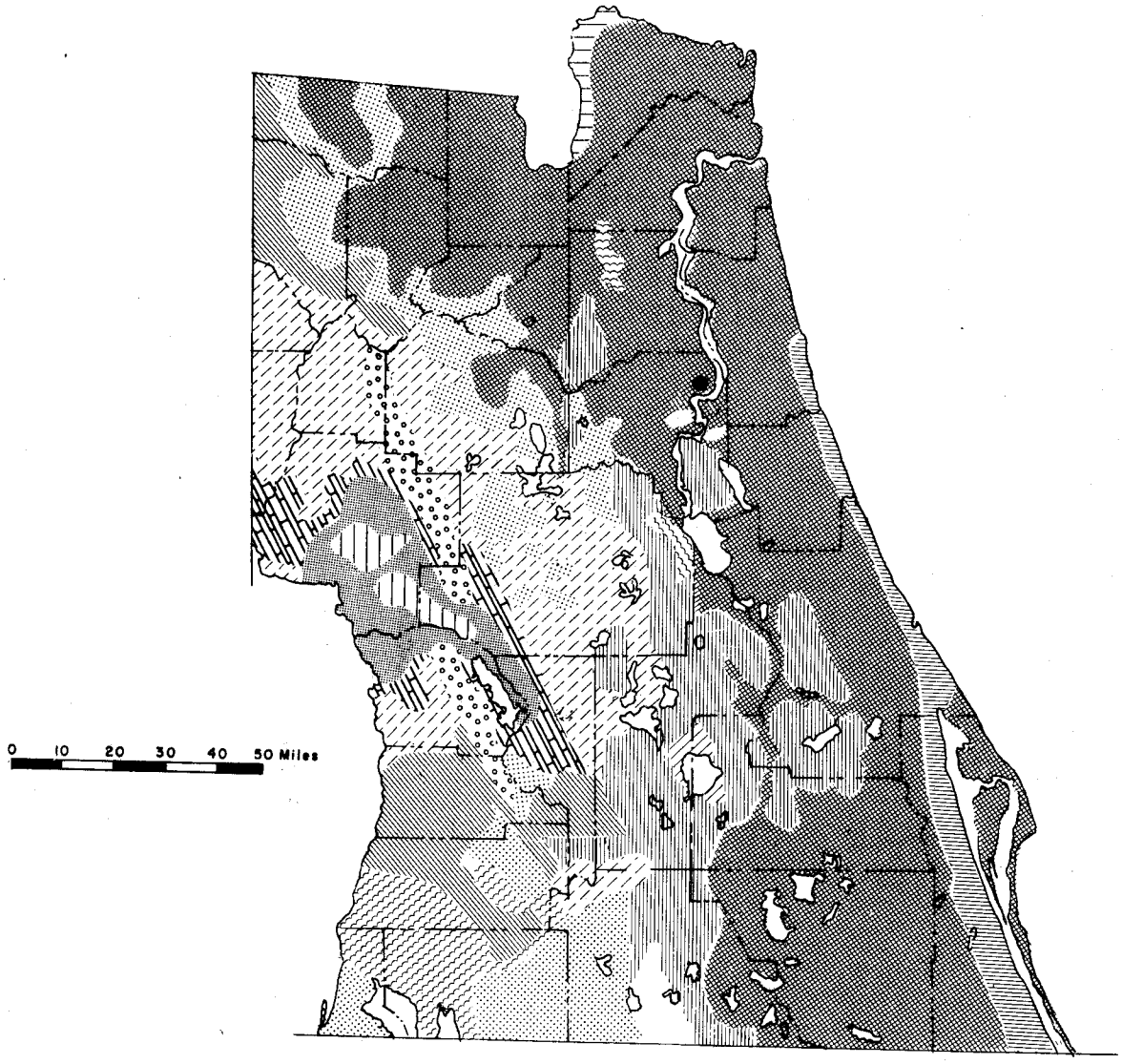


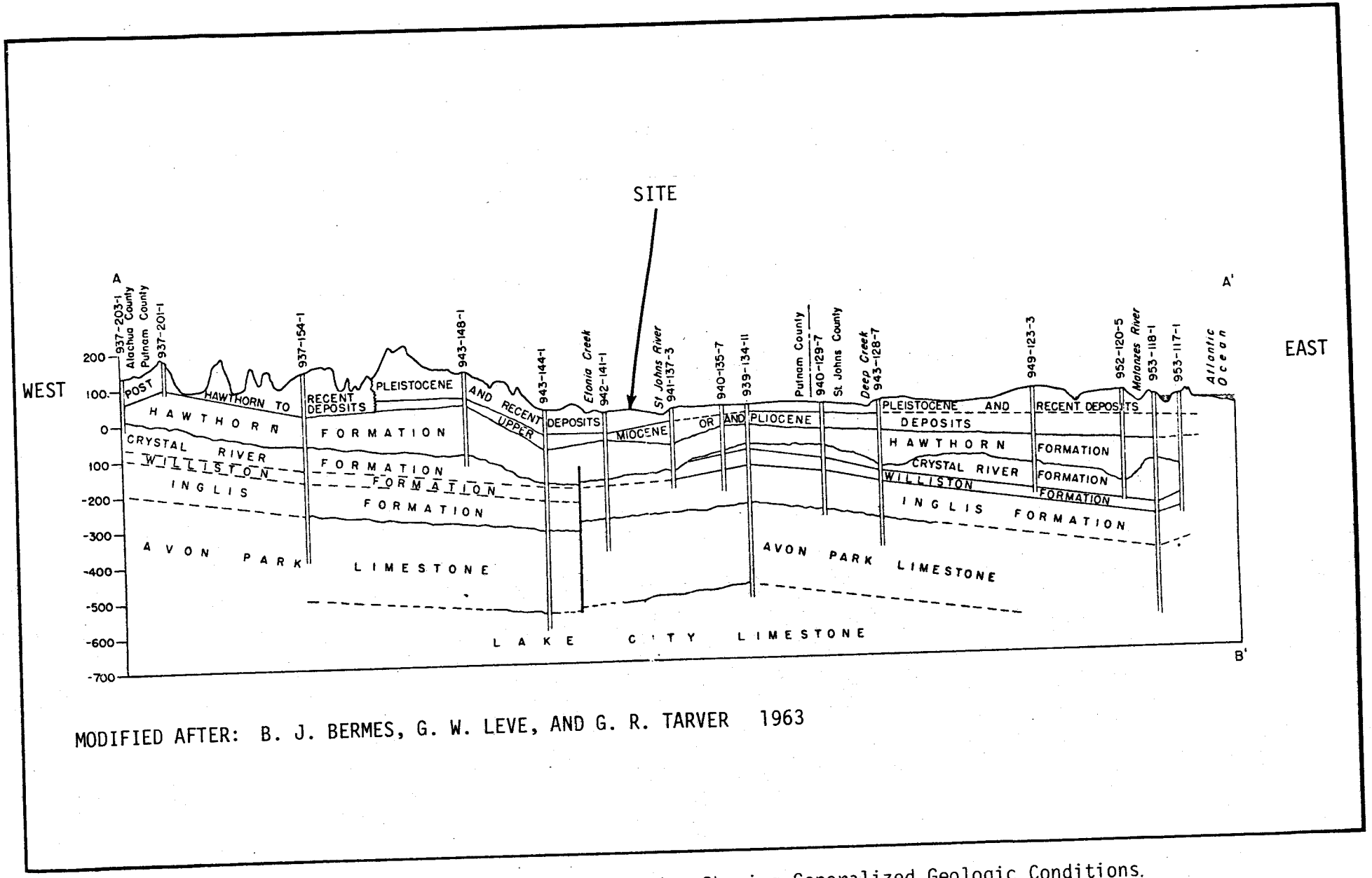
Figure F5.2 Regional Delineation of Marine Terraces.



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
	TAMPA	ST. MARKS FORMATION
OLIGOCENE		SUWANNEE LIMESTONE
EOCENE	JACKSON	CRYSTAL RIVER FORMATION
		WILLISTON FORMATION
		INGLIS FORMATION
	CLAIBORNE	AVON PARK LIMESTONE

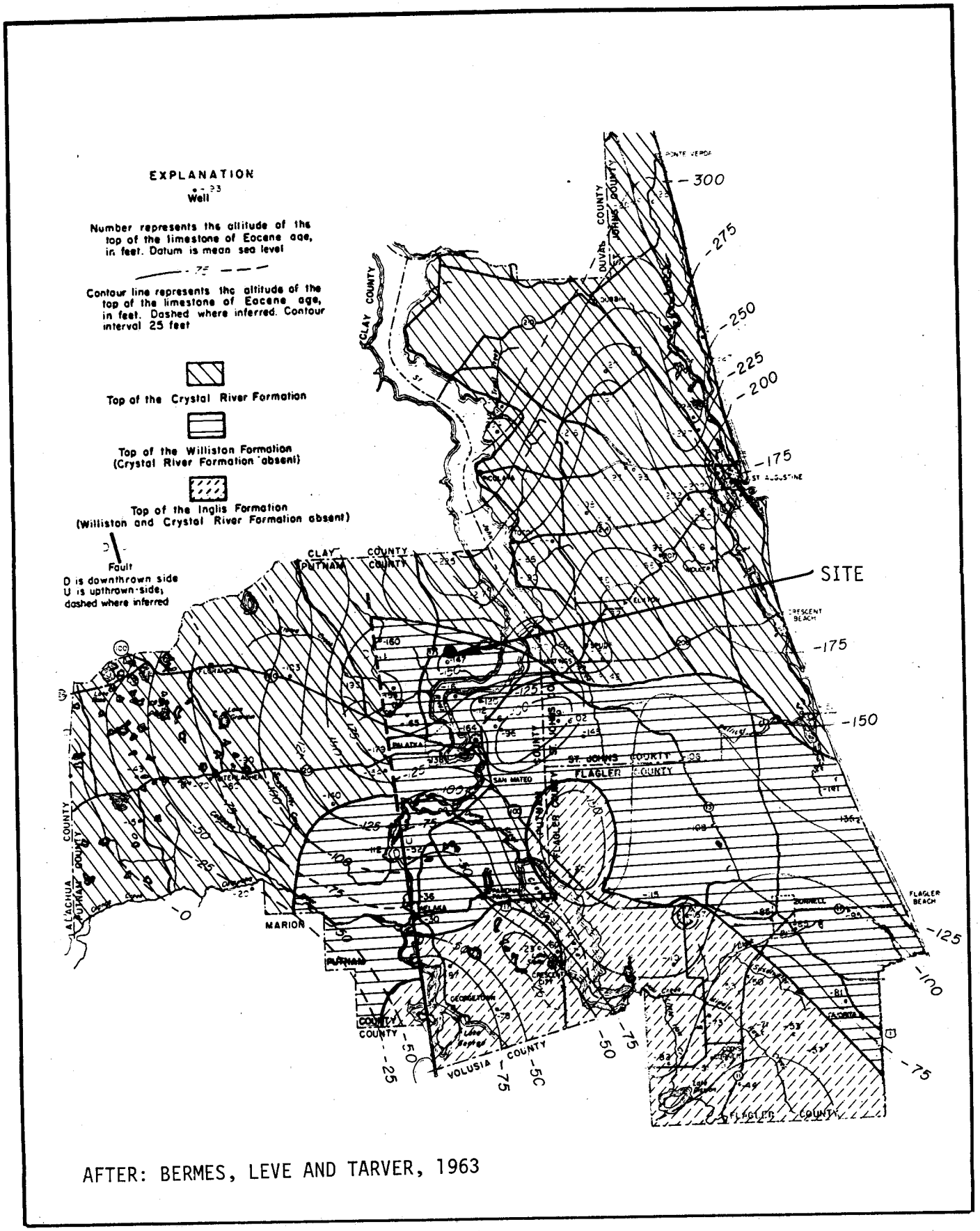
AFTER: VERNON and PURI, 1964

Figure F5.3 Geologic Map of Northeast Florida.



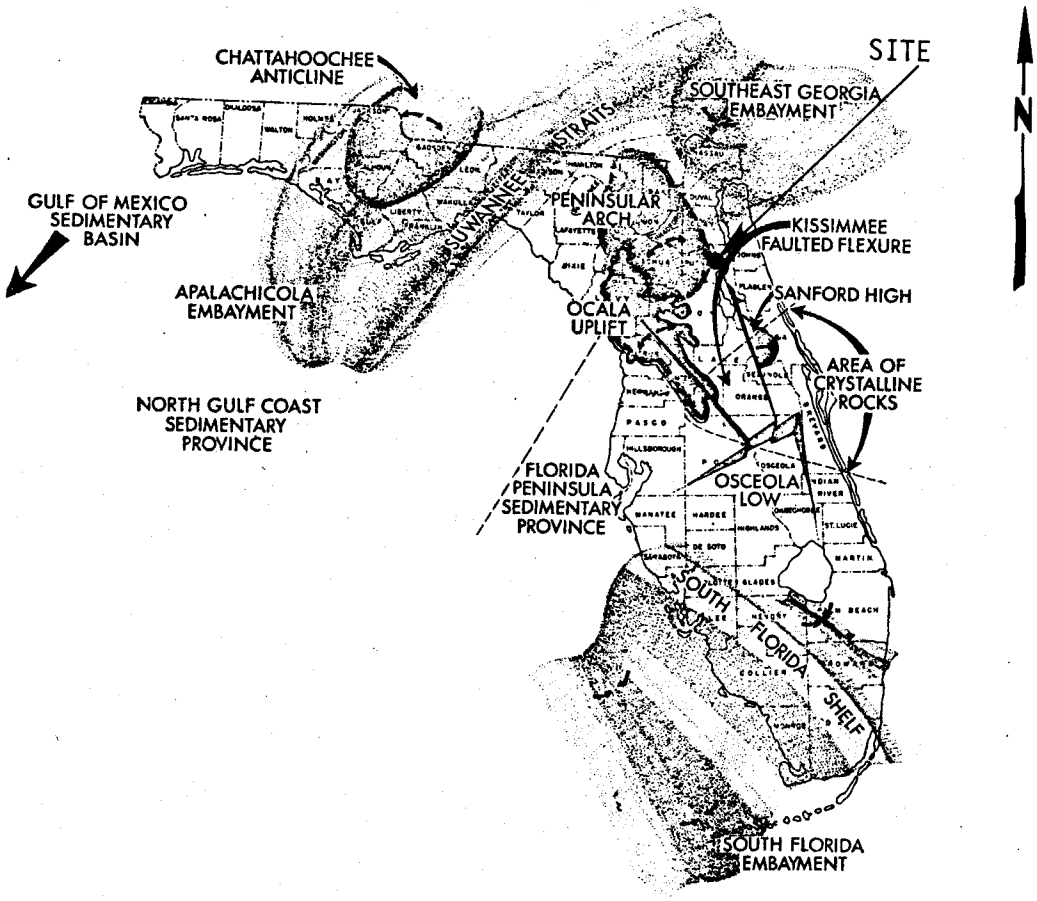
MODIFIED AFTER: B. J. BERMES, G. W. LEVE, AND G. R. TARVER 1963

Figure F5.4 Regional Cross Section Showing Generalized Geologic Conditions.



AFTER: BERMES, LEVE AND TARVER, 1963

Figure F5.5 Contours to Top of Eocene.



AFTER: PURI AND VERNON, 1964

Figure F5.6 Regional Geologic Structure.

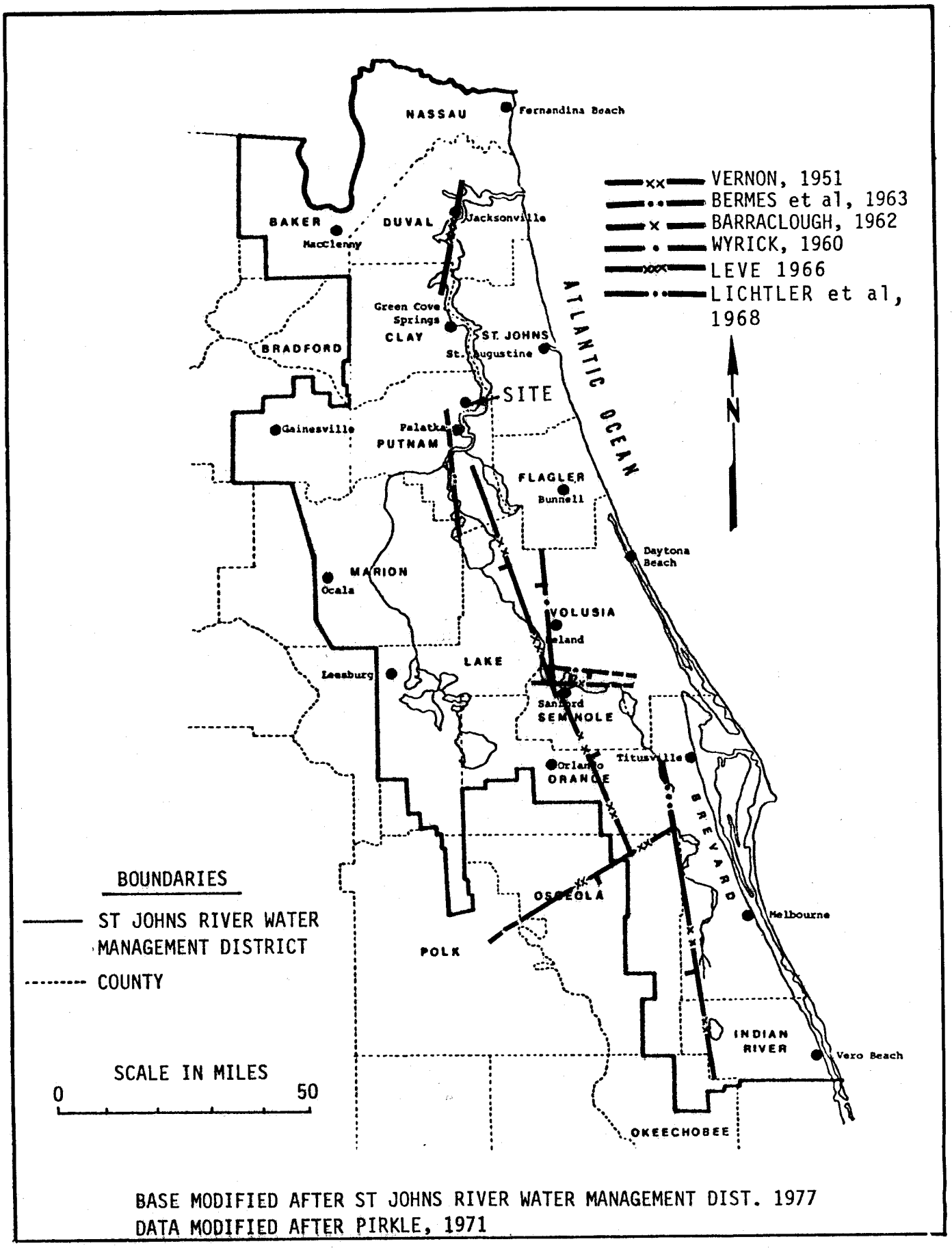


Figure F5.7 Some Reported Faults Along the St. Johns River

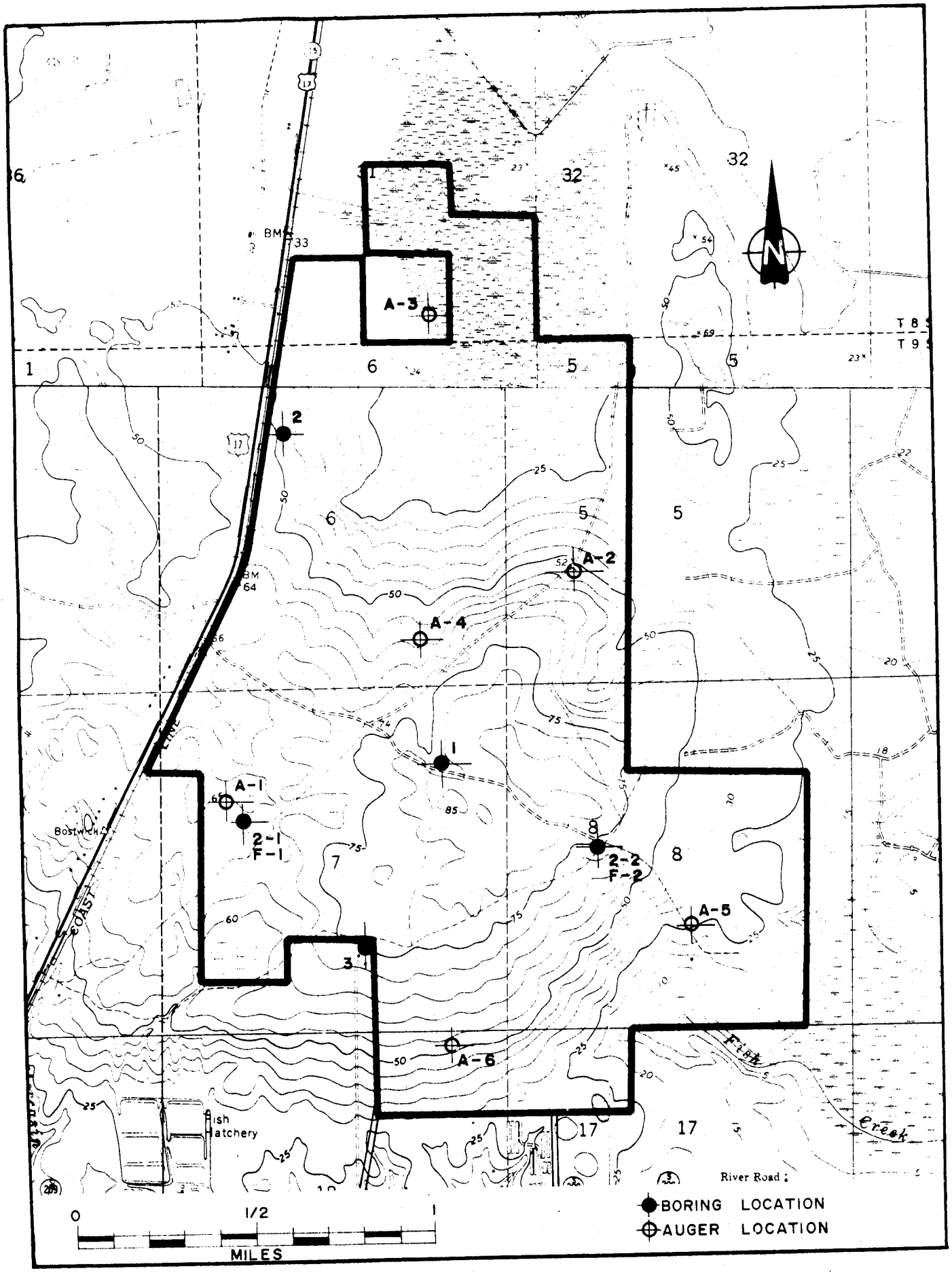


Figure F5.8 Soil Boring Location Map.

REVISED 3/15/79

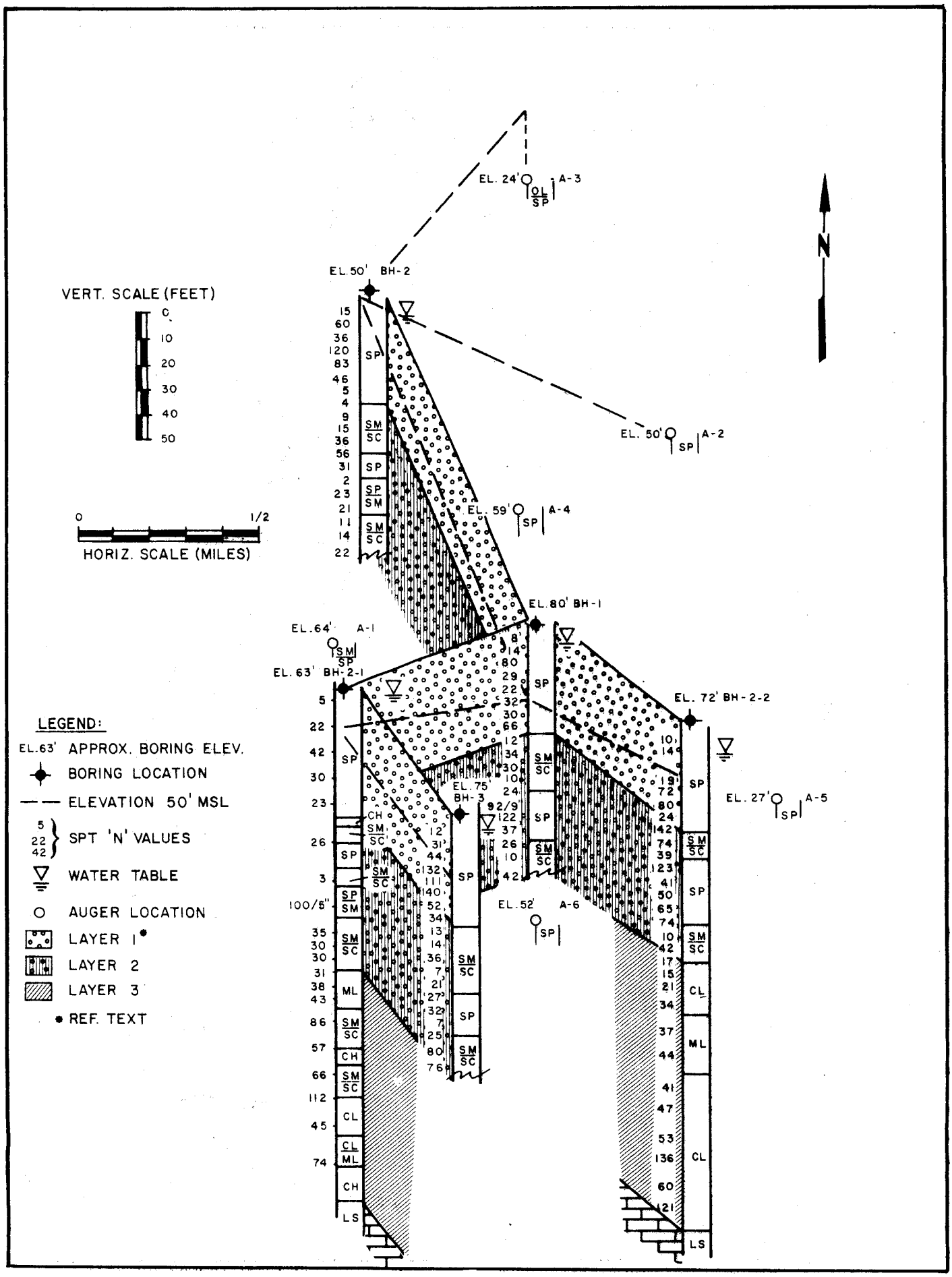


Figure F5.9 Panel Diagram - Generalized Subsurface Layers on Site.

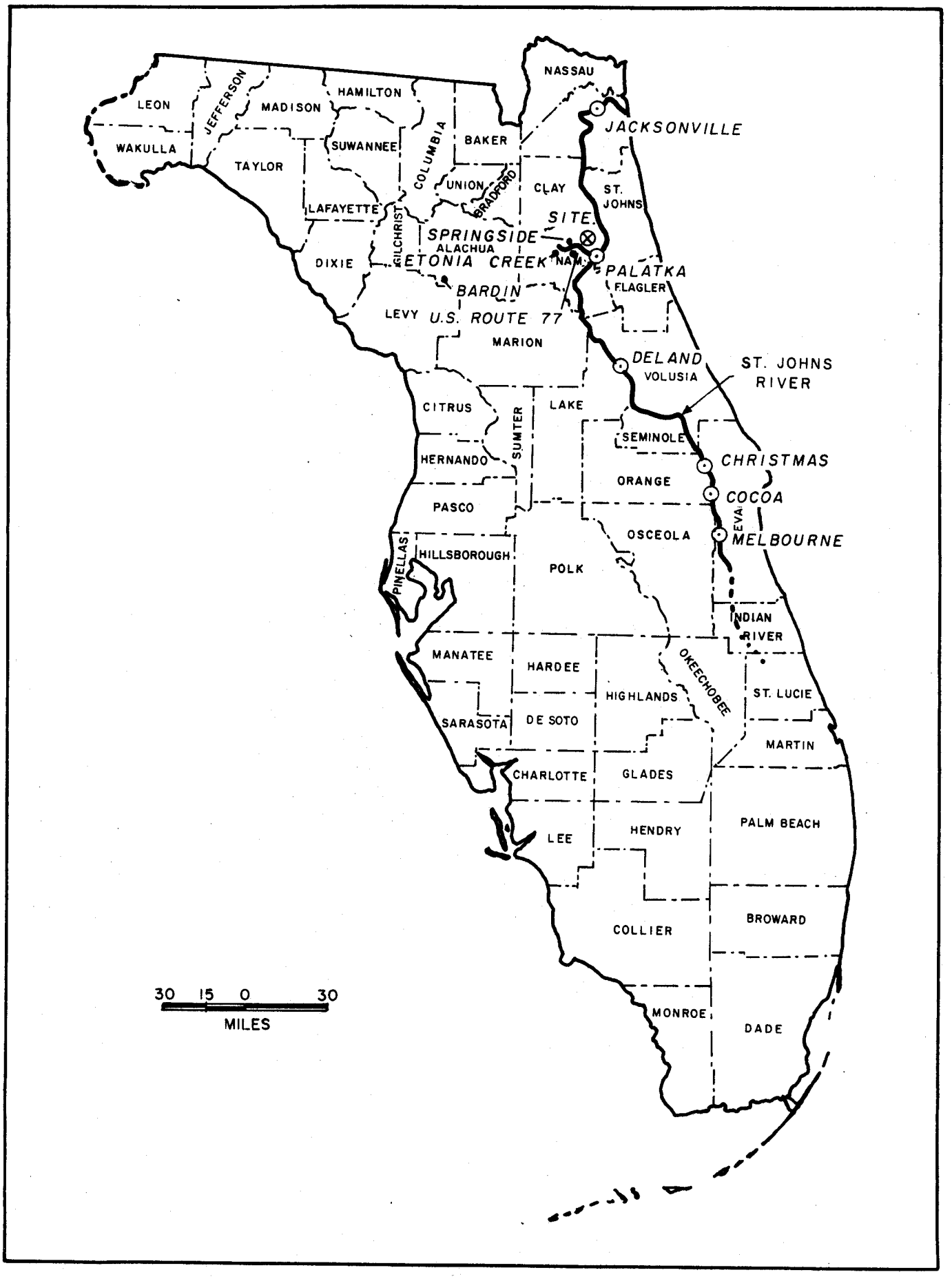


Figure F5.10 St. Johns River Basin.

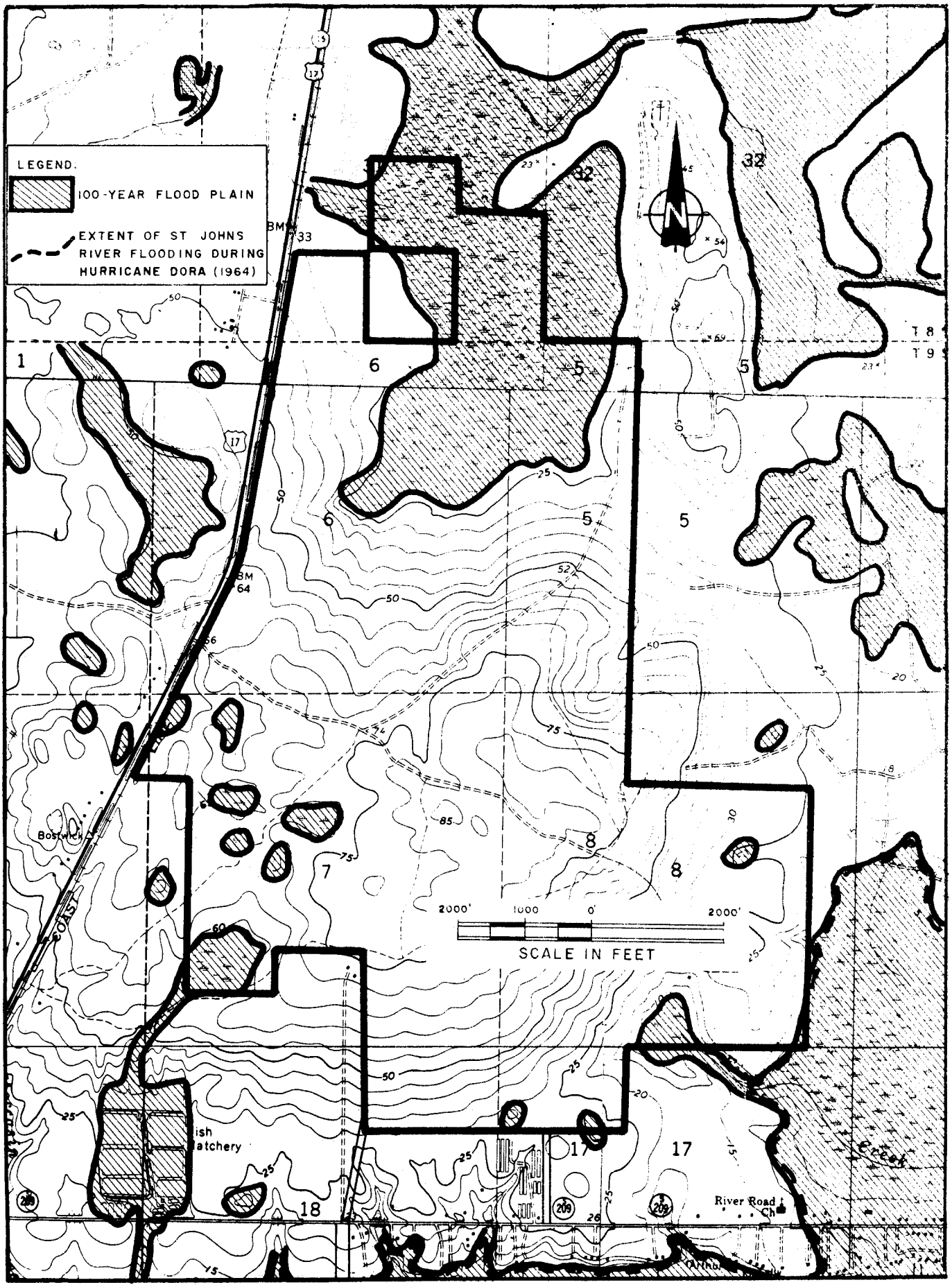


Figure F5.11 100 Year Flood Plain and Extent of Hurricane Flooding.

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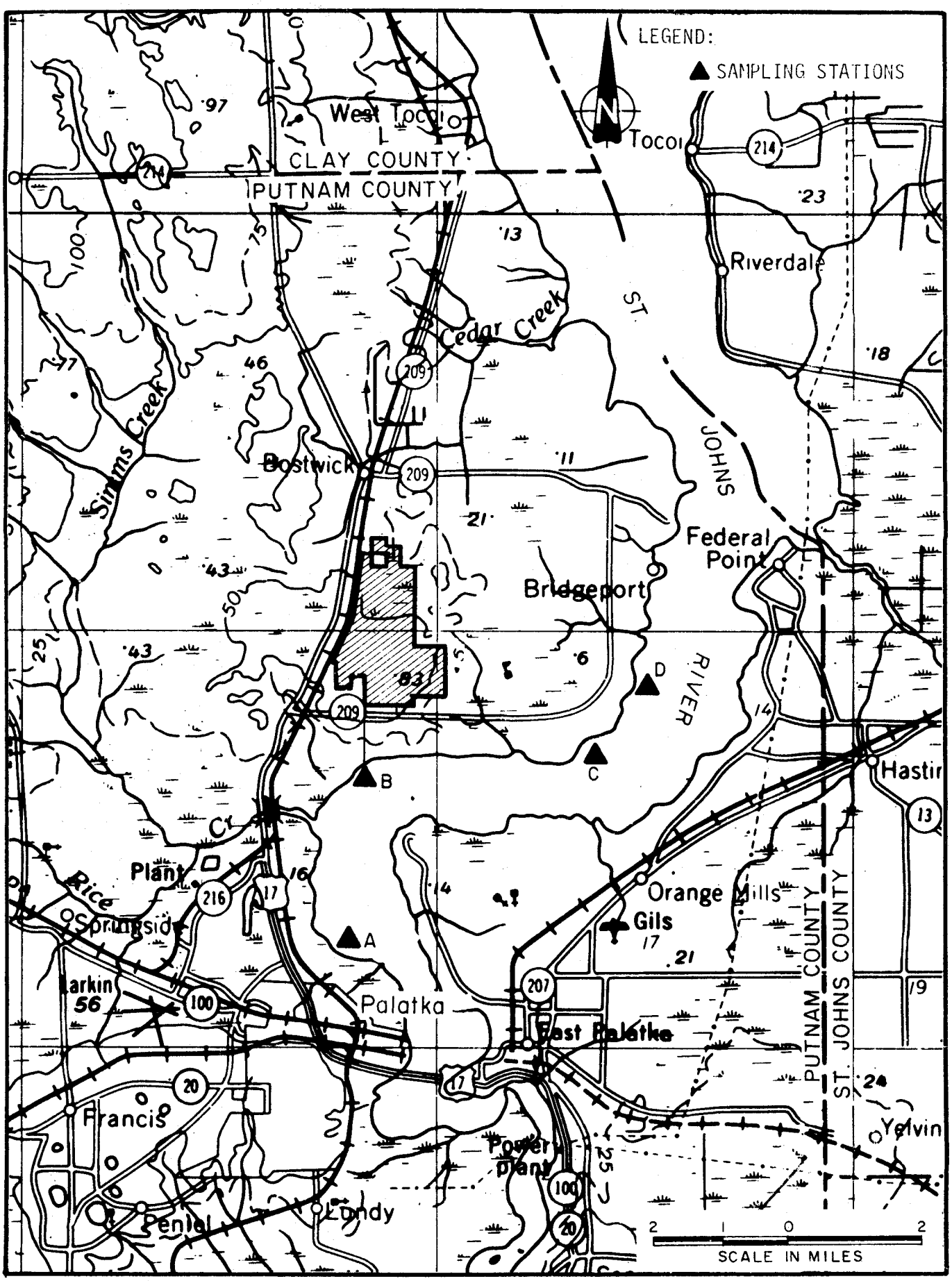

Figure F5.12 Local Tributaries and Dames & Moore Sampling Stations.

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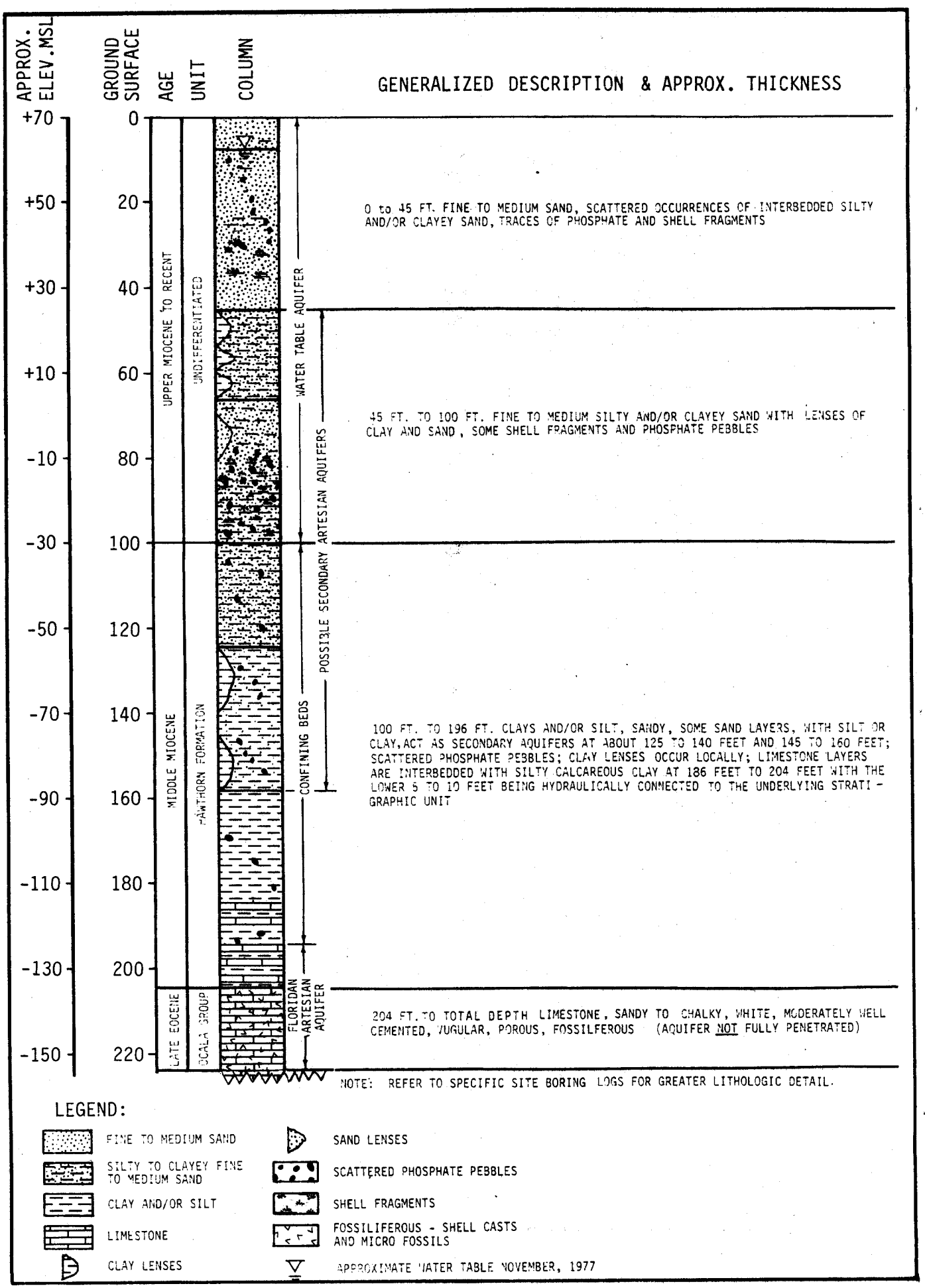


Figure F5.13 Generalized Stratigraphic Column and Water Bearing Characteristics.

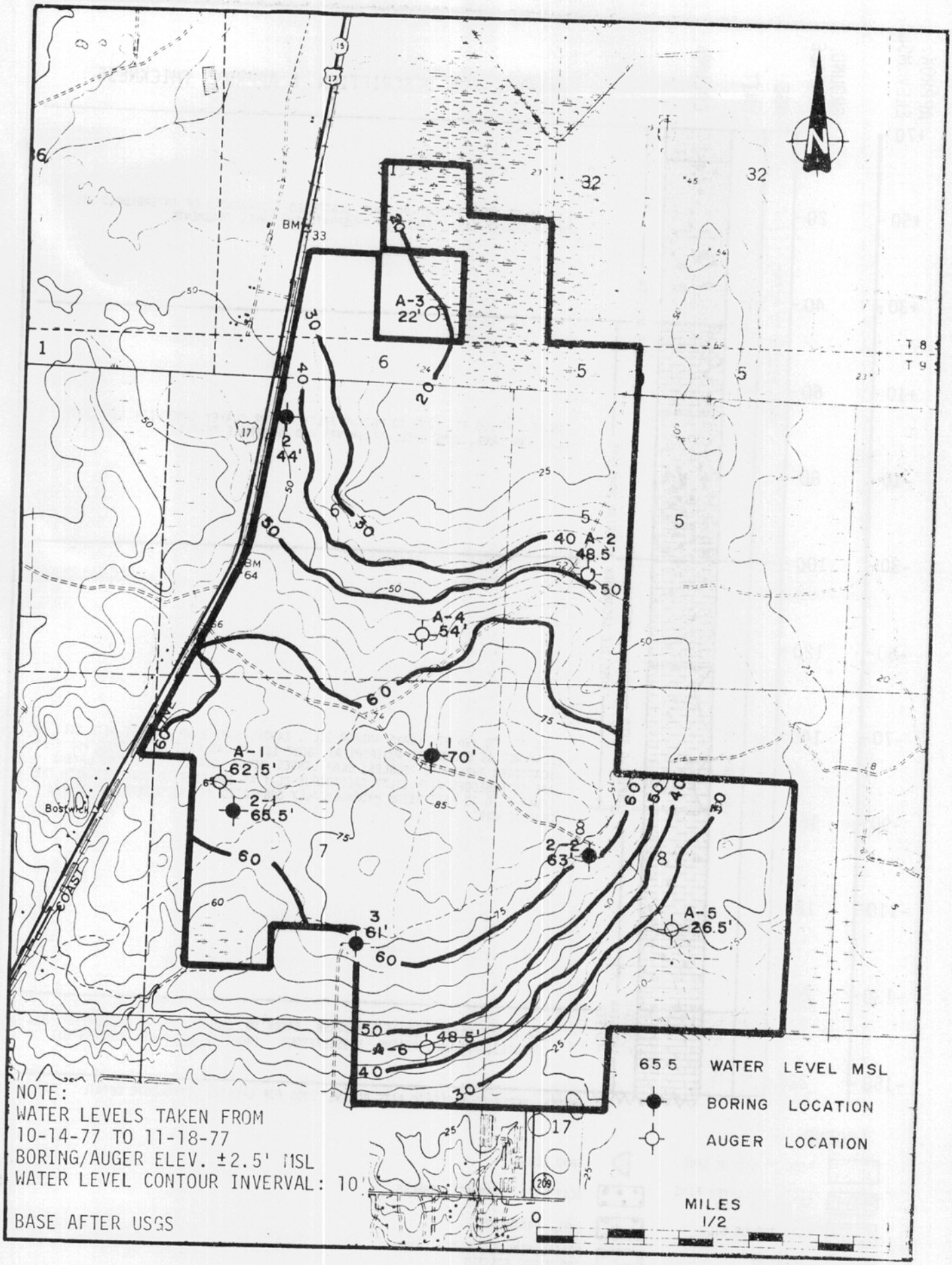
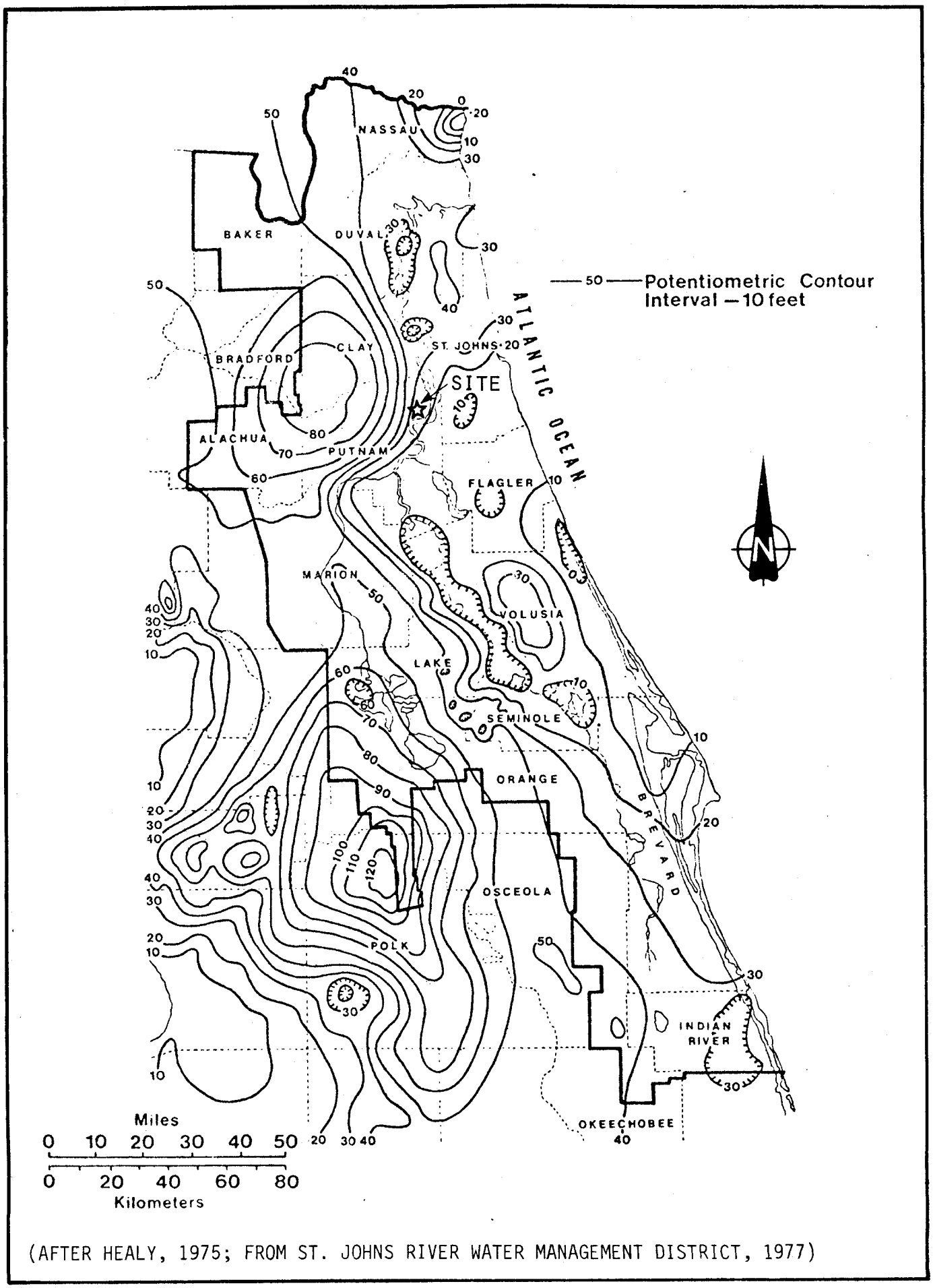


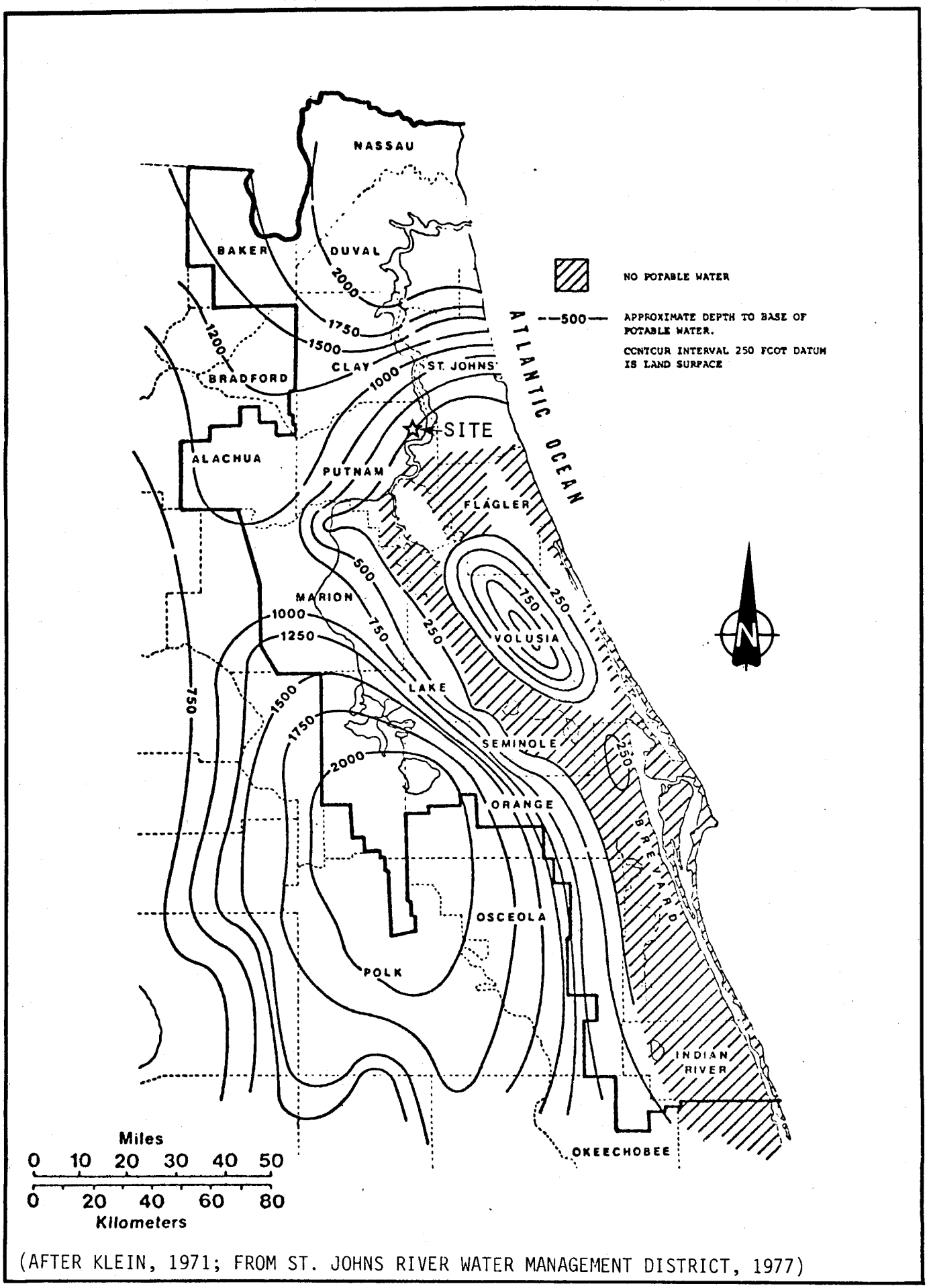
Figure F5.14 Site Water Level Contour Map of Water Table Aquifer.

REVISED 3/15/79



(AFTER HEALY, 1975; FROM ST. JOHNS RIVER WATER MANAGEMENT DISTRICT, 1977)

Figure F5.15 Regional Potentiometric Surface of Floridan Aquifer.



(AFTER KLEIN, 1971; FROM ST. JOHNS RIVER WATER MANAGEMENT DISTRICT, 1977)

Figure F.5.16 Depth to Base of Potable Water.

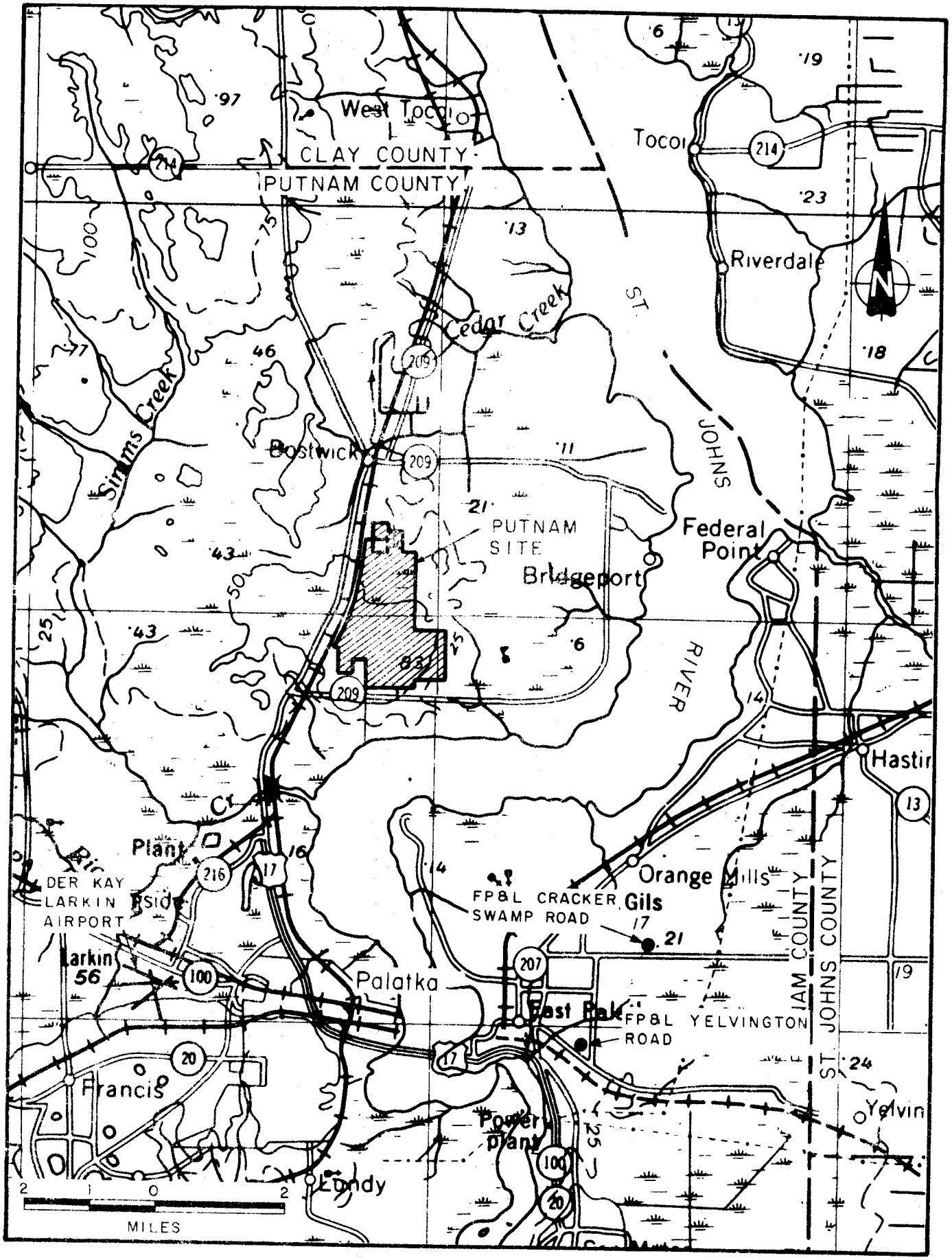


Figure F5.17 Location of Ambient Air Quality Monitoring Stations.

REVISED 3/15/79

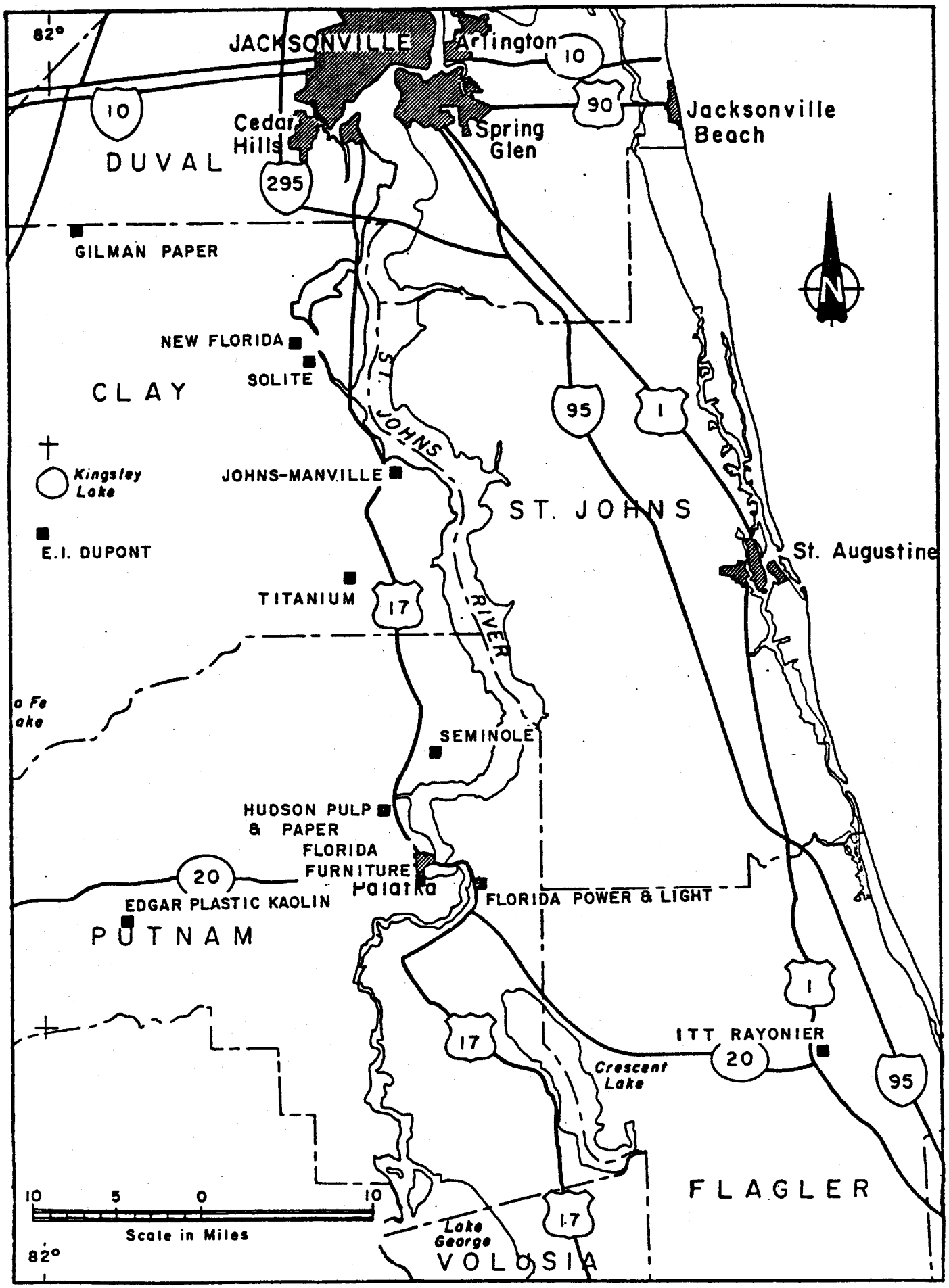


Figure F5.18 Location of Existing Emission Sources in Vicinity of the Seminole Site.

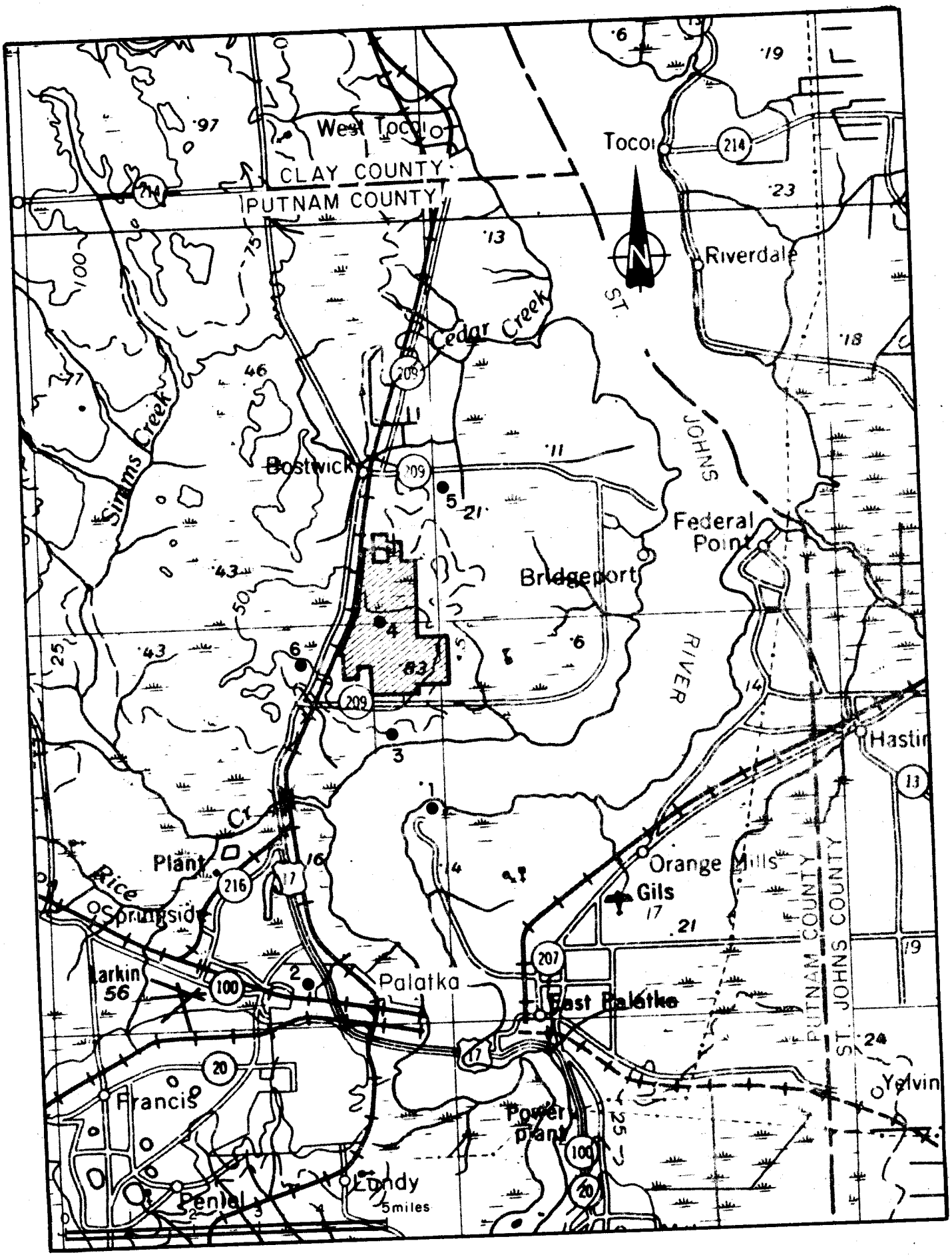


Figure F5.19 Ambient Sound Survey Measurement Locations.

REVISED 3/15/79

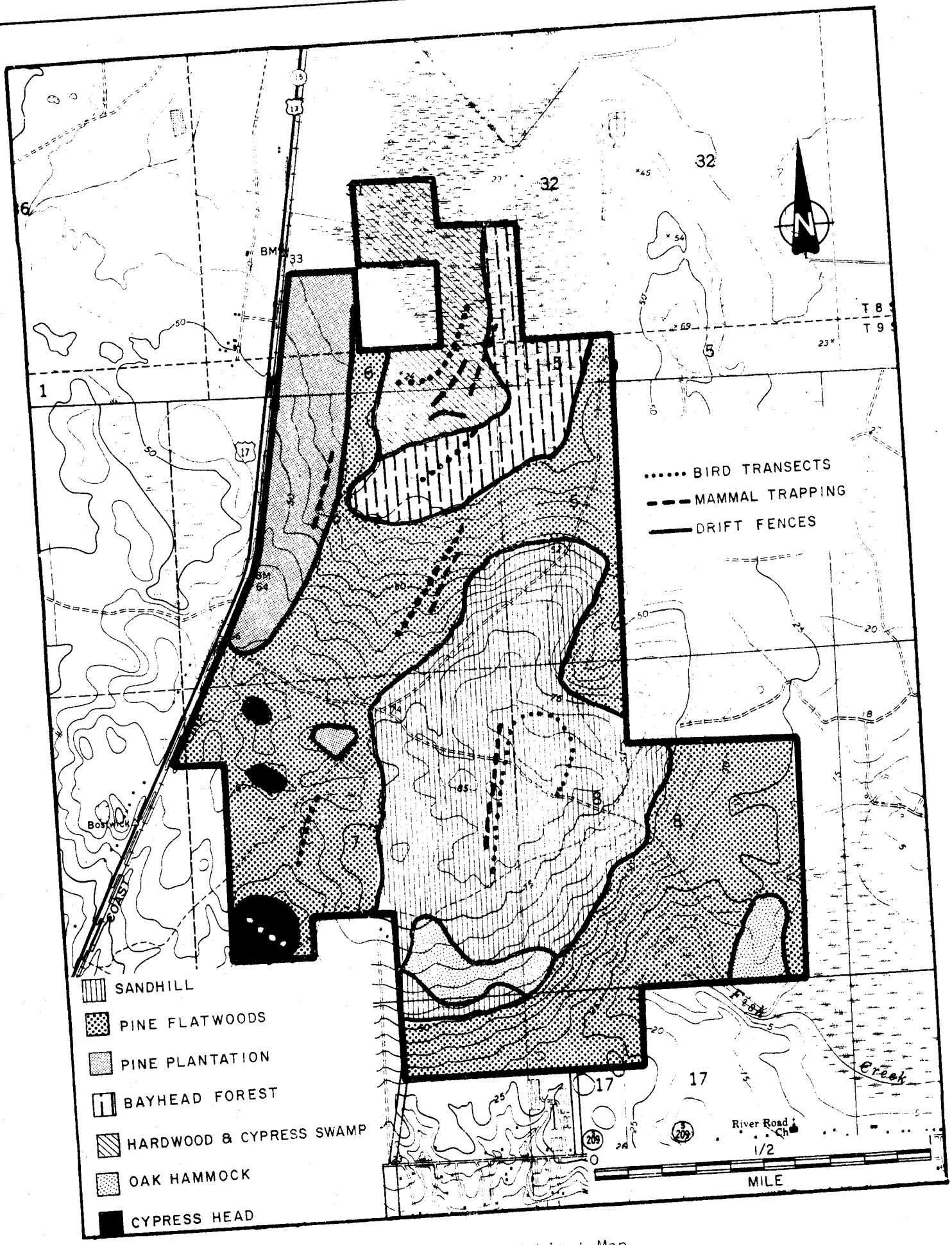
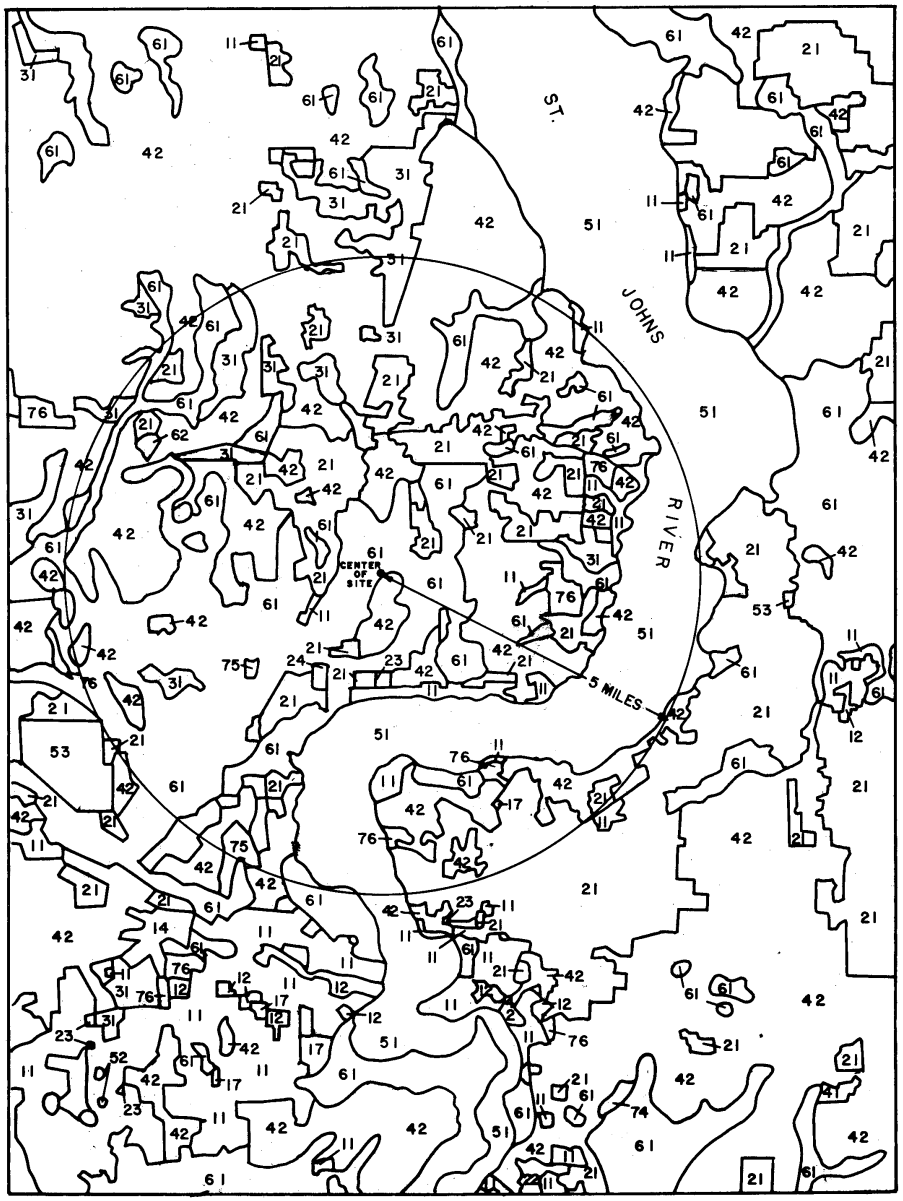


Figure F5.20 Vegetation and Habitat Map

REVISED 3/15/79



CLASSIFICATION CATEGORIES

1 URBAN OR BUILT-UP LAND

11 Residential
12 Commercial and Services
13 Industrial
14 Transportation, Communications and Utilities
15 Industrial and Commercial Complexes
16 Mixed Urban or Built-up Land
17 Other Urban or Built-up Land

2 AGRICULTURAL LAND

21 Cropland and Pasture
22 Orchards, Groves, Vineyards, Nuseries, and Ornamental
23 Confined Feeding Operations
24 Other Agricultural Land

3 RANGELAND

31 Herbaceous Rangeland
32 Shrub and Brush Rangeland
33 Mixed Rangeland

4 FOREST LAND

41 Deciduous Forest Land
42 Evergreen Forest Land
43 Mixed Forest Land

5 WATER

51 Streams and Canals
52 Lakes
53 Reserviors
54 Bays and Estuaries

6 WETLAND

61 Forested Wetland
62 Nonforested Wetland

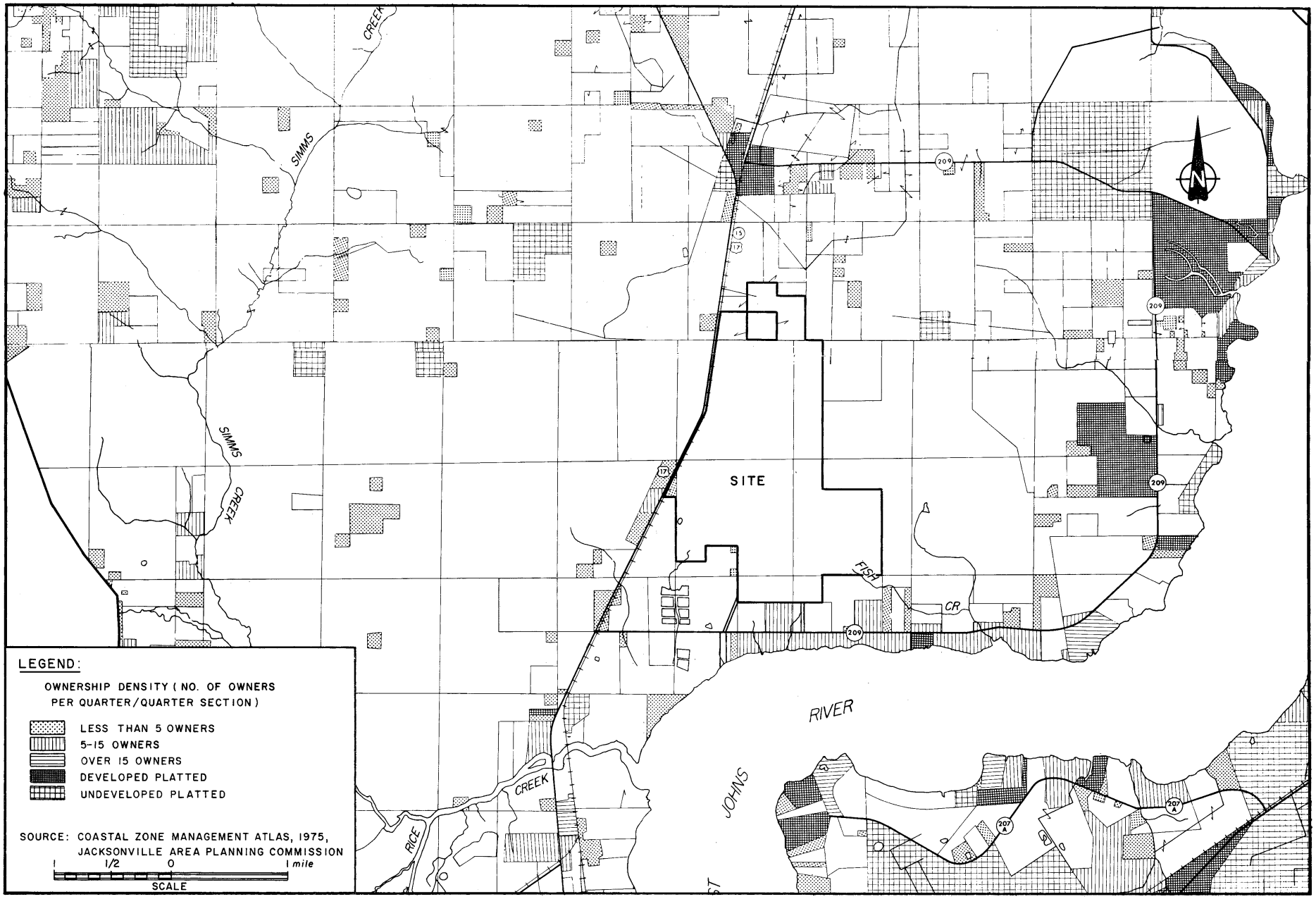
7 BARREN LAND

71 Dry Salt Flats
72 Beaches
73 Sandy Areas Other than Beaches
74 Bare Exposed Rock
75 Strip Mines, Quarries, and Gravel Pitts
76 Transitional Areas
77 Mixed Barren Land

SOURCE: U.S.G.S. LAND USE AND LAND COVER, 1972. DAYTONA BEACH, FLORIDA IN CONJUNCTION WITH FLORIDA DIVISION OF STATE PLANNING.

2 1 0 3
SCALE IN MILES

Figure F5.21 Land Use within 5 Miles of the Site.



REVISED 3/15/79

Figure F5.22 Ownership Density - Site Vicinity.

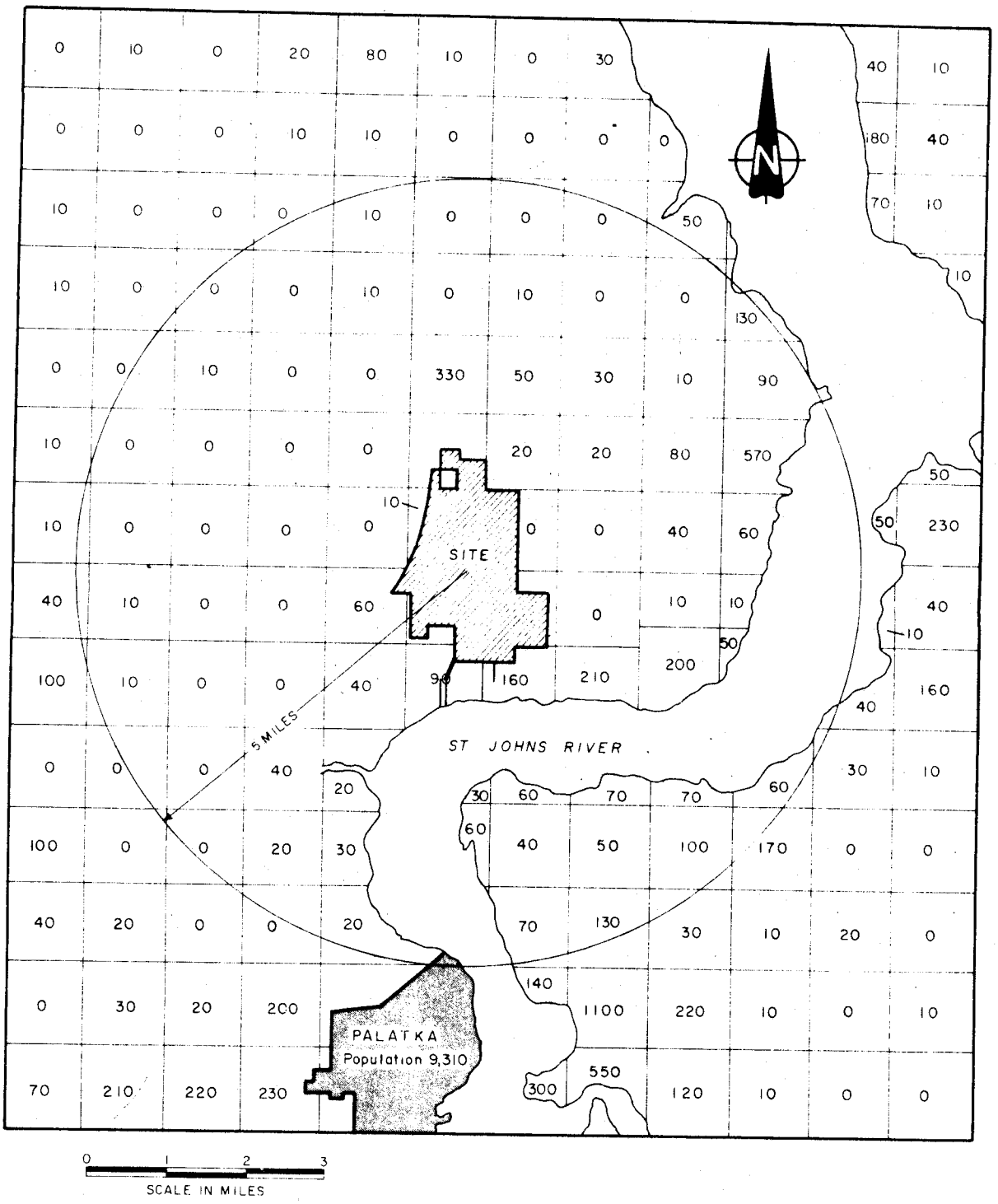


Figure F5.23 Estimated Population Distributions within 5 Miles of the Site.

REVISED 3/15/79

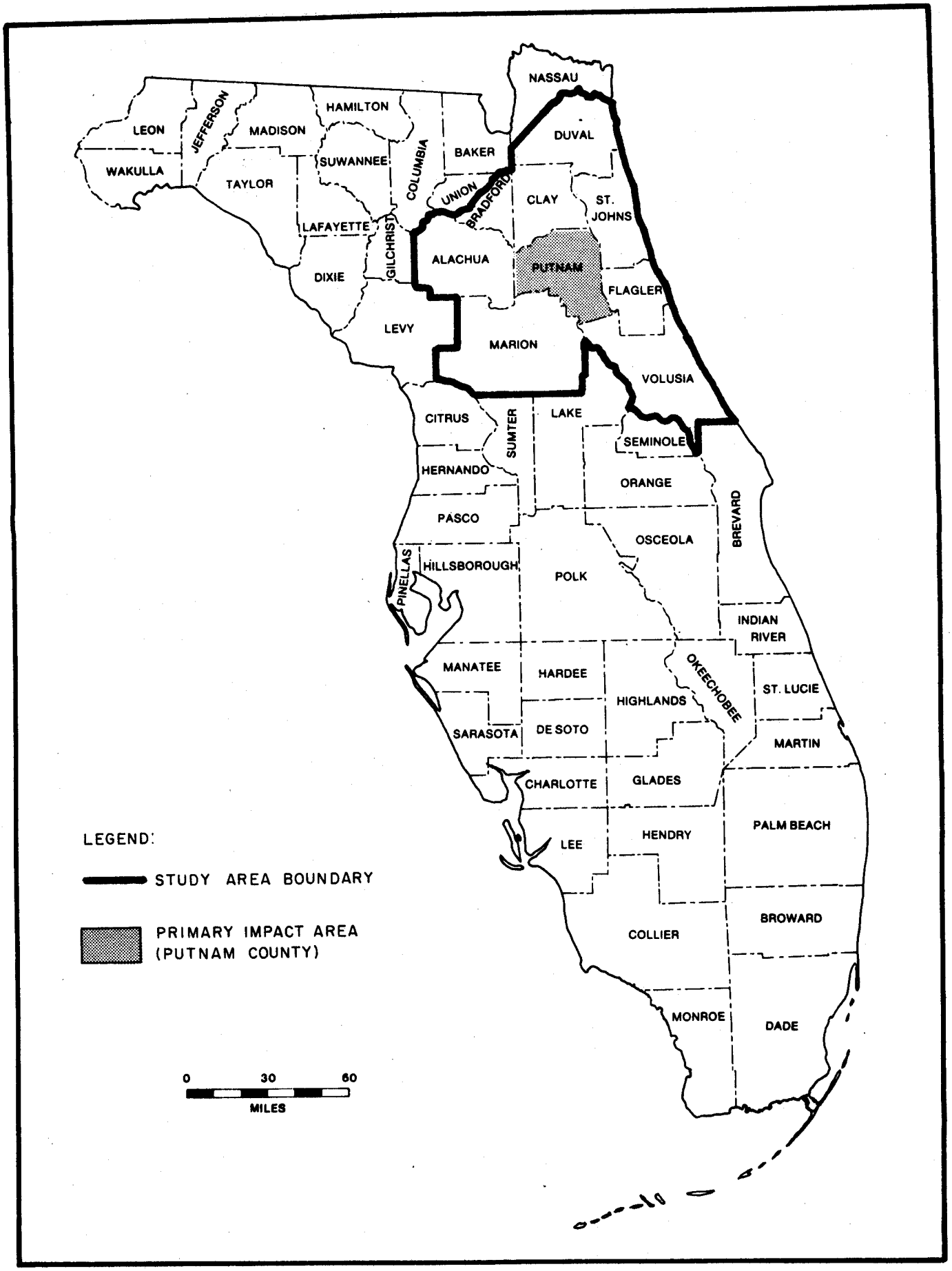
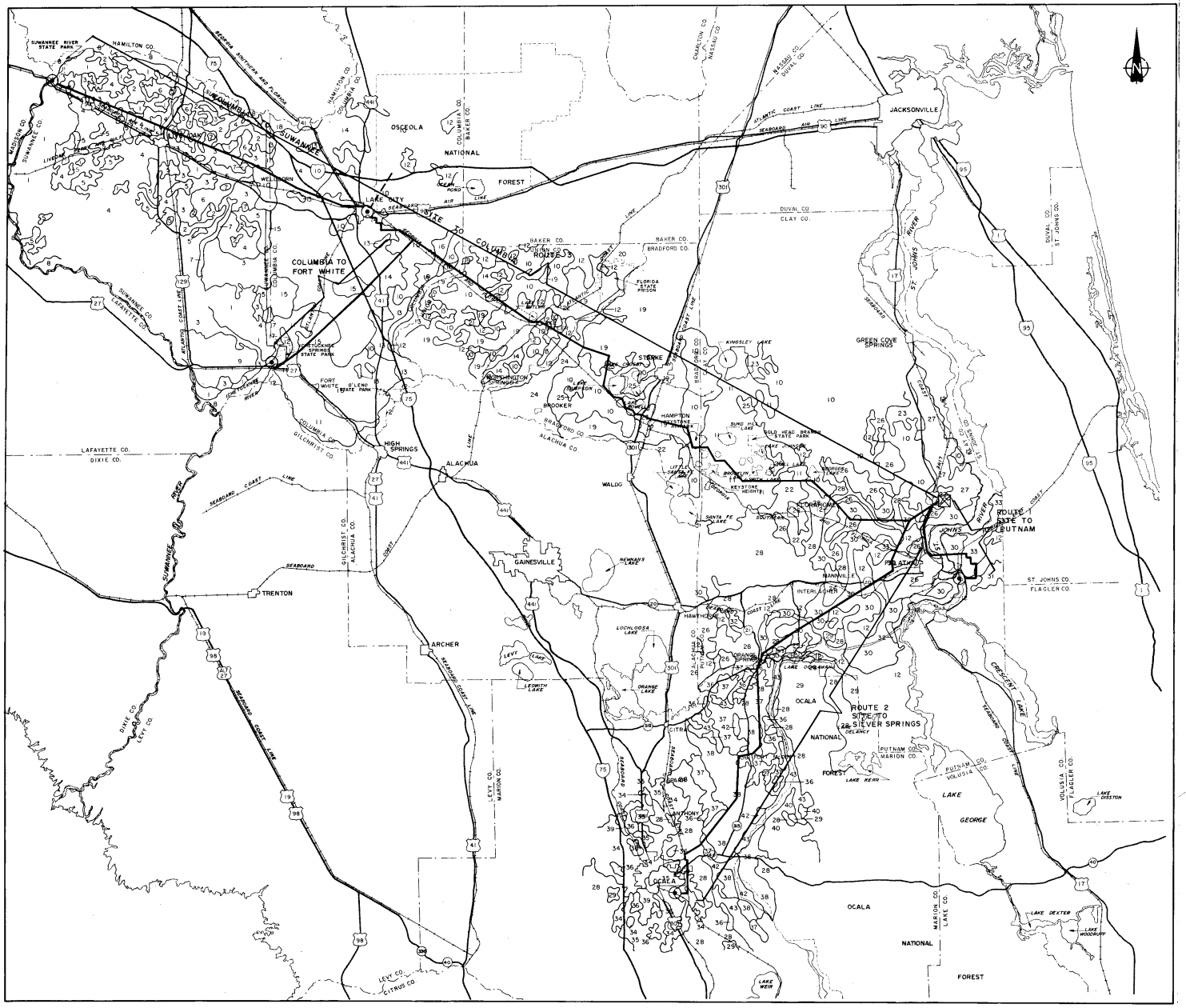


Figure F5.24 Putnam Site Socioeconomic Impact Study Area.



SOIL ASSOCIATIONS

1 BLANTON (HIGH)-LAKELAND ASSOCIATION
2 ARREDONDO-KANAPAHA ASSOCIATION
3 BLANTON (LOW)-ASSOCIATION
4 BLANTON (LOW) SUSQUEHANNA-BOWIE ASSOCIATION
5 SUSQUEHANNA-BOWIE ASSOCIATION
6 LEON-PLUMMER ASSOCIATION
7 ALLUVIAL LAND-SWAMP ASSOCIATION
8 BLANTON-KALMIA-SWAMP ASSOCIATION
9 BLANTON-CHIEFLAND ASSOCIATION
10 MASCOTTE-LEON-SURRENCY ASSOCIATION
11 ALPIN-BLANTON ASSOCIATION
12 FRESH WATER SWAMP ASSOCIATION
13 ARREDONDO, VAR.-ALAGA-KENNEY ASSOCIATION
14 CHIPLEY-ALBANY-RUTLEGE ASSOCIATION
15 ARCHER-CHIEFLAND ASSOCIATION
16 LEEFIELD-MASCOTTE-ALBANY ASSOCIATION
17 CHIPLEY CHIEFLAND ASSOCIATION
18 SURRENCY-PORTSMOUTH ASSOCIATION
19 STILSON-PELHAM-MASCOTTE ASSOCIATION
20 PELHAM-PLUMMER-RUTLEGE ASSOCIATION
21 PORTSMOUTH-RAINS ASSOCIATION
22 BRIGHTON ASSOCIATION
23 CHIPLEY-LEON-OSIER ASSOCIATION
24 KANAPAHA-CHIPLEY-SCRANTON ASSOCIATION
25 OSIER-RUTLEGE-LEON ASSOCIATION
26 TAVARES-MYAKKA-BASINGER ASSOCIATION
27 OLUSTEE-RUTLEGE-LEON ASSOCIATION
28 CANDLER-APOPKA ASSOCIATION
29 ASTATULA ASSOCIATION
30 MYAKKA-WAUCHULA-PLACID ASSOCIATION
31 OLUSTEE, VAR.-PLACID-MYAKKA ASSOCIATION
32 POMELLO-MYAKKA ASSOCIATION
33 MEGGETT, VAR.-WAUCHULA-CHOBEE ASSOCIATION
34 ARREDONDO-GAINESVILLE ASSOCIATION
35 KENDRICK-HAGUE-ZUBER ASSOCIATION
36 SPARR-LOCHLOOSA-TAVARES ASSOCIATION
37 LYNNE-PONONA-POMPANO ASSOCIATION
38 EUREKA-PAISLEY-EATON ASSOCIATION
39 BLANTON-FLEMINGTON-KANAPAHA ASSOCIATION
40 MYAKKA-SELLERS ASSOCIATION
41 SELLERS-PAMLICO ASSOCIATION
42 BLUFF-MARTEL ASSOCIATION
43 OKEECHOBEE-TERRA CEIA-TOMOKA ASSOCIATION

⊠ SEMINOLE PLANT
⊙ SUBSTATION

NOTE: MAP COMPILED FROM INFORMATION IN THE FLORIDA GENERAL SOILS ATLAS FOR REGIONAL PLANNING DISTRICTS III & IV, AND MARION COUNTY BY FLORIDA DEPARTMENT OF ADMINISTRATION, DIVISION OF STATE PLANNING, BUREAU OF COMPREHENSIVE PLANNING, JULY, 1975.

5 0 5 10 15 20
SCALE IN MILES

SOIL ASSOCIATIONS FOR PREFERRED CORRIDORS
FIGURE F5.25

6.0 ENVIRONMENTAL CONSEQUENCES

6.1 Environmental Impacts

Environmental impacts of the construction and operation of the power generating station proper, are discussed in Chapter 6.1. Environmental Impacts of the associated transmission corridors are included in Section 5.7: "Associated Transmission Facilities."

6.1.1 Air Resources

6.1.1.1 Construction Impacts

The impact of station construction on ambient air quality will result primarily from the generation of non-toxic fugitive dust due to land clearing, excavation, and movement of vehicles over unpaved surfaces. Any increase in particulate concentrations will be intermittent, primarily confined to the immediate vicinity of the Putnam Site, and subject to rapid deposition. The application of water and/or dust suppression chemicals will be used, for control. No toxic or explosive dusts are expected to be created by construction activities.

Open burning associated with land clearing will not contribute significantly to emissions. Open burning will be conducted in accordance with applicable regulations of Chapter 17-5 F.A.C. and upon prior notice to the Florida Division of Forestry.

Any increase for the area in vehicle exhaust emissions occurring during site preparation and station construction will be insignificant and have a negligible impact.

6.1.1.2 Operation Impacts

Description of Air Emissions. Coal burning rates and emission rates, (Table 6.5) correspond to extremes in the range of coal characteristics. Only maximum emission rates were considered in the modeling analysis used to evaluate ambient air quality impacts. Exhaust gases exit conditions applicable to the total plume released from the stack are listed in Table 6.6. The flue gas desulfurization system is being designed for the highest availability possible (100 percent) by using spare components.

Drift, small water droplets from the cooling towers, will be emitted to the atmosphere. However, due to the efficiency of the drift eliminators (.005 %) and the use of a fresh water cooling water source, dissolved and suspended solids will constitute only a small fraction of total droplet mass.

Primary Effects of Stack Emissions

The effects of stack emissions on ambient air quality concentrations of SO_2, TSP and NO_x were evaluated using single-source, PSD increment analysis techniques. Multiple-source modeling was used to assess compliance with ambient air quality standards. EPA models used were the Air Quality Display Model (U.S. Public Health Service, 1969) and the CRSTER Model (EPA, 1977b).

Meteorological input data were based on surface observations from the Jacksonville National Weather Service station and upper air data from the Waycross, Georgia, balloon sounding station. Approval of meteorological data used was obtained from EPA Region IV and from Florida DER prior to model application.

Information on existing emission sources within the Putnam Site was obtained from the Florida DER (St. Johns River Subdistrict Office). Seminole Station emissions source data were developed by Burns and Roe, Inc., the architect/engineer for Unit No. 1 and No. 2.

Compliance with PSD Increments - Annual Average Concentrations. Annual average SO_2 and TSP concentrations were calculated based on a load level of 75 percent of rated capacity with both units in operation. Concentrations were determined to a distance of 50 km from the Putnam Site (Table 6.7). Highest concentrations are negligible in comparison with the increments.

The pattern of annual concentrations typical for tall stack sources, consists of almost no effect at close distance and a slight increase in concentrations at distances of about 40 to 50 km. This pattern was calculated to occur to the east of the Site. Annual concentrations are estimated to be uniformly low for all directions and distances.

Compliance with PSD Increments - 24-Hour Concentrations. SO_2 and TSP 24-hour concentrations were calculated using 6 years of meteorological data based on operating levels of 50, 75, and 100 percent of rated capacity. Short-term (3-hour and 24-hour) increments, as short term ambient standards, represent increases which can be exceeded once a year. Highest concentrations for any individual year of meteorological data are referred to as "maximum" concentrations, and second-highest values will be termed "second-high" concentrations. The modifier "greatest" is used to indicate that the maximum or second-high concentration for one year exceeds the maximum or second-high values for other years.

The greatest second-high 24-hour SO_2 concentration (Table 6.8) is 60 $\mu g/m^3$ which represents 66 percent of the Class II increment at a distance very close to the Putnam Site. At greater distances, and in different directions, a lower percentage of the increment would be consumed by Station emissions.

Predicted second-high 24-hour TSP concentrations (Table 6.9) are well below the Class II increment. The greatest second-high concentrations, 2 $\mu g/m^3$ is only 5 percent of the increment.

Compliance with PSD Increments - 3-Hour Concentrations. The greatest second-high 3-hour SO_2 concentration (Table 6.10) is 437 $\mu g/m^3$ at a point a distance of 1.25 km from the site. This concentration represents 85 percent of the Class II increment. The variation of second-high concentrations from year to year is fairly large, but in every case, unstable atmospheric conditions which result in highest values at close distances are responsible for the results.

Compliance with Ambient Air Quality Standards - Annual Average Concentrations. Compliance of maximum annual SO_2, TSP and NO_2 concentrations with the Florida Ambient Air Quality Standards, is shown as follows (all concentrations in $\mu g/m^3$):

Pollutant	Maximum Calculated Annual Concentration	Florida Ambient Standard	Distance/Direction from Putnam Site
SO_2	28	60	6 km/170°
TSP	3	60	10 km/10°
NO_2	11	100	14 km/140°

Adding a geometric annual average background value of about 35 $\mu g/m^3$, the total maximum annual average TSP concentration would be about 40 $\mu g/m^3$. Annual average background concentrations of SO_2 and NO_2 are very low and need not be added to modeled concentrations. The sources included in the modeling analysis are probably largely responsible for measured background concentrations.

Annual concentrations attributable to the Seminole Station emissions alone are negligible in comparison with ambient standards. The highest SO_2, NO_2, and TSP concentrations estimated to result from Seminole Station emissions are 5, 3, and 1 $\mu g/m^3$, respectively, therefore, construction and operation of the Seminole Station will not interfere with maintaining standards compliance.

Compliance with Ambient Air Quality Standards - 24-Hour and 3-Hour Concentrations. Based on the location and strength of existing SO_2 and TSP emission sources, the only sources which could have significant interaction with the Seminole Station are Hudson Pulp and Paper Company and Florida Power & Light Company (FP&L).

Interactions among Seminole, Hudson, and FP&L were computed using a multiple-source variation of the CRSTER Model. The analysis was performed using 1972 meteorological data, assumed the Seminole Station was operating at 100 percent of rated capacity, and keyed on directions within about 30 degrees on either side of the direct angle between the Seminole Station and the other two sources.

The resulting second-high 24-hour and 3-hour SO_2 and 24-hour TSP concentrations (Table 6.11) show that maximum SO_2 concentrations occur near the Seminole Station and are almost entirely due to Seminole emissions. The second-high 24-hour SO_2 concentration calculated is 23 percent of the Florida standard (and 16 percent of the national standard), and the second-high 3-hour SO_2 concentration is 40 percent of the Florida (and national) standard.

The second-high 24-hour TSP concentration is predicted to occur near FP&L emission sources and represents only 4 percent of the Florida ambient and national secondary standard. However, if a background concentration of 35 $\mu g/m^3$ was added to the calculated interactive concentration of 5 $\mu g/m^3$, the combined concentration would be 26 percent of the standard.

Impact on Duval County TSP Nonattainment Area. (Note: At the time this evaluation was conducted the entire area of Duval County was designated "nonattainment for particulates". Recent redesignation shows downtown Jacksonville only as nonattainment for particulates.) To evaluate the impact of Seminole Station particulate emissions on the Duval County (southern boundary) TSP nonattainment area, calculations of 24-hour and annual average concentrations were made using the CRSTER Model at receptor points 50 km north of the Putnam Site. The station was assumed to operate at 100 percent of the capacity at all times.

For all six years of meteorological data, both the maximum 24-hour and annual average TSP concentrations attributable to Seminole Station emissions were predicted to be less than 1 $\mu g/m^3$. These concentrations are below the level of significant impact recognized by EPA. Therefore the Seminole Station will not significantly affect the Duval County TSP nonattainment area.

Impacts on Nearest PSD Class I Area. The nearest PSD Class I Area is the Okefenokee Wilderness Area, 105 km from the site. Calculations were made at a distance of 50 km and compared with applicable Class I increments. These increments are as follows (in $\mu g/m^3$):

	SO_2	TSP
Annual	2	5
24-Hour	5	10
3-Hour	25	--

(The 3-hour and 24-hour increments are increases in concentrations which can be exceeded once a year.)

All annual average and 24-hour calculated TSP and annual average SO_2 concentrations are estimated to be less than 1 $\mu g/m^3$ and therefore less than the Class I increment. The greatest second-high 24-hour and 3-hour SO_2 concentrations are 9 and 31 $\mu g/m^3$, respectively, at 50 km from the Putnam Site (exceeded once a year.) Since these concentrations are only slightly greater than the Class I increments, no problem is anticipated at a distance of 105 km from the site.

Impacts on Potential Wilderness Areas. In January 1979, the Forest Service published its Final Environmental Impact Statement on RARE II, Roadless Area Review and Evaluation, to identify roadless and underdeveloped land areas in the National Forest System and to determine their general uses for both wilderness and other resource management and development. Designations in the "wilderness" category will be recommended to Congress for inclusion in the National Wilderness Preservation System.

Three areas proposed for wilderness status in the area south-southwest of the proposed project are: (1) Little Lake George--2,375 acres 30 km from the site; (2) Alexander Springs--13,650 acres approximately 70 km from the site and (3) Juniper Prairie--8,650 acres approximately 55 km from the site. Prevention of significant deterioration regulations allow wilderness areas established after

August 7, 1977 to be redesignated as Class I or II if they are larger than 10,000 acres in size. Additionally, any redesignation to Class I must follow a procedure involving evaluation, governmental and public review, public hearing, recommendation by the state and approval by the EPA Administrator. Of the three areas, Alexander Springs is the most likely candidate for redesignation to Class I since it is greater than 10,000 acres in size. Because of the 70 km. distance from the site, it is not likely that emissions from the plant would cause the air quality of this area to exceed the Class I increment should the area be designated as Class I.

Secondary Effects of Stack Emissions

Effect of Sulfur Oxide Emissions on Ambient Sulfate Levels. Gaseous sulfur oxides emitted into the atmosphere can be oxidized to form sulfate aerosols. No national, or State of Florida, ambient standards for sulfates have been adopted.

Measurements of ambient sulfate levels near Gainesville and Jacksonville over a 3-month period from October through December 1977 indicate that average concentrations were on the order of 5 to 7 $\mu g/m^3$. Though difficult to place these numbers in perspective, such values are only about a third of average sulfate concentrations measured at urban stations located in the northeastern United States.

There is evidence that the conversion rate of SO_2 to sulfates in a plume released from an elevated stack is initially slow and then increases at greater downwind distances as ambient air is introduced into the plume. Potential long-range impacts are further enhanced by formation of very small aerosols (less than 1 micron in diameter). SO_2 emitted from a low stack comes into contact with the ground more quickly and is likely to be removed by dry deposition or vegetative uptake before converting to an aerosol sulfate. Emissions from a tall stack, although producing lower groundlevel SO_2 concentrations, remain suspended for a longer period of time and are more susceptible to sulfate conversion mechanisms. There is also some indication that sulfates transported from other states may affect ambient sulfate levels in Florida.

Ground-level sulfate impacts resulting from an SO_2 emission source could be somewhat more affected by a generating station equipped with a wet scrubbing control system than by an equivalent station without scrubbers; but since the end result of the scrubbing system is to diminish sulfur emissions substantially, impacts on both local and remote areas will be reduced through use of this air emissions control system.

Any aerosol sulfate formed due to operation of the Seminole Station could have an effect on prevailing visual range conditions. However, in the southeastern United States where high humidity in combination with an abundance of existing natural and man-produced aerosol sources already result in visibility restrictions, it is unlikely that the addition of a single new source of sulfur emissions will result in readily perceptible visibility changes. Another concern is that increased sulfur emissions will lead to the formation of acidic sulfates in rainwater with adverse consequences on surface water bodies, soils, and vegetation. Due to the presence of carbonates, "normal" rainfall is already acidic

(with a pH of about 5.7). The extent to which emissions from the Seminole Station would cause increased rainfall acidity cannot be accurately calculated.

Effect of Trace Element Releases. Depending on the type of fuel being used, a sizeable fraction of many trace elements will appear in the ash residue of the combustion process. These will be removed during deposition as bottom ash and collected by particulate control equipment. Some elements, such as mercury, will vaporize in the combustion zone and can escape in a gaseous form; while others, such as cadmium, lead, and zinc, apparently vaporize and then preferentially adhere to very fine particles which are not collected with the same degree of efficiency as the bulk of the ash material.

Currently, there are no Federal or State of Florida ambient air quality standards or emission standards for trace elements specific to coal-fired steam-electric generating stations.

Ground-level concentrations of trace elements resulting from fuel combustion are typically very low, well below industrial hygiene standards which have been established to control occupational exposure to trace elements. Therefore, achieving compliance with occupational standards by a wide margin would indicate that adverse health effects attributable to trace element emissions will be avoided.

Another quantitatively minor class of substances emitted from coal-fired power generating facilities which has caused some concern is polycyclic organic matter (POM) emissions. It is not now possible to provide a definite statement concerning the impact such emissions from the Seminole Station might have.

Plume opacity at the stack is regulated by State and Federal New Source Performance Standards (NSPS). Regulated opacity does not include interference of light transmittal due to any water vapor condensation which may result from the use of wet scrubbers. The efficiency of modern particulate removal systems (such as electrostatic precipitators) generally results in meeting opacity standards.

Many of the substances emitted in flue gases undergo chemical transformation in the atmosphere immediately after release. As a result of secondary products of combustion forming in the atmosphere, plume discoloration can occur within a plume which is still relatively intact. The major contributor to this effect is the conversion of nitric oxide (NO) to nitrogen dioxide (NO_2) which can impart a brownish hue to a plume. Eventually, either additional reactions occur or a plume becomes so diffuse that any discoloration which may have initially developed is no longer apparent. Prediction of the development and degree of discoloration is complicated by an inability to precisely specify either the secondary reactions involved or the rate at which a plume will be dispersed.

Although the primary particulate emissions resulting from coal combustion can have some effect on visibility impairment, the major effect results from the conversion of gaseous sulfur oxides to aerosol sulfates and the subsequent transport of these aerosols over large distances. Widely accepted methods of quantitively analyzing the visibility impact of a single new emission source have not been established.

Aside from the great difficulty of accurately predicting and monitoring the formation, transport, and visibility impairment impact of secondary products caused by the emissions of a single source, no regulatory policies have been established to limit impairment.

Emissions from the Seminole Station will probably have some effect in terms of plume discoloration and visibility impairment at distances remote from the Putnam Site. The emission control design features of the Seminole Station will serve as a definite mitigative measure to reduce visibility impacts. Sulfur oxides removal, in particular, will act to diminish the subsequent formation of aerosol sulfates which are considered to be key ingredients in the impairment of visual range.

Other Emissions

Fugitive Emissions. Fugitive dust emissions may result from coal handling operations, sludge and ash disposal, and onsite traffic even though control measures will be taken to suppress dust formation. Any dust generated will be intermittent and will tend to settle within or very near site boundaries. The impact of fugitive dust emissions on ambient air quality conditions outside plant boundaries is expected to be very slight.

Atmospheric Effects of Cooling Towers. Emissions from natural draft cooling towers occur in essentially two forms: evaporation and drift. Water evaporation losses from the two natural draft towers to be operated at the Putnam Site are estimated to be about 8,250 gallons per minute (gpm). Such condensed liquid droplets will be in an essentially pure form and will contribute nothing to ambient solid particulate concentrations.

Drift consists of very small droplets. The drift emission rate for the Seminole Station towers is estimated to be only 0.005 percent of the circulating flow or 27 gpm.

Blowdown from the Seminole towers is expected to contain a maximum of 3740 mg/liter total dissolved solids and a maximum of 184 mg/liter total suspended solids, for a total of 3924 mg/liter.

Combined drift emissions from the two natural draft towers to be operated at the Putnam Site is estimated to be 39,000 gpd. The total maximum solids equivalent emission rate from both cooling towers is 1,286 lb/day (39,000 gal/day x 8.4 lb/gal x 0.003924 solids fraction or 54 lb/hr). Particulate emissions resulting from combustion of high ash coal with both generating units in operation at rated capacity is expected to be 264 lb/hour, nearly five times greater than maximum cooling tower emissions.

The height of release and plume rise of cooling tower emissions differ from emissions of the boiler stack. More importantly, liquid droplets released from cooling towers behave differently from fly ash particles emitted from a stack. Fly ash particles are assumed to be small enough to behave in accordance with the diffusion properties of a gas. Drift droplets, on the other hand, have a

much wider size distribution with an appreciable settling velocity until droplet size is reduced by evaporation. Therefore, maximum ground-level particulate concentrations traceable to cooling tower emissions tend to occur at closer distances than those from tall-stack fly ash emissions. The relatively small quantity of solids equivalent emissions from the Seminole cooling towers (less than 150 tons per year based on an average blowdown discharge solids content of 2344 mg/liter and an annual average station operating level on the order of 70 percent of rates capacity), to be released from sources which are approximately 450 feet in height and at least 1400 feet from the nearest site boundary, suggest that ground-level impacts beyond site boundaries will be minor.

The interaction or intermingling of cooling tower and stack plumes, considering such factors as directional orientation, separation distance, structure height difference, and plume rise difference, will frequently be only partial. Interaction of cooling tower plumes with the boiler stack plume can result in the formation of acidic water droplets. The extent of acid droplet formation, the degree of resulting acidity initially and after subsequent reactions, and whether acid droplets will reach the ground before evaporating are all uncertain. Furthermore, the SO_2 content of Seminole Station stack emissions will be greatly depleted after passage through wet scrubbers. Therefore, any stack/cooling tower interaction which occurs is not expected to add appreciably to impacts which would occur in the absence of this interaction.

6.1.2 Water Resources

6.1.2.1 Construction Impacts

Surface Water

Impacts to the Aquatic System of the St. Johns River. The intake will consist of a circular sheet pile and concrete structure located about 325 feet from the shoreline to avoid disturbance of near shore aquatic vegetation. A concrete walkway 6 feet wide will connect the intake structure to the shore. The walkway will be supported by concrete piles. Approximately 300 square feet of riprap structure will be placed where the walkway intersects the shoreline. The intake structure will require approximately 650 cubic yards of dredging inside the cofferdam. The intake and discharge pipes will be entrenched and require approximately 1,100 cubic yards of dredging. The spoil will be pumped as a slurry to a disposal area on the main plant site. Moisture will be allowed to drain from the spoil area by percolation. The intake and discharge pipes will be backfilled with approximately 1,000 cubic yards of clean fill obtained from onsite stockpiles. The discharge pipe will rest on the bottom waterward of elevation -6.5 feet. The effluent water will be conveyed through a 16 inch diameter pipe to a nozzle approximately 900 feet waterward from the northwest bank of the St. Johns River. The nozzle will be directed away from the riverbottom at an angle of about 20 degrees to prevent erosion of the bottom and resuspension of sediments. Riprap will be placed on the bottom near the nozzle to prevent scour from jet turbulence.

Since excavation behind the cofferdam will be isolated from the river, it will not contribute to dredging impacts in the river. Turbidity curtains will be used during dredging of intake/discharge pipes trench.

The primary potential impact of dredging in the aquatic ecosystem will be the removal of substrate and the alteration of habitat in the dredged area. Other potential impacts include a temporary increase in turbidity and the potential for some associated chemical releases from the dredged materials.

Dredging an area of approximately 2,938 sq. ft. of substrate will result in a temporary reduction in benthic organisms. Since many of the benthic organisms are food sources for fish, a reduction of available food in the immediate area of dredging will result. However, because many of the fish in this area are not benthic feeders (bay anchovy, threadfin shad, gizzard shad), it is probable that the dredging of the intake area will result in a temporary displacement of fish to other areas. Spoil disposal will not be a source of impact at the site since all material will be placed behind dikes inland from shore.

It is estimated that about 750 square feet of aquatic macrophytes will be removed for the intake and discharge pipeline trench. Since the pipeline trench will be backfilled to original contours, macrophytes are expected to reestablish themselves in that area.

Increased turbidity and suspended sediments may potentially cause reductions in light penetration, but this impact will be temporary in nature and limited in area, and the effect of the impact is expected to be negligible.

Suspended sediments associated with turbidity may potentially cause some mechanical damage to the gills of fish and invertebrates which remain in the area during dredging. Since the affected area is relatively small, the impact will be minor. Many fish will avoid the area and the invertebrate community, if damaged, will recover quickly after dredging is completed. Some benthic organisms may recolonize a dredged area within two weeks, and in many cases complete recolonization is relatively complete in six months to a year.

Chemical releases associated with the resuspension of bottom sediments are not expected to be a source of significant impact. Pesticides, PCBs and phenols were found in low concentrations in the sediments at Transect B and in most cases were at undetectable levels. Arsenic and the various heavy metals, evaluated as part of the sediment analysis, should not cause any potentially significant adverse impacts to the aquatic biota. Concentrations of these materials were relatively low at Transect B in most cases, with the exception of arsenic and iron. The relatively nontoxic iron (iron hydroxide) has the capability of scavenging and precipitating other metals from solution. It is also probable that the solubility rates of many of the materials are too low to become disassociated in the short term period required for the suspended sediments to resettle.

The overall impact of the dredging operation should be low. The area to be dredged is relatively small, and dredging activities will occur for only a short time. Construction activities such as inland spoil disposal, runoff control and use of turbidity curtains will further assist in mitigating potential impacts.

Groundwater

Withdrawals from the Floridan Aquifer. Station service water used during construction will be provided for drinking and sanitary facilities from two wells drawing at the rate of 50 gallons per minute (20,000 gallons per day) (Figure F6.1 and Table 6.31.) The water will be chlorinated and stored in a tank with a capacity of at least 3,000 gallons. Less than a half-foot of drawdown from the 50 gpm rate is expected at the closest well drawing from the Floridan Aquifer. This should cause no significant effect on the potentiometric surface.

Dewatering Effects on the Water Table Aquifer. Temporary dewatering of the water table aquifer for construction will have no lasting environmental impact. Ground water that is removed will be allowed to recharge the aquifer at some distance from the dewatered area. The cone of depression caused by the withdrawal will not extend beyond the site property boundaries. It is unlikely that dewatering will take place in all foundation areas simultaneously.

Disposal of Construction Wastewater. Wastewater during the period of construction will be essentially sanitary waste with negligible petroleum products or chemicals. In the final stages of construction, additional wastewater from the flushing of piping systems, testing of the boiler, and cleaning of both the boiler and piping systems will either be removed via tank truck to approved disposal facilities, or will be treated by the permanent wastewater treatment system.

Sanitary wastes will be collected by a sewage network, treated in a modularized extended aeration treatment plant, and the effluent discharged into an onsite percolation field. Portable toilet facilities in outlying areas will be pumped periodically by the supplier of the facility.

Impacts to the Water Table Aquifer. Approximately 1,750 cubic yards of spoil at approximately 15 percent solids will be placed in the dredge spoil disposal area (Figure F6.15). The potential impact upon ground water is associated with the sluice water used to transport the spoil to the disposal area. This water will be the interstitial water naturally contained in the sediments prior to dredging.

Tables 6.32 and 6.33 show, respectively, the water quality data for the St. Johns River and chemical analysis of sediments. The chemical constituents of chloride, cadmium, mercury, lead and zinc occasionally exceed Florida surface water quality criteria, but in general the concentrations are below the water quality criteria. Pesticides, PCBs, and phenols were found in low concentrations in the bottom sediments of the St. Johns, at Transect B usually at undetectable levels.

Seepage from the disposal area was calculated to be about 134,000 gpd. At this seepage rate, approximately 60 days will be required to dissipate the volume of sluice water. Results of the impact analysis are summarized in Table 6.37. The concentrations of constituents at the property boundary were calculated to be

within State of Florida water quality criteria, and impacts to off-site ground water are expected to be insignificant.

6.1.2.2 Operation Impacts

Surface Water. Mineral saturation in the circulating cooling water will be prevented by discharging a portion of the recirculating water stream, blowdown (Figure F6.5) and replacing that quantity with fresh water from the river. Approximately one-half of the blowdown will be released in the flue gas desulfurization system and one-half discharged to the St. Johns River. The discharged water (NPDES No. 004) will contain heat and chemical constituents. During a yearly meteorological cycle, the greatest blowdown to ambient temperature differential will occur during the winter and maximum temperatures during the summer. Chlorine and sulfuric acid will be periodically added to the circulating water system to prevent organic growth and scale. In addition, chemical constituents in the ash pond wastewater and in the effluent from the sanitary treatment plant will be mixed with the blowdown before discharging to the St. Johns River.

Consistent with the requirements of Florida Water Quality Standards, the investigation of discharge into the St. Johns River utilized separate, though interrelated, calculation procedures for the near- and far-field regions.

The estimate of the near-field impact and dilution was obtained by a well-tested buoyant plume model. The far-field models are:

1. A hydrodynamic model, TIDAL2, to simulate the flow of the tidally-influenced St. Johns River in the region of the intake and discharge locations.

2. A water quality model, WQUAL2, to simulate the distribution of temperature and dissolved constituents around the POD under selected discharge conditions.

Thermal Analysis. The assessment of the thermal component of the discharge was conducted for worst-case scenarios of blowdown to ambient incremental difference of water temperatures and maximum temperature. The worst-case incremental temperature between the blowdown and ambient waters is associated with winter conditions and the maximum temperature of both waters is associated with summer conditions.

The surface area impacted by the thermal discharge is dependent not only on the blowdown and ambient temperatures but also on the ambient flow vector. Under a given steady state flow condition, a plume configuration will form (Figures F6.6 and F6.7) for winter and summer conditions. From the figures, the location and size of the area affected by the plume will vary depending on the ambient flow conditions.

Design winter conditions were assumed to be an incremental rise of 27°F with an ambient temperature of 59°F (15°C). This scenario includes a significant factor

of safety for assessment of required winter mixing zones. The scenario requires the simultaneous occurrence of the lowest water temperature in 20 years of record and the greatest winter dry bulb/wet bulb temperatures in 34 years of record. The maximum design discharge temperature is 93°F (33.9°C).

Design summer conditions were assumed to be an incremental rise of 3°F with an ambient temperature of 90°F (32.2°C). As above, this scenario is conservative as it involves the simultaneous occurrence of extremes of summertime river water temperature and meteorological conditions.

The effluent plume will be oriented with the ambient current and will experience greater spreading under conditions of upstream flow or flow reversals. However, jet inertia force and the attendant turbulent mixing is dissipated more rapidly under upstream flow. Under the extreme condition of an upstream flow velocity of 1.0 fps, the jet inertia forces are reduced to zero within 35 feet of the POD. The average upstream velocity of approximately 0.2 fps was used to determine the pattern of maximum steady state spreading of various isotherms in the near-field (Table 6.12).

Once the jet inertia forces were reduced to zero, the far-field analysis assessed the plant wastewater dispersion during a seven-day period of near oscillatory flow in the St. Johns River (7-day MAF) with a temperature differential equivalent (12°F, 6.7°C) to the maximum between average monthly ambient (63°F, 17.2°C) and blowdown temperatures. Assessment of summer conditions was not conducted as the 3°F (1.7°C) increment between ambient and blowdown temperatures would be undetectable by the far-field WQUAL2 simulation.

Wastewater temperature (Figure F6.8) is computed to be, at maximum, less than 0.1°F (0.06°C) above ambient within 500 feet of the POD for a limited portion of the tidal cycle. With an assumed intake/discharge structure separation of 450 feet, the build-up of heat at the intake will be negligible. During the major portion of the tidal cycle the temperature difference at the intake would be less than 0.1°F (0.06°C).

The total area effected by a thermal mixing zone over a complete tidal cycle was estimated by assuming that the thermal component is a conservative substance and applying the dimensionless near-field/far-field interpolation model. For a given ratio of excess constituent concentration versus initial excess, the model provided the total area that may experience at least that excess constituent ratio during at least a portion of the tidal cycle (Table 6.12 and Figure F6.11).

Impacts of Thermal Discharges on the Aquatic Ecology of the St. Johns River. Thermal gradients produced by cooling tower blowdown, may cause some aquatic organisms in the St. John's River to selectively avoid or to be attracted to affected areas. Other possible effects include changes in community structure, to include shifts towards nuisance organisms; and decrease in dissolved oxygen, resulting from increased organized decomposition and decreased oxygen solubility. None of these effects, however, are likely to occur as a result of the small fraction of the river influenced and the rapid rate of dilution with river water.

The maximum temperature difference between ambient and the discharge during plant operation may impact the aquatic community in several ways:

1. Temperature increases will enhance metabolic rates of phytoplankton and zooplankton and thereby, may promote growth and reproduction. Some planktonic organisms may be damaged by higher temperatures. However, the fraction of the population affected and the length of time are so small as to minimize the effect. The thermal plume, therefore, would have little adverse effect on the plankton passing through it. Higher temperatures (over 95°F, 35°C) also may have the effect of increasing productivity of nuisance organisms, primarily the blue-green algae. However, this is higher than the temperature of the thermal discharges anticipated for the Seminole Station.

2. Benthic organism numbers and distribution decrease with increases in water temperature. However, a balanced benthic population can still tolerate temperatures up to 90°F (32.2°C). The direction of discharge away from the bottom and rapid mixing with the river water should prevent thermal impacts on the benthic community. In the immediate vicinity of the discharge, there may be shifts in macrophyte community structure to more tolerant species. Macrophytes, however often vary in their growth patterns, and major shifts in community structure may occur for a variety of reasons, other than from the thermal effects.

3. There are two primary thermal effects that are important in assessing impacts on fish communities. In the summer, thermal additions from blowdown discharge may elevate temperatures above the tolerance unit for some species. The area impacted will be most pronounced during incoming tides. Under "worst case" conditions, a maximum temperature at the POD will be 93°F (33.9°C). However, under the tidal flow conditions defined as "steady state" the temperature will be reduced to 91°F (32.8°C) within an area of 200 sq.feet.

The movement of fish through a thermal plume can produce stress if a substantial difference exists between the plume and the ambient temperature. Organisms that preferentially stay in these warmer waters are vulnerable to stress during interruption of plant operation. Figure F6.12 shows for an ambient minimum temperature of 59°F (15°C), a winter discharge temperature would be allowed that is well above the maximum of 86°F (30°C) projected for this station. Because of the small proportion of the river cross section affected by the plume, however, most fish will rarely encounter the plume resulting from this blowdown discharge.

Chemical Analysis. Through the National Pollutant Discharge Elimination System (NPDES) permitting process water quality standards and performance standards (Table 6.1) are applied to control the quantity and/or quality of the discharge of liquid effluents.

As filed in the NPDES permit application, the discharge from the proposed plant will consist of the following components: (1) cooling tower blowdown (NPDES No. 004) (Table 6.26); (2) Chemical Wastewater Treatment Facility (NPDES No. 002) (Table 6.27); (3) Sanitary Waste (NPDES No. 003) (Table 6.28); (4) Low Volume Waste (Table 6.29); and (5) Bottom Ash Transport Water (Table 6.30).

Metal cleaning wastes and boiler blowdown will not be discharged to surface waters. Figures F6.1, F6.2, and F6.3 show schematics of plant water flow during construction, with Unit 1 in operation alone and with Units 1 and 2 in operation together. Table 6.31 projects average facility water use.

Except for chlorine, the constituent concentrations in the wastewater stream are based on average flow rates from the combination of chemical waste treatment facility effluent, sanitary treatment facility effluent, and cooling tower blowdown.

Apart from chemical additives, cooling tower blowdown will contain the same dissolved chemicals native to the St. Johns River but at four times the naturally occurring concentrations. (This occurs as a result of the recycling of the cooling water.) In addition, chemical constituents present in the wastewater from the chemical and sanitary treatment facilities will mix with the blowdown before it is discharged into the river.

The increase in concentration of chemical constituents over ambient conditions under different ambient velocities in the near-field is shown in Figure F6.9 in terms of the ratio between the effluent plume's original excess concentration and the remaining excess concentration. After the jet inertia forces are reduced to zero, the excess concentration of each chemical constituent is diluted to 2.4 percent of its initial value within 500 feet of the POD (Figure F6.10).

The use of mixing zones for chemical constituents was evaluated with an interpolation model of the near-field/far-field assessments. Table 6.13 shows the estimated mixing zones required under given steady state ambient constituent concentrations (measured at the USGS Palatka water quality station). The maximum measured ambient chemical concentrations of lead, cadmium, mercury, zinc, exceed the limits of the Florida DER criteria. As a result, under certain ambient concentrations the wastewater chemical constituents cannot be diluted to concentrations within the criteria. The ambient concentrations (Table 6.13) for the five constituents are the concentrations at which the facility effluent will be diluted to within state standards within a 31.0 acre mixing zone.

Assuming the intake point will be at the edge of the maximum allowable 31.0 acre mixing zone, the maximum build-up of constituents at the intake should be less than a 7 percent increase over ambient concentrations. The 7 percent value is based on the assumption that an oscillatory flow coupled with a steady on-shore wind persists for a period of time equivalent to four complete cycles of recirculating water replacement. The build-up above 7 percent becomes insignificant for greater periods of time. Table 6.14 exemplifies a highly unlikely occurrence. No evidence exists from the meteorological data that an on-shore wind would persist for the several days necessary for a four-fold replacement of recirculating water.

Other water quality parameters to which numerical Florida water quality standards apply include turbidity [measured in Jackson Turbidity Units (JTU)], dissolved oxygen (DO), and pH. A slight increase in turbidity in the St. Johns River may occur, but the resulting impacts were not quantified and will probably be negligible.

Cooling tower blowdown will probably be at near-saturated DO levels due to continuous aeration of recirculation water. The maximum blowdown temperature of 93°F (33.9°C) would result in minimum DO concentration of 7.5 mg/liter at saturation. The 5.0 mg/liter of BOD_5 in sanitary wastewater will be diluted to .018 mg/l in the combined wastewater stream and should produce only slight reduction in DO. The concentration of DO would still be greater than 7.0 mg/liter, so that blowdown discharge should not cause DO concentrations in the St. Johns to fall below the 5.0 mg/liter Florida limit.

The pH of the blowdown will be within the range of 7.0 to 7.5. After mixing with other wastewater streams, it should be from 7.5 to 6.8. As these extremes are within the Florida water quality standards of 6.0 to 8.5, the wastewater stream should have no adverse impact on pH levels in the St. Johns River.

Chlorine will be used to control biological growth in condensers and cooling towers. The quantity of total residual chlorine discharged in the blowdown from the cooling towers will not exceed 0.1 mg/l at the point of discharge (NPDES No. 001) or 0.01 mg/l beyond an instantaneous mixing zone of 750 square feet or a mixing zone envelope of 0.9 acres. A maximum discharge concentration of 0.1 mg/l total residual chlorine will not result in acute toxicity conditions within the mixing zone and will assure compliance with Florida Water Quality Standards.

Impacts of Chemical Discharges on the Aquatic Ecology of the St. Johns River. The effects of chemicals in the blowdown on aquatic organisms depend on:

1. The location and mobility of the organisms. Those located nearest the discharge and unable to move, may be subjected to the highest concentrations and be stressed. However, since the plume will be directed away from the bottom, there should also be minimal impact upon benthic organisms.

2. The time that organisms are in contact with effluent. The prolonged or chronic effects of certain chemicals may produce adverse responses in aquatic organisms. However, planktonic forms will be rapidly carried into more dilute regions of the river, and larger nektonic species can move away from the plume.

Generally, the response of an aquatic organism to varying concentrations of specific chemicals is determined by a 96-hour, LC_{50} (lethal concentrations for 50 percent of individuals in 96 hours) under defined laboratory conditions. The maximum recommended concentrations of selected chemicals represent the best estimates currently available of concentrations above which detrimental effects may occur (Table 6.15).

All chemical constituents related to the effluent will be below the recommended units at the boundary of the 31-acre mixing zone. Those species present in the St. Johns River may have a preadapted tolerance for high effluent levels, since the background concentrations were sometimes above recommended levels. Long term impacts, however, from bioconcentration and bioamplification may reduce productivity and reduce the numbers of individuals, but the majority of aquatic organisms will not pass through the higher concentrations where these levels occur. Rapid mixing will quickly reduce these chemicals to ambient concentrations.

Cooling Water Withdrawal. The maximum plant cooling water use will be less than one-half of one percent of the river flow of 7,613 cubic feet per second. Also, the estuarine nature of the river functions similarly to a reservoir, providing a large volume of freshwater during periods of low basin runoff. Therefore, the impact on overall St. Johns River basin water resources of the withdrawal of cooling tower makeup is considered negligible.

Impacts of the Cooling Water Intake System on the Aquatic Ecology of the St. Johns River. There are basically two ways in which cooling water intake facilities can affect aquatic organisms: (1) through the entrapment or impingement of organisms on the face of the intake screens and (2) through the entrainment on organisms within the cooling system.

Entrainment will potentially impact all free floating organisms small enough to pass through the intake screening system. The size of organisms impacted will be controlled by the intake screen mesh size. Impact to smaller, non-screenable organisms will depend largely on their abundance and the volume of water withdrawn. Where water volumes withdrawn are low, as in the use of recirculating cooling systems, the potential for impact is also low and roughly proportional to the percentage withdrawn from the source water body.

The proposed Seminole Units No. 1 and No. 2 will use closed-cycle cooling in order to reduce cooling water intake requirements. As the proposed intake cooling water flow represents a very small percentage of the river flow, only a very small percentage of organisms present will be available for any potential impact by the proposed plant.

The design objective for the proposed intake will be to maintain a maximum approach velocity of 0.5 foot per second. This is consistent with the approach velocity recommended in the Environmental Protection Agency Development Document. Low intake velocities should substantially reduce any potential for adverse impact in fish and macroinvertebrate populations. In particular, neither healthy adult fish nor older juveniles should become entrapped on the screens.

Due to the extremely low intake velocity which will be used at the proposed plant, concern for intake location to protect later life stage fish and macroinvertebrates is not as important as location to avoid entrainment of younger life stages. The lowest overall total captures were found at Corridor A. The bay anchovy, a common forage species, accounted for between 88 and 99 percent of the larval net captures at Corridor A. The bay anchovy is extremely abundant in the St. Johns River, and the potential loss will be kept very low due to intake capacity, design, velocity, and location. Corridor A is preferred as the intake site most likely to minimize potential adverse impacts.

The investigation to locate the intake facilities at Corridor A relative to the shoreline was aimed principally at earlier life stages of fish.

Variations of densities of younger stages of macrobenthos between nearshore and offshore areas did not show consistently significant differences. There is no strong biological preference for either area at Corridor A.

The proposed intake facility design employs a fine mesh wedge-wire screening to prevent entrainment of various sized organisms and a low intake velocity to allow organisms to escape the flow through the screens. Seminole is currently conducting an in situ biofouling and entrainment study with a model intake structure to determine the smallest wedge-wire screen mesh size that can be used under engineering feasibility criteria.

Groundwater

Withdrawals from the Floridan Aquifer. During operation of Units 1 and 2 plant service will be supplied by two wells drawing from the Floridan Aquifer. The average daily withdrawal rate will be 410 gpm. The pumps will have a 1500 gpm capacity for peak requirements.

Computations were made of the projected drawdowns resulting from ground water withdrawals of 410 gpm from two Floridan Aquifer wells. The computations were based on a transmissivity of 46,000 gpd/ft., a storage coefficient of 0.001, and a leakance factor of 0.001 gpd/ft^3. assuming a 30-year pumping period.

Potentially lowering of off-site potentiometric levels is minor. The nearest inventoried off-site wells that withdraw water from the Floridan Aquifer are A-21, a livestock well, approximately 3800 feet north of the Production Test Well (PTW); D-1, domestic well, approximately 5800 feet south of PTW and A-6, domestic well, approximately 7000 feet north of PTW (Figures F6.13 and F6.14). At least one domestic well also exists near A-21. The projected drawdowns in these wells from pumping 205 gpm in each of two plant service water wells was computed not to exceed 1.75 feet and 2.5 feet in wells A-21 and D-1, respectively, and not to exceed 1.0 feet in well A-6.

The potentially lower potentiometric levels in off-site wells should not cause a significant increase in the power required for pumping lifts. The projected drawdowns are not expected to result in any measurable upconing of salt water beneath the plant service water wells or lateral migration of higher chloride Floridan Aquifer water from the Atlantic coastal area.

Discharges to Water Table Aquifer. There are four potential sources of impacts to ground water at the site. These are (1) disposal via landfilling of coal combustion and flue gas desulfurization wastes (fly and bottom ash, and scrubber sludge); (2) disposal via percolation field of air preheater wash, boiler fireside wash and the boiler blowdown, if boiler blowdown is not recycled; (3) seepage from the coal storage area and (4) seepage from the dredge disposal area. The approximate locations of these areas are shown on Figure F6.15 in relation to the surface drainage basins in which they are located and the general direction of ground water flow.

The procedure used to evaluate the potential impacts on ground water was to apply Florida ground water quality criteria at the site boundary and, based on modeling, determine whether any contamination of ground water from leachates would exceed these limits.

Additionally a groundwater quality monitoring system will be installed. If the groundwater monitoring shows a violation of groundwater quality standards of Chapter 17-3 F.A.C., the appropriate ponds, FGD landfill, or coal pile shall be sealed, relocated or closed, or the operation of the affected facility altered to assure that no violation of groundwater standards will occur beyond the site boundary.

Disposal of Coal Combustion and Flue Gas Desulfurization Wastes. The area for storing coal combustion and flue gas desulfurization wastes will encompass 275 acres with an average depth of approximately 58 feet. Of the approximately 16,000 acre-feet of waste material contained, approximately 30 percent will consist of fly ash and bottom ash and 70 percent will consist of dewatered FGD sludge. The sludge and bottom ash will be mixed with dry fly ash until a solids content ranging from 55 to 80 percent is attained. This is referred to as "physically stabilized." Part of this material will be mixed with lime or cement to form a cementatious product, typically referred to as chemically stabilized, which will be used to form the floor and the dikes of the waste storage area.

The degree of impact of the waste storage area upon ground water will depend on the permeability of the cementatious base which is low and should act to retard the movement of constituents to the water table aquifer. During the early stages of filling, the seepage to the water table should not exceed 2 in/yr. As the thickness of disposal is increased, the seepage potential should eventually increase to a maximum of approximately 6 in/yr.

The potential migration of leachate from the waste storage area was evaluated using the site hydrogeologic parameters and analytical techniques. The concentrations of all the chemical constituents evaluated were estimated to be within State of Florida water quality criteria. Potential impacts to off-site ground water quality are expected to be insignificant, Table 6.34.

Coal Storage. The coal pile encompasses approximately 50 acres. The majority of the coal will be stored in the inactive pile. The coal will be maintained at a height of approximately 45 feet.

The coal pile storage areas will be graded to collect and channel rainfall runoff which will be diverted to a coal pile sedimentation sump and pumped out over 10 days depending on amount of rainfall. Effluent from this sump will be directed to the Wash Water Treatment Facility. Coal fines are expected to filter through the coal pile with rainfall and create a relatively impermeable layer under the coal pile which will minimize percolation to the soil and increase the amount of rainfall runoff that can be treated before discharge. It is estimated that approximately 9 in/yr will eventually reach the water table.

Impacts upon water quality by chemicals (Table 6.35) are below the State of Florida Water Quality Criteria at the property boundary. Sulfate concentrations were computed to increase background concentrations at the property boundary by approximately 30 mg/liter to a total of 42 mg/l. The USEPA criteria is 250 mg/l. Adverse impacts to offsite groundwater quality are, consequently, not expected.

Disposal of Preheater Wash, Boiler Fireside Wash, and Boiler Blowdown. The waste water to be disposed of in the percolation pond will originate in the plant as boiler blowdown (if blowdown is not recycled), boiler fireside wash, and air preheater wash. The quantities to be disposed of are a continuous 40 gpm for the boiler blowdown and a batch volume of 270,000 gallons or less four times a year.

The boiler blowdown is projected to have a total dissolved solids content of less than 5 mg/liter, with approximately 1 mg/liter of iron, and small amounts of ammonia. The quality of the remaining three items (the batch volume) should be similar to bottom ash sluice water. Therefore, the maximum potential impact to ground water will be the batch volumes disposed of four times per year. Potential impacts to ground water beyond the site boundary are expected to be insignificant, Table 6.36, due to attenuation as discussed in Section 2.5.2.2.

A groundwater monitoring program will be conducted prior to and during plant operation to detect changes in water quality attributable to onsite waste disposal. If monitoring indicates significant off-site impacts are probable, mitigative measures will be taken.

6.1.3 Land Resources

6.1.3.1 Construction Impacts

Soils. Erosion and sediment laden runoff represent the major nonpoint source of water pollution on most construction sites, especially those requiring extensive grading. Erosion also results in the loss of topsoil and visually impairs the landscape. Sediment laden runoff contributes to the generation of turbidity and deposition of sediments in adjacent water bodies.

Site preparation and construction activity for the main structures will require approximately 420 acres of land. Soil in the site area is predominantly a fine sand that resists erosion due to particle size and permeability. Based on the Universal Soil Loss Equation, the soil loss in the portion of the site undergoing construction activity will increase approximately from 0.2 to 3.0 tons per acre per year during land disturbing activities, a relatively low rate.

Construction runoff resulting from precipitation falling directly onto the construction area will be trenched away and dissipated through infiltration. Eroded sediments will be retained within the site boundaries; no offsite impacts are expected. Upon completion of construction, cleared areas will be dressed and vegetated to be compatible with the existing natural landscape elements. Therefore, no impacts due to construction area runoff will occur after this time.

Terrestrial Ecology. Sixty-five percent of the vegetation within the plant site boundaries will be left undisturbed. Habitat most adversely affected will be the Sandhill Community. Of the approximate 520 acres of Sandhill Community that exist on the site, about 55 percent or 290 acres will be cleared. Much of the Pine Flatwoods north of the Sandhill Community will be disturbed for use in

waste disposal. Two small Cypress Heads on the west side of the site will also be cleared or altered.

Primary impact of site development on wildlife species will result from the removal of the Sandhill and Pine Flatwoods habitat. Motile species such as birds and larger mammals will probably escape into surrounding habitat. Surrounding habitat should accommodate emigrants since the site is sparsely populated. Some individual amphibians, reptiles, and small mammals may be destroyed during site development.

The only inhabitant endemic to the Sandhill Community is the gopher tortoise. The tortoise is currently listed as a protected species by the state. Site development will destroy existing burrows and probably any inhabitants of those burrows. A few individuals may move into the surrounding undisturbed areas and reestablish themselves. Investigations of censusing the tortoise colony on site and translocating individuals to other areas have been undertaken in cooperation with the Florida Game and Fresh Water Fish Commission, the Gopher Tortoise Council and Seminole.

Land Uses. Construction of the plant should not interfere with land uses in the site vicinity. The natural vegetation surrounding the site will serve to reduce most effects of construction on land uses adjacent to the site property. The vegetation will dampen noise, dust, and smoke from construction operations as well as providing a visual barrier. The land necessary for development of the plant will reduce the amount of rural forested land in the county, but the area developed is fairly insignificant in regard to the amount of such land in the county.

Most of the site lies within an area classified as only fair to poor for food crop, pasture, and woodland uses. The rest of the site is rated as good for pasture and woodland uses; however, the county in general has ample area for such uses, so preemption of these uses does not appear a significant factor. The soils on the site area are also rated as unsuited to recreational uses normally associated with outdoor activity. In addition, many other areas are available for recreational activity in Putnam County.

The use of land for power generation is in conformance with the land use plans and zoning ordinances of the municipalities and counties in the site vicinity. The nearest residential land uses to the site are located along U.S. Route 17, and State Route S209 near the St. Johns River, which will be separated from the main plant structures by approximately 5,000 feet with approximately 3,000 feet remaining heavily wooded to provide a sufficient buffer zone between the plant and the residences.

The construction is expected to have no impacts on high water or flooding levels of the St. Johns River or any tributaries. No structures, embankments, or fills of any significant size are planned to be placed in site vicinity floodplains that would affect the conveyance capacity of the floodway of any stream.

6.1.3.2 Operation Impacts

Terrestrial Ecology. The use of tall stacks and transmission towers and lines poses potential obstacles for collision and may result in mortalities of birds.

In general, migratory birds fly at altitudes well above man-made structures. Most mortalities occur during times of poor visibility caused by low cloud ceiling and rain or during night migrations. However, the majority of birds observed to strike towers of any type are smaller, less agile songbirds. Few studies document waterfowl and shorebirds among casualties. Most ornithologists consider bird mortality through collision with towers to be "trivial and unimportant" when compared to other causes of avian deaths. Mortalities from the towers, stack or transmission lines of the proposed Seminole project should be insignificant.

The lowland area at the north end of the site is seasonally inundated. The water table rises in response to percolation of excess rainfall until it emerges in the lowlands. The water table declines due to evapotranspiration, underflow away from the area, and surface discharges through the ditch system toward the northeast. Operational impacts on this area as a result of the leaching of trace elements from the disposal of solid waste upgradient are not expected to be significant for three reasons: (1) surface runoff from the disposal will be collected and recycled to the flue gas desulfurization system; (2) excess water during the wet season should effectively dilute any leachate that would emerge in the lowland; and (3) the water table falls below the elevation of the lowland during the dry season when less dilution is available.

Vegetation damage from sulfur dioxide is dependent on ground level concentration, duration of exposure and sensitivity of the vegetation. Vegetable crops in the area of the proposed plant that may be affected are irish potato, cabbage and pine. "Injury" to vegetation implies that vegetation has visible markings from contact. This does not means that "damage" or economic loss occurs. In case of vegetable and horticultural crops where appearance is an important part of the value of the crop, and where the part of the plant to be sold is injured, the two are synonymous. However, in the case where the injury does not occur on the part to be sold, damage occurs only when the injury is extensive enough to cause a reduction in yield.

Studies have indicated that injury to Irish potatoes does not occur until after the SO_2 concentrations are more than 2100 $\mu g/m^3$ (0.8 ppm) for three hours or 5200 $\mu g/m^3$ (2.0 ppm) for one hour. Other studies indicate that 5700 $\mu g/m^3$ (2.5 ppm) SO_2 concentrations for one hour were required to damage cabbage. Yellow pines seem to be tolerant of SO_2. The maximum expected three hour ground level concentrations for the proposed plant are 550 $\mu g/m^3$ (0.21 ppm) SO_2. The National Ambient Air Quality Standard is 1300 $\mu g/m^3$. The contributions of SO_2 emitted from the proposed plant should not adversely impact vegetable crops in the area of the proposed plant.

Land Uses. The plant is expected to be in operation for 35 years. During this time the use of the site will be restricted to power generation.

About 60 percent of the site will be developed while the remainder will be left undisturbed.

The Putnam site possesses favorable characteristics for heavy industrial development such as access to transportation and water and non-conflicting land uses.

6.1.4 Social and Cultural Resources

6.1.4.1 Construction Impacts

Demographics. The population of Putnam County, the primary impact area, is expected to experience a slight increase in growth above the medium scenario baseline case due to the construction and operation activities. These population changes will result from two factors. First, construction-phase labor requirements are expected to bring new families into the Putnam County area. Second, operation-phase labor requirements are also expected to attract new families to Putnam County.

In the baseline population projections, three scenarios reflect different assumptions concerning the degree of migration into a given county. The baseline population projection for Putnam County in 1985 can be stated as 48,500 plus or minus 8 percent, depending upon assumptions regarding migration, representing a range of values in which the actual 1985 population is estimated to fall.

The Putnam County population projection for 1985 is 49,146 and reflects the situation expected to occur with the Seminole project (Table 6.22). This estimate is 1.3 percent above the baseline medium scenario projection of 48,500, and easily falls within the confidence interval of plus or minus 8 percent. Thus, the population increase induced by the Seminole project will not be great enough to fall outside the confidence interval for the baseline case.

The greatest demographic impact is expected to occur in 1983 when the population of Putnam County with the project is projected to be 48,251, or 1.6 percent above the baseline projection. Therefore, even in the year of peak demographic impact, the population in Putnam County as a result of the Seminole project will not be significantly different from the population projected for the baseline case.

Construction of the Seminole project will require hundreds of workers over a multi-year time period. Construction activities are expected to commence in the fourth quarter of 1979, and end by the middle of 1985. Manual labor requirements are expected to reach a peak of 903 workers on an average day during the third quarter of 1982 (Table 6.18). Supervisory labor requirements are expected to reach a peak of 111 workers on an average day during the second quarter of 1982. Total labor requirements should also peak during the second quarter of 1982, with approximately 1,013 individuals.

It is not expected that Putnam County will be able to supply all the labor demanded by Seminole construction activities. Some workers will migrate from

outside Putnam County and become new county residents. However, it is anticipated that most of the construction workers will commute from the Jacksonville area and some from the Gainesville or Daytona Beach areas.

Commuters will have an impact on the daytime population of the area in the vicinity of the site. Relocaters will be the primary source of population increase in Putnam County during the construction phase activities. The estimated distribution of manual and supervisory construction phase personnel among commuters, relocaters, and local residents is shown in Table 6.19.

Approximately 65 construction workers are expected to move into Putnam County during 1982, the peak year of construction activity, compared to the anticipated 818 workers who are expected to commute to the Putnam Site on a daily basis.

Population increase will not be confined to the migration of construction workers and their families into the county. The demand for goods and services within Putnam County will increase and additional employment will be induced in order to supply the incremental goods and services demanded. Some of the induced employment increases will result in induced population increases, beyond the direct population increases attributable to the demand for construction manpower. The magnitude of construction phase labor costs (Table 6.20) will become a key element in the formulation of Seminole project income projections.

Social and Economic Conditions. Putnam County employment will increase due to a direct employment increase of workers during construction and operation of the Seminole project and induced employment from increased demand for goods and services.

The peak year of employment impact is expected to be in 1983 when total Putnam County employment is expected to be 3.3 percent above the baseline employment of 16,378 (Table 6.23). Over the life of the plant, Seminole operation phase activities can be expected to cause an increase in employment of about 2.0 percent above the baseline employment projections.

Income. Putnam County income is expected to increase from the wages paid directly to labor during the construction and operation phases of the Seminole project and induced component of increased demand for goods and services. Income generated due to construction activities is expected to peak in 1982 at a level of $9.2 million (Table 6.24).

Direct and induced income generated due to operation-phase activities will appear in 1983 when the first unit begins operation. In 1985, direct and induced operation-phase income will rise to $4.0 million as the second unit begins operation.

Income impacts are projected to peak in 1982 when the change from the baseline case is expected to be around 2.5 percent. Thereafter, total personal income impact as a percentage of the baseline income projection will decline steadily. By 1987, the income impact due to the Seminole project will have declined to only 0.1 percent of the baseline income projection.

Due to uncertainty regarding the way in which Putnam County will handle the increases of property tax revenues, property tax impacts have not been considered in the formulation of demographic, employment, or income impact projections. The implicit assumption is that property tax millage rates would be adjusted so that property tax revenues remain essentially constant, in real dollars, after the Seminole project is in the operation phase (implying a large measure of property tax relief to existing property holders).

Assuming that property tax millages will not be changed from the current 1978 levels, Putnam County could experience a significant increase in property tax revenue as a result of the Seminole project.

Assuming that the 1978 rate of 16.326 mills remains unchanged, approximately $11.7 million in property taxes would be paid by Seminole to Putnam County in 1985. Assuming that the taxing jurisdictions spend this additional tax revenue locally, approximately $33.1 million in additional income would be generated in Putnam County's economy in 1985 alone. Thus, the total income impact of the project in 1985 would be $38.2 million (Table 6.24). Whereas the change from the baseline case is about 1.0 percent for 1985 when property taxes are not considered (Table 6.24), the change from the baseline income for 1985 becomes 6.4 percent when property taxes are considered.

Thus, property tax is the key variable in the determination of income impacts resulting from the Seminole project. A wide range of impacts is possible, all depending on how Putnam County handles the property tax issue.

Historic, Scenic, and Cultural Characteristics. Construction activities associated with the Seminole Station should not affect any public lands, National Historic Register sites, or other cultural resources. These areas are far enough removed from the site that construction activity will not interfere with their use or physical settings.

No archeological sites of significance were found on the plant site, nor in the preferred pipeline corridor to the river or along the three preferred transmission line corridors. The few homestead sites found on the site proper were in the southern portion of the plant site where little development activity is planned. Thus, no impacts are expected.

Noise. Construction of the proposed generating station is scheduled to begin in late 1979 and to continue to mid-1985. A seven-day work week is planned. No night work is scheduled. A fifteen hour work day is assumed. The sound level contribution due to construction activity was estimated using a preliminary construction equipment schedule and equipment sound levels and usage factors.

Construction site noise varies with space and time. Equivalent sound levels, L_{eq}, are computed using the maximum sound level emitted by the equipment and the fraction of time that the maximum level is emitted.

The yearly equivalent sound levels for the construction years 1979 through 1985 are presented in Figure F6.4. Highest annual equivalent sound levels will be emitted in 1982. The noise impact assessment is based on that year.

Some site foliage will be cleared for construction, leaving a border of at least 90 meters (300 feet) of trees around the circumference of the site. Construction site sound levels were extrapolated to offsite locations using an attenuation due to foliage of 10 dB per 100 meters, a conservative assumption (Table 6.2).

Construction activity will increase ambient sound levels only slightly at adjacent noise sensitive land use areas. The day sound levels at baseline measurement locations 1 and 3 were estimated to increase by 3 to 4 dB. Smaller increases were estimated at the other baseline locations. The change in day/night sound levels, L_{dn} will be minimal.

Blowout operations will occur during plant startup and will represent a major noncontinuous noise source during construction. Each blowout lasts for 3.5 to 6 minutes at intervals of 45 to 50 minutes. The maximum noise levels, Table 6.3, emitted during the blowout operation were estimated to be 107 dB at 300 meters (1,000 feet) for phase one and 117 dB at 300 meters (1,000 feet) for phase two. The maximum sound level was estimated to last for the duration of the blowout. Blowout operations are scheduled for daytime hours only.

Public Tax Revenue. Construction and operation of the Seminole Plant will generate new tax revenues for several jurisdictions in Putnam County and for the State of Florida. Real and personal property taxes will be the source of additional revenues for local governments in the County, while the gross receipts tax will be the main source of new state level taxes. As a cooperative, SECI is exempt from state and federal income taxes, but it does pay property and gross receipt taxes and sales tax on the power sold to ultimate consumers.

No official estimates of the taxes that will be paid by the Seminole Plant are available. The reasons are: (1) the bases for assessing the value of the land, improvements, and fuel supply at the proposed site have not been established by the Putnam County Assessor; (2) the price of the electrical energy to be sold to the member cooperatives has not been firmly estimated; and (3) tax rates for future years cannot be precisely predicted. Accordingly, it is only possible to estimate the general order of magnitude of various tax revenues.

Property Tax Impacts. It is uncertain how much of the expected capital cost (or other basis) of the Seminole Plant will be assessed for real and personal property taxes in Putnam County, and how much of the assessed valuation will be exempt. If it is assumed that 100 percent of the capital investment cost of the plant is the assessed valuation of the facility and that pollution control facilities are exempt (20 percent of the total capital cost), then the gross taxable value of the Seminole Plant would be on the order of $740 million. The net taxable value of the plant would average approximately one-half that figure. Thus, over the 30-year operating life of each unit, property taxes on the plant would decrease each year, ceasing in the year 2015. The coal stockpile is also subject to a property tax, but it is assessed for tax purposes at one percent of full value. The coal stockpile's taxable value will rise through the years, assuming cost escalation continues until the plant approaches retirement and the fuel reserve is used up (Table 6.25).

Changes in investment and fuel costs, assessment ratios and millage rates would, of course, materially affect the estimates. If assessment ratios and the millage rate are held constant, the total real and personal property taxes that would accrue to Putnam County jurisdiction from the Seminole Plant would aggregate to $191.4 million over the 32-year period of 1983-2014.

The assessed value of non-exempt real and personal property in Putnam County in 1976 amounted to $350.9 million. Over the period 1972-1976, non-exempt assessed values had nearly doubled. If these rates of increase continue for the decade 1976-1985, non-exempt assessed values could be on the order of $1.4 billion to $2.2 billion by the mid-1980's. Thus, if it is assumed that the Seminole Plant is incremental to this trend, its inclusion on the property tax base would expand the rolls in 1985 by one-third to one-half. To the extent that trends in assessed values were lower or higher, the contribution of the Seminole Plant to the county's tax base would vary inversely. But the increment would still be very significant in real terms, and likely to offset by several times whatever increases in costs of public services that has occurred as a result of project-induced increases in local population.

The tax rate on the Seminole Plant site land in 1977 was 16.458 mills:

Jurisdiction	Amount	Percent
County	8.250 mills	50.1%
School District	8.070 mills	49.0%
St. Johns River Water Management District	0.138 mills	0.9%
	16.458 mills	100.0%

The Putnam County School District's share produced revenues projected at $3.3 million, which amounted to 26 percent of the District's total revenues. In 1985, assuming the District has the same share of the total property tax levy, the Seminole plant's property taxes would yield about $5.7 million to the school system. The balance of $6.0 million (Table 6.25) would go to the County, with a small proportion accruing to the St. Johns River Water Management District.

The costs to support the small number of school-age dependents of imigrating personnel, a maximum of 250 in 1983, are relatively small in comparison to the potential increase in the school district's financial resources.

The project-induced increases in demand for various public services during the construction phase precede the placement on the tax rolls of the assessed value of the plant. As a result, a cash flow problem of a short-term nature may develop for agencies dealing with transient and relocated personnel and traffic. Ultimately, their budgets will reflect the increase in the county's tax base, but in the interim, advance planning may be necessary to anticipate changes in service level requirements.

Other Tax Impacts. The gross receipts tax, paid to the State, is a 1.5 percent levy on the gross revenues from sales of Seminole-generated

power to member cooperatives and other utilities. The Seminole units are planned to operate at a 68 percent capacity factor, which translates into a gross output per year for each 600 MW unit of 3,574.08 million kilowatt-hours. At 46.2 mills per kwh, the two units combined would produce 7,148.16 million kwh per year worth $330.24 million. The gross receipts tax, at 1.5 percent, would yield $4.95 million.

Seminole has projected that costs of power generation will escalate at a six percent average annual rate. Thus, over the 32 years the two units are in operation a total of $28.42 billion in gross revenues would accrue to the company, upon which the 1.5 percent gross receipts tax would yield $426.3 million. Although the state charges a sales tax on sales of electric power, Seminole is not liable because it sells all of its power at wholesale to its member cooperatives. Those latter entities, selling to ultimate users, will include a retail sales tax levy. The yield of that tax cannot be estimated, as the rates charged for power vary from utility to utility with respect to different customer groups.

Indirectly, the state will derive tax revenues from the Seminole project through local incomes of purchases made by project personnel. These will generate sales and gasoline taxes on local spending. If it is assumed that 50 percent of local consumption expenditures made in Putnam County are for taxable goods and services, then the income arising from the Seminole project would generate in its peak construction year, 1983, about $5 million in taxable sales, upon which the state 4 percent sales tax would yield $0.2 million. This may be compared to the $5.2 million in sales taxes collected in Putnam County in 1976.

The state gasoline tax of 8 cents per gallon yielded $1.9 million on sales in Putnam County in 1976. During construction (1979-1985) commuting workers from outside Putnam County--who comprise the majority of the work force--will purchase some of their fuel requirements within the County. Assuming each car uses 20 gallons of gasoline per week on the average, the 8 cent tax would yield $83.20 per car per year. With an average of 330 cars used for commuting in the peak years, total gasoline usage would amount to 351,000 gallons per year, yielding a gasoline tax revenue to $28 thousand. One-half of that amount probably would accrue to Putnam County.

Public Facilities.

Electric Utilities. Putnam County receives electric power from the Clay Electric Cooperative, a member of Seminole, and from Florida Power and Light Company. Some of the 1200 Megawatts of generating capacity proposed for construction will be available to county residents. Florida Power and Light has also recently installed 500 megawatts of generating capacity in East Palatka.

Natural Gas. Although the City of Palatka receives natural gas from the Palatka Gas Authority, the rural areas of Putnam County are not served by any natural gas pipelines. The demand for natural gas in the City of Palatka as a result of the Seminole project is not expected to be measurable.

Water Supply. Putnam County does not presently provide water supply services within the county. Various incorporated municipalities, however, do supply water within their jurisdictions. Many residents of Putnam County must rely on wells for water. The Seminole project will not cause a measurable increase in the household demand for water in Putnam County.

Sewage Treatment. Putnam County does not presently provide sewer services to county residents. The City of Palatka does, however, have a sewer system, which in 1976 had an 85.7 percent utilization rate. Population growth in Palatka due to the Seminole project can be expected to increase the utilization of the Palatka sewer system by one or two percent. Therefore, the Seminole project is not expected to have any major adverse impact on the Palatka sewer system.

Solid Waste Disposal. Putnam County provides no door-to-door collection services for solid waste. As a result of the lack of an extensive collection system, widespread roadside dumping has been a problem. Population increases due to the Seminole project could add to the dumping problem.

Transportation. During construction the traffic level along U.S. Route 17 is expected to exceed normal levels, increasing in 1979, peaking in 1982, and gradually receding until completion of the plant in 1985. Most of the traffic associated with arrival of the construction work force will occur in the morning and evening "peak hours" of traffic flow.

The expected amount of traffic generated at the plant construction site will be approximately 330 cars. The additional plant traffic will increase the peak hour traffic to 700 cars per hour. Since the traffic capacity of U.S. Route 17 in the plant vicinity is approximately 750 cars per hour at Service Level C (maneuverability retained), with the plant's additional traffic volume, the capacity of U.S. Route 17 at Service Level C will be approached. Assuming a 20 percent increase in average daily traffic by 1982, without the Seminole project, the peak hour traffic, combined with the additional plant related traffic, may exceed 750 cars per hour and may exceed the estimated capacity of U.S. Route 17 at Level C, but would not exceed the highway's absolute capacity (1,400 per hour).

Construction of the four lanes on U.S. Route 17 from State Route 209 to Palatka is scheduled to begin in 1981 and end in 1982. Construction traffic associated with the plant is expected to peak in 1982 and diminish thereafter so some overlap of these conditions could occur. However, since road construction will not occur along U.S. Route 17 in the immediate vicinity of the plant's main access road, the effects of the overlapping construction periods will be reduced. Replacement of the Rice Creek Bridge is scheduled for 1980 to 1981. The bridge should be completed before plant construction traffic reaches its peak in 1981 to 1982.

In addition to employees' arrival and departure traffic, construction activity at the site will generate traffic associated with material delivery and equipment use. Between 1981 and 1984, the volume of traffic produced by construction activities remains relatively constant varying from 270 to 350 trips per day,

with the largest number of trips during 1982, Table 6.4. These trips are expected to originate during the daytime but are not expected to increase peak hour traffic levels.

Total traffic levels during the day will increase by 33 percent (680 round trips) over existing 1977 traffic levels of 3,852. With an assumed additional 20 percent increase without project increase in traffic, U.S. Route 17 traffic levels may reach as high as 5,300 cars per day. These traffic levels are not expected to exceed daily capacity levels on U.S. Route 17 which is presently rated as 14,000 cars per day under best conditions.

Normal service deliveries to the plant should have a minimal effect on traffic flows in the area since the delivery will generally occur during periods of minimal traffic flow, not during peak hours.

Plant operations will increase traffic levels in the plant vicinity along State Route S209 (locally known as "West River Road" and "County Road C209"). Although Average Daily Traffic (ADT) along this highway is below capacity levels, peak hour traffic during morning rush hours may induce stacking problems at the intersection of U.S. Route 17 and State Route S209. This congestion may not be significant since inbound plant traffic along State Route S209 will be eastbound while commuter traffic from residential areas will be westbound toward U.S. Route 17.

If congestion becomes a problem, the addition of a traffic signal at the plant entrance on State Route S209 would help alleviate any congestion caused by plant traffic crossing the westbound lane of State Route S209 and would also serve to alleviate stacking of vehicles at the intersection of U.S. Route 17 and State Route S209.

Aviation. The main source of possible impacts on aviation is the 675 foot stack. To avoid the possibility the stack might jeopardize safety on take-off and landing operations at Kay Larken Field, 5.7 miles southwest of the site, the Federal Aviation Administration (FAA) investigated the plant's location for features hazardous to aircraft. A permit to construct a stack up to 800 feet in height was granted on May 1, 1978 by the FAA.

Although the stack is a possible obstruction to light aircraft, safety markings and warning lights, as required by the FAA, should minimize the hazard. It is possible that the visibility of the stack may prove valuable as a navigational aid to the pilots.

Public Services.

Housing. As construction and operation phase personnel relocate to Putnam County the demand for housing, both direct and induced, will increase. During 1983, the peak year of demographic impact, approximately 751 people will relocate to Putnam County (Table 6.22). Assuming an average size of 3 persons per household, approximately 250 additional dwelling units will be required in Putnam County due to the Seminole project.

In 1976, there were approximately 1,567 standard dwelling units available for occupancy in Putnam County. Therefore, it does not appear that the Seminole project will cause any severe pressure on availability of housing in Putnam County. Increased upward pressure on real estate values, however, is a possibility.

Education. Assuming one school-age individual for each household, approximately 250 ad ditional students can be expected to enroll in the entire Putnam County School District during 1983, the peak year of demographic impact.

The total student capacity in the Putnam County School District during the academic year 1977-1978 was 11,952. The projected total enrollment in the Putnam County School District for the academic year 1981-1982 is 10,333 students. The estimated enrollment with the addition of students from Seminole families would be around 10,583 students for 1983. Thus, it does not appear that the Seminole project will place any undue burden on the Putnam County School District.

Medical Services. A major new medical facility, the Putnam Community Hospital, began receiving patients on September 1, 1975 with a 1977 occupancy rate of 80 percent. Given that the population in Putnam County is only expected to increase by 1.6 percent over baseline during 1983, it does not appear the Seminole project will have any major adverse impact on the quality or quantity of medical services offered in Putnam County.

Fire Protection. Putnam County had 327 firefighters in 1976, or 7.5 firefighters per 1,000 population. Assuming no change in the number of firemen, the project-induced population changes would reduce the ratio of firemen to 7.3 per 1,000 population by 1983. With the general minimum standards of 2.4 firefighters per 1,000 of population, it appears that the Seminole project will have no major adverse impact on the demand for firefighting services in Putnam County.

Additionally, Seminole plans to contact the Palatka Fire Department to insure that communication channels can be established to provide prompt response to fires that may occur during construction activities, and to insure that adequate equipment and personnel are available to fight major fires.

Seminole also plans to locate hand fire extinguishers throughout the construction site to provide an immediate response to incipient fires. A fire brigade will be formed and trained in the use of the equipment located on the site.

For fire protection during the operation phase of the Seminole project, one 300,000 gallon storage tank will be installed at the site. This tank will supply approximately three hours of water supply for fire fighting purposes. Additionally, one diesel-powered fire pump will have its own fuel oil storage tank and battery-powered electric starting system. Finally, an underground fire loop will be installed with about four fire hydrants located throughout the site.

Police Protection. Putnam County had 129 law enforcement officers in 1975, giving a ratio of 2.95 police officers per 1,000 population. This ratio will change to 2.67 policemen per 1,000 of population by 1983. With recognized law enforcement standards of 1.75 to 2.00 officers per 1,000 persons, it appears that the Seminole project will have no major adverse impact on the demand for police services in Putnam County.

Recreation. There is an abundance of recreational opportunities in Putnam County due to its close proximity to rivers, lakes, national forests, and the ocean. Given that population in Putnam County is expected to increase by only 1.6 percent above baseline in 1983, the demand for recreational activities will increase by a similar 1.6 percent. Thus, no major adverse impact on the supply of recreational opportunities is expected to occur as a result of the Seminole project.

6.1.4.2 Operation Impacts

Demographics. The first unit of the Seminole project is expected to come on line during the middle of 1983. Table 6.21 presents estimates of the number of employees required annually and total labor costs.

Putnam County will not be able to supply all the labor demanded for operation phase activities. When Seminole Plant Unit No. 1 comes on line in mid-1983, jobs for approximately 99 employees will be created.

In mid-1985, when Unit No. 2 comes on line, an additional 41 jobs will be created. It is anticipated that a significant proportion of the operating phase employees hired will migrate into Putnam County along with their families, leading to a population increase.

Operation phase population increases should also induce additional population increases as people move into Putnam County to help supply the additional goods and services demanded by the new operation phase employees and their families.

Social and Economic Conditions. Employment. See Section 6.1.4.1, Construction Impacts.

Income. See Section 6.1.4.1, Construction Impacts.

Historic, Scenic and Cultural Characteristics. The operation of the proposed station will have no effect on public lands or interfere with any identified historic, scenic, cultural or natural landmarks.

The tallest structure of the facility is the 675 foot stack. Other major components of the plant such as the boiler building, ash silos and natural draft cooling towers vary from 75 to 450 feet tall.

Screening of the plant facilities is to be accomplished by a buffer zone composed mainly of natural vegetation supplemented by plantings where necessary. The buffer zone, in conjunction with other undisturbed areas on the site, is expected to provide adequate screening of all the plant facilities except the stack and cooling towers.

Because of the water vapor released from cooling towers, there is a potential for the formation of large visible plumes if the saturation deficit of the atmosphere is low. Aside from aesthetic considerations, a visible plume which reaches the ground beyond station boundaries can obstruct visibility and create a hazard.

The two 450 foot high natural draft cooling towers to be operated at the Seminole Station will be noticeable features of the installation, because of the size of these structures and because of evaporative emissions which will frequently produce visible plumes. The length of these plumes will at times extend past site boundaries, but plume release height and buoyancy will be such that the potential for creation of an offsite ground-level traffic hazard due to obstruction of visibility is very minor.

In general, the power plant facilities will not be visible from the highways in the area if the roadside has screening of 40 to 50 foot trees alongside it. In areas where there are no trees of this height within 50 feet of a view, the stack and cooling towers may be visible. The further from the facilities the viewer is, the less the tree height needs to be for effective screening. The stack and cooling towers will be visible from many of the residences along both sides of the St. Johns River, especially those with long unbroken vistas in the plant's direction. The facilities are also likely to be visible from the Community of Bostwick and may also be visible from some areas in Palatka.

Noise. The station is scheduled to operate 24 hours a day, seven days a week. The average sound levels for the principal indoor and outdoor noise sources, Table 6.16, were found to be negligible after attenuation due to building walls. Sound levels presented are considered to be conservative estimates of power station operational sound levels. Efforts will be made during the plant design to use low-noise equipment or components.

Cooling tower sound levels, measured 150 meters or 500 feet from natural draft units in operation were used for the calculations. The A-weighted sound level at 50 meters for a typical cooling tower is 50 decibels.

The conceptual coal handling system assumed for sound level calculations was a covered active storage with a traveling tripper for stocking out coal and a below-grade rotary plow feeder for reclaiming coal. This type of conservative system would have an intermittent and high level noise source associated with coal handling as the coal car dump is operated. The total cycle time is approximately one minute. The equivalent sound level for this operation is 64.8 dB at 20 meters (70 feet).

Adding the acoustic energy for all coal handling operations provides an equivalent sound level, L_{eq}, of 44 dB at 300 m when the coal car emptying is in progress or an equivalent sound level, L_{eq}, of 39 dB at 320 m when the coal car dumping does not take place. It is assumed that the dumping of 70 to 90 coal cars takes approximately four hours.

Operation of the station will increase train traffic on the Seaboard Coast Line Railroad by one or two trains per day. The equivalent sound level (L_{eq})

emitted to a receiver 30 meters from the track is estimated to be 84 dB for a duration of 100 seconds. When passing through more populated areas where the train speed is regulated, sound levels might be lower but they will exist for longer duration.

When coal is removed from the coal storage pile, one or two loaders will be used to move the coal to the reclaim automatic feeder areas. The estimated equivalent sound level for two loaders operating together is 53 dB at 300 meters (1,000 feet).

The day/night sound levels, L_{dn}, during operation of the plant are computed by adding, on an energy basis, the sound level contributions of each individual source (Table 6.16) including coal handling. No change in ambient day/night sound levels is anticipated except at Location 3 where a change of 1 dB is indicated (Table 6.17). Hence no adverse noise impact is anticipated from the operation of the Station.

Public Tax Revenues. See Section 6.1.4.1, Construction Impacts.

Public Facilities. See Section 6.1.4.1, Construction Impacts.

Public Services. See Section 6.1.4.1, Construction Impacts.

6.2 Unavoidable Adverse Environmental Impacts

Unavoidable, adverse environmental impacts expected during the construction and operation of Seminole Plants No. 1 and No. 2, except as noted, are considered to be minor and negligible.

The adverse impacts and mitigating measures are discussed in detail within the presentation of impact alternatives in Section 6.1. They are summarized below, with appropriate references to Section 6.1 discussions.

6.2.1 Air Resources

6.2.1.1. Construction Impacts

The temporary escape of some fugitive dusts is expected. However, control of the nuisance dusts will be accomplished by the application of water and/or dust suppression chemicals when needed.

The temporary escape of vehicle exhaust emissions from the site near the transmission alignment and along area roads is expected due to traffic increases during construction.

6.2.1.2 Operation Impacts

Air emissions from the plant will use up a portion of the available PSD increments for SO_2, near the plant, but will not prevent other emission sources from locating in the area. Plant emissions will also raise prevailing ambient concentrations of some pollutants, but not to the harmful levels defined by ambient air quality standards.

6.2.2 Water Resources

6.2.2.1 Construction Impacts

The slight lowering of the potentiometric surface of the Floridan Aquifer locally is unavoidable. This dewatering will be temporary and will not have a lasting environmental effect.

Dredging will increase turbidity and suspended sediments and cause permanent loss of macrophyte habitat. However, the proposed mitigating measures to reduce adverse impacts of an inland dike spoil disposal area, dredging in autumn months and use of silt restraining devices will decrease the ecological impact.

6.2.2.2 Operation Impacts

The use of two natural draft cooling towers will reduce thermal discharges to the St. Johns River as well as reduce water withdrawal by about 98% in comparison to use of once-through cooling methods. The towers are designed to reduce water loss through drift to the lowest practical amount.

The coupled use of the closed cycle cooling towers and the low-flow, wedge-wire screen cooling water intake structure will minimize impingement and entrainment of aquatic organisms in compliance with Section 316(b) of the Clean Water Act.

The use of two groundwater wells will preclude the lowering of the potentiometric surface of the Floridan Aquifer below mean sea level and thereby avoid potential increases in saltwater encroachment which might otherwise result from groundwater withdrawals.

With the exception of lead, mercury, zinc and cadmium discussed below, all chemical constituents discharged to the St. Johns River will be in compliance with water quality standards. Because ambient concentrations of lead, mercury, zinc and cadmium in the St. Johns River occassionally exceed water quality standards due to natural background or irreversible man-induced conditions, Seminole has requested and Florida Department of Environmental Regulations has proposed to grant a variance to water quality standards for these elements when background levels in the St. Johns River approach or exceed the standards.

All potential discharges to the water table aquifer from the percolation pond, flue gas desulfurization, sludge disposal area and coal and limestone piles will be monitored to assure compliance with groundwater quality standards. Regulatory measures will be enforced during plant operation to keep chemical discharges to a minimum.

6.2.3 Land Resources

6.2.3.1 Construction Impacts

Soil erosion from 420 acres will occur during construction. Escaping sediments are expected to dissipate and be contained on site. No offsite impacts are expected. Upon completion of construction, the area will be revegetated to be compatible with existing natural vegetation (slash pines and broomsedge grasses) to reduce erosion.

The loss of some Pine Flatwood and Cypress Dome habitat is necessary for construction. However, existing habitats on the Putnam site will be maintained as practical in accommodating plant access roads, rail lines and other facilities. The area will be revegetated with indigenous grasses, shrubs and trees.

A significant impact will be the loss of about 290 acres of Sandhill Community habitat. This represents about 55 percent of this habitat that presently exists on the Putnam site. The most significant wildlife community to be affected will be the gopher tortoise, a threatened species in Florida and the indigo snake, a federally threatened species which may inhabit gopher burrows. Investigations are currently underway to determine tortoise population sizes and the feasibility of relocating the tortoise colony and associated indigo snakes to a more accommodating area.

6.2.3.2 Operation Impacts

Consumption of land for station structures and for onsite storage of waste materials is necessary and unavoidable. However, clearing of the natural vegetation will be kept to a minimum to reduce impacts to terrestrial communities. The structures needed to support the transmission lines will take away a small amount of land from alternative uses.

6.2.4 Social and Cultural Resources

6.2.4.1 Construction Impacts

Temporary increases in ambient noise levels will be felt in the site vicinity and along the transmission alignments. The most noticeable will be the steam blowout operations that will be intermittent and will last only about two weeks per unit.

Increased vehicular traffic will be experienced on nearby highways.

6.2.4.2 Operation Impacts

A slight increase in traffic levels on local roads and highways will cause some disruption of traffic. However, the impact will not be great. An increase in noise impact will result from increased rail traffic bringing fuel to the site.

The aesthetic impacts from tall structures and possibly the cooling tower plumes will be partially alleviated by vegetation barriers.

6.3 Relationship Between Local Short-Term Uses of Man's Environment and the Maintenance and Enhancement of Long-Term Productivity

The local short-term uses of man's environment are those generally associated with the construction of large generation and transmission facilities. During construction, the major impact will be the disruption of a portion of the plant site and and clearing of rights-of-way for transmission facilities. Flora and fauna and land use will be affected during construction for both the plant site and transmission routes. Flora, fauna, and land use effects will be largely confined during operation to the plant site.

Construction will be accomplished and the facilities will be designed in a manner to minimize environmental disruptions. During and following construction appropriate reclamation and restoration procedures will be used. This will allow much of the land dedicated to transmission to revert to its prior use. A significant portion of the plant site will be unavailable for alternative uses during the plant's useful life.

The emission of contaminants into the air will cease when the useful life of the power plant is finished. Should the transmission lines and related structures be removed at the end of the project life, all of that land would be reclaimable. While the land used by the major plant facilities and solid waste disposal areas is reclaimable, the cost of returning it to its entire former productivity may be great. The use of coal in the operation of the project will reduce the amount of fuel available to future generations, while present consumers will derive benefits from the electrical energy produced by the consumption of this fuel. Some of the products used for the project can be recycled when the project's useful life is completed.

The existence of the generating station and transmission facilities will cause some visual impact during the projects' useful life. This impact could be eliminated at the end of the project by dismantling the facilities.

6.4 Irreversible or Irretrievable Commitments of Resources

6.4.1 Construction

The most severe impact of the construction of Seminole Plant Units No. 1 and No. 2 is the loss of about 55 percent of the onsite Sandhill Community habitat. However, this loss would be retrievable over a considerable period of time with structure removal, reestablishment of vegetation and the translocation of some Sandhill species. Construction of the proposed project will result in the use of significant amounts of materials, many of which cannot presently be economically reclaimed. However, certain materials, such as the metal in the transmission structures, can be recycled. Construction and maintenance will require the use of human labor.

The truly irreversible and irretrievable resource expenditures of material and energy use for facility construction will be made at the Putnam site.

6.4.2 Operation

6.4.2.1 Consumption of Fuel

The commitment of coal, and relatively minor amounts of fuel oil, represent an irretrievable commitment of fossil fuel to the project. Coal is an abundant but non-renewable resource. Based on estimated average annual coal consumption, Seminole Plant Units No. 1 and No. 2 are expected to require about 114 million tons of coal in the 35-year life of the plant. The consumption of fuel oil for the purpose of initial lightoff and low-load flame stabilization is expected to be 13.5 million gallons over the life of the plant.

6.4.2.2 Other Resource Commitments

The proposed station will depend upon air resources for dispersion of heat, particulates, sulfur oxides, nitrogen oxides, and other air pollutants. The station will also depend upon the St. Johns River as the water source and for dispersion of plant effluents. The station will require land area for the main structures and for the disposal of ash and scrubber sludge waste materials. Other resources include land and vegetative and wildlife resources associated with the clearing operations for main plant structures and the waste disposal area.

Table 6.1 U.S. Environmental Protection Agency Standards of Performance for New Sources: Maximum Allowable Discharge Concentrations by Waste Source [1,2]

Waste Source	Effluent Characteristics														
	Total Suspended Solids		Oil & Grease		pH	PCB[4]	Copper, Total		Iron, Total		Free Available Chlorine[5]		Zinc, Chromium, Phosphorous and Other Corrosion Inhabitors		Heat
	Daily Max[3]	Daily Ave[3]	Daily Max	Daily Ave	Allowable Range		Daily Max	Daily Ave	Daily Max	Daily Ave	Max. Instantaneous	Chlorination Period Ave	Daily Max	Daily Ave	
1. All discharges					6.0-9.0	ND[6]									
2. Low volume wastes[7]	100mg/1	30mg/1	20mg/1	15mg/1											
3. Bottom ash transport water[8]	100mg/1	30mg/1	20mg/1	15mg/1											
4. Fly ash transport water	ND[6,9]	ND[6,9]	ND[6,9]	ND[6,9]											
5. Metal cleaning wastes and boiler blowdown	100mg/1	30mg/1	20mg/1	15mg/1			1.0mg/1	1.0mg/1	1.0mg/1	1.0mg/1					
6. Cooling tower blowdown[10]											0.5mg/1	0.2mg/1	NDA[6]	NDA[6]	
7. Main condenser															ND[6,9,11]
8. Material storage runoff[12]	50mg/1	50mg/1			6.0-9.0										
9. Construction runoff[12]	50mg/1[9]	50mg/1[9]			6.0-9.0										

Table 6.1 U.S. Environmental Protection Agency Standards of Performance for New Sources: Maximum Allowable Discharge Concentrations by Waste Source [1,2] (Cont.)

[1] The quantity of pollutants discharged from waste sources 1-6 shall not exceed the quantity determined by multiplying the flow from the waste source times the concentration in the table.

[2] In the event that waste streams from various sources are combined for treatment or discharge, the quantity of each pollutant or pollutant property attributable to each controlled waste source shall not exceed the specified limitation for that waste source.

[3] Daily Maximum: Maximum 24-hour value; Daily Average: Average value for 30 consecutive days.

[4] PCB: Polychlorinated biphenyl compounds.

[5] Neither free available chlorine nor total residual chlorine may be discharged from any unit for more than two 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 that the units in a particular location cannot operate at or below this level of chlorination.

[6] NDA: No detectable amount and ND: No discharge.

[7] Includes, but are not limited to waste waters from wet scrubber air pollution control systems, ion exchange water treatment systems, water treatment evaporator blowdown, laboratory and sampling streams, floor drainage, cooling tower basin cleaning wastes, and blowdown from recirculating house service water systems.

[8] The quantity of pollutants discharges in bottom ash transport water shall not exceed the quantity determined by multiplying the flow of bottom ash transport water times the above concentrations and dividing the product by 20.

[9] Limitations remanded and set aside by the United States Court of Appeals for the Fourth Circuit on 16 July 1976.

[10] Blowdown shall mean the minimum discharge of recirculating cooling water for the purpose of discharging materials contained in the process, the further buildup of which would cause concentrations or amounts exceeding limits established by best engineering practice.

[11] There shall be no discharge of heat from the main condensers except heat may be discharged in blowdown from recirculated cooling water systems provided the temperature at which the blowdown is discharged does not exceed at any time the lowest temperature or recirculated cooling water prior to the addition of the makeup water.

[12] Any untreated overflow from facilities, constructed, and operated to treat the volume of material storage runoff and construction runoff which results from a 10-year, 24-hour rainfall event shall not be subject to the pH and total suspended solids limitations stipulated for this waste source.

pH measured in standard units
mg/l - milligrams per liter

Source: U.S. EPA "Steam Electric Power Generating Point Source Category: Effluent Guidelines and Standards," Federal Register, Vol. 39, No. 196, 8 Oct. 1974. 40 CFR Part 423.

Table 6.2

Construction Ambient Sound Levels[a]

	Location[b]	Background Ambient Sound Levels, dB			Construction Contribution to Ambient Sound Levels, dB	Construction Ambient Sound Levels, dB			Change in Ambient Sound Levels, dB		
		L_d	L_n	L_{dn}	L_d[c]	L_d	L_n	L_{dn}	L_d	L_n	L_{dn}
1.	Warner Point	43	40	47	43	46	40	48	3	0	1
2.	Degeyter Motel	52	51	57	37	52	51	57	0	0	0
3.	Wild Waters Trailer Park	47	39	48	48	51	39	50	4	0	2
4.	Onsite	43	36	44	--		Onsite			Onsite	
5.	Mulberry and Tillman Rds.	47	35	46	43	48	35	47	1	0	1
6.	U.S. Route 17	57	49	58	51	58	49	58	1	0	0

[a]Based on 1982 Construction Equipment Usage Schedule - Burns and Roe, for 15 hour day.

[b]See Figure 2.6-1 for locations.

[c]These sound levels reflect a 10 dB attenuation due to 90 metes (300 feet) of tree border.

Table 6.3

Blowout Operation Sound Levels

Location	Sound Level* dB
1. Warner Point	86
2. Degeyter Motel	79
3. Wide Waters Trailer Park	91
4. Onsite	--
5. At Mulberry and Tillman Rds.	100
6. U.S. Route 17	92

*Second phase blowout operations 3.5 to 6 minutes duration at 45 to 50 minute intervals.

Table 6.4

Schedule for Construction Equipment Likely to be Used Offsite

	Equipment-Months						
Description	1979	1980	1981	1982	1983	1984	1985
Fuel/Lub. Truck	2	24	18	24	24	24	4
Wtr. Spray Trucks	2	24	12	24	12	18	4
Master Mech. Truck	4	20	24	24	24	24	-
Pick-up Trucks	16	112	291	331	345	271	60
Flat Bed Trucks	4	16	123	160	41	120	12
Dump Trucks	8	48	48	57	48	60	8
Flat Bed Trailers	-	30	120	143	120	96	-
Commercial Tractors	-	6	44	56	47	36	-
Concrete Trucks	4	22	20	21	20	10	-
Total	40	302	700	840	681	659	88
Estimated Daily Trips	20	130	290	350	280	270	40

Source: Burns and Roe, Inc.

*Based on the assumption that each operating vehicle will make an average of five trips to and from the site each day.

TABLE 6.5

COAL BURNING AND EMISSION RATES,
SEMINOLE PLANT UNITS NO. 1 & NO. 2

Operating Level (Percent of of Rated Capacity)	Maximum Coal Burning Rate (ton/h)	Minimum Coal Burning Rate (ton/h)	Maximum SO_2 Emission Rate (lb/h)	Minimum SO_2 Emission Rate (lb/h)	Maximum TSP Emission Rate (lb/h)	Minimum TSP Emission Rate (lb/h)	Maximum NO_x Emission Rate (lb/h)
50%	257	234	6484	2852	170	89	3396
75%	386	351	9726	4279	255	132	5095
100%	515	468	12968	5705	340	198	6793

Note: Rates shown are for both generating units combined. Maximum and minimum rates are based on the extremes of the coal characteristics range listed below. Maximum and minimum NO_x emission rates are essentially identical; only maximum rates are listed.

Range of Coal Characteristics

Sulfur Content - 1.5 to 3.0 percent
Ash Content - 6 to 10 percent
Heat Content - 11,000 to 12,500 Btu/lb

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TABLE 6.6

STACK CONDITIONS,
SEMINOLE PLANT UNITS NO. 1 & NO. 2

Operating Level (Percent or Rated Capacity)	Stack Height (ft)	Stack[a] Diameter (ft)	Exit Velocity (ft/s)	Volumetric Flow Rate (ft^3/min)	Exit Temperature (°F)
50%	675	50.9	13.74	1,681,898	128
75%	675	50.9	20.6	2,522,848	128
100%	675	50.9	27.55	3,363,797	128

[a]Effective stack diameter for combined emissions from both generating units; emissions from each unit actually exit through separate flues within a common stack, each flue bevy 36 ft in diameter.

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TABLE 6.7

MAXIMUM PREDICTED ANNUAL AVERAGE CONCENTRATIONS
ATTRIBUTABLE TO SEMINOLE PLANT UNITS
NO. 1 & NO. 2 EMISSIONS

Maximum SO_2 Concentration ($\mu g/m^3$)	Maximum TSP Concentration ($\mu g/m^3$)	Distance/Direction of Maximum Concentration From Putnam Site
5	<1	45 km/90°

PSD Class II Area Annual Average SO_2 Increment: 20 $\mu g/m^3$

PSD Class II Area Annual Average TSP Increment: 19 $\mu g/m^3$

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TABLE 6.8

SECOND-HIGH 24-HOUR SULFUR DIOXIDE CONCENTRATIONS
ATTRIBUTABLE TO SEMINOLE PLANT UNITS
NO. 1 & NO. 2 EMISSIONS

Year	Operating Level	Second-High 24-Hour Concentration ($\mu g/m^3$)
1964	100%	53 (1.0 km/20°)[a]
1970	100%	49 (2.5 km/50°)
1971	100%	54 (1.5 km/130°)
1972	100%	60 (1.25 km/60°)
1973	75%	55 (1.25 km/140°)
1974	100%	60 (1.25 km/60°)

PSD Class II Area 24-Hour SO_2 Increment: 91 $\mu g/m^3$

[a]Distance and direction from Putnam Site at which concentration shown is calculated.

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TABLE 6.9

SECOND-HIGH 24-HOUR PARTICULATE MATTER CONCENTRATIONS
ATTRIBUTABLE TO SEMINOLE PLANT UNITS
NO. 1 & NO. 2 EMISSIONS

Year	Operating Level	Second-High 24-Hour Concentration ($\mu g/m^3$)
1964	100%	2 (1.0 km/20°)[a]
1970	100%	2 (2.5 km/50°)
1971	100%	2 (1.5 km/130°)
1972	100%	2 (1.25 km/60°)
1973	75%	2 (1.25 km/140°)
1974	100%	2 (1.25 km/60°)

PSD Class II Area 24-Hour TSP Increment: 37 $\mu g/m^3$

[a]Distance and direction from Putnam Site at which concentration shown is calculated.

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TABLE 6.10

SECOND-HIGH 3-HOUR SULFUR DIOXIDE CONCENTRATIONS
ATTRIBUTABLE TO SEMINOLE PLANT UNITS
NO. 1 & NO. 2 EMISSIONS

Year	Operating Level	Second-High 3-Hour Concentration ($\mu g/m^3$)
1964	100%	386 (1.25 km/20°)[a]
1970	100%	253 (1.0 km/310°)
1971	75%	391 (1.25 km/130°)
1972	100%	511[b] (319)[c] (1.30 km/40°)
1973	75%	437 (1.25 km/140°)
1974	100%	388 (1.25 km/30°)

PSD Class II Area 3-Hour SO_2 Increment: 512 $\mu g/m^3$

[a]Distance and direction from Putnam Site at which concentration shown is calculated.

[b]The highest concentration for this distance and direction was predicted by CRSTER to be 525 $\mu g/m^3$ and could be rejected due to the occurrence of two consecutive calms coincident with Class A stability in a three-hour period. The indicated second-high concentration (511) would then become the highest concentration with the new second-high becoming considerably lower (see footnote c).

[c]Parenthetical value indicates the greatest second high that results when day 186 of 1972 is excluded from the analysis. The distance and direction of occurrence of this value is 1.5 km at 70° from the Putnam Site.

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TABLE 6.11

SECOND-HIGH 24-HOUR AND 3-HOUR CONCENTRATIONS RESULTING FROM INTERACTION OF SEMINOLE, HUDSON PULP AND PAPER, AND FLORIDA POWER & LIGHT

Second-High 24-Hour TSP Concentration ($\mu g/m^3$)	Grid Center Point	Distance/Direction from Grid Center
5	Florida Power & Light	1.0 km/140°

Second-High 24-Hour SO_2 Concentration ($\mu g/m^3$)	Grid Center Point	Distance/Direction from Grid Center
60[a]	Seminole	1.2 km/ 60°

Second-High 3-Hour SO_2 Concentration ($\mu g/m^3$)	Grid Center Point	Distance/Direction from Grid Center
514[b]	Seminole	1.3 km/ 40°

Florida 24-Hour TSP Ambient Standard: 150 $\mu g/m^3$

Florida 24-Hour SO_2 Ambient Standard: 260 $\mu g/m^3$

Florida 3-Hour SO_2 Ambient Standard: 1300 $\mu g/m^3$

---

[a]No contribution from either Hudson Pulp and Paper or Florida Power & Light is expected in this figure.

[b]A negligible contribution of approximately 3 $\mu g/m^3$ is expected to have resulted from Hudson Pulp and Paper emission sources.

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TABLE 6.12

THERMAL MIXING ZONES AREAS[a]

SUMMER CONDITIONS		WINTER CONDITIONS	
ISOTHERM °F	MAXIMUM AREA (sq. ft.)	ISOTHERM T°F	MAXIMUM AREA (sq. ft.)
92.0	7.	15	8.
91.5	11.	10	26.
91.0	38.	5	155.
90.5	240.	2.5	1000.
90.1	16000.[b]	1.0	16000.[d]
	MAXIMUM TOTAL AREA IMPACTED OVER COMPLETE TIDAL CYCLE[d]		
92.0	261	15.0	655
91.5	1000	10.0	2440
91.0	3223	5.0	11000
90.5	13500	2.5	43560
90.1	413800	1.0	326700

[a]Based on near-field modeling assessment.

[b]Corresponds to isotherm C, Figure 5.2-3.

[c]Corresponds to isotherm C, Figure 5.2-2.

[d]Based on near-field/far-field interpolation model discussed in Appendix C, Section C.3.5. See Figure 5.2-6.

TABLE 6.13

MIXING ZONES

Parameter	Units	Ambient Concentration	Mixing Zone (acres)[a]
Iron	mg/l	.56	0.0091
Chlorine	mg/l	0.	0.0017
Specific Conductance	umhos/cm	510.	0.184
Ammonia (un-ionized)	ug/l	11.4	0.23
Selenium	ug/l	10.0	0.00023
Copper	ug/l	10.0	0.023
Cadmium	ug/l	.87	31.0
Lead	ug/l	28.	31.0
Mercury	ug/l	.18	31.0
Zinc	ug/l	25.	31.0
Oil & Grease	mg/l	4.67	31.0

[a] Size of mixing zone required for compliance with water quality standards of Chapter 17-3 F.A.C.

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TABLE 6.14

CHEMICAL CONSTITUENTS
MAXIMUM BUILDUP AT INTAKE[1]

Parameter	Units	Ambient Concentration[2]	Maximum Buildup[3]
Iron	mg/l	.56	.60
Copper	ug/l	10.0	10.7
Specific Conductance	umhos/cm	510.	545.
Ammonia	ug/l	11.4	12.2
Selenium	ug/l	10.0	10.7
Cadmium	ug/l	0.87	.934
Lead	ug/l	28.	30.08
Mercury	ug/l	.18	.193
Zinc	ug/l	25.	26.85
Oil & Grease	mg/l	4.67	5.02

---

[1] Values represent maximum buildup of constituents at the intake during a period of upstream flow lasting longer than several intake/outfall recirculation cycles.

[2] Ambient values from Table 5.2-2.

[3] Upper limit of buildup of conservative substances at the intake.

TABLE 6.15

Recommended Concentration Limits for Selected Parameters to Provide Minimal Effect on Aquatic Organisms

Parameter	Recommended Maximum Concentration(1)	Remarks	Reference
Aluminum	100 μg/liter		EPA (1973)
Ammonia	20 μg/liter	Toxicity decreases with decrease in pH and/or temperature	EPA (1976) DER (1979)
Arsenic	50 μg/liter		EPA (1976) DER (1979)
Cadmium	1.2 μg/liter (for hard waters greater than 150 mg/liter $CaCO_3$)	Toxicity depends on hardness and alkalinity of water. Less toxic in hard water and/or water of high alkalinity.	EPA (1976) DER (1979)
Chromium	100 μg/liter 50 μg/liter		EPA (1976) DER (1979)
Copper	30 μg/liter	More toxic to algae and mollusks than to other aquatic organisms.	DER (1979)
Iron	1.0 mg/liter	Field data suggest adverse effects at concentrations considerably above 1000 μg/liter.	EPA (1976) DER (1979)
Lead	30 μg/liter	Toxicity depends on hardness and alkalinity of water. Less toxic in hard water and/or water of high alkalinity.	DER (1979)
Mercury	0.05 μg/liter 0.2 μg/liter		EPA (1976) DER (1979)
Nickel	100 μg/liter		EPA (1976) DER (1979)

(1)The recommended maximum concentration is equivalent to the water quality standard for each parameter.

TABLE 6.15 (Continued)

Parameter	Recommended Maximum Concentration	Remarks	Reference
Oil & Grease	0.01 x 96-Hour LC_5 5 mg/liter	Toxicity depends upon specific component.	EPA (1976) DER (1979)
Residual Chlorine	10 µg/liter	Aquatic organisms tolerate short term exposure to higher concentrations (Mattice and Zittel, 1976).	EPA (1976) DER (1979)
Selenium	25 µg/liter		DER (1979)
Zinc	30 µg/liter		DER (1979)

Table 6.16

Plant Operation Source Equivalent Sound Levels at 300 Meters (1000 feet) from Plant*

Outdoor Power Block Sources	Outdoor L_{eq} (dB)**	Duration of Operation Daytime (hr)	Nighttime (hr)
Main Transformer	41		
F.D. Fan	40		
F.D. Fan Motor	41		
Total L_{eq}	41.5	15	9
Coal Handling			
Active Pile with Coal Car Dump	44	4	
Active Pile without Coal Car Dump	39	7	9
Inactive Storage Area	53	Intermittently	Intermittently
Cooling Towers (natural draft)	47	15	9

*Due to attentuation of plant walls, sound levels of indoor sources are negligible (<15 dB).

**Power Block sound levels are taken from a study for a similar station of 2 units of 600 megawatts generating capacity (R.G.&E, Reference 1). Coal handling sound levels from a previous Environmental Impact Study for PSCC (Reference 2).

Table 6.17

Operation Ambient Sound Levels at Baseline Meaurement Locations

Location	Background Ambient Sound Levels, dB			Contribution[a,b] to Ambient Sound Levels, dB	Operation Ambient Sound Levels, dB			Change in Ambient Sound Levels, dB		
	L_d	L_n	L_{dn}	L_d	L_d	L_n	L_{dn}	L_d	L_n	L_{dn}
1. Warner Point	43	40	47	25	43	40	47	0	0	0
2. Degeyter Motel	52	51	57	18	52	51	57	0	0	0
3. Wild Waters Trailer Park	47	39	48	30	47	40	49	0	1	1
4. On Site	43	36	44	--		On Site			On Site	
5. Mulberry and Tillman Rds.	47	35	46	24	47	35	46	0	0	0
6. Route 17	57	49	58	32	57	49	58	0	0	0

[a] Sound level includes 10 dB attenuation due to 90 meters (300 feet) of dense woods onsite surrounding the plant.

[b] Since this analysis was completed in August 1978, several design decisions have been made by SECI that have resulted in the selection of equipment with lower operating sound levels than that assumed in the analysis. Thus, the calculated sound levels are conservative.

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Table 6.18

Seminole Construction-Phase Labor Requirements
(Average monthly employment per quarter)

Quarter/Year	Manual Labor	Supervisory Labor	Total Labor Force
4-1979	55	8	63
1-1980	165	24	189
2-1980	211	31	242
3-1980	261	39	300
4-1980	288	50	338
1-1981	365	53	409
2-1981	496	68	564
3-1981	666	81	747
4-1981	766	91	857
1-1982	901	107	1,008
2-1982	902	111	1,013
3-1982	903	100	1,003
4-1982	776	98	874
1-1983	558	81	639
2-1983	670	91	761
3-1983	677	85	762
4-1983	744	88	832
1-1984	739	92	831
2-1984	723	92	815
3-1984	630	75	705
4-1984	462	70	532
1-1985	161	46	207
2-1985	154	33	187
Total Man-Months	36,792	4,842	41,634

Source: Burns and Roe, Inc., April 24, 1978.

Notes:

Average monthly employment per quarter represents the average number of employees employed each month during any given quarter. A quarter consists of three months.

Manual labor includes all union craft labor.

Supervisory labor includes contractor supervisory and administrative personnel and construction management personnel.

Total man-months is calculated by multiplying average monthly employment per quarter times three months per quarter.

This table assumes that each laborer works a full man-month each month.

A man-month is equivalent to one laborer working 173.3 hours per month.

Table 6.19

Commuter Composition of Seminole Construction Labor Force
(Number of Laborers)

	MANUAL LABOR				SUPERVISORY LABOR				ALL LABOR			
Year (1)	Average Monthly Employment (2)	Commuters (3)	Relocaters (4)	Local Residents (5)	Average Monthly Employment (6)	Commuters (7)	Relocaters (8)	Local Residents (9)	Average Monthly Employment (10)	Commuters (11)	Relocaters (12)	Local Residents (13)
1979	55	47	3	5	8	6	2	0	63	53	5	5
1980	231	196	12	23	36	27	7	2	267	223	19	25
1981	571	485	29	57	73	55	14	4	644	540	43	61
1982	871	740	44	87	104	78	21	5	975	818	65	92
1983	662	563	33	66	86	65	17	4	748	628	50	70
1984	639	543	32	64	82	62	16	4	721	605	48	68
1985	157	134	8	15	40	30	8	2	197	164	16	17

Source: Burns and Roe, Inc., April 24, 1978, and Dames & Moore, June 1978.

Notes:

All figures on this table are estimates that represent one possible scenario for the commuter composition of the Seminole construction labor force. No special significant should be assigned to any of the individual point estimates.

A commuter is a worker who commutes daily from outside Putnam County to the site inside Putnam County. A weekly commuter is considered to be a relocater. In this table, the "commuter" column gives the average number of commuting employees who are commuters each month. thus, the sum of commuters, relocaters, and local residents for manual labor equals the average monthly employment in any given year.

A relocater is a worker who has moved into Putnam County from outside Putnam County, or who is a weekly commuter. The "local resident" column gives the average number of these employed each month.

A local resident is a worker who has a permanent domicile in Putnam County for the duration of the Seminole project. The "local resident" column gives the average number of local residents employed each month.

See Appendix H.3 for a discussion of the assumptions used in the preparation of this table.

Table 6.20

Seminole Construction-Phase Labor Costs
(Thousands of Dollars)

Quarter	Manual Labor	Supervisory Labor	Total Labor Cost
4-1979	$ 271.9	$ 49.8	$ 321.7
1-1980	829.8	149.5	979.3
2-1980	1,226.7	209.1	1,435.8
3-1980	1,573.3	263.1	1,836.4
4-1980	1,825.4	337.4	2,162.8
1-1981	2,366.8	357.6	2,724.4
2-1981	3,707.4	494.0	4,201.4
3-1981	5,031.7	588.5	5,620.2
4-1981	5,713.5	661.2	6,374.7
1-1982	6,627.5	777.5	7,405.0
2-1982	7,093.5	864.1	7,957.6
3-1982	7,096.8	778.5	7,875.3
4-1982	6,218.6	762.9	6,981.5
1-1983	4,273.3	630.6	4,903.9
2-1983	5,557.3	755.6	6,312.9
3-1983	5,769.4	705.8	6,475.2
4-1983	6,306.5	730.7	7,037.2
1-1984	6,384.9	764.0	7,148.9
2-1984	6,656.3	811.7	7,468.0
3-1984	5,826.3	661.7	6,488.0
4-1984	4,293.9	617.6	4,911.5
1-1985	1,392.2	405.9	1,798.1
2-1985	1,330.4	291.1	1,621.5
Total	$97,373.4	$12,667.9	$110,041.3

Source: Burns and Roe, Inc., April 24, 1978.

Notes:

Construction labor costs represent total wage package rates, including union fringe benefits and travel allowances for manual labor, and complete payroll wage rates, excluding non-payroll mark-ups, for supervisory labor.

Labor costs are escalated to the period designated through the use of past and present union wage agreements for manual labor, and historical data for supervisory labor.

Table 6.21

Seminole Operation Phase
Labor Requirements and Costs

Year (1)	Number of Employees (2)	Labor Cost (Million Dollars) (3)
1983	99	2.52
1984	99	2.64
1985	140	3.93
1986	140	4.13
1987	140	4.33
1988	140	4.55
1989	140	4.78
1990	140	5.02
1991	140	5.27
1992	140	5.53
1993	140	5.81
1994	140	6.10
1995	140	6.40
1996	140	6.72
1997	140	7.06
1998	140	7.41
1999	140	7.78
2000	140	8.17
2001	140	8.57
2002	140	9.00
2003	140	9.46
2004	140	9.93
2005	140	10.42
2006	140	10.95
2007	140	11.50
2008	140	12.07
2009	140	12.67
2010	140	13.31
2011	140	13.97
2012	140	14.67

Source: Seminole Electric Cooperative, Inc., May 2, 1978, and Dames & Moore, June 1978.

Notes:

Labor costs have been escalated at 5 percent per year.

Unit No. 1 will begin commercial operation in June 1983.

Unit No. 2 will begin commercial operation in June 1985.

Table 6.22

Seminole Construction and Operation Phase Demographic Impacts

Year (1)	Putnam County Baseline Population Projections (Medium Scenario) (2)	Incremental Population Change Due to Seminole Project (3)	Aggregate Population Change Due to Seminole Project (4)	Putnam County Seminole Project Population Projections (Medium Scenario) (5)	Percent Increase From Baseline Case (6)
1978	44,400	0	0	44,400	0.0
1979	45,200	38	38	45,238	0.1
1980	46,000	105	143	46,143	0.3
1981	46,500	180	323	46,823	0.7
1982	47,000	165	488	47,488	1.0
1983	47,500	263	751	48,251	1.6
1984	48,000	-15	736	48,736	1.5
1985	48,500	-90	646	49,146	1.3
1986	49,600	-120	526	50,126	1.1
1987	50,700	0	526	51,226	1.0
1988	51,800	0	526	52,236	1.0
1989	52,900	0	526	53,426	1.0
1990	54,000	0	526	54,526	1.0
1995	58,200	0	526	58,726	0.9
2000	62,500	0	526	63,026	0.8
2005	66,400	0	526	66,926	0.8
2010	70,300	0	526	70,826	0.7
2015	74,250	0	526	74,776	0.7

Source: University of Florida, Bureau of Economic and Business Research, July 1977, 1978-2020 Projections of Population by County, and Dames & Moore, June 1978.

Notes:

The Putnam County Baseline Population Projections (Medium Scenario) in this table are identical to the medium scenario projections of Table 2.1.9-4. Baseline Population Projections. Interpolation was used to calculate figures for years not ending in a zero or a five.

The incremental population change due to the Seminole project (Column 3) represents the number of people expected to move into or out of Putnam County each year due to the Seminole project.

Aggregate population change due to the Seminole project (Column 4) represents the sum of all incremental population changes due to the Seminole project from 1978 to the given year.

The Putnam County Seminole Project Population Projection (Column 5) represents the sum of the baseline projection and the aggregate population change due to the Seminole project for any given year.

For a more detailed discussion of the demographic impact methodology utilized, refer to Appendix H.6.

Table 6.23

Seminole Construction and Operation Phase Employment Impacts

Year (1)	Putnam County Baseline Employment Projections (2)	Incremental Employment Change Due to Seminole Project (3)	Aggregate Employment Change Due to Seminole Project (4)	Putnam County Seminole Project Employment Projections (5)	Percent Increase From Baseline Case (6)
1978	14,958	0	0	14,958	0.0
1979	15,284	26	26	15,310	0.2
1980	15,610	89	115	15,725	0.7
1981	15,866	157	272	16,138	1.7
1982	16,122	139	411	16,533	2.5
1983	16,378	132	543	16,921	3.3
1984	16,634	-11	532	17,166	3.2
1985	16,890	-122	410	17,300	2.4
1986	17,082	0	410	17,492	2.4
1987	17,274	0	410	17,684	2.4
1988	17,465	0	410	17,875	2.4
1989	17,657	0	410	18,067	2.3
1990	17,849	0	410	18,259	2.3
1995	19,081	0	410	19,491	2.2
2000	20,347	0	410	20,757	2.0

Source: Jacksonville Area Planning Board, June 1976B, Regional Employment Study; Bureau of the Census, 1970, U. S. Census of Population; Burns and Roe, Inc., April 24, 1978; Seminole Electric Cooperative, Inc. May 2, 1978; U. S. Water Resources Council, January 1977, Guideline 5, Regional Multipliers; and Dames & Moore, June 1978.

Notes:

The Putnam County Baseline Employment Projections of Column 2 come from Table 2.1.10-6. Interpolation was used to formulate baseline projections for years not ending in a zero or five.

The incremental employment change due to the Seminole project, and the aggregate employment change due to the Seminole project refer to direct and induced employment changes. For a discussion of derivation of the data in Columns 3 and 4 of Table 6.2-6, refer to Appendix H.5.

Putnam County Seminole Project Employment Projections of Column 5 in Table 6.2-6 were calculated by summing the baseline projections of Column 2 and the aggregate employment changes of Column 4.

Table 6.24

Seminole Construction and Operation Phase Income Impacts
(in millions of nominal dollars)

Year (1)	Putnam County Baseline Personal Income Projection (2)	Personal Income Impact due to Construction Phase (3)	Personal Income Impact due to Operation Phase (4)	Total Personal Income Impact (5)	Putnam County Seminole Project Personal Income Projection (6)	Percent Change from Baseline Case (7)
1978	247.2	0.0		0.0	247.2	0.0
1979	275.9	0.1		0.1	276.0	0.0
1980	308.3	2.0		2.0	310.3	0.1
1981	339.3	5.8		5.8	345.1	1.7
1982	373.8	9.2		9.2	383.0	2.5
1983	412.0	7.6	2.6	10.2	422.2	2.5
1984	453.6	7.9	2.7	10.6	464.2	2.3
1985	499.6	1.1	4.0	5.1	504.7	1.0
1986	550.0		4.2	4.2	554.2	0.8
1987	605.8		4.4	4.4	610.2	0.1
1988	667.3		4.6	4.6	671.9	0.1
1989	734.8		4.9	4.9	739.7	0.1
1990	809.4		5.1	5.1	814.5	0.1
1995	1,298.9		6.5	6.5	1,305.4	0.1
2000	2,084.1		8.3	8.3	2,092.4	0.0
2005	3,296.5		10.6	10.6	3,307.1	0.0
2010	5,213.5		13.6	13.6	5,227.1	0.0

Source: Burns and Roe, Inc., April 24, 1978; Council of Economic Advisors, May 1978, Economic Indicators, Washington, D.C., Florida Dept. of Commerce, April 1977, Putnam County Economic Data; Jim Roach, June 2, 1978, Florida Power & Light Co., personal communication; Seminole Electric Cooperative, Inc., May 2, 1978; U. S. Corps of Engineers, December 1975, Projections of Economic Activity in Florida, Series E Population; U. S. Water Resources Council, January 1977, Guideline 5, Regional Multipliers, Washington, D.C.; and Dames & Moore, June 1978.

Notes:

The personal income impacts of Columns 3, 4, and 5 include direct and induced income changes.

For a more detailed explanation of the methodology used, refer to Appendix H.6.

Table 6.25

Hypothetical Putnam County Property Taxes from Seminole Plant
(in millions of dollars)

	1983	1985	1999	2012
Unit 1 -- Net Assessed Value[1]	$368.0	$368.0	$368.0	$368.0
less accumulated depreciation[2]	0.0	24.5	196.3	355.7
Net taxable value	$368.0	$343.5	$171.7	$ 12.3
Unit 2 -- Net Assessed Value[3]	$ 0.0	$372.1	$372.1	$372.1
less accumulated depreciation[2]	0.0	0.0	173.6	334.9
Net taxable value	$ 0.0	$372.1	$198.5	$ 37.2
Coal Stockpile (@10%)[4]	$ 1.5	$ 3.4	$ 7.7	$ 16.4
Total Taxable Value	$369.5	$719.0	$377.9	$ 65.9
Total Putnam County Tax (@16.326 mills)[5]	$ 6.0	$ 11.7	$ 6.2	$ 1.1
Total Taxes, 1983-2014	$191.4			

[1] $460,000,000 less 20% for exempt pollution control facilities. Assumes property enters tax rolls January 1, 1983.

[2] Straightline over 30 years. Unit 1 AV declines at $12.3 million per year, Unit 2 @$12.4 million per year.

[3] $465,170,400 less 20%, commencing January 1, 1985.

[4] Stockpile valuation based on estimated cost of coal (delivered) of $1.60 per million BTU (1978) for 75-day inventory with each unit burning 1.5 million tons per year of 12,000 BTU/lb. coal. Coal costs escalated to 1986 at 5.3% annually and 6.0% thereafter.

[5] 1978 millage rate, real and personal property.

Source: Appendix H, Table H-7.

Table 6.26

Cooling Tower Blowdown
(Line J, Figures F6.2 & F6.3)
Estimated Constituent Concentrations
(mg/l)
Average Flow (Phase III) = 1722 TGD

Parameter	Maximum Ambient*	Maximum Blowdown**	Average Ambient*	Average Blowdown**	Minimum Ambient*	Minimum Blowdown**
TSS***	46.0	184.	8.0	32.0	<1.	4.
TDS	935.	3740.	578.	2312.	378.	1512.
Sodium	180.	720.	122.	488.	70.	280.
Magnesium	28.	112.	18.	72.	10.	40.
Copper	0.010	0.040	0.003	0.012	0.001	0.004
Nickel	0.003	0.012	0.002	0.008	0.001	0.004
Zinc***	0.18	0.72	0.020	0.08	0.000	0.00
Chromium	0.020	0.080	0.013	0.052	0.009	0.036
Mercury	0.0005	0.002	0.00018	0.00072	0.0	0.0
Aluminum	0.150.	0.6	0.083	0.332	0.04	0.16
Iron***	0.560	2.240	0.219	0.876	0.020	0.08
Manganese	0.030	0.120	0.016	0.064	0.006	0.024
Chloride	400.	1600.	220.	880.	120.	480.
Sulfate****	--	861.	--	--	--	231.
Phosphorus	0.40	1.6	0.2	0.8	0.06	0.24
Oil & Grease	22.	88.	10.	40.	4.	16.
Residual Chlorine						
Phase II	--	0.1	--	0.1	--	0.1
Phase III	--	0.1	--	0.1	--	0.1
Ammonia***	0.38	1.52	0.1	0.4	0.05	0.2

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Table 6.26 (Continued)

Parameter	Maximum Ambient*	Maximum Blowdown**	Average Ambient*	Average Blowdown**	Minimum Ambient*	Minimum Blowdown**
COD***	106.	424.	64.	256.	46.	184.
BOD_5***	3.9	15.6	1.9	7.6	0.2	0.8
Arsenic	0.02	0.08	0.0054	0.022	0.001	0.004
Antimony	NA	NA	NA	NA	NA	NA
Berylium	NA	NA	NA	NA	NA	NA
Boron	NA	NA	NA	NA	NA	NA
Cadmium	0.006	0.024	0.00064	0.00256	0.0	0.0
Cyanide	NA	NA	NA	NA	NA	NA
Flouride	NA	NA	NA	NA	NA	NA
Lead	0.074	0.296	0.0139	0.0556	0.001	0.004
Selenium	0.01	0.04	0.005	0.02	0.001	0.004
Silver	NA	NA	NA	NA	NA	NA
Thorium	NA	NA	NA	NA	NA	NA
Uranium	NA	NA	NA	NA	NA	NA
pH	--	7.5	--	--	--	7.0
Nitrate	2.6	10.4	0.01	0.04	0.098	0.392

*Data for river water constituent concentrations obtained from STORET file, St. John's River Palatka station (except where noted).

**Constituent concentrations considered to be the same for both Phase II and Phase III,

***Values revised based on water quality data obtained by Dames & Moore in 1978.

****Total Sulfate after addition of H_2SO_4.

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Table 6.27

Chemical Wastewater Treatment Facility*
(Line T, Figures F6.2 & F6.3)
Estimated Maximum Constituent Concentrations
(mg/l)

Constituent	Coal Pile, Limestone Drainage Line W**	Low Volume Waste Table Vd	Bottom Ash Transport Water Table Ve	Treatment Facility Influent Line R**	Treatment Facility Effluent Line T**
Flow (TGD)***	150.	135.	432.	717.	717.
TSS	610.	184.	184.	273.	100.
TDS	5800.	2126.	3740.	3867.	***
Sodium	1260.	586.	720.	808.	***
Magnesium	174.	33.	112.	110.	***
Copper	1.8	0.88	0.19	0.66	***
Nickel	0.2	0.0	0.075	0.09	***
Zinc	1.6	0.04	0.81	0.83	***
Chromium	0.3	0.001	0.12	0.14	***
Mercury	0.002	0.0001	0.003	0.002	***
Aluminum	825.	0.0	2.067	174.	***
Iron	0.9	4.38	11.49	7.94	1.
Manganese	180.	0.021	0.12	37.7	***
Chloride	23.	144.	1600.	996.	***
Sulfate	5231.	1787.	861.	1950.	***
Phosphorus	1.2	0.104	1.6	1.23	***
Oil & Grease	100.	10.4	88.	76.	20.
Free Chlorine	0.0	0.02	0.13	0.082	***
Ammonia	1.35	150.	0.0	28.5	***

Table 6.27 (continued)

Constituent	Coal Pile, Limestone Drainage Line W**	Low Volume Waste Table Vd	Bottom Ash Transport Water Table Ve	Treatment Facility Influent Line R**	Treatment Facility Effluent Line T**
COD	1080.	21.	424.	485.	243.
BOD_5	3.	NA	15.6	10.	5.
Arsenic	0.05	0.0	0.09	0.064	****
Antimony	0.1	"	0.033	0.041	****
Berylium	0.01	"	0.003	0.004	****
Boron	5.	"	1.67	2.05	****
Cadmium	0.1	"	0.057	0.055	****
Cyanide	0.01	"	0.003	0.004	****
Flouride	0.0	"	0.0	0.0	****
Lead	0.1	"	0.32	0.21	****
Selenium	0.01	"	0.04	0.026	****
Silver	0.01	"	0.003	0.004	****
Thorium	0.005	"	0.002	0.002	****
Uranium	0.01	"	0.003	0.004	****

*Basis for constituent concentrations:
Coal Pile/Limestone Drainage - Except for trace metals, values taken from Development Document for the Steam Electric Generating Point Source Category. Trace metals estimated based on coal analysis.
Low Volume Waste - See Table Vd
Bottom Ash Transport Water - See Table Ve
Treatment Facility Influent - Composite result of treatment in central waste facility of collected and equalized waste streams.

**See Figures 2 and 3.

***Thousand gallons/day (Phase III).

****As the effect of treatment on these constituents cannot be predicted, it was conservatively assumed there would be no reduction in constituent concentration.

Table 6.28

Sanitary Waste
(Line J, Figures F6.2 & F6.3)
Estimated Maximum Constituent Concentration
(mg/l)

Parameter	Treated Water Quality
TSS	<5.0*
TDS	242.0
Sodium	11.0
Magnesium	10.0
Manganese	0.050
Copper	0.150
Zinc	0.340
Chromium	0.010
Mercury	0.001
Iron	12.4
Chloride	12.2
Sulfate	25.3
Phosphorus	<1.00*
BOD_5	<5.00*
Free Chlorine Residual	1.00 to 2.00*
Nitrate	<3.00*

*Constituents assumed to be directly treated in the sanitary treatment facility (other values are based on maximum recorded groundwater constituent concentrations).

Table 6.29

Low Volume Waste*
Estimated Maximum Constituent Concentrations
(mg/l)

Constituent	Lab and Floor Drains Line X**	Neut. Tank Line Z**	Pre-Treatment System, Line AA**	Combined Low Volume Wastes
Average Yearly Flow (TGD)***	14.	78.	43.	135.
TSS	100.	25.	500.	184.
TDS	240.	3560.	140.	2126.
Sodium	20.	1000.	20.	586.
Magnesium	10.	50.	10.	33.
Copper	0.15	1.5	0.0	.88
Nickel	0.0	0.0	"	0.0
Zinc	0.34	"	"	.04
Chromium	0.01	"	"	.001
Mercury	0.001	"	"	.0001
Aluminum	0.0	"	"	0.0
Iron	0.1	7.5	0.1	4.38
Manganese	0.05	0.0	0.05	0.021
Chloride	40.	220.	40.	144.
Sulfate	45.	3060.	45.	1787.
Phosphorus	1.	0.0	0.0	0.104
Oil & Grease	100.	"	"	10.4
Free Chlorine	0.2	"	"	0.02
Ammonia	0.0	260.	"	150.

Table 6.29(continued)

Constituent	Lab and Floor Drains Line X**	Neut. Tank Line Z**	Pre-Treatment System Line AA**	Combined Low Volume Wastes
COD	200.	NA	NA	21.
BOD_5	NA****	"	"	NA
Arsenic	"	"	"	"
Antimony	"	"	"	"
Berylium	"	"	"	"
Boron	"	"	"	"
Cadmium	"	"	"	"
Cyanide	"	"	"	"
Flouride	"	"	"	"
Lead	"	"	"	"
Selenium	"	"	"	"
Silver	"	"	"	"
Thorium	"	"	"	"
Uranium	"	"	"	"

*Basis for constituent concentrations:
Lab and Floor Drains - water supply for this source is groundwater. Volumes of oil & grease and TSS generated at this source were estimated. Concentrations of other constituents represent maximum measured naturally occurring groundwater concentrations.

Neut. Tank - concentrations determined from average composition of the neutralized waste from the makeup demineralizer and condensate polisher operating under design conditions.
Pre-Treatment System - concentrations determined from composite of pretreatment clarifer blowdown and filter backwash water.

**See Figures 2 and 3.

***Thousand gallons/day (Phase III).

****NA - not available. Assumed to be zero.

Table 6.30

Bottom Ash Transport Water*
Estimated Maximum Constituent Concentration
(mg/l)

Constituent	Dewatering Bin Line Q**	Seal Trough Overflow Line YY**	Combined
Average Yearly Flow (TGD)***	144.	288.	432.
TSS	184.	184.	184.
TDS	3740.	3740.	3740.
Sodium	720.	720.	720.
Magnesium	112.	112.	112.
Copper	0.5	0.04	0.19
Nickel	0.2	0.012	0.075
Zinc	1.72	0.72	1.05
Chromium	0.2	0.08	0.12
Mercury	0.007	0.002	0.004
Aluminum	5.	0.6	2.067
Iron	30.	2.24	11.49
Manganese	0.12	0.12	0.12
Chloride	1600.	1600.	1600.
Sulfate	861.	861.	861.
Phosphorus	1.6	1.6	1.6
Oil & Grease	88.	88.	88.
Free Chlorine	0.0	0.2	0.13
Ammonia	0.0	0.0	0.0
COD	424.	424.	424.
BOD_5	15.6	15.6	15.6
Arsenic	0.12	0.08	0.09
Antimony	0.1	0.0	0.033
Berylium	0.01	"	0.003
Boron	5.	"	1.67
Cadmium	0.124	0.024	0.057
Cyanide	0.01	0.0	0.003
Flouride	0.0	"	0.0

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Table 6.30 (Continued)

Constituent	Dewatering Bin Line Q**	Seal Trough Overflow Line YY**	Combined
Lead	0.39	0.29	0.32
Selenium	0.05	0.04	0.04
Silver	0.01	0.0	0.003
Thorium	0.005	"	0.002
Uranium	0.01	"	0.003

*Basis for constituent concentrations:
Dewatering Bin - constituent concentrations based on cooling tower blowdown water quality (Table Va) and coal analysis.
Seal Trough Overflow - Constituent concentrations based on cooling tower blowdown water quality (Table Va).

**See Figures 2 and 3.

***Thousand gallons/day (Phase III).

Table 6.31

Facility Water Use

Average Flow

(Thousand Gallons Per Day)

(See Figures F6.1, F6.2, & F6.3)

Line No.		Phase I Average Usage	Phase II Average Usage	Phase III Average Usage	Phase III Maximum Usage
A	Total river water make-up	0	7,905	15,810	28,437
B	Screen wash return	0	0	0	1,440
C	Boiler blowdown quench water	0	0	0	288
D	FGD system fresh water make-up	0	0	0	3,486
E	Cooling tower make-up	0	7,904	15,807	23,223
F	Cooling tower drift	0	19	39	39
G	Cooling tower evaporative	0	5,940	11,880	17,467
H	Cooling tower blowdown	0	1,944	3,888	5,717
I	Cooling tower blowdown make-up to FGD system	0	867	1,734	3,486
J	Cooling tower blowdown to river (001 discharge)	0	861	1,722	5,717
K	Cooling tower blowdown make-up to bottom ash system	0	216	432	432

Notes:

1) Phase I - Unit 1 construction. 11/79 to 6/83
2) Phase II- Unit 1 operation, Unit 2 construction. 6/83 to 6/85
3) Phase III- Unit 1 and 2 operation. 6/85 to 6/2020
4) Maximum usages are not additive and are maximum based upon worst conditions.

Table 6.31 (cont'd)

Line No.		Phase I Average Usage	Phase II Average Usage	Phase III Average Usage	Phase III Maximum Usage
L	FGD system evaporation	0	1,174	2,347	3,456
M	Sludge pond runoff	0	317	634	1,426
N	FGD system effluent	0	10	20	30
O	Bottom ash system evaporation	0	0	0	0
P	Bottom ash system sluice water	0	1,440	2,880	2,880
Q	Dewatering bin blowdown	0	72	144	144
R	Total bottom ash sump to waste treatment facilities	0	359	717	1,728
S	Waste treatment facility recirculation	0	0	0	1,728
T	Waste treatment effluent to monitor	0	359	717	1,728
U	Waste treatment effluent to meter facility	0	359	717	1,728
V	Waste treatment effluent to river (001 discharge)	0	359	717	1,728
W	Coal and limestone storage runoff	0	75	150	337
X	Lab and floor drains	0	7	14	439
Z	Neutralization tank effluent	0	39	78	576
AA	Pretreatment system blowdown and backwash	--	22	43	1,224

Table 6.31 (cont'd)

Line No.		Phase I Average Usage	Phase II Average Usage	Phase III Average Usage	Phase III Maximum Usage
CC	Cond. polisher make-up (condensate system)	--	17	35	360
DD	Soot blowing and vent losses	--	187	374	374
EE	Demineralizer effluent	--	233	467	1,152
FF	Condensate polisher backwash and regeneration	--	17	35	360
GG	Demineralizer	--	22	43	576
HH	Mis. station uses	--	7	14	439
II	Demineralizer water supply	--	255	510	1,440
JJ	Sanitary treatment system effluent to river (001 discharge)	--	18	9	14
KK	Pretreatment system effluent to Pw Storage Tank	--		23	453
LL	Pretreatment system supply	--	288	576	1,728
MM	Fire water system supply	14	14	14	2,160
NN	Boiler blowdown to percolation fields	--	29	58	288
OO	Boiler fireside wash to percolation fields	--	0.3	0.6	288

Table 6.31 (cont'd)

Line No.		Phase I Average Usage	Phase II Average Usage	Phase III Average Usage	Phase III Maximum Usage
PP	Air preheater wash to percolation fields	--	0.9	1.6	3,600
RR	Effluent from percolation field (not including Item CCC)	--	29.7	59.4	4,176
TT	Air preheater wash water	--	0.9	1.6	3,600
UU	Boiler fires wash water	--	0.3	0.6	288
VV	Service water supply	--	1.1	2.1	3,888
WW	Boiler blowdown	--	29	58	288
XX	Chemical cleaning wastes	0.1	0.1	0.3	720
YY	Seal trough overflow	--	144	288	576
ZZ	Total discharge to river (including construction sanitary wastes)	--	1,238	2,448	7,459
AAA	Well water make-up	34	324	590	3,888
BBB	Construction water usage (including sanitary wastes generated by construction personnel)	20	22	0	0
CCC	Construction sanitary wastes	12	14	0	0
DDD	Plant area manifold	8	8	0	0
EEE	Plant operation sanitary wastes	--	4	9	14

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TABLE 6.32

WATER QUALITY DATA - ST. JOHNS RIVER[a]

Parameter Measured	Units	Measure-ments	Data Average	Maximum Value	Minimum Value	Beginning Date	Ending Date
Water Temp.	°C	68	23.9	30.5	8.5	62-08-16	77-05-20
Turb. JKSN	JTU	56	4.875	21	1	68-09-24	77-05-20
Specific Conductivity at 25°C	µmhos/cm	66	974	1400	510	62-06-08	77-05-20
DO	mg/l	64	6.6	11.6	2.7	68-04-26	77-05-20
DO saturated	%	57	76	107	35	68-04-26	77-05-20
BOD (5-day)	mg/l	35	2.1	8.2	.6	68-09-24	77-05-20
pH	units	51	6.1	9.4	5.4	62-06-08	77-05-20
Bicarbonate HCO_3	mg/l	48	102	150	48	62-08-16	77-02-25
Carbonate CO_3	mg/l	1	3	3	3	66-11-22	76-07-18
Phosphate PO_4 Tot	mg/l	5	.15	.24	.05	68-04-26	70-09-21
Ortho PO_4 Diss.	mg/l	7	.09	.16	.01	66-11-22	71-00-14
TOT Hard $CaCO_3$	mg/l	58	196.1	310	94	62-06-08	77-05-20
Ammonia Nitrogen Tot	mg/l	54	.05	.28	.01	68-09-24	77-05-20
Calcium Ca, Diss.	mg/l	52	47.7	78	30	62-06-08	77-05-20
Magnesium Mg, Diss.	mg/l	52	17.8	28	10	62-06-08	77-05-20
Sodium Na, Diss.	mg/l	48	121.6	180	70	62-06-08	77-02-25
Potassium K, Diss.	mg/l	48	4.5	8.8	1.2	62-06-08	77-02-25
Chloride Cl, Diss.	mg/l	57	220	400	120	62-06-08	77-05-20
Sulfate SO_4, Diss.	mg/l	48	64.7	114	37	62-06-08	77-02-25

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TABLE 6.32 (Continued)

Parameter Measured	Units	Measure-ments	Data Average	Maximum Value	Minimum Value	Beginning Date	Ending Date
Arsenic As, Tot	µg/l	13	5.4	20	1	72-05-22	77-02-25
Cadmium Cd, Tot	µg/l	22	.64	6[b]	0	72-05-22	78-08-28
Chromium Cr, Tot	µg/l	11	<12.7	20	<9	70-05-18	77-02-25
Copper Cu, Tot	µg/l	12	3.25	10	1	72-05-22	77-02-25
Iron Fe, Tot	µg/l	16	218	560	40	72-05-22	77-02-25
Lead Pb, Tot	µg/l	23	13.9	74	0	72-05-22	78-08-28
Mercury Hg, Tot	µg/l	25	.175	.5	0	71-05-12	78-08-28
Manganese Mn, Tot	µg/l	14	15.7	30	6	72-05-22	76-05-18
Zinc Zn, Tot	µg/l	20	19.6	70	0	72-05-22	78-08-28
CO_2	mg/l	36	4.5	14	.1	62-08-16	77-02-25
Fec.Col.	/100ml	31	74.2	1200	5	74-01-16	76-11-10
Fecstrep	/100ml	2	27.5	50	5	76-12-21	77-05-20
Aldrin Whl Smpl	µg/l	0	0	0	0	68-09-24	68-09-24
DDD Whl Smpl	µg/l	0	0	0	0	68-09-24	68-09-24
DDT Whl Smpl	µg/l	0	0	0	0	68-09-24	68-09-24
DDE Whl Smpl	µg/l	0	0	0	0	68-09-24	68-09-24
Endrin Whl Smpl	µg/l	0	0	0	0	68-09-24	68-09-24
HCHLR Whl Smpl	µg/l	0	0	0	0	68-09-24	68-09-24
Lindane Whl Smpl	µg/l	0	0	0	0	68-09-24	68-09-24
Alkalinity ($CaCo_3$)	mg/l	48	73	123	39	62-06-08	77-02-25
Total Carbon (C)	mg/l	30	32.8	72	24	71-05-12	77-05-20

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TABLE 6.32 (Continued)

Parameter Measured	Units	Measure-ments	Data Average	Maximum Value	Minimum Value	Beginning Date	Ending Date
Silica SiO_2, Diss.	mg/l	48	4.4	14	.1	62-06-08	77-02-25
Flouride f, Diss.	mg/l	48	.3	.8	.1	62-06-08	77-02-25
Cobalt Co, Tot	µg/l	5	2	5	1	72-05-22	77-02-05
Nickel Ni, Tot	µg/l	3	2	3	1	73-05-25	76-05-18
Strontium Sr, Diss	µg/l	42	1086	8600	80	66-11-22	77-02-25
Aluminum Al, Tot	µg/l	3	83	150	40	70-05-18	76-05-18
Selenium Se, Tot	µg/l	5	5	10	1	74-01-16	77-02-25
Silvex	µg/l	0	0	0	0	75-07-22	75-07-22
Eldrin Whl Smpl	µg/l	0	0	0	0	68-09-24	68-09-24
Total 24-D	µg/l	6	.09	.28	.0	75-07-22	76-01-27
Total 245-T	µg/l	1	.04	.04	.04	75-07-22	76-01-27
TSS	mg/l	2	8	8	8	73-05-25	73-09-21
TDS Residue @180°	mg/l	48	578	935	378	62-06-08	77-02-25
Phenols	µg/l	1	1	1	1	68-09-24	70-05-18
Nitrite Tot	mg/l	41	.013	.10	.01	68-09-24	77-05-20
Nitrate Tot	mg/l	39	.098	.54	.01	62-06-08	77-05-20
KJELDAHL Nitrogen Tot	mg/l	50	1.0	2.5	.10	73-05-25	77-05-20

a. EPA (1978a) STORET data file. Due to internal inconsistancies in the data and the limited data base, the above statistical summarization can only be used as a general indication of water quality.

b. A value of 100 µg/l was recorded in the EPA STORET data for 78/05/31. The value is two orders of magnitude higher than most other measured cadmium concentrations at St. Johns water quality stations. Based on an extensive examination of water quality stations in the St. Johns Basin, the 100 µg/l measurement was determined to be a data error.

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TABLE 6.33

SEDIMENT SAMPLES - ST. JOHNS RIVER
(in mg/kg dry weight)

Parameter	Analysis A	Analysis B	Analysis C	Analysis D
Chromium, Cr	2.98	5.29	42.58	0.998
Mercury, Hg	5.3	1.4	6.0	<0.1
Arsenic, As	1.99	3.17	1.77	0.998
Lead, Pb	2.49	2.11	17.74	0.998
Copper, Cu	2.53	4.23	10.64	0.998
Iron, Fe	1,491	1,480	14,192	289
Zinc, Zn	30.8	54.9	97.6	469
Cadmium, Cd	0.10	0.21	0.43	0.37
Phenols	27.0	<0.2	19.7	<0.02
BHC	<0.001	<0.001	<0.001	<0.001
Lindane	0.023	0.011	0.004	0.002
Heptachlor	<0.001	<0.001	<0.001	<0.001
Aldrin	0.280	0.024	0.009	0.006
Heptachlor Epoxide	0.026	0.029	0.004	0.002
Dieldrin	<0.001	0.022	<0.001	<0.001
Endrin	<0.001	<0.001	<0.001	<0.001
Captan	<0.001	<0.001	<0.001	<0.001
DDE	<0.001	<0.001	<0.001	<0.001
DDD	<0.001	<0.001	<0.001	<0.001
DDT	<0.001	<0.001	<0.001	<0.001
Methoxychlor	<0.001	<0.001	<0.001	<0.001
Endosulfan	<0.001	<0.001	<0.001	<0.001
Dichloran	<0.001	<0.001	<0.001	0.001
Mirex	<0.001	<0.001	<0.001	<0.001
Pentachloronitrohenzene	<0.001	<0.001	<0.001	<0.001
Trifluralin	<0.001	<0.001	<0.001	<0.001
Strobane	<0.001	<0.001	<0.001	<0.001
Toxaphene	<0.001	<0.001	<0.001	0.001
Chlordane	<0.001	<0.001	<0.001	<0.001
Polychlorinated Biphenyls	<0.001	<0.001	<0.001	<0.001

Notes: 1) Date of collection: April 13, 1978.

2) Collecting device: K-B Cora Sampler; sample contained a plastic tube liner.

3) Samples placed in containers supplied by Orlando Laboratories Inc. (no preservative added).

4) Analysis for: Heavy metals (similar to the water column) PCB's; Pesticides.

5) For sampling locations see Figure C-5.

TABLE 6.34

COMPARISON OF WATER QUALITY CRITERIA
WITH ESTIMATED GROUND WATER QUALITY
AT PROPERTY BOUNDARY
(Waste Storage Area)

Constituent[a]	Florida[b] Criteria	Assumed[c] Leachate Concentration in Landfill	Background[d] Concentrations in Ground Water	Estimated Increase[e] in Concentrations at Property Boundary	Estimated Ground[f] Water Quality at Property Boundary
Calcium	NS	700	80	40	120
Sodium	NS	400	14	25	39
Potassium	NS	300	2.22	20	22
Magnesium	NS	100	6.6	5	12
Bicarbonate	NS	800	293	50	343
Sulfate	NS	2000	2.9	125	128
Chloride	NS	600	13	38	51
Fluoride	1.5[g]	3.2	0.3	0.2	0.5
Nitrate	10	31	3.4	2	5
Arsenic	0.05	0.7	0.01	ND	0.01
Barium	1	14	<0.5	ND	<0.5
Cadmium	0.01	0.13	0.005	ND	0.005
Chromium	0.05	4.0	0.01	ND	0.01
Copper	NS	2.3	<0.16	ND	<0.16
Iron	NS	3.0	0.75	ND	0.75
Lead	0.05	1.8	<0.01	ND	<0.01
Manganese	NS	1.9	<0.05	ND	<0.05

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TABLE 6.34 (Continued)

Constituent[a]	Florida[b] Criteria	Assumed[c] Leachate Concentration in Landfill	Background[d] Concentrations in Ground Water	Estimated Increase[e] in Concentrations at Property Boundary	Estimated Ground[f] Water Quality at Property Boundary
Mercury	0.002	0.024	<0.001	ND	<0.001
Selenium	0.01	1.0	<0.01	ND	<0.01
Silver	0.05	0.034	0.019	ND	0.019
Zinc	NS	2.7	0.33	ND	0.33
TDS	NS[h]	~5,000	310	~305	~615

[a]Concentrations given in mg/liter.

[b]Criteria applicable to ground water in Florida (Class I-B).

[c]Concentrations do not include background concentrations.

[d]Based upon average at monitoring well S-1.

[e]Property boundary assumed to be 2300 feet from edge of landfill.

[f]Background quality plus estimated increase in concentrations.

[g]If background levels exceed 1.5 mg/liter, the criteria must not be exceeded.

[h]Class I-B waters are classified as having less than 10,000 mg/l total dissolved solids.

NS = no standard applicable.

ND = constituent did not reach property boundary.

TABLE 6.35

COMPARISON OF WATER QUALITY CRITERIA
WITH ESTIMATED GROUND WATER QUALITY
AT PROPERTY BOUNDARY
(Coal Storage Area)

Constituent[a]	Florida[b] Criteria	Assumed[c] Leachate Concentration in Landfill	Background[d] Concentrations in Ground Water	Estimated Increase[e] in Concentrations at Property Boundary	Estimated Ground[f] Water Quality at Property Boundary
Sodium	NS	1260	4.5	50	55
Magnesium	NS	174	2.7	7	10
Sulfate	NS	5230	12.2	730	742
Chloride	NS	23	5.35	3	8
Fluoride	1.5[g]	0.0	<0.1	0.0	<0.1
Arsenic	0.05	0.05	<0.013	ND	<0.013
Cadmium	0.01	0.1	<0.005	ND	<0.005
Chromium	0.05	0.3	<0.01	ND	<0.01
Copper	NS	1.8	<0.1	ND	<0.1
Iron	NS	0.9	10.9	ND	10.9
Lead	0.05	0.1	<0.011	ND	<0.011
Manganese	NS	180	<0.05	ND	<0.05

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TABLE 6.35 (Continued)

Constituent[a]	Florida[b] Criteria	Assumed[c] Leachate Concentration in Landfill	Background[d] Concentrations in Ground Water	Estimated Increase[e] in Concentrations at Property Boundary	Estimated Ground[f] Water Quality at Property Boundary
Mercury	0.002	0.002	<0.001	ND	<0.001
Selenium	0.01	0.01	0.009	ND	0.009
Silver	0.05	0.01	<0.015	ND	<0.015
Zinc	NS	1.6	0.06	ND	0.06

[a]Concentrations given in mg/liter.

[b]Criteria applicable to ground water in Florida (Class I-B).

[c]Concentrations do not include background concentrations.

[d]Based upon average at monitoring well No. 1.

[e]Property boundary assumed to be 1500 feet from edge of landfill.

[f]Background quality plus estimated increase in concentrations.

[g]If background levels exceed 1.5 mg/liter, the criteria must not be exceeded.

NS = no standard applicable.

ND = constituent did not reach property boundary.

TABLE 6.36

PERCOLATION FIELD
WASTE WATER QUALITY

Constituent[a]	Florida[b] Criteria	Assumed[c] Concentration in Leachate	Background[d] Concentrations in Ground Water	Estimated Increase[e] in Concentrations at Property Boundary	Estimated Ground[f] Water Quality at Property Boundary
Chloride	NS	900	8.4	23	31
Fluoride	1.5[g]	0	<0.1	0	<0.1
Magnesium	NS	75	2.45	1.89	4.34
Sodium	NS	490	10.6	12.6	23.2
Sulfate	NS	550	8.6	13.9	22.5
Aluminum	NS	4.7	NA	ND	--
Antimony	NS	0.10	NA	ND	--
Arsenic	0.05	0.07	<0.011	ND	<0.011
Beryllium	NS	0.01	NA	ND	--
Cadmium	0.01	0.10	0.007	ND	0.007
Chromium	0.05	0.17	<0.01	ND	<0.01
Copper	NS	0.47	<0.1	ND	<0.1
Iron	NS	28.6	0.75	ND	0.75
Lead	0.05	0.10	0.014	ND	0.014
Manganese	NS	0.06	<0.05	ND	<0.05
Mercury	0.002	0.005	<0.001	ND	<0.001
Selenium	0.01	0.03	<0.01	ND	<0.01

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TABLE 6.36 (Continued)

Constituent[a]	Florida[b] Criteria	Assumed[c] Concentration in Leachate	Background[d] Concentrations in Ground Water	Estimated Increase[e] in Concentrations at Property Boundary	Estimated Ground[f] Water Quality at Property Boundary
Silver	0.05	0.034	<0.01	ND	<0.01
Zinc	NS	0.80	0.08	ND	0.08
Oil & Grease	NS	40	NA	ND	--
Total Dissolved Solids	NS[h]	2300	164	52	216

[a]Concentrations given in mg/liter.

[b]Criteria applicable to ground water in Florida (Class I-B).

[c]Concentrations do not include background concentrations.

[d]Based upon average at monitoring well No. 3.

[e]Property boundary assumed to be approximately 2200 feet from percolation field.

[f]Background quality plus estimated increase in concentrations.

[g]If background levels exceed 1.5 mg/liter, the criteria must not be exceeded.

[h]Class I-B waters are classified as having less than 10,000 mg/liter total dissolved solids.

NA = not analyzed.

NS = no standard.

ND = constituent did not reach property boundary.

TABLE 6.37

COMPARISON OF WATER QUALITY CRITERIA WITH ESTIMATED GROUND WATER QUALITY AT PROPERTY BOUNDARY (Dredge Disposal Area)

Constituent[a]	Florida[b] Criteria	Concentration St. Johns River	Concentration in St. Johns Bottom Sediments (mg/kg)	Assumed[c] Leachate Concentration	Concentrations[d] in Ground Water	Estimated[e] Increase in Concentrations at Property Boundary	Estimated[f] Concentrations at Property Boundary
Chloride	NS	120-400		400	8.4	16	24
Sulfate	NS	1.79-114		114	8.6	4.8	13.4
Cadmium	0.01	0-0.006		0.006	0.007	ND	0.007
Mercury	0.002	0.0005		0.0005	<0.001	ND	<0.001
Lead	0.05	0-0.074		0.074	0.014	ND	0.014
Zinc	NS	0-0.07		0.07	0.08	ND	0.08
Phenols	NS	<0.001	<0.02 - 27.0	3.8	<0.001	0.0009	<0.0019
Lindane	0.004	0	0.002 - 0.023	0.0033	NA	0.0000005	∿0.0000005
Heptachlor Epoxide	NS	NA	0.002 - 0.029	0.0041	NA	0.0000009	∿0.0000009
Dieldrin	NS	NA	<0.001 - 0.022	0.0031	NA	0.0000007	∿0.0000007
Aldrin	NS	0	0.006 - 0.280	0.04	NA	0.000009	∿0.000009

[a]Concentrations in mg/liter unless otherwise noted.

[b]Criteria applicable to ground water in Florida (Class I-B).

[c] Concentrations do not include background concentrations.

[d]Based on data from monitoring well No. 3.

[e]Property boundary assumed to be 500 feet from disposal area.

[f]Background concentrations plus estimated increase in concentrations.

NS - no standard applicable.

NA - not analyzed.

ND - constituent did not reach property boundary.

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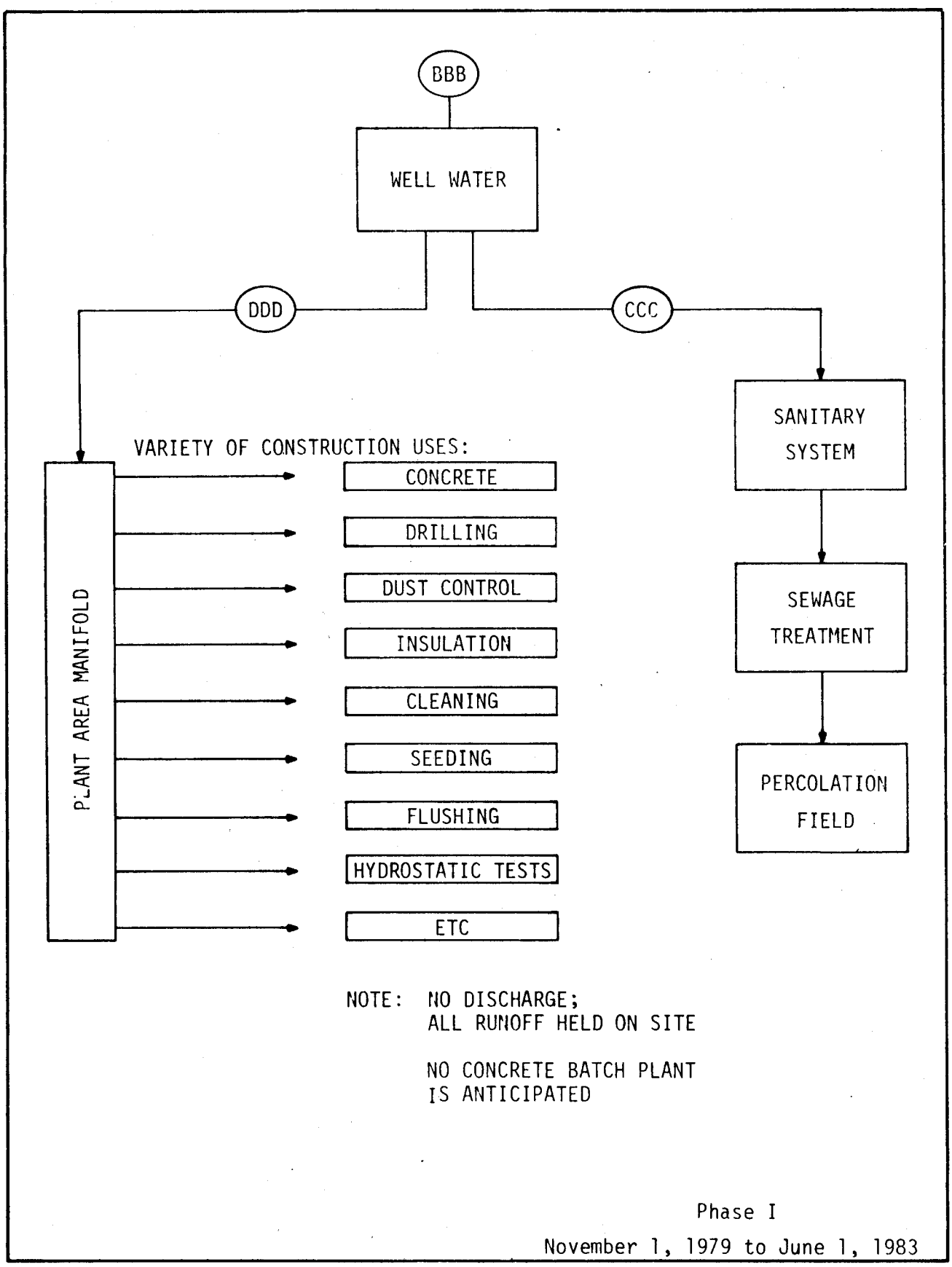

Figure F6.1 Schematic of Water Flow: Unit 1 Construction,
Seminole Electric, Putnam Station
Steam Electric Generating. Nov. 1, 1978

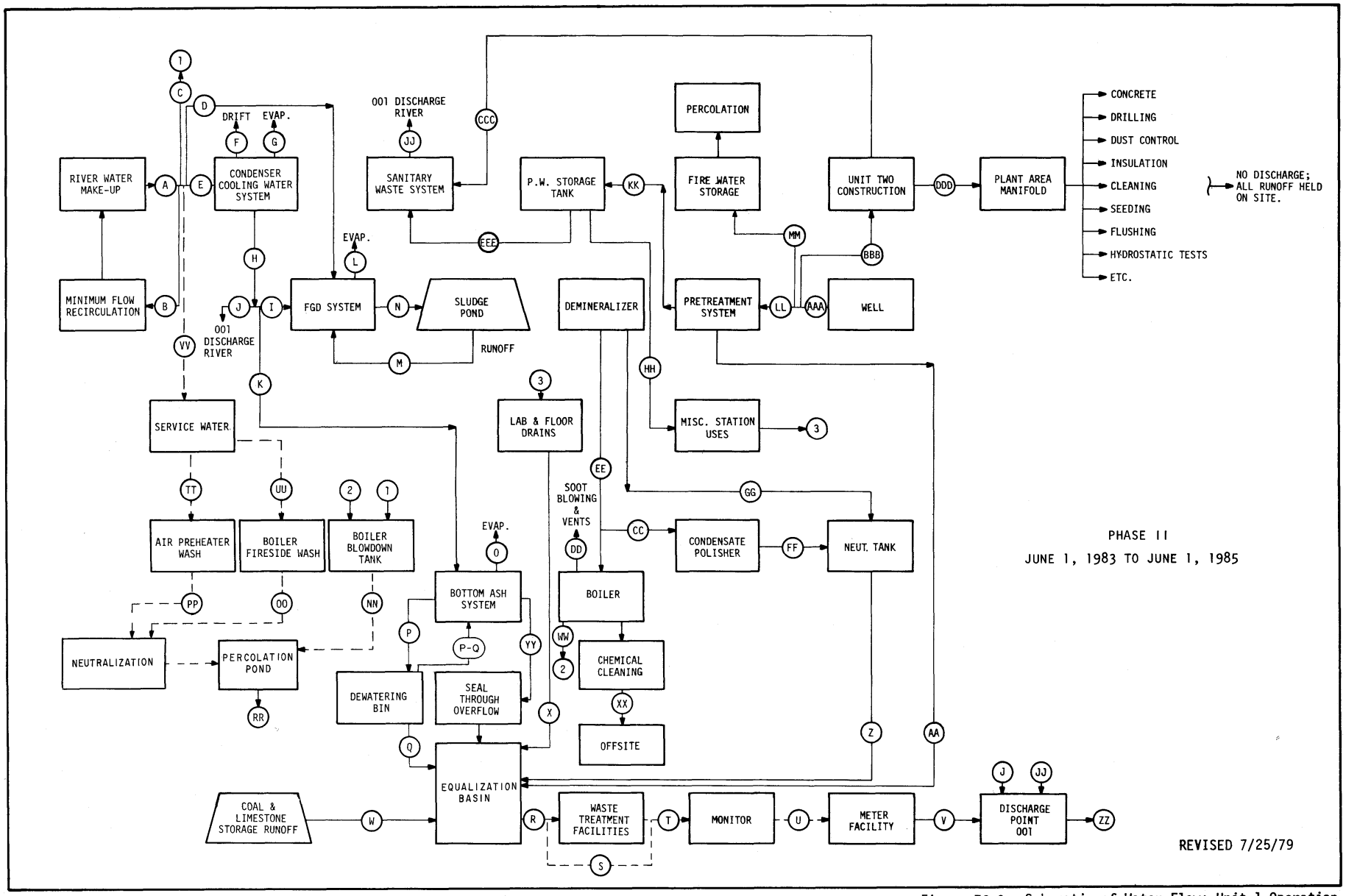

Figure F6.2 Schematic of Water Flow: Unit 1 Operation, Unit 2 Construction
Seminole Electric, Putnam Station
Steam Electric Generating.

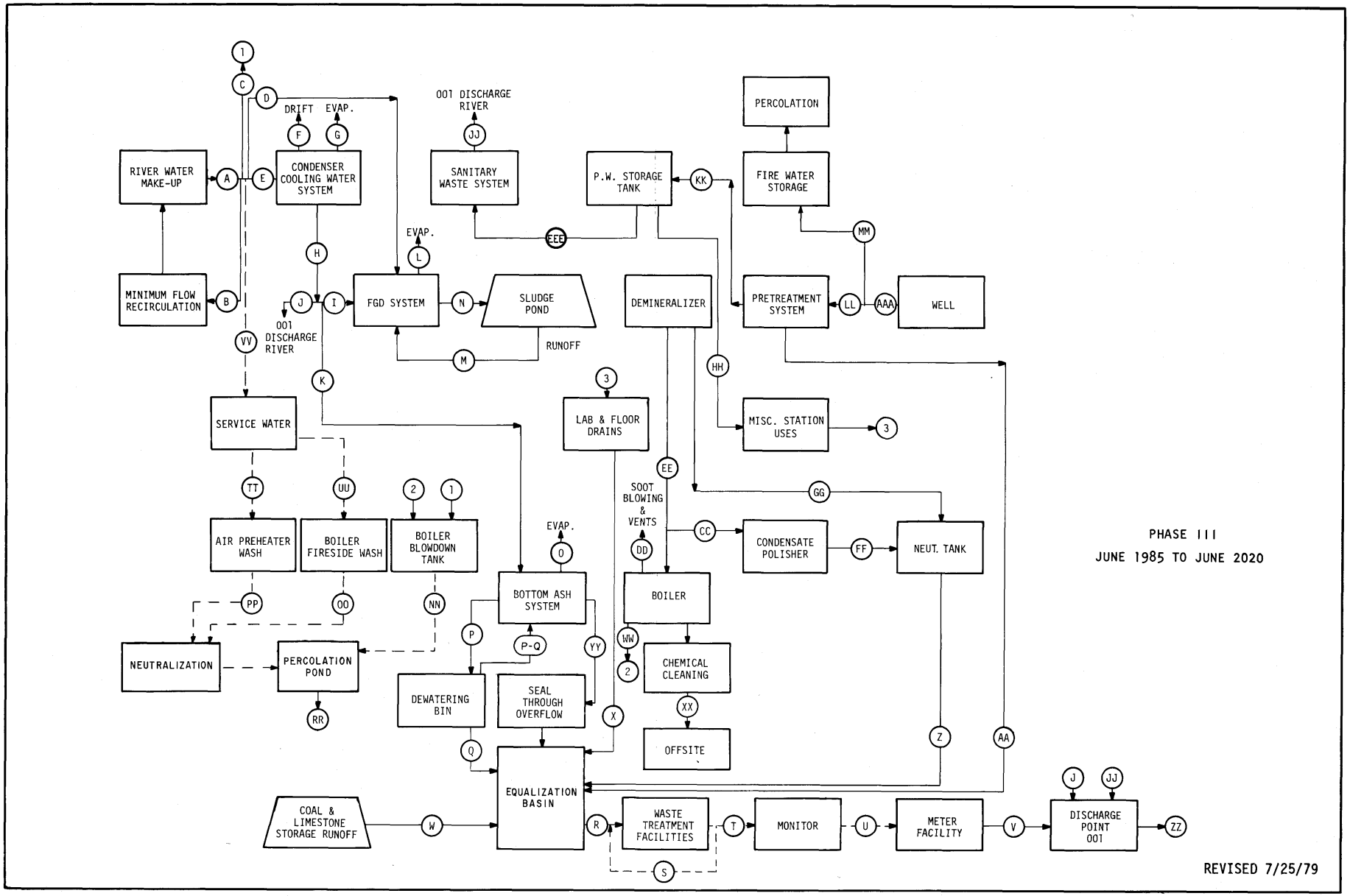

Figure F6.3 Schematic of Water Flow: Units 1 and 2, Seminole Electric, Putnam Station Steam Electric Generating.

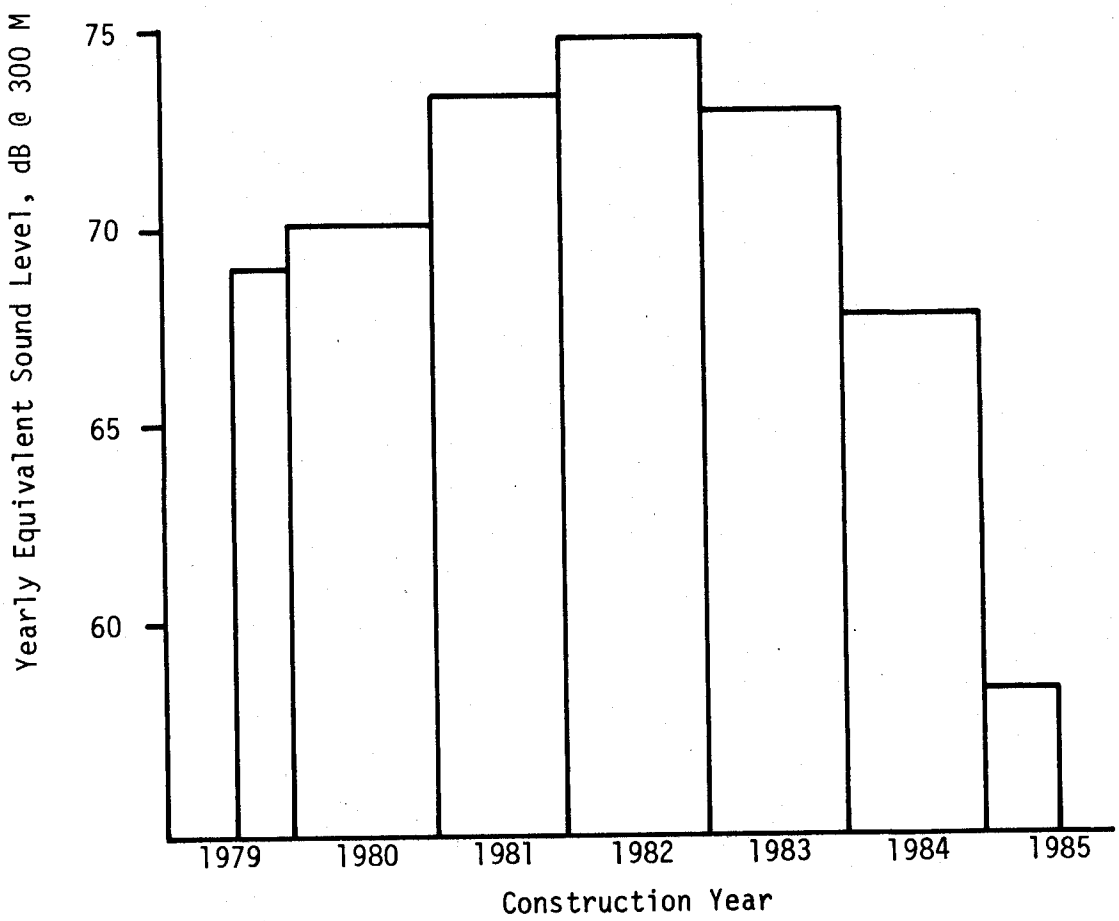

Figure F6.4 Yearly Equivalent Sound Levels.

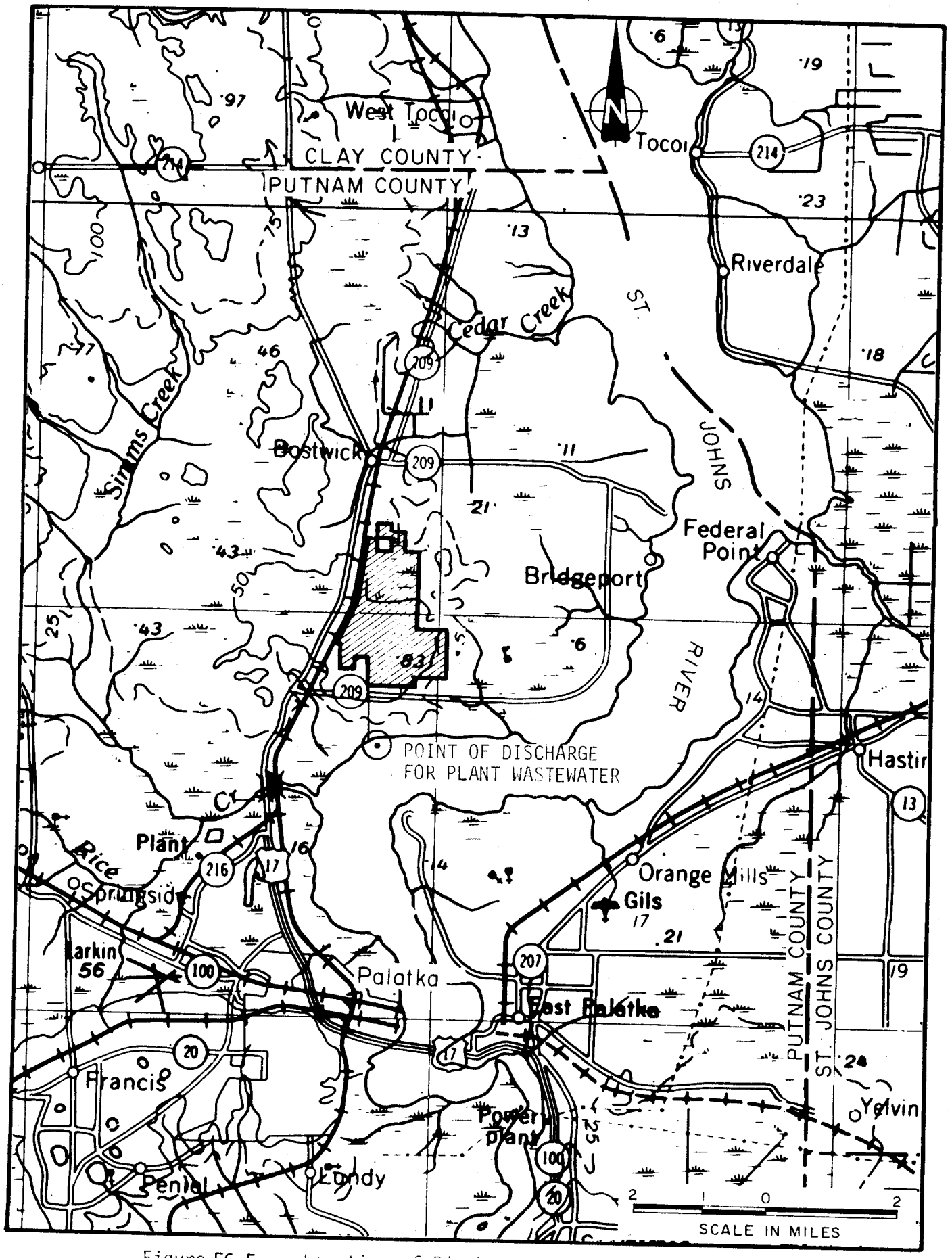

Figure F6.5 Location of Discharge for Plant Wastewater.

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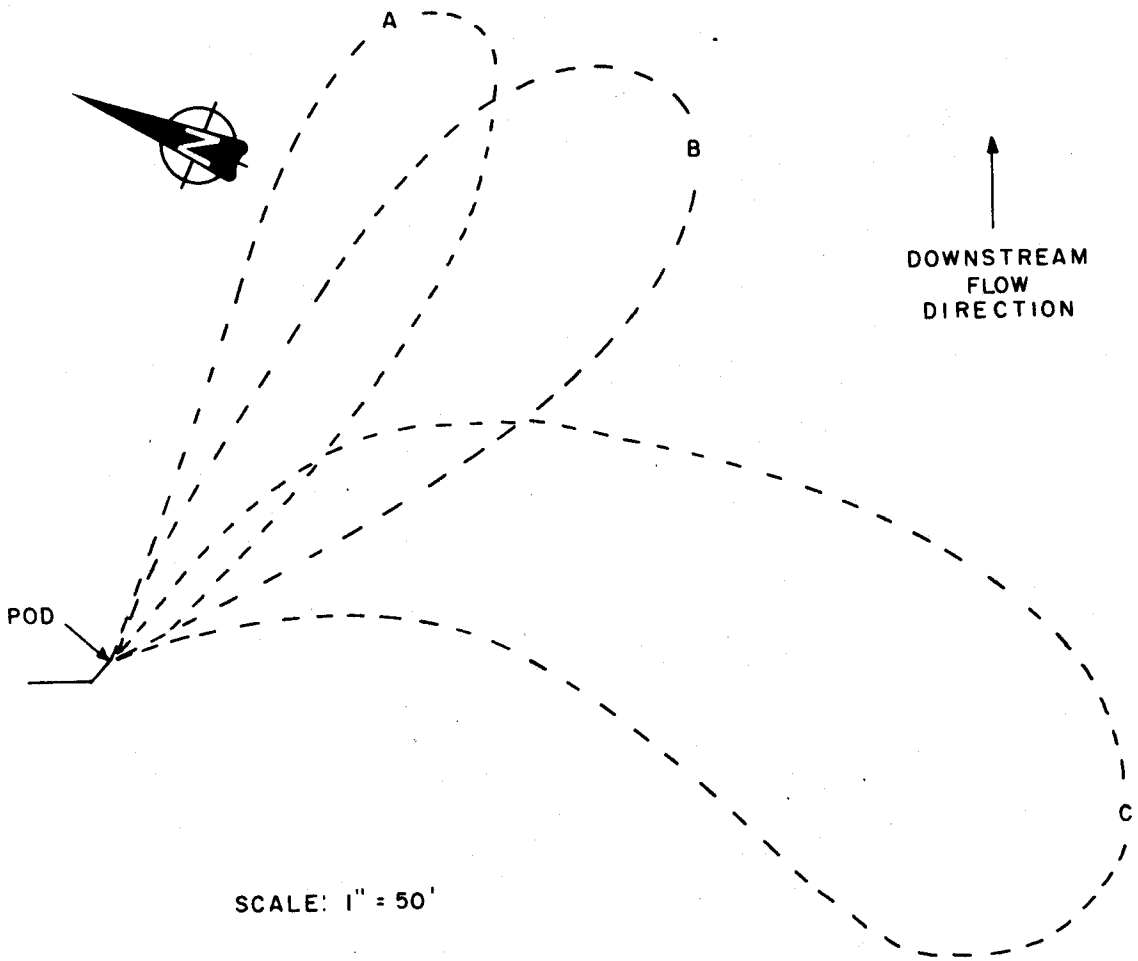


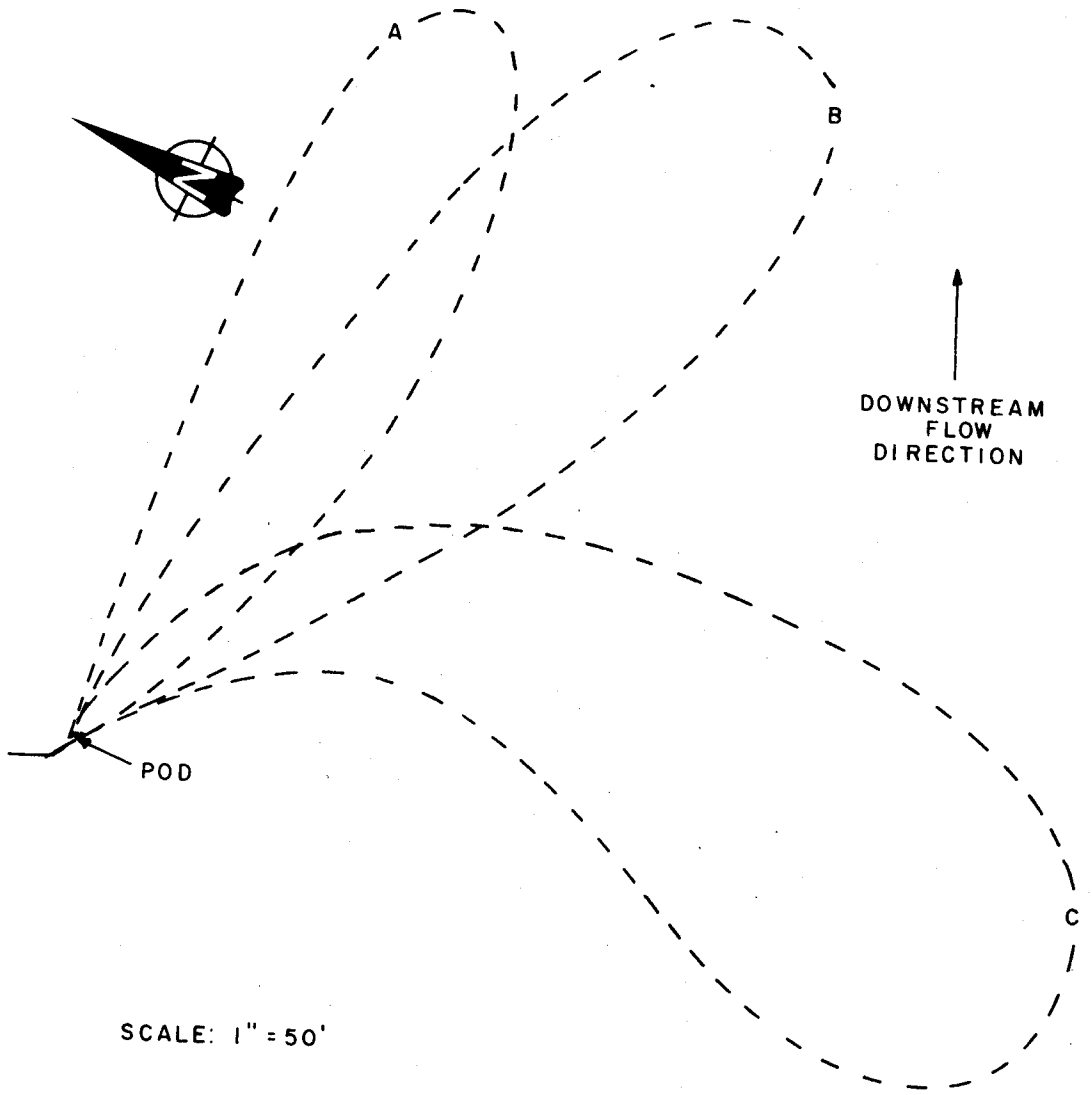
ISOTHERM	ΔT REMAINING (°F)	AREA (SQ. FT.)	AMBIENT VELOCITY (FT/SEC)
A	1.0	7000	+0.2
B	1.0	9000	0.0
C	1.0	16000	-0.2

AMBIENT TEMPERATURE = 59°F

WASTEWATER TEMPERATURE = 86°F

NOTE: FOR MORE DETAIL ON THE NEAR-FIELD THERMAL ASSESSMENT SEE APPENDIX C, SECTION C.3.4.

Figure F6.6 Near-Field Thermal Assessment, Winter Conditions. REVISED 3/15/79



ISOTHERM	°F TEMPERATURE	AREA (SQ. FT.)	AMBIENT VELOCITY (FT/SEC)
A	90.1	9500	+ 0.2 DOWNSTREAM
B	90.1	13000	0.0
C	90.1	16000	- 0.2 UPSTREAM

AMBIENT TEMPERATURE = 90°
WASTEWATER TEMPERATURE = 93°F

NOTE: FOR MORE DETAIL ON THE NEAR-FIELD THERMAL ASSESSMENT SEE APPENDIX C, SECTION C.3.4.

Figure F6.7 Near-Field Thermal Assessment, Summer Conditions. REVISED 3/15/79

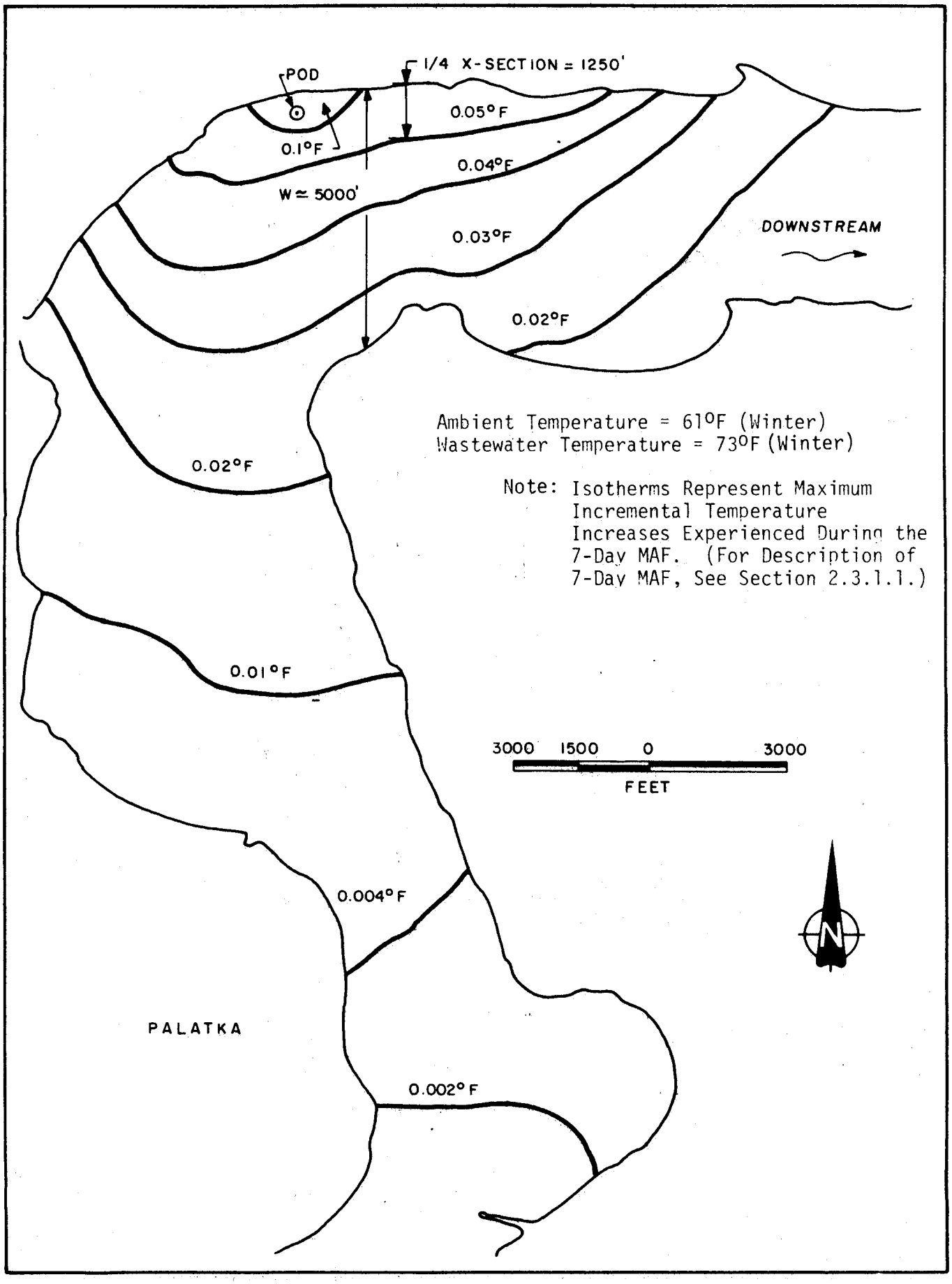
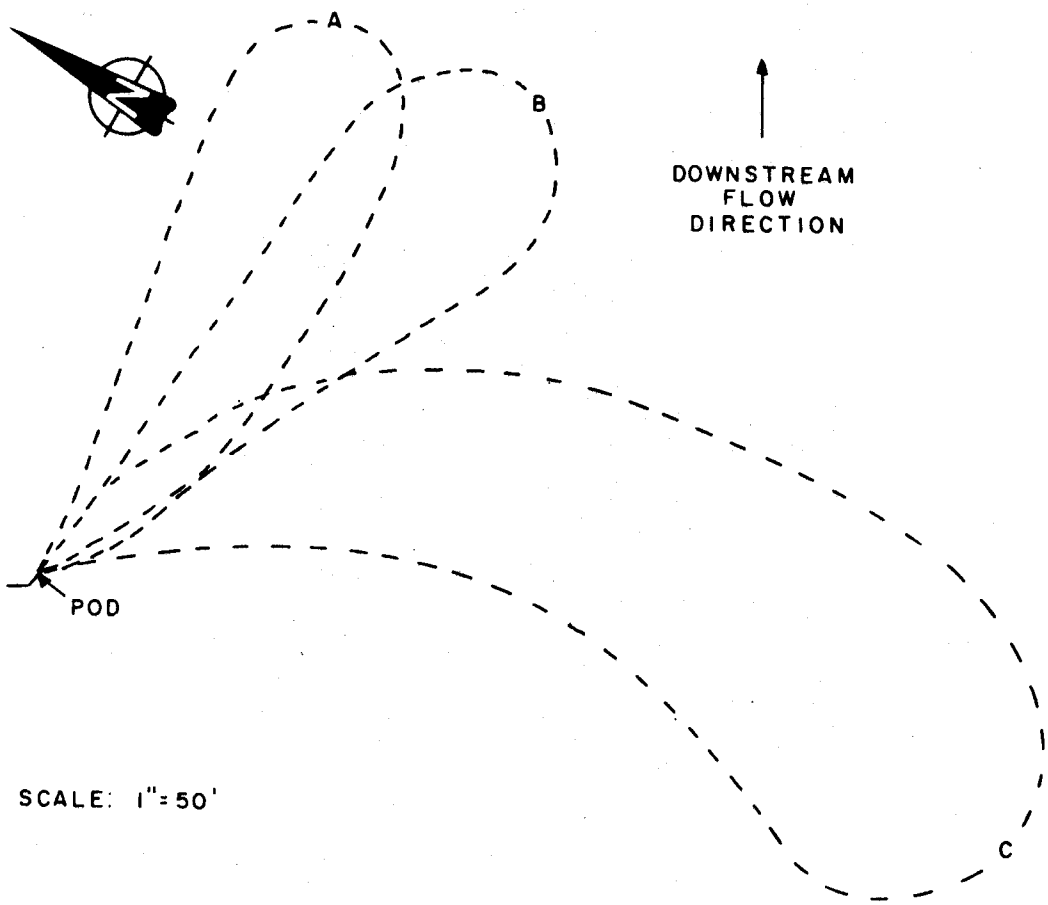


Figure F6.8 Thermal Impacts-Far Field Analysis. REVISED 3/15/79



ISOPLETH	% OF ORIGINAL EXCESS REMAINING @ ISOPLETH	AREA (FT^2)	AMBIENT VELOCITY (FT/SEC)
A	4	5600	+0.2 DOWNSTREAM
B	4	7000	0.0
C	4	15000	-0.2 UPSTREAM

Figure F6.9 Conservative Substance Isopleths, Near-Field Assessment.

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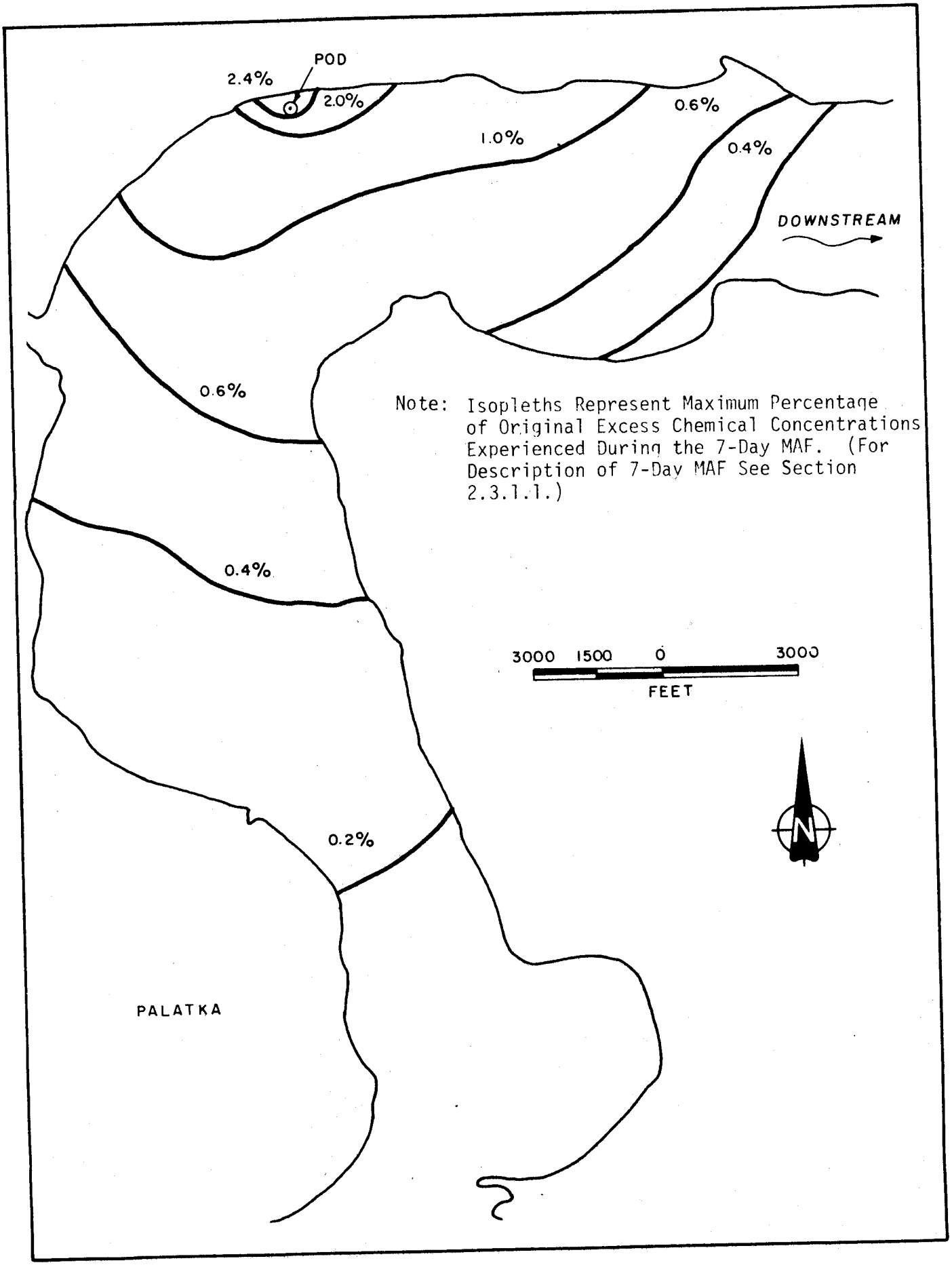

Figure F6.10 Chemical Impacts-Far Field Analysis.

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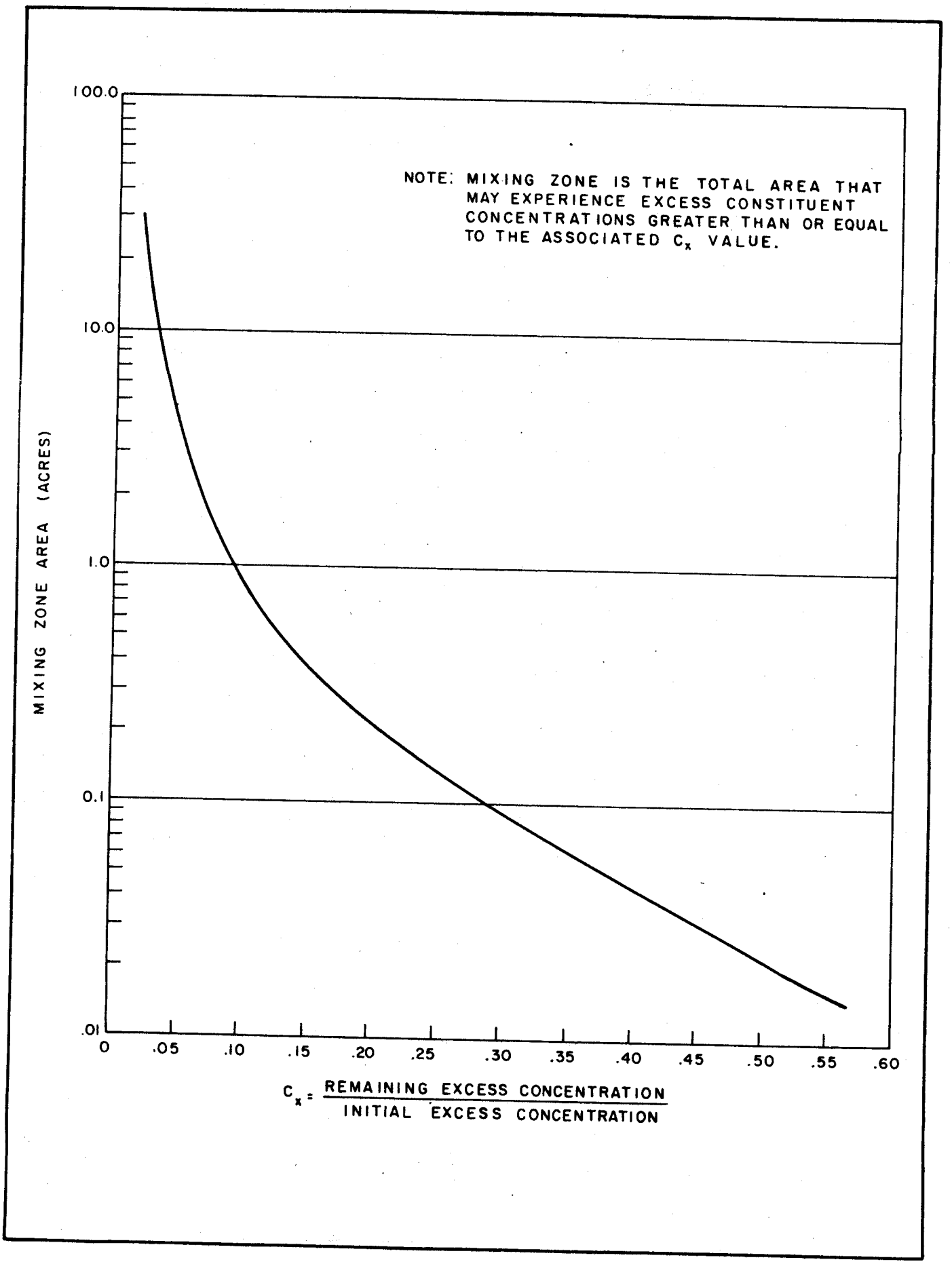

Figure F6.11 Remaining Excess Constituent Concentration Versus Mixing Zone.

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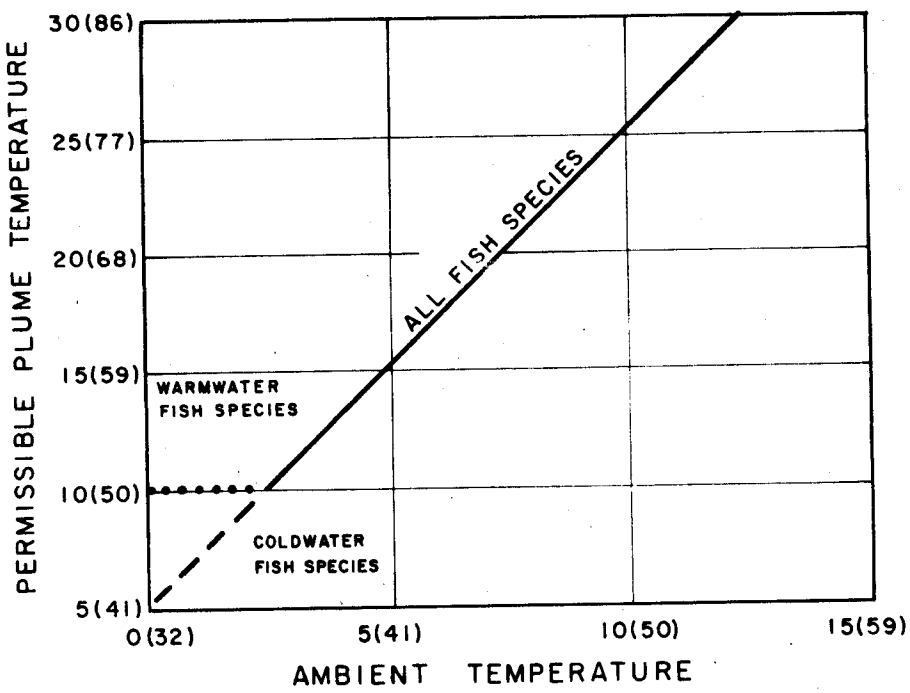

Source: USEPA, 1976.

Figure F6.12 Nomograph to estimate maximum winter weekly average permissible temperature of plumes for various ambient temperatures, °C (°F).

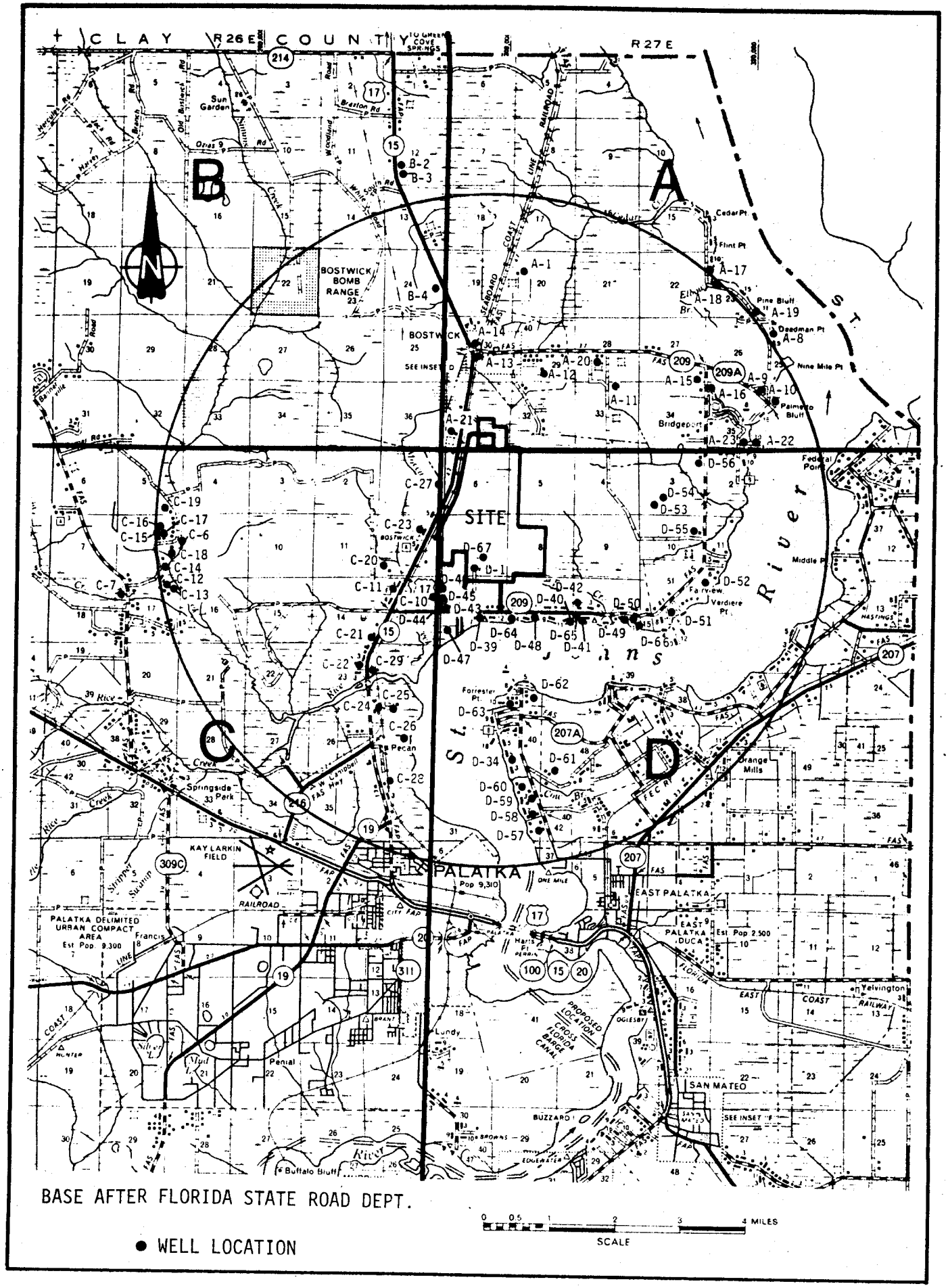

Figure F6.13 Location Map Dames & Moore Field Inventory.

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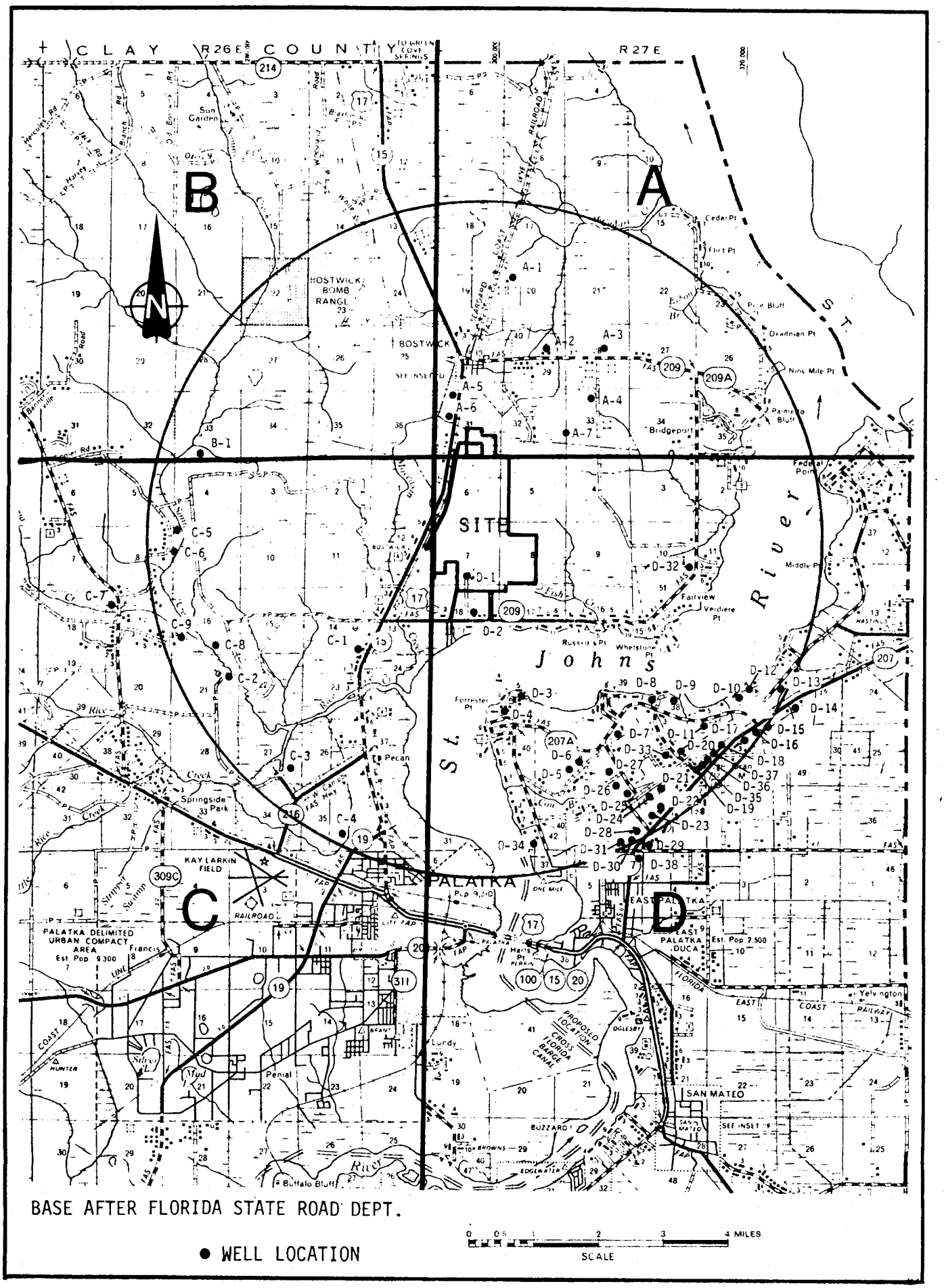

BASE AFTER FLORIDA STATE ROAD DEPT.

● WELL LOCATION

0 0.5 1 2 3 4 MILES
SCALE

Figure F6.14 Location Map USGS Inventory.

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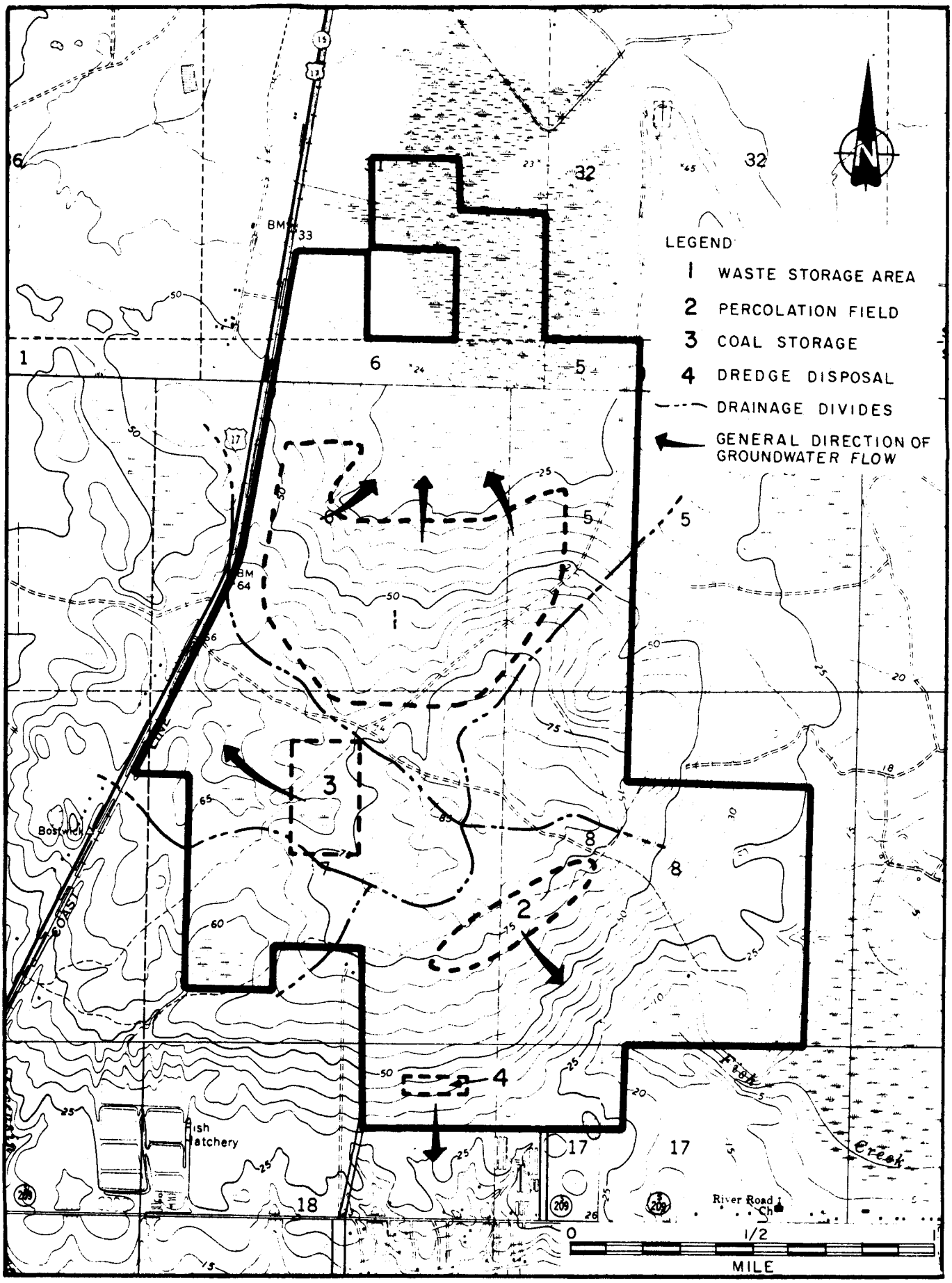

Figure F6.15 Generalized Directions of Groundwater Flow with Respect to Disposal and Storage Areas.

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7.0 COORDINATION

7.1 Permits, Approvals and Actions Required to Construct and Operate the Project

7.1.1 Status of Permits and Approvals

The licensing of a coal-fired steam electric power generating station requires compliance or conformance with numerous local, state, and federal laws, regulations, and ordinances. These may impose procedural as well as substantive requirements, and may mandate performance standards, limitations, consistency reviews, agency approvals, and interagency coordination. Table 7.1, Status of Permits and Approvals, identifies specific licensing, permitting, and approval actions and the schedule of such actions necessary for timely licensing of the proposed power station. Figure F7.1 presents a Master Permit Schedule which identifies the sequencing of the major permitting actions: site certification appliation, environmental analysis, National Pollutant Discharge Elimination System permit application, Prevention of Significant Deterioration permit application, and applications for construction in navigable waters and wetlands. Environmental permits are scheduled to be granted prior to final loan approval by the Rural Electrification Administration.

7.1.2 Status of Compliance with Other Related Statutory Requirements

In addition to statutory and regulatory requirements related to issuing permits and granting approvals, there are other statutory requirements having special relevance to NEPA. Seminole's status in conforming to other statutory requirements is discussed in this section.

National Energy Act. The National Energy Act of 1978 consists of five separate pieces of legislation:

- National Energy Conservation Policy Act of 1978 (NECPA);
- Powerplant and Industrial Fuel Use Act of 1978 (FUA);
- Public Utility Regulatory Policy Act of 1978;
- Energy Tax Act of 1978; and
- Natural Gas Act of 1978

This section discusses the applicability to Seminole Electric Cooperative, Inc., of (1) the National Energy Conservation Policy Act and (2) rules proposed by the U.S. Department of Energy to implement the Powerplant and Industrial Fuel Use Act.

National Energy Conservation Policy Act. The National Energy Conservation Policy Act of 1978 contains provisions that are applicable to electric utility companies that meet specific requirements. These provisions are contained in the Act at Part 1 of Title II and Part 4 of Title VI.

Part 1 of Title II contains provisions to effect residential energy conservation by requiring, through state residential energy conservation plans, that each

"public utility" implement a utility program. A "public utility" is defined as:

> ...any person, State agency or Federal agency which is engaged in the business of selling natural gas or electric energy...to residential customers for use in a residential building.

Because Seminole Electric Cooperative, Inc., does not sell electric energy directly to residential customers, it is not, by DOE's definition, a public utility. Therefore, Seminole is not subject to the requirements of Part 1 of the Act, including the implementation of a utility program.

Nevertheless, Seminole is working with REA, member cooperatives, and other state electrical utilities to develop and implement a residential energy conservation plan.

Part 4 of Title VI, section 661, amends the Energy Policy and Conservation Act to incorporate, with one modification, the provisions of section 125 of the Clean Air Act that require the use of locally or regionally available coal or coal derivatives if such use is determined by the proper authorities to be necessary in order to minimize significant local or regional economic disruption or unemployment that would result from the use of other than locally or regionally available coal, petroleum products or natural gas.

Seminole Electric Cooperative, Inc., has negotiated a long-term purchase agreement to obtain supplies of Western Kentucky and/or Illinois coal for use in its Seminole Plant. In addition to coal, relatively small amounts of No. 2 oil will be burned during startup and for low load flame stabilization. Seminole does not anticipate that a change in fuel supplies will be required in order to minimize local or regional economic disruption or unemployment. If, however, the use of other supplies of fuel were determined to be necessary by the proper authorities, Seminole Electric Cooperative, Inc., would act in accordance with the legal requirements of section 125 of the Clean Air Act and section 107 of the Energy Policy and Conservation Act.

Powerplant and Industrial Fuel Use Act. The primary purpose of the Powerplant and Industrial Fuel Use Act of 1978 is to minimize the use of petroleum and natural gas in industrial and electric utility boilers. To accomplish this purpose, the FUA prohibits, except for exemptions which may be granted by DOE, the use of petroleum and natural gas by new electric utility powerplants.

The Economic Regulatory Administration (ERA) of DOE has recently proposed rules at 43 Fed. Reg. 53974-54061 (November 16, 1978) to implement the FUA. If promulgated as proposed, these rules would classify Seminole Plant Units No. 1 and 2 as a "new electric powerplant" [see proposed section 500.2(a)(51)], and thus subject to the applicable provisions of final rules promulgated by DOE.

Section 503.2 of the ERA/DOE proposed rules would impose prohibitions on (1) the use of petroleum or natural gas as a primary energy source in any new electric powerplant and (2) the construction of any new electric powerplant without the capability to use an alternate fuel as a primary source.

According to proposed section 500.2(a)(66), "primary energy source" means:

> ...the fuel or fuels used for normal operation by any existing or new electric powerplant...except... [m]inimum amounts of fuel required for unit ignition, startup, testing, flame stabilization and control use.... (Emphasis added.)

"Alternate fuel" is defined in proposed Section 500.2(a)(7) as "electricity of any fuel other than natural gas or petroleum. The term [alternate fuel] includes...coal...."

Seminole Electric Cooperative, Inc., will burn coal, an alternate fuel, as its primary energy source. Only small amounts of No. 2 oil will be burned for initial lightoff and during low load flame stabilization. Consequently, the prohibitions of section 503.2 of the FUA does not apply to Seminole Power Plant Units No. 1 and 2.

National Historic Preservation Act and Executive Order 11593. The National Historic Preservation Act of 1966, Executive Order 11593: Protection and Enhancement of the Cultural Environment, and other related Acts are implemented by 36 CFR 800, "Procedures for the Protection of Historic and Cultural Properties."

To assure the protection of historic and cultural properties, a survey was conducted to locate, identify, and assess the cultural resources that might exist on Seminole's Putnam site. Conducted in accordance with 36 CFR 800, this survey included archaeological field work; a review of previously known site locations recorded in the literature and in the Florida Master File: and a study of historic documents (federal and state land records, published historical studies, Spanish land grants, historical maps and plots, and county property and tax records).

The survey revealed the existence of no properties on the Putnam site that would be considered of National Register importance. Moreover, the nearest National Register properties are located in Palatka,approximately 5 miles south of the site. (October 23, 1978 letter from Mr. L. Ross Morrell, Deputy State Historic Preservation Officer to Mr. Tim Doyle, Dames & Moore, re: Cultural Resource Assessment of Seminole Electric Cooperative, Proposed Generating Facility Putnam County, Florida. By letter dated June 21, 1979, the State Historic Preservation Officer concluded that there were no sites listed or eligible for listing on the National Register on the three transmission corridors.) If during construction, previously unidentified sites listed or eligible for listing in the National Register are exposed, all earth moving activities in the vicinity will cease and the State Historic Preservation Officer notified. Activities may be reinitiated upon approval of the State Historic Preservation Officer.

Coastal Zone Management Act. The Coastal Zone Management Act of 1972 encourages the states to develop and implement coastal zone management programs to achieve wise use of the nation's coastal zone.

Currently, the State of Florida is in the process of developing its own coastal zone management program. Responsibilities for administering and implementing the State program have been delegated to the Florida Department of Environmental Regulation.

In accordance with the Florida Coastal Management Act of 1978, the Florida Coastal Zone Management Program will be based entirely on existing statutes and rules. Because Seminole Electric Cooperative, Inc., has complied with applicable existing statutes and rules, Seminole Plant Units No. 1 and 2 will comply with the provisions of the Florida Coastal Zone Management Program after the program has been adopted. In the event that the state program imposes additional requirements on the Seminole Plant, Seminole Electric Cooperative, Inc., will take appropriate actions to comply with such requirements.

Endangered Species Act. The Endangered Species Act of 1973 *as amended* mandates that federal agencies seek to conserve endangered and threatened species. Pursuant to this statutory responsibility, REA requested that the U.S. Fish and Wildlife Service (USFWS) and National Marine Fisheries Service provide information concerning whether any plant or animal species listed or proposed to be listed as a federal threatened or endangered species may be present in the area of the proposed Putnam site or associated transmission corridors. On January 11, 1979, REA requested by letter to the U.S. Fish and Wildlife Service, that Section 7 Consultation be initiated. The USFWS provided information on the distribution of listed species in the area and the REA submitted a biological assessment in accordance with Section 7(c) of the Act. On the basis of the biological assessment, REA has determined that the proposed plant and three associated transmission lines will not adversely impact any federally listed species, those eligible for listing or critical habitat. By letters dated January 19, 1979 from the National Marine Fisheries Service and April 5, 1979 and July 19, 1979 from the U.S. Fish and Wildlife Service, both agencies reached the same conclusion.

Fish and Wildlife Coordination Act. The Fish and Wildlife Coordination Act requires that the U.S. Fish and Wildlife Service and state wildlife agency participate in the review of permit applications for activities that would cause any body of water to be modified.

The Field, Area and/or Regional Offices of the U.S. Fish and Wildlife Service and the Florida Game and Fresh Water Fish Commission have participated in the licensing process of the proposed Seminole Units No. 1 and 2 since the initial stages of the project in early 1977.

Wild and Scenic Rivers Act. The Wild and Scenic Rivers Act establishes the policy of the United States that certain rivers of the nation, which "...possess outstanding remarkable scenic, recreational, geologic, fish and wildlife, historic, cultural or other similar values, shall be preserved in free-flowing condition, and that they and their immediate environments shall be protected for the benefit of future generations."

Throughout the process of evaluating alternative sites and in its selection of a preferred site, Seminole has considered the existence of wild and scenic rivers and those potential additions to the wild and scenic rivers system. No rivers of this designation or proposed for this designation occur within the region of the preferred site or would otherwise be impacted by construction or operation of the proposed site.

Executive Order 11990: Protection of Wetlands. Executive Order 11990: Protection of Wetlands directs each federal agency to:

> ...take action to minimize the destruction, loss or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands in carrying out the agency's responsibilities for ...(2) providing Federally undertaken, financed, or assisted construction and improvements; and (3) conducting Federal activities and programs affecting land use, including but not limited to water and related land resource planning, regulating and licensing activities.

Specifically, the direction is to be carried out in furtherance of Section 101(b)(3) of the National Environmental Policy Act of 1969 and, to the extent possible, follow the procedures of the Council on Environmental Quality and Water Resources Council.

Seminole Electric Cooperative, Inc. has incorporated the guidance of the Council on Environmental Quality and the Water Resources Council in its planning activities and coordinated closely with both state and federal agencies whose responsibilities are to manage wetland resources. See discussion in Section 2.5.3.3 for REA's findings on wetlands.

Executive Order 11988: Floodplain Management. Executive Order 11988: Floodplain Management, directs that each federal agency:

> ...shall take action to reduce the risk of flood loss, to minimize the impact of floods on human safety, health and welfare, and to restore and preserve the natural and beneficial values served by floodplains in carrying out its responsibilities for...(2) providing Federally undertaken, financed or assisted construction and improvements; and (3) conducting Federal activities and programs affecting land use, including but not limited to water and related land resources planning, regulating and licensing activities.

To implement this directive, the agency must, before taking action, determine whether the proposed action will occur in a flood plain. If, the agency determines to, or proposes to, conduct, support, or allow an action to be located in a flood plain, the agency shall evaluate the action, considering alternatives to avoid adverse effects and incompatible development in the floodplains. The Water Resources Council has developed guidelines for implementing Executive Order 11988, published in the Federal Register Vol. 43, No. 29: February 10, 1978.

Seminole Electric Cooperative, Inc., has planned the location of its proposed facilities with respect to the 100-year and 500-year floodplains. While the 100-year floodplain is shown to infringe upon the site property, no structures, embankments, or fill are planned to be placed in the 100-year floodplain. None of the principal plant equipment (critical to the operation of the plant) is located within the 500-year floodplain. (The intake structure, by nature of its function, is an exception.) See Section 2.5.3.3 for REA's findings on floodplains. Portions of preferred transmission corridors of Routes 1, 2, and 3 will be located in floodplains. REA has determined that there is no practicable alternative that will avoid floodplains.

Secretary's Memorandum No. 1827 Revised: Statement on Land Use Policy. The Secretary's Memorandum No. 1827 Revised: Statement on Land Use Policy expresses concern for the continued loss of lands well suited to the production of food, forage, fiber, and timber, and the degradation of the environment resulting from those losses. Consequently, major consideration must be given to important farm, range and forest lands and the long-range need to retain the productive capability and environmental values of American agriculture and forestry.

The Secretary's Memorandum sets policy requiring, where federal funds are involved, that Department of Agriculture personnel carefully explore land use alternatives which would minimize impacts on important farm, range and forest lands, and, where possible, avoid land use decisions which irrevocably commit important lands to non-farmland, non-range land uses, thereby foreclosing the options of future generations.

Seminole Electric Cooperative, Inc., has considered the potential presence of important farm, range and forest lands in evaluations of land use on the proposed site. Although some Prime agricultural land could exist in all transmission line corridors, no significant impact will occur that will prevent continued use of these lands for agricultural purposes. REA has determined that the project will not significantly affect important Farmlands and Forestlands or Prime Rangelands.

7.2 List of Agencies, Organizations, and Persons to Whom Copies of the Draft and Final Environmental Impact Statement Have Been Sent:

Copies of the Final Environmental Impact Statement including the Appendices have been sent to the following agencies, organizations, and persons.

Environmental Protection Agency (7)

Room 537, West Tower
401 M Street, S.W.
Washington, D.C. 20202

Regional Administrator (7)
EPA - Region IV
345 Courtland Street, N.E.
Atlanta, Georgia 30308

State Agencies

Bureau of Intergovernmental
Relations (20)
Division of State Planning
Department of Administration
660 Apalachee Parkway
Tallahassee, Florida 32304

North Central Florida Regional
Planning Council (2)
Executive Director
2002 N.W. 13th Street
Gainesville, Florida 32601

Northeast Florida Regional
Planning Council (2)
Executive Director
8641 Baypine Road, Suite 9
Jacksonville, Florida 32216

Tampa Bay Regional Planning Council (2)
Executive Director
3151 Third Avenue North
St. Petersburg, Florida 33713

Withlacoochee Regional Planning Council (2)
Executive Director
P.O. Box 335
Silver Springs, Florida 32688

State Conservationist (1)

Soil Conservation Service
Federal Building
P.O. Box 1208
Gainesville, Florida 32601

Florida Game and Freshwater Fish Commission (1)

P.O. Box 1903
Eutis, Florida 32726

Environmental Specialist (1)
Farris Bryant Building
620 South Meridian Street
Tallahassee, Florida 32304

State Historic Preservation Officer (1)

Director, Division of Archives, History, and Records Management
Department of State
401 East Gaines Street
Tallahassee, Florida 32304

Florida Department of Environmental Regulation (15)

Division of Environmental Permitting
2600 Blairstone Road
Tallahassee, Florida 32301

State of Florida Department of Administration (1)

Division of State Planning
660 Apalachee Parkway
Tallahassee, Florida 32304

State of Florida Department of State (1)

The Capitol
Tallahassee, Florida 32304

St. Johns River Water Management District (1)

Executive Director
Route 2
P.O. Box 659
Palatka, Florida 32077

Suwannee River Water Management District (1)

P.O. Box K
Bridge Street
White Springs, Florida 32096

Florida Public Service Commission (1)

Engineering Department
700 South Adams Street
Tallahassee, Florida 32304

FEDERAL AGENCIES

Department of the Interior (20)

Assistant Secretary - Program Development
and Budget
Director, Office of Environmental
Project Review
Department of the Interior
Washington, D.C. 20240

U.S. Fish and Wildlife Service (2)
Regional Director
17 Executive Park Drive, N.E.
Atlanta, Georgia 30329

Federal Energy Regulatory Commission (2)

Commission's Advisor on Environmental Quality
Federal Energy Regulatory Commission
825 North Capitol Street, N.E.
Washington, D.C. 20426

Federal Aviation Administration (1)

Office of Environmental Quality
AEQ-100
800 Independence Avenue, S.W.
Washington, D.C. 20591

Department of Health, Education and Welfare (1)

Director, Office of Environmental Affairs
Room 4740, HEW North
Washington, D.C. 20202

Department of Agriculture
(Washington, D.C. 20250)

Deputy Chief (2)
Forest Service
Room 3029, S. Bldg.

Assistant Administrator (1)
National Programs Staff
Agricultural Research Service

Director, National Resource (1)
Economic Research Service
Economics Division, Room 412
Bldg. 500 12th Street, S.W.

Coordinator (1)
Environmental Quality Activities
Office of the Secretary
Room 359a
Administration Building

Administrator (1)
Soil Conservation Service
Room 5105 South Building

Department of Energy (12)

Director of NEPA Affairs
Mail Station E-201, GTN
Germantown, Maryland 20545

Department of Commerce (1)

Economic Development Administration
Special Assistant for the Environment
Washington, D.C. 20230

National Marine Fisheries Service (2)
Regional Director
Duval Building
9450 Koger Boulevard
St. Petersburg, Florida 33702

Energy Research and Development Adm. (1)

Office of Environmental Assessments
ERDA - Mail Stop E-201
Washington, D.C. 20545

Department of the Army (2)

Chief of Engineering Division
U.S. Army Corps of Engineers
Jacksonville District
P.O. Box 4970
Jacksonville, Florida 32201

Federal Highway Administration (1)

Director, Office of Environmental Quality
Room 3226, Nassif Building
Washington, D.C. 20590

Department of Transportation (1)

Haydon Burns Building
605 Suwannee Street
Tallahassee, Florida 32301

Putnam County Soil Conservation Service (1)

P.O. Box 520
Palatka, Florida 32077

Other Groups

Seminole Electric Cooperative, Inc. (2)
2410 E. Busch Blvd., Suite 108
Tampa, Florida 33612

Dames & Moore (2)
Suite 200
455 East Paces Ferry Road
Atlanta, Georgia 30305

The Environmental Licensing Group, Inc. (1)
Post Office Box 12269
Pensacola, Florida 32581

Sierra Club (1)
1601 North West 35th Way
Gainesville, Florida 32605

Audubon Society (1)
5305 Isabelle Drive
Tallahassee, Florida 32301

Sumter County Court House (1)
Florida County Commissioner
Court House
Busnell, Florida 33513

Board of Putnam County Commissioners (1)
P.O. Box 1486
Palatka, Florida 32077

Board of St. Johns County Commissioners
P.O. Drawer 300
St. Augustine, Florida 32084

Libraries

Tampa Main Library (1)
900 North Ashaly Street
Tampa, Florida 33601

Sumter County Public Library (1)
Busnell, Florida 33513

Palatka Main Library (1)
216 Reid Street
Palatka, Florida 32077

Central Florida Regional Library (1)
15 Southeast Osceola Avenue
Ocala, Florida 32670

Clay County Public Library (1)
57 West Ferris Street
P.O. Box 248
Green Cove Springs, Florida 32043

Bradford County Public Library (1)
105 E. Jackson Street
Starke, Florida 32091

Suwannee River Regional Library (1)
Seven County Regional Branch
Pine Avenue
Live Oak, Florida 32060

St. Johns County Library
12 Aniles Street
St. Augustine, Florida 32084

7.3 Coordination Among Local, State and Federal Agencies and the Public

From the initiation of the NEPA process, the Rural Electrification Administration has encouraged the applicant to conduct its activities and interactions with local, state and federal agencies and the public in an open, objective manner.

Coordination among the applicant, governmental agencies and the public is reflected in the summary of pertinent communications, meetings and interactions included in this chapter. During the process, seven innovative techniques for accomplishing the objectives of the National Environmental Policy Act were implemented. These include:

1. An assertive, open public information program.

2. The early preparation and distribution of the Plan of Study, a methodological approach directed to: (1) identify, generally describe and organize the diverse activities required to develop environmental information needed to comply with applicable regulations and to design a power generating station to optimally utilize available natural resources; and (2) encourage responsible, open extra-agency input to the decision making process through the anticipation of critical points and paths of decision making and information flow by use of a tie-scaled network diagram.

3. Preparation of a consolidated "Master Project Schedule" developing relationships among project feasibility and power supply studies; environmental analysis and licensing; financing fuel supply; property acquisition; engineering and construction and insurance.

4. The coordination and consolidation of State and Federal requirements in the preparation of a single Environmmental Analysis/Site Certification Application document.

5. Continuing, frequent interaction and interchange in the preparation and review of environmental analyses.

6. Preparation and distribution of an Interim Report midway through the environmental analyses: (1) to provide an overview and update of project activities; (2) to provide an early opportunity for participant reviewers to focus on site-specific issues and alternatives; (3) to illuminate the on-going decision making process; and (4) to assist in guiding the company and consultants by stimulating critique and recommendations from project reviewers.

7. Early, simultaneous filing of the "Site Certification Application and Environmental Analysis" with State and Federal agencies to allow ample opportunity for public and agency reviews.

Three tables have been prepared: Coordination with Governmental Agencies, Coordination with the Public and Articles and Notices of Proposed Project.

While records of coordination activities in this chapter have been documented only through January 1979, due to requirements for publication, actual coordination will continue through the federal NEPA and state Site Certification processes.

Table 7.1

STATUS OF PERMITS AND APPROVALS*

Subject of Permit Application or Approval	Statutory Mandate	Administering Agency**	Date of Application (Proposed)	Approval Date (Expected)	Comments
FEDERAL					
Application for loan approval	Rural Electrification Act	REA	(3/79)	(12/79)	
Environmental Analysis	National Environmental Policy Act; Exec. Order 11514: Protection and Enhancement of Environmental Quality; Exec. Order 11991: Relating to Protection and Enhancement of Environmental Quality	REA	8/78	(11/79)	
NPDES	Clean Water Act (§402)	EPA	10/78	(11/79)	Preliminary draft NPDES permit to be issued by 2/79.
Preconstruction New Source Air Quality Review	Clean Air Act (§110)	EPA	8/78	(11/79)	This review will be conducted by the State through its Site Certification process.
PSD	Clean Air Act (§160-169)	EPA	5/78	(Prior to 5/79)	Preliminary determination made by 2/79.
Activities in Navigable Waters	Rivers and Harbors Act (§10)				
1. Intake/discharge structures		COE	9/78	(11/79)	
2. Transmission Lines		COE	5/79	(11/79)	

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Table 7.1 (Continued)

Subject of Permit Application or Approval	Statutory Mandate	Administering Agency**	Date of Application (Proposed)	Approval Date (Expected)	Comments
Activities in Wetlands	Clean Water Act (§404)	COE	NA	NA	No permit required (June 22, 1978 letter from COE)
Construction of Plant Stack	Federal Aviation Act	FAA	2/78	5/78	FAA approval contingent on DOT stack construction approval
STATE					
Site Certification Application	Florida Electrical Power Plant Siting Act	DER	8/78	(9/79)	
Transmission Line Road Crossings	Ch. 338 F.S. (Ch. 14-46 FAC Utilities Installation or Adjustment)	DOT	(3/79)	(5/79)	
Modifications of State Road 17		DOT	(3/79)	(5/79)	
Construction of Plant Stack	Ch. 75-16 F.S.	DOT	6/78	6/78	
Water Well Drilling	Ch. 381.031(1)(g)(3) F.S.	DHRS and DER	4/78	4/78	
Well Regulation	Florida Water Resources Act	SJRWMD	4/78	4/78	
Easement through State Owned Lands	Ch. 253 F.S. and Ch. 76-24F F.S.	DNR	10/78	12/78	

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Table 7.1 (Continued)

Subject of Permit Application or Approval	Statutory Mandate	Administering Agency**	Date of Application (Proposed)	Approval Date (Expected)	Comments
LOCAL					
Land Use or Zoning Approval	Putnam County Zoning Ordinance 75-6 Chapter 163 F.S. Chapter 125 F.S.	Putnam County Commission	4/78	5/78	
Pipeline Road (209) Crossings	Putnam County Ordinance Ch. 338 F.S.	Putnam County Commission DOT	(3/79)	(5/79)	

* Status as of February 19, 1979

** Abbreviations:

REA	U. S. Rural Electrification Administration
EPA	U. S. Environmental Protection Agency
COE	U. S. Corps of Engineers
FAA	Federal Aviation Administration
DER	Florida Department of Environmental Regulation
DOT	Florida Department of Transportation
DHRS	Florida Department of Health and Rehabilitative Services
SJRWMD	St. Johns River Water Management District
DNR	Florida Department of Natural Resources
NA	Not applicable

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Table 7.2

Coordination with Governmental Agencies

DATE	AGENCY*	NATURE OF COORDINATION
10/27/76	DER, DSP, PSC	Introductory meeting among agencies, applicant and consultant to discuss the regulations and requirements for power plant site selection.
2/10/77	DNR, DSP, DOT, DER	Meeting to review progress of site alternative studies.
3/28/77	DER, DSP	Meeting to discuss alternative site studies and results.
4/12/77	DSP, DER, PSC, GFWFC, DNR-Coastal Zone Planning	Meeting of the Florida Clearinghouse Committee to discuss early siting efforts.
5/25/77	DSP	Transmittal of Minutes for 4/12/77 meeting.
6/2/77	DER	Transmittal of REA bulletin 20-21:320-21 to DER.
6/7/77	REA	Meeting to discuss proposed SECI project and REA requirements and responsibilities under the National Environmental Policy Act.
6/8/77	REA	Transmittal of SECI's Site Selection Study -- Executive Summary.
6/13/77	EPA, USFWS	Meeting to initiate discussion and preparation for the review of proposed electric facilities for SECI.
6/24/77	EPA, USFWS, NMFS, REA, PSC, DSP, SJRWMD, DER, COE	Invitation from SECI for "Interagency Coordination Review Meeting" to be held 7-8 July 1977. Purposes of meeting included: (1) determination of each agency's responsibilities in power plant licensing; (2) the procedures to be used to carry out these responsibilities; and (3) opportunities for consolidating the state and federal regulatory process.
6/26/77	DER	Transmittal of "Draft" outline for review and approval of a consolidated format for Environmental Analysis/Site Certification Application to unify federal and state requirements.
6/30/77	NEFRPC	Telephone conversation with Executive Director to introduce the SECI proposed 1200 MW power generating station project and solicit help in timely review of activities within planning council jurisdiction.
6/30/77	PSC	Letter to solicit comments regarding "Draft" DER application for Certification of a Proposed Fossil Fuel Power Generating Plant Site.
7/7-8/77	DER, SJRWMD, USFWS, EPA, PSC, COE, REA	Interagency coordination meeting held in Keystone Heights, Florida (see 6/24/77 for purpose of meeting).
7/14/77	NMFS	Letter outlining NMFS principal responsibilities in siting review and permitting-licensing process.
7/25/77	DSP	Comments from USFWS to DSP on Ten Year Site Plan for SECI.
7/28/77	NMFS	Transmittal of draft, consolidated federal-state contents for Environmental Assessment Statement/Site Certification Application.
8/1/77	NMFS	Acknowledgement of receipt of "Table of Contents" for the "Environmental Assessment Statement/Site Certification Application" and determination of NMFS interests in power plant siting.
8/2/77	NEFRPC	Meeting with Executive Director to introduce the SECI power plant project, to solicit council's participation, and to determine the council's role in waste treatment management, coastal zone planning, and local comprehensive planning.
8/5/77	EPA	Determination that proposed generating facility will be "new source" and will be subject to NEPA of 1969.
8/17/77	REA, DER, EPA, USFWS, DST, SJRWMD, JAPB	Transmittal of draft PLAN OF STUDY for proposed project.
8/23/77	DER	Comments on Dames & Moore PLAN OF STUDY.
8/25/77	REA	Comments from USFWS to REA on request for technical assistance on proposal to construct power plant.
8/26/77	USFWS	Comments from USFWS on Dames & Moore Environmental Analysis Plant Study.
9/7/77	NMFS	Response to request for comments on PLAN OF STUDY.
9/9/77	SJRWMD	Response to request for comments on PLAN OF STUDY.
9/13/77	REA	Meeting with REA in Washington to review comments of draft Site Certification Application/Environmental Analysis, PLAN OF STUDY and establish direction of continuing efforts of SECI, REA, and Dames & Moore to satisfy requirements of REA.

Table 7.2 (Continued)

DATE	AGENCY*	NATURE OF COORDINATION
9/20/77	REA, NEFRPC, NMFS, SJRWMD, DSP, USFWS, EPA, DER, JAPB	Extension of period for comments on Dames & Moore Site Certification Application/Environmental Analysis PLAN OF STUDY.
9/21/77	REA	Telephone conversation to clarify applicable public notice requirements.
9/23/77	DAH&R	Letter to State Historic Preservation Officer to determine if archaeological study is necessary on preferred site.
9/26/77	USFWS	Response to request for comments on the Site Specific Sampling Plan, Aquatic Ecology.
9/26/77	REA	Letter to REA requesting determination of responsibilities of REA as lead agency under NEPA and clarification of role of applicant in preparation of environmental analysis.
10/13/77	DSP	Meeting of (1) Review SECI's Site Certification activities, (2) Review DSP process for evaluation of Ten Year Site Plan, (3) Review energy element of State Comprehensive Plan.
10/20/77	DAH&R	Request for DAH&R comments on archaeological survey to be conducted on preferred site.
10/20/77	REA, NEFRPC, NMFS, SJRWMD, USFWS, DSP, EPA, DER, COE, GFWFC, JAPB.	Transmittal of revised "Site Certification Application and Environmental Analysis PLAN OF STUDY," 10/14/77.
11/14/77	REA, EPA, DER	Invitation to agencies to discuss compliance with 1977 amendments to Clean Air Act.
11/18/77	EPA, DER	Meeting in Atlanta to determine procedures for compliance with the 1977 amendments to the Clean Air Act in the licensing of the preferred site.
12/7/77	USFWS	Request for comments on location evaluation for intake/discharge structure at preferred site.
12/15/77	USFWS	Response to comments on intake/discharge structure.
12/30/77	DER	Request for DER clarification on PSD permit application requirements.
1/16/78	USFWS	Response to correspondence of 12/7 and 12/15 with USFWS. Restatement of SECI's philosophy of cooperation and open communications.
1/19/78	REA	Invitation to REA to participate in 2/9-10 meeting to visit alternative power plant sites, discuss status of project, and discuss federal agency coordination process.
1/24/78	COE	Transmittal of copy "Site Certification Application and Environmental Analysis Seminole Plant Putnam County PLAN OF STUDY."
1/24/78	GFWFC	Letter concerning tentative selection of pipeline corridor.
1/27/78	GFWFC	Confirmation of meeting with SECI's respresentatives to discuss plans for proposed plant.
2/1/78	FAA	Application for construction of tall structure filed.
2/22/78	EPA	Meeting in Atlanta to identify information to support PSD permit application and review licensing and equipment procurement schedule.
3/1/78	REA	Letter to confirm documentation of site study.
3/2/78	REA, USFWS	Meeting with USFWS in Atlanta to discuss (1) recent correspondence between Dames & Moore, USFWS, and SECI, (2) USFWS procedures for coordination of correspondence with SECI, (3) REA position on site alternatives selection process, and (4) status of proposed SECI power plant project and effects of proposed CEQ regulations on licensing.
3/7/78	GFWFC	Meeting to discuss status of SECI's licensing activities and the relationship between USFWS and GFWFC.
3/8/78	GFWFC	Transmittal of a copy of PLAN OF STUDY.
3/14/78	DER (St. Johns River Subdistrict)	Meeting to discuss suitability of existing ambient air quality data.
3/14/78	DER, Duval County Pollution Control Dept.	Meeting in Jacksonville to discuss application for prevention of significant deterioration.
3/15/78	DER	Transmittal of comments on preferred site study plan.
3/24/78	DER (St. Johns River Subdistrict)	Request of DER for endorsement of comments and available ambient air quality data.
3/24/78	Putnam County Comm.	Application for rezoning of preferred site filed.

Table 7.2 (Continued)

DATE	AGENCY*	NATURE OF COORDINATION
3/31/78	DSP	Transmittal of "Ten-Year Site Plan" discussing electrical need forecasts and forecast for new facilities.
4/3/78	Putnam County Comm.	Private water well construction permit application filed.
4/4-5/78	REA, SJRWMD, DSP, SWFWMD, GFWFC, USFWS, EPA, DER	Interagency Coordination meeting to (1) allow participants to visit "preferred" and alternate sites, and (2) review and discuss engineering and licensing activities, interagency coordination, and results of site investigations.
4/10/78	Putnam County Comm.	Private water well construction permit issued.
4/19/78	REA, NEFRPC, NMFS, SJRWMD, DSP, EPA, DER, COE, GFWFC, JAPB, USFWS	Transmittal of "Interim Report" to (1) coordinate environmental licensing activities and engineering design, (2) ensure regulatory compliance requirements are incorporated early in engineering design process, and (3) assure adequate and orderly opportunity for participation of state and federal agencies in decision making.
4/20/78	DER	Letter responding to 3/15/78 DER comments on aquatic sampling program.
4/20/78	SJRWMD	Water well construction permit issued.
5/2/78	FAA	Permit to construct tall structure issued.
5/2/78	EPA	Conversation regarding Seminole's and Jacksonville Electric Authority's plans for proposed plants and the proper sequence for PSD and FPSD permits.
5/8/78	Putnam County Planning Commission.	Public information workshop on proposed power plant project.
5/10/78	SCWAB	Meeting to discuss Sumter site as an alternative location for a coal-fired power plant. Discussion of sludge disposal, ash disposal, disposal of cooling water, and treated waste water into surrounding area.
5/10/78	Putnam County Planning Commision	Public hearing before Planning Commission.
5/10/78	NMFS	Comments from NMFS on INTERIM REPORT: Environmental Input to Power Plant Enginering Design process.
5/18/78	EPA, (copies to REA, DER)	Transmittal of Prevention of Significant Deterioration (PSD) Permit Application for Seminole Plant Units No. 1 and No. 2.
5/22/78	DER	Comments from DER on INTERIM REPORT: Environmental Input to Power Plant Engineering Design Process.
5/23/78	Putnam County Comm.	Approval of land use zoning change.
5/24/78	COE, EPA	Meeting in Jacksonville to discuss requirements for COE permit applications.
6/2/78	COE	Letter to COE requesting review of alternative sites and a determination of jurisdiction over use of wetlands on the sites and activities in navigable waters adjacent to the sites.
6/5/78	EPA, GFWFC, USFWS	Invitation to meet to discuss alternative cooling water intake/discharge facilities and locations for use at the proposed site.
6/7/77	COE	Visit preferred site to review condition of wetlands.
6/8/78	DOT	Tall structure permit issued.
6/8/78	GFWFC	Receipt from GFWFC of comments on INTERIM REPORT and "Appendix E of PLAN OF STUDY."
6/9/78	DER	Comments on and findings of acceptability of Prevention of Significant Deterioration Application.
6/14/78	EPA	Meeting in Atlanta to discuss 316(b) compliance criteria applicable to the design and operation of a cooling water intake structure to achieve "best available technology."
6/14/78	USFWS	Meeting in Atlanta to discuss proposed "best available technology" design for cooling water intake structure.
6/16/78	GFWFC	Meeting to discuss the proposed cooling water intake structure design as "best available technology" to minimize adverse environmental impact.
6/16/78	NMFS	Transmittal of the results of the 6/14/78 meetings with EPA and USFWS on §316(b) compliance and request for review and comments.
6/16/78	DER	Transmittal of the results of the 6/14/78 meetings with EPA and USFWS on §316(b) compliance and request for review and comments.

Table 7.2 (Continued)

DATE	AGENCY*	NATURE OF COORDINATION
6/22/78	COE	Letter reporting on field trip of COE to the preferred Putnam County Site and determination that COE jurisdiction does not extend to wetlands on this site.

*ABBREVIATIONS:

Federal

COE	Corps of Engineers
EPA	Environmental Protection Agency
FAA	Federal Aviation Administration
NMFS	National Marine Fisheries Services
REA	Rural Electrification Administration
USFWS	U. S. Fish and Wildlife Service

State

DAH&R	Division of Archives, History and Records Management
DER	Department of Environmental Regulation
DNR	Department of Natural Resources
DOT	Department of Transportation
DSP	Division of State Planning
GFWFC	Florida Game and Fresh Water Fish Commission
PSC	Public Service Commission
SJRWMD	St. Johns River Water Management District

Local

JAPB	Jacksonville Area Planning Board
NEFRPC	Northeast Florida Regional Planning Council

Table 7.3

COORDINATION WITH GOVERNMENTAL AGENCIES
(Additions from August, 1978 to January, 1979)

DATE	AGENCY*	NATURE OF COORDINATION
8/7/78	COE,EPA,DOA,DOCA, DAH&R DNR, DHRS, DOT,GFWFC,DOC, DA&CS,PSC,SIERRA,WiRPC, NEFRPC	Transmittal by DER to agencies of copies of SECI Site Certification Application and Environmental Analysis.
8/4/78	DER,REA	SECI files Site Certification Application and Environmental Analysis with DER and REA.
8/14/78	DER	Determination that Site Certification is "complete".
8/24/78	Sumter County Water Authority	Comments on report on groundwater conditions at Sumter site alternate.
8/31/78	EPA,DOI,COE	Letter from REA to other federal agencies proposing REA be designated as federal "lead agency" on Seminole project.
9/1/78	WiRPC, NEFRPC, NCFRPC	Letter from SECI to planning councils requesting certification that proposed transmission corridors are consistent with applicable land use plans and zoning ordinances.
9/7/78	NEFRPC	Confirmation from NEFRPC that proposed site is consistent with regional land use plan and Putnam County Comprehensive Plan.
9/7/78	EPA	SECI transmittal of draft NPDES application to EPA.
9/7/78	COE	SECI transmittal of application for activities in navigable waters to COE.

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Table 7.3 (Continued)

DATE	AGENCY*	NATURE OF COORDINATION
9/8/78	EPA	Letter from EPA to REA concurring with REA as lead federal agency and agreeing to work to coordinate activities and provide a draft NPDES permit for inclusion in Draft EIS.
9/13/78	DER,COE,EPA,REA	Meeting of agencies with SECI to eliminate duplication among procedures as directed by proposed Council on Environmental Quality regulations.
9/15/78	EPA	Meeting with SECI to discuss draft NPDES application.
9/20/78	WiRPC	SECI request for certification that transission corridors are consistent with regional and local land use plans.
9/20/78	NCFRPC	NCFRPC transmittal of land use plan to SECI.
9/22/78	NCFRPC	Letter to SECI acknowledging consistency of transmission corridor with regional land use plan.
9/27/78	Putnam County Board of County Commission	Transmittal to SECI of Board resolution providing for rezoning of land to allow use as a proposed power plant site.
9/29/78	COE	Letter from COE to REA agreeing with REA as lead agency.
9/29/78	NEFRPC	Transmittal regional land use plan to SECI.
10/4/78	Marion County Zoning and Building Department	Confirmation that transmission corridors would not violate zoning regulations.
10/5/78	DNR	Comments to DER on Site Certification Application.
10/5/78	SJRWMD	Comments to DER on preliminary review of Site Certification Application.

Table 7.3 (Continued)

DATE	AGENCY*	NATURE OF COORDINATION
10/6/78	DNR	SECI submittal to DNR of application for easement across state owned bottomlands.
10/9/78	Columbia County Board of County Commissioners	Transmittal to SECI of Columbia County Comprehensive Plan.
10/9/78	Bradford County Zoning Commission	Transmittal to SECI of Bradford County zoning codes and land use plan.
10/10/78	EPA	Letter from EPA to SECI requesting that the PSD Application be amended and confirming May 19, 1978 as the official date of application.
10/12/78	DOI	Letter concurring with role of REA as lead agency.
10/13/78	DER,COE,EPA,REA	SECI transmittal of minutes of state/federal review coordination meeting held 9/13/78.
10/16/78	DER	Transmittal to SECI of DER questions on the Site Certification Application.
10/23/78	DAH&R	Letter from State Historic Preservation Officer stating compliance with 36 CFR 800.
10/23/78	NCFRPC	NCFRPC comments on consistency of proposed transmission corridor with local and regional plans.
10/30/78	NCFRPC	Comments on transmission line corridor through Lake Butler.
10/31/78	EPA	SECI transmittal of NPDES Application and request for 316(b) determination.
11/1/78	DER	Request by REA for DER to cooperate and coordinate with REA during the NEPA process.

Table 7.3 (Continued)

DATE	AGENCY*	NATURE OF COORDINATION
11/1/78	NMFS	Letter to REA accepting REA as "lead agency" and identifying NMFS responsibilities.
11/6/78	DNR	Letter from DNR to SECI determining requirement for easement across state owned lands.
11/8/78	NCFRPC	Request for NCFRPC to be party to Seminole Site Certification proceedings.
11/9/78	EPA	Meeting of SECI with EPA to discuss PSD Application.
11/13/78	Marion County	Meeting with SECI regarding transmission line routing through county.
11/14/78	Marion County	Transmittal of comments on transmission line routing.
11/28/78	Marion County	Stipulation stating that no zoning ordinance exist which apply to transmission corridor.
12/6/78	NMFS	Letter to REA identifying NMFS interests in environmental impact statement process and permit process.
12/7/78	COE	Meeting of SECI with COE to discuss COE permit application for activities in navigable waters at proposed Putnam County Site.
12/7/78	DER	Meeting with SECI with DER to discuss estuarine modeling of water effluents.
12/12/78	USFWS, EPA, DER, GFWFC	Transmittal by SECI of "Plan of Study Aquatic Biological Program to Monitor In Situ Intake Screen Testing for Seminole Units No. 1 and 2" and request for comments.
12/12/78	COE	Letter from COE determining applicability of COE requirements for alternate power plant sites.

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Table 7.3 (Continued)

DATE	AGENCY*	NATURE OF COORDINATION
12/14/78	USFWS	Meeting of SECI with FWS to discuss proposed aquatic biological testing in compliance with Section 316(b) of the Clean Water Act.
12/15/78	EPA	Meeting of SECI with EPA to submit and discuss PSD Application Amendments.
12/19/78	DNR	DNR notification to SECI of Board of Trustees of the Internal Improvement Trust Fund approval of utility easement across state owned bottomlands.
12/21/79	USFWS	Transmittal of USFWS comments on biofouling and aquatic biological testing program for 316(b) compliance.
1/3/79	DER	Letter from DER to SECI acknowledging review of In situ screen testing plan and offering comments.
1/3/79	PSC	Meeting of SECI and PSC to discuss SECI expansion plans.
1/4/79	USFWS (Area Office)	Meeting with SECI to discuss proposed project status.
1/4/79	SJRWMD	SECI transmittal to SJRWMD of responses to questions raised by SJRWMD on Site Certification Application.
1/8/79	USFWS	REA request of USFWS for USFWS comments for inclusion in Draft EIS.
1/8/79	USFWS	Letter to REA transmitting USFWS comments on intake screen testing program.
1/8/79	NMFS	Transittal by SECI to NMFS of copy of Site Certification Application.
1/8/79	NMFS	REA request of NMFS for NMFS comments to be included in Draft EIS.
1/8/79	PSD	Transmittal by PSC to DER of PSC final report of Seminole's Site Certification Application.

Table 7.3 (Continued)

DATE	AGENCY*	NATURE OF COORDINATION
1/11/79	USFWS	Letter from REA requesting Section 7 Consultation with USFWS and determination of effects of proposed project on manatee.
1/12/79	DER	Transmittal of SECI responses to DER questions dated 10/16/78.
1/16/79	USFWS (Field Office)	Meeting of SECI with USFWS to discuss NEPA responsibilities and progress of proposed project.
1/17/79	REA	Transmittal by SECI of amended copy of PSD application to REA.
1/18/79	GFWFC	GFWFC recommendations to SECI on intake screen study design.
1/25/79	SJRWMD	Meeting with SECI to discuss Site Certification Application.
1/25/79	DER, SJRWMD	Transmittal by SJRWMD to DER of District comments on Site Certification Application.
1/26/79	GFWFC	SECI response to GFWFC comments on "Aquatic Biological Program to Monitor In Situ Intake Screen Testing".
1/26/79	DER	Transmittal to DER of Seminole Plant Units No. 1 and 2 Mixing Zone Assessment Report.
1/31/79	EPA	Letter from EPA (Athens) acknowledging review and acceptance of plan of study for In Situ intake screen testing program.
1/31/79	REA, PSC	Transmittal of PSC's final evaluation of SECI Site Certification Application to REA.

Table 7.4

COORDINATION WITH GOVERNMENTAL AGENCIES
(Additions to Table 7.2)

DATE	AGENCY*	NATURE OF COORDINATION
6/1/77	Department of Navy	Letter cancelling use of Naval restricted bombing site area near Bostwick, Florida, effective 7/1/77.
7/29/77	Putnam County Port Authority	Letter to SECI describing citizen's concerns over property adjacent to proposed plant.
8/15/77	USFWS	Letter to REA concerning potential for threatened or endangered species on proposed site near Bostwick.
8/17/77	NEFRPC	Transmittal by SECI to NEFRPC of Plan of Study and request for comments on Plan.
8/31/77	USFWS	Transmittal to SECI by USFWS of USFWS comments on Plan of Study.
9/28/77	SJRWMD	Transmittal to SECI SJRWMD comments on Plan of Study.
11/18/77	EPA	Meeting of SECI with EPA to discuss air quality issues and requirements for compliance with new source performance standards and prevention of significant deterioration regulations.
3/3/78	DNR	SECI request for determination of existence of state owned bottomlands.
4/11/78	DSP	Trasmittal of "Power Requirements Study, Florida 41, Seminole, for Seminole Electric Cooperative, Inc." from SECI to DSP.
5/9/78	Sumter County Water Authority Board	Meeting with SECI to discuss alternative site Sumter.

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Table 7.4 (Continued)

DATE	AGENCY*	NATURE OF COORDINATION
6/6/78	SJRWMD	SECI transmittal to SJRWMD of report: "Floridan Aquifer Study, Boiler Feedwater, Putnam Site."
6/16/78	EPA	Meeting with SECI to discuss procedures for compliance with 316(b) requirements.
6/16/78	USFWS	Meeting with SECI to discuss procedures for compliance with 316(b) requirements.
6/21/78	DOT	Issuance of tall structure permit.
6/22/78	COE	Letter to SECI establishing need for COE permit for intake/discharge facilities and determining that the COE does not have jurisdiction over "wetlands" on the proposed Putnam County site.

*LIST OF ABBREVIATIONS FOR TABLES 7.3 and 7.4
(Coordination with Governmental Agencies)

Federal

COE	Corps of Engineers
EPA	Environmental Protection Agency
FAA	Federal Aviation Administration
NMFS	National Marine Fisheries Service
REA	Rural Electrification Administration
USFWS	U.S. Fish and Wildlife Service
DOI	Department of the Interior

State

DA&CS	Department of Agriculture and Consumer Services
DAH&R	Division of Archives, History and Records Management
DER	Department of Environmental Regulation
DNR	Department of Natural Resources
DOC	Department of Commerce
DOCA	Department of Community Assistance
DOT	Department of Transportation
DSP	Division of State Planning
GFWFC	Florida Game and Fresh Water Fish Commission
PSD	Public Service Commission
SJRWMD	St. Johns River Water Management District

Local

JAPB	Jacksonville Area Planning Board
NCFRPC	North Central Florida Regional Planning Council
NEFRPC	Northeast Florida Regional Planning Council
WRPC	Withlacoochee Regional Planning Council

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Table 7.5

Coordination with the Public

Date	Organization/Individual	No. of Participants	Nature of Coordination
5/3/77	Mr. R. E. Hudson, Putnam County Chamber of Commerce		Letter of support from the Industrial Development Team of local businessmen.
7/20/77	Putnam County Chamber of Commerce	125	General presentation of project.
7/26/77	Mr. Prime F. Osborn, The Family Lines System Railroad		Offer of assistance and letter of support for Palatka plant site.
7/27/77	Mr. A. H. "Gus" Craig, The Florida House of Representatives		Offer of personal support and assistance for Putnam County plant.
8/9/77	Palatka Rotary	75	General presentation of project.
8/16/77	Kiwanis (Azalea City)	85	General presentation of project.
8/17/77	Mr. Sherrill "Pete" Skinner, The Florida Senate		Letter of support for Putnam County plant and expression of concern for expeditious handling of permitting process.
9/1/77	Kiwanis (Downtown, Palatka)	80	General presentation of project.
9/17/77	Putnam County Democratic Women	25	General presentation of project.
9/17/77	Tri-County Electric Cooperative Annual Meeting	800	General presentation of project.
9/21/77	Crescent City Rotary	50	General presentation of project.
10/3/77	Palatka Lions Club	70	General presentation of project.
10/12/77	St. Mark's Parish	25	General presentation of project.
11/7/77	Men's Fellowship Group, (Christ Independent Methodist Church, Palatka)	30	General presentation of project.
1/26/78	Friends of the St. Johns	10	General discussion of proposed project.
1/26/78	National Rural Electric Association		Award recognition to Seminole as winner in 1977 member services contest for public information program on the proposed new power station.
3/11/78	Consulting Engineers' Council of Georgia, Inc.		1977 Engineering Award of Merit for Plant Location Study.
5/23/78	Public Meeting	80	REA sponsored public coordination meeting in Sumterville.
5/24/78	Public Meeting	40	REA sponsored public coordination meeting in Palatka.

Table 7.6

COORDINATION WITH PUBLIC
(Additions)

DATE	ORGANIZATION/INDIVIDUAL	NATURE OF COORDINATION
	Putnam County Commission	Resolution declaring support for proposed plant.
2/13/78	Friends of the St. Johns River	Meeting with SECI to inform of proposed power plant site.
9/18/78	Putnam County Chamber of Commerce	Resolution declaring support for proposed plant.
10/12/78	City of Palatka Commission	Resolution declaring support for proposed plant.
10/19/78	Board of Directors, Atlanta National Bank of Palatka	Resolution declaring support for proposed plant.
10/25/78	Bill Chappell, Congressman	Letter of support for project.
10/26/78	Putnam County School Board	Resolution declaring support for proposed plant.
11/16/78	Sierra Club	Meeting of Sierra Club to discuss comments on Environmental Analysis.
11/21/78	Sierra Club	Transmittal of copy of NPDES Permit Application by SECI to Sierra Club.
11/27/78	Sierra Club	Transmittal of Sierra Club comments to DSP on DSP Preliminary Report to DER.
12/15/78	Sierra Club	Sierra Club review of the Preliminary Report on the Seminole Site Application by the Sierra Club.
1/17/79	Sierra Club	Transmittal of copy of PSD Application by SECI to Sierra Club.
2/1/79	Sierra Club	Transmittal of SECI responses to questions raised by Sierra Club in review of Environmental Analysis.

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Table 7.7

Articles and Notices of Proposed Project

Date	Publication	Nature of Article/Notice
7/20/77	Florida Times Union	Announcement of proposed plant site selection.
7/20/77	Palatka Daily News	Announcement of proposed plant site selection.
7/21/77	Tampa Tribune	Announcement of proposal to construct plant.
7/21/77	Palatka Daily News	Announcement of proposed plant site selection.
7/21/77	Florida Times Union	Announcement of proposed plant site selection.
7/25/77	Palatka Daily News	Adoption of Resolution by Putnam County Commission Board supporting Seminole Electric Cooperative, Inc. plans.
7/26/77	Palatka Daily News	Editorial supporting proposed plant site.
8/15/77	Palatka Daily News	Report of presentation by H. Wright of SECI on results of preliminary site studies.
8/23/77	Tampa Tribune	"Roy Bertke on Business" reports on progress of environmental studies and Seminole's plans for new plant.
8/23/77	Palatka Daily News	Seminole announcement of request for bids from architectural/engineering firms on proposed plant.
9/77	Development News (Florida Div. of Economics)	Announcement of plans to construct electric generating plant in Putnam County.
9/6/77	Federal Register	Notice of anticipation of preparation of Environmental Impact Statement for Seminole Electric Cooperative, Inc.
9/16/77	Palatka Daily News	Notice of speech by Mr. Verne Eveland, president, Seminole Electric Cooperative, on proposed project before the Democratic Women's Club.
10/4/77	Palatka Daily News	Report of speech by Mr. R. Claussen to Lions Club of Palatka.
5/8/78	Ocala Star-Banner	Announcement of potential generating station to be constructed near Sumter and of hearing scheduled for May 24, 7 p.m.
5/17/78	Herald Express	Public Forum Editorial raising questions about proposed plant in Sumter County.
5/19/78	Florida Administrative Weekly (Vol. 4, No. 20)	Department of Environmental Regulation announcement of public information meeting regarding potential power plant site, May 23, 7:30.
5/19/78	Sumter County Times	Public notice of public information meetings and opportunity to provide input to REA by mail.
5/22/78	Palatka Daily News	Announcement of two meetings regarding SECI proposed plant: Putnam County Commissioners and public information meeting, May 23.
5/23/78	Palatka Daily News	Drawing of planned Seminole Electric Plant and announcement of public information hearing May 23, 1978.
5/19,22, 23/78	Palatka Daily News	Public Notice of public information meeting May 23, 1978.
5/24/78	Florida Times Union	Report of public information meeting and public concern over low water table.
5/24/78	Palatka Daily News	Report of public information meeting and public concern over water problems in the area and the proposed plant burning coal.
5/20,22 23,24/78	Leesburg Commercial	Notice of public information meeting.
5/26/78	Sumter County Times	Report of public forum convened by Rural Electrification Administration and support of local people for power plant.
5/29/78	Ocala Star-Banner	Report of public forum conducted by Rural Electrification Administration to find out public opinion in Sumter County on Seminole Electric Cooperative's plans to construct a power generating plant.
5/29/78	Ocala Star-Banner	U. S. Rep. Richard Kelly expressed support for Seminole Electric Cooperative's plans to construct a power generating plant in Sumter County.

Table 7.8

ARTICLES AND NOTICES OF PROPOSED PROJECT
(Additions)

DATE	PUBLICATION	NATURE OF ARTICLE/NOTICE
3/24/78	Palatka Daily News	Notice of public hearing to consider changes in zoning ordinances in Putnam County.

REVISED 3/15/79

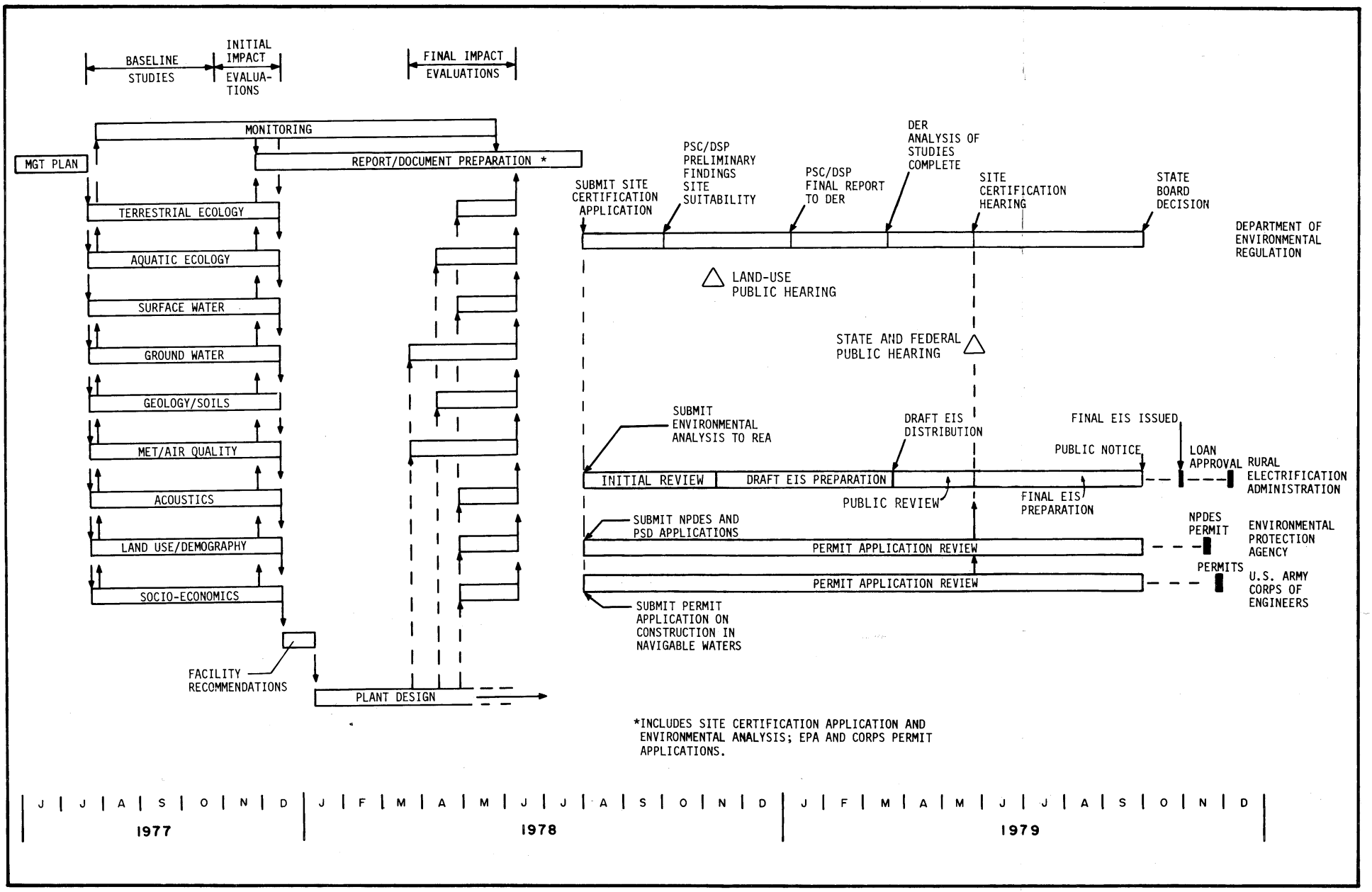

Figure F7.1 Master Permit Schedule.

Section 8.0 COMMENTS RECEIVED ON THE DRAFT EIS

Subsequent to the time period for receipt of comments on the DEIS, REA has received correspondence from residents of St. Johns County expressing concern over Seminole's proposed project. The concerns are mainly:

- Effects of burning coal on agriculture in St. Johns County.
- Alternatives to burning coal.
- Effect on Tourism .
- Effect on historical sites.
- Visibility inpairment.

An additional public hearing is also requested.

We have reviewed the issues raised and have concluded that the Final Environmental Impact Statement adequately considers and addresses these concerns. REA also believes that an additional public hearing would not disclose any new issues.

Section 8.1.1 FEDERAL AGENCIES COMMENTS

8.1.1.1 U. S. Environmental Protection Agency (letter dated April 6, 1979)

Comment 1 (EPA comments are on a "preliminary" copy of the DEIS).

The preliminary DEIS is too long and does not comply with the CEQ, November 29, 1978, Regulations. It is noted in the Introduction that information in the DEIS supercedes information in the EA. A great deal of the EA has been included in the DEIS in identical form. To reduce the size of the document would it not be appropriate to include the EA material by reference. For clarification, it is also suggested that the DEIS precisely identify those areas where REA's assessment may differ from Seminole's assessment in the EA.

Response

Since the Draft EIS was issued prior to July 30, 1979, this proposed project is not subject to CEQ NEPA regulations. However, to the fullest extent practicable, REA has attempted to implement the CEQ regulations in its review of the proposal. If the comment section and appendices are not taken into account, the Final EIS text exceeds 150 pages by only a small margin, and the text and tables do not exceed 300 pages. It is very difficult to indicate where the Environmental Analysis differs from REA's assessment in the EIS. The Final EA was prepared only after extensive input from REA, EPA, other Federal agencies and State entities. As a result, the EA reflects the views and assessments of all of the above parties.

Comment 2

Page 6, DEIS Outline. Appendix 2 should read: "Draft NPDES Permit and Permit Rationale."

Response

This change has been made.

Comment 3

Page 2.9, last paragraph. Intake velocity is stated as 0.5 feet per second in the EA and elsewhere in DEIS.

Response

The intake, through screen, velocity is less than 0.5 feet per second.

Comment 4

Page 2.10 first paragraph. The distance offshore of the discharge from the intake is proposed to be at least 450 feet rather than 150 feet.

Response

The point of discharge is designed to be approximately 900 feet offshore. There will be at least a 150 foot separation between the point of discharge and point of intake to prevent recirculation. See Section 2.5.2.1.

Comment 5

Page 2.12. The projected concentrations of cadmium mentioned here and the concentrations of chromium mentioned in Appendix D of the EA are of concern with regard to impacts to the Water table aquifer.

Response

These concerns are reflected by discussion in the Final EIS at Sections 2.5.2.2 and Table D-22 of Chapter 6.

Comment 6

Page 2.14, 3rd complete paragraph. A sentence should be added after the second sentence as follows: "An application for an NPDES permit was submitted in October 1978 and is pending until completion of the National Environmental Policy Act Process. A copy of a preliminary...."

Response

This change has been made in Section 2.5.2.3. The Draft EIS reflected this comment.

Comment 7

Page 2.14. In section 2.3, the PSD Approval is not correctly referred to as a "major Federal action" as those actions defined in the Clean Water Act. Also, compliance with the Endangered Species Act, National Historic Preservation Act, E.O. 11593 and site certification are not "major Federal actions."

Response

These changes have been made in Sections 2.5.2.3, and 2.5.4.3. The Draft EIS reflected this comment.

Comment 8

Page 2.14, 4th paragraph. It is suggested that the last sentence be deleted at this time.

Response

The Draft EIS reflected this comment.

Comment 9

Page 2.14, Section 2.5.3.2. The Coastal Zone Management Plan should be mentioned in the discussion of land uses.

Response

Florida does not have a Coastal Zone Management Program. The Coastal Zone Management Biophysical Atlas referenced in the Environmental Analysis and dividing the coastal areas into "Development," "Conservation," and "Preservation" categories is not an officially sanctioned document.

Comment 10

Page 2.15, second paragraph. A more accurate statement in place of the last sentence would be: Siting the plant and its attendant facilities outside of wetland areas and taking appropriate steps to assure that the plant does not significantly disrupt the normal functioning within the wetlands fulfills this responsibility.

Response

Section 2.5.3.3 of the DEIS reflects this comment.

Comment 11

Page 2.18, second paragraphs last sentence. The statement may not be correct or at least pre-mature. Studies on whether the gopher tortoise can be moved successfully are not finished. Also, the presence of the manatee is more likely since grassbeds have been found near proposed intake and discharge area (according to EA pg. 4.4-2).

Response

Seminole is working closely with the Florida Game and Fresh Water Fish Commission and the U. S. Fish and Wildlife Service to manage the gopher tortoise population on the site. REA and the U. S. Fish and Wildlife Service have determined that the proposed project will not jeopardize the continued existence of the Florida manatee or result in destruction or adverse modification of its habitat.

Comment 12

Page 2.19. It is not clear what the statement about other agency permits and conditions thereto means as it pertains to REA's loan guarantee. Clarification is needed.

Response

The section referred to has been revised and clarified.

Comment 13

Page 3.1, Section 3.0. It would be appropriate to have Seminole update its recent experienced load peaks and to compare this data to what was earlier projected.

Response

The load data has been updated and is presented in Chapter 3. Actual 1978 data was compared to projections from 1976 and 1977 figures. The projected load was a good approximation of the actual load experienced.

Comment 14

Page 4.5. It may be worthwhile to investigate the seeking of short or intermediate term purchases of power generation capacity from Georgia Power Company. Recently, this Utility sought to sell sizable portions of Plant Scherer. It is also known that surplus capacity exists and that a new nuclear unit (about 810 MW) is nearing operational status.

Response

Power generation capacity purchased from the Georgia Power Company was considered by Seminole. The purchase was found to be unfeasible economically due to the additional transmission facilities that would be required between Florida and Georgia. We understand that the possibility of increasing the transmission ties between Florida and Georgia is being studied by the Florida coordinating group.

Comment 15

Page 4.21. Low sulfur coal has not been mentioned as an alternative air pollution control strategy. There should be a discussion of its use. It should be explained why the Cooperative has not elected to use low sulfur coal. The discussion should include, (a) how recent regulations under the Clean Air Act require SO_2 removal (b) the lack of need for very stringent limits below new source performance standards, (c) economic aspects of such a control strategy.

Response

See the response to question 22 of the July 3, 1979, EPA letter.

Comment 16

Page 4.21, third paragraph. Even though it appears that the overriding reason is proven performance behind Seminole's selection of a "throw-away" type reactant FGD system, the environmental benefits of a regenerative type system have not been emphasized sufficiently. The waste disposal problem is significantly reduced and the resource requirement for the reactant also reduced to a fraction of that for the selected system. There are the attendent continual costs for transportation etc., which may not have been figured into the cost comparison.

Response

REA agrees that the waste disposal problem is significantly reduced and the resource requirement for the reactant is reduced. However, capital and operating costs are significantly higher for a non-regenerative system (even when transportation cost is included). See Section 4.4.3.1 for further discussion.

Comment 17

Page 4.21. Scrubber technology has been under attack from both industry and conservation forces nationwide. Therefore, a very simple summation of FGD lime/limestone experience would be appropriate. The PEDCO reports contain nearly all the industry experience with scrubbers presenting reliability and operability and efficiency data.

Response

See the response to comment 25 contained in the EPA letter of July 3, 1979.

Comment 18

Page 4.23 Delete reference to cooling ponds under the Once Through cooling discussion. This method is considered off stream like towers, and is an evaporative system.

Response

This change has been made in Section 4.4.4.

Comment 19

Page 4.23. It would be better to use the more common gallons per minute limits instead of acre-feet and to compare the withdrawal rates for once-through with off-stream cooling.

Response

Appropriate changes have been made in Section 4.4.4.

Comment 20

Page 4.27, item #3 under Corridor A. This statement is not correct according to the EA. Macrophytes are present.

Response

The presence of aquatic macrophytes in the nearshore vicinity of Corridor A has been recorded. The intake facilities have been relocated offshore beyond the distribution of vegetation.

Comment 21

Page 4.31. Consideration should be given to providing a multiport diffuser as an alternative to a single discharge point. Such a structure could be provided to assure a 10-fold dilution or greater at a relatively modest cost. Such a structure would rapidly dilute effluent pollutants in close proximity to the POD and assure that chronic and/or acute toxicity conditions do not exist. Required mixing zone size would be significantly reduced.

Response

See response to comment 33 of the July 3, 1979, EPA letter.

Comment 22

Page 5.131, 2nd paragraph. The power plant referenced is the Putnam Plant at Palatka, Florida. The Palatka Plant of FP&L which utilizes once-through cooling is adjacent to the Putnam Plant and is presently in cold standby status. Both plants should be mentioned.

Response

Section 5.6.1.2 of the Final EIS reflects this comment.

Comment 23

Page 4.31. The discussion and identification of the radial well intake system as the most environmentally preferred is good. EPA agrees with the rationale for not selecting this intake.

Response

No response required.

Comment 24

Page 4.33 Solid Waste Disposal. A more specific alternative disposal procedure for the ash-scrubber sludge wastes could incorporate phased activities. A series of smaller containment dikes could be constructed with fixed material starting at the higher elevations of the proposed disposal site. Monitoring of surface run-off and leaching from these smaller areas would be a more cautious approach than proceeding on full scale diking up to the wetland area. Phased site clearing could then also be employed for the disposal area.

Response

See the responses to Comments 35, 36 and 37 in the July 3, 1979, EPA letter.

Comment 25

Page 4.34. There is apparently a discrepancy on the selected project here with that described in the EA. If only a portion of the FGD/ash waste is to be chemically fixed to form a liner and dikes, then this clarification must be included in the DEIS.

Response

The situation is clarified in Section 4.4.9. Chemically fixed ash and sludge will be used to line the bottom and sides of the disposal area. After fixation, semi-solid stabilized cake or the chemically stabilized sludge would be placed in this lined area. A test program, during which surface water runoff and leachates will be monitored, will be conducted to determine which pozzolanic technology should be employed.

Comment 26

Page 5.1. Sections 5.0 and 5.1 are missing.

Response

The Draft EIS reflected this comment.

Comment 27

Page 6.6. On the air quality assessment it is not clear if background concentrations were factored into the modeling both on single source and interaction. Also, the origen of the background concentrations (whether modelied or from ambient monitors) should be stated.

Response

The analysis for compliance with the National Ambient Air Quality Standards included background concentrations as provided by ambient monitoring results. Refer to Sections 5.1.2.2 and 5.1.2.3 for additional discussion.

Comment 28

Page 6.12, third paragraph. Circulating flow is 27 gpm as given on page 2.9 not 29 gpm.

Response

REA agrees. The correction has been made.

Comment 29

Page 6.37. Near-field and far-field modeling of the thermal regime associated with blowdown discharge indicates little problem with thermal effects. Discharge volume is small relative to stream flow resulting in a ΔT of $0.1^{o}F$ within 500 feet of the POD under worst case conditions. Rapid dilution and dispersion of heated discharge by jetting it upward and away from the river bottom should be adequate to preclude any substantial thermal effects to the benthos proximate to the discharge point. Some limited perturbations to the benthic community in the immediate vicinity of the discharge point may occur during the summer when bottom water temperatures are expected to reach $93^{o}F$ due to a combination of ambient and discharge temperatures, but even so, the area effected would remain small.

Response

REA agrees. No further response is necessary.

Comment 30

Page 6.40. Reference to 316(B) should be 316(b). Also "Siting" is misspelled.

Response

The Final EIS has been changed to reflect this.

Comment 31

Page 6.44. Footnote (a) should be changed to state "Required mixing zone. Designation in acres except where noted."

Response

This comment is reflected in Table 5.2-2 in Chapter 6 of the DEIS (Table 6.13 in FEIS).

Comment 32

Page 6.57. Title of "Plant Liquid Effluent System" should be placed before material on page 6.30.

Response

The Draft EIS reflected this comment.

Comment 33

Page 6.57, last paragraph. The applicant has indicated in the NPDES application that maximum flows of domestic waste will occur during operation of Unit 1 while construction of Unit 2 is underway. During this period flows of 12.5 gpm are expected.

Response

REA agrees.

Comment 34

Page 6.58. Paragraph at top of page appears to be partial duplication of information on previous page.

Response

This duplication has been eliminated.

Comment 35

Page 6.63 second paragraph. First, the manatee is not properly discussed under Terrestrial Wildlife since it is an aquatic mammal. Also, the discussion is inconsistent with the EA because grassbeds are stated to be present. The analysis of manatee presence should be reconsidered. The species of macrophyte present should be determined as well as its utilization by the manatee.

Response

Macrophytes are identified in Section 5.4.2.2. The manatee and its relationship to aquatic vegetation are discussed in Section 5.4.4, which is a segment of the more general section labelled "Aquatic Ecology." Grassbeds are present near the shoreline at the project site, but such vegetation is abundant along most of the St. Johns River. The point of discharge is well away from the vegetated area. The U. S. Fish and Wildlife Service has concluded that the proposed project will not jeopardize the existence of the manatee nor adversely affect its habitat.

Comment 36

Page 6.31. The section on Operational impacts to land resources is missing in the text. The specific area of air emissions impacts was also not adequately addressed in the EA (Sec. 5.1). There will likely be an impact especially to sensitive vegetation but virtually undetectable when compared to studies in the literature on crops experiencing much greater concentrations of SO_2 and TSP. A comparison of expected conditions with documented situations of experienced damage would be appropriate.

Response

This comment is reflected in Section 6.1.3.2 of the Final EIS.

Comment 37

Page 6.31. Another operational impact that needs to be addressed here is the impact to the wetlands north of the solid waste disposal area. The area proposed for ash and sludge disposal is designated as lowland and classified in the State Coastal Zone Management Atlas as a "presentation" area. In light of this, a more thorough explanation of the "lowland" nature of this area should be presented to more clearly identify it as being ecologically separable from the wetlands it adjoins. Additionally, the source of inundation for the swamp and lowlands in the northern portion of the site should be explained in order for the reviewer to better understand the hydrologic character of these areas and their relationship, if any, to the river or tributary streams.

Response

The lowland area at the north end of the site is seasonally inundated during the wet season. The water table rises in response to the percolation of excess rainfall until it emerges in the lowlands. The water table declines due to evapo-transportation, underflow away from the area, and surface discharges through the ditch system toward the northeast.

Operational impacts on the lowland area due to disposal of solid waste is not expected to be significant for two reasons: (1) surface runoff from disposed material will be collected and returned to the scrubber system, and (2) excess water during the wet season should effectively provide a great amount of dilution of any leachate that would emerge in the lowland. During the dry season, when less dilution is available, the water table falls below the elevation of the lowland. (Refer to EPA's July 3 letter - Comment 18).

Comment 38

Chlorine

a. Page 2.10, 3rd paragraph. The applicant has proposed to discharge 0.4 mg/l of total residual chlorine (TRC) when one unit is in operation and 0.2 mg/l when two units are in operation by staggering chlorination. EPA considers these concentrations to be unacceptable and has proposed a maximum instantaneous limit of 0.1 mg/l in the draft NPDES permit to assure compliance with toxicity requirements of Florida Water Quality Standards (17-3.051 and 17-3.061). Reference to this EPA proposed limit should be included at this point in the DEIS. Reference to the 0.4 mg/l concentration is also necessary if the 0.2 mg/l value is stated at this point in the DEIS. Also see Item 1.c. below.

b. Page 2.14, 3rd paragraph. Use of a mixing zone to achieve dilution of a toxic pollutant to a level which would protect aquatic organisms is not acceptable if acute toxicity levels are present within the mixing zone at a point where aquatic organisms could be subjected to that pollutant for periods of time sufficient to allow toxicity. Language expressing the above as well as the proposed 0.1 mg/l TCR limitation should be included in the DEIS at this point. See also Item 1.c. below. For the conditions stated, the instream concentration would be 0.01 mg/l not 0 mg/l as stated.

c. Page 6.36, 2nd and 3rd paragraph. EPA standards of performance for new sources allow discharge of TCR for period(s) not exceeding two hours per unit per day. Due to recirculation of cooling water through a cooling tower system, however, TRC will be present for more that two hours after chlorine addition to the system and may be detectable continuously if chlorine is added to the system one or more times per day. Therefore, limitations must be incorporated in the NPDES permit to assure that acute and/or chronic toxicity conditions do not occur in the receiving water body. Therefore, a maximum instantaneous limitation of 0.1 mg/l of TCR has been proposed in the draft NPDES permit. Available data (see Attachment I) indicates that holdup of blowdown for periods of approximately two hours will result in reduction of TCR levels to 0.1 mg/l or less. This approach has been utilized in permits for several new steam-electric generating plants including, Phipps Bend (TN), Sequoyah (TN), Watts Bar (TN), and Yellow Creek (MS) (see Attachment II). Notwithstanding this limitation it is necessary to assure a rapid 9 to 1 dilution of blowdown to assure that aquatic organisms can not be subjected to long exposures of 0.01 mg/l or more of TCR. Use of a multiport diffuser should be considered as an alternate to the single discharge pipe proposed. The above language should be incorporated in the DEIS at this point.

The 3.0 acre zone indicated in the third paragraph is predicated on two unit operation with a discharge concentration of 0.2 mg/l. As noted elsewhere in the statement a discharge of 0.4 mg/l from one unit would require a dilution zone of 23 acres. However, information submitted to EPA on

March 12 and 21, 1979, (see Attachment III) indicates that acutely toxic levels of TCR can be expected. Figure 2 (March 12, 1979) indicates that centerline plume velocity for Phase II (one-uint operation) will be less than two fps at a distance of about 17 feet from the POD and less than one fps at a distance of about 35 feet from the POD. Additionally, the figure submitted on March 21, 1979, indicates that TCR concentrations will be about 0.2 mg/1 at 17 feet and 0.12 mg/1 at 35 feet from the POD. Since adult fish can sustain swimming speeds in excess of one fps for significant periods of time, congregation in the vicinity of the discharge could occur where TCR concentrations exceed 0.12 mg/1 for one unit operation. Data plots (See Attachment IV) by Mattice and Zittel (Mattice, J. S. and Zittel, H.E., "Site-specific Evaluation of Power Plant Chlorination," Journal, Water Pollution Control Federation, 48, 2284, October 1976) indicate an acute toxicity threshold of 10 to 20 minutes for TCR concentrations of 0.20 and 0.12 mg/1, respectively. Similarly, for Phase III (two-unit operation) velocities of two and one fps occur at about 25 and 55 feet from the POD, respectively. TCR concentrations at these points are about 0.08 and 0.04 mg/1. Corresponding acute toxicity thresholds occur at about 40 and 100 minutes, respectively. The above information should be included in the DEIS as the basis for the 0.1 mg/1 maximum instantaneous limitation on TCR proposed in the draft NPDES permit. Attachment III Figures (3) and Attachment IV should be specifically included in the DEIS.

d. Page 6.39, 2nd paragraph. Although larger nekton may move away from the plume, there is no assurance that they will move away from low level toxic concentrations, especially in cooler weather where they may be attracted to the thermal plume. Modification of this paragraph is therefore necessary.

e. Page 6.106, last paragraph. The words "and total residual chlorine" should be added to the last sentence. In addition, it is recommended that the following be added: "By holdup of blowdown for approximately two hours after termination of chlorine addition, it should be possible to achieve a concentration of 0.1 mg/1 or less total residual chlorine in the discharge from each cooling tower."

Response

a. The discharge of total residual chlorine will be limited to a maximum instantaneous concentration of 0.1 mg/1 with dilution to 0.01 mg/1 within an area of less than one acre as required by Florida Water Quality Standards. See Section 2.5.2.1.

b. This comment is reflected in Section 2.5.2.2 under "Discharges to Surface Water."

c-e. These comments are no longer applicable or have been addressed since the discharge of total residual chlorine has been reduced to the limits given in a. above.

Comment 39

Bottom Ash Sump (Equalizing Basin)

Pages 2.10, 2nd paragraph; 4.32, 1st and 3rd paragraph; 6.57, 1st (two times) and 2nd paragraph; and 6.58, 1st paragraph. Reference to "bottom ash pond(s)", "ash pond area", and "ash pond effluent" are incorrect. The NPDES permit application indicates that bottom ash will be dewatered and blowdown from bottom ash transport wastewater will be discharged to a "Bottom Ash Sump". Discussions with company personnel indicate that this sump will be a lined equalizing basin (see also March 15, 1979, revisions to E.A., especially Figures 3.6-1 and -2, etc.). It is suggested that the phrase "bottom ash sump (equalizing basin)" be used to replace the above incorrect phrases.

Response

The errors have been corrected and replaced with the suggested language.

Comment 40

Florida Water Quality Standards

a. Pages 5.52, last paragraph. Section 173.061 should be noted as General Criteria applicable to all surface waters. Section 17-3.051 should also be referenced in that it provides Minimum Criteria for all waters at all times and all places. Section 17-3.051 prohibits acutely toxic conditions and is not subject to a mixing zone, whereas Section 17-3.061 prohibits chronic toxicity at the edge of an assigned mixing zone. The distinction should be made here or at some other point in the DEIS.

b. Pages 6.46 and 6.47. Table should indicate that DER (1976) refers to the Florida Water Quality Standards. Recommended corrections to this Table are indicated in Attachment V.

Response

a. These comments are reflected in Section 5.4.1.3.

b. The corrections have been made.

Comment 41

Section 316(b)

a. Page 6.40, 1st paragraph. A statement of 316(b) of the Federal Water Pollution Control Act, as amended, should be provided to assist in subsequent discussions; namely that 316(b) requires "that the location, design, construction, and capacity of cooling water intake structures reflect the best technology available for minimizing adverse environmental impact."

b. Page 6.42, 1st three paragraphs. The term "placement" of the intake should be replaced with "location" at three points for consistency with the language of 316(b). Grass beds appear to exist in the vicinity of the proposed shoreline intake structure. Since these beds may constitute a significant nursery area, further consideration should be given to locating the intake (and also the discharge) in deeper water away from shore (third alternative intake scheme on Page 4.30). We can not ascertain at this time whether the proposed location is consistent with the requirements of 316(b).

c. Pages 4.30, 4.31, 6.41 and 6.42. Proposed intake design which includes wedge-wire screens with low approach velocity and low velocity through the screen openings appears to offer assurance with "design" requirements of section 316(b), provided that the field-test data demonstrate the ability to utilize small screen openings.

d. Page 6.41, 1st paragraph. Intake "capacity" has generally been minimized by plant design which includes cooling towers to cool and recirculate condenser cooling water rather than using once-through coolong. Additionally, cooling tower blowdown will be utilized as make-up to the FGD system and bottom ash system to the extent practicable. A blowdown minimization study is required by the draft NPDES permit to assure minimized intake of water.

Response

a. This comment is reflected in Section 2.5.2.3.

b. The term "placement" has been replaced with "location". The grass beds extend at certain points to 250 feet from the shore. The intake structure will be located 325 feet from shore (Section 4.4.6). The grass beds will only be disturbed by the water, pipeline and pier to be constructed for maintenance purposes. Minimal impact on the grass beds or fauna residing there is anticipated due to the distance between the intake structure and grass beds.

c. The interim report on the proposed 1 mm to 2 mm screen mesh width indicates that field tests demonstrate that such small screen openings can be satisfactorily utilized.

d. No response is required.

Comment 42

NPDES Permit

a. Page 6.21, last paragraph. The NPDES application did not include a request that treated pre-operational metal cleaning be authorized for discharge. Since such wastes may have extremely high levels of phosphate, BOD and COD and may include toxic compounds, a notification that discharge of such wastes is not Authorized is provided in Part III.F. of the draft NPDES permit. Should the applicant submit a revised application indicating the compounds to be used, the expected pollutants and their concentrations, an assessment of these discharges will be made and the permit modified accordingly after public notice.

b. Page 6.30 et seq. A table of standards of performance for new source from 40 CFR Part 423 should be included in the DEIS (see Attachment VI) and referenced at applicable place(s) in the text (such as page 6.36, last paragraph; page 6.57, second paragraph; etc.).

c. Page 6.57, 1st paragraph. Figure 3.4-1 has been deleted from the EA and replaced with figures appended to the NPDES application. It is suggested that Figure 2 (see Attachment VII) be included in the DEIS to support discussions of plant wastes and discharge points as provided in the NPDES permit (Attachment A to the NPDES Permit). Reference should be made to the fact that the draft NPDES Permit and Permit Rationale are included in Appendix 2 of the DEIS.

d. Page 6.57, 1st paragraph. Discharge from the Bottom Ash Sump (Equalization Basin) should be designated in the text as NPDES serial number 002. This designation should also be placed after the heading, i.e. "Chemical Waste System (NPDES serial number 002)."

e. Page 6.57, 2nd paragraph. "Metal cleaning wastes, boiler blowdown," should be deleted as these wastes are discharged to the percolation fields. "Contaminated runoff should be replaced with material storage runoff from coal and limestone storage." "Copper, and iron" should be deleted from the last sentence.

f. Page 6.57, 3rd paragraph. The first sentence should be revised as follows: "The 500 gpm (1.1 cfs) of treated chemical wastewater (NPDES serial number 002) along with treated sanitray wastewater (NPDES serial number 003) and cooling tower blowdown (NPDES serial number 004) will be discharged to the St. Johns River through the main plant discharge (NPDES serial number 001)."

g. Page 6.57, last paragraph. Heading should be revised as follows: "Sanitary Waste System (NPDES serial number 003)."

h. Page 6.30, 1st paragraph. " NPDES serial number 004" should be inserted at an applicable point after cooling tower blowdown is mentioned.

Response

a. No response required.

b. This comment has been accepted. See Table 6.1 of Chapter 6.

c. The figure is referred to as F6.3 in Chapter 6.

d-h. Corrections have been made in the final EIS in Section 6.1.2.2.

8.1.1.2 EPA Region IV (April 12, 1979)

Comment

Although pollutants have been considered in the Environmental Analysis along with mitigation which will be employed, such is not the case with air emission excursions above approved limits. Specifically, potential malfunction of particulate and sulfur dioxide control devices should be considered.

Response

AIR EMISSION EXCURSION ANALYSIS
SEMINOLE PLANT UNITS NO. 1 AND NO. 2
SEMINOLE ELECTRIC COOPERATIVE, INC.

INTRODUCTION

Current EPA regulations governing preparation of environmental impact statements for new source NPDES permits are found in 40 CFR 6. Paragraph 6.924(c)(6) of these regulations states that "irreversible damage can result from environmental accidents associated with the new source and this possibility should be evaluated." With this statement in mind, EPA Region IV has posed a question regarding excursions of air emissions above approved limits resulting from possible malfunction of boiler flue gas emission controls at Seminole Plant Units No. 1 and No. 2.

This report contains a discussion of the probability of major emission excursions and an analysis of possible environmental effects associated with an extreme excursion. The discussion is restricted to sulfur dioxide (SO_2) and particulate matter (PM) excursions since the only flue gas emission controls not integral to the furnace itself (as are oxides of nitrogen controls) are the flue gas desulfurization units (scrubbers) for SO_2 control and electrostatic precipitators for PM control.

PROBABILITY OF EXCURSIONS

Sulfur Dioxide

The probability of a major SO_2 excursion after commercial operation of each generating unit begins is very low. Based on information contained in a technical report (U.S. Environmental Protection Agency, 1978) prepared in conjunction with proposed New Source Performance Standards for electric utility steam generating units, the estimated availability of Seminole's scrubbers is 98 to 99+ percent at full load, and even greater than this at reduced loads. The referenced EPA report projects that a scrubber system having modules designed for 95 percent availability and equipped with one spare module should achieve an actual availability of 98 percent. The system required by Seminole's design specifications meets this description. In addition, Seminole's design calls for two redundant pumps with each module, effectively making the system equivalent to one with two spare modules. An arrangement with two spare modules is projected to achieve an availability of 99+ percent at full load.

It should also be noted that the availability figures just presented pertain to availability of the scrubbers at full design efficiency. Availability at less than design efficiency is even more certain, so that the possibility of complete uncontrolled emissions is very remote.

Simultaneous malfunction of both scrubber units (one for each boiler) would be an extremely unlikely event. The units will operate independently and will be serviced by redundant water supply and reagent sources.

The probability of scrubber malfunction during the initial start-up and shakedown phase is much more difficult to estimate. Rather than attempting an estimate of this type, it is perhaps more appropriate to point out that the generating unit being tested is typically operating at reduced loads

during this phase, plus mitigating actions would be taken quickly if a malfunction occurred since the purpose of startup and shakedown is to identify and correct equipment problems. Therefore, independent of the chance of a malfunction taking place, the possibility of a prolonged, high emission rate excursion is minor.

Particulate Matter

PM emissions will be controlled through the use of precipitators, with each precipitator bank sized so that as much as ten percent of the total collecting surface area can be de-energized and the design collection efficiency of 99.6 percent still maintained. Considering the ten percent spare collection surface area and the vendor guarantee of availability which is based on extensive operating experience, we can estimate that precipitator availability at full design efficiency will be similar to, if not higher than, that projected for the scrubbers--98 to 99+ percent. Availability at less than design efficiency is even more certain, so that the possibility of completely uncontrolled emissions is very remote.

The general comments on scrubbers above related to independence of each boiler's emission controls and conditions during startup and shakedown also apply to electrostatic precipitators.

POTENTIAL FOR DAMAGE DUE TO AN EXTREME EXCURSION

Introduction

The greatest theoretical emission rate for the Seminole plant is with both generating units operating and no emission controls in effect. The previous discussion describes the unlikelihood of such an emission rate ever occurring. Almost as unlikely is the possibility that even one generating unit would be operating in the absence of either SO_2 or PM controls. For illustration purposes, however, we define an extreme excursion as complete failure of emission controls on one unit, maintenance of design control efficiency on the other unit, and continued operation of both generating units at average load levels or greater for a sustained period of

several hours. The potential for damage posed by this hypothetical extreme excursion is discussed in the remainder of this report.

Evaluation Criteria

Many studies have been made to determine the possible adverse effects of atmospheric SO_2 and PM concentrations. Based on such studies, National Ambient Air Quality Standards (NAAQS) were established to protect against adverse effects. Two types of standards were developed: primary standards intended to protect public health with an adequate margin of safety, and secondary standards intended to protect public welfare (i.e., to prevent vegetation damage, damage to materials, etc.). Although considerable research has been conducted since 1971 when the NAAQS were first issued and questions have been raised concerning whether or not the standards are too stringent or not stringent enough, the NAAQS offer a logical starting point for assessing if an extreme SO_2 or PM excursion at Seminole Plant Units No. 1 and No. 2 would result in "irreversible damage".

The primary annual average standard for SO_2 is 80 $\mu g/m^3$. This standard is of no concern to this present discussion since any excursions at the Seminole plant would be too short-lived to affect annual average ambient ground-level concentrations significantly. Short-term concentrations alone will be affected by an excursion, and the only short-term primary SO_2 standard is a 24-hour average concentration of 365 $\mu g/m^3$ not to be exceeded more than once a year (40 CFR 50.4). The underlined phrase is important because it allows for exceptional meteorological or emission source events, and indicates that a single violation of the standard is not likely to have an unacceptable impact, assuming of course that the highest concentration in a given year is not many times higher than the standard. It is also germane to compare the primary standard of 365 $\mu g/m^3$, which is intended to prevent aggrevation (not necessarily irreversible) of respiratory illness in susceptible populations (U.S. Department of Health, Education, and Welfare, 1970), with the OSHA standard developed to protect a relatively healthy working population from adverse health effects due to occupational SO_2

exposure. The OSHA 8-hour time weighted limit for SO_2 is 13,000 $\mu g/m^3$ (29 CFR 1910.1000), an order of magnitude greater than the ambient standard.

Looking next at secondary SO_2 standards, the only current secondary standard is a 3-hour average concentration of 1,300 $\mu g/m^3$ not to be exceeded more than once a year (40 CFR 50.5). Without going extensively into the history of standards development, this standard seems based primarily on possible vegetation damage (U.S. Department of Health, Education, and Welfare, 1970). Concentrations exceeding the standard could result in irreversible damage to certain types of vegetation.

The short-term primary and secondary ambient standards for particulate matter are both applicable to a 24-hour average concentration. The primary 24-hour standard is 260 $\mu g/m^3$ (40 CFR 50.6) and the secondary standard is 150 $\mu g/m^3$ (40 CFR 50.7), both of which are concentrations not to be exceeded more than once a year.

The 24-hour secondary PM standard is apparently based largely on reversible effects such as decreases in visibility (U.S. Department of Health, Education, and Welfare, 1969), and therefore is not really an appropriate criterion for assessment of possible irreversible damage due to emission excursions. The primary standard is based on epidemiological studies showing possible aggrevation of respiratory illnesses, such as bronchitis, at various PM levels. This standard probably does not represent a level of irreversible effects, but nevertheless will be used as a starting point in assessing the significance of emission excursions.

Evaluation Method and Results

Ambient air quality modeling results for the proposed Seminole plant based on SO_2 and PM emission controls operating at design collection efficiencies have already been reviewed by EPA Region IV. These results are now used to estimate excursion effects by applying an appropriate scaling factor expressing the ratio of uncontrolled to controlled emission rates.

All emission characteristics other than emission rates are assumed identical in both the controlled and uncontrolled case.

The maximum 3-hour SO_2 and 24-hour SO_2 and PM concentrations previously reported represent second-high concentrations derived from 6 years of meteorological data. It is appropriate to use second-high concentrations again in this excursion analysis for the following reasons:

- Meteorological conditions associated with highest concentrations are very unusual events and therefore not likely to be occurring at the time of an extreme excursion.
- Concentrations were calculated using the most adverse combinations of sulfur, ash, and heating content of the design coal - combinations not likely to exist at the specific time of an excursion. Calculated concentrations are therefore already conservative from a fuel quality standpoint, and this conservatism is not diminished greatly by use of second-high rather than high concentrations.
- The NAAQS being used as evaluation criteria are stated in terms of second-high concentrations.
- The greatest second-high concentration used in this excursion analysis for each pollutant and averaging period is applicable to a single point at ground level. At other points - that is, at other distances and in other directions - predicted concentrations are considerably below the value reported as the greatest second-high concentration. (See the Prevention of Significant Deterioration Permit Application previously submitted to EPA Region IV on this point.)

To determine ambient SO_2 concentrations attributable to the defined extreme excursion, it is first necessary to calculate the ratio of excursion to controlled emission rates. Based on the worst case design coal (sulfur content of 3 percent and heating value of 11,000 Btu/lb), the uncontrolled emission rate is 5.455 lb/10^6 Btu and the controlled emission

rate is 1.145 lb/10^6 Btu. The combined emission rate for one uncontrolled unit operating with one controlled unit is 3.3 lb/10^6 Btu. The ratio of the excursion rate to the controlled rate is therefore 3.3/1.145, or approximately 2.9.

The greatest second-high 3-hour and 24-hour SO_2 concentrations computed for the controlled case are 437 and 60 μg/m^3, respectively. Applying the scaling factor of 2.9, excursion concentrations are approximately 1270 μg/m^3 and 175 μg/m^3 for 3-hour and 24-hour averaging periods. These concentrations in comparison with the NAAQS are as follows:

	Excursion Concentration	NAAQS
3-Hour SO_2	1270	1300
24-Hour SO_2	175	365

In other words, even under the extreme excursion conditions evaluated, maximum ground-level concentrations are expected to be less than those allowed by national ambient standards.

The ratio of excursion PM emission rates to controlled rates can be calculated in a way similar to that for SO_2. Using a worst case design coal with an ash content of 10 percent and a heating value of 11,000 Btu/lb, the PM emission rate without precipitators in operation is 7.27 lb/10^6 Btu. (Derivation of this value assumes 20 percent removal of particulate matter as bottom ash.) The controlled emission rate, on the other hand, is expected to be 0.03 lb/10^6 Btu in accordance with proposed New Source Performance Standards. With one generating system controlled and the other uncontrolled, the combined excursion emission rate is 3.65. The ratio of the excursion rate to the controlled rate is therefore 3.65/0.03, or approximately 122. (Note that we have taken the conservative approach of ignoring any PM removal in the SO_2 scrubbers.)

Multiplying this scaling factor times the greatest second-high 24-hour PM concentration calculated from the controlled case, the maximum predicted excursion 24-hour concentration turns out to be approximately 200 μg/m^3. This value exceeds the secondary NAAQS of 150 μg/m^3 which we concluded to be an inappropriate index of possible irreversible damage, but does not exceed the primary NAAQS of 260 μg/m^3.

Conclusion

Since the ground-level impacts of the excursion case analyzed do not exceed the evaluation criteria selected, we conclude that the probability of "irreversible damage" resulting from occurrence of an excursion of this type is extremely low. This conclusion is reached fully recognizing that there are no fixed guidelines for a risk analysis of this type. Among the shortcomings involved is an absence of established ambient levels which, if met, would assure avoiding any irreversible damage. There are ambient air quality standards to be sure, but these are supposedly developed to provide an adequate margin of safety to protect public health and welfare from adverse effects. Standards which provide an adequate margin of safety against adverse effects are not necessarily identical to limits which prevent irreversible damage. Despite such conceptual difficulties, we feel that the remote chance of an extreme excursion actually happening, combined with the unlikelihood of irreversible damage should an extreme excursion occur, provided a reasonable argument in favor of concluding that the possibility of irreversible damages is extremely low.

REFERENCES

U.S. Department of Health, Education, and Welfare, 1969, Air quality criteria for particulate matter. Public Health Service, National Air Pollution Control Administration Publication No. AP-49.

U.S. Department of Health, Education, and Welfare, 1970, Air quality criteria for sulfur oxides. Public Health Service, National Air Pollution Control Administration Publication No. AP-50.

U.S. Environmental Protection Agency, 1978, Flue gas desulfurization system capabilities for coal-fired steam generators, volume II, technical report. Office of Research and Development.

29 CFR 1910.1000: Code of Federal Regulations, Title 29, Part 1910 - Occupational Safety and Health Standards, Subpart Z - Toxic and Hazardous Substances, Section 1910.1000 Air contaminants.

40 CFR 6.924(c)(6): Code of Federal Regulations, Title 40, Part 6 - Preparation of Environmental Impact Statement, Subpart I - Preparation of Environmental Impact Statements on New Source NPDES Permits, Section 6.924 Content of an environmental impact statement.

40 CFR 50.4, 50.5, 50.6, 50.7: Code of Federal Regulations, Title 40, Part 50 - National Primary and Secondary Ambient Air Quality Standards, Section 50.4 National primary ambient air quality standards for sulfur oxides (sulfur dioxide), Section 50.5 National secondary ambient air quality standards for sulfur oxides (sulfur dioxide), Section 50.6 National primary ambient air quality standards for particulate matter, Section 50.7 National secondary ambient air quality standards for particulate matter.

8.1.1.3 Science and Education Administration/U. S. Department of Agriculture (letter dated June 7, 1979)

Comment

From the standpoint of natural resources protection, we are concerned over the plan proposed for disposing of the waste material. In our opinion, the proposed plan does not provide for adequate protection of the groundwater (water table aquifer) from contamination by leaching of the wastes and other stockpiled material. We suggest that such plans be included in the final environmental statement.

Response

A discussion of potential impacts of leachates from solid waste disposal and coal storage is contained in Section 6.1.2.2. A plan for monitoring such impacts and for determining, evaluating and implementing mitigative measures is contained in the State of Florida "Conditions of Site Certification" attached to the Final EIS in Appendix 9.2.3. Additional discussion of effects on groundwater and solid waste disposal plans is presented in Sections 2.5.2.2 and 4.4.9.

8.1.1.4 U.S.D.A. Forest Service

Introduction

For the purposes of this information request, the midlines of the proposed one-mile-wide transmission line corridors were assumed to be the rights-of-way (ROW). The exact determination of the ROW location have yet to be made, and the information reported herein can be expected to change according to the final ROW location.

Resource Maps used in making determinations reported herein are "Timber, Forage, and Wildlife" maps prepared by the Florida Division of Planning for the Forest Resource Evaluation Project.

1. Comment

Request for an estimate of the current output of timber, per year, from the generation site and transmission corridors.

Response

As the final alignment of the ROW is presently unknown, a determination of timber output is difficult as the timber land included in the corridor contains timber in many stages of growth, age, stocking rate, and degree of management. The Resource Maps delineate timber yield based on three classifications termed #1 for high, #2 for medium, and #3 for low. These classifications are based upon median site index measurements for natural forest stands containing slash pine in Florida.

The proposed Site-to-Putnam corridor is approximately 13 miles long and crosses approximately 46 percent high yield, 33 percent medium yield, and 21 percent low yield land. The Site-to-Silver Springs corridor is approximately 46 miles long, of which approximately 20 percent is high yield, 26 percent is medium yield, and 54 percent is low yield timber land. The Site-to-Columbia corridor is approximately 74 miles long, of which 10 percent is high yield, 79 percent is medium yield, and 11 percent is low yield timber land. The Columbia-to-Suwannee corridor is approximately 42 miles long, 87 percent of which is high yield timber land, and 13 percent is medium yield. The Columbia-to-Fort White corridor is approximately 22 miles long crossing 78 percent high yield and 22 percent medium yield timber land.

When considering all the corridors together, approximately 38 percent of the combined corridors crosses high yield (Prime Timber) land, 43 percent crosses medium yield land, and 19 percent low yield land.

According to the personnel at the Florida Forestry Commission, the median site index for high yield land is 80, for medium yield land is 70, and for low yield land is 60. Timber output can be determined from the site index, stocking rate, and age of the stand. Without the latter two criteria, it would be difficult to determine timber output. However, it is possible to get a qualitative idea of production by reviewing the above data which outlines the percentage of the assumed line passing through various yield timber land. On the generating site itself managed pine plantation represents approximately 8% which will not be adversely affected by the plant.

2. Comment
Request for an estimate for the above land if the timber resource was intensively managed.

Response
As noted above, the exact nature of the timber resource to be affected cannot be completely defined until the right-of-way alignments have been selected. Additionally, many assumptions would have to be made to estimate the timber production possible under maximum management conditions. For example, an assumption would be required as to the species to be grown for a specific purpose. Both slash pine and longleaf pine might be considered appropriate for this region. The type of end product would also figure heavily in the production rates since pines are managed differently when grown for naval stores, pulpwood, poles, plywood, or high quality timber. Rotation times vary as do stocking rates and pre-harvesting cuts according to the end product. Changes in the economy would effect all such plans to harvest. For example, a drop in pulpwood demand would make growers postpone cutting timber until the market improves. This means such stands may be past optimum production regardless of the management plan used because they would be past prime growing capacity for pulpwood production.

Therefore, the only answer that can be given at this point would be based on an assumption that all stands would be managed in a similar manner with a similar end product in mind, which means the limiting factor would be the site index of the stands in the area. These indices have been presented and discussed in the previous response. Any production figures derived from the site index for this area should probably be halved as personnel with the Florida Forestry Commission state that the rate of stocking for natural stands is one-half that which is assumed when preparing timber volume tables.

3. Comment
Request for the environmental effects of not producing timber on the land proposed for the generation site and transmission corridors.

Response
One environmental effect very important to this area would be the changes in wildlife habitat provided by the forest ecosystem. This effect has been discussed in Section 10.5.2 of the Environmental Analysis (EA) which was attached to the Draft EIS as an Appendix. The effect would be similar on the generation site as well as the transmission corridors.

Other environmental effects, addressed in Section 10.5.4 of the EA, include a potential for increased soil erosion and siltation near streams.

4. Comment
What are the long term effects of committing commercial forest lands to the proposed use?

Response
The maintenance procedures necessary for transmission lines preclude timber production as a possible land use within the right-of-way. Therefore, commercial timber production would be excluded from the right-of-way for the life of the line. Acreages for the proposed rights-of-way will vary according to the section of line; some sections of line will share existing rights-of-way while others will require new rights-of-way. Shared right-of-way would be widened by 75 feet. Newly constructed right-of-way would be 150 feet wide. Approximately one half of the 195 miles of line would share right-of-way and the other half would require new right-of-way. Transmission lines would go through seven counties in Florida that contain cumulatively over two million acres of commercial timber land. Therefore, the loss of land capable of timber production would be approximately one-tenth of one percent of the total of the seven counties.

5. Comment
How much prime timber land is involved?

Response
The State Division of Planning recognizes three classes of potential timber land, i.e., #1 - high, #2 - medium, and #3 - low. The Florida Division of Forestry considers any area classified as #1 potential as being prime timber land. Approximately thirty-eight percent of all the proposed corridors cross high potential or prime timberland. Percentages for each corridor segment are present in the response to Comment 1.

8.1.1.5 Soil Conservation Service/U. S. Department of Agriculture (letter dated June 26, 1979)

Comment

As to impacts on soil resources during construction discussed in paragraph 4, page 102 (DEIS), we recommend that some precautionary measures be taken to lessen soil erosion impacts. On those soils highly susceptible to erosion, practices such as water bars, water turnouts, temporary seeding, and temporary sediment traps should be used. Stream crossings, during construction, should be of ample size to prevent washout and possible degradation to streams.

Response

To the extent practicable and necessary, the suggested measures will be utilized to mitigate soil erosion and minimize stream degradation. Seminole shall follow, to the extent practicable, the USDA/USDI guidelines contained in the Environmental Criteria for Electrical Transmission Systems (1970) to minimize any adverse environmental effects which may be associated with the construction, operation and maintenance of the transmission line and associated facilities.

8.1.1.6 U. S. Department of the Interior (letter dated July 2, 1979)

Comment 1

Statement generally adequate in coverage of impacts to mineral and fish and wildlife resources.

Response

No response required.

Comment 2

No conflict with or impacts on any unit of the National Park System.

Response

No response required.

Comment 3

Consultation with local and state officials may be adequate to identify problems during transmission corridor selection.

Response

No response required.

Comment 4

Historic and archaeological field survey should be performed in consultation with the Florida State Historic Preservation Officer. Design flexibility should be provided to avoid historic or archaeological resources identified in this investigation.

Response

Seminole has agreed to consult with the State Historic Preservation Officer; to conduct an archaeological survey of the transmission tower locations prior to construction; and to avoid historic or archaeological resources identified in the investigation. Refer to page 139 of the FEIS for additional discussion.

Comment 5

Potential contamination of surface runoff from coal piles, disposal sites for ash, flue gas desulfurization and other wastes should be discussed.

Response

Runoff from the coal pile will be collected and processed through the chemical waste treatment system prior to discharge. Runoff from the flue gas desulfurization wastes, which combine ash and FGD. wastes will not be discharged but recycled within the FGD system.

Comment 6

Discuss eventual reclamation of the waste disposal sites.

Response

There are no plans to reclaim the waste disposal sites. However, solid waste re-use has been investigated. Solid wastes from the flue gas desulfurization process will be used to build a liner for storage of bottom ash and fly ash, separately or as a blend. After construction of the liner, if an oxidized scrubber sludge (gypsum) becomes marketable, the sludge could be sold. Also, bottom ash can be disposed of in other ways since it is not used in the stabilizing process. Please refer to Section 6.3 of the EIS for additional discussion.

Comment 7

The potential impact of herbicide usage to maintain transmission right-of-ways should be discussed more thoroughly, especially the impact on groundwater.

Response

Since the decision to use a particular herbicide has not been made, specific impacts cannot be discussed. If herbicides are required for right-of-way maintenance, Seminole will only use safe herbicides that are non-persistant, and when applied according to manufacturers specifications, will not harm non-targeted vegetation and are approved by State and Federal authorities. Seminole will further seek approval from the Florida Department of Environmental Regulation before herbicide application.

Comment 8

Does Table 5.2-2 represent effluent concentrations after dilution within the mixing zone? Define "ambient concentration."

Response

Table 5.2-2 shows ambient concentrations of effluent parameters and the size of mixing zone required for compliance with water quality standards of Chapter 17-3, F.A.C. "Ambient concentrations" refers to the concentration of the parameter existing in the receiving water body prior to effluent additions.

Comment 9

The chlorine concentrations of 0.1 mg/l listed on page 119, paragraph 2 appear to be ten times higher than the EPA and Florida recommended maximum concentrations shown on Table 5.2-4.

Response

Total residual chlorine will be limited to a maximum instantaneous concentration of 0.1 mg/l at the point of discharge. This will assure compliance with Florida Water Quality Standards. The effluent will further be diluted by a factor of 10 to 0.01 mg/l, as allowed by Florida Water Quality Standards, within one acre.

Comment 10

The mixing zone sizes reported on page 119 are not consistent with those in Table 5.2-2.

Response

Mixing zone sizes are regulated by Florida Water Quality Standards and are shown in revised Table 5.2-2 and the State "Conditions of Certification."

8.1.1.7 Environmental Protection Agency (July 3, 1979)

Comment 1

Page 9, Section 2.5.2.1. An addition should be made to the first sentence of the Section so that it reads: "...for condenser cooling (NPDES Serial No. 005, See Draft National Pollutant Discharge Elimination System (NPDES) Permit in Appendix 8.2).

Response

REA has reviewed the comment and the appropriate change has been made in Section 2.5.2.1.

Comment 2

Page 9. The first sentence of the last paragraph on this page should be modified to read: "Discharges from the central wastewater treatment system (NPDES No. 002) Sanitary System (NPDES No. 003) and cooling tower blowdown (NPDES No. 004) will be made to the St. Johns River by single discharge pipe (NPDES No. 001)."

Response

REA has reviewed the comment and the appropriate change has been made in Section 2.5.2.1.

Comment 3

Page 10, first complete paragraph, third line. The word "silt" should be replaced with the word "oil" so that the sentence reads: "...source, separate oil before pumping..." (See Page 34, first paragraph).

Response

REA has reviewed the comment and the appropriate change has been made in Section 2.5.2.1.

Comment 4

Page 10, second complete paragraph. This paragraph should be modified to show that discharge will be limited to a maximum instantaneous concentration of total residual chlorine (TRC) of 0.1 mg/1 regardless of the number of units in operation. Holdup of blowdown until TRC has dissipated to acceptable levels will be practiced.

Response

REA has reviewed the comment and the appropriate change has been made in Section 2.5.2.1. Holdup of blowdown until TRC has dissipated to acceptable levels will be practiced.

Comment 5

Page 10, third complete paragraph. A new sentence should be added to the end of the paragraph as follows: "The maximum discharge temperature will be limited to 93°F (33.9^{o}C)."

Response

REA has reviewed the comment and the appropriate change has been made in Section 2.5.2.1.

Comment 6

Page 10, Section 2.5.2.1. Another potential discharge to the water table aquifer is leachate from the land spreading of sanitary sewage sludge.

Response

Land spreading of sanitary sludge is not proposed. Sanitary sludges are to be disposed with scrubber wastes encapsulated between layers of scrubber sludge.

Comment 7

Page 11, third paragraph. This paragraph should be revised as follows and possibly be placed as first paragraph of the Section:

Section 316(b) of the Clean Water Act requires "that the location, design, construction, and capacity of cooling water intake structures reflect the best technology available for minimizing adverse environmental impact.

To meet these requirements the following features are proposed:

(a) Location. Insert present item number 4 from DEIS.

(b) Design. A cylindrical wedge-wire screen system with 1 to 2 mm screen openings will be used rather than conventional 10 mm (3/8 inch) mesh size providing for through screen water velocity of about 0.15 mps (0.5 fps). Field tests are presently underway to determine optimum screen opening size.

(c) Construction. No necessary construction techniques to assure compliance are to be included in the Corps of Engineers Section 10 permit.

(d) Capacity. Use of cooling towers for the plant will reduce make-up water rate to less than three percent of a comparable once-through system. Plant make-up will utilize less than one-half of one percent of the flow of the St. Johns River. Additionally, cooling tower blowdown is proposed for use as make-up to the flue gas desulfurization system and bottom ash sluice system (to the extent practicable), thereby further reducing plant water withdrawal.

Response

REA has reviewed the comment and the appropriate changes have been made in Section 2.5.2.2.

Comment 8

Page 11, last paragraph. The first word in the seventh line should be changed from "blowdown" to "plant discharge" since item "(3)" is not a component of the blowdown. In the eighth line the word "about" should be added since cycles of concentration will vary. The sentence would then read "...but concentrated about four times..."

Response

REA has reviewed the comment and the appropriate change has been made in Section 2.5.2.2.

Comment 9

Page 12, first complete paragraph. The second sentence should be reworded since a mixing zone does not "assimilate" wastes. We suggest: "Residual heat and wastes will be mixed within the St. Johns River in the area of a mixing zone assigned by the State of Florida and should not..."

Response

REA has reviewed the comment and the appropriate change has been made in Section 2.5.2.2.

Comment 10

Page 12 and Page 17, second complete paragraph. Total residual chlorine will be limited to a maximum instantaneous concentration of 0.1 mg/l at the point of discharge. This will assure compliance with acute toxicity requirements of Sections 17-3.051 and 17-4.244 of the Florida Water Quality Standards. The effluent would be diluted by a factor of 10 to 0.01 mg/l, the applicable State criterion of Section 17-3.121, within an area of one acre. This information should be included in the FEIS.

Response

REA has reviewed the comment and the appropriate change has been made in Section 2.5.2.2. The change does not apply to page 17.

Comment 11

Page 13, Section 2.5.2.3, the first sentence is incorrect. The Clean Water Act (CWA) does not regulate groundwater in any way. (It is not clear to the writer whether RCRA on the Safe Drinking Water Act covers seepage from waste ponds and piles and/or discharges from percolation ponds to groundwater.) Further, "use of surface waters" is not regulated under the CWA. Revision of this paragraph is, therefore, necessary.

Response

REA has reviewed the comment and the appropriate change has been made in Section 2.5.2.3.

Comment 12

Page 13, Section 2.5.2.3. Section 316(b) and its requirements should be mentioned in this section.

Response

REA has reviewed the comment and the appropriate change has been made in Section 2.5.2.3.

Comment 13

Page 13, Section 2.5.2.3. Standards of performance for new sources (SPNS) as required by Section 306 of the Clean Water Act were promulgated in 40 CFR Part 423 on October 8, 1974. This information should be included in this section as well as reference to a table of SPNS. A suggested table was previously provided to REA and should be included in the FEIS.

Response

REA has reviewed the comment and the appropriate changes have been made in Section 2.5.2.3. The referenced table number is 6.1.

Comment 14

Page 13. The word "will" in the last sentence of the first paragraph should be replaced with "is expected to". This sentence would probably be better placed in Section 2.7.

Response

REA has reviewed the comment and the appropriate change has been made in Section 2.5.2.3.

Comment 15

Page 17a. The following should be added: "EPA has evaluated waste treatment facilities and procedures proposed by SECI and expects that proper operation of the facilities will result in compliance with EPA standards of performance for new sources, with SPNS, the Florida Water Quality Standards and requirements of the Draft NPDES permit."

Response

REA has reviewed the comment and the appropriate change has been made in Section 2.5.2.3.

Comment 16

Page 13. The projected concentrations of cadmium mentioned here and the concentrations of chromium mentioned in Appendix D of the EA are of concern with regard to impacts to the water table aquifer.

Response

REA has reviewed the comment and the appropriate discussion is found in Section 2.5.2.2. A review of chromium data indicates that it will not affect the water table aquifer.

Comment 17

Page 14, Section 2.5.2.3. The Coastal Zone Management Plan should be mentioned in the discussion of land uses.

Response

Florida does not have a Coastal Zone Management Program. The Coastal Zone Management Biophysical Atlas referenced in the Environmental Analysis and dividing the coastal areas into "Development," "Conservation," and "Preservation" categories is not an officially sanctioned document.

Comment 18

Page 17. Based on information in the Draft EIS and from Seminole, the EPA has been assured that wetland areas on the north end of the property will be protected from direct or indirect impact resulting from waste disposal operations.

Response

No response required.

Comment 19

Page 18, Section 3.0. It would be appropriate to have Seminole update its recent experienced load peaks and to compare this data to what was earlier projected.

Response

REA has reviewed the comment and the appropriate change has been made in Section 3.0 and Table 2.

Comment 20

Page 20. It may be worthwhile to investigate the seeking of short of intermediate term purchases of power generation capacity from Georgia Power Company. Recently, this Utility sought to sell sizable portions of Plant Scherer. It is also known that sulfur capacity exists and that a new nuclear unit (about 810 MW) is nearing operational status.

Response

Power generation capacity purchased from the Georgia Power Company were considered by Seminole. Transmission line limitations between Georgia and Florida made capacity purchases uneconomical. Please refer to the response to comment 14 of your April 6 letter.

Comment 21

Page 23. The DEIS does not indicate any consideration of several smaller power plants vs one large plant as Seminole has proposed. Factors such as reliability and transmission costs may be significantly better with smaller facilities, especially since the service area extends nearly the length of peninsular Florida. It is noted that in 1986 when the demand is projected to be 1793 MW, about 63% will be supplied from the two Seminole units. Unexpected loss of one unit's capacity would have a severe impact unless ample system back-up is certain.

Response

Studies made by Seminole indicate that the addition of a 600 MW unit in 1883 and in 1985 would have a favorable financial impact on the cost of power to Seminole's members. The proposed units would also greatly improve the reliability of the bulk generation and transmission system serving the State of Florida "peninsula" area. In 1983, after the first unit would go into commercial operation, Seminole's total installed capacity would be 614 MW while the peak demand is estimated to be 1835 MW. In 1985, after the second unit would go into commercial operation, Seminole's total installed capacity would be 1214 MW while the peak demand is estimated to be 2235 MW. The 600 MW units would be suitable for both base load and intermediate load operation. Seminole's projected combined base load and intermediate load requirements are 1284 MW and 1564 MW in 1983 and 1985, respectively.

The size selected is large enough to take advantage of the economics of scale in construction, offer better heat rates than smaller units and are projected to have higher capacity factors. This has been confirmed by Seminole's consulting engineer and by information from the 1976 Council on Economic Priorities publication on Power Plant Performance. The use of several power plant sites would also require more land and additional transmission facilities. The environmental effects would cover a greater area. An analysis indicates a lack of viable power plant sites in the Florida panhandle which would be further reduced if Seminole used multiple sites.

Comment 22

Page 24. Low sulfur coal has not been mentioned as an alternative air pollution control strategy. There should be a discussion of its use. It should be explained why the Cooperative has not elected to use low sulfur coal. The discussion should include (a) how recent regulations under the Clean Air Act require SO_2 removal; (b) the lack of need for very stringent limits below new source performance standards. and (c) economic aspects of such a control strategy.

Response

The 1977 Amendments to the Clean Air Act require major new sources to install Best Available Control Technology and comply with New Source Performance Standards. Under the Amendments coal-fired units, whether firing low or high sulfur coals, would be required to apply Best Available Control Technology. This consequently destroyed the economic incentive for complying with New Source Performance Standards by using low sulfur coals soly

In late 1977, Seminole recognized the potential impact of the Amendments and switched its fuel selection strategy from the use of low sulfur coals. Part of the rationale for the decision was the fact that sources currently using fuels with less than 1% sulfur content and not subject to BACT were expected to continue a strong demand for this fuel type. In order to minimize electrostatic precipitator costs, coal with sulfur content greater than 1-1/2% was sought.

Early in 1978, Seminole began a search for long-term medium sulfur content coal supplies and initiated modifications to plant design to accommodate flue gas desulfurization equipment.

In January 1979, Seminole entered a contract for the supply of 80% of its coal requirements for Seminole Plants No. 1 and 2 through the year 2010. This coal supply provides a washed product with sulfur content of about 2.75% at a heat rate of 11,700 Btu/lb or better. According to a study by J. E. Jones, Director, Kentucky Department of Energy, presented at the Southern States Energy Board Seminar on PSD July 10, 1979, the total cost to operate a power plant with scrubbers using Western Kentucky coal available to Seminole is slightly less than that using low sulfur Eastern Kentucky coal.

Comment 23

Page 25. Regarding coal slurry pipelines, it should be noted that EPA, Region IV, has been contacted about this type of project.

Response

No response required.

Comment 24

Page 25. It is not clear how much solar water heating on the user level has been factored into decreasing load projections by the applicant. Page 29, third paragraph. Even though it appears that the over riding reason is proved performance behind Seminole's selection of a "throw-away" type reactant FGD system, the environmental benefits of a regenerative type system have not been emphasized sufficiently. The waste disposal problem is significantly reduced and the resource requirement for the reactant also reduced to a fraction of that for the selected system. There are the attendant continual costs for transportation, etc., which may not have been figured into the cost comparison.

Response

Use of solar water heating is not expected to significantly impact load projections within the timeframe of the proposed units (1980 to 1985). The appropriate discussion is found in Sections 4.2.4 and 4.4.3.1.

Comment 25

Page 29. Scrubber technology has been under attack from both industry and conservation forces nationwide. Therefore, a very simple summation of FGD lime/limestone experience would be appropriate. The PEDCO reports contain nearly all the industry experience with scrubbers presenting reliability, efficiency, etc.

Response

Ninty percent of all flue gas desulfurization systems in operation, under construction or planned for 1980 are some form of a lime/limestone system. Improving SO_2 removal efficiency on lime/limestone systems involves the careful balancing of reactivity of scrubbing liquid; degree of gas/liquid interface; the liquid to gas ratio ; the gas residence time; and the number of scrubber stages. Efficiencies of 90 percent can be obtained.

Comment 26

Page 29. Flue Gas Emissions Control. Fluidized bed combustion of coal should be considered because of its excellent pollution control characteristics. Mr. Howard Feibus at the Department of Energy, Washington, D. C., has been mentioned to EPA as being an authority on industrial application of new energy technology.

Response

Fluidized bed combustion was not considered for use in the proposed Seminole Plant Units No. 1 and No. 2 since this equipment was not commercially available during September 1978 when boiler purchase was required. Foster Wheeler Corporation and Pope Evans and Robbins are testing a 30 MW demonstration unit in West Virginia, but Foster Wheeler does not believe such units will be commercially available until 1980.

Comment 27

Page 30, Once-Through, seventh line. Use of a "cooling pond" as an alternate cooling methodology should not be included in this paragraph but as a separate paragraph. A "cooling pond" is not a method of once-through cooling, but is considered a technological off-stream cooling device. as is a cooling tower.

Response

The reference to use of a "cooling pond" has been removed from the discussion of once-through cooling. Spray ponds and cooling ponds were considered as alternative cooling devices in Section 9.2.3.4 of the "Site Certification Application and Environmental Analysis." These were rejected due to the land area required (approximately 1,500 acres) and because the site geological and soil conditions would not be suitable.

Comment 28

Page 30. Delete reference to cooling ponds under the Once Through cooling discussion. This method is considered off stream like towers, and is an evaporative system.

Response

REA has reviewed the comment and the appropriate change has been made in Section 4.4.4.

Comment 29

Page 30. It would be better to use the more common gallons per minute limits instead of acre-feet and to compare the withdrawal rates for once-through with off-stream cooling.

Response

REA has reviewed the comment and the appropriate change has been made in Section 4.4.4.

Comment 30

Table 9.3-1, Item #3 under Corridor A. This statement is not correct according to the EA. Macrophytes are present.

Response

REA has reviewed the comment and the appropriate change has been made in Table 9.3-1.

Comment 31

Page 33. The change in proposed intake location is not reflected in the discussion.

Response

REA has reviewed the comment and the appropriate change has been made in Section 4.4.6.

Comment 32

Page 33. The discussion and identification of the radial well intake system as the most environmentally preferred is good. EPA agrees with the rationale for not selecting this intake.

Response

No response required.

Comment 33

Page 32, New Section. Consideration should be given to providing a multiport diffuser as an alternate to a single discharge port. Such a structure could be provided to assure a 10-fold dilution or greater at a relatively modest cost. Such a structure would rapidly dilute effluent pollutants in close proximity to the POD and assure that chronic and/or acute toxicity conditions do not exist. Required mixing zone site would be significantly reduced.

Response

A multiport discharge was considered, but all test model runs showed that a single-port high-velocity discharge assured proper dilution.

Comment 34

Page 34, Section 4.4.7, last paragraph. It is not clear that "bottom ash ponds" are the alternate, and that the "separate collection-equialization systems" are the proposed technology.

Response

REA has reviewed the comment and the appropriate change has been made in Section 4.4.8.

Comment 35

Page 35, Solid Waste Disposal. A more specific alternative disposal procedure for the ash-scrubber sludge wastes could incorporate phased activities. A series of small containment dikes could be constructed with fixed material starting at the higher elevations of the proposed disposal site. Monitoring of surface run-off and leaching from these smaller areas would be a more cautious approach than proceeding on full scale diking up to the wetland area. Phased site clearing could then also be employed for the disposal area.

Response

Seminole no longer plans to develop the full 275 acre solid waste disposal site at one time. Rather, it plans phased development, initially conducting tests of various site disposal techniques using pozzolanic technology. Sludge disposed during the test period will be fully fixed chemically to avoid contamination of ground and surface waters. During the testing phase, surface water runoff and leachates will be monitored. A permanent disposal plan will be developed at the end of the test program. The plan is expected to employ phased clearing and area compartmentalization.

Comment 36

Page 35. There is apparently a discrepancy on the selected project here with that described in the EA. If only a portion of the FGD/ ash waste is to be chemically fixed to form a liner and dikes, then this clarification must be included in the DEIS.

Response

The test program mentioned above, is designed to identify the most suitable long term solid waste disposal program. If the test results demonstrate that only a portion of the solid wastes will need to be chemically fixed in order to assure environmentally suitable disposal, Seminole would provide a suitable liner of chemically fixed sludge and encapsulate unfixed sludge in lieu of creating dikes. No decision will be made until the test results have been evaluated.

Comment 37

Page 35. The solid waste disposal scheme has been modified by SECI. The present scheme should be well defined.

Response

As provided in the State Conditions of Certification, the FGD sludge disposal test and evaluation program will be implemented in accordance with the program outline submitted to EPA and DER on April 27, 1979, and contained as an attachment to the Conditions of Certification (Appendix 9.2.3).

Comment 38

Page 35. There is no indication that solid waste re-use has been investigated. The resulting sludge is a gypsum-lime material which could be used and it is known that nearly all the fly ash byproduct from Units 1 and 2 at Crystal River Plant went into the construction of the nuclear unit at that plant site.

Response

Solid waste re-use has been investigated. Solid wastes from the flue gas desulfurization process will be used to build a liner for storage of bottom ash and fly ash, separately or as a blend. After construction of the liner, if an oxidized scrubber sludge (gypsum) becomes marketable, the sludge could be sold. Also, bottom ash can be disposed in other ways since it is not used in the stabilizing process.

Comment 39

Page 36, Section 4.4.8. Seminole's waste disposal plant has been revised. Seminole will conduct a two-year study to evaluate disposal models and monitoring needs. The Final EIS should reflect this change. A plan of study for evaluating waste disposal models and monitoring needs should be submitted to EPA by Seminole before an NPDES permit is issued.

Response

Please refer to responses to Comments 35, 36 and 37.

Comment 40

Page 54. We disagree with the use of the term "freshwater estuary" to describe the St. Johns River. Also, Cyathura is mispelled (pg. 68).

Response

The Florida Department of Environmental Regulation has determined for purposes of compliance with water quality standards that the portion of the St. Johns River in the area of the plant is an "estuary."

Comment 41

Page 58, Section 5.4.1.3. Mixing zone requirements are contained in Section 17-4.244 of the Florida Administrative Code and toxicity requirements are contained in 17-3.051 and 17-4.244. This information should be included in the FEIS.

Response

REA has reviewed the comment and the appropriate change has been made in Section 5.3.1.3.

Comment 42

Page 72. Discussion on the manatee in the EIS is inconsistant with the Environmental Analysis because in that document grassbeds are said to be present. The analysis of manatee presence and impact from plant construction and operation should be reconsidered. The impacts to the grassbeds are now minimal due to the change in intake location and presently proposed construction procedures.

Response

REA has reviewed the comment and the appropriate change has been made in Section 5.4.4.

Comment 43

Page 95, second paragraph. The power plant referenced is the Putnam Plant at Palatka, Florida. The Palatka Plant of FP&L which utilizes once-through cooling is adjacent to the Putnam Plant and is presently in cold standby status. Both plants should be mentioned.

Response

REa has reviewed the comment and the appropriate change has been made in Section 5.6.4.1.

Comment 44

Page 109. Even though no standards exist for trace element emissions, the EIS should address them to the extent possible. Radiological emissions (uranium and thorium daughter elements) do occur from the combustion of coal.

Response

Analyses of coal from sources to be used in the Seminole Units shows the coal contains about 0.0015% uranium and 0.0006% thorium. Assuming average operating levels, (68% capacity factor), 99.6% removal of fly ash, emissions of uranium and thorium are 538 g/day and 170 g/day, respectively. Most of the radioactivity contained in coal is retained with the fly ash or bottom ash. This ash will not contribute to public exposure because it will be fixed in place in the FGD waste solidification process and stored on site. Calculations of second high 3-hour ground level concentrations based on the above discharge rates are estimated to be 1.6×10^{-14} uCi/cc. to total activity.

Comment 45

Page 111. The effect of plume and stack emission interaction is not uncertain; acidic water droplets typically result. It is the rapidity and degree of pH lowering which is not easy to predict.

Response

REA has reviewed the comment and the appropriate change has been made in Section 6.1.1.2.

Comment 46

Page 114, Section 6.1.2.2. first paragraph, fifth line. "(NPDES No. 004)" should be inserted after the word blowdown to read "... blowdown (NPDES No. 004), will contain..."

Response

REA has reviewed the comment and the appropriate change has been made in Section 6.1.2.2.

Comment 47

Page 115, third paragraph. The following sentence should be added to the paragraph: "Maximum design discharge temperature is 33.9°C (93°F). Celcium equivalents should be provided in the paragraph and elsewhere.

Response

REA has reviewed the comment and the appropriate change has been made in Section 6.1.2.2.

Comment 48

Page 117, Chemical Analysis, first paragraph. Reference to Table of SPNS should be included. Second paragraph - NPDES serial numbers should be inserted after cooling tower blowdown (004), chemical wastewater treatment facility (002) and sanitary waste (003). Revised Figures 2 and 3 should be included. Reference to Table "VI" should be "VII."

Response

REA has reviewed the comment and the appropriate change has been made in Section 6.1.2.2.

Comment 49

Page 119, second paragraph. The applicant has modified his NPDES application to indicate that the maximum instantaneous discharge of TRC will be 0.1 mg/l regardless of the number of units in operation. The required mixing zone to achieve a residual of 0.01 mg/l at the boundary will be less than or equal to 1.0 acre. Table 5.2-2 requires similar correction.

Response

REA has reviewed the comment and the appropriate change has been made in Section 6.1.2.2.

Comment 50

Page 119, last paragraph. A sentence should be added: "A maximum discharge concentration of 0.1 mg/l of total residual chlorine in the plant discharge (NPDES No. 001) will not result in acute toxicity conditions within the mixing zone and will assure compliance with Florida Water Quality Standards."

Response

REA has reviewed the comment and the appropriate change has been made in Section 6.1.2.2.

Comment 51

Page 120, last complete paragraph. The word "location" should be used instead of "placement" three times.

Response

REA has reviewed the comment and the appropriate change has been made in Section 6.1.2.2.

Comment 52

Page 120. Land spreading sewage sludge is a fifth potential source of impact to the water table aquifer. If this operation is carefully controlled, we would not expect any impact on groundwater quality.

Response

Please refer to response to comment 6.

Comment 53

Page 121. Although drinking water standards were not developed nor intended to be used for the evaluation of groundwater quality, they do serve as a general index when used with respect to the limited treatment capabilities of private-well usage. The naturally high background TDS and sulfate concentrations of the area coupled with estimated increases from leachate would bring respective levels leaving the project boundary of 615 mg/1 and 720 mg/1. Both of these levels would exceed proposed secondary maximum contaminant levels and would impact or perhaps impair potential and existing private-well groundwater usage down gradient from the project boundaries.

Response

The initial concentration of sulfate from coal pile runoff of 5,230 mg/1 used for the impact evaluation was obtained from the literature. At that time, the coal source was not known and could not be taken into account in estimating concentrations. Current projections of initial sulfate concentrations are 50 to 200 mg/l. At an initial concentration of 200 mg/l, the estimated increase in concentration at the property boundary would be approximately 30 mg/l. With a background concentration of 12 mg/l, the estimated sulfate concentrated at the property boundary would be about 42 mg/l, well below the EPA criteria of 250 mg/l. Adverse impacts to off-site groundwater quality are, consequently, not expected.

Comment 54

Page 122. Leachate from coal storage areas bearing elevated concentrations of trace elements and heavy metals would also be of concern with respect to groundwater usages in outlying areas. We would suggest strict adherence with the short and long-term monitoring programs as outlined. We would also bring to light that a perpetual inventory of private, municipal, and industrial usages of groundwater down gradient of the project does not seem to have been incorporated within the monitoring program.

Response

Impact of potential leachate from the coal storage area will be evaluated at the site boundary. Should the data indicate significant adverse impacts could be expected at the site boundary, mitigative measures will be taken. Consequently, any users of groundwater down gradient and offsite will be protected. If results indicate that a perpetual inventory is required, then Seminole will undertake such a program.

Comment 55

Page 122. Refer to Comment No. 39. Final EIS should reflect new disposal and monitoring plans for coal storage areas.

Response

Please refer to Comment 39.

Comment 56

Page 122, Section 6.1.2.2. In the groundwater impact analysis (EIA Appendix D) it was demonstrated that Florida's water quality criteria would be met at the property boundary. This approach is consistent with EPA's proposed solid waste disposal facility performance standards (Classification Criteria for Solid Waste Disposal Facilities) in which the groundwater criteria are applied at the property boundary. However, many commentors on the proposed regulation argued that this approach circumvents the intent of RCRA by allowing companies with large land holdings to contaminate large areas of groundwater beyond the immediate vicinity of a permitted disposal site. The final regulation (due out in July 1979) may contain more stringent groundwater criteria in response to public comment. Therefore, Seminole may need to evaluate the capability of their disposal models to meet more stringent requirements than contained in Florida's regulations.

Response

No response required.

Comment 57

Page 125, Section 6.1.3.2. Depending on the type of waste disposal system selected, the potential exists for an irretrievable commitment of 275 acres of perpetual waste storage. Seminole should evaluate their disposal models with respect to future land use options for the disposal area.

Response

Please refer to responses to comments 35 and 38.

Comment 58

Page 125. Another operational impact that needs to be addressed here is the impact to the wetlands north of the solid waste disposal area. The area proposed for ash and sludge disposal is designated as lowland and classified in the State Coastal Zone Management Atlas as a "preservation" area. In light of this, a more thorough explanation of the "lowland" nature of this area should be presented to more clearly identify it as being ecologically separable from the wetlands it adjoins. Additionally, the source of inundation for the swamp and lowlands in the northern portion of the site should be explained in order for the reviewer to better understand the hydrologic character of these areas and their relationship, if any, to the river or tributary streams.

Response

REA has reviewed the comment and the appropriate change has been made in Section 6.1.3.2. Please refer to comment 18 and response to comment 17.

Comment 59

Page 125. The Section, Operational Impacts to Terrestrial Ecology, does not contain the impacts of air pollutants on soils and biota, especially sensitive vegetation. Because of the comments heard at the public hearing about local cash crops, this assessment should focus on the potential effects of SO_2, particulates and low pH rainfall to potato and cabbage plants. There exists in the literature good information on proved vegetative impacts from the subject pollutants thus enabling some degree of comparison of emission rates and ground level concentrations.

Response

REA has reviewed the comment and the appropriate change has been made in Section 6.1.3.2.

Comment 60

Table C-8. Water quality standards information contains errors. The following corrections are necessary:

The Dissolved Solids limit applies to water supply (Class 1A) only.

Specific conductance Delete...for streams considered to be fresh water streams.

Radioactive Substances Delete entirely and substitute: (1) combined radium 226 and 228 shall not exceed five picocures per liter. (2) Gross alpha particle activity including radium 226, but excluding radon and uranium shall not exceed fifteen (15) mg/liter, or ...Substitute: Dissolved or emulsified greases shall not exceed 50 mg/l...

Fluoride Delete entirely except for last part of last sentence beginning with...shall.

Response

Table C-8 - "Water Quality Standards Pertinent to all Florida Waters" was incorrectly included in the DEIS and has been deleted. Table C-8 now refers to Water Quality Data - St. Johns River as referenced by the discussion contained on page 109, now refer to as Table 6.32.

Comment 61

Page 138. Operational impacts from increased rail traffic has not been addressed with respect to time of day of trains and the effect to vehicular traffic at points of congestion.

Response

Rail traffic to the area will increase by about 1 train per day. Little congestion of vehicular traffic is expected since the rail route is being planning to avoid populated areas as possible. The time of day that the train will arrive is not known at this time.

Comment 62

Page 140. Section 6.2.2.2, first paragraph, last sentence. "Total residual chlorine" should be substituted for "free available chlorine."

Response

Closing of the blowdown values during cooling water chlorination treatment of the cooling towers will reduce the discharge of total residual chlorine to meet the chlorine effluent limit of 0.1 mg/l at the point of discharge.

Comment 63

Page 143. In response to the question posed April 12, 1979, to REA regarding accidental air emissions excursions, Seminole's consultant Dames and Moore has presented an assessment of potential for and degree of such occurrences. Review of this matter is not complete and suggested EIS Additions will be forthcoming.

Response

Please refer to the response to EPA's April 12, 1979, letter, Section 8.1.1.2.

Comment 64

Tables following Page 143. (a) Corrections to several Tables including 5.2-2, Va, Vb, Vd, Ve, and VII will be necessary as a result of amendments to the NPDES applications. (b) Table 5.2-4. Comments including requested changes were previously provided to REA on April 6, 1979.

Response

REA has reviewed the comment and the appropriate changes have been made.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION IV

345 COURTLAND STREET
ATLANTA, GEORGIA 30308

APR 6 1979

FILE ID NUMBER	SUBJECT
A	126-6.3A.5

Mr. Gilbert Broyles
Chief, Power Planning Branch
Rural Electrification Administration
USDA
14th and Independence, S.W.
Washington, D.C. 20250

RE: Proposed Seminole Electric Cooperative Generating Station

Dear Mr. Broyles:

On March 26, 1979 EPA Region IV received for review and comment the preliminary Draft EIS prepared by REA on the subject project. This document has been reviewed by our office along with Seminole's Environmental Analysis (EA), as revised 3/15/79. As you know EPA must make a permitting decision on a new source NPDES permit based on the Federal EIS. It is for this reason that these comments are offered on the preliminary DEIS. EPA as a coordinating agency in this effort will continue to strive to make this EIS consistent with this Agency's NEPA responsibilities.

The attached comments are directed towards information in both the preliminary DEIS and the EA. Therefore a comment made on one may be equally appropriate for the other even if not specifically stated.

It should be noted in the comments that strong environmental reservations are made regarding (a) the potential impacts to the ground water and wetlands from the waste disposal operations, (b) the impact of the proposed chlorinated discharge to the St. Johns River and (c) the proposed nearshore location of the cooling water intake. Discussions between EPA and the Applicant (and the REA if desired) should be initiated soon with the objective of resolving these issues. Resolution of these issues may take considerable time. I am concerned that a resolution may not be able to be reached prior to the scheduled date of publication of the Draft EIS.

Let me say again that EPA is desirous of resolving all issues prior to publication of the Draft EIS if possible. Otherwise, EPA will further formalize it's concerns and attempt to reach resolution through the commenting process and prior to publication of the Final EIS. If resolution is not reached before issuing the draft, EPA's concerns should be noted in the draft in Section 2.5.

Our Permits Branch has been in recent contact with Seminole attempting to

resolve differences on the draft permit. It is important that this office be informed as to the latest point in time when revisions could be made to the permit prior to its publication in the DEIS. Also, a notice of the public hearing is in preparation by EPA which includes pertinent dates. Any changes from the previously established filing date of April 20 for the DEIS should likewise be brought to our attention.

Thank you for the opportunity to provide preliminary comment on the Draft EIS.

Sincerely,

Robert B Howard

Robert B. Howard
Chief, EIS Preparation Section

cc/with attachment
Robert Claussen, SECI
Ken Prest ELG, Inc.

Date: APR 1 19

Seminole Plant Preliminary Draft EIS

The comments which follow have been arranged first according to the document reviewed and in chronological order. Secondly, certain comments have been grouped by topic wherever it has been convenient to do so.

Comments on Preliminary DEIS

1. The preliminary DEIS is too long and does not comply with the CEQ, November 29, 1978 Regulations. It is noted in the Introduction that information in the DEIS supercedes information in the EA. A great deal of the EA has been included in the DEIS in identical form. To reduce the size of the document would it not be appropriate to include the EA material by reference. For clarification, it is also suggested that the DEIS precisely identify those areas where REA's assessment may differ from Seminole's assessment in the EA.

2. Page 6, DEIS Outline. Appendix 2 should read: " Draft NPDES Permit and Permit Rationale."

3. Page 2.9, last paragraph. Intake velocity is stated as 0.5 feet per second in the EA and elsewhere in DEIS.

4. Page 2.10 first paragraph. The distance offshore of the discharge from the intake is proposed to be at least 450 feet rather than 150 feet.

5. Page 2.12. The projected concentrations of cadmium mentioned here and the concentrations of chromium mentioned in Appendix D of the EA are of concern with regard to impacts to the Water table aquifer.

6. Page 2.14, 3rd complete paragraph. A sentence should be added after the second sentence as follows: "An application for an NPDES permit was submitted in October 1978 and is pending until completion of the National Environmental Policy Act Process. A copy of a preliminary...."

7. Page 2.14. In section 2.3, the PSD Approval is not correctly referred to as a "major Federal action" as those actions defined in the Clean Water Act. Also, compliance with the Endangered Species Act, National Historic Preservation Act, E.O. 11593 and site certification are not "major Federal actions."

8. Page 2.14, 4th paragraph. It is suggested that the last sentence be deleted at this time.

9. Page 2.14, Section 2.5.3.2. The Coastal Zone Management Plan should be mentioned in the discussion of land uses.

Poor Original

10. Page 2.15, second paragraph. A more accurate statement in place of the last sentence would be: Siting the plant and its attendent facilities outside of wetland areas and taking appropriate steps to assure that the plant does not significantly disrupt the normal functioning within the wetlands fulfills this responsibility.

11. Page 2.18, second paragraphs last sentence. The statement may not be correct or at least pre-mature. Studies on whether the gopher tortoise can be moved successfully are not finished. Also the presence of the manatee is more likely since grassbeds have been found near proposed intake and discharge area (according to EA pg. 4.4-2).

12. Page 2.19. It is not clear what the statement about other agency permits and conditions thereto means as it pertains to REA's loan guarantee. Clarification is needed.

13. Page 3.1, Section 3.0. It would be appropriate to have Seminole update its recent experienced load peaks and to compare this data to what was earlier projected.

14. Page 4.5. It may be worthwhile to investigate the seeking of short or intermediate term purchases of power generation capacity from Georgia Power Company. Recently, this Utility sought to sell sizable portions of Plant Scherer. It is also known that surplur capacity exists and that a new nuclear unit (about 810 mw) is nearing operational status.

15. Page 4.21. Low sulfur coal has not been mentioned as an alternative air pollution control strategy. There should be a discussion of its use. It should be explained why the Cooperative has not elected to use low sulfur coal. The discussion should include, (a) how recent regulations under the Clean Air Act require SO_2 removal (b) the lack of need for very stringent limits below new source performance standards, (c) economic aspects of such a control strategy.

16. Page 4.21, third paragraph. Even though it appears that the overriding reason is proven performance behind Seminole's selection of a "throw-away" type reactant FGD system, the environmental benefits of a regenerative type system have not been emphasized sufficiently. The waste disposal problem is significantly reduced and the resource requirement for the reactant also reduced to a fraction of that for the selected system. There are the attendent continual costs for transportation etc. which may not have been figured into the cost comparison.

17. Page 4.21. Scrubber technology has been under attack from both industry and conservation forces nationwide. Therefore a very simple summation of FGD lime/limestone experience would be appropriate. The PEDCO reports contain nearly all the industry experience with scrubbers presenting

reliability and operability and efficiency data.

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19. Page 4.23. It would be better to use the more common gallons per minute limits instead of acre-feet and to compare the withdrawal rates for once-through with off-stream cooling.

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21. Page 4.31. Consideration should be given to providing a multiport diffuser as an alternative to a single discharge point. Such a structure could be provided to assure a 10-fold dilution or greater at a relatively modest cost. Such a structure would rapidly dilute effluent pollutants in close proximity to the POD and assure that chronic and/or acute toxicity conditions do not exist. Required mixing zone size would be significantly reduced.

22. Page 5.131, 2nd paragraph. The power plant referenced is the Putnam Plant at Palatka, Florida. The Palatka Plant of FP & L which utilitizes once-through cooling is adjacent to the Putnam Plant and is presently in cold standby status. Both plants should be mentioned.

23. Page 4.31. The discussion and identification of the radial well intake system as the most environmentally perferred is good. EPA agrees with the rationale for not selecting this intake.

24. Page 4.33 Solid Waste Disposal. A more specific alternative disposal procedure for the ash-scrubber sludge wastes could incorporate phased activities. A series of smaller containment dikes could be constructed with fixed material starting at the higher elevations of the proposed disposal site. Monitoring of surface run-off and leaching from these smaller areas would be a more cautious approach than proceeding on full scale diking up to the wetland area. Phased site clearing could than also be employed for the disposal area.

25. Page 4.34. There is apparently a discrepancy on the selected project here with that described in the EA. If only a portion of the FGD/ash waste is to be chemically fixed to form a liner and dikes, then this clarification must be included in the DEIS.

26. Page 5.1. Sections 5.0 and 5.1 are missing.

27. Page 6.6. On the air quality assessment it is not clear if background concentrations were facotred into the modeling both on single source and interaction. Also, the origen of the background concentrations (whether modelied or from ambient monitors) should be stated.

28. Page 6.12, third paragraph. Circulating flow is 27 gpm as given on page 2.9 not 29 gpm.

29. Page 6.37. Near-field and far-field modeling of the thermal regime associated with blowdown discharge indicates little problem with thermal effects. Discharge volume is small relative to stream flow resulting in a T of 0.1°F within 500 feet of the POD under worst case conditions. Rapid dilution and dispersion of heated discharge by jetting it upward and away from the river bottom should be adequate to preclude any substantial thermal effects to the benthos proximate to the discharge point. Some limited perturbations to the benthic community in the immediate vicinity of the discharge point may occur during the summer when bottom water temperatures are expected to reach 93°F due to a combination of ambient and discharge temperatures, but even so, the area effected would remain small.

30. Page 6.40. Reference to 316(B) should be 316(b). Also "Siting" is misspelled.

31. Page 6.44. Footnote (a) should be changed to state "Required mixing zone. Designation in acres except where noted."

32. Page 6.57. Title of "Plant Liquid Effluent System" should be placed before material on page 6.30.

33. Page 6.57, last paragraph. The applicant has indicated in the NPDES application that maximum flows of domestic waste will occur during operation of Unit 1 while construction of Unit 2 is underway. During this period flows of 12.5 gpm are expected.

34. Page 6.58. Paragraph at top of page appears to be partial duplication of information on previous page.

35. Page 6.63 second paragraph. First, the manatee is not properly discussed under Terrestrial Wilflife since it is an aquatic mammal. Also, the discussion is inconsistent with the EA because grassbeds are stated to be present. The analysis of manatee presence should be reconsidered. The species of macrophyte present should be determined as well as its utilization by the manatee.

36. Page 6.31. The section on Operational impacts to land resources is missing in the text. The specific area of air emissions impacts was also not adequately addressed in the EA (Sec. 5.1). There will likely be an impact especially to sensitive vegetation but virtually undetectable when compared to studies in the literature on crops experiencing much greater concentrations of SO_2 and TSP. A comparison of expected conditions with documented situations of experienced damage would be appropriate.

37. Page 6.31. Another operational impact that needs to be addressed here is the impact to the wetlands north of the solid waste disposal area. The area proposed for ash and sludge disposal is designated as lowland and classified in the State Coastal Zone Management Atlas as a "presentation" area. In light of this, a more thorough explanation of the "lowland" nature of this area should be presented to more clearly identify it as being ecologically separable from the wetlands it adjoins. Additionally, the source of inundation for the swamp and lowlands in the northern portion of the site should be explained in order for the reviewer to better understand the hydrologic character of these areas and their relationship, if any, to the river or tributary streams.

Chlorine

a. Page 2.10, 3rd paragraph. The applicant has proposed to discharge 0.4 mg/l of total residual chlorine (TRC) when one unit is in operation and 0.2 mg/l when two units are in operation by staggering chlorination. EPA considers these concentrations to be unacceptable and has proposed a maximum instantaneous limit of 0.1 mg/l in the draft NPDES permit to assure compliance with toxicity requirements of Florida Water Quality Standards (17-3.051 and 17-3.061). Reference to this EPA proposed limit should be included at this point in the DEIS. Reference to the 0.4 mg/l concentration is also necessary if the 0.2 mg/l value is stated at this point in the DEIS. Also see Item 1.c. below.

b. Page 2.14, 3rd paragraph. Use of a mixing zone to achieve dilution of a toxic pollutant to a level which would protect aquatic organisms is not acceptable if acute toxicity levels are present within the mixing zone at a point where aquatic organisms could be subjected to that pollutant for periods of time sufficient to allow toxicity. Language expressing the above as well as the proposed 0.1 mg/l TCR limitation should be included in the DEIS at this point. See also Item 1.c. below. For the conditions stated, the instream concentration would be 0.01 mg/l not 0 mg/l as stated.

c. Page 6.36, 2nd and 3rd paragraph. EPA standards of performance for new sources allow discharge of TCR for period(s) not exceeding two hours per unit per day. Due to recirculation of cooling water through a cooling tower system, however, TRC will be present for more that two hours after chlorine addition to the system and may be detectable continuously if chlorine is added to the system one or more times per day. Therefore, limitations must be incorporated in the NPDES permit to assure that acute and/or chronic toxicity conditions do not occur in the receiving water body. Therefore, a maximum instantaneous limitation of 0.1 mg/l of TCR has been proposed in the draft NPDES permit. Available data (see Attachment I) indicates that holdup of blowdown for periods of approximately two hours will result in reduction of TCR levels to 0.1 mg/l or less. This approach has been utilized in permits for several new steam-electric generating plants including, Phipps Bend (TN), Sequoyah (TN), Watts Bar (TN), and Yellow Creek (MS) (see Attachment II). Notwithstanding this limitation it is necessary to assure a rapid 9 to 1 dilution of blowdown to assure that aquatic organisms can not be subjected to long exposures of 0.01 mg/l or more of TCR. Use of a multiport diffuser should be considered as an alternate to the single discharge pipe proposed. The above language should be incorporated in the DEIS at this point.

The 3.0 acre zone indicated in the third paragraph is predicated on two unit operation with a discharge concentration of 0.2 mg/l. As noted elsewhere in the statement a discharge of 0.4 mg/l from one unit would require a dilution zone of 23 acres. However, information submitted to EPA on

March 12 and 21, 1979, (see Attachment III) indicates that acutely toxic levels of TCR can be expected. Figure 2 (March 12, 1979) indicates that centerline plume velocity for Phase II (one-unit operation) will be less than two fps at a distance of about 17 feet from the POD and less than one fps at a distance of about 35 feet from the POD. Additionally, the figure submitted on March 21, 1979, indicates that TCR concentrations will be about 0.2 mg/l at 17 feet and 0.12 mg/l at 35 feet from the POD. Since adult fish can sustain swimming speeds in excess of one fps for significant periods of time, congregation in the vicinity of the discharge could occur where TCR concentrations exceed 0.12 mg/l for one unit operation. Data plots by Mattice and Zittel (Mattice, J.S. and Zittel, H.E., "Site-specific Evaluation of Power Plant Chlorination," Journal, Water Pollution Control Federation, 48, 2284, October 1976) indicate an acute toxicity threshold of 10 to 20 minutes for TCR concentrations of 0.20 and 0.12 mg/l, respectively. Similarly, for Phase III (two-unit operation) velocities of two and one fps occur at about 25 and 55 feet from the POD, respectively. TCR concentrations at these points are about 0.08 and 0.04 mg/l. Corresponding acute toxicity thresholds occur at about 40 and 100 minutes, respectively. The above information should be included in the DEIS as the basis for the 0.1 mg/l maximum instantaneous limitation on TCR proposed in the draft NPDES permit.

d. Page 6.39, 2nd paragraph. Although larger nekton may move away from the plume, there is no assurance that they will move away from low level toxic concentrations, especially in cooler weather where they may be attracted to the thermal plume. Modification of this paragraph is therefore necessary.

e. Page 6.106, last paragraph. The words "and total residual chlorine" should be added to the last sentence. In addition, it is recommended that the following be added: "By holdup of blowdown for approximately two hours after termination of chlorine addition, it should be possible to achieve a concentration of 0.1 mg/l or less total residual chlorine in the discharge from each cooling tower."

Bottom Ash Sump (Equalizing Basin)

Pages 2.10, 2nd paragraph; 4.32, 1st and 3rd paragraph; 6.57, 1st (two times) and 2nd paragraph; and 6.58, 1st paragraph. Reference to "bottom ash pond(s)", "ash pond area", and "ash pond effluent" are incorrect. The NPDES permit application indicates that bottom ash will be dewatered and blowdown from bottom ash transport wastewater will be discharged to a "Bottom Ash Sump". Discussions with company personnel indicate that this sump will be a lined equalizing basin (see also March 15, 1979, revisions to E.A., especially Figures 3.6-1 and -2, etc.). It is suggested that the phrase "bottom ash sump (equalizing basin)" be used to replace the above incorrect phrases.

Florida Water Quality Standards

a. Pages 5.52, last paragraph. Section 17-3.061 should be noted as General Criteria applicable to all surface waters. Section 17-3.051 should also be referenced in that it provides Minimum Criteria for all waters at all times and all places. Section 17-3.051 prohibits acutely toxic conditions and is not subject to a mixing zone, whereas Section 17-3.061 prohibits chronic toxicity at the edge of an assigned

mixing zone. The distinction should be made here or at some other point in the DEIS.

b. Pages 6.46 and 6.47. Table should indicate that DER (1976) refers to the Florida Water Quality Standards. Recommended corrections to this Table are indicated in Attachment V.

Section 316(b)

a. Page 6.40, 1st paragraph. A statement of 316(b) of the Federal Water Pollution Control Act, as amended, should be provided to assist in subsequent discussions; namely that 316(b) requires "that the location, design, construction, and capacity of cooling water intake structures reflect the best technology available for minimizing adverse environmental impact."

b. Page 6.42, 1st three paragraphs. The term "placement" of the intake should be replaced with "location" at three points for consistency with the language of 316(b). Grass beds appear to exist in the vicinity of the proposed shoreline intake structure. Since these beds may constitute a significant nursery area, further consideration should be given to locating the intake (and also the discharge) in deeper water away from shore (third alternative intake scheme on Page 4.30). We can not ascertain at this time whether the proposed location is consistent with the requirements of 316(b).

c. Pages 4.30, 4.31, 6.41 and 6.42. Proposed intake design which includes wedge-wire screens with low approach velocity and low velocity through the screen openings appears to offer assurance with "design" requirements of section 316(b), provided that the field-test data demonstrate the ability to utilize small screen openings.

d. Page 6.41, 1st paragraph. Intake "capacity" has generally been minimized by plant design which includes cooling towers to cool and recirculate condenser cooling water rather than using once-through cooling. Additionally, cooling tower blowdown will be utilized as make-up to the FGD system and bottom ash system to the extent practicable. A blowdown minimization study is required by the draft NPDES permit to assure minimized intake of water.

43. NPDES Permit

a. Page 6.21, last paragraph. The NPDES application did not include a request that treated pre-operational metal cleaning be authorized for discharge. Since such wastes may have extremely high levels of phosphate, BOD and COD and may include toxic compounds, a notification that discharge of such wastes is not Authorized is provided in Part III.F. of the draft NPDES permit. Should the applicant submit a revised application indicating the compounds to be used, the expected pollutants and their concentrations, an assessment of these discharges will be made and the permit modified accordingly after public notice.

b. Page 6.30 et seq. A table of standards of performance for new source from 40 CFR Part 423 should be included in the DEIS (see Attachment VI) and referenced at applicable place(s) in the text (such as page 6.36, last paragraph; page 6.57, second paragraph; etc.).

c. Page 6.57, 1st paragraph. Figure 3.4-1 has been deleted from the EA and replaced with figures appended to the NPDES application. It is suggested that Figure 2 (see Attachment VII) be included in the DEIS to support discussions of plant wastes and discharge points as provided in the NPDES permit (Attachment A to the NPDES Permit). Reference should be made to the fact that the draft NPDES Permit and Permit Rationale are included in Appendix 2 of the DEIS.

d. Page 6.57, 1st paragraph. Discharge from the Bottom Ash Sump (Equalization Basin) should be designated in the text as NPDES serial number 002. This designation should also be placed after the heading, i.e. "Chemical Waste System (NPDES serial number 002)."

e. Page 6.57, 2nd paragraph. "Metal cleaning wastes, boiler blowdown," should be deleted as these wastes are discharged to the percolation fields. "Contaminated runoff should be replaced with material storage runoff from coal and limestone storage." "Copper, and iron" should be deleted from the last sentence.

f. Page 6.57, 3rd paragraph. The first sentence should be revised as follows: "The 500 gpm (1.1 cfs) of treated chemical wastewater (NPDES serial number 002) along with treated sanitary wastewater (NPDES serial number 003) and cooling tower blowdown (NPDES serial number 004) will be discharged to the St. Johns River through the main plant discharge (NPDES serial number 001)."

g. Page 6.57, last paragraph. Heading should be revised as follows: "Sanitary Waste System (NPDES serial number 003)."

h. Page 6.30, 1st paragraph. " NPDES serial number 004" should be inserted at an applicable point after cooling tower blowdown is mentioned.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION IV

ATLANTA, GEORGIA 30308

April 12, 1979

Mr. Gilbert Broyles
Chief, Power Planning Branch
Rural Electrification Administration
USDA
14th and Independence, SW
Washington, D.C. 20250

RE: Seminole EIS

Dear Mr. Broyles:

At a meeting on April 10 with the Applicant and his consultant, Dames and Moore, EPA presented a comment relative to the preliminary DEIS. It was overlooked in the EPA comments of April 6, 1979.

EPA Regulations on preparation of EIS's for new source industries require that the likelihood of environmental accidents be assessed and also whether such accidents would result in any irreversible environmental damage. Although pollutants have been considered in the Environmental Analysis along with mitigation which will be employed, such is not the case with air emissions excursions above approved limits. Specifically, potential malfunction of particulate and sulfur dioxide control devices should be considered. It is felt that the topic of "accidents" is important enough to merit a good summarization in the DEIS. Seminole has instructed Dames and Moore to address this matter.

Besides brief discussion of the aforementioned comment, the April 10 meeting dealt with two of EPA's three remaining concerns with the Seminole project: wastes disposal and cooling water intake location. Our technical people attended the meeting and are presently re-evaluating these concerns after receiving project clarification. Although some further data has been requested, it is still hoped that EPA will be able to shortly resolve one or both of these issues. Should resolution occur, REA will be immediately notified.

Questions on these matters should be directed to Ted Bisterfeld of my staff.

Sincerely,

Robert B. Howard

Robert B. Howard
Chief, EIS Preparation Section

cc: Robert Claussen, SECI
Ken Prest, ELG, Inc.

UNITED STATES DEPARTMENT OF AGRICULTURE
SCIENCE AND EDUCATION ADMINISTRATION

AGRICULTURAL RESEARCH
NATIONAL PROGRAM STAFF
BELTSVILLE, MARYLAND 20705

June 7, 1979

SUBJECT: USDA-REA Draft Environmental Impact Statement
(Florida 41 Seminole)

TO: J. S. Zoller
Assistant Administrator, REA
USDA
Washington, D. C.

We have reviewed the draft environmental impact statement related to the proposed Seminole Plant Units 1 and 2.

The authors of this statement have done an excellent job in identifying the existing environmental conditions, assessing the impact various possible actions would have on the environment, and selecting the alternatives that would permit construction and operation of the units with the least impact on the environment.

From the standpoint of natural resources protection, we are concerned over the plan proposed for disposing of the waste material. In our opinion, the proposed plan does not provide for adequate protection of the groundwater (water table aquifer) from contamination by leaching of the wastes and other stockpiled material. We suggest that such plans be included in the final environmental statement.

We appreciate having an opportunity to review this statement.

H. L. Barrows

H. L. BARROWS
Acting Chief
Soil, Water, and Air Sciences

UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE

WO

REPLY TO: 1950 Forest Service NEPA Process

JUN 19 1979

SUBJECT: Draft Environmental Statement for Site Certification Application for Seminole Plant Units 1 and 2, Seminole Electric Coop., Florida

TO: Assistant Administrator, Electric, Environmental Branch, REA

We have reviewed the Draft Environmental Impact Statement and accompanying environmental analysis for the Site Certification Application for Seminole Plant Units No. 1 and No. 2, Seminole Electric Cooperative, Inc., Tampa, Florida.

Our comments are attached in triplicate.

for Lirian L. Koeyt
R. MAX PETERSON
Deputy Chief

Enclosure

Forest Service Comments

Draft Environmental Statement for Site Certification
Application for Seminole Plant Units No. 1 and No. 2
Electric Cooperative Inc., Tampa, Florida

Overall, we find the environmental impact statement and the accompanying environmental analysis to be well written, although the analysis is rather lengthy.

As now written, however, it is almost totally deficient in discussing the timber resource, except as it relates to wildlife habitat.

When the final environmental impact statement is written on this proposal we recommend that the statement contain specific information about the following:

a. An estimate of the current output of timber, per year, from the generation site and transmission corridors.

b. An estimate for the above land if the timber resource was intensively managed.

c. The environmental effects of not producing timber on the land proposed for the generation site and transmission corridors.

d. What are the long term effects of committing commercial forest lands to the proposed uses?

e. How much prime timber land is involved?

The above information is needed for all alternatives so a comparison between alternatives can be shown.

UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
State Office, P. O. Box 1208, Gainesville, FL 32602

June 26, 1979

Mr. William R. Dalton, Director
Southeast Area - Electric
USDA - REA
South Building, Room 5906
Washington, D.C. 20250

Dear Mr. Dalton:

Re: Draft Environmental Impact Statement: Seminole Plant Units No. 1 and 2

We have examined the subject draft EIS and the associated preferred transmission line corridors.

Although some prime agricultural land could exist in all transmission line corridors, we feel that no significant impact will occur that will prevent continued use of these lands for agricultural purposes.

As to impacts on soil resources during construction discussed in paragraph 4, page 102 (DEIS), we recommend that some precautionary measures be taken to lessen soil erosion impacts. On those soils highly susceptible to erosion, practices such as water bars, water turnouts, temporary seeding, and temporary sediment traps should be used. Stream crossings, during construction, should be of ample size to prevent washout and possible degradation to streams.

We appreciate the opportunity to review and comment on this statement.

Sincerely,

William E. Austin
State Conservationist

cc: R. W. Claussen
K. W. Prest

United States Department of the Interior

OFFICE OF THE SECRETARY
WASHINGTON, D.C. 20240

JUL 2 1979

ER 79/457

Mr. Joe S. Zoller
Assistant Administration - Electric
Rural Electrification Administration
Department of Agriculture
Washington, D.C. 20250

Dear Mr. Zoller:

The Department of the Interior has received and reviewed the draft environmental statement for the Seminole Plant Units 1 and 2, Putnam County, Florida. We have the following comments.

We find the statement to be generally adequate in its coverage of impacts to mineral resources and fish and wildlife resources. Also there appears to be no conflict with or impacts on any unit of the National Park System. Historic and archeological evaluation of the proposed station site and outfall corridors appears adequate, particularly if Corridor B is eliminated from further consideration.

In regard to transmission line corridors, access roads, and work camp areas, the consultation with local and State officials mentioned on pages 10.6-1 and 10.6-2 may be adequate to identify problems during corridor selection. However, we do not feel this is adequate for the design and construction stages. Historic and archeological field survey should be performed in consultation with the Florida State Historic Preservation Officer. Enough design flexibility should be provided to allow right-of-way decisions which include alignment shifts or changes in tower placement, if necessary, to avoid historic or archeological resources identified in this investigation.

Potential contamination of surface runoff from coal piles, disposal sites for ash, flue-gas desulfurization, and other wastes should be discussed, as should the eventual reclamation of these sites.

The plan to use herbicides (page 98, paragraph 2) to maintain transmission line right-of-ways should be more thoroughly discussed; the potential for impacts on ground water should be assessed. This seems especially important because of the relatively

high permeability of the surficial materials, the shallow water-table conditions, the predominance of sand (which presumably is low in absorptive capacity), and the use of the shallow water for domestic consumption.

Table 5.2-2 does not appear to represent effluent concentrations after dilution within the mixing zone as stated. In any case "Ambient Concentration" in the table should be further defined.

On page 119, paragraph 2, chlorine concentration of 0.1 mg/l would be 10 times higher than the EPA and Florida recommended maximum concentration shown in table 5.2-4. Also, the mixing zone areas do not match those in table 5.2-2.

We hope these comments will be of assistance in completing the final statement.

Sincerely,

Larry E. Meierotto
Assistant SECRETARY

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION IV

345 COURTLAND STREET
ATLANTA, GEORGIA 30308

JUL - 3 1979

4SA-EIS

Mr. William R. Dalton
Director, Southeast Area - Electric
USDA - REA
South Building, Room 5906
Washington, D. C. 20250

Dear Mr. Dalton:

In response to your request, EPA comments are enclosed for your consideration on formulating a Final Environmental Impact Statement (EIS) on Seminole Electric Plant. Although we believe that this facility will not engender any significant environment problems, there are a number of important issues yet to be resolved. As such, we have assigned a rating of LO-2, i.e., no objections, however, additional data are necessary.

I wish to express my dissatisfaction with the interagency coordination of this facility, especially the handling of our comments of April 6, 1979, which addressed the preliminary Draft EIS. EPA became actively involved in this EIS because a new source NPDES permit was required. Seminole Electric Cooperative and REA were provided assistance to insure that an environmentally acceptable power plant would be constructed and to fulfill EPA's responsibility under NEPA. One of the most important elements of this coordination in the latter stages of document development was our April 6 letter, yet this material was not reflected in the Draft EIS. Those comments contained essential data, especially if we are to fully support the NPDES permit application. Additionally, significant deficiencies in the content of the preliminary Draft EIS and Seminole's Environmental Analysis were identified. Because of the unwarranted delays and misunderstandings which could result, we urge that our corrections/information be included in the Final document.

As stated previously, EPA is prepared to add further clarification to these comments and will also assist REA with responses to other comments received. REA is also reminded that the NPDES application was amended on May 31 and June 13, 1979, by Seminole (copies were forwarded to Mr. Broyles by Seminole). This will require corresponding changes in the Final EIS. A Final Draft NPDES permit will be developed after review of the comments received and after the Florida Site Certification is finalized. A copy of this permit will be forwarded at that time for inclusion in the Final EIS.

For ease of reference, comments enclosed reiterate points made on the preliminary review which are still applicable. Our April 6 comment letter must still be referenced for unanswered comments addressed to Seminole's Environmental Analysis. Continued coordination on the preparation of a Final document will be through Mr. Ted Bisterfeld (FTS 257-7458) of my EIS Preparation staff.

Sincerely yours,

John C. White

John C. White
Regional Administrator

Enclosure

cc: R. Claussen, SECI

SPECIFIC COMMENTS

1. Page 9, Section 2.5.2.1. An addition should be made to the first sentence of the Section so that it reads: "...for condenser cooling (NPDES Serial No. 005, See Draft National Pollutant Discharge Elimination System (NPDES) Permit in Appendix 8.2).

2. Page 9. The first sentence of the last paragraph on this page should be modified to read: "Discharges from the central wastewater treatment system (NPDES No. 002) Sanitary system (NPDES No. 003) and cooling tower blowdown (NPDES No. 004) will be made to the St. Johns River by single discharge pipe (NPDES No. 001)."

3. Page 10, first complete paragraph, third line. The word "silt" should be replaced with the word "oil" so that the sentence reads: "...source, separage oil before pumping..." (See Page 34, first paragraph).

4. Page 10, second complete paragraph. This paragraph should be modified to show that discharge will be limited to a maximum instantaneous concentration of total residual chlorine (TRC) of 0.1 mg/l regardless of the number of units in operation. Holdup of blowdown until TRC has dissipated to acceptable levels will be practiced.

5. Page 10, third complete paragraph. A new sentence should be added to the end of the paragraph as follows: "The maximum discharge temperature will be limited to 93°F (33.9°C)."

6. Page 10, Section 2.5.2.1. Another potential discharge to the water table aquifer is leachate from the land spreading of sanitary sewage sludge.

7. Page 11, third paragraph. This paragraph should be revised as follows and possibly be placed as first paragraph of the Section:

   Section 316(b) of the Clean Water Act requires "that the location, design, construction, and capacity of cooling water intake structures reflect the best technology available for minimizing adverse environmental impact."

   To meet these requirements the following features are proposed:

   (a) Location. Insert present item number 4 from DEIS.

   (b) Design. A cylindrical wedge-wire screen system with i to 2 mm screen openings will be used rather than conventional 10 mm (3/8 inch) mesh size providing for through screen water velocity of about 0.15 mps (0.5 fps). Field tests are presently underway to determine optimum screen opening size.

(c) Construction. Necessary construction techniques to assure compliance are to be included in the Corps of Engineers Section 10 permit.

(d) Capacity. Use of cooling towers for the plant will reduce make-up water rate to less than three percent of a comparable once-through system. Plant make-up will utilize less than one-half of one percent of the flow of the St. Johns River. Additionally, cooling tower blowdown is proposed for use as make-up to the flu gas desulfurization system and bottom ash sluice system (to the extent practicable), thereby further reducing plant water withdrawal.

8. Page 11, last paragraph. The first word in the seventh line should be changed from "blowdown" to "plant discharge" since item "(3)" is not a component of the blowdown. In the eighth line the word "about" should be added since cycles of concentration will vary. The sentence would then read "...but concentrated about four times..."

9. Page 12, first complete paragraph. The second sentence should be reworded since a mixing zone does not "assimilate" wastes. We suggest: "Residual heat and wastes will be mixed within the St. Johns River in the area of a mixing zone assigned by the State of Florida and should not..."

10. Page 12 and Page 17, second complete paragraph. Total residual chlorine will be limited to a maximum instantaneous concentration of 0.1 mg/l at the point of discharge. This will assure compliance with acute toxicity requirements of Sections 17-3.051 and 17-4.244 of the Florida Water Quality Standards. The effluent would be diluted by a factor of 10 to 0.01 mg/l, the applicable State criterion of Section 17-3.121, within an area of one acre. This information should be included in the FEIS.

11. Page 13, Section 2.5.2.3, the first sentence is incorrect. The Clean Water Act (CWA) does not regulate groundwater in any way. (It is not clear to the writer whether RCRA on the Safe Drinking Water Act covers seepage from waste ponds and piles and/or discharges from percolation ponds to groundwater.) Further, "use of surface waters" is not regulated under the CWA. Revision of this paragraph is, therefore, necessary.

12. Page 13, Section 2.5.2.3. Section 316(b) and its requirements should be mentioned in this section.

13. Page 13, Section 2.5.2.3. Standards of performance for new sources (SPNS) as required by Section 306 of the Clean Water Act were promulgated in 40 CFR Part 423 on October 8, 1974. This information should be included in this section as well as reference to a table of SPNS. A suggested table was previously provided to REA and should be included in the FEIS.

14. Page 13. The word "will" in the last sentence of the first paragraph should be replaced with "is expected to". This sentence would probably be better placed in Section 2.7.

15. Page 17a. The following should be added: "EPA has evaluated wast treatment facilities and procedures proposed by SECI and expects that proper operation of the facilities will result in compliance with EPA standards of performance for new sources, with SPNS, the Florida Water Quality Standards and requirements of the draft NPDES permit."

16. Page 13. The projected concentrations of cadmium mentioned here and the concentrations of chromium mentioned in Appendix D of the EA are of concern with regard to impacts to the Water table aquifer.

17. Page 14, Section 2.5.3.2. The Coastal Zone Management Plan should be mentioned in the discussion of land uses.

18. Page 17. Based on information in the Draft EIS and from Seminole, the EPA has been assured that wetland areas on the north end of the property will be protected from direct or indirect impact resulting from waste disposal operations.

19. Page 18, Section 3.0. It would be appropriate to have Seminole update its recent experienced load peaks and to compare this data to what was earlier projected.

20. Page 20. It may be worthwhile to investigate the seeking of short of intermediate term purchases of power generation capacity from Georgia Power Company. Recently, this Utility sought to sell sizable portions of Plant Scherer. It is also known that sulphur capacity exists and that a new nuclear unit (about 810 mw) is nearing operational status.

21. Page 23. The DEIS does not indicate any consideration of several smaller power plants vs one large plant as Seminole has proposed. Factors such as reliability and transmission costs may be significantly better with smaller facilities, especially since the service area extends nearly the length of peninsular Florida. It is noted that in 1986 when the demand is projected to be 1793 mw about 63% will be supplied from the two Seminole units. Unexpected loss of one unit's capacity would have a severe impact unless ample system back-up is certain.

22. Page 24. Low sulfur coal has not been mentioned as an alternative air pollution control strategy. There should be a discussion of its use. It should be explained why the Cooperative has not elected to use low sulfur coal. The discussion should include (a) how recent regulations under the Clean Air Act require SO_2 removal; (b) the lack of need for very stringent limits below new source performance standards, and (c) economic aspects of such a control strategy.

23. Page 25. Regarding coal slurry pipelines, it should be noted that EPA, Region IV, has been contacted about this type of project.

24. Page 25. It is not clear how much solar water heating on the user level has been factored into decreasing load projections by the applicant. Page 29, third paragraph. Even though it appears that the over riding reason is proved performance behind Seminole's selection of a "throw-away" type reactant FGD system, the environmental benefits of a regenerative type system have not been emphasized sufficiently. The waste disposal problem is significantly reduced and the resource requirement for the reactant also reduced to a fraction of that for the selected system. There are the attendant continual costs for transportation, etc., which may not have been figured into the cost comparison.

25. Page 29. Scrubber technology has been under attack from both industry and conservation forces nationwide. Therefore, a very simple summation of FGD lime/limestone experience would be appropriate. The PEDCO reports contain nearly all the industry experience with scrubbers presenting reliability, efficiency, etc.

26. Page 29. Flue Gas Emissions Control. Flouidized bed combustion of coal should be considered because of its excellent pollution control characteristics. Mr. Howard Feibus at the Department of Energy, Washington, D. C., has been mentioned to EPA as being an authority on industrial application of new energy technology.

27. Page 30, Once-Through, seventh line. Use of a "cooling pond" as an alternate cooling methodology should not be included in this paragraph but as a separate paragraph. A "cooling pond" is not a method of once-through cooling, but is considered a technological off-stream cooling devise, as is a cooling tower.

28. Page 30. Delete reference to cooling ponds under the Once Through cooling discussion. This method is considered off stream like towers, and is an evaporative system.

29. Page 30. It would be better to use the more common gallons per minute limits instead of acre-feet and to compare the withdrawal rates for once-through with off-stream cooling.

30. Table 9.3-1, Item #3 under Corridor A. This statement is not correct according to the EA. Macrophytes are present.

31. Page 33. The change in proposed intake location is not reflected in the discussion.

32. Page 33. The discussion and identification of the radial well intake system as the most environmentally preferred is good. EPA agrees with the rationale for not selecting this intake.

33. Page 34, New Section. Consideration should be given to providing a multiport diffuser as an alternate to a single discharge port. Such a structure could be provided to assure a 10-fold dilution or greater

at a relatively modest cost. Such a structure would rapidly dilute effluent pollutants in close proximity to the POD and assure that chronic and/or acute toxicity conditions do not exist. Required mixing zone site would be significantly reduced.

34. Page 34, Section 4.4.7, last paragraph. It is not clear that "bottom ash ponds" are the alternate, and that the "separate collection-equalization systems" are the proposed technology.

35. Page 35, Solid Waste Disposal. A more specific alternative disposal procedure for the ash-scrubber sludge wastes could incorporate phased activities. A series of smaller containment dikes could be constructed with fixed material starting at the higher elevations of the proposed disposal site. Monitoring of surface run-off and leaching from these smaller areas would be a more cautious approach than proceeding on full scale diking up to the wetland area. Phased site clearing could then also be employed for the disposal area.

36. Page 35. There is apparently a discrepancy on the selected project here with that described in the EA. If only a portion of the FGD/ash waste is to be chemically fixed to form a liner and dikes, then this clarification must be included in the DEIS.

37. Page 35. The solid waste disposal scheme has been modified by SECI. The present scheme should be well defined.

38. Page 35. There is no indication that solid waste re-use has been investigated. The resulting sludge is a gypsum-lime material which could be used and it is known that nearly all the fly ash byproduct from Units 1 and 2 at Crystal River Plant went into the construction of the nuclear unit at that plant site.

39. Page 36, Section 4.4.8. Seminole's waste disposal plant has been revised. Seminole will conduct a two year study to evaluate disposal models and monitoring needs. The Final EIS should reflect this change. A plan of study for evaluating waste disposal models and monitoring needs should be submitted to EPA by Seminole before an NPDES permit is issued.

40. Page 54. We disagree with the use of the term "freshwater estuary" to describe the St. Johns River. Also, Cyathura is mispelled (pg. 68).

41. Page 58, Section 5.4.1.3. Mixing zone requirements are contained in Section 17-4.244 of the Florida Administrative Code and toxicity requirements are contained in 17-3.051 and 17-4.244. This information should be included in the FEIS.

42. Page 72. Discussion on the manatee in the EIS is inconsistant with the Environmental Analysis because in that document grassbeds are said to be present. The analysis of manatee presence and impact from plant construction and operation should be reconsidered. The impacts to the grassbeds are now minimal due to the change in intake location and presently proposed construction procedures.

43. Page 95, second paragraph. The power plant referenced is the Putnam Plant at Palatka, Florida. The Palatka Plant of FP&L which utilizes once-through cooling is adjacent to the Putnam Plant and is presently in cold standby status. Both plants should be mentioned.

44. Page 109. Even though no standards exist for trace element emissions, the EIS should address them to the extent possible. Radiological emissions (uranium and thorium daughter elements) do occur from the combustion of coal.

45. Page 111. The effect of plume and stack emission interaction is not uncertain; acidic water droplets typically result. It is the rapidity and degree of pH lowering which is not easy to predict.

46. Page 114, Section 6.1.2.2, first paragraph, fifth line. "(NPDES No. 004)" should be inserted after the word blowdown to read "...blowdown (NPDES No. 004), will contain..."

47. Page 115, third paragraph. The following sentence should be added to the paragraph: "Maximum design discharge temperature is 33.9°C (93°F). Celcius equivalents should be provided in the paragraph and elsewhere.

48. Page 117, Chemical Analysis, first paragraph. Reference to Table of SPNS should be included. Second paragraph - NPDES serial numbers should be inserted after cooling tower blowdown (004), chemical wastewater treatment facility (002) and sanitary waste (003). Revised Figures 2 and 3 should be included. Reference to Table "VI" should be "VII."

49. Page 119, second paragraph. The applicant has modified his NPDES application to indicate that the maximum instantaneous discharge of TRC will be 0.1 mg/l regardless of the number of units in operation. The required mixing zone to achieve a residual of 0.01 mg/l at the boundary will be less than or equal to 1.0 acre. Table 5.2-2 requires similar correction.

50. Page 119, last paragraph. A sentence should be added: "A maximum discharge concentration of 0.1 mg/l of total residual chlorine in the plant discharge (NPDES No. 001) will not result in acute toxicity conditions within the mixing zone and will assure compliance with Florida Water Quality Standards."

51. Page 120, last complete paragraph. The word "location" should be used instead of "placement" three times.

52. Page 120. Land spreading sewage sludge is a fifth potential source of impact to the water table aquifer. If this operation is carefully controlled, we would not expect any impact on groundwater quality.

53. Page 121. Although drinking water standards were not developed nor intended to be used for the evaluation of groundwater quality, they do serve as a general index when used with respect to the limited treatment capabilities of private-well usage. The naturally high background TDS and sulfate concentrations of the area coupled with estimated increases from leachate would bring respective levels leaving the project boundary of 615 mg/1 and 720 mg/1. Both of these levels would exceed proposed secondary maximum contaminant levels and would impact or perhaps impair potential and existing private-well groundwater usage down gradient from the project boundaries.

54. Page 122. Leachate from coal storage areas bearing elevated concentrations of trace elements and heavy metals would also be of concern with respect to groundwater usages in outlying areas. We would suggest strict adherence with the short and long-term monitoring programs as outlined. We would also bring to light that a perpetual inventory of private, municipal, and industrial usages of groundwater down gradient of the project does not seem to have been incorporated within the monitoring program.

55. Page 122. Refer to commen No. 39. Final EIS should reflect new disposal and monitoring plans for coal storage areas.

56. Page 122, Section 6.1.2.2. In the groundwater impact analysis (EIA Appendix D) it was demonstrated that Florida's water quality criteria would be met at the property boundary. This approach is consistent with EPA's proposed solid waste disposal facility performance standards (Classification Criteria for Solid Waste Disposal Facilities) in which the groundwater criteria are applied at the property boundary. However, many commentors on the proposed regulation argued that this approach circumvents the intent of RCRA by allowing companies with large land holdings to contaminate large areas of groundwater beyond the immediate vicinity of a permitted disposal site. The final regulation (due out in July 1979) may contain more stringent groundwater criteria in response to public comment. Therefore, Seminole may need to evaluate the capability of their disposal models to meet more stringent requirements than contained in Florida's regulations.

57. Page 125, Section 6.1.3.2. Depending on the type of waste disposal system selected, the potential exists for an irretrievable committment of 275 acres of perpetual waste storage. Seminole should evaluate their disposal models with respect to future land use options for the disposal area.

58. Page 125. Another operational impact that needs to be addressed here is the impact to the wetlands north of the solid waste disposal area. The area proposed for ash and sludge disposal is designated as lowland and classified in the State Coastal Zone Management Atlas as a "preservation" area. In light of this, a more thorough explanation of the "lowland" nature of this area should be presented to more clearly identify it as

being ecologically separable from the wetlands it adjoins. Additionally, the source of inundation for the swamp and lowlands in the northern portion of the site should be explained in order for the reviewer to better understand the hydrologic character of these areas and their relationship, if any, to the river or tributary streams.

59. Page 125. The Section, Operational Impacts to Terrestrial Ecology, does not contain the impacts of air pollutants on soils and biota, especially sensitive vegetation. Because of the comments heard at the public hearing about local cash crops, this assessment should focus on the potential effects of SO_2, particulates and low pH rainfall to potato and cabbage plants. There exists in the literature good information on proved vegetative impacts from the subject pollutants thus enabling some degree of comparison of emission rates and ground level concentrations.

60. Table C-8. Water quality standards information contains errors. The following corrections are necessary:

<u>The Dissolved Solids</u> limit applies to water supply (Class 1A) only.

<u>Specific conductance</u> Delete ...for streams considered to be fresh water streams.

<u>Radioactive Substances</u> Delete entirely and substitute: (1) Combined radium 226 and 228 shall not exceed five picocures per liter. (2) Gross alpha particle activity including radium 226, but excluding radon and uranium shall not exceed fifteen (15) mg/liter, or...Substitute: Dissolved or emulsified greases shall not exceed 50 mg/1...

<u>Fluoride</u> Delete entirely except for last part of last sentence beginning with ...shall.

61. Page 138. Operational impacts from increased rail traffic has not been addressed with respect to time of day of trains and the effect to vehicular traffic at points of congestion.

62. Page 140, Section 6.2.2.2, first paragraph, last sentence. "Total residual chlorine" should be substituted for "free available chlorine."

63. Page 143. In response to the question posed April 12, 1979, to REA regarding accidental air emissions excursions, Seminole's consultant Dames and Moore has presented an assessment of potential for and degree of such occurrences. Review of this matter is not complete and suggested EIS Additions will be forthcoming.

64. Tables following Page 143. (a) Corrections to several Tables including 5.2-2, Va, Vb, Vd, Ve, and VII will be necessary as a result of amendments to the NPDES applications. (b) Table 5.2-4. Comments including requested changes were previously provided to REA on April 6, 1979.

Section 8.1.2 STATE/LOCAL AGENCIES COMMENTS

8.1.2.1 Florida Department of Environmental Regulation (letter dated June 7, 1979)

Comment 1

Page 10, second paragraph. "The chemical waste system will be designed to neutralize...remove suspended solids before pumping,...."

Response

REA has reviewed the comment and the appropriate change has been made in Section 2.5.2.1.

Comment 2

Page 10. A new chlorination program will be implemented by SECI. A residual of 0.1 ppm at the POD will be achieved. There is no time limit on chlorination.

Response

REA has reviewed the comment and the appropriate change has been made in Section 2.5.2.1.

Comment 3

Page 12, third paragraph. Chlorine mixing zone is now projected to be instantaneously 750 square feet and to fall within an envlope of 0.9 acres.

Response

REA has reviewed the comment and the appropriate change has been made in Section 2.5.2.1.

Comment 4

Section 4.4.6, Page 32-33. The intake and discharge structures have been designed and selected. This section should be revised to describe the system selected by SECI.

Response

REA has reviewed the comment and the appropriate change has been made in Section 4.4.6.

Comment 5

Section 4.4.8, Page 35. Seminole now has more specific information on the coal and possibly trace element composition. Since SECI has only tentatively selected the final method of sludge/ash disposal, an initial method and interim test program should be described. Dewatered and stabilized sludge can become thixotrophic, therefore the statement in the third paragraph that no diking would be required is in error.

Response

REA has reviewed the comment and the appropriate change has been made in Section 4.4.9.

Comment 6

Table 9.3-1, Corridor A. Advantage #3 is in error. Macrophyte beds are present. Move to disadvantage column.

Response

REA has reviewed the comment and the appropriate change has been made in Table 9.3-1.

Comment 7

Page 46: The discussion of existing and changed emission sources is in error. The 500 MW of combined cycle units at FPL's Putnam Station is not discussed. The new units were certified in 1974 and started operation in 1977. Also, the units at FPL's Palatka Station are now on cold standby which should reduce annual emissions.

Response

The discussion of existing and changed emission sources includes the 500 MW combined cycle units at FPL's Putnam Station and the FPL units at the Palatka Station. The second page of Table 2.5-6 and Table 2.5-7 showing these sources were inadvertantly omitted.

Comment 8

Page 57, 5.4.1.3, last paragraph. Seminole's plant is in the Peninsular Florida Climatic Zone and is governed by those standards for heated water discharges.

Response

REA has reviewed the comment and the appropriate change has been made in Section 5.3.1.3.

Comment 9

Page 66, next to last paragraph. More recent surveys indicate beds of macrophytes along the shore.

Response

REA has reviewed the comment and the appropriate change has been made in Section 5.4.2.2.

Comment 10

Page 100, Endangered or Threatened. Second sentence should read: "Both...the U. S. Fish and Wildlife Service have listed faunal species...."

Response

REA has reviewed the comment and the appropriate change has been made in Section 5.7.3.

Comment 11

Table 2.5-2. Federal NSPS for Particulate now 0.03 lb/10^6 Btu

NO_2 - 0.6 lb/10^6 Btu

Response

REA has reviewed the comment and the appropriate change has been made in Table 2.5-2.

Comment 12

Table 2.5-6. No inclusion of the FPL sources in Putnam County.

Response

See reply to Comment 7.

Comment 13

Page 102: Last two paragraphs belong under Section 5.7.1 on Page 97.

Response

REA has reviewed the comment and the appropriate change has been made in Section 5.7.1.

Comment 14

Page 104 - 6.1.1.1: Discussion of impacts of smoke from burning land clearing debris should be included.

Response

REA has reviewed the comment and a discussion of the impacts of burning and clearing has been included in Section 6.1.1.1.

Comment 15

Page 111 - Section 6.1.2.1: Needs to be revised in accordance with the revised intake/discharge design. Spoil may be pumped or trucked to the disposal site. Clean sand will be used for backfilling the pipe trenches.

Response

REA has reviewed the comment and the appropriate changes have been made in Section 6.1.2.1.

Comment 16

Page 113 - Last paragraph on Dredging: Use of turbidity screens are another means to mitigate potential impacts. Extending the intake out further reduces dredging to be done which also reduces impacts.

Response

REA has reviewed the comment and the appropriate change has been made in Section 6.1.2.1.

Comment 17

Page 114 - Impacts to Water Table Aquifer: Amount of spoil is reduced due to new intake proposal.

Response

REA has reviewed the comment and the appropriate change has been made in Section 6.1.2.1.

Comment 18

Page 118 - 2nd Paragraph: Oil and grease which may exceed water quality standards was not discussed.

Response

REA has reviewed the comment and the appropriate change has been made in Section 6.1.2.2.

Comment 19

Table 5.2-2: Needs to be updated to conform to the new mixing zones.

Response

REA has reviewed the comment and the appropriate change has been made in Table 5.2-2.

Comment 20

Page 122 - Last Paragraph: The discussion on sulfate concentrations should be revised in accordance with the latest revision of the Environmental Analysis.

Response

REA has reviewed the comment and the appropriate change has been made in Section 6.1.2.2.

Comment 21

Page 124 - Last Paragraph: That the site would have been developed for another industrial use, if not a power plant, may not be highly probable. The conclusion is highly speculative and unsupported.

Response

REA has reviewed the comment and this statement has been deleted in the FEIS.

Comment 22

Page 140 - 6.2.2.2: The discussion on closing of blowdown valves during chlorination may be in error due to the new chlorine effluent limit of 0.1 mg/l.

Response

Closing of the blowdown valves during cooling water chlorination treatment of the cooling towers will be required to meet the chlorine effluent limit of 0.1 mg/l at the point of discharge.

Comment 23

Table C - 8: is no longer correct. The Florida Water Quality Standards have been changed.

Response

Table C-8: "Water Quality Standards Pertinent to All Florida Waters" was incorrectly included in the DEIS. The discussion contained on page 109 refers to Table C-8: "Water Quality Data - St. Johns River". This revised table C-8 has been incorporated into this FEIS as Table 6.32.

Comment 24

Figure 4.4-1: Should be revised to agree with the revised intake system and amended USA COE application.

Response

Figure 4.4-1 has been removed from the FEIS.

Comment 25

Table 12-30: is not up to date.

Response

The referenced table is 12-3a. While records of coordination activities have been documented only through January 1979, due to requirements for publication, actual coordination will continue through the Federal NEPA and State Site Certification processes.

8.1.2.2 St. Johns River Water Management District (letter dated June 20, 1979)

Comment

At this time, we would like to request that SECI keep the District informed as engineering design is refined or modified, particularly with regard to any changes or modifications in proposed water use or proposed hydrologic monitoring programs.

Response

SECI will do this.

8.1.2.3 Florida Secretary of State/State Historic Preservation Office

Comment

A review of the Florida Master Site File indicates that no recorded sites listed, or eligible for listing, in the National Register of Historic Places are contained within the above referenced project area. However, the areas have not been surveyed for such resources, so the lack of recorded sites is not considered significant. Furthermore, environmentally similar areas which have been surveyed have been found to contain a high density of prehistoric archaeological sites. Therefore, it is the recommendation of this office that, prior to any construction activity, all areas to be impacted be professionally surveyed for archaeological and historical sites.

Response

Prior to any construction activity associated with the transmission lines, all areas to be impacted will be professionally surveyed for archaeological and historic sites.

8.1.2.4.1 Department of Environmental Regulation (May 31, 1979)

Comment 1

Page 9 - Parenthetical statement that Florida emission standards are as restrictive as the Federal ones - this is no longer correct; Florida's particulate limit is .1 lb/10^6 BTU which is less than the new National .03 standard - also, our NO_x limit is less restrictive.

Response

The comment is noted.

Comment 2

Page 10 - Chlorination requirement has been changed - also, some discharges will only be within state standards by virtue of the granting of mixing zones and/or variances but would not meet the standards at the POD.

Response

REA has reviewed the comment and the appropriate change has been made in Section 2.5.2.1.

Comment 3

Page 57 - Seminole Electric's site, by virtue of being 16 minutes south of 30 degrees north latitude, is not in the Northern Florida Climatic Zone, but Peninsular Florida.

Response

REA has reviewed the comment and the appropriate change has been made in Section 5.4.1.3.

Comment 4

Page 117 - Third paragraph under Chemical Analysis - Why exception of chlorine? Has that changed with new limitations? Where else would chlorine come from other than the blowdown, sanitary effluent, and the chemical waste effluent?

Response

Chlorine is measured as maximum instantaneous concentration. (Refer to Response 4 of EPA, July 3, 1979). Instantaneous concentration of chlorine will meet the new standards. No other sources of chlorine are known.

Comment 5

Page 119 - Chlorine discussion needs updating. Also, regarding the chemical constituent discussion in last paragraph, all constituents may not be below the recommended LC_{50} tolerances at the edge of the mixing zone if variances are needed from water quality standards; The river itself may be above certain tolerance levels.

Response

Chlorine discussion has been updated in Section 6.1.2.2 of the FEIS. Discussion of variance for water quality standards for lead, mercury, cadmium and zinc is presented in Section 2.5.2.3 Water Resources: Regulatory Compliance and in Appendix 9.2.3 Conditions of Certification Item II.A.11 and II.A.12.a.

Comment 6

Page 141 - Operation impacts, second sentence. It is unclear which blowdown to the water table aquifer might not meet DER standards; Cooling tower blowdown will not be discharged directly to the aquifer (although some may occur in combination with sluicing waters); Boiler blowdown is expected to meet the criteria at the point of discharge.

Response

REA has reviewed the comment and the appropriate change and discussion has been made in Section 6.2.2.2.

Comment 7

Page 128 - If noise is to be described in terms of a socioeconomic impact, the discussion should consist of how it will effect any nearby residents or change their lifestyle, rather than just how loudly and how often it will occur.

Response

The cumulative effect of the sound levels from operation of the plant is discussed in Section 5.6 of the "Site Certification Application and Environmental Analysis." The maximum increase in day/night sound levels above background condition at selected nearby offsite locations is projected to be no more than 1 decibel, an insignificant increase. Noise should not effect nearby residents or change their lifestyle.

Comment 8

Page 122 - Discussion under waste disposal may need changing; Also, the landfill structure for sludge disposal may be varied. Last paragraph: A new analysis of sulfate impacts has been conducted, altering this assessment.

Response

REA has reviewed the comment and the appropriate change has been made in Section 6.1.2.2.

Comment 9

Figures 2.2-9 and 2.2-14 - Overprinted in some copies.

Response

REA has reviewed the comment and the appropriate change has been made in the subject figures.

NOTE: For other DER comments refer to response to DER letter dated June 7, 1979, Section 8.1.2.1.

8.1.2.4.2 Department of Agriculture and Consumer Services

Response - Please refer to the Comments/Responses to the USDA Forest Service letter, Section 8.1.1.4.

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

BOB GRAHAM
GOVERNOR

JACOB D. VARN
SECRETARY

STATE OF FLORIDA

DEPARTMENT OF ENVIRONMENTAL REGULATION

June 7, 1979

RECEIVED
JUN 12 1979
S.E. AREA-ELECTRIC

William R. Dalton, Director
Southeast Area - Electric
USDA - REA
South Building, Room 5906
Washington, D.C. 20250

Dear Mr. Dalton:

Attached are comments on the Draft Environmental Impact Statement related to the proposed Seminole Plant Units 1 and 2, USDA-REA (ADM) 79-3-D.

It is realized that Seminole has made numerous last minute changes in response to the concerns of various reviewers of the Environmental Analysis. The final EIS should be amended to include the assessment of cooling tower drift on particulate levels in the ambient air, new chlorine discharge limitations and chlorine operation techniques, the changes in intake and discharge structure locations and other comments as noted on the attachment.

Enclosed please find an amended copy of the Department of Environmental Regulation's Staff Analysis of the Seminole Plant.

Sincerely,

Hamilton S. Oven, Jr.

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

HSOjr/ed

Attachment

original typed on 100% recycled paper

Page 10 - 2nd Paragraph: The chemical waste system will be designed to neutralize -------, remove suspended solids before pumping, ------.

Page 10: A new chlorination program will be implemented by SECI. A residual of 0.1 ppm at the POD will be achieved. There is no time limit on chlorination.

Page 12 - 3rd Paragraph: Chlorine mixing zone is now projected to be instantaneously 750 square feet and to fall within an envelope of 0.9 acres.

Section 4.4.6 - Page 32-33: The intake and discharge structures have been designed and selected. This section should be revised to describe the system selected by SECI.

Section 4.4.8 - Page 35: Seminole now has more specific information on the coal and possibly trace element composition. Since SECI has only tenatively selected the final method of sludge/ash disposal, the initial method and interim test program should be described. Dewatered and stabilized sludge can become thixotropic, therefore the statement in the 3rd Paragraph that no diking would be required is in error.

Table 9.3-1 - Corridor A: Advantage #3 in error - Macrophyte beds are present - Move to disadvantage column.

Page 46: The discussion of existing and changed emission sources is in error. The 500 MW of combined cycle units at FPL's Putnam Station is not discussed. The new units were certified in 1974 and started operation in 1977. Also the units at FPL's Palatka Station are now on cold standby which should reduce annual emissions.

Page 57 - 5.4.1.3 - Last Paragraph: Seminoles plant is in the Peninsular Florida Climatic Zone and is governed by those standards for heated water discharges.

Page 66 - Next to last Paragraph: More recent surveys indicate beds of macrophytes along the shore.

Page 100 - Endangered or Threatened ---, Second sentence should read: Both ---- the U.S. Fish and Wildlife Service have listed faunal species ----.

Table 2.5-2: Federal NSPS for Particulate Now 0.03 $lb/10^6 Btu$
NO2 - 0.6 $lb/10^6 Btu$

Table 2.5-6: No inclusion of the FPL sources in Putnam County.

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Page 104 - 6.1.1.1: Discussion of impacts of smoke from burning land clearing debris should be included.

Page 111 - Section 6.1.2.1: Needs to be revised in accordance with the revised intake/discharge design. Spoil may be pumped or trucked to the disposal site. Clean sand will be used for backfilling the pipe trenches.

Page 113 - Last Paragraph on Dredging: Use of turbidity screens are another means to mitigate potential impacts. Extending the intake out further reduces dredging to be done which also reduces impacts.

Page 114 - <u>Impacts to Water Table Aquifer</u>: Amount of spoil is reduced due to new intake proposal.

Page 118 - 2nd Paragraph: Oil and grease which may exceed water quality standards was not discussed.

Table 5.2-2: Needs to be updated to conform to the new mixing zones.

Page 122 - Last Paragraph: The discussion on sulfate concentrations should be revised in accordance with the latest revision of the Environmental Analysis.

Page 124 - Last Paragraph: That the site would have been developed for another industrial use, if not a power plant, may not be highly probable. The conclusion is highly speculative and unsupported.

Page 140 - 6.2.2.2: The discussion on closing of blowdown valves during chlorination may be in error due to the new chlorine effluent limit of 0.1 mg/l.

Table C - 8: is no longer correct. The Florida Water Quality Standards have been changed.

Figure 4.4-1: Should be revised to agree with the revised intake system and amended USA COE application.

Table 12-30: is not up to date.

ST. JOHNS RIVER

WATER MANAGEMENT DISTRICT

FREDERICK O. ROUSE
Executive Director

ROUTE 2 BOX 695
PALATKA, FLORIDA 32077
TELEPHONE (904) 325-5383

June 20, 1979

Mr. William R. Dalton, Director
Southeast Area-Electric
USDA - REA
South Building, Room S906
Washington, D.C. 20250

Re: Seminole Power Plant EIS
Palatka, Florida

Dear Mr. Dalton:

The District staff has completed its review of the above project. Since the EIS material is unchanged from the State of Florida Site Certification Application, I have enclosed the Districts' comments concerning the Application.

If I can be of further help, please contact me.

Sincerely,

Donald M. Thompson

Donald M. Thompson
Water Resource Planner
Department of Resource Planning

DMT:vw

Enclosure

R. T. (TOMMY) CLAY
Chairman - Palatka

FRANK X. FRIEDMANN, JR.
Jacksonville

JASPER JOINER
Vice-Chairman - Gainesville

A. RAY BEVILLE
Fernandina Beach

CLAUDE O. GODWIN
Secretary - Titusville

JACK R. CHRISTMAS
Apopka

MICHAEL BRADDOCK
Treasurer - Pierson

CLIFF TOWNSEND
St. Augustine

JOSEPH A. WILSON
Ocala

JOHN R. TRIPSON
Vero Beach

ST. JOHNS RIVER

WATER MANAGEMENT DISTRICT

ROUTE 2 BOX 695
PALATKA, FLORIDA 32077
TELEPHONE (904) 325-5383

FREDERICK O. ROUSE
Executive Director

March 23, 1979

Mr. Hamilton Oven, Administrator
Power Plant Siting Section
Department of Environmental Regulation
Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32301

RE: Seminole Electric Cooperative, Inc. (SECI)
Site Certification Application--Bostwick, Florida

Dear Mr. Oven:

This letter presents the current position of the St. Johns River Water Management District staff concerning the SECI application. All substantive questions raised by the SJRWMD have been satisfactorily addressed by SECI through meetings, letters of clarification, and amendments to the application (March 15, 1979 Revision). SECI's planned water use and planned hydrologic and environmental safeguards as outlined to date are consistent with current District review guidelines. Based on information submitted to the District, we have no objection to the granting of site certification for the Bostwick site.

At this time, we would like to request that SECI keep the District informed as engineering design is refined or modified, particularly with regard to any changes or modifications in proposed water use or proposed hydrologic monitoring programs.

It should be noted that this is the position of the staff of the SJRWMD. The Governing Board was informed of the staff position at their March 21, 1979 meeting.

R. T. (TOMMY) CLAY
Chairman · Palatka

JASPER JOINER
Vice-Chairman · Gainesville

CLAUDE O. GODWIN
Secretary · Titusville

MICHAEL BRADDOCK
Treasurer · Pierson

JOSEPH A. (JOEL) WILSON
Ocala

FRANK X. FRIEDMANN JR
Jacksonville

RAY BEVILLE
Fernandina Beach

JACK R. CHRISTMAS
Apopka

CLIFF TOWNSEND
St. Augustine

JOHN R. TRIPSON
Vero Beach

If you have any questions concerning this letter, or if we can be of any further assistance, please do not hesitate to contact this office.

Very truly yours,

Alfred P. Canepa

ALFRED P. CANEPA, Chief
Water Resources Evaluation Section
Water Resources Department

APC:jmf

cc: Robert Claussen, SECI
David Lester, SECI
Frederick O. Rouse
Jerry E. Kubal
George W. Griffith
Michael D. Young
District Clerk

Secretary of State

STATE OF FLORIDA
THE CAPITOL
TALLAHASSEE 32304
(904) 488-3680

GEORGE FIRESTONE
SECRETARY OF STATE

Wei

June 21, 1979

In reply refer to:

Mr. John Scarry
Historic Sites Specialist
(904) 487-2333

RECEIVED
JUL 18 1979
S.E. AREA - ELECTRIC

Mr. R. W. Clausen
Director of Engineering
Seminole Electric Cooperative, Inc.
Suite 108
2410 E. Busch Boulevard
Tampa, Florida 33612

Re: Transmission Corridors Associated With the Proposed Seminole Electric Cooperative Generating Facility, Putnam County

Dear Mr. Clausen:

As requested in your letter of June 14, 1979, we have reviewed the above referenced project for possible impact to archaeological and historical resources. This review is in accordance with the National Historic Preservation Act of 1966 (Public Law 89-665) and Executive Order 11593, as they are implemented by 36 C.F.R., Part 800.

These corridors were inadvertently omitted from our earlier review of the entire project. We regret any inconvenience which this may have caused.

A review of the Florida Master Site File indicates that no recorded sites listed, or eligible for listing, in the National Register of Historic Places are contained within the above referenced project area. However, the areas have not been surveyed for such resources, so the lack of recorded sites is not considered significant. Furthermore, environmentally similar areas which have been surveyed have been found to contain a high density of prehistoric archaeological sites. Therefore, it is the recommendation of this office that, prior to any construction activity, all areas to be impacted be professionally surveyed for archaeological and historical sites.

Sincerely,

L. Ross Morrell,
Deputy State Historic
Preservation Officer

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

STATE OF FLORIDA
Department of Administration
Division of State Planning
ROOM 530 CARLTON BUILDING
TALLAHASSEE
32304
(904) 488-1115

R. G. Whittle, Jr.
TATE PLANNING DIRECTOR

Bob Graham
GOVERNOR

Jim Tait
SECRETARY OF ADMINISTRATION

June 21, 1979

Mr. William R. Dalton, Director
Southeast Area - Electric
U.S.D.A. - R.E.A.
South Building, Room 5906
Washington, D.C. 20250

Dear Mr. Dalton:

Functioning as the state planning and development clearinghouse contemplated in U.S. Office of Management and Budget Circular A-95, we have reviewed the following draft environmental impact statement:

Seminole Plants, Units 1 & 2, and Associated Transmission Facilities, SAI: 79-2124E

During our review we referred the environmental impact statement to the following agencies, which we identified as interested:

Department of Agriculture and Consumer Services, Department of Community Affairs, Department of Commerce, Department of Environmental Regulation, Department of Health and Rehabilitative Services, Department of Natural Resources, Department of State, Department of Transportation, Florida Game and Fresh Water Fish Commission, Bureau of Land and Water Management, and the State Energy Office.

Agencies were requested to review the statement and comment on possible effects that actions contemplated could have on matters of their concern. Letters of comment on the statement are enclosed from:

Department of Agriculture and Consumer Services, Department of Commerce, Department of Community Affairs, Department of Environmental Regulation, Department of Health and Rehabilitative Services, Department of Natural Resources, Department of Transportation, and the Florida Game and Fresh Water Fish Commission.

We have reviewed this document and the state agency comments thereon. Based upon this review, we find that the document, in

of Agriculture and Consumer Services and the Department of Environmental Regulation have identified several issues which must be satisfied before proceeding. We also suggest that you coordinate your development activities with the Department of Natural Resources and the Department of Transportation to avoid future construction delays.

In accordance with the Council on Environmental Quality guidelines concerning statement on proposed federal actions affecting the environment, as required by the National Environmental Policy Act of 1969, and U.S. Office of Management and Budget Circular A-95, this letter, with attachments, should be appended to the final environmental impact statement on this project. Comments regarding this statement and project contained herein or attached hereto should be addressed in the statement

We request that you forward us copies of the final environmental impact statement prepared on this project.

Sincerely,

R.G. Whittle, Jr., Director

RGWjr:WKy

Enclosures

cc: Mr. John Bethea
Mr. Charles Blair
Mr. James Cullison
Ms. Joan Heggen
Mr. Joseph W. Landers, Jr.
Mr. W.M. Lofroos
Mr. Jacob Varn
Mr. H.E. Wallace

State of Florida
DEPARTMENT OF ENVIRONMENTAL REGULATION

INTEROFFICE MEMORANDUM

For Routing To District Offices And/Or To Other Than The Addressee	
To:	Loctn.:
To:	Loctn.:
To:	Loctn.:
From:	Date:

TO: Hamilton S. Oven, Jr.

FROM: Karen Anthony Reynolds KAR

DATE: May 31, 1979

SUBJECT: Draft Environmental Impact Statement for Seminole Units 1 and 2

Having reviewed the above referenced document, I submit the following general and specific comments.

In general, most of the report has been excerpted directly from the Environmental Analysis. While I do not disagree with the conclusions reached in most of either report, since the entire EA was appended as part of the EIS, it would seem they could have reduced the text to provide their own assessment of that which was provided in the EA, while referencing the reader back to the EA when necessary for detailed clarification.

Further, although I realize that there have been numerous last minute changes by the applicant in response to reviewer's concerns, the EIS should be amended as well to include the new Cooling Tower Particulate analysis, the information on chlorine discharge, the change in intake and discharge location, the new EPA scrubbing requirements and the new sulfate groundwater impact assessment.

I will itemize the more specific problems:

Page 9: parenthetical statement that Florida emission standards are as restrictive as the Federal ones - this is no longer correct; Florida's particulate limit is .1 lb/10^6BTU which is less than the new National .03 standard - also, our NO_X limit is less restrictive.

Page 10: chlorination requirement has been changed - also, some discharges will only be within state standards by virtue of the granting of mixing zones and/or variances but would not meet the standards at the POD.

Page 12: although the chlorine limitation is correctly described here, the mixing zone size is incorrect.

Page 29: ~~the FGD scrubbing reduction will probably change for Seminole because of the newly adopted air pollution standards.~~

Page 57: Seminole Electric's site, by virtue of being 16 minutes south of 30 degrees north latitude, is not in the Northern Florida Climatic Zone, but Peninsular Florida.

Page 97: ~~Only the top two paragraphs in the soils section specifically pertain to soils - the other two paragraphs I believe belong more appropriately in the terrestrial ecology section.~~

Page 100: under the Endangered/Threatened species discussion the word "faunal" should be inserted in the second sentence to clarify it; the first sentence mentions that Florida has no floral species on the lists, and then goes to discuss species (all faunal) which do occur.

Page 102: last two paragraphs discuss soils and so should be in soils, not land use section.

on page 97

Page 103: ~~the discussions on noise, static proof hardware, and shock current do not seem to fit in with the discussion of socio-economics.~~

Table 2.5-2 Federal emission standards for particulates has been changed.

Figures 2.2-9 and 2.2-14: Overprinted in some copies

Page 111: needs to be updated to match revised Corps of Engineers permit application.

Page 117: third paragraph under Chemical Analysis - why exception of chlorine? has that changed with new limitations? where else would Chlorine come from other than the blowdown, sanitary effluent, and the chemical waste effluent?

Page 118: second paragraph mentions five constituents which may exceed the Florida water quality standards but only itemizes four; should add an Oil & Grease discussion.

Page 119: chlorine discussion needs updating - also, regarding the chemical constituent discussion in last paragraph, all constituents may not be below the recommended LC_{50} tolerances at the edge of the mixing zone if variances are needed from water quality standards; the river itself may be above certain tolerance levels.

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Page 122: discussion under waste disposal may need changing; ~~quantities of sludge may be different with new air quality standards,~~ also, the landfill structure for sludge disposal may be varied - last paragraph: a new analysis of sulfate impacts has been conducted, altering this assessment.

Page 128: if noise is to be described in terms of a socio-economic impact, the discussion should consist of how it will effect any nearby residents or change their lifestyle, rather than just how loudly and how often it will occur.

Page 137: same argument as above.

Page 141: operation impacts, second sentence: it is unclear which blowdown to the water table aquifer might not meet DER standards; cooling tower blowdown will not be discharged directly to the aquifer (although some may occur in combination with sluicing waters); boiler blowdown is expected to meet the criteria at the point of discharge.

Figure 4.4-1: Intake Channel Dredge Plan should be updated to match the new COE application.

KAR/ed

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Junior Letters

Page 10 - 2nd Paragraph: The chemical waste system will be designed to neutralize --------, remove suspended solids before pumping. -------.

Page 10: A new chlorination program will be implemented by SECI. A residual of 0.1 ppm at the POD will be achieved. There is no time limit on chlorination.

Page 12 - 3rd Paragraph: Chlorine mixing zone is now projected to be instantaneously 750 square feet and to fall within an envelope of 0.9 acres.

Section 4.4.6 - Page 32-33: The intake and discharge structures have been designed and selected. This section should be revised to describe the system selected by SECI.

Section 4.4.8 - Page 35: Seminole now has more specific information on the coal and possibly trace element composition. Since SECI has only tenatively selected the final method of sludge/ash disposal, the initial method and interim test program should be described. Dewatered and stabilized sludge can become thioxotropic, therefore the statement in the 3rd Paragraph that no diking would be required is in error.

Table 9.3-1 - Corridor A: Advantage #3 in error - Macrophyte beds are present - Move to disadvantage column.

Page 46: The discussion of existing and changed emission sources is in error. The 500 MW of combined cycle units at FPL's Putnam Station is not discussed. The new units were certified in 1974 and started operation in 1977. Also the units at FPL's Palatka Station are now on cold standby which should reduce annual emissions.

Page 57 - 5.1.1.3 - Last Paragraph: Seminoles plant is in the Peninsular Florida Climatic Zone and is governed by those standards for heated water discharges.

Page 66 - Next to last Paragraph: More recent surveys indicate beds of macrophytes along the shore.

Page 100 - Endangered or Threatened ---, Second sentence should read: Both ---- the U.S. Fish and Wildlife Service have listed faunal species ----.

Table 2.5-2: Federal NSPS for Particulate Now 0.03 $lb/10^6 Btu$

NO2 - 0.6 $lb/10^6 Btu$

Table 2.5-6: No inclusion of the FPL sources in Putnam County.

Page 102: Last two paragraphs belong under Section 5.7.1 on Page 97.

Page 104 - 6.1.1.1: Discussion of impacts of smoke from burning land clearing debris should be included.

Page 111 - Section 6.1.2.1: Needs to be revised in accordance with the revised intake/discharge design. Spoil may be pumped or trucked to the disposal site. Clean sand will be used for backfilling the pipe trenches.

Page 113 - Last Paragraph on Dredging: Use of turbidity screens are another means to mitigate potential impacts. Extending the intake out further reduces dredging to be done which also reduces impacts.

Page 114 - Impacts to Water Table Aquifer: Amount of spoil is reduced due to new intake proposal.

Page 118 - 2nd Paragraph: Oil and grease which may exceed water quality standards was not discussed.

Table 5.2-2: Needs to be updated to conform to the new mixing zones.

Page 122 - Last Paragraph: The discussion on sulfate concentrations should be revised in accordance with the latest revision of the Environmental Analysis.

Page 124 - Last Paragraph: That the site would have been developed for another industrial use, if not a power plant, may not be highly probable. The conclusion is highly speculative and unsupported.

Page 140 - 6.2.2.2: The discussion on closing of blowdown valves during chlorination may be in error due to the new chlorine effluent limit of 0.1 mg/l.

Table C - 8: is no longer correct. The Florida Water Quality Standards have been changed.

Figure 4.4-1: Should be revised to agree with the revised intake system and amended USA COE application.

Table 12-30: is not up to date.

SA

1950 Forest Service N.E.P.A. Process
(P&L)

June 4, 1979

Site Certification Application & Environmental Analysis
for Seminole Plant Units No. 1 and No. 2,
Seminole Electric Cooperative, Inc., Tampa, Florida

Chief

We have reviewed the above mentioned environmental analysis. As now written, it is almost totally deficient in discussing the timber resource, except as it relates to wildlife habitat.

We assume that an environmental impact statement will be written on this proposal and would recommend that the statement contain specific information about the following:

a. An estimate of the current output of timber, per year, from the generation site and transmission corridors.

b. An estimate for the above land if the timber resource was intensively managed.

c. The environmental effects of not producing timber on the land proposed for the generation site and transmission corridors.

d. What are the long term effects of committing commercial forest land to the proposed uses?

e. How much prime timber land is involved?

The above information is needed for all alternatives so a comparison between alternatives can be made.

Overall, we find the environmental analysis to be a well written document even though it is rather lengthy.

W. Kagawa

JOHN A. VANCE
Area Director

cc: State Forester, Florida

Section 8.1.3 PUBLIC COMMENTS

8.1.3.1 Sierra Club (Letter dated May 28, 1979)

Comment 1

In our review of the Draft Environmental Impact Statement filed by the REA for Seminole Units 1 & 2 (NPDES # FL 0036498), we have found a serious omission in the section on air quality. Section 5.1.2.1, Air Quality Standards and Classifications, contains a discussion of PSD requirements for Class I areas and the effect of the Seminole plant on such areas. The DEIS states that there are two areas within 30 km of the Putnam site which may potentially be redesignated Class I. These are the Castillo de San Marcos National Monument and the Fort Matanzas National Monument. The only existing Class I area is the Okefenokee Wilderness Area.

The Sierra Club would like to point out that there are three areas proposed for wilderness designation much closer to the Putnam site than the Okefenokee. These are the Little Lake George, Alexander Springs, and Juniper Prairie areas of the Ocala National Forest. Alexander Springs (13,650 acres) is approximately 70 km from the plant site, Juniper Prairie (8,650 acres) approximately 55 km, and Little Lake George (2,375 acres) only 30 km away from the Putnam site. The DEIS (p. 107) shows that at 50 km the 24-hour SO2 concentration is 80% higher and the 3-hour SO2 concentration is 24% higher than the allowable Class I standards. Therefore, it is clear that there will be a violation of Class I air standards at the Little Lake George area and that violation is highly likely at Juniper Prairie. There is not sufficient information in the REA DEIS to make such a determination for Alexander Springs.

Response

The closest PSD Class I area to the Putnam site is the Okefenokee Wilderness Area, located approximately 105 kilometers north-northwest of the site. There were two areas under consideration for PSD Class 1 designation, the Castillo de San Marcos National Monument and the Fort Matanzas National Monument, both areas located within 30 kilometers of the Putnam site. Subsequently, both areas have been dropped from PSD Class 1 consideration.

The three areas proposed for wilderness designation, Little Lake George, Alexander Springs, and Juniper Prairie, have not been considered for redesignation as Class 1 areas. A wilderness designation does not automatically classify an area a PSD Class 1. The process for classification as a PSD Class 1 Area is different and completely independent of the process followed for wilderness designation.

Comment 2

The U. S. Forest Service released its RARE II Draft Environmental Impact Statement on potential wilderness areas in national forests on June 15, 1978, well before Seminole filed its Site Certification Application with the State of Florida. The Forest Service Final EIS, recommending inclusion of these three areas in the National Wilderness System, was released on January 4, 1979, some 4 months before the REA Draft EIS on the Seminole plant was released. The Sierra Club is not aware that either Seminole Electric Cooperative Inc. or the REA made any comments on either the RARE II Draft or Final EIS recommendations of the wilderness category for these three areas even though such designation might impact on the Seminole plant.

The Sierra Club would also note that, even though the Forest Service is a sister USDA agency, there was no reference in the DEIS Table 12-1 or Table 12-1a of any coordination with the Forest Service by either Seminole or the REA. In fact, the only notice to the U. S. Forest Service appears to have been a courtesy mailing of two copies of the DEIS to the Deputy Chief of the Forest Service in Washington, D.C. It would seem that consultation with the USFS State Forester and the Ocala Forest Supervisor would not only have been courteous but also a requirement of the EIS process since a portion of the Ocala National Forest is actually in Putnam County and less than 20 miles from the proposed site.

Response

The purpose of the Draft Environmental Impact Statements, provided to the Forest Service by REA, was for the compliance with the Guidelines of the Council on Environmental Quality and requirements of Section (2) (c) of the National Environmental Policy Act (42 U.S.C. 4322(2)(c)) to obtain a review of the proposed action. This is the consultation process required by law. In addition, the Forest Service was informed of their right to comment on the DEIS and of the public hearing held on June 4, 1979, by REA in conjunction with EPA and the Florida Department of Environmental Regulations on the proposed Seminole plant.

Comment 3

The Sierra Club requests that the REA be required to amend the Seminole EIS to include an analysis of the predicted impact on air quality in each of these proposed wilderness areas. In addition, the socioeconomic impact of degrading the air quality of the only remaining potential wilderness areas in this section of Florida should be addressed.

Response

The impact on potential wilderness areas is discussed in Section 6.1.1.2 of the EIS. The prevention of significant deterioration regulations allow wilderness areas established after August 7, 1977, to be redesignated as Class I or II if they are larger than 10,000 acres. Alexander Springs is greater than 10,000 acres and if it were to be redesignated as Class I it is not likely that emissions from the plant would cause the area to exceed Class I increment. The plant will meet all air quality standards.

8.1.3.2 H. Paul Friesema (letter dated 6/5/79)

Comment 1

It seems to me the discussion of the potential impact and consequences on the Florida manatee is entirely inadequate. You write (p. 72), "consultation with the U.S. Fish and Wildlife Service suggests that the operation of the plant will not adversely affect this specie or its critical habitat." That is quite an inadequate statement. It seems clear enough that effluent discharges can attract manatee. (Are the concentration of manatees at Polatka, which you note on page 72, in connection with the power plant discharge there?)

Is it likely that manatee will concentrate for winter habitat near the Sminole Plant? Would that be desirable? Should you consider thermal discharge alternatives which would actually promote the development of such critical habitat? Apparently Florida Power and Light is successfully doing so, in conjunction with the Audubon Society (See "A New Hand in the Wildlife Business, Audubon, May, 1979). I'm not at all sure that such a program would desirable. But it seems clear that, depending upon the cooling alternatives you select, manatees may be attracted. Therefore, the EIS is the appropriate vehicle for considering this opportunity (or threat). If it is appropriate to do something about the manatee, REA as a governmental agency should mandate the appropriate action, as a condition of any loan support, because preserving the manatee is an unambiguous national goal.

Response

Discussion of the Florida manatee has been expanded in Section 5.4.4 Aquatic Ecology: Endangered Species. Additionally, by letter dated April 5, 1979, the U.S. Fish and Wildlife Service has concluded in its Biological Opinion:

> "After a careful review of the findings by Fish and Wildlife Service Personnel, it is our Biological Opinion that the proposed coal fired generating units near Bostwick, Florida, are not likely to jeopardize the continued existence of the Florida manatee... or result in the destruction of or adverse modification of habitat."

It would be possible to design thermal discharges from the generating station to attract the manatee. However, concentration of manatees near the discharge area in winter months may cause severe adverse effects on that population if discharges should be interrupted due to operational failure.

Comment 2

I think that you are remiss in your consideration of alternative fuels, at this particular site. On pages 23-25, you consider alternate fuels, including nuclear fission, nuclear fusion, oil or natural gas, coal, and other forms, including solar, hydro-electric, and geo-thermal. These are discussed and dismissed in only the most general terms.

Response

The amount of discussion devoted to the various alternatives reflects the viability, feasibility, and economic aspects associated with them within the timeframe in which additional power is needed. For the

reasons stated in Section 4.2, these alternative fuel sources are not viable alternatives. Council on Environmental Quality NEPA regulations indicate that the preponderence of analysis should be devoted to the significant issues and reasonable alternatives. Some additional discussion of solar energy follows: The use of solar energy in the form of wind or sun to generate "base load" energy in the amounts required by Seminole is not technically and economically feasible. Solar generating facilities in order to be counted on as reliable base load resource would require substantial backup generating capability or energy storage facilities. The use of solar energy does "displace" the requirement for higher cost energy and is technically feasible and in some areas economically feasible and should be pursued; however, it would not displace the base load capacity that Seminole requires. The individual solar heating and cooling systems commercially available and being installed today, rely on the utility to supply power at night and on cloudy days. Seminole's system requirements for base load capacity would not be significantly decreased.

Comment 3

The alternative which isn't discussed, but which bears detailed discussion it seems to me is wood. If locally available would could be substituted, in whole or part, for coal shipped in from Illinois or Kentucky, you would be furthering the national energy objective to promote the use of renewable resources for energy, and also save on the use of considerable scarce diesel fuel, needed for train transportation of coal, but sorely needed in agriculture as well. Whate are the timber resources available nearby? Does the Hudson Pulp and Paper Co. produce slash or other wood product residues which could be used? Obviously the use of wood as a boiler fuel would be a stimulus to the local economy of some importance. It deserves a full examination and consideration in the EIS. If appropriate, REA should mandate its use, as a condition of loan support, not only because of our national energy and environmental policies, but also because REA is a part of the Department of Agriculture, and needs to promote the interests of American agriculture in developing markets for products, including forest products, and in preserving scarce (diesel) fuel needed for American agriculture.

Response

The only source of wood for fuel in the vicinity of the generating station is the Hudson Pulp and Paper Company. However that company uses all of its wood residue for its own purposes. At present, the use of wood as a fuel for an electric generating unit in the range of 600 MW has not been demonstrated as a feasible alternative. The largest operational wood burning plant, located in Michigan, has a capacity of 30 MW. The use of coal as a fuel source for electric generating stations is consistent with the Powerplant and Industrial Fuel Use Act.

Comment 4

When considering alternatives could you also consider whether a cogeneration project might be appropriate with the Hudson Pulp and Paper Co., either for the Seminole Electric Coop, Inc. or some of its members coops.

Response

A cogeneration project involving Seminole Electric and Hudson Pulp and Paper was considered in 1977-78. Studies and analyses showed that such an alternative was not feasible.

8.1.3.3. Sierra Club - Florida Chapter (Letter dated June 6, 1979)

Comment 1

In the area of ground water, we have learned that Seminole is now planning to conduct field tests to determine the actual direction and rate of ground water flow and to perform new ground water modeling studies based on this site specific data. These new tests are for the purpose of determining the effects of the coal storage area on ground water quality. Seminole has also indicated the possibility that they will line the portion of the coal storage area that will be used during the first several years of operation of the plant in lieu of conducting the tests just described. Lining of the coal pile would be accompanied by further testing to determine the need for lining of the entire coal pile. Seminole has further stated that they are reducing the amount of discharge into the percolation bed.

Response

During the first two years of operation prior to completion of Unit 2, the amount of coal required for contingencies will occupy only one-third of the inactive coal storage area. Rather than run the risk that the coal may later have to be moved, at great cost and possible disruption of operations in order to permit the inactive coal storage area to be lined, Seminole will either (1) line the first third of the inactive coal storage area with bentonite or its Engineer's approved equal before coal is placed on it, or (2) conduct additional groundwater modeling studies before any coal is placed on the inactive coal storage area if we determine that such studies can conclusively demonstrate whether or not the entire inactive coal storage area should be lined.

If Seminole selects the first option, an in situ evaluation of the leachates from the lined portion of the inactive pile will be conducted during the first two years of operation of Unit 1. This will enable us to determine whether it will be necessary to line the balance of the inactive coal storage area before coal is placed on it in preparation for Unit 2 operation.

If Seminole selects the second option, the additional groundwater modeling study will include inputs from (1) a realistic leachate evaluation of the washed coal to be used at the plant, (2) test wells to verify the direction of groundwater flow, and (3) a sampling of the aquifer through the use of appropriate tracers in the test walls.

Comment 2

In the surface water area, Seminole has done further analytical studies to determine the extent of their pollution of the St. John River. In place of the actual field verification requested by the Sierra Club, Seminole performed sensitivity studies to determine the effect on the size of the mixing zone of using smaller dispersion coefficients. The studies done by Seminole appear to indicate that the discharges from the plant will not exceed state standards for effluent discharges and water quality

Response

Seminole has conducted studies indicated by the Sierra Club. The study results show that discharge from the generating station will not exceed state standards for effluent discharges and water quality.

8.1.3.4 R. Gamble Mann (Letter dated June 12, 1979)

A. Adverse Impact on Privately Owned Residential Property

Comment 1

It will deprive residential and other owners of valuable riverfront property in the vicinity of the proposed plant of the right to quiet, peaceful enjoyment of their property both during construction of the plant and thereafter. It should be noted that the REA's Draft Environmental Impact Statement is completely silent about the fact that the riverfront property south of West River Road (Rt. 209) was zoned residential and there are numerous residences located there.

Response

Sections 6.1.4.1 and 6.1.4.2, Noise, discuss the potential noise impacts as a result of construction and operation activities. Construction activities will temporarily increase noise levels slightly. Operation activities will not increase ambient levels only very slightly. These activities should not interfere with the use of privately owned residential property.

Comment 2

It will greatly depreciate the value of all of this riverfront property as a residential and recreational area. Our property was appraised in 1975 by Mr. Jeff Cooper, Jacksonville, Florida, a licensed real estate appraiser, at $80,000. Undoubtedly, the value of this riverfront property continued to increase after that date until it became public knowledge that it would be located in close proximity to and overshadowed by a massive electric utility plant.

Response

The property in the area surrounding the plant is not expected to decrease in value.

Comment 3

While a 675-foot smoke stack and two 450-foot cooling towers may be things of beauty to utilities and their engineer, they are, in fact, esthetic monstrosities which will drastically detract from the natural beauty of the Florida riverfront hammock land in the proposed plant's vicinity. There is no possible way these gigantic structures can be screened from public view no matter how much planting is done.

Response

While a 675-foot structure cannot be screened completely from public view, the applicant has taken measures to screen the plant to minimize visual impact.

Comment 4

The presence of up to some 900 construction workers at the plant site over a 5-year period poses a positive threat to the property and persons residing in the plant site vicinity. It is a well established fact the crime rate rises in any area where there is an influx of itinerant construction workers. Putnam County and the State of Florida currently lack the police forces to now prevent frequent trespass, thievery, etc. along State Rt. 209. This situation is certain to become a great deal worse during plant construction.

Response

Access to the plant site during construction will be from U. S. 17, not County Road 209, with specific intent to minimize construction traffic on Road 209. Based on current studies Putnam County is served by four different law enforcement agencies which should be capable of providing adequate protection with the influx of construction workers.

Comment 5

Displaced reptiles from the plant site will pose a constant hazard and threat to all residents in the vicinity. It is nothing short of remarkable that REA officials in inspecting the proposed plant site found only one specie of snake--the black racer. Presumably their inspection was made during exceptionally cold weather. The plant site has long been known to be rattlesnake infested. The swamp area in the southeast corner of the plant site, which forms the headwaters of Fish Creek, is also infested with cotton mouth and water moccasins. Tree moccasins, pine rattlers, corn snakes, king snakes and coral snakes have also been observed in the plant site area. While these snakes are scarcely "endangered species", construction of the plant will create a constant danger to nearby residents as these snakes are driven from their natural habitat by construction equipment. In this connection, it is worth recalling that when old WWI Camp Johnston on U. S. Rt. 17 near Jacksonville, Florida was converted into the U. S. Naval Air Station, Jacksonville, for an extended period during its construction hundreds of displaced rattlesnakes were constantly observed moving onto U. S. Rt. 17 in search of new habitats and they were continually striking at motor vehicles, pedestrians and animals. The same situation can be expected to occur at the proposed electric plant site.

Response

The observed lack of snakes and other ground dwelling animals is probably due to the presence of hogs as explained in the "Site Certification Application." Hogs are widely known for consuming snakes and other reptiles and there is clear evidence of the presence of hogs throughout the site area. Most of the residences adjacent to the site are located in the southeast area. Portions of the site are planned to be left undisturbed, particularly in the southeast area. As a consequence, sufficient habitat should be available to accommodate any reptiles that may be displaced as a result of construction on the site.

B. Adverse Impact on Air Quality

Comment 1

1. The REA Draft Environmental Impact Statement (2.5.1.2) concedes that REA does not know and cannot assess the adverse impact on air quality of the sulfate aerosols which will result from gaseous sulfur oxides emitted into the atmosphere by the proposed plant. Furthermore, it concedes it does not know the relationship between sulfate levels and public health welfare effects.

Additionally, REA concedes it does not know the adverse consequences of the formation of acidic sulfates in rainwater, on surface water bodies, soils and vegetation. Despite this, REA urges on the U. S. Environmental Protection Agency and the Florida Department of Environmental Regulation that they buy "a pig in a poke" and approve construction of the proposed plant.

There is a close parallel between this "we don't know" advocacy and the earlier lack of knowledge of the adverse effects of nuclear radiation, x-rays, etc., on human beings for which the public is now paying dearly for the disastrous effects.

If no one knows the answers to the adverse impact on air quality of sulfate aerosols and "acid rain", as REA alleges, then it would be the height of recklessness for any governmental body to approve the proposed plant until the adverse effects ARE known. We suggest there is a presumption against sulfate aerosols and "acid rain" since it IS known that both gaseous sulfur and solid sulfur is detrimental to human beings, water, soil and vegetation if there is constant exposure, as would be the case in the proposed plant area.

Response

There is considerable difference of professional opinion on the source, formation, and distribution of sulfate aerosols and the potential impact such may have on public health and welfare. It is known that by contributing sulfur dioxide to the atmosphere, powerplants may contribute to the formation of sulfate aerosols. The U. S. Environmental Protection Agency has set rules, in carrying out the mandates of the Clean Air Act to protect public health and welfare, which limit the amount of sulfur dioxide which can be discharged to the atmosphere. As explained in Section 2.5.1 of the Draft EIS, the Seminole Plant Units No. 1 and 2 are required by law to comply with emission limitations for sulfur dioxide and to employ Best Available Control Technology to reduce the total amount of sulfur dioxides produced by 85 percent and to avoid significant deterioration of air quality. The proposed plant will achieve these objectives.

Comment 2

The coal contracted for and to be used by the proposed plant has an alleged maximum sulfur content of 2.75% (see 4.2.3.2.). This is what is commonly referred to as "high sulfur coal" and it is certain to increase gaseous sulfur emissions and "acid rain", despite so-called washing of the coal and the scrubbers to be installed. REA estimates that 90% of the sulfur will be eliminated and sulfur emissions will only be 10%. Unfortunately, according to current newspaper reports, the Environmental Protection Agency has eased its sulfur emission standards so as to permit a 15% emission. That assures the proposed plant will be emitting at least 15% gaseous sulfur further polluting the air quality.

Response

Please refer to the above response. The flue gas desulfurization equipment will remove at least 85% of the sulfur dioxides produced.

Comment 3

The REA Draft Environmental Impact Statement glosses over the combined air pollution which result if the electric plant is permitted. Realistically, what will happen is the creation of a near-constant stench in the surrounding areas. Whenever the prevalent southwest wind is blowing in the spring and summer months obnoxious fumes from the Hudson Pulp and Paper Co. mill roll in like fog over the proposed plant and riverfront areas. The sulfur fumes from the electric plant in the fall and winter months when the prevailing wind is from the northwest would inundate the riverfront areas. In brief, there would be little or no relief at any time for property owners from the individual and combined odors of these two plants and the quality of air will be seriously reduced. We have yet to meet the human being who can long tolerate the smells of an open sewer.

Response

No odor will be produced by the proposed power generating facilities.

C. Adverse Impact on Groundwater and the Florida Aquifer

Comment 1

Both the groundwater and Florida aquifer will be seriously polluted by the waste water and air discharges of the proposed plant as well as by the seepage from the coal and ash pits and from the percolation area. It is a basic law of physics that water seeks its own level thus assuring that seepage from the coal and ash pits will eventually find its way into the groundwater and Florida aquifer. Any geological obstruction such as the Hawthorne strata will simply mean that seepage and other waste water will move laterally until it finds its way into the groundwater and aquifer.

Response

The potential impacts on groundwater resources are identified and discussed in Sections 2.5.2 and 6.1.2 of the Environmental Impact Statement and in Appendix D of the "Site Certification Application and Environmental Analysis". The evaluation of potential contamination of the water table aquifer was based on site specific field and laboratory studies of geology and soils. The principal criterion for judging impact was the limits on groundwater quality established by the Florida Department of Environmental Regulation. The evaluation indicates that Florida groundwater quality criteria will be met at the site boundary. No significant impacts to off-site groundwater quality are anticipated.

Comment 2

There is no assurance whatever the "chemically stabilized" materials to be used to form the floor and dikes of the waste storage area will prevent seepage. Furthermore, while the materials to make the dikes and floor of the waste area are being generated, there will be heavy seepage into the groundwater and Florida aquifer. It should be noted that the pits used by Hudson Pulp and Paper Co. to hold chemical wastes and other discharges permitted seepage into Rice Creek. Both the direct discharge and seepage of these wastes turned Rice Creek into what is is today--a "deadend" body of water devoid of marine vegetation, marine life,etc.

Response

Laboratory and field test indicate that chemical stabilization of flue gas desulfurization sludges by pozzolanic technology produces a solid material with high compressive strength, high chemical stability (so that virtually no leachate would be created by rainfall), and low permeability. To ensure environmentally acceptable disposal of FGD wastes, Seminole has agreed to evaluate the handleability, economics, structural stability and environmental acceptability of waste disposal and develop and implement a long term disposal plan.

Comment 3

The water supply of many residents in the area comes from "surface" wells that are 30-50 feet in depth. Waste water and seepage from the proposed plant will render this water non-potable or actually poison it. Those properties served by artesian wells may fare a little better but water pressure will be seriously affected by the draw down by the plant's wells. Our property is served by an artesian well reputed to be 800 feet deep though we have no way of knowing for sure since the well was on the property when it was purchased. Over a span of 40 years the water pressure has been reduced by no less than one-third.

Response

Please refer to discussions of potential impact on water resources contained in Sections 2.5.2 and 6.1.2 of the Environmental Impact Statement. No significant impacts to off-site groundwater quality are anticipated.

Comment 4

It is noted from Figure D-10, Zone "2", to be the plant's percolation field, has a water ground flow towards our property and the headwaters of Fish Creek. This would be a positive health hazard from plant sewage and pollutants. Furthermore, we are unalterably opposed to the discharge of ANY form of pollutants into the area of the headwaters of Fish Creek since the Creek is a breeding ground for various species of fish and the American alligator. The Creek's estuary is also the feeding ground of both fish and alligators.

Response

An evaluation of the potential impact of the percolation field, area 2, shown in Figure D-10 of the DEIS is discussed in Section 6.1.2.2., Groundwater, Operational Impacts. The evaluation concluded that Florida groundwater quality criteria can be met at the property boundary in the vicinity of Fish Creek. Additionally, a groundwater quality monitoring program will be conducted during plant operation. If the data indicate a potential significant impact on Fish Creek, Seminole will take measures to mitigate this impact.

Comment 5

REA concedes that evaluation of percolation of equipment cleaning wastes from the plant do NOT meet the State of Florida's water quality

criteria in the case of iron and that cadmium is borderline. The REA states: "The potential impact of these minerals to groundwater beyond the site boundary are not anticipated." It is an interesting theory that water pollutants will run up to the site boundary and stop. An "anticipation" is also a far cry from a certainty.

Response

The concentrations of iron and cadmium in question pertain to the concentrations in the percolation pond; not at the property boundary. The impact evaluation indicates that concentrations of these two constituents at the property boundary should not exceed Florida water quality criteria.

Comment 6

It is noted that Zone "A", to be used for ash and sludge disposal, is flood prone and designated a "preservation" area by the Coastal Zone Management Plan. This is NOT noted in Table 9.1.1.

Response

Please refer to response to Comment 17 in Responses to 3 July 1979 EPA Comments. Additionally, the area identified for waste storage completely avoids intruding on the lowlands areas of the site. Minimum impacts to these lowlands are expected since waste storage runoff will be collected and returned to the flue gas desulfurization system and not discharged to the lowland.

Comment 7

The proposed plant is to have sufficient water storage facilities to fight fire for a period of three hours. This would be a mere drop in the bucket if the amount of coal to be stored on the plant site was ignited by lightning, brush or forest fire, etc. It is also highly doubtful that Putnam County could muster sufficient fire hose that would reach the St. Johns River in ample time to contain a fire in the coal pit.

The quantity of water sufficient to extinguish a large coal fire would flood the coal pit and drastically pollute the groundwater and aquifer. Furthermore, a smoldering coal fire could seriously pollute the air for weeks.

Response

Coal pile fires are due to spontaneous combustion which is aggrevated by coal with free pyritic sulfur lumps, improperly compacted and poorly maintained. Seminole will avoid this type of fire by: purchasing washed coal, minimizing the free pyritic sulfur, compacting the coal pile from a received density of about 50 lbs/cu ft. to approximately 68 lbs/cu. ft. and maintaining the coal pile by reshaping and recompacting as needed.

Comment 8

REA makes light of the quantity of water to be taken from the St. Johns River by the proposed plant's water intake pipe... "The maximum withdrawal of cooling water from the St. Johns River represents less than one-half of one percent (0.5%) of the average river flow." (See 2.5.2.2.). REA states that plant will be using 16,127 gallons of river water PER MINUTE. That amounts to 8,466,322,000 gallons of water per year. Expressed another way, the plant will use on A DAILY basis the equivalent amount of water that would be consumed by 1,935 average Florida residences in a period of an ENTIRE MONTH. This is a monumental dissipation of Florida's water supply which is becoming progressively depleted.

Response

The plant will be withdrawing a maximum of 16,127 gallons per minute from the river however 12, 130 gallons per minute will be evaporated in the cooling towers, 27 gallons per minute will be put in the atmosphere by drift and 3,970 gallons per minute will be returned to the river. The water withdraw does not represent a "dissipation" of Florida's water supply.

The significance of the impact of surface water withdrawal is further discussed in Sections 6.1.2.2 and 2.5.2.2 of the Environmental Impact Statement.

Comment9

The REA Draft Environmental Impact Statement makes no mention of the fact that the plant's water intake pipeline running 900 feet into the St. Johns River will have constant clogging problems, screen or no screens. In discussions with REA engineers at the REA Washington Headquarters it became apparent that they had no knowledge of the fact that water hyacinths have returned to the St. Johns River in great profusion and often clog the river during the winter months. As the jyacinths die off their long, hairlike roots sink to the bottom of the river and will be constantly smothering the plant's water intake pipe and clogging its screens. Any one with the slightest familiarity with hyacinths can appreciate the problem of trying to cope with this aquatic pest.

Response

The discharge pipe extends 900 feet into the St. Johns River. The intake structure located approximately 325 feet offshore has been designated to avoid fouling by water hyacinths. "Constant clogging problems" are not expected in the discharge or intake pipe.

Comment 10

It has long been known that a subterranean fresh water river flows through that section Florida where the proposed plant is to be located and empties into the Atlantic Ocean some 35 miles east of St. Augustine, Florida. From the volume of water flowing from this subterranean river it has been estimated the river is greater in size than the St. Johns River which crosses and flows above it. Over the years various geological studies reported in Florida newspapers have expressed the belief this subterranean river may well flow directly beneath the area where the proposed plant is to be located. It would be totally irresponsible to risk polluting this subterranean river with 35 years of seepage from the coal and ash pits and other wastes from an electric power plant. At some time in the future this subterranean river could well become a major source of fresh water for the northeastern portion of Florida. Certainly this situation calls for extensive geological studies made by independent geologists before any permit is granted for construction of a coal-fired electric plant in the area.

Response

The concept of a "subterranean fresh water river" has been commonly used in a nontechnical sense to describe the flow of groundwater. Unlike the flow of surface water in channels, the flow of groundwater is not channelized but occurs through small voids in porous rock formations. Please refer to Section 2.5.2 and 6.1.2 of the EIS for discussion of the impact of the proposed plant on groundwater resources.

D. Adverse Impact of Flora and Fauna

Comment 1

We are deeply concerned about the adverse impact of gaseous emissions and water pollution from the proposed plant on a live oak tree on our property. This tree is one of the largest in the State of Florida and it has been estimated to be 1,000 years old. Loss of this tree would be incalculable.

Response

The fossil-fueled power plant air pollutant most closely linked to possible vegetation damage is sulfur dioxide. Live oaks are generally classified as resistant to sulfur dioxide damage. Since the ambient sulfur dioxide levels resulting from operation of Seminole Plant Units No. 1 and 2 under adverse conditions are expected to be well below the levels necessary to protect sensitive types of vegetation, a resistant species like the live oak should not be damaged.

E. Adverse Noise Impact

Comment 1

The proposed plant is certain to create a noise pollution problem. By REA's estimates (see Tables 5.6-1 and 5.6-2) the following noise levels will exist when the plant is fully operational:

Main transformer	41 decibels
F. D. Fan	40 "
F. D. Fan Motor	41 "

Coal handling:

Active pile with coal car dump	44 decibels
Inactive storage area	53 "
Cooling towers	47 "

In sum, that representa a total of 266 decibels of noise...plus the current decibels from trains, boats, aircraft, and traffic on U. S. Rt. 17 and State Rt. 209. Any combination of these noise levels will be bedlam and intolerable to living conditions in the plant's vicinity.

Response

Sound pressure levels (expressed in decibels) from different sources cannot be added arithmetically to achieve a cumulative sound level. The cumulative effect of the sound levels from operation of the Seminoel Plant is discussed in Section 5.6 of the "Site Certification Application and Environmental Analysis". The maximum increase in day/night sound levels above background conditions at selected nearby offsite locations is projected to be no more than 1 decibel, which represents an insignificant increase.

F. Adverse Impact on Endangered Species

Comment 1

There are at least two "endangered species" which inhabitat the St. Johns River and its tributaries--the manatee (sea cow) and the American alligator. REA, in its Draft Environmental Impact Statement, acknowledges the presence of themanatee but makes no reference to the American alligator. The swamp area in the southeast corner of the proposed plant site, which forms the headwaters of Fish Creek, is a known habitat of the American alligator and they have been observed on many occasions coming down Fish Creek at dusk to feed in the estuary.

Response

The American alligator is listed as a "threatened" species by the U. S. Fish and Wildlife Service. By letter dated April 5, 1979 the U. S. Fish and Wildlife Service after study and consultation concluded that the American alligator and the Florida manatee, among others, would not be adversely affected by the proposed plant. Further discussion of

endangered and threatened species is contained in Sections 2.5.4.3 and 5.7.3 of the EIS.

Comment 2

Water and air pollutants emanating from the proposed plant will be a positive threat to both manatees and alligators. REA states (5.4.4): "Consultation with the U. S. Fish and Wildlife Service suggests that the operation of the plant will not adversely affect this specie (manatee) or its critical habitat." The letter to REA from the U. S. Fish and Wildlife Service inserted into REA's Draft states anything but that. The Service made it abundantly clear to REA that it was not willing to take a position of the impact on manatees without extensive study of the question.

Response

The Fish and Wildlife Service in their biological opinion dated April 5, 1979 state that the proposed units are ".. not likely to jeopardize the continued existence of the Florida manatee,... the American alligator,... or result in destruction or adverse modification of habitat." Their letter is included in the appendix. Please refer to the above response for additional response.

G. Meteorological Impact

Comment 1

The REA erred in using the weather data for Jacksonville, Florida is assessing the impact of weather on the proposed plant site. During the spring and summer months the plant site and the St. Johns Riverfront area have been frequently referred to as "Thunder Alley". Severe thunderstorms are almost a daily occurrence. These storms arrive with uncanny accuracy at 4 P.M. EDST. There is near-total darkness, heavy thunder, exceedingly heavy rain and continuous lightning. On

occasion the rain is so heavy it will stand on the sandy soil some 3-5 inches deep before absorption and runoff. We have lost numerous trees as a result of lightning strikes.

Response

The only National Weather Service stations located within 50 miles of the proposed site which report thunderstorm occurrence are Jacksonville and Daytona Beach. Jacksonville is considered slightly more representative of the site because it is located about the same distance inland whereas Daytona Beach is closer to the coast. Daytona Beach experiences a slightly greater incidence of thunderstorms but greater rainfall amounts occur at Jacksonville on an annual basis and during the peak summer rainfall season.

Comment 2

Lightning will pose a constant threat in the spring and summer to the plant and its strucutres, the coal pit, transformers and transmission lines. Lightning strikes will result in frequent damage to the plant's generators, transformers and transmission lines and frequent electrical outages are certain to occur.

Response

The electrical plant facilities, including transmission facilities, will be properly designed to protect the facilities from high isotonic levels in the area. This will include grounding and "shielding". Lightning strikes are not expected to cause any significant amount of damage to the plant or ancillary facilities.

Comment 3

While only one hurricane has struck in the proposed plant site area is recent years it did result in considerable damage and heavy flooding. Approximately one-half of our property was under water. This flooding is to be expected every time a hurricane moves up the Florida

east coast or crosses the Florida peninsula from southwest to northeast. It will take only one hurricane to topple the 675-foot smoke stack and the two 450-foot cooling towers.

Response

The plant's facilities, particularly tall structures, are engineered to withstand hurricane force winds. The power plant will be located above the 500 year flood plain.

Comment 4

Tornados are not unknown in Putnam County and there is very little room for doubt a tornado would demolish the plant's smoke stack, water cooling towers and transmission lines.

Response

Tornados are discussed in Section 5.1.1.2. Since the probability of a tornado occuring in the area of the plant is 0.00054 with a return frequency of one in every 1,839 years, it is not practical to engineer the plant to withstand tornado force winds.

H. Adverse Impact on Wetlands and Floodplain

Comment 1

Approximately 20 percent of the proposed plant site contains wetlands. Another 20 percent of the site is within the floodplains. REA acknowledges there will be adverse impacts to wetlands and floodplains and that transmission lines will be sited in both.

Response

About 20 percent of the site is lowland or wetlands characterized by periodic inundation, most of which is located in the northern part of the site. The identified onsite floodplain areas are nearly identical to the lowlands areas (Figure 2.3-2 Draft EIS and Environmental Analysis); floodplain areas are not an additional

20 percent of the site. Except for small, isolated flood prone areas in the western part of the site, lowlands or wetlands, and floodplain areas will remain undisturbed, and little if any adverse impacts are expected. (Refer to Section 2.5.3.3 for additional discussion).

Comment 2

The coal and ash pits are in close proximity to wetlands on the proposed site and will result in irretreivable damage to these wetlands.

Response

No adverse impacts are expected to occur to wetlands as a result of the location of the coal storage area or percolation pond. Please refer to Section 6.2.1.3.2 of the Environmental Impact Statement.

Comment 3

The percolation area planned for the proposed plant is in close proximity to wetlands and will result in irretreivable damage to these wetlands

Response

Please refer to the above response.

I. Threat to Aircraft Safety

Comment 1

The REA Draft Environmental Impact Statement avers there are no military facilities in the proposed plant's area. Figure D-7 shows a U. S. Navy bombing range just west of Bostwick, Florida. In WW II the U. S. Navy also maintained a practice field northwest of Bostwick. It may well be the day will come again when the U. S. Navy finds it necessary to clear and reactivate this landing field for the training of aviation cadets. The last thing fledging pilots or Navy pilots practicing bombinb runds need is a 675-foot smoke stack in their

landing, take-off, diving and pull out patterns. Why hasn't the U. S. Navy consulted about this?

Response

The Navy was consulted regarding the construction of power generating facility in the vicinity of the deactivated bombing range. Although the stack is a possible obstruction to light aircraft, safety markings and warning lights as required by the FAA, should minimize the hazard. It is possible that the visibility of the stack may prove valuable as a navigational aid to the pilots.

Comment 2

REA states that the Federal Aviation Administration has approved the construction of a smoke stack up to 800 feet in height. The Federal Aviation Administration has a consistent tract record of NOT recognizing an aviation hazard until AFTER there has been an air disaster. The proposed smoke stack will be one of the tallest, if not the tallest, structure in the State of Florida. As such it will be a constant hazard for private, commercial and military aircraft, all of which have been observed from time to time flying BELOW the 675-foot lever. In inclument weather private and military planes frequently seek out the St. Johns River to use as a landmark to orient themselves; in doing so they will be flying in close proximity to this 675-foot smoke stack.

Response

Please refer to the response to Comment 1 above.

J. Alternates not Requiring New Generation

Comment 1

In Section 4.1.1. Seminole laments that if the proposed project is not constructed "growth within the area served would by necessity curtailed." Yet as Sec. 4.1.2 Seminole unequivocally states there is "the need to reduce (load) growth rate." Would curtailment of both population growth and load growth necessarily be bad? We think not. Florida's population growth since WW II has been phenominal and with it has come all of the ills a population explosion brings. Limiting the availability of electric power, which is the most expensive form of power, is one way to slow down the growth rate. Steadily depleting water resources in Florida is another very good reason to attempt to retard growth.

Response

Seminole and its members are actively pursuing load management and energy conservation programs to minimize load growth. Seminole's load, however, exceeds its generation capacity by over 1000 MW. By the time the Seminole Plant is fully operational, Seminole's load is anticipated to continue to exceed its generation capability by the same amount as today. The addition of the two units in the Putnam area will, however, help secure for Seminole's members a reliable and economical generation resource.

Comment 2

Seminole claims it and its member distribution cooperatives have recently been experiencing load growth which exceeds national trends. Yet many areas served by Seminole and its cooperatives have the slowest growth rates of any areas in Florida. Figures to claim "growth" can be highly deceptive and made to prove almost any desired point.

Response

Seminole's actual load growth has been within a 0.6 percent energy and 0.3 percent demand forecasts, established in a 1977 Power Requirements Study. There has been no indication that the Seminole load forecast is overstated. Although it is possible that on individual members load may grow at a lower rate than the national trend the Seminole system has exceeded the national trends.

Comment 3

Seminole also states (5.6.1.3. that: "Putnam County is not expected to experience development pressures as intensely as other counties in the coastal zone," and further; "Zoning of the area, then, gives the county the opportunity to control development and to prevent conflicting uses." There can be no more conflicting use than constructing a coal-fired electric plant adjacent to valuable river-front residential and recreational properties. Furthermore, the county's opportunity to control development through zoning will be severely restricted if the plant is permitted to be constructed since use of land for that purpose is wholly incompatible with many other land uses.

Response

Please refer to Section 2.5.3.2. of the EIS. There are no conflicting uses of the site. As required by the Florida Electrical Power Plant Siting Act, the site and transmission corridors were found to be in conformance with existing land use plans and zoning ordinances.

Comment 4

Seminole also rejects out of hand other forms of fuel and generation including solar power, as not feasible. This is just so much pure, unadulterated eyewash. Solar power is anything but a new form of energy though from all of the hoopla in the press one would believe it is a new discovery. Many homes in South Florida in the late 1930's had hot water solar heating. The Mike Wallace TV-Show, "60 Minutes" broadcast on June 3, 1979, also clearly demonstrated the feasibility of solar power in Florida.

Response

Solar power applications are not technologically or economically feasible for centralized power generation in increments large enough to meet the projected needs of the Seminole system.

K. Miscellaneous

Comment 1

The proposed plant site is wholly uneconomical since by Seminole's own admission the additional generating capacity is to serve the State of Florida "peninsula" area--NOT Putnam County, which is already served by Florida Power & Light Co. (East Palatka plant) and Clay Electric Cooperative (Keystone Heights).

Response

Feasibility studies performed by Seminole show that the proposed plant is economical.

Comment 2

Seminole states its principal markets are to be Ocala and Lake City; both many miles removed from the Putnam County plant site. Nonetheless, it proposes to spend millions of dollars running transmission lines to these remote principal markets from the Putnam County site when an alternate site would be more economical.

Response

Seminole considered factors in additional to economics, including the environmental effects of the proposed project in evaluating all potential sites.

Comment 3

We, therefore, must look to the State of Florida and the agencies of the U. S. Government to protect the public interest and our own. Unfortunately, the U. S. Rural Electrification Administration has cast itself in the role of an adversary in openly advocating Seminole's application. Somewhere along the line that agency forgot its responsibilities and obligations extend BEYOND just support of rural electrification.

Response

REA has never "cast itself in the role of an adversary advocating Seminole's application." We have been working with the cooperative, and its consultants for approximately 3 years studing alternative power supply arrangements to improve Seminole's ability to meet its obligations of providing an assured power supply to its members. REA in conjunction with several other cooperating Federal and State agencies has prepared the EIS. In making an assessment of all the viable alternatives REA has conducted a completely open NEPA process. REA has encouraged and facilitated public involvment in its decisionmaking process. This approach provides for complete freedom of REA to look at all reasonable and viable alternative power supply arrangements throughout the process and to be objective in our evaluation.

8.1.3.5 Ms. Margaret M. Lovejoy (letter dated 6/12/79)

Comment 1

The plant will burn approximately 9,000 tons of coal a day. Cooling towers will use more than 12,000 gallons of water from the river per minute, a large part of which will be discharged into the atmosphere, with prevailing winds spreading the sulfuric oxides contained therein over St. Johns County areas. This would have disastrous consequences to the most valuable assets of St. Johns County: agriculture (this area is the major supplier of cabbage and potatoes in the United States), pines (a planted crop in northeast Florids), and animals (a category in which residents may be included).

Response

Vegetation injury or damage from sulfur dioxide as a result of the burning of coal is dependent on ground level concentration, duration of exposure and sensitivity of the vegetation. The maximum expected 3-hour ground level concentrations for the proposed plant will be such that sulfur dioxide emissions from the proposed plant shall not adversely impact potato, cabbage or pines. Refer to Section 2.5.1.2 for additional details. A general discussion of the impact of the proposed station on ambient air quality, compliance with emission limitations and compliance with prevention of significant deterioration increments is included in Section 6.1.1.2. For additional discussion, please refer to the response to Comment 2 below.

Comment 2

Information presented in the "Site Certification Application and Environmental Analysis" of Seminole Electric Co-op seem to be general information compiled in other areas. A study of this area prepared by Environmental Research & Technology, Inc. (February 1978) for Florida Sulfur Oxides Study, Inc., Orlando, Florida, states:

- The effects of sulfur oxides are most pronounced at temperatures higher than 60°F, relative humidity greater than 60%, and abundant and prolonged periods of intense sunlight. (Our area, exactly).
- Plants are damaged at a level of dose-duration less than emission levels shown in the Seminole Co-op figures submitted.
- The biggest threat to Florida's aquatic ecosystems (rivers, lakes, aquifers, springs and coastal waters) related to sulfur oxides could be acid rainfall.

Response

There is considerable difference in professional opinion on the source, formation and distribution of sulfate aerosols and the potential impact such may have on public health and welfare. It is known that by contributing sulfur dioxide to the atmosphere, power plants may contribute to the formation of sulfate aerosols. The U. S. Environmental Protection Agency has set rules, in carrying out the mandates of the Clean Air Act to protect public health and welfare, which limit the amount of sulfur dioxide which can be discharged to the atmosphere. As explained in Section 2.5.1 of the Draft EIS, the Seminole Plant Units No. 1 and 2 are required by law to comply with emission limitations for sulfur dioxide, additionally

employ Best Available Control Technology to reduce the total amount of sulfur dioxides produced by 85% and avoid significant deterioration of air quality. The proposed plant will achieve these objectives. Please also refer to the response to Comment 1 above.

Comment 3

In addition, the effects of use and return (heated) of the astronomic quantities of water from the St. Johns River have not been brought to the public in any media our group has been able to find.

Response

The potential environmental impacts of cooling water withdrawal and cooling tower blowdown are discussed in Section 6.1.2 Environmental Consequences; Water Resources and 2.5.2 Major Concerns and Issues; Water Resources of the Environmental Impact Statement. The Environmental Impact Statement, including the "Site Certification Application and Environmental Analysis" discuss the environmental effects of the plant and was made available to the public and Federal and State agencies during May 1979. In addition, public information meetings and a public hearing have been held on the project.

Comment 4

We recommend that approval for construction of this plant be withheld until studies for this area can be obtained and information disseminated through publications, public hearings, or both.

Response

As discussed in response to Comment 3 above, considerable information has been disseminated to the public and a public hearing, as well as public information meetings have been held. There has been periodic review of the project by various governmental agencies since 1977, and we do not see the need for an additional public hearing on this project.

SIERRA CLUB
FLORIDA CHAPTER

1601 NW 35 Way
Gainesville, FL 32605

May 28, 1979

Ms. Mona Ellison
Enforcement Division
U.S. Environmental Protection Agency
345 Courtland Street, N.E.
Atlanta, Georgia 30308

Dear Ms. Ellison:

In our review of the Draft Environmental Impact Statement filed by the REA for Seminole Units 1 & 2 (NPDES # FL 0036498), we have found a serious omission in the section on air quality. Section 5.1.2.1, Air Quality Standards and Classifications, contains a discussion of PSD requirements for Class I areas and the effect of the Seminole plant on such areas. The DEIS states that there are two areas within 30 km of the Putnam site which may potentially be redesignated Class I. These are the Castillo de San Marcos National Monument and the Fort Matanzas National Monument. The only existing Class I area is the Okefenokee Wilderness Area.

The Sierra Club would like to point out that there are three areas proposed for wilderness designation much closer to the Putnam site than the Okefenokee. These are the Little Lake George, Alexander Springs, and Juniper Prairie areas of the Ocala National Forest. Alexander Springs (13,650 acres) is approximately 70 KM from the plant site, Juniper Prairie (8650 acres) approximately 55 km, and Little Lake George (2375 acres) only 30 km away from the Putnam site. The DEIS (p. 107) shows that at 50 km the 24-hour SO2 concentration is 80% higher and the 3-hour SO2 concentration is 24% higher than the allowable Class I standards. Therefore, it is clear that there will be a violation of Class I air standards at the Little Lake George area and that violation is highly likely at Juniper Prairie. There is not sufficient information in the REA DEIS to make such a determination for Alexander Springs.

The U.S. Forest Service released its RARE II Draft Environmental Impact Statement on potential wilderness areas in national forests on June 15, 1978, well before Seminole filed its Site Certification Application with the State of Florida. The Forest Service Final EIS, recommending inclusion of these three areas in the National Wilderness System, was released on January 4, 1979, some 4 months before the REA Draft EIS on the Seminole plant was released. The Sierra Club is not aware that either Seminole Electric Cooperative Inc. or the REA made any comments on either

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the RARE II Draft or Final EIS recommendations of the wilderness category for these three areas even though such designation might impact on the Seminole plant.

The Sierra Club would also note that, even though the Forest Service is a sister USDA agency, there was no reference in the DEIS Table 12-1 or Table 12-1a of any coordination with the Forest Service by either Seminole or the REA. In fact, the only notice to the U.S. Forest Service appears to have been a courtesy mailing of two copies of the DEIS to the Deputy Chief of the Forest Service in Washington, D.C. It would seem that consultation with the USFS State Forester and the Ocala Forest Supervisor would not only have been courteous but also a requirement of the EIS process since a portion of the Ocala National Forest is actually in Putnam County and less that 20 miles from the proposed site.

The Sierra Club therefore requests that the REA be required to amend the Seminole EIS to include an analysis of the predicted impact on air quality in each of these proposed wilderness areas. In addition, the socioeconomic impact of degrading the air quality of the only remaining potential wilderness areas in this section of Florida should be addressed. The Sierra Club feels that coordination by REA with the U.S. Forest Service should be required.

Yours truly,

Lynne C. Capehart
Vice-chair for Conservation

cc: Joe S. Zoller, REA

H.S. Oven, Fla. DER

Seminole Electric Cooperative, Inc.

Don Percival, State Forester, U.S. Forest Service

Supervisor, Ocala National Forest

NORTHWESTERN UNIVERSITY
Center For Urban Affairs
. . . an interdisciplinary center for urban research and policy studies

June 5, 1979

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S.E.

Mr. Joe S. Zoller
Assistant Administrator - Electric
Rural Electrification Administration
USDA
Washington, D.C. 20250

Dear Mr. Zoller:

I am writing to submit my personal comments on the draft EIS for the proposed Seminole Plant Units 1 & 2 and Associated Transmission Facilities [USDA-REA (adm) -79-3-D].

The draft EIS is far better than any other EIS of your agency which I have read. I feel quite confident that the improvement has more to do with the time and care which went into the preparation of it, rather than the new format. While this is a far better EIS than any previous REA statement, one should not go overboard in praise. It is still only approaching the quality of analysis which the Corps of Engineers, EPA, Bureau of Land Management and Bureau of Reclamation, among other agencies, routinely have demonstrated in statements concerning coal fired electrical generating plants. In any case, if REA (as distinguished from the applicants who, have always seemed to be doing just what they as applicants should do) continues to devote time, resources and care to the preparation of these reports, we should be able to anticipate far more environmentally sensitive decision-making by the agency--but only to the extent that REA itself is conducting and involved in the analysis.

With only a little more effort now, REA should be able to dispense with the circulation of the applicant's report as a part of the EIS. It is repetitive and costly to reproduce and distribute such materials, and is contrary to the goal to reduce paper waste. In the Seminole case the DEIS can nearly stand on its own, as it should do.

(1) It seems to me the discussion of the potential impact and consequences on the Florida manatee is entirely inadequate. You write (p.72), "consultation with the U.S. Fish and Wildlife Service suggests that the operation of the plant will not adversely affect this specie or its critical habitat." That is quite an inadequate statement. It seems clear enough that effluent discharges can attract manatee. (Are the concentration of manatees at Polatka, which you note on page 72, in connection with the power plant discharge there?)

2040 Sheridan Road, Evanston, Illinois 60201 (312) 492-3395

Is it likely that manatee will concentrate for winter habitat near the Seminole Plant? Would that be desirable? Should you consider thermal discharge alternatives which would actually promote the development of such critical habitat? Apparently Florida Power and Light is successfully doing so, in conjunction with the Audubon Society (See "A New Hand in the Wildlife Business, Audubon, May, 1979).

I'm not at all sure that such a program would be desirable. But it seems clear that, depending upon the cooling alternatives you select, manatees may be attracted. Therefore, the EIS is the appropriate vehicle for considering this opportunity (or threat). If it is appropriate to do something about the manatee, REA as a governmental agency should mandate the appropriate action, as a condition of any loan support, because preserving the manatee is an unambiguous national goal.

(2) I think that you are remiss in your consideration of alternative fuels, at this particular site. On pages 23-25, you consider alternate fuels, including nuclear fission, nuclear fusion, oil or natural gas, coal, and other forms, including solar, hydro-electric and geo-thermal. These are discussed and dismissed in only the most general terms. The alternative which isn't discussed, but which bears detailed discussion, it seems to me is wood. If locally available wood could be substituted, in whole or part, for coal shipped in from Illinois or Kentucky, you would be furthering the national energy objective to promote the use of renewable resources for energy, and also save on the use of considerable scarce diesel fuel, needed for train transportation of coal, but sorely needed in agriculture as well.

What are the timber resources available nearby? Does the Hudson Pulp and Paper co. produce slash or other wood product residues which could be used? Obviously the use of wood as a boiler fuel would be a stimulus to the local economy of some importance. It deserves a full examination and consideration in the EIS. If appropriate, REA should mandate its use, as a condition of loan support, not only because of our national energy and environmental policies, but also because REA is a part of the Department of Agriculture, and needs to promote the interests of American agriculture in developing markets for products, including forest products, and in preserving scarce (diesel) fuel needed for American agriculture.

When considering alternatives could you also consider whether a co-generation project might be appropriate with the Hudson Pulp and Paper Co., either for the Seminole Electric Coop, Inc. or some of its members coops.

Thank you for considering these comments.

Sincerely,

H. Paul Friesema

H. Paul Friesema
Associate Professor

HPF:JH

SIERRA CLUB
FLORIDA CHAPTER

1601 NW 35 Way
Gainesville, FL 32605
June 6, 1979

RECEIVED
JUN 18 1979
S.L.

Ms. Mona Ellison
Enforcement Division
U.S. Environmental Protection Agency
345 Courtland Street, N.E.
Atlanta, GA 30308

Re: Draft Environmental Impact Statement--Seminole Units 1 & 2
(NPDES #FL 0036498)

Dear Ms. Ellison:

The Sierra Club recently sent you a series of comments made by our hydrologist, Steven Graham, on potential problems with the Seminole Environmental Impact Statement relating to ground water and surface water quality. We would like to update our comments based on recent information we have received from Seminole.

In the area of ground water, we have learned that Seminole is now planning to conduct field tests to determine the actual direction and rate of ground water flow and to perform new ground water modeling studies based on this site specific data. These new tests are for the purpose of determining the effects of the coal storage area on ground water quality. Seminole has also indicated the possibility that they will line the portion of the coal storage area that will be used during the first several years of operation of the plant in lieu of conducting the tests just described. Lining of the coal pile would be accompanied by further testing to determine the need for lining of the entire coal pile. Seminole has further stated that they are reducing the amount of discharge into the percolation bed.

The Sierra Club feels that these changes in Seminole's plans reflect an improvement in the groundwater analysis section of the DEIS and should reduce the potential for ground water contamination problems beyond the property boundary.

In the surface water area, Seminole has done further analytical studies to determine the extent of their pollution of the St. Johns River. In place of the actual field verification

requested by the Sierra Club, Seminole performed sensitivity studies to determine the effect on the size of the mixing zone of using smaller dispersion coefficients. The studies done by Seminole appear to indicate that the discharges from the plant will not exceed state standards for effluent discharges and water quality.

We appreciate this opportunity to amend our previous comments on water quality problems.

Yours truly,

Barney L. Capehart

Barney L. Capehart
Chairman, Power Plant Siting
Committee, Florida Chapter

xc: Mr. Joseph Zoller, REA

Mr. H.S. Oven, Jr., DER

Mr. Robert Claussen, SECI

R. GAMBLE MANN

11 Wilelinor Drive
P.O. Box 176
Edgewater, MD 21037

~~810 VIGAR LANE~~
~~ALEXANDRIA, VIRGINIA 22302~~

June 12, 1979

Re: NPDES No. (FL0036498)

Rural Electrification Administration
Att'n: Mr. William R. Dalton
U. S. Dept. of Agriculture
14th & Independence Ave., S.W.
Washington, D.C. 20250

Dear Mr. Dalton:

We, the undersigned, are parties of interest in the proposal to construct Seminole Plant Units 1 and 2 in Putnam County, Florida on approximately 2,000 acres bounded on the west by U. S. Rt. 17 and on the south in close proximity to West River Road (State Rt. 209).

We are each the owners of an undivided one-half interest in West half of Government Lot Ten (10), in Section Sixteen (16), Township Nine (9) South, Range Twenty Seven (27) East, Putnam County, Florida. This land consists of approximately 11 acres of St. Johns Riverfront property on both sides of Fish Creek (see Figure 9.3-2, REA Draft Environmental Impact Statement) and approximately one mile from the proposed plant site. This property has been in the Mann family for more than 40 years and is held for recreational use and as potential retirement sites.

We are strongly opposed to the construction of the Seminole coal-fired electric plant at the proposed site for the following reasons:

ADVERSE IMPACT ON PRIVATELY OWNED RESIDENTIAL PROPERTY

1. It will deprive residential and other owners of valuable riverfront property in the vicinity of the proposed plant of the right to quiet, peaceful enjoyment of their property both during construction of the plant and thereafter. It should be noted that the REA's Draft Environmental Impact Statement is completely silent about the fact that the riverfront property south of West River Road (Rt. 209) was zoned residential and there are numerous residences located there.

2. It will greatly depreciate the value of all of this riverfront property as a residential and recreational area. Our property was appraised in 1975 by Mr. Jeff Cooper, Jacksonville, Florida, a licensed real estate appraiser, at $80,000. Undoubtedly the value of this riverfront property continued to increase after that date until it became public knowledge that it would be located in close proximity to and overshadowed by a massive electric utility plant.

3. While a 675-foot smoke stack and two 450-foot cooling towers may be things of beauty to utilities and their engineers, they are, in fact,

esthetic monstrosities which will drastically detract from the natural beauty of the Florida riverfront hammock land in the proposed plant's vicinity. There is no possible way these gigantic structures can be screened from public view no matter how much planting is done.

4. The presence of up to some 900 construction workers at the plant site over a 5-year period poses a positive threat to the property and persons residing in the plant site vicinity. It is a well established fact the crime rate rises in any area where there is an influx of itinerant construction workers. Putnam County and the State of Florida currently lack the police forces to now prevent frequent trespass, thievery, etc. along State Rt. 209. This situation is certain to become a great deal worse during plant construction.

5. Displaced reptiles from the plant site will pose a constant hazard and threat to all residents in the vicinity. It is nothing short of remarkable that REA officials in inspecting the proposed plant site found only one specie of snake--the black racer. Presumably their inspection was made during exceptionally cold weather. The plant site has long been known to be rattlesnake infested. The swamp area in the southeast corner of the plant site, which forms the headwaters of Fish Creek, is also infested with cotton mouth and water moccasins. Tree moccasins, pine rattlers, corn snakes, king snakes and coral snakes have also been observed in the plant site area. While these snakes are scarcely "endangered species", construction of the plant will create a constant danger to nearby residents as these snakes are driven from their natural habitat by construction equipment. In this connection, it is worth recalling that when old WW I Camp Johnston on U. S. Rt. 17 near Jacksonville, Florida was converted into the U. S. Naval Air Station, Jacksonville, for an extended period during its construction hundreds of displaced rattlesnakes were constantly observed moving onto U. S. Rt. 17 in search of new habitats and they were continually striking at motor vehicles, pedestrians and animals. The same situation can be expected to occur at the the proposed electric plant site.

ADVERSE IMPACT ON AIR QUALITY

1. The REA Draft Environmental Impact Statement (2.5.1.2) concedes that REA does not know and cannot assess the adverse impact on air quality of the sulfate aerosols which will result from gaseous sulfur oxides emitted into the atmosphere by the proposed plant. Furthermore, it concedes it does not know the relationship between sulfate levels and public health welfare effects.

Additionally, REA concedes it does not know the adverse consequences of the formation of acidic sulfates in rainwater, on surface water bodies, soils and vegetation. Despite this, REA urges on the U. S. Environmental Protection Agency and the Florida Department of Environmental Regulation that they buy "a pig in a poke" and approve construction of the proposed plant.

There is a close parallel between this "we don't know" advocacy and the earlier lack of knowledge of the adverse effects of nuclear radiation, x-rays, etc. on human beings for which the public is now paying dearly for the disastrous effects.

If no one knows the answers to the adverse impact on air quality of sulfate aerosols and "acid rain," as REA alleges, then it would be the height of recklessness for any governmental body to approve the proposed plant

until the adverse effects ARE known. We suggest there is a presumption against sulfate aerosols and "acid rain" since it IS known that both gaseous sulfur and solid sulfur is detrimental to human beings, water, soil and vegetation if there is constant exposure, as would be the case in the proposed plant area.

2. The coal contracted for and to be used by the proposed plant has an alleged maximum sulfur content of 2.75% (see 4.2.3.2). This is what is commonly referred to as "high sulfur coal" and it is certain to increase gaseous sulfur emissions and "acid rain," despite so-called washing of the coal and the scrubbers to be installed. REA estimates that 90% of the sulfur will be eliminated and sulfur emissions will only be 10%. Unfortunately, according to current newspaper reports, the Environmental Protection Agency has eased its sulfur emission standards so as to permit a 15% emission. That assures the proposed plant will be emitting at least 15% gaseous sulfur further polluting the air quality.

3. The REA Draft Environmental Impact Statement glosses over the combined air pollution which result if the electric plant is permitted. Realistically, what will happen is the creation of a near-constant stench in the surrounding areas. Whenever the prevalent southwest wind is blowing in the spring and summer months obnoxious fumes from the Hudson Pulp and Paper Co. mill roll in like fog over the proposed plant and riverfront areas. The sulfur fumes from the electric plant in the fall and winter months when the prevailing wind is from the northwest would inundate the riverfront areas. In brief, there would be little or no relief at any time for property owners from the individual and combined odors of these two plants and the quality of air will be seriously reduced. We have yet to meet the human being who can long tolerate the smells of an open sewer.

ADVERSE IMPACT ON GROUNDWATER AND THE FLORIDA AQUIFER

1. Both the groundwater and Florida aquifer will be seriously polluted by the waste water and air discharges of the proposed plant as well as by the seepage from the coal and ash pits and from the percolation area. It is a basic law of physics that water seeks its own level thus assuring that seepage from the coal and ash pits will eventually find its way into the groundwater and Florida aquifer. Any geological obstruction such as the Hawthorne strata will simply mean that seepage and other waste water will move laterally until it finds its way into the groundwater and aquifer.

2. There is no assurance whatever the "chemically stabilized" materials to be used to form the floor and dikes of the waste storage area will prevent seepage. Furthermore, while the materials to make the dikes and floor of the waste area are being generated, there will be heavy seepage into the groundwater and Florida aquifer. It should be noted that the pits used by Hudson Pulp and Paper Co. to hold chemical wastes and other discharges permitted seepage into Rice Creek. Both the direct discharge and seepage of these wastes turned Rice Creek into what it is today--a "dead" body of water devoid of marine vegetation, marine life, etc.

3. The water supply of many residents in the area comes from "surface" wells that are 30-50 feet in depth. Waste water and seepage from the proposed plant will render this water non-potable or actually poison it. Those properties served by artesian wells may fare a little better but water pressure will be seriously affected by the draw down by the plant's wells. Our property is served by an artesian well reputed to be 800-feet deep though we have no way of knowing for sure since the well was on the property when it was purchased. Over a span of 40 years the water pressure has been reduced by no less than one-third. Tapping of the area's water sources by the proposed plant will be a positive threat to our water supply.

4. It is noted from Figure D-10, Zone "2", to be the plant's percolation field, has a water ground flow towards our property and the headwaters of Fish Creek. This would be a positive health hazard from plant sewage and pollutants. Furthermore, we are unalterably opposed to the discharge of ANY form of pollutants into the area of the headwaters of Fish Creek since the Creek is a breeding ground for various species of fish and the American alligator. The Creek's estuary is also the feeding ground of both fish and alligators.

5. REA concedes that evaluation of percolation of equipment cleaning wastes from the plant do NOT meet the State of Florida's water quality criteria in the case of iron and that cadmium is borderline. The REA states: "The potential impact of these minerals to groundwater beyond the site boundary are not anticipated." It is an interesting theory that water pollutants will run up to the site boundary and stop. An "anticipation" is also a far cry from a certainty.

6. It is noted that Zone "A", to be used for ash and sludge disposal, is flood prone and designated a "preservation" area by the Coastal Zone Management Plan. This is NOT noted in Table 9.1.1.

7. The proposed plant is to have sufficient water storage facilities to fight fire for a period of three hours. This would be a mere drop in the bucket if the amount of coal to be stored on the plant site was ignited by lightning, brush or forest fire, etc. It is also highly doubtful that Putnam County could muster sufficient fire hose that would reach the St. Johns River in ample time to contain a fire in the coal pit. The quantity of water sufficient to extinguish a large coal fire would flood the coal pit and drastically pollute the groundwater and aquifer. Furthermore, a smoldering coal fire could seriously pollute the air for weeks.

8. REA makes light of the quantity of water to be taken from the St. Johns River by the proposed plant's water intake pipe..."The maximum withdrawal of cooling water from the St. Johns River represents less than one-half of one percent (0.5%) of the average river flow." (See 2.5.2.2.). REA states the plant will be using 16,127 gallons of river water PER MINUTE. That amounts to 8,466,322,000 gallons of water per year. Expressed another way, the plant will use on A DAILY basis the equivalent amount of water that would be consumed by 1,935 average Florida residences in a period of

an ENTIRE MONTH. This is a monumental dissipation of Florida's water supply which is becoming progressively depleted.

9. The REA Draft Environmental Impact Statement makes no mention of the fact that the plant's water intake pipeline running 900 feet into the St. Johns River will have constant clogging problems, screen or no screens. In discussions with REA engineers at the REA Washington Headquarters it became apparent that they had no knowledge of the fact that water hyacinths have returned to the St. Johns River in great profusion and often clog the river during the winter months. As the hyacinths die off their long, hair-like roots sink to the bottom of the river and will be constantly smothering the plant's water intake pipe and clogging its screens. Any one with the slightest familiarity with hyacinths can appreciate the problem of trying to cope with this aquatic pest.

10. It has long been known that a subterranean fresh water river flows through that section of Florida where the proposed plant is to be located and empties into the Atlantic Ocean some 35 miles east of St. Augustine, Florida. From the volume of water flowing from this subterranean river it has been estimated the river is greater in size than the St. Johns River which crosses and flows above it. Over the years various geological studies reported in Florida newspapers have expressed the belief this subterranean river may well flow directly beneath the area where the proposed plant is to be located. It would be totally irresponsible to risk polluting this subterranean river with 35 years of seepage from the coal and ash pits and other wastes from an electric power plant. At some time in the future this subterranean river could well become a major source of fresh water for the northeastern portion of Florida. Certainly this situation calls for extensive geological studies made by independent geologists before any permit is granted for the construction of a coal-fired electric plant in the area.

ADVERSE IMPACT ON FLORA AND FAUNA

1. We are deeply concerned about the adverse impact of gaseous emissions and water pollution from the proposed plant on a live oak tree on our property. This tree is one of the largest in the State of Florida and it has been estimated to be 1,000 years old. Loss of this tree would be incalculable.

ADVERSE NOISE IMPACT

1. The proposed plant is certain to create a noise pollution problem. By REA's estimates (see Tables 5.6-1 and 5.6-2) the following noise levels will exist when the plant is fully operational:

Main transformer	41 decibels
F.D. Fan	40 "
F.D. Fan Motor	41 "

Coal handling:

Active pile with coal car dump	44 decibels
Inactive storage area	53 "
Cooling towers	47 "

In sum, that represents a total of 266 decibels of noise...plus the current decibels from trains, boats, aircraft, and traffic on U.S. Rt. 17 and State Rt. 209. Any combination of these noise levels will be bedlam and intolerable to living conditions in the plant's vicinity.

ADVERSE IMPACT ON ENDANGERED SPECIES

1. There are at least two "endangered species" which inhabit the St. Johns River and its tributaries--the manatee (sea cow) and the American alligator. REA, in its Draft Environmental Impact Statement, acknowledges the presence of the manatee but makes no reference to the American alligator. The swamp area in the southeast corner of the proposed plant site, which forms the headwaters of Fish Creek, is a known habitat of the American alligator and they have been observed on many occasions coming down Fish Creek at dusk to feed in the estuary.

2. Water and air pollutants emanating from the proposed plant will be a positive threat to both manatees and alligators. REA states (5.4.4): "Consultation with the U. S. Fish and Wildlife Service suggests that the operation of the plant will not adversely affect this specie (manatee) or its critical habitat." The letter to REA from the U. S. Fish and Wildlife Service inserted into REA's Draft states anything but that. The Service made it abundantly clear to REA that it was not willing to take a position of the impact on manatees without extensive study of the question.

METEOROLOGICAL IMPACT

1. The REA erred in using the weather data for Jacksonville, Florida in assessing the impact of weather on the proposed plant site. During the spring and summer months the plant site and the St. Johns Riverfront area have been frequently referred to as "Thunder Alley". Severe thunderstorms are almost a daily occurrence. These storms arrive with uncanny accuracy at 4 P.M. EDST. There is near-total darkness, heavy thunder, exceedingly heavy rain and continuous lightning. On occasion the rain is so heavy it will stand on the sandy soil some 3-5 inches deep before absorption and runoff. We have lost numerous trees as a result of lightning strikes.

2. Lightning will pose a constant threat in the spring and summer to the plant and its structures, the coal pit, transformers and transmission lines. Lightning strikes will result in frequent damage to the plant's generators, transformers and transmission lines and frequent electrical outages are certain to occur.

3. While only one hurricane has struck in the proposed plant site area in recent years it did result in considerable damage and heavy flooding. Approximately one-half of our property was under water. This flood-

ing is to be expected every time a hurricane moves up the Florida east coast or crosses the Florida peninsula from southwest to northeast. It will take only one hurricane to topple the 675-foot smoke stack and the two 450-foot cooling towers.

4. Tornados are not unknown in Putnam County and there is very little room for doubt a tornado would demolish the plant's smoke stack, water cooling towers and transmission lines.

ADVERSE IMPACT ON WETLANDS AND FLOODPLAIN

1. Approximately 20% of the proposed plant site contains wetlands. Another 20% of the site is within the floodplain. REA acknowledges there will be adverse impacts to wetlands and floodplains and that transmission lines will be sited in both.

2. The coal and ash pits are in close proximity to wetlands on the proposed site and will result in irretreivable damage to these wetlands.

3. The percolation area planned for the proposed plant is in close proximity to wetlands and will result in irretreivable damage to these wetlands.

THREAT TO AIRCRAFT SAFETY

1. The REA Draft Environmental Impact Statement avers there are no military facilities in the proposed plant's area. Figure D-7 shows a U. S. Navy bombing range just west of Bostwick, Florida. In WW II the U. S. Navy also maintained a practice field northwest of Bostwick. It may well be the day will come again when the U. S. Navy finds it necessary to clear and reactivate this landing field for the training of aviation cadets. The last thing fledgling pilots or Navy pilots practicing bombing runs need is a 675-foot smoke stack in their landing, take-off, diving and pull-out patterns. Why wasn't the U. S. Navy consulted about this?

2. REA states that the Federal Aviation Administration has approved the construction of a smoke stack up to 800 feet in height. The Federal Aviation Administration has a consistent track record of NOT recognizing an aviation hazard until AFTER there has been an air disaster. The proposed smoke stack will be one of the tallest, if not the tallest, structure in the State of Florida. As such it will be a constant hazard for private, commercial and military aircraft, all of which have been observed from time to time flying BELOW the 675-foot level. In inclement weather private and military planes frequently seek out the St. Johns River to use as a landmark to orient themselves; in doing so they will be flying in close proximity to this 675-foot smoke stack.

ALTERNATES NOT REQUIRING NEW GENERATION

1. In Sec. 4.1.1 Seminole laments that if the proposed project is not constructed "growth within the area served would by necessity be curtailed." Yet as Sec. 4.1.2 Seminole unequivocally states there is "the need to reduce (load) growth rate." Would curtailment of both population growth and load growth necessarily be bad? We think not. Florida's popu-

lation growth since WW II has been phenominal and with it has come all of the ills a population explosion brings. Limiting the availability of electric power, which is the most expensive form of power, is one way to slow down the growth rate. Steadily depleting water resources in Florida is another very good reason to attempt to retard growth.

2. Seminole claims it and its member distribution cooperatives have recently been experiencing load growth which exceeds national trends. Yet many areas served by Seminole and its cooperatives have the slowest growth rates of any areas in Florida. Figures to claim "growth" can be highly deceptive and made to prove almost any desired point.

3. Seminole also states (5.6.1.3) that: "Putnam County is not expected to experience development pressures as intensely as other counties in the coastal zone," and further; "Zoning of the area, then, gives the county the opportunity to control development and to prevent conflicting uses." There can be no more conflicting use than constructing a coal-fired electric plant adjacent to valuable riverfront residential and recreational properties. Furthermore, the county's opportunity to control development through zoning will be severely restricted if the plant is permitted to be constructed since use of land for that purpose is wholly incompatible with many other land uses.

4. Seminole also rejects out of hand other forms of fuel and generation, including solar power, as not feasible. This is just so much pure, unadulterated eyewash. Solar power is anything but a new form of energy though from all of the hoopla in the press one would believe it is a new discovery. Many homes in South Florida in the late 1930s had hot water solar heating. The Mike Wallace TV-show, "60 Minutes" broadcast on June 3, 1979 also clearly demonstrated the feasibility of solar power in Florida.

All of the documents in support of Seminole Plant Units 1 and 2 are indeed impressive. So much so, in fact, they create the distinct impression they represent a concerted attempt to justify that which is unjustifiable.

The proposed plant site is wholly uneconomical since by Seminole's own admission the additional generating capacity is to serve the State of Florida "peninsula" area--NOT Putnam County, which is already served by Florida Power & Light Co. (East Palatka plant) and Clay Electric Cooperative (Keystone Heights).

Seminole states its principal markets are to be Ocala and Lake City, both many miles removed from the Putnam County plant site. Nonetheless, it proposes to spend millions of dollars running transmission lines to these remote principal markets from the Putnam County site when an alternate site would be more economical.

It should also be noted from REA's assessment of advantages and disadvantages of the proposed site and the three alternate sites (Table 9.1-1) the ratio of advantages over disadvantages for the Putnam County site is only 1.8 to 1 (the same ratio as for the Sumter site), whereas the ratio

for the alternate Suwannee site is 2.5 to 1...a significant difference in favor of the Suwanee site. The ratio favoring the Suwannee site would be even higher but for the meaningless "disadvantage" of no access to water transportation.

Individual parties of interest are at a distinct disadvantage in opposing applications such as Seminole's since they lack the time and resources to retain qualified engineers, environmentalists, geologists, etc. to mount a formidable opposition to an unworthy and detrimental project.

We, therefore, must look to the State of Florida and the agencies of the U. S. Government to protect the public interest and our own. Unfortunately, the U. S. Rural Electrification Administration has cast itself in the role of an adversary in openly advocating Seminole's application. Somewhere along the line that agency forgot its responsibilities and obligations extend BEYOND just support of rural electrification.

We respectfully request that full consideration be given to all of the many reasons why we are strenuously opposed to the Seminole application, and that the Putnam County site be rejected.

Sincerely yours,

Frances H. Mann

Frances H. Mann

R. Gamble Mann

R. Gamble Mann

cc: REA
EPA

Margaret M. Lovejoy
R.F.D. One, Box 98F
St. Augustine, Florida
32084

June 12, 1979

Rural Electrification Administration
U. S. Department of Agriculture
14th & Independence, S.W.
Washington, D.C. 20250

Re: Application No. FL0036498

Attention: Mr. William A. Dalton

Dear Sirs:

Along with a fast-growing group of residents in St. Johns County, Florida, I have become increasingly concerned about the local effects of the proposed Seminole County Co-op Electric Co. plant in Putnam County directly across the St. Johns River from our County.

The plant will burn approximately 9,000 tons of coal a day. Cooling towers will use more than 12,000 gallons of water from the river per minute, a large part of which will be discharged into the atmosphere, with prevailing winds spreading the sulfuric oxides contained therein over St. Johns County areas. This would have disastrous consequences to the most valuable assets of St. Johns County: agriculture (this area is the major supplier of cabbage and potatoes in the United States), pines (a planted crop in northeast Florida), and animals (a category in which residents may be included.)

Information presented in the "Site Certification Application and Environmental Analysis" of Seminole Electric Co-op seem to be general information compiled in other areas. A study of this area prepared by Environmental Research & Technology, Inc. (February 1978) for Florida Sulfur Oxides Study, Inc., Orlando, Florida states:

- The effects of sulfur oxides are most pronounced at temperatures higher than 60° F, relative humidity greater than 60%, and abundant and prolonged periods of intense sunlight. (Our area, exactly.)
- Plants are damaged at a level of dose-duration less than emission levels shown in the Seminole Co-op figures submitted.
- The biggest threat to Florida's aquatic ecosystems (rivers, lakes, aquifers, springs and coastal waters) related to sulfur oxides could be acid rainfall.

In addition, the effects of use and return (heated) of the astronomic quantities of water from the St. Johns River have not been brought to the public in any media our group has been able to find.

We recommend that approval for construction of this plant be withheld until studies for this area can be obtained and information disseminated through publications, public hearings, or both.

RECEIVED
JUN 19 1979

Sincerely,

Margaret M. Lovejoy

Margaret M. Lovejoy

MML/tb

Section 8.1.4 COMMENTS REQUIRING NO RESPONSE

UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
Palatka, Florida 32077

SUBJECT: Seminole Electric Cooperative, Inc.
Seminole Plant Units 1 & 2
Erosion Control Program

DATE: 5/2/79

TO: Mr. T. E. Crumlish, Program Director
2410 East Busch Boulevard
Tampa, Florida 33612

REC'D MAY 4 1979

Dear Sir:

Thank you for giving us an opportunity to review your proposed plan for erosion control on the Seminole Plant Site in Putnam County.

Your program looks very good and I would have only one suggestion which might help you in some areas.

On critical areas such as slopes, road banks, etc., add a nurse crop to your perennial grass seeding program. My recommendations would be as follows;

From March through August, use Browntop Millet of Pearl Millet at the rate of 25 pounds per acre.

From September through February, use 20 pounds of Ryegrass seed per acre.

If moisture conditions are good these crops will give an immediate ground cover and root system to hold the soil while perennial grass is getting started.

I will also be glad to give on-site assistance with any erosion problem that may occur during construction.

Respectfully yours,

Joseph F. Davenport,
District Conservationist

DEPARTMENT OF THE ARMY
JACKSONVILLE DISTRICT, CORPS OF ENGINEERS
P. O. BOX 4970
JACKSONVILLE, FLORIDA 32201

SAJEN-EE

31 May 1979

JUN - 5 1979
S.L.

Mr. William R. Dalton
Rural Electrification Administration
U. S. Department of Agriculture
14th and Independence, S.W.
Washington, D.C. 20250

Dear Mr. Dalton:

On the basis of our review of the Draft Environmental Impact Statement on Seminole Plant Units 1 and 2, we have determined that the impacts in those areas of concern to this agency have been adequately addressed.

We do not have any other comments concerning this draft statement.

Sincerely,

James L. Garland

JAMES L. GARLAND
Chief, Engineering Division

STATE OF FLORIDA
Department of Administration
Division of State Planning
ROOM 530 CARLTON BUILDING
TALLAHASSEE
32304
(904) 488-1115

R. G. Whittle, Jr.
STATE PLANNING DIRECTOR

Bob Graham
GOVERNOR

Jim Tait
SECRETARY OF ADMINISTRATION

June 21, 1979

Mr. William R. Dalton, Director
Southeast Area - Electric
U.S.D.A. - R.E.A.
South Building, Room 5906
Washington, D.C. 20250

Dear Mr. Dalton:

Functioning as the state planning and development clearinghouse contemplated in U.S. Office of Management and Budget Circular A-95, we have reviewed the following draft environmental impact statement:

Seminole Plants, Units 1 & 2, and Associated Transmission Facilities, SAI: 79-2124E

During our review we referred the environmental impact statement to the following agencies, which we identified as interested:

Department of Agriculture and Consumer Services, Department of Community Affairs, Department of Commerce, Department of Environmental Regulation, Department of Health and Rehabilitative Services, Department of Natural Resources, Department of State, Department of Transportation, Florida Game and Fresh Water Fish Commission, Bureau of Land and Water Management, and the State Energy Office.

Agencies were requested to review the statement and comment on possible effects that actions contemplated could have on matters of their concern. Letters of comment on the statement are enclosed from:

Department of Agriculture and Consumer Services, Department of Commerce, Department of Community Affairs, Department of Environmental Regulation, Department of Health and Rehabilitative Services, Department of Natural Resources, Department of Transportation, and the Florida Game and Fresh Water Fish Commission.

We have reviewed this document and the state agency comments thereon. Based upon this review, we find that the document, in general, addresses major state concerns. However, the Department

of Agriculture and Consumer Services and the Department of Environmental Regulation have identified several issues which must be satisfied before proceeding. We also suggest that you coordinate your development activities with the Department of Natural Resources and the Department of Transportation to avoid future construction delays.

In accordance with the Council on Environmental Quality guidelines concerning statement on proposed federal actions affecting the environment, as required by the National Environmental Policy Act of 1969, and U.S. Office of Management and Budget Circular A-95, this letter, with attachments, should be appended to the final environmental impact statement on this project. Comments regarding this statement and project contained herein or attached hereto should be addressed in the statement

We request that you forward us copies of the final environmental impact statement prepared on this project.

Sincerely,

R.G. Whittle, Jr., Director

RGWjr:WKy

Enclosures

cc: Mr. John Bethea
Mr. Charles Blair
Mr. James Cullison
Ms. Joan Heggen
Mr. Joseph W. Landers, Jr.
Mr. W.M. Lofroos
Mr. Jacob Varn
Mr. H.E. Wallace

STATE OF FLORIDA

Department of Administration

Division of State Planning

Room 530 Carlton Building
TALLAHASSEE
32304
(904) 488-2371

Bob Graham
GOVERNOR

Jim Tait
SECRETARY OF ADMINISTRATION

R.G.Whittle, Jr.
STATE PLANNING DIRECTOR

DIVISION OF STATE PLANNING, Bureau Of Intergovernmental Relations
MAY 25 1979
RECEIVED
S.A.I. NO.

TO: SECRETARY
Department of Commerce
510 Collins Building
Tallahassee, Florida 32304

ATT: Jim Cullison

Sec Cop.

DATE: 5-17

DUE DATE: 5-31

SUBJECT SAI: 79-2124E

FROM: Bureau of Intergovernmental Relations

The attached "424 Preapplication" serving as notification of intent to apply for federal assistance is being referred to your agency for review and comment. Your review and comments should address themselves to the extent to verify that the project(s) is/are consistent with or contributed to the fulfillment of your agency's plans or the achievement of your projects, programs and objectives.

If further information is required, you are urged to telephone the contact person named on the preapplication form. If a conference seems necessary, or if you wish to review the entire application, contact this office by telephone as soon as possible. Please check the appropriate box, attach any comments on your agency's stationery and return to BIGR or telephone by the above due date. If we do not receive a response by the due date, we will assume your agency has no adverse comments. In both telephone conversation and written correspondence, please refer to the SAI Number.

Sincerely,

Loring Lovell, Chief
Bureau of Intergovernmental Relations

Enclosure

****

TO: Bureau of Intergovernmental Relations

FROM: Department of Commerce

SUBJECT SAI: 79-2124E

No Comment [✓]

Comments Attached [ ]

Division/Bureau of Economic Analysis

Reviewer [signature]

Date May 23, 1979

STATE OF FLORIDA

DEPARTMENT OF COMMUNITY AFFAIRS

BOB GRAHAM, GOVERNOR

JOAN M. HEGGEN, SECRETARY

DIVISION OF TECHNICAL ASSISTANCE

M-E-M-O-R-A-N-D-U-M

DATE: June 6, 1979

TO: Joseph Gerry

FROM: John H. Haslam JHH

SUBJECT: A-95 Review: SAI 79-2024E

Staff review has been made of the Draft Environmental Impact Statement for the Seminole Plants as submitted by Rural Electrification Administration (SAI: 79-2124E). We feel the project is consistent with the goals and objectives of this Department.

We feel the economic impact will be beneficial for Putnam County and the State of Florida. We note that all of the plant facilities will be located out of the flood plains. We would recommend that where possible, transmission lines be placed, also, out of the flood plains.

JHH/lr

BOB GRAHAM
Governor
GEORGE FIRESTONE
Secretary of State
JIM SMITH
Attorney General
GERALD A. LEWIS
Comptroller
BILL GUNTER
Treasurer
DOYLE CONNER
Commissioner of Agriculture
RALPH D. TURLINGTON
Commissioner of Education

State of Florida

DEPARTMENT OF NATURAL RESOURCES

HARMON W. SHIELDS
Executive Director

CROWN BUILDING / 202 BLOUNT STREET / TALLAHASSEE 32304

MAY 30 1979
RECEIVED

May 29, 1979

Mr. Joseph Gerry, Chief
Bureau of Intergovernmental Relations
Division of State Planning
Department of Administration
530 Carlton Building
Tallahassee, Florida 32301

Dear Mr. Gerry:

The Department of Natural Resources staff has reviewed SAI: 79-2124E - Draft Environmental Impact Statement, Seminole Plant Units 1 and 2 and Associated Transmission Facilities.

Based on the assumption that the Management of the Seminole Electric Cooperative is aware that appropriate arrangements must be made with the Trustees of the Internal Improvement Trust Fund wherever the transmission lines cross state lands, staff has no adverse comments. In general, the DEIS adequately covers those environmental impacts that can be anticipated from construction and operation of Seminole Plant Units 1 and 2 and Associated Transmission Facilities.

Staff recommends that early contact be made with the Bureau of State Lands wherever it has been determined by Seminole Electric Cooperative that state lands must be crossed with transmission facilities.

Sincerely,

James G. Smith

James G. Smith
Administrative Assistant

JGS/cc

Florida Department of Transportation

BOB GRAHAM
GOVERNOR

Haydon Burns Building, 605 Suwannee Street, Tallahassee, Florida 32301, Telephone (904) 488-8541
WILLIAM N. ROSE
SECRETARY

DIVISION OF STATE PLANNING
Bureau Of
Intergovernmental Relations
JUN 6 1979
RECEIVED
SAI NO.

June 5, 1979

Mr. Joseph H. Gerry, Acting Chief
Bureau of Intergovernmental Relations
Division of State Planning
Department of Administration
660 Apalachee Parkway
IBM Building
Tallahassee, Florida 32301

Dear Mr. Gerry:

Subject: SAI 79-2124E

This Department has cooperated with Seminole Electric Cooperative, Inc. in developing plans for access to this proposed generating plant and have reviewed the proposed corridors for transmission lines.

Since the siting permit, once it is issued, will supercede all other permits, and since it is impossible to determine the exact alignment of the proposed transmission lines within the corridors at this time, we would like to reserve option to coordinate the placement and vertical clearance of the lines crossing state highways. The purpose is not to regulate the cooperative, but to insure that the placement and construction of the line crossings is done in keeping with proper highway safety practices.

The primary impacts of this generating plant and transmission network on transportation will come from the unit trains transporting coal This is expected to be very minimal since there will be only one or two trains daily added to the 28 trains a day on this track. Other impacts will be temporary during the construction phase.

Sincerely,

RAY G. L'AMOREAUX, DIRECTOR
DIVISION OF TRANSPORTATION PLANNING

W. N. Lofroos, P. E.
Chief, Bureau of Planning

WNL/CEM/pc

cc: Mr. Phil Bennett

Florida Department of Transportation

BOB GRAHAM
GOVERNOR

Haydon Burns Building, 605 Suwannee Street, Tallahassee, Florida 32301, Telephone (904) 488-8541
WILLIAM N. ROSE
SECRETARY

June 13, 1979

DIVISION OF STATE PLANNING,
Bureau Of
Intergovernmental Relations
JUN 15 1979
RECEIVED
SAI NO.

Mr. Joseph Gerry, Acting Chief
Bureau of Intergovernmental
Relations
Division of State Planning
Department of Administration
660 Apalachee Parkway
IBM Building
Tallahassee, Florida 32301

Dear Mr. Gerry:

Subject: SAI 79-2124E

This is in addition to comments made in our letter of June 5, 1979 on the above referenced SAI. Enclosed is a copy of stipulations entered into by the Florida Department of Transportation and Seminole Electric Cooperative, Incorporated guaranteeing that FDOT will have the right to review and permit each highway crossing of a powerline.

The concerns expressed in our earlier letter are completely satisfied by these stipulations.

Sincerely,

RAY G. L'AMOREAUX, DIRECTOR
DIVISION OF TRANSPORTATION PLANNING

W. N. Lofroos, P. E.
Chief, Bureau of Planning

WNL/EM/pc

Enclosure

EX 1

STATE OF FLORIDA
DIVISION OF ADMINISTRATIVE HEARINGS

IN RE: SEMINOLE ELECTRIC COOPERATIVE, INC., SITE CERTIFICATION	)	CASE NO. 79-1388

STIPULATION BETWEEN
SEMINOLE ELECTRIC COOPERATIVE, INC.
AND
FLORIDA DEPARTMENT OF TRANSPORTATION

WHEREAS, Seminole Electric Cooperative, Inc. ("Seminole"), has applied for certification of Seminole Units 1 and 2, and associated facilities and transmission lines, pursuant to the Florida Power Plant Siting Act, Part II, Chapter 403, Florida Statutes (1977); and

WHEREAS, Seminole will require transmission lines, as indicated in Appendix "M" to its Site Certification Application, crossing state roads in Putnam, Marion, Clay, Bradford, Union, Columbia, and Suwannee Counties, Florida, which roads are under the jurisdiction of the State of Florida Department of Transportation ("DOT"); and

WHEREAS, Seminole will require a driveway permit for the connection of a driveway on DOT right-of-way for State Road No. 15 (U.S. 17) in Putnam County as more particularly described on Attachment "A" to this stipulation, and DOT has

reviewed such attachment and found the proposed driveway to conform to DOT's Driveway Regulations Covering Private Entrances and Exits for State-Maintained Roads, Section 14-44.01, F.A.C.; and

WHEREAS, Section 403.509(2), Florida Statutes (1977) provides that:

> "In regard to the properties and works of any agency which is a party to the certification hearing, the board shall have the authority to decide issues relating to the use, the connection thereto, or the crossing thereof, for the electrical power plant and site and to direct any such agency to execute, within 30 days of the entry of certification, the necessary license or easement for such use, connection, or crossing, subject only to the conditions set forth in such certification." And

WHEREAS, DOT has been made a party to this proceeding; and

WHEREAS, Seminole is at this time able to identify the locations of the proposed transmission lines associated with Seminole Units 1 and 2 only generally within proposed mile-wide corridors, and DOT is therefore able to evaluate such proposed crossings only generally, not specifically at this time.

NOW, THEREFORE, it is agreed and stipulated by Seminole and DOT that any Certification Order issued in connection

with this proceeding shall contain the following provisions and conditions:

1. Within 30 days of the entry of the Certification Order DOT shall issue to Seminole a driveway permit for connection of a driveway to State Road No. 15 (U.S. 17) in accordance with DOT's Driveway Regulations Covering Private Entrances and Exits for State-Maintained Roads, Chapter 14-44.01, F.A.C.

2. DOT shall issue a permit for each transmission line crossing a state road within the corridors identified in Appendix "M" to the Site Certification Application within 30 days of the submission of a completed application for such transmission line crossing.

3. In the construction of associated transmission lines, Seminole shall:

a. Follow the DOT Utilities Accommodation Guide as of June 4, 1979, unless Seminole and DOT subsequently agree to the contrary.

b. Make all crossings as nearly perpendicular to and place all towers as far from state, county, and city road rights-of-way as practicable in order to allow future widening and expansion.

c. Not construct transmission lines across any state, county, or city bridge which is supported by pilings.

IN WITNESS WHEREOF, the undersigned parties by and

through their respective attorneys have entered into this stipulation on June 4, 1979.

SEMINOLE ELECTRIC COOPERATIVE, INC.

By _____
Attorney

STATE OF FLORIDA DEPARMTENT OF TRANSPORTATION

By _____
Attorney

DEPARTMENT OF ADMINISTRATION
Division of State Planning
660 Apalachee Parkway · IBM Building
TALLAHASSEE 32304
(904) 488-2371

Bob Graham
GOVERNOR

Jim Tait
SECRETARY OF ADMINISTRATION

L.G. Wattle, Jr.
STATE PLANNING DIRECTOR

RECEIVED MAY 22 1979

JUN 15 1979

TO: Mr. H. E. Wallace
Game & Fresh Water Fish Commission
Bryant Building
Tallahassee, Florida 32304

DATE: 5-17

DUE DATE: 5-31

FROM: Bureau of Intergovernmental Relations

SUBJECT: SAI: 79-2124E

The attached "Advance Notification" of intent to apply for federal assistance is being referred to your agency for review and comments. Your review and comments should address themselves to the extent to which the project is consistent with or contributes to the fulfillment of your agency's plans or the achievement of your projects, programs, and objectives.

If further information is required, you are urged to telephone the contact person named on the notification form. If a conference seems necessary, or if you wish to review the entire application, contact this office by telephone as soon as possible. If you have no adverse comments, you may wish to report such by telephone. Please check the appropriate box, attach any comments on your agency's stationery, and return to BIGR or telephone by the above due date. If we do not receive a response by the due date, we will assume your agency has no adverse comments. In both telephone conversation and written correspondence, please refer to the SAI.

Sincerely,

Loring Lovell, Chief
Bureau of Intergovernmental Relations

Enclosures

****

TO: Bureau of Intergovernmental Relations
FROM: Game & Fresh Water Fish Commission
SUBJECT: Project Review and Comments, SAI: 79-2124E

[X] No Comments

[ ] Comments Attached

Reviewing Agency:
Signature: Douglas D. Bailey
Date: 6-13-79
Title: Assistant Director, Office of Environmental Services

STATE OF FLORIDA

DEPARTMENT OF HEALTH AND REHABILITATIVE SERVICES

PROJECT NOTIFICATION AND REVIEW SYSTEM

RECOMMENDATION

Office of the Secretary

Date: JUN 8 1979

MEMORANDUM

SUBJECT: NOTIFICATION OF INTENT TO APPLY FOR FEDERAL FUNDS

TO: Chief, Bureau of Intergovernmental Relations, State Planning and Development Clearinghouse

FROM: Director, Office of Health and Social Services Policy Development
Department of Health and Rehabilitative Services

BY: Harold L. Davidson, Department Coordinator for PNRS

REF. NO: DHRS _____ SPDC (SAI) 79-2124E

TITLE Seminole Plant Units 1 and 2

APPLICANT Seminole Electric Cooperative, Inc.

- [x] The project is consistent with the goals and objectives of the Department of Health and Rehabilitative Services. Favorable action is recommended.
- [ ] Substantive comments have been received and are summarized in the attached.
- [ ] Full application is requested
- [ ] Conference with applicant is requested.
- [ ] The project is not consistent with the goals and objectives of the Department of Health and Rehabilitative Services. Approval is not recommended for reasons described in the attached comments.

Attachment(s)

PDHS-A-95-06

Gilbert

ROY E. CAMPBELL, M. D., P.A.
PUTNAM MEDICAL ARTS BUILDING
700 ZEAGLER DRIVE, SUITE 3
PALATKA, FLORIDA 32077

TELEPHONE 328-1565

June 5, 1979

GENERAL SURGERY

Rural Electrification Administration
U. S. Dept. of Agriculture
14th & Independence Ave., S.W.
Room 5906
Washington, D. C. 20250

Attn: Mr. Joe Zoller

Dear Sir:

I would like to add my support to that of the vast majority of the people who live in Putnam County to support the application of Seminole Electric Cooperative to build a plant in Putnam County (NPDES #FL0036498).

I have been active in the support of education and other civic projects for over twenty years and have arrived at the conclusion that the prime need of this county is an additional tax base. The per family income in Putnam County is approximately $4,000.00 below state average and the amount for schools is also lagging. There is a tremendous need for businesses like Seminole to locate in our county.

Since Seminole first informed the area of the possibility of locating here I have kept up with its progress and it is my feeling that they have been open and aboveboard with all of their intentions and are as interested in the environment as the rest of the citizens of this county. I sincerely hope that you will approve the location as requested.

Sincerely yours,

Roy E. Campbell

Roy E. Campbell, M. D.

REC:bd

UNITED BROTHERHOOD OF CARPENTERS AND JOINERS OF AMERICA

CARPENTERS LOCAL UNION 627

EARL S. HUFF
BUSINESS REPRESENTATIVE
TELEPHONE 387-4471

CARPENTERS BUILDING
4000 UNION HALL PLACE
JACKSONVILLE, FLORIDA 32205

June 8, 1979

Rural Electrification Administration
U.S. Department of Agriculture
14th & Independence Avenue, SW, Room 5906
Washington, D.C. 20250

Re: NPDES #FL0036498

Gentlemen:

I would like to take this opportunity to express my support for the Seminole Electric Cooperative, Inc. Since it's conception over forty years ago, the Cooperative has made tremendous strides towards providing Floridians with economical and reliable electric service. Seminole's principle theme of "people pulling together" to meet the challenge of our future energy needs represents the belief of our forefathers who gave our great nation it's beginning. And it is this spirit which will help our nation to solve it's energy problems and ensure a better America for future generations.

The construction of two 600-megawatt generating units, the first to begin this year, is a major step toward achieving that goal. Not only will the units provide Floridians with increased electrical power, but it will further our State towards energy independence, and will provide Floridians with desperately needed jobs.

I am 200% behind the Seminole Electric Cooperative, Inc. and their responsible pursuit of controlling the destiny of our energy problems. I feel all Floridians should be proud of Seminole's efforts and achievements and should support their projects.

Sincerely,

Earl S. Huff

Earl S. Huff
Business Representative

ESH:kmb

JUN 13 1979

C661

Beulah C. Motes BROKER

PHONES: DAY [904] 328-2818
EVENING [904] 325-4179

June 7, 1979

Mr. Harry Wright, Executive Vice President
Seminole Electric Cooperative, Inc.
Tampa, Florida 33612

Dear Sirs:

We are strong supporters in the efforts of Seminole Electric Cooperative to build an electric generating station (NPDES #FLoo36498) in Putnam County. We feel the people of this County will benefit greatly from the economic and energy effects of this project. We are also impressed with the environmental concern shown by Seminole. They are spending millions of dollars to minimize any possible environmental impact.

Having attended several of the open meetings by Seminole with the local public, and hearing the views and willingness to answer any and all questions about the plant, we leave these meetings with the feeling that Seminole has been very open, responsive and cooperative since they announced their plans almost two years ago.

We feel this entire project, and the fine people we have met from Seminole will be a great asset to Putnam County as a whole.

We sincerely hope you will approve this project for construction this year. I am convinced that the majority of the citizens of Putnam County will express this same view.

Yours truly,

Mrs. Beulah C. Motes

(Mrs.) Beulah C. Motes, Broker-Realtor
President, Putnam County Tax Payers League

BCM/bmp

RECEIVED
JUN 11 1979
By

Beulah C. Motes Realty
BRANCH OFFICE - 520 ST. JOHNS AVENUE
P. O. BOX 310 - PALATKA, FLORIDA 32077

ACREAGE RANCHETTES LOTS HOMES RENTALS RIVERFRONT

CLYDE D. MIDDLETON
PHONE 325-2667 P. O. BOX 979
PALATKA, FLORIDA

June 4, 1979

Seminole Electric Cooperative, Inc.
Harry W. Wright, Executive Vice President
2410 E. Busch Boulevard
Tampa, Florida 33612

Dear Mr. Wright:

I would like to congratulate you on the fair way you have conducted your hearings thus far.

I would like to state that I feel that the project that your company has contemplated building and operating in Putnam County is a step forward in our energy program that is getting more serious by the day. I also feel that it was a step backward when the Florida Senate and House tried to kill the Cross Florida Barge Canal which would have saved the consumer millions of dollars by bringing coal into this area for so much less then it will now cost.

Getting back to your project, I think it is feasible, properly located and timely. I am a lifelong resident of Putnam County, and I congratulate your company for having such great foresight.

Sincerely,

Clyde D. Middleton

Clyde D. Middleton, Sr.

CDM:agk

Atlantic Bank

Atlantic National Bank of Palatka, 200 Reid Street, Palatka, Florida 32077, Telephone 904 328-5111
H. F. Ward, Chairman of the Board and President

June 1, 1979

RECEIVED
JUN - 4 1979
S.E. Area

Rural Electrification Administration
U. S. Department of Agriculture
14th & Independence Avenue, Southwest
Room 5906
Washington, DC 20250

Attention: Mr. Joe Zoller

Dear Mr. Zoller:

We strongly support the efforts of Seminole Electric Cooperative to build an electric generating station (NPDES #FL0035498) in Putnam County. The economic and energy effects of this project will be very substantial and beneficial for the people in this region. We also have been impressed with the environmental concern shown by Seminole. They are spending millions of dollars to install equipment to minimize any possible environmental impact.

Seminole has been very open, responsive and cooperative in their local public contacts since their plans were announced almost two years ago. We believe that the Seminole organization, the plant, and its employees will all be an asset to our community.

We hope you will approve this project for construction this year. I believe the majority of citizens of Putnam County agree with our position.

Very truly yours,

H. F. Ward

HFW:nh

FIRST FEDERAL SAVINGS
AND LOAN ASSOCIATION OF PUTNAM COUNTY

JOHN L. MIKELL
PRESIDENT

June 1, 1979

JUN - 4 1979

Rural Electrification Administration
U.S. Department of Agriculture
14th & Independence Ave., SW., Room 5906
Washington, DC 20250

ATTENTION: Mr. Joe Zoller

RE: Electric Generating Station
NPDES #FL0036498, Seminole Electric

Dear Mr. Zoller:

I would like to express to you our support of Seminole Electric Cooperative, Inc. in their efforts to build an electric generating station in Putnam County just north of Palatka. The favorable economic impact this effort will have upon Palatka, Putnam County and the surrounding area is great for both the short-term and the long-term outlook. To have this source of energy and power located within our immediate geographical area will be a tremendous development tool in attracting new business and industry thereby giving a rural section of north Florida a broader and more stable economic base.

From the time Seminole Electric announced its plans to the community, they have demonstrated, at all levels of contact with the community, complete cooperation and candid responsiveness.

Seminole Electric has shown by their actions that they are genuinely concerned with maintaining, as close as possible, the ecological and environmental status of the area thereby minimizing or negating any adverse impact. We have truly been impressed with their concern in this area.

As one of the larger financial institutions in the immediate area serving the people of Putnam and Clay County, we sincerely believe that the Seminole organization and its entire effort will be an asset to our area and will promote development, jobs and economic expansion. We urge you to favorably consider and approve this project for construction this year feeling in confidence that this would be the best decision for Putnam and Clay County, and its people.

Sincerely,

John L. Mikell

John L. Mikell
President

JLM/lb

511 ST. JOHNS AVENUE · PALATKA, FLORIDA 32077

Route 4 Box 324
Palatka, Florida 32077
May 31, 1979

Mr. Joe Zoller
Rural Electrification Administration
U. S. Department of Agriculture
14th & Independence Ave., S. W. Rm. 5906
Washington, D. C. 20250

RECEIVED
JUN - 4 1979
S.E. AREA - ELEC

Re: NPDES
FL0036498

Dear Mr. Zoller:

Please be advised that the Palatka Jaycees are in favor of building the Seminole Power Plant at it's Bostwick site. As an organization of young businessmen and community leaders who live in Putnam County we stand 100% behind completion of this project. Our list of active members now stands at 89.

We feel the environmental impact to our community will be extremely small. This has been indicated by representatives of Seminole and our County Commission who have visited a plant designed like the Seminole plant in operation.

Everyone is aware of the increasing cost of producing electricity with oil fired generators. This plant being coal fired will help hold the line on increasing costs during the remainder of this century. It will benefit Putnam County residents along with 281,155 other cooperative members in Florida.

Sincerely,

Walter L. Bunce Jr.

Walter L. Bunce, Jr
2nd Vice President
Palatka Jaycees

WLB/ldk

RECEIVED
JUN - 4 1979
S.E. AREA - ELECTRIC

May 31, 1979

Mr. Joe Zoller
Rural Electrification Administration
U. S. Department of Agriculture
14th & Independence Ave. S. W. Room 5906
Washington, D. C. 20250

Re: NPDES
FL0036498

Dear Mr. Zoller:

I would like to take this opportunity to request that you view favorably the proposed Seminole power plant in Putnam County, Florida.

As a resident of Putnam County for the past 28 years I have observed the tremendous growth in this area as well as the entire state. Without providing additional generating facilities to meet our current and future electrical needs, where will our power requirements come from? With the almost daily increases in petroleum costs, coal seems to be the only logical choice in fuel.

I personally feel that there will not be any adverse environmental problems associated with this new plant and I urge you to expedite this matter in any way that you can.

Sincerely,

Kenneth E. Hinton Jr.

Kenneth E. Hinton, Jr.
3109 Edgemoor
Palatka, Florida 32077

KEH/ldk

Route 4 Box 314
Palatka, Florida 32077
May 29, 1979

Rural Electrification Administration
U.S. Department of Agriculture
14th & Independence Ave., S.W., Rm. 5906
Washington, D. C. 20250

Ref: N.P.D.E.S.
#FL0036498

ATTENTION: MR. JOE ZOLLER

Dear Mr. Zoller:

Please be advised that as a resident of Putnam County, Florida I am in favor of the electric generation plants proposed by Seminole Electric Cooperative, Inc.

With the ever increasing need for electric energy in our state and in light of the fact that these will be coal fired plants it seems that this will be a logical step in the right direction.

Sincerely,

William C. Phillips

William C. Phillips

Sheriff

E. W. PELLICER • *Putnam County*
MEMBER FLORIDA SHERIFF'S ASSOCIATION
NATIONAL SHERIFF'S ASSOCIATION
PALATKA, FLORIDA 32077

June 4, 1979

Rural Electrification Administration
U. S. Department of Agriculture
Fourteenth and Independence Avenue SW
Room 5906
Washington, D. C. 20250

Attention: Mr. Joe Zoller
Re: FL0036498

Gentlemen:

Since Seminole Electric Cooperative first made public its desire and plans to construct an electric generating station in this area Seminole has contacted the local governmental authorities and business men, and made a great effort to inform the public of the effects and benefits of this undertaking.

After having listened to representatives of Seminole Electric Cooperative and having been informed of their environmental concerns, and their intention to install equipment to control as far as possible whatever harmful effect this project may have on the surroundings, I feel that this organization will be a responsible part of the community.

The economic effects and the increased energy production engendered through this project will be of benefit to the surrounding area, and I believe that most of the citizens are favorable toward this construction in this location.

In light of the above, I trust that you will give favorable consideration to the proposed plans of the Seminole Electric Cooperative in our community.

Sincerely yours,

E. W. Pellicer
Sheriff

EWP:hsw

Beulah C. Motes BROKER

PHONES: DAY (904) 328-2818
EVENING (904) 325-4179

June 7, 1979

Mr. Joe Zoller
Rural Electridication Administration
Washington, D. C. 20250

Dear Sirs:

We are strong supporters in the efforts of Seminole Electric Cooperative to build an electric generating station (NPDES #FLoo36498) in Putnam County. We feel the people of this County will benefit greatly from the economic and energy effects of this project. We are also impressed with the environmental concern shown by Seminole. They are spending millions of dollars to minimize any possible environmental impact.

Having attended several of the open meetings by Seminole with the local public, and hearing the views and willingness to answer any and all questions about the plant, we leave these meetings with the feeling that Seminole has been very open, responsive and cooperative since they announced their plans almost two years ago.

We feel this entire project, and the fine people we have met from Seminole will be a great asset to Putnam County as a whole.

We sincerely hope you will approve this project for construction this year. I am convinced that the majority of the citizens of Putnam County will express this same view.

Yours truly,

Mrs. Beulah C. Motes

(Mrs.) Beulah C. Motes, Broker-Realtor
President, Putnam County Tax Payers League

BCM/bmp

Beulah C. Motes Realty
BRANCH OFFICE - 520 ST. JOHNS AVENUE
P. O. BOX 310 - PALATKA, FLORIDA 32077

ACREAGE RANCHETTES LOTS HOMES RENTALS RIVERFRONT

PUTNAM COUNTY

P.O. BOX 758
PALATKA, FLORIDA 32077

BOARD OF COUNTY COMMISSIONERS

MANGIN PEACOCK
CRESCENT CITY, DISTRICT 1

JOHN EUBANKS
PALATKA, DISTRICT 2

ROBERT L. REVELS
EAST PALATKA, DISTRICT 3

JERRY B. KELLEY
FLORAHOME, DISTRICT 4

KELLEY SMITH, JR.
PALATKA, DISTRICT 5

June 6, 1979

United States Department of Agriculture
Rural Electrification Administration
Washington, D. C. 20250

RE: Seminole Electric Cooperative, Inc.

Dear Sirs:

The Draft Environmental Impact Statement relating to an anticipated loan application from Seminole Electric Cooperative, Inc. has been reviewed by the public and by the Board of County Commissioners. We have received no adverse comments concerning the proposed facility and the Board of County Commissioners of Putnam County supports the construction of the two 600 MW coal-fired units and the associated transmission facilities.

If we can be of further assistance, please contact us at the above address.

Sincerely,

BOARD OF COUNTY COMMISSIONERS
PUTNAM COUNTY, FLORIDA

By Kelley Smith Jr.
Chairman

KSJr/ls

RECEIVED
JUN 12 1979

COUNTY OF PUTNAM
FLORIDA

Susan McCool
Deputy Supervisor of Elections

Donald L. Hersey
Supervisor of Elections
P. O. Box 977
Palatka, Florida 32077
(904) 328 5181 Ext. 273

June 1, 1979

Rural Electrification Administration
U.S. Department of Agriculture
14th & Independence Ave., S. W.
Room 5906
Washington, D. C. 20250

RE: NPDES (FL0036498)

Dear Mr. Zoller:

I am writing in support of the coal fired power plant being proposed for Putnam County. I feel that with the price of oil, we need to go to coal as a method of producing the power that we all have to depend on.

I have personally visited a similar coal power generator plant in Carrollton, Georgia. I was very impressed with the concern they have for the environment and all phases of their operation.

This in my opinion would be a major asset to Putnam County and all of North Florida as our power needs grow.

Yours truly,

Donald L. Hersey
Supervisor of Elections
Putnam County

DLH/ssm

REC
JUN 4 1979
AREA
ELEC CE

Gilbert

SHEFFIELD STEEL PRODUCTS, INC.
Barge Port P. O. Box 1357 PALATKA-FLORIDA 32077

Telephone
904-328-4683

June 4, 1979

Mr. Joe Zoller
c/o Rural Electrification Administration
U. S. Department of Agriculture
Room 5906
14th & Independence Avenue, SW
Washington, D. C. 20250

Dear Sir:

I would like to be on record with your agency as strongly supporting the plan for Seminole Electric Cooperative to build a generating plant, identified as NPDES No. FL0036498, in Putnam County, Florida.

I have followed the planning for this project with considerable interest, and have every reason to believe that Seminole is making every effort to conform to all regulations regarding both environmental impact and safety.

In addition to the fact that this facility will ensure adequate electricity for a very large region, we feel that many other benefits would be received.

I have talked to many other citizens in this and adjacent communities, and to this time have not found any one person, who has any feelings other than complete support.

It is my understanding that permitting is to be considered by your agency at this time, and I respectfully request that very prompt approval be given to this very worth while project.

Very truly yours,

D. B. Sheffield
President

DBS:mcm

Section 8.2 PUBLIC HEARING

REA has reviewed the testimony taken at the Public Hearing held June 4, 1979 in Palatka, Florida and determined that all significant issues have been addressed in this Final Environmental Impact Statement.

Listing of Issues
from
Joint Public Hearing

Mr. Gerrit Dinkla

1. Effect of drawdown on adjacent wells from water withdrawn from the Floridan Aquifer for plant station service use.

2. Effect of surface water pollution on five acre lake currently under construction for use in raising fish.

3. Effect on welfare of people owning property in vicinity of the proposed plant.

Ms. Era Mae Dinkla

1. Effect of "moisture fallout" on breathing conditions.

2. Increased salt water intrusion as a result of withdrawals from the Floridan Aquifer.

3. Effect of high voltage transmission lines on people living under or near the lines.

Mr. Tim Keyser

1. Effect of air emissions on ambient air quality, particularly as related to health of population, local industries, agriculture and tourism.

2. Concern that "wrong policy direction to promote massive labor and energy intensive plants that will utilize high technology and are high polluting." ...instead of..." small and decentralized sites where the user is, and fueled by locally available and renewable resources."

Ms. Carol Ryan

1. Effect of sulfur dioxide emissions on potatoes, cabbage, and possibly pines, both southern and slash.

2. Effect of "excess moisture" creating possible haze.

3. Requests that monitoring devices be placed in the farming area of St. Johns County.

Ms. Pamela Vetro

1. Questioned need for power in Putnam County.

2. Questioned the use of coal-fired power generation instead of solar.

3. Concern for any additional air and water pollution.

Mr. F. N. Brubaker

1. Concern for the amount of water proposed to be withdrawn from the Floridan Aquifer as this may impact the agribusiness of the area.

2. Effect of "acid rain" in St. Johns County.

Mr. Everett R. Byrnes

1. Concern that crops will be damaged by "sulfuric acid fallout" from the plant.

2. Request that Seminole monitor discharges and be responsible for "anything they do to the environment."

People Testifing in Support of Seminole Plant

Mr. Joseph Marvin, Jr.
Mr. Jeff Emerson
Mr. Glenn Powell
Mr. Howard Gardner
Mr. Leon Conlae
Mr. Ray McCall
Mr. A. J. Watson
Mr. Bob Hudson
Ms. Beulah Motes
Mr. John Gaines
Mr. Robert E. Taylor
Mr. Eddie A. Cholerton, Jr.
Mr. Brian E. Michaels
Mr. Eugene Walker
Mr. Dick Woodall

Section 9.0 APPENDICES

Section 9.1 SITE CERTIFICATION APPLICATION AND ENVIRONMENTAL ANALYSIS, SEMINOLE PLANT UNITS 1 and 2

Official agencies or the general public who received copies of the Draft Environmental Impact Statement will not be issued additional copies of the Appendix: Site Certification Application and Environmental Analysis unless a specific request is made.

Section 9.2 PERMITS AND APPROVALS

Section 9.2.1 NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM

DRAFT 7/30/79

Permit No. FL0036498
Application No. FL0036498

AUTHORIZATION TO DISCHARGE UNDER THE
NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM

In compliance with the provisions of the Federal Water Pollution Control Act, as amended, (33 U.S.C. 1251 et. seq; the "Act"),

Seminole Electric Cooperative, Incorporated
2410 East Busch Boulevard
Tampa, Florida 33612

is authorized to discharge from a facility located at

Seminole Electric Steam-Electric Generating Station Seminole Plant
Units 1 and 2
Palatka, Putnam County, Florida

to receiving waters named St. Johns River
from discharge points enumerated herein, as serial numbers 001 through 004

during the effective period of this permit

in accordance with effluent limitations, monitoring requirements and other conditions set forth in Parts I, II, and III hereof.

This permit shall become effective on

This permit and the authorization to discharge shall expire at midnight, September 30, 1980. Permittee shall not discharge after the above date of expiration without prior authorization. In order to receive authorization to discharge beyond the above date of expiration, the permittee shall submit such information, forms, and fees as are required by the Agency authorized to issue NPDES permits no later than 180 days prior to the above date of expiration.

Signed this day of

Effective date 11/15

Sanford W. Harvey, Jr., Director
Enforcement Division

DRAFT

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

During the period beginning on start of discharge and lasting through expiration the permittee is authorized to discharge from outfall(s) serial number(s) 001- Main Plant Discharge

Such discharges shall be limited and monitored by the permittee as specified below:

Effluent Characteristic	Discharge Limitations		Monitoring Requirements	
	Daily Average	Instantaneous Maximum	Measurement Frequency	Sample Type
Flow—m^3/Day (MGD)	N/A	N/A	Continuous	Recorder/Totalizer
Temperature °C(°F)	32.2(90.0) 1/	33.9(93.0) 1/	Continuous	Recorder
Total Chlorine Residual (mg/1)	See Below		1/week 2/	Multiple Grabs
Additional Monitoring	See Part III. I.		1/month	8-hour composite

Chlorine may be discharged continuously. However, discharge of

Total residual chlorine shall not exceed a maximum instantaneous concentration of 0.1 mg/1. In the event that the units cannot be operated at or below this level of chlorination, the applicant may submit a demonstration, based on biological toxicity data, that discharge of higher levels of chlorine are consistent with toxicity requirements of the Florida Water Quality Standards. Effluent limitations will be modified consistent with an acceptable demonstration.

The pH shall not be less than 6.0 standard units nor greater than 8.5 standard units and shall be monitored 1/week on multiple grab samples.

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): Main plant discharge.

1/ The receiving water shall not exceed (1) maximum water temperature change of 2.8 °C (5.0°F) relative to an upstream control point or (2) a maximum temperature of 33.3 °C (92.0°F) outside of a mixing zone which does not exceed an area of 155 square feet.

2/ From start of chlorination and including the first two-month period of substantially full power operation, analyses shall follow each application of chlorine until sufficient operating experience has been obtained to assure conformance with limitations and then analysis frequency may be reduced to one day per week.

B. PROPOSED EFFLUENT LIMITATIONS

During the period beginning on start of discharge and lasting through expiration the permittee is authorized to discharge from outfall(s) serial number(s) 002 1/- Equilization Basin discharge

Such discharges shall be limited and monitored by the permittee as specified below:

Effluent Characteristic	Discharge Limitations kg/day (lbs/day) Daily Avg	Daily Max	Other Units (mg/1) Daily Avg	Instantaneous Max	Monitoring Requirements Measurement Frequency	Sample Type
Flow—m^3/Day (MGD)	N/A	N/A	N/A	N/A	Continuous	Recorder
Oil and Grease	17(38) 2/	38(84) 2/	15	15	1/week	Grab
Total Suspended Solids	81(180) 2/	250(560) 2/	30	75 3/	1/week	Grab
Ammonia	N/A	N/A	N/A	28.5	~~1/month~~ 4	8-hour composite
Aluminum	N/A	N/A	N/A	174	~~1/month~~ 5	8-hour composite
Arsenic	N/A	N/A	N/A	0.073	~~1/month~~ 5	8-hour composite
Cadmium	N/A	N/A	N/A	0.060	~~1/week~~ 5	8-hour composite
Cyanide	N/A	N/A	N/A	0.004	~~1/month~~ 5	8-hour composite
Chromium	N/A	N/A	N/A	0.14	~~1/month~~ 5	8-hour composite
Copper	N/A	N/A	N/A	0.66	~~1/month~~ 5	8-hour composite
Lead	N/A	N/A	N/A	0.21	~~1/week~~ 5	8-hour composite
Mercury	N/A	N/A	N/A	0.003	1/week	8-hour composite
Nickel	N/A	N/A	N/A	0.09	1/month 4	8-hour composite
Selenium	N/A	N/A	N/A	0.04	1/month 4	8-hour composite
Zinc	N/A	N/A	N/A	1.0	1/week 4	8-hour composite
Additional Monitoring Iron		See Part III.I.			~~1/month~~ 4 5 6	8-hour composite

The pH shall not be less than 6.0 standard units nor greater than 9.0 standard units and shall be monitored 1/week on a grab sample.

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):

Equalization Basin treatment facility prior to mixing with any other waste stream.

1/ Serial number assigned for identification and monitoring purposes.
2/ Prior to start of discharges from Unit 2, limitations shall be one-half of this value.
3/ Daily maximum
4 Monthly for first year quarterly thereafter
5 Weekly for first 3 mos, monthly next 9 mos quarterly thereafter

6 weeks be [illegible] 6 weeks ea next 3 months, monthly 6 months, quarterly thereafter

DRAFT

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

During the period beginning on start of discharge and lasting through expiration the permittee is authorized to discharge from outfall(s) serial number(s) 003 1/- sanitary wastewater.

Such discharges shall be limited and monitored by the permittee as specified below:

Effluent Characteristic	Discharge Limitations mg/1, except as noted		Monitoring Requirements	
	Daily Average	Daily Maximum	Measurement Frequency	Sample Type
Flow—m^3/Day (MGD)	N/A	68(0.018)	1/week	Instantaneous
Biochemical Oxygen Demand (5 day)	30	60	1/month	Composite
Total Suspended Solids	30	60	1/month	Composite
Fecal Coliform Bacteria, N/100ml	N/A	N/A	1/month	Grab
Total Chlorine Residual	N/A	N/A	1/week	Grab

There shall be no discharge of floating solids or visible foam in other than trace amounts.

The effluent shall not cause a visible sheen on the receiving water.

Samples taken in compliance with the monitoring requirements specified above shall be taken at the following location(s): Sewage treatment plant effluent prior to mixing with any other waste stream

1/ Serial number assigned for identification and monitoring purposes.

DRAFT

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

During the period beginning on start of discharge and lasting through expiration the permittee is authorized to discharge from outfall(s) serial number(s) 004 1/ - Cooling tower blowdown

Such discharges shall be limited and monitored by the permittee as specified below:

Effluent Characteristic	Discharge Limitations		Monitoring Requirements	
	Daily Average	Daily Maximum	Measurement Frequency	Sample Type
Flow—m^3/Day (MGD)	N/A	N/A	Continuous	Recorder

Discharge of blowdown from the cooling towers shall be limited to the minimum discharge of recirculating water necessary for the purpose of discharging materials contained in the process, the further build-up of which would cause concentrations or amounts exceeding limits established by best engineering practice. Discharge temperature shall not exceed the lowest temperature of the recirculating cooling water prior to the addition of make-up. A report showing how conformance with these requirements will be met, including operational procedures, shall be submitted during the system design stage. Annual reports on cooling tower operation showing compliance with these requirements shall be submitted along with the first quarterly monitoring report submitted after January 1st of each year.

Blowdown shall contain no detectable amounts of materials added for corrosion inhibition including but not limited to zinc, chromium and phosphorus.

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): discharge from the cooling tower prior to mixing with other waste streams.

1/ Serial number assigned for identification and monitoring purposes.

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

During the period beginning on start of intake and lasting through expiration the permittee shall monitor serial number(s) 005 1/- Plant Intake(s)

Such discharges shall be limited and monitored by the permittee as specified below:

Influent Characteristic	Discharge Limitations		Monitoring Requirements	
	Daily Average	Daily Maximum	Measurement Frequency	Sample Type
Flow—m^3/Day (MGD)	N/A	N/A	Continuous	Recorder/Totalizer
Ambient Temperature °C(°F)	N/A	N/A	Continuous	Recorder
Additional Monitoring	See Part III.I.		1/month	8-hour composite

Samples taken in compliance with the monitoring requirements specified above shall be taken at the following location(s): Plant Intake(s).

1/ Serial number assigned for identification and monitoring purposes.

B. SCHEDULE OF COMPLIANCE

1. The permittee shall achieve compliance with the effluent limitations specified for discharges in accordance with the following schedule:

a. Notification of expected start of discharge - [illegible] 30 days prior to ~~discharge~~ expected start of discharge

b ~~a.~~ Compliance with effluent limitations - effective date or start of discharge (001 through 004)

c ~~b.~~ Blowdown reports (004)
   (1) Study Plan - During System design
   (2) Annual reports - Annually with the first quarterly monitoring report of each calender year.

d ~~c.~~ Plume report (III.E.)
   (1) Unit 1 report - 15 months after commercial operation date of Unit 1
   (2) Units 1 & 2 report - 15 months after commercial operation date of Unit 2

e ~~d.~~ 316(b) monitoring program (III.G.) - Unless waived by Director, Enf. Div.
   (1) Implement - commercial operation date of Unit 1
   (2) Unit 1 report - 15 months after commercial date of Unit 1
   (3) Unit 1 & 2 report - 15 months after commercial date of Unit 2

f ~~e.~~ Flow Report (III.H.)
   (1) Unit 1 report - 15 months after commercial operation date of Unit 1
   (2) Unit 1 & 2 report - 15 months after commercial operation date of Unit 2

2. No later than 14 calendar days following a date identified in the above schedule of compliance, the permittee shall submit either a report of progress or, in the case of specific actions being required by identified dates, a written notice of compliance or noncompliance. In the latter case, the notice shall include the cause of noncompliance, any remedial actions taken, and the probability of meeting the next scheduled requirement.

Note: Any construction of new waste treatment facilities or alterations to existing waste treatment facilities will require a permit or authorization for construction in accordance with applicable state law and regulation.

C. MONITORING AND REPORTING

1. *Representative Sampling*

Samples and measurements taken as required herein shall be representative of the volume and nature of the monitored discharge.

2. *Reporting*

Monitoring results obtained during the previous 3 months shall be summarized for each month and reported on a Discharge Monitoring Report Form (EPA No. 3320-1), postmarked no later than the 28th day of the month following the completed reporting period. The first report is due on Mt 28th day of the month following month of discharge covered by this permit. Duplicate signed copies of these, and all other reports required herein, shall be submitted to the Regional Administrator and the State at the following addresses:

Chief Water Enf

Regional Administrator Environmental Protection Agency 345 Courtland St., N.E. Atlanta, Georgia 30308	AND	Division of Environmental Programs Florida Department of Environmental Regulation Twin Towers Office Building 2600 Blair Stone Road Tallahassee, Florida 32301

Bill Boyd

3. *Definitions*

a. The "daily average" concentration means the arithmetic average (weighted by flow) of all the daily determinations of concentration made during a calendar month. Daily determinations of concentration made using a composite sample shall be the concentration of the composite sample. When grab samples are used, the daily determination of concentration shall be the arithmetic average (weighted by flow) of all the samples collected during that calendar day.

b. The "daily maximum" concentration means the daily determination of concentration for any calendar day.

c. "Weighted by flow" means the summation of each sample concentration times its respective flow in convenient units divided by the summation of the flow values.

d. "Nekton" means free swimming aquatic animals whether of freshwater or marine origin.

e. For the purpose of this permit, a calendar day is defined as any 24-hour period.

f. The "daily average" discharge means the total discharge by weight during a calendar month divided by the number of days in the month that the production or commercial facility was operating. Where less than daily sampling is required by this permit, the daily average discharge shall be determined by the summation of all the measured daily discharges by weight divided by the number of days during the calendar month when the measurements were made.

g. The "daily maximum" discharge means the total discharge by weight during any calendar day.

4. *Test Procedures*

Test procedures for the analysis of pollutants shall conform to regulations published pursuant to Section 304(g) of the Act, under which such procedures may be required.

5. *Recording of Results*

For each measurement or sample taken pursuant to the requirements of this permit, the permittee shall record the following information:

a. The exact place, date, and time of sampling;

b. The dates the analyses were performed;

c. The person(s) who performed the analyses;

d. The analytical techniques or methods used; and

e. The results of all required analyses.

6. *Additional Monitoring by Permittee*

If the permittee monitors any pollutant at the location(s) designated herein more frequently than required by this permit, using approved analytical methods as specified above, the results of such monitoring shall be included in the calculation and reporting of the values required in the Discharge Monitoring Report Form (EPA No. 3320-1). Such increased frequency shall also be indicated.

7. *Records Retention*

All records and information resulting from the monitoring activities required by this permit including all records of analyses performed and calibration and maintenance of instrumentation and recordings from continuous monitoring instrumentation shall be retained for a minimum of three (3) years, or longer if requested by the Regional Administrator or the State water pollution control agency.

A. MANAGEMENT REQUIREMENTS

1. *Change in Discharge*

All discharges authorized herein shall be consistent with the terms and conditions of this permit. The discharge of any pollutant identified in this permit more frequently than or at a level in excess of that authorized shall constitute a violation of the permit. Any anticipated facility expansions, production increases, or process modifications which will result in new, different, or increased discharges of pollutants must be reported by submission of a new NPDES application or, if such changes will not violate the effluent limitations specified in this permit, by notice to the permit issuing authority of such changes. Following such notice, the permit may be modified to specify and limit any pollutants not previously limited.

2. *Noncompliance Notification*

If, for any reason, the permittee does not comply with or will be unable to comply with any daily maximum effluent limitation specified in this permit, the permittee shall provide the Regional Administrator and the State with the following information, in writing, within five (5) days of becoming aware of such condition:

a. A description of the discharge and cause of noncompliance; and

b. The period of noncompliance, including exact dates and times; or, if not corrected, the anticipated time the noncompliance is expected to continue, and steps being taken to reduce, eliminate and prevent recurrence of the noncomplying discharge.

3. *Facilities Operation*

The permittee shall at all times maintain in good working order and operate as efficiently as possible all treatment or control facilities or systems installed or used by the permittee to achieve compliance with the terms and conditions of this permit.

4. *Adverse Impact*

The permittee shall take all reasonable steps to minimize any adverse impact to navigable waters resulting from noncompliance with any effluent limitations specified in this permit, including such accelerated or additional monitoring as necessary to determine the nature and impact of the noncomplying discharge.

5. *Bypassing*

Any diversion from or bypass of facilities necessary to maintain compliance with the terms and conditions of this permit is prohibited, except (i) where unavoidable to prevent loss of life or severe property damage, or (ii) where excessive storm drainage or runoff would damage any facilities necessary for compliance with the effluent limitations and prohibitions of this permit. The permittee shall promptly notify the Regional Administrator and the State in writing of each such diversion or bypass.

6. *Removed Substances*

Solids, sludges, filter backwash, or other pollutants removed in the course of treatment or control of wastewaters shall be disposed of in a manner such as to prevent any pollutant from such materials from entering navigable waters.

7. *Power Failures*

In order to maintain compliance with the effluent limitations and prohibitions of this permit, the permittee shall either:

a. In accordance with the Schedule of Compliance contained in Part I, provide an alternative power source sufficient to operate the wastewater control facilities;

or, if such alternative power source is not in existence, and no date for its implementation appears in Part I,

b. Halt, reduce or otherwise control production and/or all discharges upon the reduction, loss, or failure of the primary source of power to the wastewater control facilities.

B. RESPONSIBILITIES

1. *Right of Entry*

The permittee shall allow the head of the State water pollution control agency, the Regional Administrator, and/or their authorized representatives, upon the presentation of credentials:

a. To enter upon the permittee's premises where an effluent source is located or in which any records are required to be kept under the terms and conditions of this permit; and

b. At reasonable times to have access to and copy any records required to be kept under the terms and conditions of this permit; to inspect any monitoring equipment or monitoring method required in this permit; and to sample any discharge of pollutants.

2. *Transfer of Ownership or Control*

In the event of any change in control or ownership of facilities from which the authorized discharges emanate, the permittee shall notify the succeeding owner or controller of the existence of this permit by letter, a copy of which shall be forwarded to the Regional Administrator and the State water pollution control agency.

3. *Availability of Reports*

Except for data determined to be confidential under Section 308 of the Act, all reports prepared in accordance with the terms of this permit shall be available for public

inspection at the offices of the State water pollution control agency and the Regional Administrator. As required by the Act, effluent data shall not be considered confidential. Knowingly making any false statement on any such report may result in the imposition of criminal penalties as provided for in Section 309 of the Act.

4. *Permit Modification*

After notice and opportunity for a hearing, this permit may be modified, suspended, or revoked in whole or in part during its term for cause including, but not limited to, the following:

a. Violation of any terms or conditions of this permit;

b. Obtaining this permit by misrepresentation or failure to disclose fully all relevant facts; or

c. A change in any condition that requires either a temporary or permanent reduction or elimination of the authorized discharge.

5. *Toxic Pollutants*

Notwithstanding Part II, B-4 above, if a toxic effluent standard or prohibition (including any schedule of compliance specified in such effluent standard or prohibition) is established under Section 307(a) of the Act for a toxic pollutant which is present in the discharge and such standard or prohibition is more stringent than any limitation for such pollutant in this permit, this permit shall be revised or modified in accordance with the toxic effluent standard or prohibition and the permittee so notified.

6. *Civil and Criminal Liability*

Except as provided in permit conditions on "Bypassing" (Part II, A-5) and "Power Failures" (Part II, A-7), nothing in this permit shall be construed to relieve the permittee from civil or criminal penalties for noncompliance.

7. *Oil and Hazardous Substance Liability*

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties to which the permittee is or may be subject under Section 311 of the Act.

8. *State Laws*

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties established pursuant to any applicable State law or regulation under authority preserved by Section 510 of the Act.

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9. Property Rights

The issuance of this permit does not convey any property rights in either real or personal property, or any exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of Federal, State or local laws or regulations.

10. Severability

The provisions of this permit are severable, and if any provision of this permit, or the application of any provision of this permit to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of this permit, shall not be affected hereby.

PART III

OTHER REQUIREMENTS

A. In the event that waste streams from various sources are combined for treatment or discharge, the quantity of each pollutant or pollutant property attributable to each controlled waste source shall not exceed the specified limitation for that waste source.

B. If the permittee, after monitoring for at least 12 months, determines that he is consistently meeting the effluent limits contained herein, the permittee may request of the Regional Administrator that the monitoring requirements be reduced to a lesser frequency or be eliminated.

C. The permittee shall notify the Director, Enforcement Division, in writing not later than ninety (90) days prior to instituting use of any additional biocide or chemical used in cooling systems, other than chlorine, which may be toxic to aquatic life. Such notification shall include:

1. name and general composition of biocide or chemical,
2. 96-hour median tolerence limit data for organisms representative of the biota of the waterway into which the discharge shall occur,
3. quantities to be used,
4. frequencies of use,
5. proposed discharge concentrations, and
6. EPA registration number, if applicable.

D. Intake screen backwash may be discharged without limitation or monitoring requirements.

DRAFT

E. ~~The discharge structure shall be designed to assure a minimum dilution factor of 10 at all river flow conditions.~~ Subsequent to commercial operation of each unit, field measurements (supplemented as necessary with modeling results) shall be conducted to determine the three dimensional configuration of the chemical and thermal plumes, substantiate the dispersion modeling, and assure conformance with the assigned mixing zones. The reports on plume and dispersion characteristics shall be submitted not later than 15 months after commercial operation dates for each unit.

F. This Authorization to Discharge does not permit the discharge of pre-operational or other metal cleaning wastes (any cleaning compounds, rinse waters (including water wash operations), or any other waterborne residues derived from cleaning any metal process equipment including, but not limited to, boiler tube cleaning, boiler fireside cleaning and air preheater cleaning), boiler blowdown, discharge of wastes or runoff from the FGD system or sludge disposal, therefrom, or construction runoff.

G. By the commercial operation date of Unit 1, permittee shall implement an approved 316(b) study. Reports shall be submitted for Unit 1 not later than 15 months after the commercial operation date of Unit 1 and for Units 1 and 2 not later than 15 months after the commercial operation date of Unit 2. At the conclusion of these study periods, subject to opportunity for hearing and review, the permittee shall implement procedures and/or facility construction associated with the intake structure as required by the Director, Enforcement Division. However, after review of the preoperational study report (scheduled for submission in October 1979), the Director, Enforcement Division may waive the above 316(b) study requirements.

H. Subsequent to the commercial operation date of Unit 1 and 2, respectively, the permittee shall conduct a detailed evaluation of actual water use and inplant waste discharges to confirm design flow data. Reports of this evaluation shall cover a one year period after startup of each unit and shall be submitted not later than 15 months after the commercial operation date of each unit. In the event that actual flow data is significantly different from design data, permit may be modified by the Director, Enforcement Division.

I. Additional monitoring of the main plant discharge (001), equalization basin treatment facility discharge (002), and plant intake (005) shall be conducted at the frequency ~~of once per month~~ shown on page 5 herein to assure conformance with applicable water quality standards. Parameters shall include ammonia, chloride; sulfate; total, dissolved, settleable and suspended solids; and total aluminum, arsenic, cadmium, chromium, copper, iron, lead, manganese, mercury, nickel, selenium and zinc. ~~After monitoring for a period of 12 month, the permittee may request of the Director, Enforcement Division that the monitoring requirements be reduced to a lesser frequency or be eliminated.~~ Subsequent to start of discharge from Unit 2 sampling freq. shall be increased to monthly for a period of one year and then reduced to quarterly.

DRAFT

J. There shall be no discharge of polychlorinated biphenyl compounds such as those commonly used for transformer fluid.

K. Copies of all plans and reports submitted in accordance with Parts I.B.1.b, c, d, and e, (Schedule of Compliance) and III.C. herein shall be forwarded by the permittee as follows:

Number of Copies	Addressee
3	Director, Enforcement Division, EPA (Atlanta)
1	Chief, Ecology Branch, EPA (Athens)
2	Regional Director, Fish and Wildlife Service (Atlanta)
1	Florida, Dept. of Environmental Regulation (Tallahassee)

L. No herbicides shall be used prior to initial mechanical clearing of each proposed transmission corridor. Transmission corridors are identified as: 1. Putnam line, 2. Silver Springs line, 3. Columbia line, 4. Columbia-Fort White line, and 5. Columbia-Suwannee line. Maintenance use of herbicides shall be limited to EPA approved projects and in strict accordance with labeled instructions for use.

M. The Permittee shall implement a ground water monitoring program, as generally specified in Part E of the proposed Conditions of State Certification (Section 9.2.3 of the Final EIS), following final acceptance by both the State of Florida and EPA. Consultation with EPA and State officials for approval of final design and exact monitoring well placement is required of the Permittee. Reporting requirements to EPA shall conform with those outlined in Part III.E. of document referenced above.

Final monitoring program design shall be sufficient to evaluate impacts of leached pollutants from the coal pile, percolation pond, equilization basin and scrubber sludge/ash disposal area on ground water.

N. The Permittee shall implement a leachate evaluation study of the scrubber waste and ash disposal area as generally proposed to EPA and the State of Florida on April 27, 1979 (included herein by reference). Reporting and testing procedures and specifications to be required of the permittee shall be as defined in Section XII of the proposed Conditions of State Certification (Section 9.2.3 of the Final EIS).

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O. In accordance with Section 306(d) of the Clean Water Act (33 USC Section 1251, et seq.) effluent limitations based on standards of performance contained in this permit shall not be made any more stringent during a ten year period beginning on the date of completion of such construction or during the period of depreciation or amortization of such facility for the purposes of Section 167 or 169 (or both) of the Internal Revenue Code of 1954, whichever period ends first. The provisions of Section 306(d) do not limit the authority of the Environmental Protection Agency to modify the permit to require compliance with a toxic effluent limitation promulgated under BAT or toxic pollutant standard established under Section 307(a) of the Clean Water Act, or to modify, as necessary, to assure compliance with any applicable State Water Quality Standard. This permit shall be modified, or alternatively, revoked and reissued, to comply with any applicable effluent standard or limitation issued or approved under sections 301(b)(2) (C), and (D), 304(b)(2), and 307(a)(2) of the Clean Water Act, if the effluent standard or limitation so issued or approved:

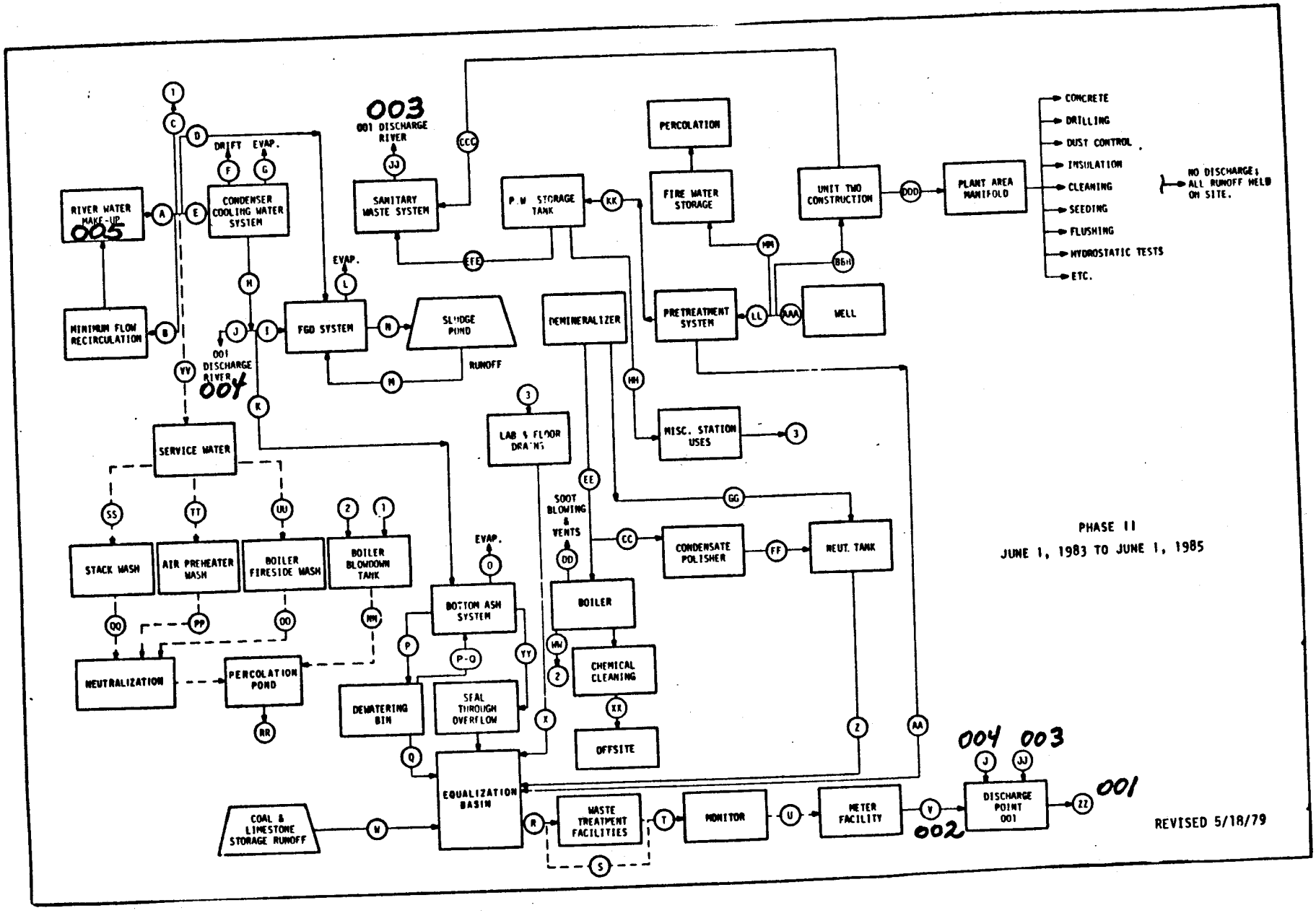
(1) Contains different conditions or is otherwise more stringent than any effluent limitation in the permit; or

(2) Controls any pollutant not limited in the permit.

The permit as modified or reissued under this paragraph shall also contain any other requirements of the Act then applicable.

P. The State of Florida Department of Environmental Regulation has certified the discharge(s) covered by this permit with conditions (See Attachment B). Section 401 of the Act requires that conditions of certification shall become a condition of the permit. The monitoring and sampling shall be as indicated for those parameters included in the certification.

Any effluent limits, and any additional requirements, specified in the attached state certification which are more stringent supersede any less stringent effluent limits provided herein. During any time period in which the more stringent state certification effluent limits are stayed or inoperable, the effluent limits provided herein shall be in effect and fully enforceable.



ATTACHMENT A
Permit No. FL0036498

ATTACHMENT B
Permit No. FL0036498

Conditions of State Certification

(To be attached)

ATTACHMENT C
Permit No. FL0036498

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Seminole Electric Steam-Electric Generating Station

Limitations Rationale

I. Bottom Ash Sump discharge, Serial Number 002-two Units

A. Waste Flows and Concentration Limitations

Source	Flow(MGD) Avg.	Flow(MGD) Max.	Allowable Concentration (mg/1) Total Suspended Solids Daily Avg.	Allowable Concentration (mg/1) Total Suspended Solids Daily Max.	Allowable Concentration (mg/1) Oil and Grease Daily Avg.	Allowable Concentration (mg/1) Oil and Grease Daily Max.
Low Volume Wastes	0.423	1.247	30	100	15	20
Bottom Ash blowdown	0.144	0.144	30	100	15	20
Material Storage Runoff	0.15	0.337	30 1/	30 1/	0	0

B. Effluent Limitations - #/day (kg/day)

		Total Susp. Solids	Oil and Grease
1. Low Volume and bottom ash blowdown			
a. Total Suspended Solids			
1. 0.567 x 30 x 8.345	=	142(64.4)*	
2. 0.567 x 100 x 8.345	=	473(215)*	
3. 1.391 x 30 x 8.345	=	348(158)	
b. Oil and grease			
1. 0.567 x 15 x 8.345	=		71.0(32.2)*
2. 0.567 x 20 x 8.345	=		94.6(42.9)
3. 1.391 x 15 x 8.345	=		174.1(79.0)*
2. Material Storage Runoff			
a. Total Suspended Solids			
1. 0.15 x 30 x 8.345	=	37.5(17.0)*	
2. 0.337 x 30 x 8.345	=	84.4(38.3)*	
3. Combined Limitation			
1. Daily Average	=	180(81)*	71(32)*
2. Daily Maximum	=	560(250)*	170(79)*

C. Effluent Limitations (mg/1)

			Daily Avg.	Daily Max.
Total Suspended Solids:	182 ÷ (8.345 x 0.717)	=	30*	
Total Suspended Solids:	557 ÷ (8.345 x 0.904)	=		74 Use 75*
Oil and Grease:	71 ÷ (8.345 x 0.717)	=	12 Use 15*	
Oil and Grease:	174.1 ÷ (8.345 x 1.728)	=		12 Use 15*

1/ Instantaneous maximum limitation is 50 mg/1

* Used in Limitation

ATTACHMENT D
Permit No. FL0036498

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Chlorine Rationale

Section 17-3.051 of the Florida Water Quality Standards prohibits acutely toxic conditions from existing at any time in any water of the State where acute toxicity is defined as one-third of the amount lethal to 50 percent of the test organisms in 96 hours (96-hr LC_{50}) for a species significant to the indigenous aquatic community. Section 17-3.051 limitations are applicable within a mixing zone.

Values of 96-hr LC_{50} and other total chlorine residual (TCR) toxicity data for indigenous (or representative) species in the St. Johns River are shown in attached Table I. Source: Mattice, J.S. and Zittel, H.E., "Site-Specific Evaluation of Power Plant Chlorination," Journal, Water Pollution Control Federation, 48, 2284, October 1976.

EPA Standards of performance for new sources 40 CFR Part 423.15 allow discharges of free available chlorine (FAC) in the cooling tower blowdown from individual unit of 0.2 mg/l average and 0.5 mg/l maximum. However, discharge of FAC and TRC for more than two hours per day from any unit is prohibited. Due to recirculation of cooling water through a cooling tower system, TRC will be present for more than two hours after chlorine addition to the system and may be detectable continuously if chlorine is added to the system one or more times per day. Therefore, "Best Engineering Judgement " was utilized in arriving at a limitation. Available data indicates that holdup of cooling tower blowdown for periods of approximately two hours after chlorine addition will allow decay of TCR to 0.1 mg/l.

Based on this information, a maximum instantaneous limitation of 0.1 mg/l of TCR has been provided in the permit and no limitation on the period of time that TCR may be discharged has been provided. Additionally, however, if the permittee can not operate the units at or below this level of chlorination, he may submit a demonstration based on biological toxicity data, that discharge of higher levels of chlorine are consistent with Toxicity Requirements of the Florida Water Quality Standards. A requirement that the discharge structure be designed to assure a minimum 10 to 1 dilution factor at all river flow conditions has also been provided to assure compliance with the 0.01 mg/l criteria of the Florida Water Quality Standards.

Table I

	Scientific Name	Descriptive Name	Concentration (mg/1)	Duration (min)	Effect
1..	Callinectes sapidus	Blue crab	0.1	5,760	50% mortality
2.	Alosa aestivalis	Blueback herring	0.67	60	50% mortality
3.	Ictalurus catus	White catfish	0.1	2,880	50% mortality
4.	Notemigonus chrysoleucas	Golden shiner	0.03-0.23	5,760	50% mortality
5.	Pimepheles promelas *	Fathead minnow larvae	0.108	43,200	60% mortality
6.	Pimepheles promelas *	Fathead minnow	0.08-0.19	5,760	50% mortality
7.	Daphnia magna	Water flea	0.5	4,320	100% mortality
8.	Gammarus pseudolimnaeus	Scud	0.22	5,760	50% mortality
9.	Hydropsyche sp. *	Caddisfly	0.55	10,080	50% mortality
10.	Pterynarcys sp.	Stonefly	0.480	4,320	50% mortality

* Organism not known to be present but considered typical of similar organisms which are present.

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Section 9.2.2 PREVENTION OF SIGNIFICANT DETERIORATION

Review of a Proposed Air Pollution Source Pursuant to Environmental Protection Agency Rules for the Prevention of Significant Deterioration (PSD)
40 CFR 52.21

Seminole Electric Cooperative, Inc.

Seminole Plant Units No. 1 and No. 2
Putnam County, Florida

U.S. Environmental Protection Agency
345 Courtland Street, N.E.
Atlanta, Georgia 30308

I Introduction

Seminole Electric Cooperative, Inc., has applied to the U.S. Environmental Protection Agency to construct a coal fired steam electric plant in Putnam County, Florida. The proposed construction is subject to review under 40 CFR 52.21, Regulations for the Prevention of Significant Deterioration (PSD). Under these regulations, a new source of air pollution in any one of 28 specified categories which will emit more than 100 tons per year of any pollutant, is subject to review for each of those pollutants. One of these categories is fossil fuel-fired steam electric plants of more than 250 million BTU per hour heat input, of which Seminole Plant is one.

Paragraph (r) of the PSD regulations requires, in part, that EPA issue a Preliminary Determination whether the source should be approved, approved with conditions, or disapproved. It is the decision of EPA that the source should be approved with conditions. The conditions are included to ensure that the applicant complies with emission control techniques and emission limits which are a part of the application. The conditions of approval follow on the next page.

CONDITIONS OF APPROVAL

A. FOR THE ELECTRIC UTILITY STEAM GENERATING UNITS

The applicant shall comply with emission limits and other requirements as specified by the U.S. Environmental Protection Agency's Standards of Performance for Electric Utility Steam Generating Units proposed on September 19, 1978 (40 CFR 60, Subpart Da). Emission limits for particulate matter, sulfur dioxide and nitrogen oxides are specified below:

Item 1 - Particulate Matter

(a) Particulate matter in gases discharged into the atmosphere from the steam generators shall not exceed 13 ng/J (0.03 lb/million Btu) heat input.

(b) Gases discharged into the atmosphere from the steam generators shall not exhibit greater than 20 percent opacity except for one 6 minute period per hour of not more than 27 percent opacity.

Item 2 - Sulfur Dioxide

(a) Sulfur dioxide in gases discharged into the atmosphere from the steam generators shall not exceed:

1. 340 ng/J heat input (0.80 lb/million Btu) derived from the combustion of fuel oil.

2. 520 ng/J heat input (1.2 lb/million Btu) derived from the combustion of coal except as provided under paragraph (b) of this section and;

3. 15 percent of the potential combustion concentration (85 percent reduction) except as provided under paragraphs (b) and (c) of this section.

(b) The sulfur dioxide emissions allowed under paragraph (a) of this section may be exceeded up to three 24-hour periods during any calendar month; however, the sulfur dioxide emissions must be reduced to less than 25 percent of the potential combustion concentration (75 percent reduction) at all times.

(c) The requirements under paragraph (a) of this section do not apply when the sulfur dioxide emitted to the atmosphere is less than 86 ng/J heat input (0.20 lb/million Btu).

(d) For purposes of determining compliance with provisions of paragraph (a)(3) of this section, any reduction in potential sulfur dioxide emissions resulting from the following may be credited in accordance with 40CFR60.48a(b):

(1) Fuel pretreatment.
(2) Coal pulverizers.
(3) Bottom ash and fly ash interaction.

(e) When different fuels are combusted simultaneously, the applicable standard is determined by proration using the following formula:

$PSso_2=x(340)+y(520)/100$
where:

$PSso_2$ is the prorated standard for sulfur dioxide when combusting different fuels simultaneously (ng/J heat input).

x is the percentage of total heat input derived from the combustion of fuel oil.

y is the percentage of total heat input derived from the combustion of coal.

Item 3 - Nitrogen Oxide Emissions

(a) Nitrogen oxides in gases discharged into the atmosphere from the steam generators shall not exceed:

1. 130 ng/J heat input (0.3 lb/million Btu) derived from the combustion of fuel oil.

2. 260 ng/J heat input (0.6 lb/million Btu) derived from the combustion of bituminous coal.

(b) When both fuels are combusted simultaneously, the applicable standard is determined by proration using the following formula:

$PSno_x = x(130)+y(260)/100$
Where:
$PSno_x$ is the applicable standard for nitrogen oxides when multiple fuels are combusted simultaneously (ng/J heat input):

x is the percentage of total heat input derived from the combustion of fuel oils.
y is the percentage of total heat input derived from the combustion of bituminous coal.

B. FOR THE COAL PREPARATION AND MATERIALS HANDLING FACILITIES

For the coal preparation facilities, the applicant must meet requirements as specified by the U.S. Environmental Protection Agency's Standards of Performance for Coal Preparation Plants promulgated on January 15, 1976 (40 CFR 60, Subpart Y). Opacity requirements for these and other materials handling facilities are specified below.

Item 1

The applicant shall not cause to be discharged into the atmosphere from any coal processing and conveying equipment, coal storage system, coal transfer and loading system, or any other materials handling system, including lime and limestone processing and handling, gases which exhibit 20 percent opacity or greater.

C. SUBMISSION OF FINAL DESIGN SPECIFICATIONS TO EPA:

Item 1 - Control Devices

The applicant must submit to EPA, within ten working days after it becomes available, copies of all technical data pertaining to the selected control devices, including formal bid from the vendor, guaranteed efficiency or emission rate, and final detailed engineering specifications. A list of any additional required information will be sent to the applicant upon receipt of this submittal. Although the type of control devices which are described in the application have been determined by EPA in its initial pre-construction review to be adequate, EPA must review the final selected devices and EPA may, upon review of these data, disapprove the application if EPA determines the selected control devices to be inadequate to meet the emission limits specified in this conditional approval.

Item 2 - Coal Characteristics and Contracts

Before approval can be granted by EPA for the precipitator and scrubber under condition C.1. above, characteristics of the coal to be fired must be known. Therefore, before these approvals are granted, the applicant must submit to EPA copies of coal contracts which should include the expected sulfur content, ash content, and heat content of the coal to be fired. These data will be used by EPA in its evaluation of the adequacy of the control devices.

As an alternative to the submittal of contracts for purchase of coal, the applicant may submit the following information:

(a) The name of the coal supplier;

(b) The sulfur content, ash content, and heat content of the coal as specified in the purchase contract;

(c) The location of the coal deposits covered by the contract (including mine name and seam);

(d) The date by which the first delivery of coal will be made

(e) The duration of the contract; and

(f) An opinion of counsel for the applicant that the contract(s) are legally binding.

II BACKGROUND

On May 19, 1978, EPA received from Mr. T. E. Crumlish an application from Seminole Electric Cooperative, Inc. to construct two 680 megawatt coal fired steam electric generators in Putnam County, Florida. Additional information was submitted from Seminole or its representatives on June 8, July 3, October 26, November 28, November 29, and December 15, 1978. Also on December 15, Seminole submitted a revision to its application which changed the proposed emission rate of sulfur dioxide from the plant. This revision was submitted in order to make the proposed plant comply with proposed revisions to EPA's New Source Performance Standards published on September 19, 1978. Since the modification to the application increased the proposed SO_2 emission rate, EPA advised Seminole that this modification would change the date of complete application for review under the PSD regulation to December 15, 1978. Seminole objected to this determination in its letter of December 15, because this determination may have caused Seminole to be required to conduct ambient air quality monitoring in the vicinity of the proposed plant. EPA determined that, due to the existence of monitoring data already conducted in the area, and the minimal impact of the plant with regard to National Ambient Air Quality Standards, no additional monitoring would be required.

III REVIEW REQUIREMENTS

The pollutants for which potential emissions are greater than 100 tons per year, and therefore subject to review, are particulate matter, sulfur dioxide, nitrogen oxides, and carbon monoxide. Review of control technology and ambient impacts is required. For sources applying after August 7, 1978, ambient monitoring may be required.

Certain portions of the PSD review may not be required if the proposed modification is subject to EPA's interpretative ruling, or if the source is a nonprofit health or education institution, or if the source has previously received approval under PSD and is only relocating. None of these exemptions applies in this case.

Other exemptions can apply to control technology review and ambient impact review. For control technology review, if allowable emissions of any pollutant are less than 50 tons per year, 1000 pounds per day and 100 pounds per hour, or if a modification is made to an existing facility and the emissions are offset by reductions elsewhere, review may not be required. None of these exemptions applies in this case.

For ambient impact review and monitoring requirements, other exemptions are provided for. In addition to the allowable emission threshold, there are exemptions for temporary sources and for sources whose net emissions, after considering decreases, do not increase. None of these exemptions apply in this case.

A. Control Technology Review

The applicant is required to install best available control technology (BACT) for each pollutant, taking into account energy, environmental and economic impacts and other costs. EPA concludes that the systems proposed by the applicant represent BACT for particulate, SO_2 and nitrogen oxides. There is currently no applicable technology for reduction of carbon monoxide emissions beyond what is accomplished in the boiler.

1. Particulate

The applicant will install a high efficiency electrostatic precipitator (ESP) to control particulate emissions. Emission limits have been specified by EPA as a condition of approval. Bag filters are to be used to control particulate emissions from fly ash handling. Opacity limitations are imposed to ensure proper design and operation.

A combination of liquid spray and bag filter systems will be used to control particulate emissions from coal handling and lime and limestone handling. Opacity limitations are imposed to ensure proper design and operation.

2. Sulfur Dioxide

The applicant has proposed the use of coal washing and the installation of a limestone scrubber which will achieve an overall reduction of 85% of potential sulfur dioxide emissions. This will comply with proposed requirements under 40 CFR 60, Federal New Source Performance Standards. This requirement is considered BACT, and is included as a condition of approval.

3. Nitrogen Oxides

The applicant has proposed boiler design controls which limit flame temperature and oxygen availability in order to control the formation of nitrogen oxides in the boiler to 0.6 lb/mm Btu. EPA considers this system to represent BACT. An emission limitation of 0.6 lb/mm Btu is a condition of approval.

B. Impact Review

The PSD regulations require the following air quality impacts to be assessed by the applicant:
1) National Ambient Air Quality Standards (NAAQS)
2) PSD increments
3) Visibility, soils and vegetation
4) Impacts due to growth caused by proposed source

All these impacts were assessed by the applicant. Air quality modelling showed no violations of the NAAQS with all sources in the area of the Seminole Plant in operation. Likewise, the PSD increment analysis showed no violations with Units 1 and 2 operating at maximum load.

The percent consumption of the Class II PSD increments caused by the Seminole Plant are presented in the following table:

Increment	Pollutant	
	Particulate	SO2
Annual	0	25%
24 hour	5%	66%
3 hour	N/A	85%

Impacts on visibility, soils and vegetation and on air quality due to growth were judged to be minimal.

The closest Class I area is Okefenokee National Wilderness Area, about 105 km away. There will be no impact from the proposed plant on this area.

The closest area where NAAQS is now being violated is the City of Jacksonville, about 50 km away. The impact of particulate emissions from Seminole on this area will be below the levels EPA considers significant.

U. S. Environmental Protection Agency

NOTICE

PRELIMINARY DETERMINATION CONCERNING THE PROPOSED CONSTRUCTION OF A POWER PLANT.

Seminole Electric Cooperative, Inc. has applied to the U.S. Environmental Protection Agency (EPA) to construct two 680 megawatt coal fired steam-electric units in Putnam County, Florida. The proposed construction is subject to EPA regulations for the Prevention of Significant Deterioration (PSD), 40 CFR 52.21. EPA has made a Preliminary Determination that the construction can be approved with conditions.

The maximum degree of Class II PSD increment consumption caused by the proposed construction is predicted to be as follows:

Particulate Matter, annual increment:	0
Particulate Matter, 24 hour increment:	5%
Sulfur Dioxide, annual increment:	25%
Sulfur Dioxide, 24 hour increment:	66%
Sulfur Dioxide, 3 hour increment:	85%

No Class I area will be affected.

Any person may submit written comments to EPA and/or request a public hearing. To be considered, any written comments must be received by EPA not later than 30 days from the date of this notice and submitted to:

Mr. Winston A. Smith, Chief
Air Programs Branch
U.S. Environmental Protection Agency
345 Courtland Street
Atlanta, Georgia 30308

A request for a public hearing must be received not later than 15 days from the date of this notice, and sent to Mr. Smith.

A copy of all materials submitted by the applicant and a copy of the Preliminary Determination is available for inspection at the County Commissioners' Office in Palatka, Florida.

Section 9.2.3 CONDITION OF SITE CERTIFICATION

STATE OF FLORIDA

DIVISION OF ADMINISTRATIVE HEARINGS

IN RE: SEMINOLE ELECTRIC COOPERATIVE, INC. SITE CERTIFICATION	:	CASE NO. 79-1388

NOTICE OF FILING CONDITIONS OF CERTIFICATION

The Conditions of Certification recommended by the Florida Department of Environmental Regulation which are proposed to be attached to and made a part of the jointly proposed Recommended Order mailed to the parties and submitted to the Hearing Officer on June 22, 1979, are hereby submitted for the consideration of the Honorable Chris H. Bentley.

Respectfully submitted,

Roderick K. Shaw, Jr.
Of Allen, Dell, Frank & Trinkle
P.O. Box 2111
Tampa, Florida 33601

Attorneys for Seminole Electric Cooperative, Inc.

CERTIFICATE OF SERVICE

I HEREBY CERTIFY that copy of the foregoing Notice of Filing and the Conditions of Certification were furnished by mail to all parties listed on the attached Service Schedule this 28th day of June, 1979.

Attorney

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Hearing Examiner
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Tallahassee, Florida 32301

Conditions of Certification

State of Florida Department of Environmental Regulation
Seminole Electric Cooperative, Inc.
Seminole Units 1 & 2
PA 78-10
CONDITIONS OF CERTIFICATION

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NOTE: Seminole will petition the Florida Department of Environmental Regulation pursuant to Condition of Certification XXV.a. to amend the Condition of Certification pertaining to Air Monitoring: (1) to change the location of one of the two air monitoring stations and (2) to correct an error in the prescribed date of commencement of air monitoring.

State of Florida Department of Environmental Regulation
Seminole Electric Cooperative, Inc.
Seminole Units 1 & 2
PA 78-10

CONDITIONS OF CERTIFICATION

I. Air

The Construction and operation of Units No. 1 and 2 at the Seminole steam electric power plant site shall be in accordance with all applicable provisions of Chapters 17-2, 17-5 and 17-7, Florida Administrative Code. In addition to the foregoing, the permittee shall comply with the following conditions of certification:

A. Emission Limitations

1. Stack emissions from Units 1 and 2 shall not exceed the following when burning coal:

   a. SO_2 - 1.2 lb. per million BTU heat input, maximum two hour average.

   b. NO_x - 0.60 lb. per million BTU heat input.

   c. Particulates - 0.03 lb. per million BTU heat input.

2. The height of the boiler exhaust stack for Units No. 1 & 2 shall not be less than 675 ft. above grade.

3. Particulate emissions from the coal handling facilities:

   a. The applicant shall not cause to be discharged into the atmosphere from any coal processing or conveying equipment, coal storage system or coal transfer and loading system processing coal, visible emissions which exceed 20 percent opacity. Particulate emissions shall be controlled by use of control devices having a removal efficiency of not less than 99.9%.

   b. The applicant must submit to the Department within ten (10) working days after it becomes available, copies of technical data pertaining to the selected particulate emissions control for the coal handling facility. These data should include, but not be limited to, guaranteed efficiency and emission rates, and major design parameters such as air/cloth ratio and flow rate. The Department may, upon review of these data, disapprove the use of such device if the Department determines the selected control device to be inadequate to meet the emission limits specified in 3(a) above. Such disapproval shall be issued within 30 days of receipt of the technical data.

4. Particulate emissions from the FGD sludge fixing facility shall be in compliance with Section 17-2.05(2).

B. Air Monitoring Program

1. The permittee shall install and operate continuously monitoring devices for the Units No. 1 & 2 boiler exhausts for sulfur dioxide, nitrogen dioxide and opacity. The monitoring devices shall meet the applicable requirements of Section 17-2.08, FAC. The opacity monitor may be placed in the duct work between the electrostatic precipitator and the FGD scrubber.

2. The permittee shall operate the two ambient monitoring devices for sulfur dioxide as generally shown on Figure 1. in accordance with EPA reference methods in 40 CFR, Part 53 and two ambient monitoring devices for suspended particulates as generally shown on Figure 1. The monitoring devices shall be specifically located at a location approved by the Department. The frequency of operation shall be every six days commencing as specified by the Department.

3. The permittee shall maintain a daily log of the amounts and types of fuels used and copies of fuel analyses containing information on sulfur content, ash content and heating values.

4. The permittee shall provide sampling ports into the stack and shall provide access to the sampling ports, in accordance with DER Publication, Standard Sampling Techniques and Methods of Analysis for the Determination of Air Pollutants from Point Source, July 1975.

5. The ambient monitoring program may be reviewed annually beginning two years after start-up of Unit No. 2 by the Department and the permittee.

6. Prior to operation of the source, the applicant shall submit to the Department a standardized plan or procedure that will allow the applicant to monitor emission control equipment efficiency and enable the applicant to return malfunctioning equipment to proper operation as expeditiously as possible.

C. Stack Testing:

1. Within 60 calendar days after achieving the maximum capacity at which each unit will be operated, but no later than 180 operating days after initial startup, the owner or operator shall conduct performance tests for particulates and SO_2 and furnish the Department a written report of the results of such performance tests.

2. Performance tests shall be conducted and data reduced in accordance with methods and procedures in accordance with DER's Standard Sampling Techniques and Methods of Analysis for Determination on Air Pollutants from Point Sources, July 1975.

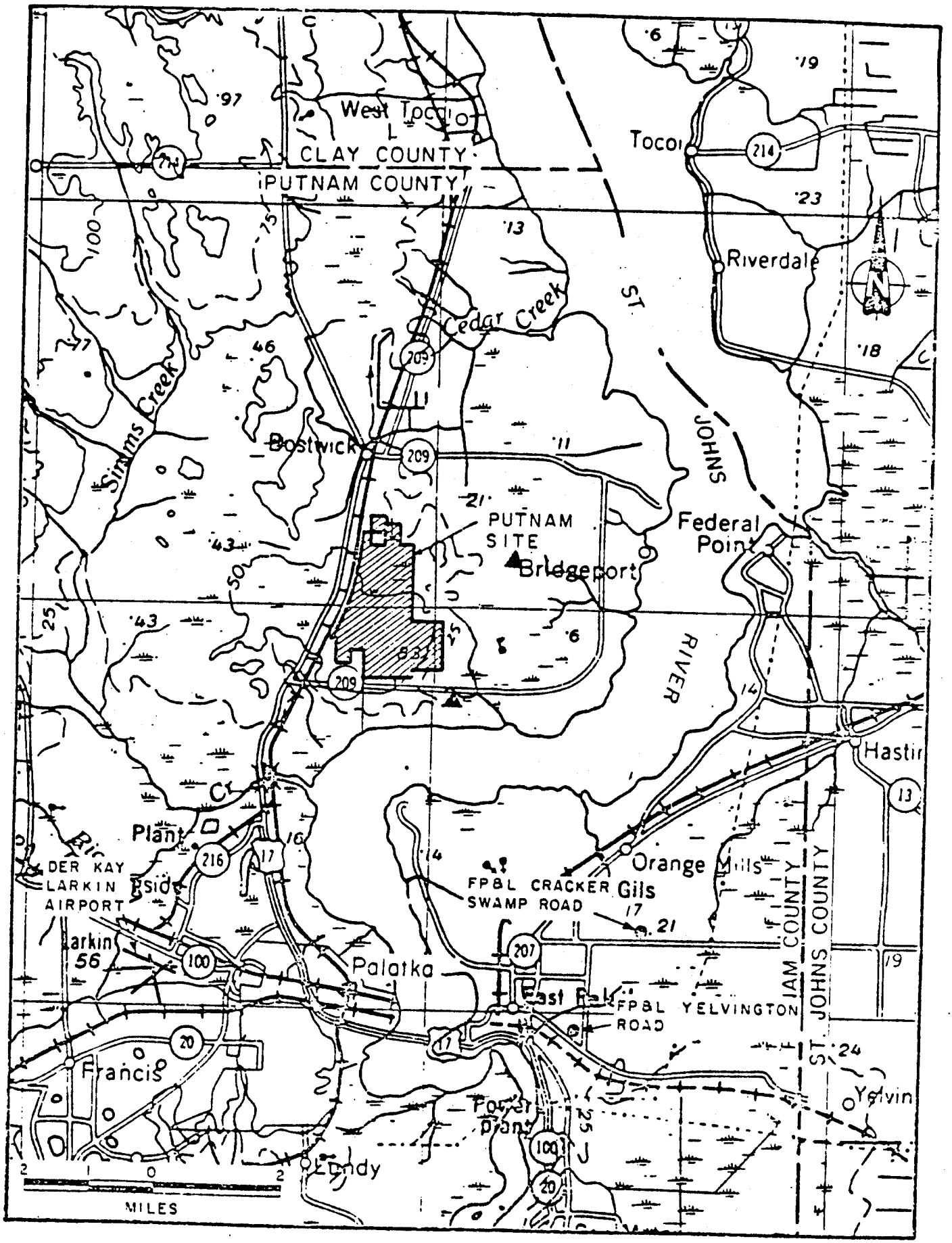


Figure . 1. Location of Ambient Air Quality Monitoring Stations.

3. Performance tests shall be conducted under such conditions as the Department shall specify based on respresentative performance of the facility. The owner or operator shall make available to the Department such records as may be necessary to determine the conditions of the performance tests.

4. The owner or operator shall provide 30 days prior notice of the performance tests to afford Department the opportunity to have an observer present.

5. Stack tests for particulates and SO_2 shall be performed annually in accordance with conditions C. 2, 3, and 4 above.

D. Reporting

1. For each Unit, stack monitoring, fuel usage and fuel analysis data shall be reported to the Department on a quarterly basis commencing with the start of commercial operation in accordance with 40 CFR, Part 60, Section 60.7., and in accordance with Section 17-2.08, FAC.

2. Ambient air monitoring data shall be reported to the Department quarterly commencing on the date of certification by the last day of the month following the quarterly reporting period utilizing the SAROAD or other format approved by the Department in writing.

3. Beginning one month after certification the applicant shall submit to the Department a quarterly status report briefly outlining progress made on engineering design and purchase of major pieces of equipment (including control equipment). All reports and information required to be submitted under this condition shall be submitted to the Administrator of Power Plant Siting, Department of Environmental Regulation, 2600 Blair Stone Road, Tallahassee, Florida 32301.

II. Water Discharges

Any discharges into any waters of the State during construction and operation of Units No. 1 & 2 shall be in accordance with all applicable provisions of Chapter 17-3, Florida Administrative Code and 40 CFR, 423, Effluent Guidelines and Standards for Steam Electric Power Generating Point Source Category except as provided herein. Also the permittee shall comply with the following conditions of certification:

A. Plant Effluents and Receiving Body of Water

For discharges made from the power plant the following conditions shall apply.

1. Receiving Body of Water (RBW)

The receiving body of water has been determined by the Department to be those waters of the St. Johns River and any other water affected which are considered to be waters of the State within the definition of Chapter 403, Florida Statutes.

2. Point of Discharge (P.O.D.)

The point of discharge will be determined by the Department to be where the effluent physically enters the waters of the State.

3. Thermal Mixing Zone

The instantaneous zone of thermal mixing for cooling tower blowdown shall not exceed an area of 155 square feet. During Discharge, the blowdown from the cooling tower for Units No. 1 & 2 shall be withdrawn at the point of lowest temperature of the recirculating cooling water prior to the addition of makeup water. The temperature at the point of discharge into the St. Johns River shall not be greater than 93 degrees F. The temperature of the water at the edge of the mixing zone shall not exceed the limitations of Paragraph 17-3.05(1)(d).

4. Chemical Wastes and Boiler Blowdown

All discharges of low volume wastes (demineralizer regeneration, floor drainage, lab drains and similar wastes), shall comply with Chapter 17-3. If violations of Chapter 17-3 occur, corrective action shall be taken. These wastewaters shall be discharged to an adequately sized and constructed treatment facility. Preoperational cleaning wastes shall be treated to comply with 40 CFR Part 423 and Chapter 17-3, FAC, prior to discharge. Boiler blowdown, boiler fireside wash, air preheater wash, and stack wash shall be disposed of in an adequately sized percolation pond.

5. Coal Pile and Limestone Pile

Coal pile runoff and Limestone Pile runoff from less than 10-year 24-hour rainfall shall be treated as required to limit the suspended solids to 50 mg/l and to prevent increases in turbidity to less than 50 JTU in waters of the state beyond a distance of 150 meters from the POD.

6. Cooling tower Blowdown

The cooling tower blowdown shall contain no detectable amounts of material added for corrosion inhibition, including but not limited to zinc and chromium.

7. Chlorine

The quantity of total residual chlorine discharged in the blowdown from the cooling tower shall not exceed 0.1 mg/l at the POD nor 0.01 mg/l beyond an instantaneous mixing zone of 750 square feet. There will be no limit on the duration of discharge of chlorine.

8. pH

The pH of all discharges shall be such that the pH be within the range of 6.0 to 8.5.

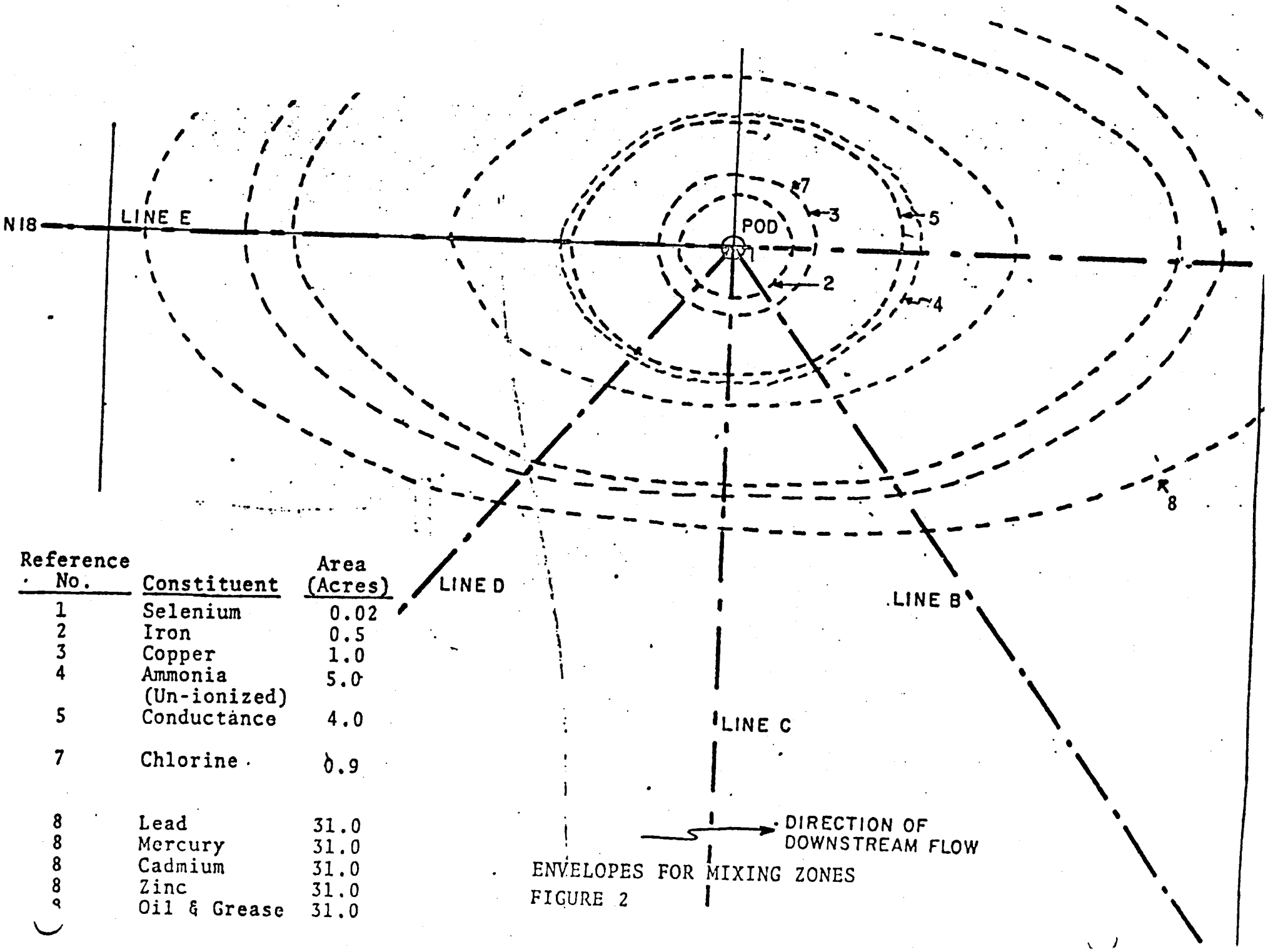
9. Polychlorinated Biphenyl Compounds

There shall be no net discharge of polychlorinated biphenyl compounds.

10. Mixing Zones

The discharge of the following pollutants shall not violate the Water Quality Standards of Chapter 17-3, F.A.C. beyond the edge of the designated instantaneous mixing zone as described herein and located within the envelopes as shown on Figure 2.

Pollutants	Instantaneous Mixing Zone	Envelope of Mixing Zones	
Ammonia	10,000 ft^2	20,235 m^2	5.0 Acres
Arsenic	8 ft^2	65 m^2	0.2 "
Chlorine	750 ft^2	3,645 m^2	0.9 "
Copper	1,000 ft^2	4,047 m^2	1.0 "
Iron	400 ft^2	2,024 m^2	0.5 "
Selenium	10 ft^2	84 m^2	0.02 "
Specific Conductance	8,015 ft^2	16,188 m^2	4.0 "
Lead		125,600 m^2	31 "
Mercury		125,600 m^2	31 "
Cadmium		125,600 m^2	31 "
Zinc		125,600 m^2	31 "
Oil and Grease		125,600 m^2	31 "
Chromium	25 ft^2	195 m^2	0.05 "



Reference No.	Constituent	Area (Acres)
1	Selenium	0.02
2	Iron	0.5
3	Copper	1.0
4	Ammonia (Un-ionized)	5.0
5	Conductance	4.0
7	Chlorine	0.9
8	Lead	31.0
8	Mercury	31.0
8	Cadmium	31.0
8	Zinc	31.0
8	Oil & Grease	31.0

ENVELOPES FOR MIXING ZONES
FIGURE 2

11. Variances To Water Quality Standards

In accordance with the provisions of Sections 403.201 and 403.511(2), F.S., Seminole Electric Cooperative, Inc., is hereby granted variances to the Water Quality Standards of Chapter 17-3, F.A.C., for cadmium, lead, mercury, and zinc, but only at such times as the natural background levels of the St. Johns River approach or exceed those standards; in any event the discharge shall comply with the effluent limitations set forth in paragraph II.A.12.a

12. Effluent Limitations

a. The following instantaneous maximum effluent limitations shall apply for cadmium, mercury, lead and zinc at the locations specified:

(i) cooling blowdown - concentrations shall not exceed four times the concentrations present in the river at Applicant's intake structure at the time of intake.

(ii) coal/limestone storage runoff - concentrations shall not exceed:

cadmium. . . . 0.11 mg/l
mercury. . . . 0.0022 mg/l
lead. . . . . .0.11 mg/l
zinc. . . . . .1.76 mg/l

(iii) bottom ash sluice blowdown - concentrations shall not exceed the unweighted sum of the amount per liter described in (i) above plus the following amounts per liter:

cadmium. . . . 0.11 mg/l
mercury. . . . 0.0055 mg/l
lead. . . . . .0.11 mg/l
zinc. . . . . .1.1 mg/l

b. The following instantaneous maximum effluent limitations shall apply at the discharge from the chemical wastewater treatment facility:

Pollutant	Effluent Limit (mg/l)
Ammonia	28.5
Aluminum	174

Continued...

Pollutant	Effluent Limit (mg/l)
Arsenic	0.073
Cyanide	0.004
~~Cadmium~~	~~0.031~~
Chromium	0.14
Copper	0.66
~~Lead~~	~~0.1~~
~~Mercury~~	~~0.002~~
Nickel	0.09
Selenium	0.04
Oil and grease	15
~~Zinc~~	~~0.83~~

B. Water Monitoring Programs

The permittee shall monitor and report to the Department the listed parameters on the basis specified herein. The methods and procedures utilized shall receive written approval by the Department. The monitoring program may be reviewed annually by the Department, and a determination may be made as to the necessity and extent of continuation, and may be modified in accordance with Condition No. XXV.

1. Chemical Monitoring

The following parameters shall be monitored as shown during discharge commencing with the start of commercial operation of the first unit and reported quarterly to the Department:

Parameter	Location	Sample Type	Frequency
Flow Intake	Intake	Recorder	Totalizer
Flow Groundwater	Wellfield pipeline	Recorder	Totalizer
Flow, Discharge	C.T. Outfall	Recorder	Totalizer
Conductivity	C.T. Outfall	Recorder	Continuous
pH	C.T. Outfall	Multiple Grab	Weekly
Temperature	C.T. Outfall	Recorder	Continuous

Continued ...

Parameter	Location	Sample Type	Frequency
TSS	C.T. Outfall	Grab	Weekly
Chlorine, Total Residual	C.T. Outfall	Multiple Grab	Weekly
Oil and Grease	C.T. Outfall & Intake	Grab	Weekly
Metals	C.T. Outfall, Intake & Waste Treatment Facility	Multiple Grab	as noted below
Arsenic	"	"	*
Copper	"	"	*
Iron	"	"	*
Aluminum	"	"	*
Lead	"	"	**
Mercury	"	"	**
Cadmium	"	"	**
Zinc	"	"	**

~~2. Physical Monitoring~~

~~The permittee, in consultation with the Department, shall develop and implement a program to verify mixing zone diffusion coefficients.~~

III. Groundwater

A. General

The use of groundwater from two wells for plant service water for Units 1 and 2 shall be minimized to the greatest extent practicable, but in no case shall exceed 3.9 mgd on a maximum daily basis or 0.85 mgd on an average annual basis.

B. Well Criteria

The submission of well logs and test results and location, design and construction of wells to provide plant service water shall be in accordance with applicable rules of the Department of Environmental Regulation and the St. Johns River Water Management District (SJRWMD). Total water use per month shall be reported quarterly to SJRWMD commencing with the start of construction.

C. Water Use Restriction

Ground water is restricted to uses other than main steam condensing. Any change in the use of said water will require a modification of this condition.

D. Emergency Shortages

In the event an emergency water shortage should be declared pursuant to Section 373.175 or 373.246, F.S., by St. Johns

*Weekly for the first three months, monthly for the next nine months, then quarterly thereafter.
**Weekly for the first three months, biweekly for the next three months, monthly for the next three months, then quarterly thereafter.

River Water Management District for an area including the location of these withdrawal points, the Department pursuant to Section 403.516, F.S., may alter, modify, or declare to be inactive, all or parts of Condition III.A.-F. An authorized Water Management District Representative, at any reasonable time, may enter the property to inspect the facilities.

E. Monitoring and Reporting

Seminole shall implement the following groundwater monitoring program:

1. The groundwater levels shall be monitored continuously at wells as approved by the DER and the St. Johns River Water Management District. Chemical analyses shall be made on samples from all monitored wells identified in this Condition. The location, frequency and selected chemical analyses shall be as given in Condition III.E.4.

2. The groundwater monitoring program shall be implemented at least one year prior to operation of Seminole No. 1. The Chemical analyses shall be in accord with the latest edition of Standard Methods for the Analysis of Water and Wastewater. The data shall be submitted within 30 days of collection/analysis to the St. Johns River Water Management District and to the DER Power Plant Siting Section.

3. Seminole shall install flow meters in compliance with SJRWMD specifications on all production wells.

4. After consultation with the DER and SJRWMD, Seminole shall install a monitoring well system as generally shown on Figure 3 to monitor groundwater quality in the top 40 feet of surficial aquifer. One well shall be installed to a depth greater than 40 feet but less than 100 to monitor vertical dispersion or groundwater contaminants. Monitoring well locations and designs shall be submitted to the Department and SJRWMD for review. Approval or disapproval of the locations and design shall be granted within 60 days. The water samples collected from each of the monitor wells shall be collected immediately after removal by pumping of a quantity of water equal to two casing volumes. The water quality analyses shall be performed monthly during the year prior to commercial operation and two years after operation and quarterly thereafter. Results shall be submitted to the Department and the SJRWMD by the fifteenth (15th) day of the month following the month during which such analyses were performed. Testing for the following constituents is required.

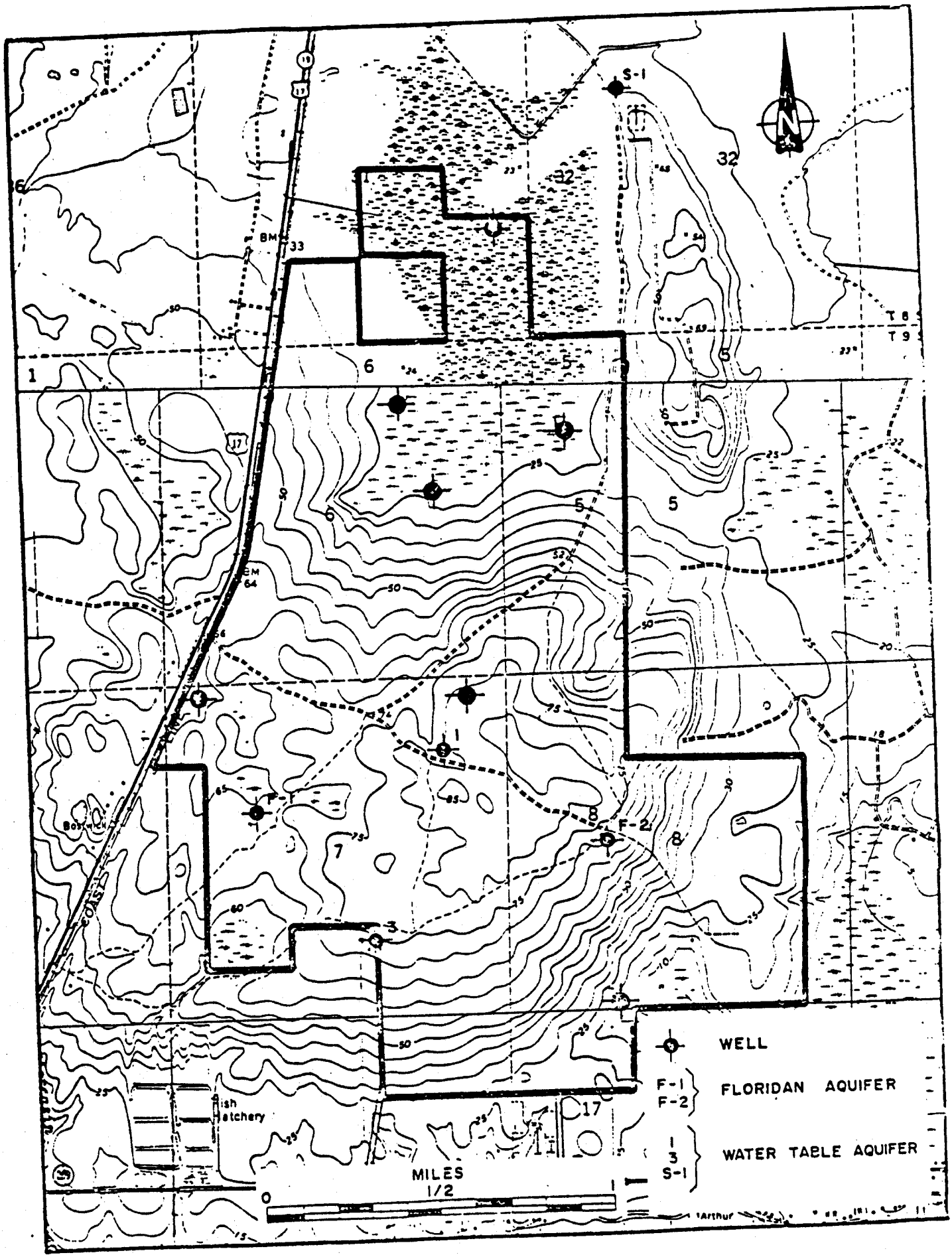


Figure 3. Monitor Well Location Map.

Conductance	Nickel
pH	Selenuim
chloride	Chromium
Iron	Arsenic
Cadmium	Beryllium
Zinc	Mercury
Copper	Lead
Sulfate	Gross Alpha
Silver	Barium

5. After the second year of monitoring and periodically thereafter, the Department and the applicant shall review the results of the monitoring program and determine the necessity for modifying or continuing the program.

F. Leachate

1. Zone of Discharge

Leachate from the FGD/sludge landfill, coal storage pile, bottom ash sump, percolation and FGD emergency pond shall not contaminate waters of the State (including both surface and groundwaters) in excess of the limitations of Chapter 17-3, FAC., beyond the boundary of the site.

2. Corrective Action

When the groundwater monitoring system shows a violation of the groundwater water quality standards of Chapter 17-3, FAC., the appropriate ponds, FGD landfill, or coal pile shall be sealed, relocated or closed, or the operation of the affected facility shall be altered in such a manner as to assure the Department that no violation of the groundwater standards will occur beyond the boundary of the site.

IV. Control Measures During Construction

A. Stormwater Runoff

During construction and plant operation, necessary measures shall be used to settle, filter, treat or absorb silt containing or pollutant laden stormwater runoff to limit the suspended solids to 50 mg/l or less at the POD during rainfall periods less than the 10-year, 24-hour rainfall, and to prevent an increase in turbidity of more than 50 Jackson Turbidity Units above background in waters of the state beyond 150 meters from the POD.

Control measures shall consist at the minimum, of filters, sediment traps, barriers, berms or vegetative planting. Exposed or disturbed soil shall be protected as soon as possible to minimize silt and sediment laden runoff. The pH shall be kept within the range of 6.0 to 8.5 at the POD.

B. Sanitary Wastes

Disposal of sanitary wastes from construction toilet facilities shall be in accordance with applicable regulations of the Department and appropriate local health agency. The sewage treatment plant shall be operated in accordance with Chapters 17-3, 17-16, and 17-19, FAC. Plans and specifications for the sewage treatment plant shall be submitted to the Departments St. Johns River Subdistrict Manager for review and approval prior to installation.

C. Environmental Control Program

An environmental control program shall be established under the supervision of a qualified person to assure that all construction activities conform to good environmental practices and the applicable conditions of certification.

The permittee shall notify the Department if unexpected harmful effects or evidence of irreversible environmental damage are detected during construction, shall immediately report to the Department and shall within two weeks provide an analyses of the problem and a plan to eliminate or significantly reduce the harmful effects or damage, and to prevent reoccurrence.

V. Solid Wastes

Solid wastes resulting from construction or operation shall be disposed of in accordance with the applicable regulations of Chapter 17-7, FAC. The permittee shall submit a program for approval outlining the methods to be used in handling and disposal of solid wastes indicating at least methods for erosion control, covering, vegetation and quality control.

Open burning in connection with land clearing shall be in accordance with Chapter 17-5, FAC. No additional permits shall be required, but the Division of Forestry shall be notified prior to burning. Open burning shall not occur if the Division of Forestry has issued a ban on burning due to fire hazard conditions.

VI. Operation Safeguards

The overall design, layout, and operation of the facilities shall be such as to minimize hazards to humans and the environment. Security control measures shall be utilized to prevent exposure of

the public to hazardous conditions. The Federal Occupational Safety and Health Standards will be complied with during construction and operation. The safety Standards specified under Section 440.56, F.S., by the Industrial Safety Section of the Florida Department of Commerce will also be complied with.

VII. Screening

The permittee shall provide screening of the site through the use of aesthetically acceptable structures, vegetated earthen walls and/or existing or planted vegetation.

VIII. Potable Water Supply System

The potable water supply system shall be designed and operated in conformance with Chapter 17-22, FAC. Information as required in 17-22.108 shall be submitted to the Department prior to construction and operation. The operator of the potable water supply system shall be certified in accordance with Chapter 17-16, FAC.

IX. Transformer and Electric Switching Gear

The foundations for transformers, capacitors, and switching gear necessary for Seminole Units 1 and 2 to the existing distribution system shall be constructed of an impervious material and shall be constructed in such a manner to allow complete collection and recovery of any spills or leakage of oily, toxic, or hazardous substances.

X. Toxic, Deleterious, or Hazardous Materials

The spill of any toxic, deleterious, or hazardous materials shall be reported in the manner specified by Condition XV.

XI. Construction in Waters of the State

1. No construction on sovereignty submerged lands shall commence without obtaining lease or title from the Department of Natural Resources.

2. Construction of intake and discharge structures should be done in a manner to minimize turbidity. Turbidity screens should be used to prevent turbidity in excess of 50 JTU above background beyond 150 meters from the dredging, pile driving, or construction site.

3. Dredging of the intake channel and discharge pipe trench should be performed by hydraulic dredge (small "mudcat" type is suitable): clamshell or other excavating equipment is satisfactory behind cofferdams or other turbidity control devices.

4. All spoil shall be piped hydraulically or trucked to an upland disposal site of sufficient capacity to retain all material. The discharge pipe trench should be refilled with clean sand sized material.

5. Effective stabilization of submerged bottom sediments at the discharge pipe exist should be achieved and maintained during the period of operation by the placement of riprap or other suitable material.

XII. FGD/Sludge Landfill and Coal Pile

Adequate geophysical testing shall be conducted to determine if solution cavities are present under the landfill area. If such cavities are located, such cavities shall be sealed off and stabilized.

The proposed FGD sludge landfill area shall be monitored and studied pursuant to a detailed groundwater testing and monitoring program as defined in Condition III E.

The results of the program will be used by the Department in determining whether Seminole has affirmatively demonstrated that Florida Water Quality Standards (17-3 F.A.C) will not be violated beyond the site boundary.

If the Department determines that Seminole has failed to affirmatively demonstrate that Florida Water Quality Standards (17-3 F.A.C) will not be violated, Seminole shall present to the Department, within 90 days of such determination, a plan of correction, (which may include, if appropriate, an impermeable liner) for review and approval by the Department, and for timely implementation by Seminole.

During the initial years of operation of Unit 1, but not to exceed five years from start up of Unit 1, a FGD sludge disposal test and evaluation program shall be implemented in accordance with the program outline submitted to the Department on April 27, 1979 as attached and incorporated herein as Attachment 1. During the test program, any FGD sludge not utilized in the program shall be fixed so as to achieve an ultimate permeability not greater than 7x10-7 cm/sec and shall be disposed of in a manner and located so as to not interfere with the sludge testing program.

Upon completion of the test and evaluation program, Seminole shall submit a proposed method of FGD sludge disposal to the Department for Review. The Department shall indicate its approval or disapproval of the program within 60 days of receipt. Seminole shall implement the approved program as soon as practical upon receipt of approval from the Department. Should the program be disapproved by the Department Seminole shall fix the FGD sludge so as to achieve a permeability not greater than 1 x 10-7 cm/sec and place it with the bottom layer at least eight feet thick or line it with an impermeable liner.

Upon initiation of FGD sludge disposal, a quality control program shall be implemented to insure that the permeability of the FGD sludge does not exceed prescribed levels. Construction of perimeter berms of "Fixed" FGD sludge, if any, shall be in conformance with the provisions of Chapter 17-9, FAC, regarding earthen dams.

XIII. Transmission Lines

Directly associated transmission lines shall be constructed and maintained in a manner to minimize environmental impacts in accordance with Chapter 403, F.S.

A. Construction

1. Filling and construction in waters of the State shall be minimized to the extent practicable. No such activities shall take place without obtaining lease or title from the Department of Natural Resources.

2. Placement of fill in wetland areas shall be minimized by spanning such areas with the maximum transmission lines span practicable.

3. Construction and access roads should avoid wetlands and be located in surrounding uplands. Any fill required in wetlands for construction but not required for maintenance purposes shall be removed and the ground restored to its original contours after transmission line placement.

4. Keyhole fills from upland areas are preferable to a single road and should be oriented as nearly parallel to surface water flow lines as possible.

5. Sufficient culverts shall be placed through fill causeways to maintain sheet flow. The number and locations of such culverts will be determined in the field by consultation with DER field inspectors.

6. Maintenance roads shall be planted with native species to prevent erosion and subsequent water quality degradation.

7. Construction activities should proceed as much as possible during the dry season.

8. Turbidity control measures, where needed, shall be employed to prevent violation of water quality standards.

9. Good environmental practices as described in Environmental Criteria for Electric Transmission Systems as published by the U.S. Department of Interior and the U.S. Department of Agriculture should be followed.

10. Any archaeological sites discovered during construction of the transmission lines shall be disturbed as little as possible and such discovery shall be communicated to the Department of State, Division of Archives, History and Records Management.

B. Maintenance

1. Vegetative removal for maintenance should be carried out in the following manner:

   Vegetative clearing operations to be carried out within the corridor should follow the general standards for clearing rights-of-way for overhead transmission lines as referenced in XIII.A.9. above, thus preserving immature tree species along the peripheries of the right-of-way. These standards define the zone that shall be cleared of all tree growth as the area between structures 10 ft. to either side of the outside conductor. The remainder of the right-of-way from the cleared area to the right-of-way limit shall be screened. This translates to mean that only trees in excess of 10 ft. in height would be removed from the outer zone except where location of the access roads necessitates complete clearing.

2. Chemicals or herbicides shall not be used for vegetation control along the transmission line without prior approval of the Department.

XIV. Change in Discharge

All discharges or emission authorized herein shall be consistent with the terms and conditions of this certification. The discharge of any pollutant not identified in the application, or any discharge more frequent than, or at a level in excess of that authorized herein, shall constitute a violation of the certification. Any anticipated facility expansions, production increases, or process modification which will result in new, different or increased discharges or expansion in steam generating capacity will require a submission of a new or supplemental application pursuant to Chapter 403, Florida Statutes.

XV. Noncompliance Notification

If, for any reason, the permittee does not comply with or will be unable to comply with any limitation specified in this certification, the permittee shall notify the St. Johns River Subdistrict Manager of the Department by telephone during the working day during which permittee becomes aware of said noncompliance ~~occurs~~ and shall confirm this situation in writing within seventy-two (72) hours of first becoming aware of such conditions, supplying the following information:

a. A description and cause of noncompliance; and

b. The period of noncompliance, including exact dates and times; or, if not corrected, the anticipated time the noncompliance is expected to continue, and steps being taken to reduce, eliminate and prevent recurrence of the noncomplying event.

XVI. Facilities Operation

The permittee shall at all times maintain in good working order and operate as efficiently as possible all treatment or control facilities or systems installed or used by the permittee to achieve compliance with the terms and conditions of this certification. Such systems are not to be bypassed without prior department approval, except, during periods of when light oil is used for ignition, the FGD system may be bypassed.

XVII. Adverse Impact

The permittee shall take all reasonable steps to minimize any adverse impact resulting from noncompliance with any limitation specified in this certification, including but not limited to such accelerated or additional monitoring as necessary to determine the nature and impact of the noncomplying event.

XVIII. Right of Entry

The permittee shall allow the Secretary of the Florida Department of Environmental Regulation and/or authorized respresentatives, upon the presentation of credentials:

a. To enter upon the permittee's premises where an effluent source is located or in which records are required to be kept under the terms and conditions of this permit; and

b. To have access to and copy all records required to be kept under the conditions of this certification; and

c. To inspect and test any monitoring equipment or monitoring method required in this certification and to sample any discharge or pollutants, and

d. To assess any damage to the environment or violation of ambient standards.

XIX. Revocation or Suspension

This certification may be suspended or revoked pursuant to Section 403.512, Florida Statutes, or for violations of any Condition or certification.

XX. Civil and Criminal Liability

This certification does not relieve the permittee from civil or criminal responsibility or liability for noncompliance with any conditions of this certification, applicable rules or regulations of the Department, or Chapter 403, Florida Statutes, or regulations thereunder.

Subject to Section 403.511, Florida Statutes, this certification shall not preclude the institution of any legal action or relieve the permittee from any responsibilities or penalties established pursuant to any other applicable State Statutes or regulations.

XXI. Property Rights

The issuance of this certification does not convey any property rights in either real or personal property tangible or intangible, nor any exclusive priviledges, 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 applicant will obtain title, lease or right of use from the State of Florida, to any sovereign submerged lands occupied by the plant, transmission line structures, or appurtenant facilities.

XXII. Severability

The provisions of this certification are severable, and if any provision of this certification, or the application of any provision of this certification to any circumstances is held invalid, the application of such provision to other circumstances and the remainder of the certificaiton shall not be affected thereby.

XXIII. Definitions

The meaning of terms used herein shall be governed by the definitions contained in Chapter 403, Florida Statutes, and any regulation adopted pursuant thereto. In the event of any dispute over the meaning of a term used in these general or special conditions which is not defined in such statutes or regulations, such dispute shall be resolved by reference to the most relevant definitions contained in any other state or federal statute or regulation or, in the alternative by the use of the commonly accepted meaning as determined by the Department.

XXIV. Review of Site Certification

The certification shall be final unless revised, revoked or suspended pursuant to law. At least every five years from the date of issuance of this certification or any National Pollutant Discharge Elimination System Permit issued pursuant to the Federal Water Pollution Control Act Amendments of 1972, for the plant units, the

Department shall review all monitoring data that has been submitted to it during the proceeding five-year period, for the purposes of determining the extent of the permittee's compliance with the conditions of this certification of the environmental impact of this facility. The Department shall submit the results of its review and recommendations to the permittee. Such review will be repeated at least every five years thereafter.

XXV. Modification of Conditions

The conditions of this certification may be modified in the following manner:

a. The Board hereby delegates to the Secretary the authority to modify, after notice and opportunity for hearing, any conditions pertaining to monitoring, testing and evaluation programs, sampling, groundwater, mixing zones, zones of discharge or variances to water quality standards, or location of transmission line corridors within areas already approved at the land use hearing.

b. All other modifications shall be made in accordance with Section 403.516, Florida Statutes.

PROPOSED PROGRAM FOR MONITORING AND EVALUATING THE GEOTECHNICAL AND ENVIRONMENTAL CHARACTERISTICS OF FGD SLUDGE AND ASH DISPOSAL

Seminole Electric Cooperative, Inc. (SECI) wishes to demonstrate to the Florida Department of Environmental Regulation (DER) and the Environmental Protection Agency (EPA) that it has the capability to dispose of the various power plant waste materials which will be produced at Seminole Units 1 and 2 in an environmentally acceptable manner. To ensure this environmentally acceptable disposal, SECI intends to include in its power plant subsystems, a waste treatment system capable of processing all of the FGD sludge, fly ash and bottom ash produced by both Seminole Units 1 and 2. This waste treatment system will utilize accepted pozzolanic technology to chemically fix the power plant waste products.

Sludge and fly ash processed through the plant using the fixation process shall be defined herein as "stabilized" material. Sludge and fly ash blended within the plant without fixation additives shall be defined herein as "unstabilized" material.

The primary emphasis of the program is to evaluate the handleability, economics, structural stability and environmental acceptability of unstabilized fly ash and sludge (either unoxidized or oxidized) mixtures, and to develop a long term disposal plan in line with sound engineering principles acceptable to the DER and the EPA.

Attached please find our outline for the proposed program, Exhibit II, and Figures A through E.

ATTACHMENT 1

OUTLINE

PHASE I - DESIGN AND DEVELOPMENT OF MONITORING PROGRAM

A. Develop Disposal Concepts

- Unstabilized disposal
- Encapsulation
- Selected stabilization
- Total stabilization

B. Select Disposal Concepts for Test Cell Development and Monitoring

- Unstabilized disposal
- Selected stabilization and encapsulation of oxidized sludge and ash.
- Selected stabilization and encapsulation of unoxidized sludge and ash
- Total stabilization of oxidized or unoxidized sludge and ash

C. Design Test Cells and Monitoring Program for Concept Evaluation - See Figures A thru E

- Establish monitoring point locations
- Design test cells
- Develop field and laboratory test program

PHASE II - IMPLEMENTATION AND EVALUATION OF MONITORING PROGRAM

A. Monitoring, Quality Control and Testing Program

- Establish physical and chemical characteristics of disposal materials
- Monitor runoff and leachate
- Determine in situ material characteristics with regard to density, strength, permeability, stability, etc.

B. Establish Effect of Various Disposal Concepts on Operations

- Equipment and manpower requirements
- Operating efficiency
- Seasonal variations
- Operational difficulties

PHASE III - EVALUATION OF SHORT AND LONG TERM EFFECTS OF VARIOUS CONCEPTS

A. Environmental Acceptability

- Meets or exceeds Florida water quality standards

B. Structural Integrity

- Immediate and long term stability

C. Operational Feasibility

- Potential for reclaimation and future land use

SECI
4-27-79

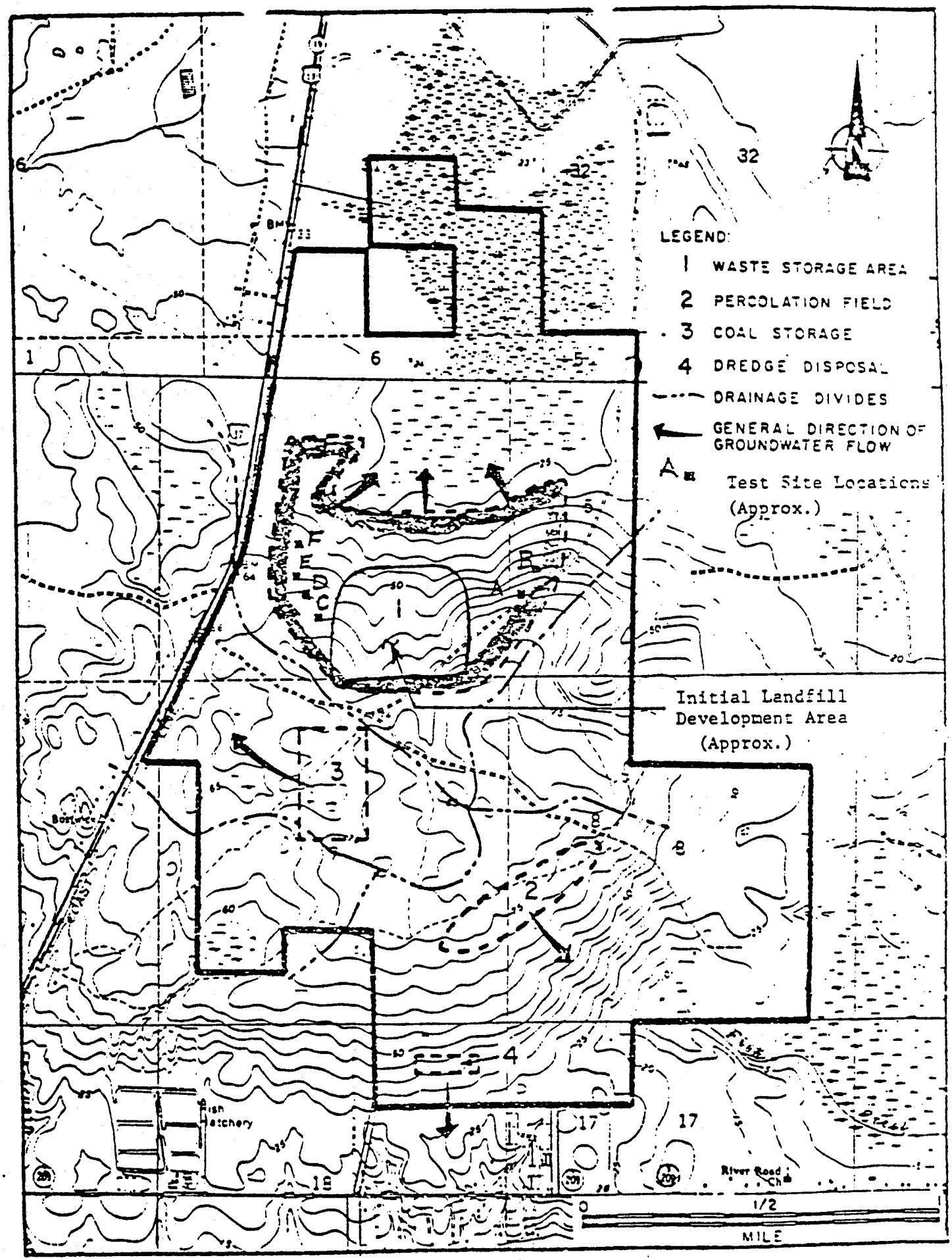
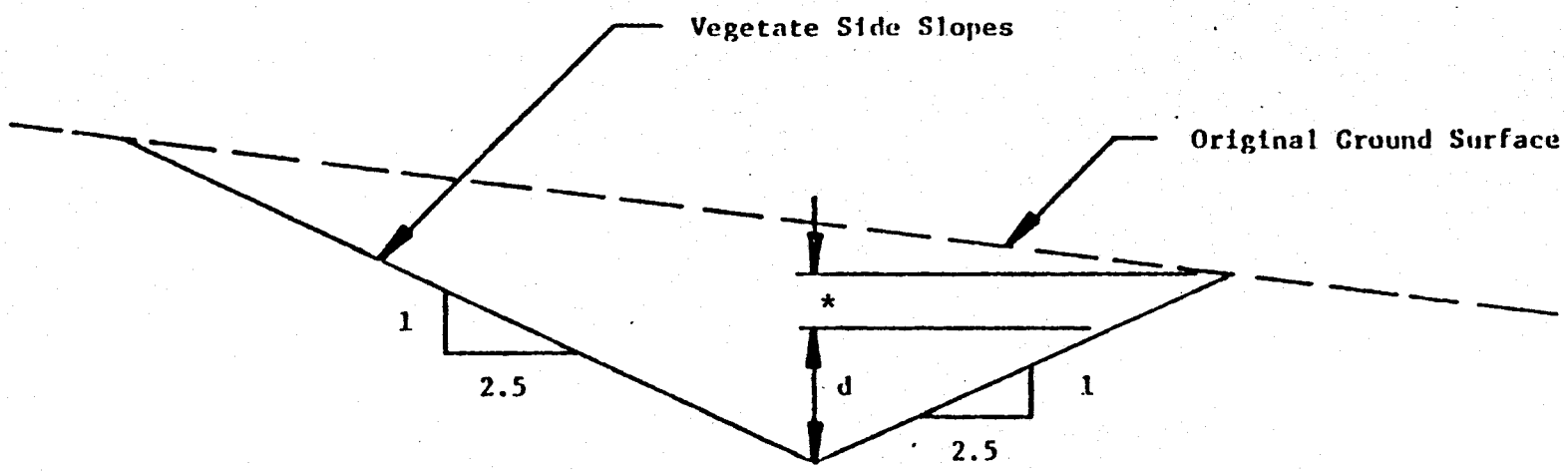


Figure A

FGD SLUDGE AND ASH DISPOSAL SITES



d = Flow Depth

* = Freeboard, 1'-0 min.

Figure B

TYPICAL CROSS SECTION

DIVERSION CHANNEL
NO SCALE

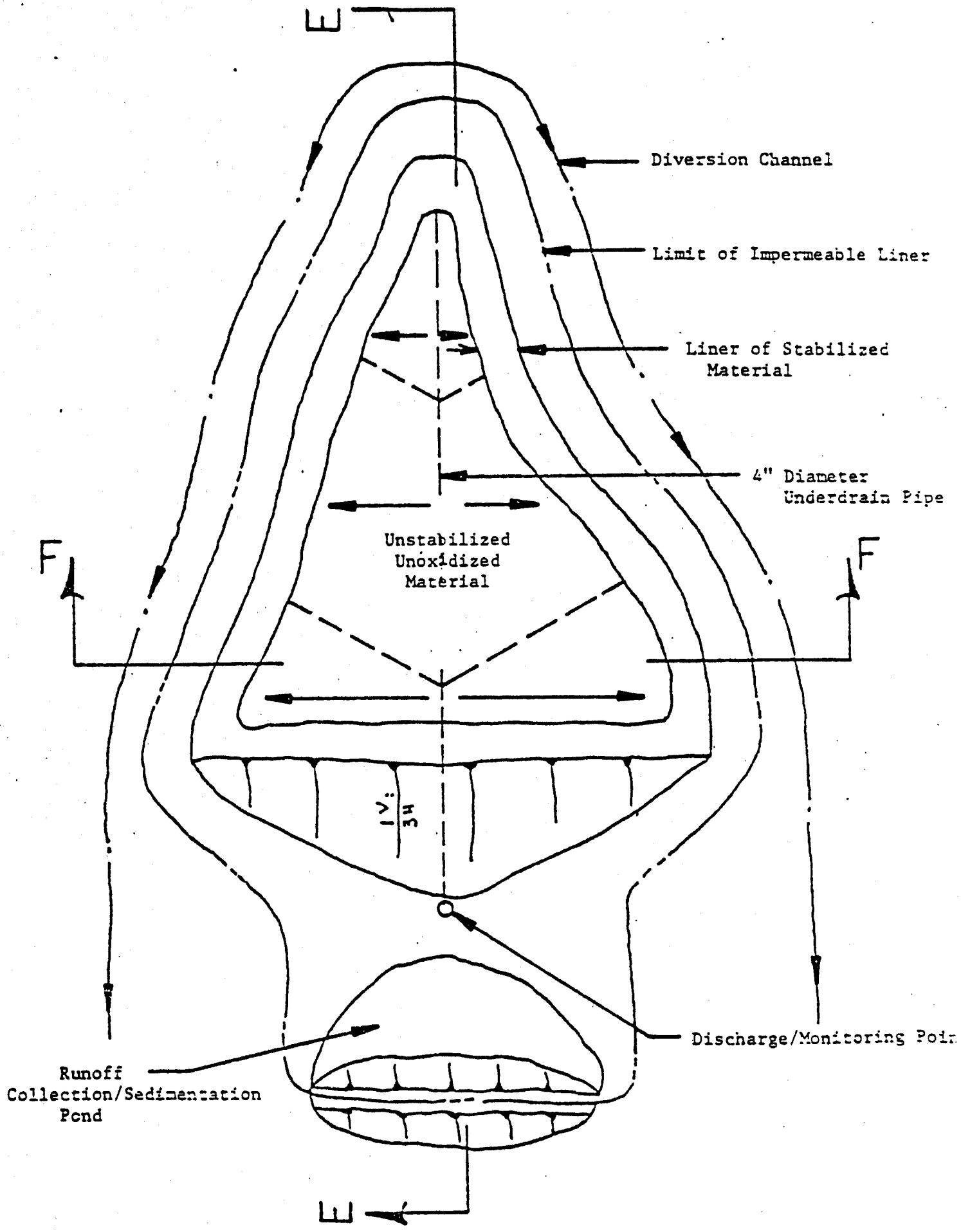


Figure C
TEST SITE C
SITE PLAN
NO SCALE

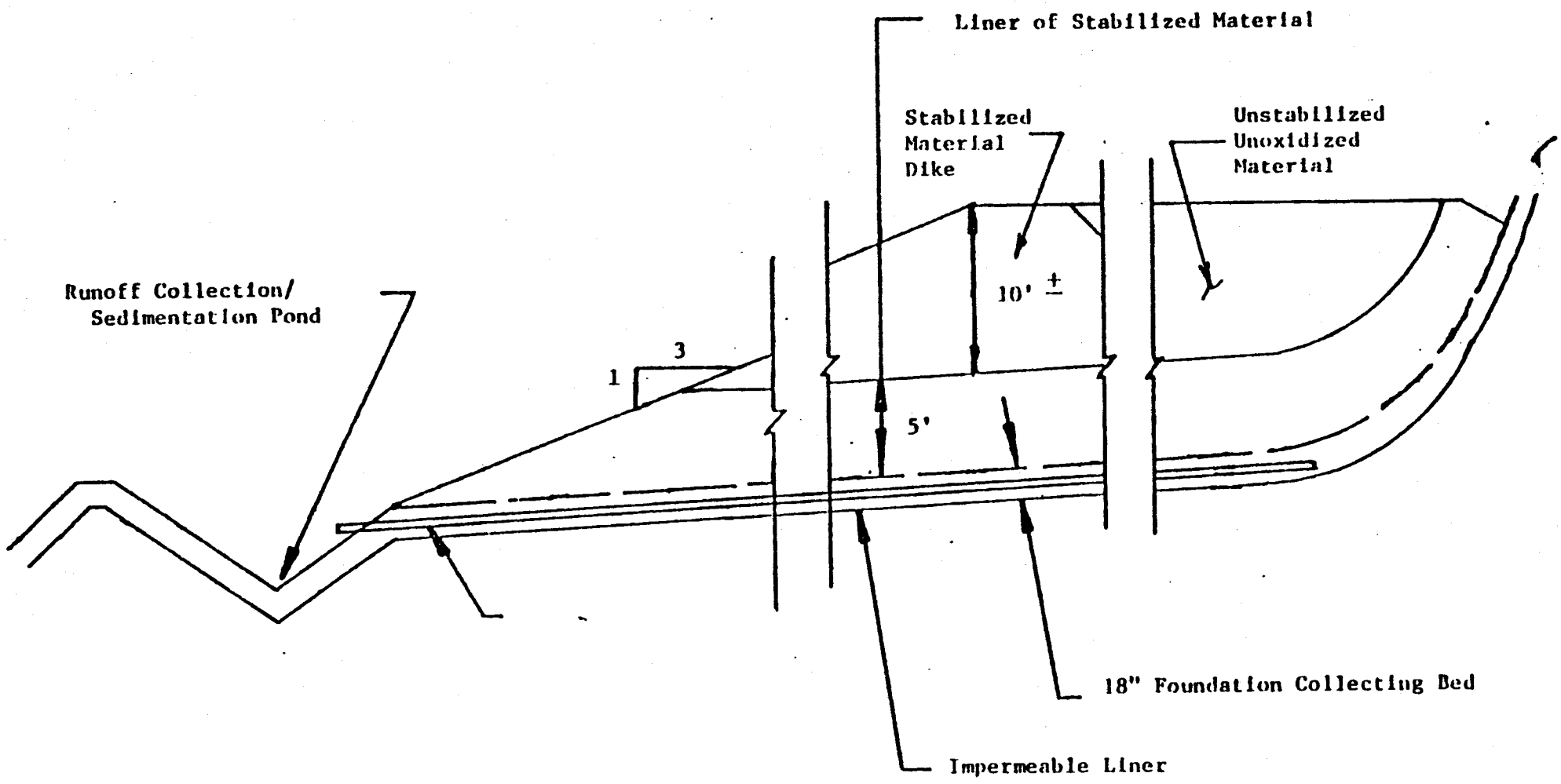


Figure D

SECTION EE

TYPICAL CROSS SECTION

NO SCALE

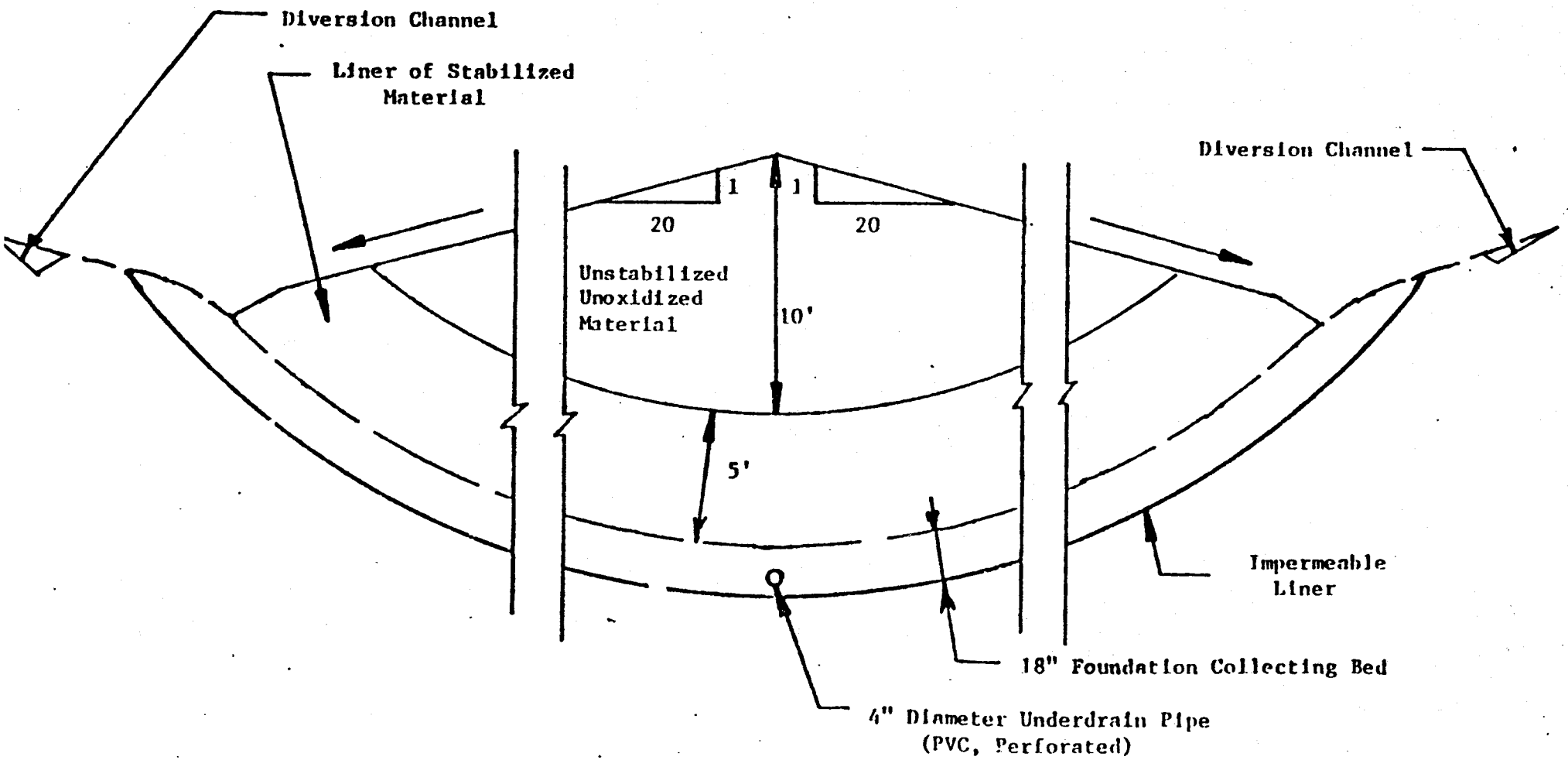


Figure E

SECTION FF

TYPICAL CROSS SECTION

NO SCALE

STATE OF FLORIDA
DIVISION OF ADMINISTRATIVE HEARINGS

IN RE: SEMINOLE ELECTRIC COOPERATIVE, INC., SITE CERTIFICATION	)	Case No. 79-1388

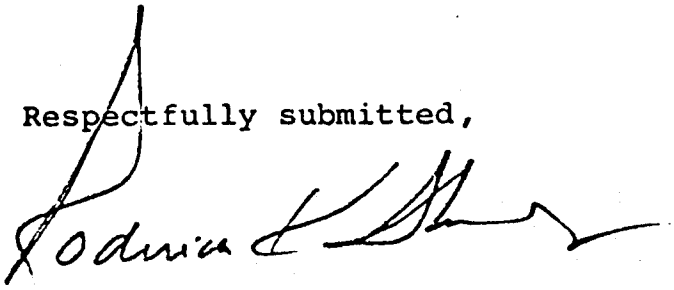
NOTICE OF FILING JOINTLY PROPOSED ORDER

The Florida Department of Environmental Regulation, Florida Public Service Commission, Florida Division of State Planning, and the Applicant, Seminole Electric Cooperative, Inc., jointly propose the attached Findings of Fact, Conclusions of Law, and Recommended Order, subject to the concurrence of the Florida Department of Natural Resources in the language appearing in brackets in paragraphs 19 and 33 (expected on or before June 29, 1979). The jointly proposed order is hereby submitted for the consideration of the Honorable Chris H. Bentley by Seminole Electric Cooperative, Inc., by its undersigned attorneys.

The Florida Department of Environmental Regulation, Florida Public Service Commission, and Florida Division of State Planning have approved this proposed joint order, except for the language in brackets in paragraphs 19 and 33 which

they have not yet reviewed, by and through Sheri W. Smallwood, Barrett G. Johnson, and Charles L. Keesey, their respective attorneys.

Respectfully submitted,



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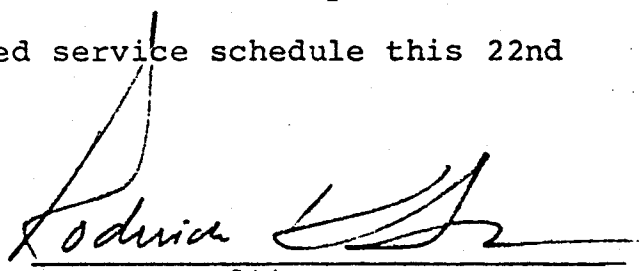
Attorneys for Seminole Electric Cooperative, Inc.

CERTIFICATE OF SERVICE

I HEREBY CERTIFY that a copy of the foregoing Notice of Filing and the Proposed Order was furnished by mail to all parties listed on the attached service schedule this 22nd day of June, 1979.



Attorney

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City of Lake City
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STATE OF FLORIDA
DIVISION OF ADMINISTRATIVE HEARINGS

IN RE: SEMINOLE ELECTRIC COOPERATIVE, INC., SITE CERTIFICATION	)	CASE NO. 79-1388

FINDINGS OF FACT, CONCLUSIONS OF LAW, AND RECOMMENDED ORDER

This proceeding was held pursuant to the Florida Electrical Power Plant Siting Act, Chapter 403, Part II, Florida Statutes, and Chapter 17-17, Florida Administrative Code, to consider the application of Seminole Electric Cooperative, Inc. (Seminole) for site certification of two electrical generating facilities, associated facilities, and directly associated transmission lines, collectively known as Seminole Plant Units No. 1 and No. 2 (Units 1 and 2), proposed for Putnam County, Florida.

The Governor and Cabinet, sitting as the Board under Chapter 403, Part II, Florida Statutes, entered an Order dated March 21, 1979, holding that the proposed site including associated facilities and directly associated transmission lines is consistent and in compliance with existing land use plans and zoning ordinances.

The statutory parties to this proceeding, in addition to Seminole, are:

1. Florida Department of Environmental Regulation;

2. Florida Public Service Commission;

3. Florida Division of State Planning; and

4. St. Johns River Water Management District.

North Central Florida Regional Planning Council became a party to the proceeding pursuant to Section 403.508(3)(b)2, Florida Statutes, and the Sierra Club became a party to the proceeding pursuant to Section 403.508(3)(b)3, Florida Statutes.

Pursuant to Sections 403.508(3)(e) and 403.509(2), Florida Statutes, and Section 17-17.11(2)(3), Florida Administrative Code, Seminole requested that the following agencies be made parties to this proceeding:

1. Florida Department of Transportation;

2. Florida Department of Natural Resources;

3. Suwannee River Water Management District;

4. Bradford County;

5. Clay County;

6. Columbia County;

7. Marion County;

8. Putnam County;

9. Suwannee County;

10. Union County;

11. City of Ocala; and

12. City of Lake City.

The Florida Department of Transportation, Clay County, Columbia County, Marion County, Putnam County, Union County, and the City of Ocala filed notices of intent to participate and thereby became parties. The Florida Department of Natural Resources, the Suwannee River Water Management District, Bradford County, Suwannee County, and the City of Lake City did not file notices of intent to participate.

Pursuant to proper notice (Hearing Officer's Exhibit 1), a certification hearing as required by Section 403.508(3), Florida Statutes, was held in Palatka, Florida, June 4, 1979, for the purpose of receiving testimony and evidence concerning whether the location and operation of the proposed facilities will produce minimal adverse effects on human health, the environment, the ecology of the land and its wildlife, and the ecology of state waters and their aquatic life. The hearing included an examination of the following: the necessity for expanded electrical generation; the expected environmental impact from construction and operation of the facilities; operational safeguards of the facilities; the availability of abundant, low-cost electrical energy; and other public interests and issues relevant to certification of the proposed site. In addition, evidence relating to best available control technology (BACT), the prevention of significant deterioration (PSD), variances and effluent limitations, mixing zones, zones of discharge, and permission

for the applicant to use, connect to, or cross over property or works of the State of Florida, Department of Natural Resources, Department of Transportation, City of Lake City, City of Ocala, Clay County, Columbia County, Putnam County, Marion County, Union County, Suwannee County, Bradford County, Suwannee River Water Management District, and St. Johns River Water Management District was presented.

The following parties entered appearances or were present at the hearing:

1. Seminole Electric Cooperative, Inc.;
2. Florida Department of Environmental Regulation;
3. Florida Public Service Commission;
4. Florida Department of Transportation;
5. The Sierra Club;
6. Putnam County; and
7. Marion County.

Only Seminole, the Department of Environmental Regulation, the Public Service Commission, and the Board of County Commissioners of Putnam County actively participated at the hearing.

All contested issues were resolved by agreement of the parties at or before the certification hearing. Having considered all testimony and evidence properly admitted, having heard argument of counsel, and being otherwise fully apprised herein, the following Findings of Fact, Conclusions of Law, and Recommended Order are entered.

FINDINGS OF FACT

1. The proposed site of Units 1 and 2 is approximately 4-1/2 miles north of Palatka, Florida. It is situated north and west of the St. Johns River and is bordered on the west by U. S. Highway 17 and the Seaboard Coast Line Railroad. It is primarily high terrain covered with pines, palmettoes, and scrub oaks. It slopes on the south and east to the river and on the north to a hardwood and cypress swamp area. Until recently, it was used primarily for logging. It consists of 1,994 acres. It includes a 66-foot wide corridor for vehicular access to County Road 209 on the south. Additional access by vehicles and rail will be provided at the northwest boundary where the principal site abuts U. S. Highway 17 and the Seaboard Coast Line Railroad right-of-way. Access to the river for the intake and discharge pipelines will be provided by a 100-foot to 200-foot wide corridor on the south to the river.

2. Three double circuit 230-KV directly associated transmission lines are proposed. The proposed routes are as follows:

Route 1:

From the principal site to the Putnam Substation near Palatka.

Route 2:

From the principal site to the Silver Springs substation at Silver Springs, Florida.

Route 3:

From the principal site to the Columbia substation in Lake City, and continuing by one branch line to a substation at Suwannee and by another branch line to a substation near Ft. White.

Seminole and its consultants have studied various alternative corridors for these proposed transmission lines. Those finally selected, and described in Appendix "M" of the application, will minimize adverse environmental impacts. The specific rights-of-way within the mile-wide corridors will be determined by Seminole at a later date and be subject to Condition of Certification XIII and Conclusion of Law Number 33(c).

3. Units 1 and 2, as proposed, are each a 620 MW coal-fired steam electric generating unit with related facilities. As envisioned, the two units will share a single chimney shell approximately 675 feet tall which will contain two flues, one for each unit. Each unit will control oxides of nitrogen by boiler design, particulates by electrostatic precipitators, and sulfur dioxide by flue gas scrubbers. Each unit will also have a natural draft cooling tower approximately 450 feet tall and about 400 feet in diameter at the base for the purpose of expelling the rejected heat load to the atmosphere rather than to the river. The closed cycle condenser cooling system, of which the cooling

towers are an integral part, recirculates the cooling waters thereby reducing substantially the volume of water required to be withdrawn from the river. The intake structure will be located 325 feet offshore in the St. Johns River. It will utilize wedge wire screens to minimize entrainment and will achieve intake water approach velocities of less than 0.5 feet per second to minimize impingement. The discharge structure will be located 900 feet offshore at a point at which the river is over a mile wide and the channel is approximately 2,000 feet offshore. This location will assure that the mixing zones will not encroach nursery areas. Other associated facilities will include the railroad spur, two access roads, sewage disposal plant, central wastewater treatment system, solid and liquid waste storage areas, coal and limestone handling and storage areas, service building, maintenance shop, warehouse, 230 KV switchyard, and two freshwater wells. The two wells will supply plant service water from the Floridan aquifer. None of this water will be used for cooling the condensers.

4. Units 1 and 2 will be needed for additional capacity by their projected startup dates of June 1983 and June 1985 respectively. At the present time Seminole has only negligible generating capacity of its own. To determine Seminole's future electrical needs, a Power Requirements Study was prepared in March 1977 by each of Seminole's

member cooperatives. It was conducted in accordance with Revised REA Bulletin 120-1. Key factors which affected the electrical load growth were analyzed, including population growth, anticipated economic development, consumer income, the effect on usage of the cost of electricity, the effect of conservation efforts, and the impact of weather. From this information and other local considerations, a forecast was developed by each member system. The composite of the individual system analyses was reviewed and completed as the Seminole Forecast.

For the winter of 1977-78, Seminole predicted a demand of 992 MW and had an actual demand of 1,007 MW. For the winter of 1978-79, Seminole predicted a demand of 1,104 MW and the actual winter peak was 1,069. The predicted electrical demand of the Seminole member systems for the winter of 1983 is 1,835 MW and the predicted demand for the winter of 1985 is 2,235 MW. Even if those demand predictions are high, Seminole's members will have sufficient demand to justify the additional 1,240 MW of capacity that Seminole proposes.

Seminole has engaged in continuing efforts to purchase generating capacity from other electric power generating utilities and other alternatives. Despite these efforts, the evidence shows that the 1,240 MW of additional generating capacity are needed as planned.

Seminole is connected with other electric power generating utilities in the state via the grid system. The evidence shows that the effect of not installing the two Seminole units would be to cause the winter reserve for Florida to drop 2.6 percent in 1983-84 and 4.7 percent in 1985-86. Florida's total reserve would drop to 14.8 percent in 1986-87 and 14.1 percent in 1988-89 if the two Seminole units were not installed. Those reserve levels would be unacceptably low, especially in view of an unacceptably high loss of load probability (LOLP) for the same period. The evidence also shows that Florida needs additional electric generating capacity and that the failure to build Seminole Units 1 and 2 as coal-fired units might cost Floridians an aggregate of $200,000,000 every year in increased fuel costs. Thus, the Seminole units will help Florida reduce its dependence on the use of foreign oil which has an uncertain supply future.

5. In the preparation of the principal site and construction of the associated facilities other than transmission lines, approximately 420 acres of land will be cleared. About 65 percent of the vegetation within the principal site will be left undisturbed. Previous lumbering activities have already greatly lowered the quality of much of the principal site as a wildlife habitat. Frequent disruption

by man and competition from hogs have resulted in relatively low wildlife populations in the area so that the more mobile species can move to surrounding habitats without overcrowding. The impact of the removal of less mobile species, which are not abundant, will be minor.

6. Due to the isolated nature of the proposed site for Units 1 and 2, there is very little opportunity for public access during construction and operation. Vehicular traffic from U. S. Highway 17 to the west and County Road 209 to the south will be intercepted and controlled by a guard system. The railroad crossing to U. S. Highway 17 will be protected by a signal and gate system. Seminole has proposed adequate measures to comply with the federal Occupational Safety and Health Act and the Florida Workmen's Compensation Law, to minimize fugitive dust during construction, to minimize open burning, and to control turbidity and sedimentation from construction activities. Increased ambient noise levels resulting from construction activities will have little impact on the general public due to the remoteness of the plant site and the presence of a tree screen surrounding most of the construction site.

7. The wastewaters to be discharged from Units 1 and 2 to the St. Johns River consist of those from the central wastewater treatment facility, cooling tower blowdown, and the sewage treatment facility. These facilities are designed

to cause all of these discharges to comply (i) with all applicable provisions of the federal Effluent Guidelines and Standards for Steam Electric Power Generating Point Sources, as made applicable in Florida by Section 17-6.01(2), Florida Administrative Code, in the manner described in Condition of Certification II, (ii) with the effluent limitations for temperature, pH, chlorine, and oil and grease described in Condition of Certification II A, and (iii) with the requirements relating to sanitary wastes contained in Chapter 17-6, Florida Administrative Code. The total volume of wastewaters to be discharged to the St. Johns River will average 2.45 mgd and never exceed 7.46 mgd.

8. Seminole and its consultants have modeled and analyzed the projected effect of the proposed wastewater discharges of Units 1 and 2 on the St. Johns River. Except to the possible extent discussed in paragraph 10 for which a variance is recommended, the evidence developed from such studies shows that through compliance with the effluent limitations established by Condition of Certification II A 12 (b), the concentrations of each substance discharged by Seminole will meet the water quality standard applicable to that substance at the boundary of the instantaneous mixing zone established for that substance by Condition of Certification II A 10. Should ambient concentrations of oil and grease within the St. Johns River be found to exceed

5 mg/l, Seminole can comply with the Florida water quality rules for oil and grease by further reducing the concentration of oil and grease in its wastewater discharges to 5 mg/l.

9. The evidence developed in the studies referred to in paragraph 8 above shows that through compliance with the thermal effluent limitations established by Condition of Certification II 3 A, the temperatures will meet the thermal water quality standard at the boundary of an instantaneous thermal mixing zone of 155 square feet established by Condition of Certification II A 3.

10. Seminole has requested a variance from water quality standards during those occasional instances when the natural background concentrations of cadmium, lead, mercury, and zinc within the St. Johns River approach or exceed the water quality standards for those substances. When concentrations of those four substances within the river are at normally experienced levels, the concentrations of each within the wastewater discharges can be diluted to applicable water quality limits within a mixing zone smaller than the 31-acre instantaneous mixing zone presumptively allowable by the water quality rules. The evidence discloses that there is no practical removal technique that can reduce concentrations of these four substances to those levels equivalent to the water quality standards applicable to the river when

the river itself exceeds the standards. Neither is there any practicable means by which the discharge of wastewaters can be eliminated entirely, since the cost of doing so would be between $140,000,000 and $280,000,000 over the life of the plant, or would require the use of percolation ponds approximately 24 miles long. Should the highest recorded ambient concentrations of these substances within the river recur, the effluent limitations described in Condition of Certification II A 12 (a) will assure that the wastewater discharges will have an undetectable effect on concentrations of these substances within the river generally and will produce a net reduction in the mass of each present within the river.

11. When Units 1 and 2 are operating at full capacity, the volume of water to be withdrawn from the St. Johns River will be 15.8 mgd. This is a small fraction of the nearly 5,000 mgd average net downstream flow of the St. Johns River at the site and will have no significant impact on the river.

12. The volume of water to be withdrawn from the two wells will average approximately 410 gpm. The evidence discloses that this small withdrawal of groundwater from the Floridan aquifer will not significantly affect the potentiometric levels for the Floridan aquifer, will not cause the water table aquifer to be lowered, will not significantly

affect lake stages or vegetation on lands beyond the site boundary, and should not cause any significant upconing or lateral migration of salt water.

13. Seminole and its consultants have studied various strategies for minimizing the effects of the operation of Units 1 and 2 on groundwaters. Those selected for implementation or further study are described in the amended application, the testimony of Seminole witnesses, and the conditions of certification. The projected effects on groundwater have been modeled and analyzed by Seminole and its consultants. The evidence developed from such studies shows that the operation of Units 1 and 2 as proposed subject to the attached conditions of certification will comply with the groundwater quality standards at the boundary of the zone of discharge both during the operation of Units 1 and 2 and after the closure of the plant. The evidence in the application, as amended, relating to the zone of discharge for groundwaters included consideration of physical, chemical, and hydrological characteristics of the receiving strata, methods of discharge, cumulative effect on all zones of discharge, the conditions and direction of flow of the receiving groundwater, other sources of pollutants, proximity of water supply facilities, the nature, volume, and frequency of the proposed discharge including synergistic effects, and geologic conditions in order to determine the effect on public

health, safety, and welfare, from which the Department of Environmental Regulation has concluded in Condition of Certification III F 1 that the boundary of the zone of discharge should coincide with the boundary of the site.

14. Seminole and its consultants have modeled and analyzed the projected effect of the air pollution control strategy proposed for Units 1 and 2. The evidence developed from such studies shows that the operation of Units 1 and 2 as proposed pursuant to the attached conditions of certification will comply with the state and federal standards for the prevention of significant deterioration of air quality and will meet all state and federal air emission limitations to the extent applicable to Units 1 and 2. In addition, the evidence demonstrates that the emission control strategy proposed by Seminole and its consultants utilizes the best available control technology as required by state and federal regulations.

15. During and at the conclusion of the site certification hearing, the public was given the opportunity to comment upon the application for site certification. Twenty-two members of the public offered testimony under oath. Twelve witnesses, representing United Paper Workers Local 598, IBEW Local 1583, the Putnam County Chamber of Commerce, the Putnam County Development Authority, the Putnam County Board of Realtors, IBEW Local 1205, the District School Board of

5

Putnam County, the Azalea City Kiwanis Club, the Plumbers and Pipefitters local union, the City of Palatka, and the Downtown Association of Palatka, and three individual witnesses testified in favor of certifying Seminole Units 1 and 2 as proposed. Six individual members of the public and one witness representing agricultural interests testified against site certification or raised questions about it. The principal areas of concern were water use and air impacts, but no competent substantial evidence that would support findings of fact contrary to Findings of Fact Numbers 11, 12, and 14 was introduced into evidence.

16. The Florida Department of Environmental Regulation, the Public Service Commission, the Division of State Planning, and Putnam County have all recommended certification of Units 1 and 2. The recommendation of the Department of Environmental Regulation is subject to the imposition of the conditions of certification which are attached.

17. Seminole will need to use, cross over or connect to properties or works of the following agencies:

State of Florida, Department of Natural Resources	Transmission lines over St. Johns River and easement for intake and discharge pipelines and structures in St. Johns River
Florida Department of Transportation	Transmission lines over state roads and driveway connection to State Road 15 (U.S. 17)

St. Johns River Water Management District	Transmission lines over St. Johns River and intake and discharge pipelines and structures in St. Johns River
Suwannee River Water Management District	Transmission lines over works of the District
Bradford County	Transmission lines over county roads
Clay County	Transmission lines over county roads
Columbia County	Transmission lines over county roads
Marion County	Transmission lines over county roads
Putnam County	Transmission lines over county roads
Suwannee County	Transmission lines over county roads
Union County	Transmission lines over county roads
City of Ocala	Transmission lines over city roads
City of Lake City	Transmission lines over city roads

18. The issuance of permits by the Florida Department of Transportation to allow Seminole to use, connect to, or cross over state roads has been resolved by stipulation and a condition of certification described herein.

19. The issuance of leases of bottomlands of the St. Johns River by the Department of Natural Resources to allow Seminole to place its intake and discharge pipelines and

structures within the area described in Seminole's Exhibit 18 and to allow Seminole to place transmission towers within the transmission corridor shown in the application has been resolved by stipulation [to be provided].

CONCLUSIONS OF LAW

20. This proceeding was held pursuant to the Florida Electrical Power Plant Siting Act, Chapter 403, Part II, Florida Statutes, and Chapter 17-17, Florida Administrative Code, to consider the subject application for site certification.

21. Notice, in accordance with Chapter 403 and Chapter 120, Florida Statutes, and Chapter 17-17, Florida Administrative Code, has been given to all persons and parties entitled thereto, as well as the general public.

22. The purpose of the site certification hearing was to receive testimony and evidence concerning whether the location and operation of the proposed facilities will produce minimal adverse effects on human health, the environment, the ecology of the land and its wildlife, and the ecology of state waters and their aquatic life, and to fully balance the increasing demand for electric power plant location and operation with the broad interests of the public, as provided in Chapter 403, Florida Statutes.

23. The record of this hearing consists of all pleadings and papers filed herein, including the site certification application, as amended, the transcripts of all hearings,

all orders entered by the Hearing Officer, and all evidence and exhibits properly admitted to the record.

24. Seminole has requested that certain agencies be made parties to this proceeding. The following agencies did not file notices of intent to become parties to the proceeding, thereby creating a presumption that they did not intend to participate:

a. State of Florida, Department of Natural Resources;

b. Suwannee River Water Management District;

c. Bradford County;

d. Suwannee County; and

e. City of Lake City.

The uncontroverted evidence shows, however, that Seminole will need to use, cross over, or connect to properties and works of such agencies. Accordingly, such agencies are parties to this proceeding pursuant to Sections 403.508(3)(e) and 403.509(2), Florida Statutes, and Section 17-17.11(2)(e), Florida Administrative Code.

25. Section 403.507(1)(a), Florida Statutes, provides that the Division of State Planning shall present a report as to the compatibility of the proposed electrical power plant with any state comprehensive plan. The Division of State Planning has made a report on Units 1 and 2 and its report and recommendations have been submitted and introduced

into evidence. The Division finds compatibility of Seminole Units 1 and 2 with the State Comprehensive Plan and recommends their certification.

26. Section 403.507(1)(b), Florida Statutes, requires that the Florida Public Service Commission shall prepare a report and recommendation as to the present and future needs for the electrical generating capacity to be supplied by the proposed electrical power plant and shall submit its findings to the Department of Environmental Regulation. Such a report and recommendations have been submitted and introduced into evidence. The Public Service Commission finds the need for additional electrical generating capacity and recommends the certification of proposed Units 1 and 2.

27. Section 17-17.04(5), Florida Administrative Code, requires the water management district in whose jurisdiction Units 1 and 2 are proposed to be located to prepare a report of its position of the impact of the proposed facilities on the water resources of the district. The St. Johns River Water Management District comments have been submitted and introduced into evidence. The final comments state that all substantive questions raised by St. Johns River Water Management District have been satisfactorily addressed through clarifications or amendments to the application.

28. Section 403.507(2), Florida Statutes, requires that the Department of Environmental Regulation conduct, or

contract for, studies of the proposed electrical power plant and site, including, but not limited to, (a) cooling system requirements, (b) construction and operational safeguards, (c) proximity to transportation systems, (d) soil and foundation conditions, (e) impact on suitable present and projected water supplies for this and other competing uses, (f) impact on surrounding land uses, (g) accessibility to transmission corridors, and (h) environmental impacts. Such a report and recommendations have been submitted and introduced into evidence. The Department of Environmental Regulation recommends certification of proposed Units 1 and 2, subject to the conditions of certification which are attached and have been accepted by Seminole.

29. The location and operation of proposed Units 1 and 2, as described by the evidence admitted to the record, if made subject to the conditions of certification attached, are expected to produce minimal adverse effects on human health, the environment, the ecology of land and its wildlife, and the ecology of state waters and their aquatic life.

30. The construction and operational safeguards for proposed Units 1 and 2 are technically sufficient for the welfare and protection of the citizens of Florida.

31. The certification of proposed Units 1 and 2 is consonant with the premise of abundant, low-cost electrical energy.

32. Proposed Units 1 and 2, if certified pursuant to the conditions of certification attached, will comply with the pertinent state and federal regulations concerning the prevention of significant deterioration of air quality (PSD), Section 17-2.04, Florida Administrative Code, and the application of the best available control technology (BACT), Section 17-2.03, Florida Administrative Code.

33. Certification of Units 1 and 2 will constitute permission for Seminole to use, connect to, and cross over the works and properties of the agencies described in Finding of Fact Number 17, subject to the following terms and conditions of certification:

a. Within 30 days of the entry of the Certification Order the Florida Department of Transportation (DOT) shall issue to Seminole a driveway permit for connection of a driveway to State Road 15 (U.S. 17) in accordance with DOT's Driveway Regulations Covering Private Entrances and Exits for State-Maintained Roads, Chapter 14-44.01, Florida Administrative Code.

b. DOT, Bradford County, Marion County, and Putnam County shall issue a permit for each transmission line crossing a state, county, or city road in their jurisdiction within the corridors identified in Appendix "M" to the Site Certification Application within 30 days of the submission of a completed

application for such transmission line crossing. Applications to the other counties, water management districts, and cities listed in Finding of Fact Number 17 are not required.

c. In the construction of directly associated transmission lines over roads, Seminole shall:

(1) Follow the DOT Utilities Accommodation Guide as of June 4, 1979, unless Seminole and DOT subsequently agree to the contrary.

(2) Make all crossings as nearly perpendicular to and place all towers as far from state, county, and city road rights-of-way as practicable in order to allow future widening and expansion.

(3) Not construct transmission lines across any state, county, or city bridge which is supported by pilings.

d. Within 30 days of the entry of the Certification Order the State of Florida shall issue to Seminole an easement in, upon, and across sovereignty land described as follows for construction and operation of its proposed pipeline and intake and discharge structures:

Commencing at a C.M. at the apparent S.W. corner of Government Lot 2 of Section 18, T-9-S, R-27-E; run then S 00°05'02"E, 1354.97 feet to the South R/W of S.R. 209, as now layed out and in use; thence S 89°39'25"W, 194.63 feet along the South R/W of S.R. 209 to a C.M.; thence S 00°51'00"E, 948.60 feet to a found Conc. Mon. on the waters

edge of the St. Johns River and the P.O.B. of the herein described easement; thence continue S 00°51'00"E, 347.60 feet from the P.O.B.; thence S 35°19'53"E, 611.07 feet; S 54°40'07"W, 50.00 feet; thence N 35°19'53"W, 487.17 feet; thence S 88°59'07"W, 224.70 feet; thence N 01°00'53"W, 400.00 feet to a found C.M. on the waters edge of the St. Johns River; thence Northeasterly along the St. Johns River, 212.06 feet to a found Conc. Mon. and the P.O.B. Containing 2.7 acres more or less.

Bearings based on the Florida State Plane Coordinate System East Zone. The above described land is subject to all easements, Rights-of-Way and Covenants of record.

[e. The State of Florida, Department of Natural Resources, shall issue an easement for a transmission line crossing the St. Johns River within the corridor identified in Appendix "M" to the Site Certification Application within 60 days of the submission of a completed application for such easement, subject to the following terms and conditions:

(1) The transmission lines and towers shall comply with all substantive standards contained in statutes and rules governing such easements.

(2) The transmission lines shall be parallel to and as close to the existing Florida Power & Light Company transmission line crossing as practicable.

(3) The towers shall be placed as far from the channel as practicable.]

34. Proposed Units 1 and 2, if certified pursuant to the conditions of certification attached, will comply with

the pertinent state and federal Effluent Guidelines and Standards for Steam Electric Power Generating Point Sources, Section 17-6.01(2), Florida Administrative Code.

35. Under the Florida water quality rules, a mixing zone of reasonable size is allowable so that the higher concentration of a substance within a wastewater discharge to a river can be diluted, within the mixing zone, to the lower concentration which the river itself is required to meet at and beyond the mixing zone boundary. The mixing zone size presumptively allowable under Section 17-4.244(1)(g), Florida Administrative Code, is 31 acres (125,600 square meters). The mixing zones established by the conditions of certification are within the dimensions allowable by that provision.

36. Under the Florida water quality rules, a thermal mixing zone of reasonable size is allowable so that the warmer temperatures of the wastewaters can be diluted, within the mixing zone, to the lower temperatures which the river itself is required to meet at and beyond the thermal mixing zone boundary. The thermal mixing zone established by the conditions of certification is well within the dimensions allowable under Section 17-3.05(1), Florida Administrative Code.

37. Under the Florida water quality rules, if the natural background of a substance within the river is

higher than the applicable water quality standard, the reduction of the higher concentration within the wastewater discharge to the lower concentration applicable to the river itself under the water quality standard must be accomplished prior to discharge. There is no practicable means known or available whereby the concentrations of cadmium, lead, mercury, and zinc within the cooling waters withdrawn from the river or within the wastewater discharged to the river can be eliminated or reduced, at the point of discharge, to the water quality standards applicable to the St. Johns River should the concentrations of those substances within the river again exceed water quality standards. The requested variance should, therefore, be granted under Sections 403.201 and 403.511(2), Florida Statutes, subject to the effluent limitations for those substances established by Condition of Certification II A 12 (a).

38. Section 17-6.10, Florida Administrative Code, provides for the establishment of effluent limitations which, if met at the point of discharge, are expected to assure that the water quality standards will be met at the boundaries of the applicable mixing zones. The effluent limitations established by the conditions of certification conform to that provision.

39. Under the Florida water quality rules, a zone of discharge is allowable so that a higher concentration of a

substance within a discharge to groundwater can be diluted, within the zone of discharge, to the water quality standards which the groundwaters are required to meet at and beyond the boundary of the zone of discharge. The zone of discharge established by the conditions of certification is within the limits allowable under Section 17-4.245, Florida Administrative Code.

RECOMMENDED ORDER

Having reviewed the record of this proceeding, and based upon the findings of fact and conclusions of law set forth herein, it is hereby recommended that certification, pursuant to Chapter 403, Part II, Florida Statutes, be granted to Seminole Electric Cooperative, Inc., for the construction and operation of Seminole's Plant Units 1 and 2, the associated facilities, and the directly associated transmission lines, as proposed in the amended application and evidence admitted to the record. It is further recommended that the certification include the terms and be made subject to the conditions of certification attached hereto and to those described in Conclusion of Law Number 33.

DONE and ORDERED this _____ day of _____, 1979, in Tallahassee, Florida.

CHRIS H. BENTLEY
Hearing Officer
Division of Administrative Hearings
101 Collins Building
Tallahassee, Florida 32304
(904) 488-9675

Section 9.3 CORRESPONDENCE

BOARD OF COUNTY COMMISSIONERS

St. Johns County, Florida

COUNTY COURTHOUSE
ST. AUGUSTINE, FLORIDA
Oldest City in the United States

OLIVER LAWTON, CLERK
POST OFFICE DRAWER 300
ST. AUGUSTINE, FLORIDA
32084

PHONE (904) 824-8131

RICHARD L. (DICK) PARKS, JR.
Post Office Drawer 187
St. Augustine, Fla. 32084
(District No. 1)

FRANCIS N. BRUBAKER
Route 1, Box 225
Elkton, Fla. 32033
(District No. 2)

CHESTER BENET
Post Office Box 255
St. Augustine, Fla. 32084
(District No. 3)

HARRY WALDRON
118 Colon Avenue
St. Augustine, Fla. 32084
(District No. 4)

ROBERT E. CURTAN
202 Oglethorpe Boulevard
St. Augustine, Fla. 32084
(District No. 5)

July 13, 1979

Ms. Mona Ellison
EPA Enforcement Division
345 Courtland Street N.E.
Atlanta, GA 30308

RE: Certification of Putnam Site
NPDES, FL0036498

Dear Ms. Ellison:

The Board of County Commissioners voted to have me write to our Governor's office and other agencies in order to request a delay in certifying the application of the Seminole Electric Cooperative of Tampa to build a coal burning plant in Putnam County, Florida.

We request from your agency a delay in federal certification until the questions on the effects of this plant on St. Johns agriculture, tourism, and restoration of the historical district can be ascertained. These subjects were not addressed by Seminole Electric Environmental Analysis. Less that 1% of the 8,000 page survey referred to possible impacts in St. Johns County and this plant is only five miles from the County line.

I am enclosing a copy of an article which appeared in The St. Augustine Record and will more fully explain our grave concern over the building of this plant.

Your cooperation in this matter will be much appreciated.

Sincerely yours,

Robert E. Curtan

Robert E. Curtan, Chairman
BOARD OF COUNTY COMMISSIONERS
OF ST. JOHNS COUNTY, FLORIDA

REC:mh
Enc.

WATER ENFORCEMENT
BRANCH
RECEIVED
JUL 18 1979
EPA-REGION IV
ATLANTA, GA

Campaign On To Delay Coal-Burning Plant

By JACKIE FEAGIN — News Editor

An eleventh-hour campaign has been launched here by Citizens for Clean Air, in an effort to convince state officials to delay site approval of a proposed coal-fired generating plant in neighboring Putnam County until full impact upon St. Johns County's environment, tourism and agriculture can be studied.

Site certification of the twin 600-megawatt generating plants Seminole Electric Cooperative of Tampa proposes to build on a 2,000-acre site at Bostwick — just across the river from St. Johns County — is expected to go before Gov. Bob Graham and the Florida Cabinet the first week in August.

Sandra Shuler, wife of local veterinarian Jack Schuler and secretary-treasurer of the citizens group, said distribution of petitions and literature the group has compiled about coal-burning plant is being made to civic groups, convenience stores, shopping centers and other locations.

TUESDAY, COUNTY COMMISSIONERS VOTED TO WRITE various agencies and officials, voicing concern about possible detrimental effects of the plant on St. Johns County and asking a delay in site approval.

Action came after Steve Miles, president of Citizens for Clean Air, appeared before the board, emphasizing that St. Johns Countians had been omitted from the public hearing process relative to plant location and that very little attention has been given to effects upon this county in an 8,000 page report made by Seminole relative to the plant.

Miles said the plant is one of six proposed in a line along the western bank of the St. Johns River and noted that the State of Florida has just given emminent domain status to a coal slurry pipeline, meaning property through which the proposed pipeline would run could be condemned and taken if owners are unwilling to sell.

THE PROPOSED PLANT DESIGN INCLUDES A 675-FOOT STACK and two 450-foot cooling towers, a 270-foot boiler building, two 100-foot tall ash silos, a 103-foot high turbine building, coal pile and other facilities, to be built on a grade elevation approximately 80 feet above sea level.

High stacks, Miles told commissioners Tuesday, have been designed to place pollutants into the prevailing wind blowing toward this county. Fears have been expressed by agricultural interests that fallout, instead of reaching the ocean, and acid rainfall may damage crops and forests here.

The citizens group says the massive study report states there will be "a slight increase in concentration (of air pollutants) at distances of about 40 to 50 kilometers (24 to 30 miles), in this case to the east of the site," meaning that air pollution will actually be greater in St. Augustine than at the site.

CONTRARY TO BELIEF THAT STATE OR FEDERAL CLEAN AIR standards will provide protection from pollutants, the citizens group points to a part of the study report in which it is stated that "...no national (or State of Florida) ambient standards for sulfates have been adopted." Sulfate compounds from coal-fired plants frequently result in sulfuric acid being formed and present in the rainfall, according to the group's literature. The group quotes another part of the study, stating "The extent to which emissions from the Seminole station would cause increased rainfall acidity cannot be accurately calculated."

Cited also by the group are study statements that "Emissions from the Seminole Station will probably have some effect in terms of plume (air column) discoloration and visibility impairment at distances remote from the Putnam site" and "As of now there are no federal or state air quality standards for trace elements or any national emission standards for hazardous air pollutants specific to coal-fired steam-electric generating stations."

Coal-fired plants release trace elements of mercury as vapor, cadmium, lead and zinc, the citizens group says.

Citizens for Clean Air urges that St. Johns Countians join and work with them, sign petitions asking for a delay in site approval, write local, state and national officials. They also are seeking contributions to the non-profit organization. Information is available from Miles, Mrs. Shuler and Margaret Lovejoy, the group's vice president.

St Augustine Record 7-12-79

RESPONSE TO ISSUES IDENTIFIED IN
"CAMPAIGN ON TO DELAY COAL-BURNING PLANT"
FROM THE ST. AUGUSTINE RECORD

The following discussion is in response to the four statements published in the editorial, "Campaign on to Delay Coal-Burning Plant" by Jackie Feagin from the St. Augustine Record. For convenience of review, the newspaper statement is reproduced and followed by the response.

1. Newspaper Statement:
High stacks, Miles told Commissioners Tuesday, have been designed to place pollutants into the prevailing wind blowing toward this county. Fears have been expressed by agricultural interests that fallout, instead of reaching the ocean, and acid rainfall may damage crops and forests here.

Response:
The tall stack has not been "designed" to place pollutants into the prevailing wind. First, wind measurements available for the area do not show the presence of a "prevailing" wind. U.S. Department of Commerce data indicate that winds from the southwest are more common in the spring and summer while winds from the northwest are more common in the fall. Overall, however, there is a fairly even wind distribution so that substances emitted from the Seminole plant will be carried away from St. Johns County about as often as they will be carried toward it. The design and use of a tall stack is to elevate the discharge above ground level to increase dispersion and thereby reduce concentrations of the combustion products at ground level.

Scientific understanding of what causes changes in rainfall acidity and what effects rainfall of increased acidity may have on contact with the earth is not conclusive. It is generally believed, however, that rainfall more acidic than normal is a regional phenomena attributable to a combination of many sources (including naturally occurring sources, industrial and power generating facilities and automobiles), distributed over a wide area rather than to any one single emission source. Furthermore, the acidity of rainfall is known to be due, not solely to sulfur compounds, but to naturally occurring and man-made substances such as carbon dioxide and compounds of nitrogen and chlorine.

Despite limited knowledge of the "acid rain" phenomena, its potential effects can be significantly reduced over the long term by controlling the production of oxides of sulfur and nitrogen. The Seminole plant has been designed to include efficient emissions controls and practices for these pollutants. The Federal Clean Air Act and related federal regulations require that new power

plants meet stringent emission limitations for sulfur dioxide and nitrogen dioxide and further reduce the amounts of these pollutants to the maximum degree by using Best Available Control Technology. Seminole has shown it can comply with these requirements. Consequently, compared to older coal-fired power plants of the same size, the Seminole plant will be a much cleaner operation.

2. Newspaper Statement:
The citizens' group says the massive study report states there will be "a slight increase in concentration (of air pollutants) at distances of about 40 to 50 kilometers (24 to 30 miles), in this case to the east of the site," meaning that air pollution will actually be greater in St. Augustine than at the site.

Response:
The statement quoted above has been taken out of context. The paragraph from which the statement was taken is included on page 5.1-4 of the "Site Certification Application and Environmental Analysis:"

> The pattern of annual concentrations, as is typical for tall stack sources, consists of almost no effect at close distance and a slight increase in concentrations at distances of about 40 to 50 km, in this case to the east of the site. However, the concentrations calculated are so low in relation to the accuracy of the model that the only firm conclusion which can be drawn regarding geographic distribution is that concentrations are estimated to be uniformly low for all directions and distances. (Emphasis added.)

3. Newpaper Statement:
Contrary to belief that State or Federal clean air standards will provide protection from pollutants, the citizens' group points to a part of the study report in which it is stated that "...no national (or State of Florida) ambient standards for sulfates have been adopted." Sulfate compounds from coal-fired plants frequently result in sulfuric acid being formed and present in the rainfall, according to the group's literature. The group quotes another part of the study, stating, "The extent to which emissions from the Seminole station would cause increased rainfall acidity cannot be accurately calculated."

Response:
National Ambient Air Quality Standards have been established to protect public health and public welfare. The Seminole plant has been designed to comply with these standards. As mentioned

previously, the operation of the plant should not result in any substantial increase in sulfate concentrations, in part because particular attention has been paid to the reduction of sulfur emissions. The reduction process will begin with coal washing at the mine and will end with the use of an advanced flue gas desulfurization system at the power plant which represents Best Available Control Technology. Additionally, sulfate concentrations at ground level are kept measureably low by complex reaction sequences, rapid diffusion and delayed reaction times. For example, a large percentage of the sulfur dioxide emitted is not converted to sulfuric acid, and a large portion of that which is converted reacts to form other compounds before reaching ground level or being absorbed by rainwater. Long reaction times further allow the plume to become diffuse, thereby reducing sulfate concentrations at ground level. As a result, even though there are no national ambient standards for sulfates and accurate projections of rainfall acidity cannot be made, these facts would not diminish the conclusion that the plant, as proposed, will be operated within limits protective of public health and public welfare.

4. Newspaper Statement:
Cited also by the group are study statements that "Emissions from the Seminole Station will probably have some effect in terms of plume (air column) discoloration and visibility impairment at distances remote from the Putnam site."

Response:
The paragraph on visibility impairment has been taken out of context. The following direct quote from the "Site Certification Application and Environmental Analysis," page 5.1-16, should restore integrity to the statement's meaning.

> Visibility impairment refers to the situation in which the outlines of a plume are no longer detectable but in which both the substances originally emitted and the secondary products resulting from atmospheric chemical conversions contribute to degradation of visibility when a viewer looks toward a remote object or the horizon. Although the primary particulate emissions resulting from coal combustion can have some effect on visibility impairment, the major effect results from the conversion of gaseous sulfur oxides to aerosol sulfates and the subsequent transport of these aerosols over large distances. Widely accepted methods of quantitatively analyzing the visibility impact of a single new emission source have not been established. Factors which complicate such an analysis in the eastern United States are the occurrence of high relative humidities and the existence of substantial

background aerosol concentrations resulting from both natural sources and sources related to human activities.

Aside from the great difficulty of accurately predicting and monitoring the formation, transport, and visibility impairment impact of secondary products caused by the emissions of a single source, no regulatory policies have been established to limit impairment. At the direction of Congress, as expressed through the Clean Air Act Amendments of 1977, in which the main concern is with visibility protection in PSD Class I areas, EPA now has underway a research program aimed at developing visibility impact assessment methods and recommending methods to prevent and control visibility impairment. The results of this ambitious tasks will not be available for general use until sometime in 1979.

Emissions from the Seminole Station will probably have some effect in terms of plume discoloration and visibility impairment at distances remote from the Putnam Site. However, any attempt to estimate the magnitude of these effects would be conjectural. The emissions control design features of the Seminole Station will serve as a definite mitigative measure to reduce visibility impacts. Sulfur oxides removal in particular will act to diminish the subsequent formation of aerosol sulfates which are considered to be key ingredients in the impairment of visual range.

5. Newspaper Statement:
As of now there are no federal federal or state air quality standards for trace elements or any national emission standards for hazardous air pollutants specific to coal-fired steam-electric generating stations. Coal-fired plants release trace elements of mercury as vapor, cadmium, lead and zinc, the citizens' group says.

Response:
The "Site Certification Application and Environmental Analysis" discusses trace element discharges on page 5.1-4:

Depending on the type of fuel being used, the atmospheric emissions of a coal-fired steam-electric generating station contain varying amounts and types of trace elements. Not all of the trace elements originally present in the coal are emitted. A sizable fraction of many elements will appear in the ash residue of the combustion process and will be subject to the removal

mechanisms applicable to the total ash formed, i.e., deposition as bottom ash and collection by particulate control equipment. Some elements, such as mercury, will vaporize in the combustion zone and can escape in a gaseous form; while others, such as cadmium, lead, and zinc, apparently vaporize and then preferentially adhere to very fine particles which are not collected with the same degree of efficiency as the bulk of the ash material (Klein and others, 1975).

The specific coal supply for the Seminole Station has not yet been determined and therefore it is not possible to estimate coal trace element composition or trace element emission rates. Even if more exact information were available, there would still be the difficulty of interpreting the significance of trace element emission releases. As of now there are no federal or State of Florida ambient air quality standards for trace elements or any National Emission Standards for Hazardous Air Pollutants (NESHAP) specific to coal-fired steam-electric generating stations.

Ground-level concentrations of trace elements resulting from fuel combustion are typically very low, well below the industrial hygiene standards which have been established to control occupational exposure to trace elements. Although occupational standards are established on a different basis and directed toward a somewhat different population than are ambient standares, achieving compliance with occupational standards by a wide margin would indicate that adverse health effects attributable to trace element emissions will be avoided.

RESPONSE TO ISSUES IDENTIFIED IN
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FROM THE ST. AUGUSTINE RECORD

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previously, the operation of the plant should not result in any substantial increase in sulfate concentrations, in part because particular attention has been paid to the reduction of sulfur emissions. The reduction process will begin with coal washing at the mine and will end with the use of an advanced flue gas desulfurization system at the power plant which represents Best Available Control Technology. Additionally, sulfate concentrations at ground level are kept measureably low by complex reaction sequences, rapid diffusion and delayed reaction times. For example, a large percentage of the sulfur dioxide emitted is not converted to sulfuric acid, and a large portion of that which is converted reacts to form other compounds before reaching ground level or being absorbed by rainwater. Long reaction times further allow the plume to become diffuse, thereby reducing sulfate concentrations at ground level. As a result, even though there are no national ambient standards for sulfates and accurate projections of rainfall acidity cannot be made, these facts would not diminish the conclusion that the plant, as proposed, will be operated within limits protective of public health and public welfare.

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mechanisms applicable to the total ash formed, i.e., deposition as bottom ash and collection by particulate control equipment. Some elements, such as mercury, will vaporize in the combustion zone and can escape in a gaseous form; while others, such as cadmium, lead, and zinc, apparently vaporize and then preferentially adhere to very fine particles which are not collected with the same degree of efficiency as the bulk of the ash material (Klein and others, 1975).

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UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
P. O. Box 520, Palatka, Florida 32077

February 26, 1979

Mr. Marvin Smith, Staff Geographer
Dames & Moore, Consultants
Suite 200, 455 East Paces Ferry Road
Atlanta, Georgia, 30305

Dear Sir:

We have made an intensive soil survey of the property acquired by Seminole Electric Cooperative, Inc. in Putnam County, Florida.

There is no prime agricultural land within the boundaries delineated.

Respectfully yours,

Joseph M. Davenport
District Conservationist

DEPARTMENT OF THE ARMY
JACKSONVILLE DISTRICT, CORPS OF ENGINEERS
P. O. BOX 4970
JACKSONVILLE, FLORIDA 32201

REC'D JUN 26 1978

SAJOD-RP

22 June 1978

FILE IDENTIFIER	SUBJECT
A	173-E.1

Mr. David L. Lester
Environmental Engineer
Seminole Electric Cooperative Inc.
Suite 108
2410 East Busch Blvd.
Tampa, Florida 33612

Dear Mr. Lester:

This letter is in followup to our trip to the site contemplated by Seminole Electric Cooperative Inc., for an electric generating station south of Bostwick, Florida, near the St. Johns River just north of the intersection of the St. Johns River and Rice Creek.

The purpose of this letter is to let you know of our determination of the need for a Department of the Army permit for the work you contemplate.

The wetland areas found on the north end of the property are an isolated wetlands not connected to navigable waters by a surface tributary system and we have determined that the degradation of that area would not adversely impact on interstate commerce. Therefore, they are not subject to the Corps of Engineers jurisdiction pursuant to Section 404 of the Federal Water Pollution Control Act Amendments of 1972 since they are not wetlands which fall under the category of waters of the United States. Therefore, a Department of the Army permit would not be required for placing fill in that wetland area.

The connection of the intake and discharge structures to the St. Johns River will require a Department of the Army permit since we have made an administrative determination that the St. Johns River is a navigable water of the United States, in that reach. Thus, any work in that area would be subject to a permit pursuant to Section 10 of the River and Harbor Act of 1899, and, in addition, the placement of any fill in the river would also be subject to a permit pursuant to Section 404 of the Federal Water Pollution Control Act Amendments of 1972 (Public Law 92-500).

SAJOD-RP
Mr. David L. Lester

22 June 1978

If you have any questions regarding the content of this letter, please do not hesitate to contact us.

Sincerely yours,

Gail G. Gren

GAIL G. GREN
Chief, Operations Division

STATE OF FLORIDA

Department of State

THE CAPITOL
TALLAHASSEE 32304

OCT 1978

DAMES & MOORE
1038/111-002 (2.5.1)

[redacted]
SECRETARY OF STATE
JESSE J. McCRARY, JR.

October 23, 1978

L. ROSS MORRELL, ACTING DIRECTOR
DIVISION OF ARCHIVES, HISTORY, AND
RECORDS MANAGEMENT
(904) 488-1480

IN REPLY REFER TO:

Mr. Louis Tesar
Historic Sites Specialist
(904) 487-2333

Mr. Tim Doyle
Dames and Moore
455 East Paces Ferry Road
Suite 200
Atlanta, Georgia 30305

Re: Cultural Resource Assessment of
Seminole Electric Cooperative
Proposed Generating Facility
Putnam County, Florida

Dear Sir:

In accordance with the procedures contained in 36 C.F.R., Part 800 ("Procedures for the Protection of Historic and Cultural Properties"), we have reviewed the above referenced project for possible impact to archaeological and historical sites or properties listed, or eligible for listing, in the National Register of Historic Places. The authorities for these procedures are the National Historic Preservation Act of 1966 (Public Law 89-665) as amended by P.L. 91-243, P.L. 93-54, P.L. 94-422, and P.L. 94-458, and Presidential Executive Order 11593 ("Protection and Enhancement of the Cultural Environment").

We have reviewed the Florida Master Site File and the results of the recent archaeological and historical survey of the project area by Cultural Resource Management, Inc. Two previously unrecorded prehistoric shell midden sites were found on the St. Johns River in the general area of outfall corridor B, Fryman, Griffin and Miller (1978) report:

> These sites contain intact stratigraphy and, being likely to yield information important in prehistory, must be considered eligible for inclusion in the National Register of Historic Places. Avoidance of impact is recommended by rejection of alternate corridor B.

No other archaeological or historical sites are recorded for the proposed project area. Therefore, it is our opinion that if alternate corridor B is not utilized, then no archaeological or historical sites listed, or eligible for listing, on the National Register of Historic Places, or otherwise of national, state or local significance, and the project may proceed without further involvement with this agency. If alternate corridor B is utilized, it is our recommendation that two identified sites be mitigated through archaeological salvage excavation by a professionally competent agency.

If you have any questions about our comments, or about federal historic preservation regulations, please feel free to contact us.

Your interest and cooperation in preserving Florida's historic resources are appreciated.

Sincerely,

L. Ross Morrell,
Deputy State Historic
Preservation Officer

LRM:Teh

cc: James J. Miller

Secretary of State
STATE OF FLORIDA
THE CAPITOL
TALLAHASSEE 32304
(904) 488-3680

GEORGE FIRESTONE
SECRETARY OF STATE

June 21, 1979

In reply refer to:

Mr. John Scarry
Historic Sites Specialist
(904) 487-2333

Mr. R. W. Clausen
Director of Engineering
Seminole Electric Cooperative, Inc.
Suite 108
2410 E. Busch Boulevard
Tampa, Florida 33612

RECEIVED
JUL 1 8 1979
ARTA-ELECTRIC

Re: Transmission Corridors Associated With the Proposed Seminole Electric Cooperative Generating Facility, Putnam County

Dear Mr. Clausen:

As requested in your letter of June 14, 1979, we have reviewed the above referenced project for possible impact to archaeological and historical resources. This review is in accordance with the National Historic Preservation Act of 1966 (Public Law 89-665) and Executive Order 11593, as they are implemented by 36 C.F.R., Part 800.

These corridors were inadvertently omitted from our earlier review of the entire project. We regret any inconvenience which this may have caused.

A review of the Florida Master Site File indicates that no recorded sites listed, or eligible for listing, in the National Register of Historic Places are contained within the above referenced project area. However, the areas have not been surveyed for such resources, so the lack of recorded sites is not considered significant. Furthermore, environmentally similar areas which have been surveyed have been found to contain a high density of prehistoric archaeological sites. Therefore, it is the recommendation of this office that, prior to any construction activity, all areas to be impacted be professionally surveyed for archaeological and historical sites.

Sincerely,

L. Ross Morrell,
Deputy State Historic
Preservation Officer

REC'D JUN 28 1979

United States Department of the Interior
FISH AND WILDLIFE SERVICE
P. O. BOX 95067
ATLANTA, GEORGIA 30347

Mr. Kenneth Kumor
Environmental Services Branch, EERD
Rural Electrification Administration
14th and Independence Avenue, S.W.
South Building
Washington, D.C. 20250

Dear Mr. Kumor:

This acknowledges Mr. Broyles' letter of January 11, 1979, requesting consultation relative to potential effects to endangered species from the proposed construction and operation of two 600 MW coal-fired electric generating units and related facilities at three sites in Florida.

Section 7(c) of the 1978 amendments to the Endangered Species Act (attached) requires Federal agencies requesting consultation to obtain from the Fish and Wildlife Service information as to whether any species which is listed or proposed to be listed may be present in the area of the proposed action. It is the responsibility of the agency to determine if those species are likely to be affected in the area influenced by the proposed action. We believe the following species may be present in the area of proposed action: the Florida manatee (*Trichechus manatus*) and red-cockaded woodpecker (*Picoides borealis*) (Putnam County only), the eastern indigo snake (*Drymarchon corais couperi*), the bald eagle (*Haliaeetus leucocephalus*), the American alligator (*Alligator mississippiensis*) (threatened), and possibly the ivory-billed woodpecker (*Campephilus principalis*) and Florida panther (*Felis concolor coryi*).

Section 7(c) also requires agencies to provide a biological assessment which identifies the species which are likely to be affected. The biological assessment shall be completed within 180 days after the date on which initiated, before any contracts for construction are entered into, and before construction is begun. Consultation cannot begin until we have received the assessment.

This means that it is very unlikely that the consultation will be concluded by the March 1, 1979, date mentioned in your letter. Consultation will be completed 90 days from the date that we receive the biological assessment, or sooner. We do not feel that we can

adequately assess the effects of the proposed action on listed species or Critical Habitat without a complete assessment, which should include at a minimum the following information:

1. Identification of the listed species and any Critical Habitat determined to be present in the area influenced by construction.

2. A description of the proposed activities.

3. A description of the potential impacts of the construction or associated activities on the listed species or Critical Habitat.

4. Where impact is identified to listed species or Critical Habitat, a discussion of the efforts that will be taken to eliminate any adverse effects.

The Fish and Wildlife Service representatives who will provide you with technical assistance during this biological assessment period are Mr. Dave Peterson or Dr. James Baker, Endangered Species Specialists, 900 San Marco Boulevard, Jacksonville, Florida 32207, telephone FTS 946-2267, commercial 904/791-2267.

Also, we would like to call to your attention Section 7(d) of the recently amended Endangered Species Act which underscores the requirement that a Federal agency shall not make any irreversible or irretrievable commitment of resources which in effect would deny the formulation or implementation of reasonable alternatives regarding the impact of their actions on any endangered or threatened species.

We look forward to this consultation toward preserving the endangered species, and we thank you for your interest in the program.

Sincerely yours,

Kenneth E. Black

Regional Director

Attachment

Section 7 of the
Endangered Species Act as amended 1978

"INTERAGENCY COOPERATION

"SEC. 7. (a) CONSULTATION.—The Secretary shall review other programs administered by him and utilize such programs in furtherance of the purposes of this Act. All other Federal agencies shall, in consultation with and with the assistance of the Secretary, utilize their authorities in furtherance of the purposes of this Act by carrying out programs for the conservation of endangered species and threatened species listed pursuant to section 4 of this Act. Each Federal agency shall, in consultation with and with the assistance of the Secretary, insure that any action authorized, funded, or carried out by such agency (hereinafter in this section referred to as an 'agency action') does not jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of habitat of such species which is determined by the Secretary, after consultation as appropriate with the affected States, to be critical, unless such agency has been granted an exemption for such action by the Committee pursuant to subsection (h) of this section.

"(b) SECRETARY'S OPINION.—Consultation under subsection (a) with respect to any agency action shall be concluded within 90 days after the date on which initiated or within such other period of time as is mutually agreeable to the Federal agency and the Secretary. Promptly after the conclusion of consultation, the Secretary shall provide to the Federal agency concerned a written statement setting forth the Secretary's opinion, and a summary of the information on which the opinion is based, detailing how the agency action affects the species or its critical habitat. The Secretary shall suggest those reasonable and

prudent alternatives which he believes would avoid jeopardizing the continued existence of any endangered or threatened species or adversely modifying the critical habitat of such species, and which can be taken by the Federal agency or the permit or license applicant in implementing the agency action.

"(c) BIOLOGICAL ASSESSMENT.—To facilitate compliance with the requirements of subsection (a), each Federal agency shall, with respect to any agency action of such agency for which no contract for construction has been entered into and for which no construction has begun on the date of enactment of the Endangered Species Act Amendments of 1978, request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action. If the Secretary advises, based on the best scientific and commercial data available, that such species may be present, such agency shall conduct a biological assessment for the purpose of identifying any endangered species or threatened species which is likely to be affected by such action. Such assessment shall be completed within 180 days after the date on which initiated (or within such other period as is mutually agreed to by the Secretary and such agency) and, before any contract for construction is entered into and before construction is begun with respect to such action. Such assessment may be undertaken as part of a Federal agency's compliance with the requirements of section 102 of the National Environmental Policy Act of 1969 (42 U.S.C. 4332).

"(d) LIMITATION ON COMMITMENT OF RESOURCES.—After initiation of consultation required under subsection (a), the Federal agency and the permit or license applicant shall not make any irreversible or irretrievable commitment of resources with respect to the agency action which has the effect of foreclosing the formulation or implementation of any reasonable and prudent alternative measures which would avoid jeopardizing the continued existence of any endangered or threatened species or adversely modifying or destroying the critical habitat of any such species.

"(e)(1) ESTABLISHMENT OF COMMITTEE.—There is established a committee to be known as the Endangered Species Committee (hereinafter in this section referred to as the 'Committee').

"(2) The Committee shall review any application submitted to it pursuant to this section and determine in accordance with subsection (h) of this section whether or not to grant an exemption from the requirements of subsection (a) of this section for the action set forth in such application.

"(3) The Committee shall be composed of seven members as follows:

"(A) The Secretary of Agriculture.

"(B) The Secretary of the Army.

"(C) The Chairman of the Council of Economic Advisors.

"(D) The Administrator of the Environmental Protection Agency.

"(E) The Secretary of the Interior.

"(F) The Administrator of the National Oceanic and Atmospheric Administration.

"(G) The President, after consideration of any recommendations received pursuant to subsection (g)(2)(B) shall appoint one individual from each affected State, as determined by the Secretary, to be a member of the Committee for the consideration of the

application for exemption for an agency action with respect to which such recommendations are made, not later than 30 days after an application is submitted pursuant to this section.

"(4)(A) Members of the Committee shall receive no additional pay on account of their service on the Committee.

"(B) While away from their homes or regular places of business in the performance of services for the Committee, members of the Committee shall be allowed travel expenses, including per diem in lieu of subsistence, in the same manner as persons employed intermittently in the Government service are allowed expenses under section 5703 of title 5 of the United States Code.

"(5)(A) Five members of the Committee or their representatives shall constitute a quorum for the transaction of any function of the Committee, except that, in no case shall any representative be considered in determining the existence of a quorum for the transaction of any function of the Committee if that function involves a vote by the Committee on any matter before the Committee.

"(B) The Secretary of the Interior shall be the Chairman of the Committee.

"(C) The Committee shall meet at the call of the Chairman or five of its members.

"(D) All meetings and records of the Committee shall be open to the public.

"(6) Upon request of the Committee, the head of any Federal agency is authorized to detail, on a nonreimbursable basis, any of the personnel of such agency to the Committee to assist it in carrying out its duties under this section.

"(7)(A) The Committee may for the purpose of carrying out its duties under this section hold such hearings, sit and act at such times and places, take such testimony, and receive such evidence, as the Committee deems advisable.

"(B) When so authorized by the Committee, any member or agent of the Committee may take any action which the Committee is authorized to take by this paragraph.

"(C) Subject to the Privacy Act, the Committee may secure directly from any Federal agency information necessary to enable it to carry out its duties under this section. Upon request of the Chairman of the Committee, the head of such Federal agency shall furnish such information to the Committee.

"(D) The Committee may use the United States mails in the same manner and upon the same conditions as a Federal agency.

"(E) The Administrator of General Services shall provide to the Committee on a reimbursable basis such administrative support services as the Committee may request.

"(8) In carrying out its duties under this section, the Committee may promulgate and amend such rules, regulations, and procedures, and issue and amend such orders as it deems necessary.

"(9) For the purpose of obtaining information necessary for the consideration of an application for an exemption under this section the Committee may issue subpenas for the attendance and testimony of witnesses and the production of relevant papers, books, and documents.

"(10) Except in the case of a member designated pursuant to paragraph (3)(G) of this subsection, no member shall designate any

person to serve as his or her representative unless that person is, at the time of such designation, holding a Federal office the appointment to which is subject to the advice and consent of the United States Senate. In no case shall any representative, including a representative of a member designated pursuant to paragraph (3)(G) of this subsection, be eligible to cast a vote on behalf of any member.

"(f) REGULATIONS.—Not later than 90 days after the date of enactment of the Endangered Species Act Amendments of 1978, the Secretary shall promulgate regulations which set forth the form and manner in which applications for exemption shall be submitted to the Secretary and the information to be contained in such applications. Such regulations shall require that information submitted in an application by the head of any Federal agency with respect to any agency action include, but not be limited to—

"(1) a description of the consultation process carried out pursuant to subsection (a) of this section between the head of the Federal agency and the Secretary; and

"(2) a statement describing why such action cannot be altered or modified to conform with the requirements of subsection (a) of this section.

"(g) APPLICATION FOR EXEMPTION AND CONSIDERATION BY REVIEW BOARD.—(1) A Federal agency, the Governor of the State in which an agency action will occur, if any, or a permit or license applicant may apply to the Secretary for an exemption for an agency action of such agency if, after consultation under subsection (a), the Secretary's opinion under subsection (b) indicates that the agency action may jeopardize the continued existence of any endangered or threatened species or destroy or adversely modify the critical habitat of such species. An application for an exemption shall be considered initially by a review board in the manner provided in this subsection, and shall be considered by the Endangered Species Committee for a final determination under subsection (h) after a report is made by the review board. The applicant for an exemption shall be referred to as the 'exemption applicant' in this section.

"(2)(A) An exemption applicant shall submit a written application to the Secretary, in a form prescribed under subsection (f) of this section, not later than 90 days after the completion of the consultation process. Such application shall set forth the reasons why the exemption applicant considers that the agency action meets the requirements for an exemption under this subsection.

"(B) Upon receipt of an application for exemption for an agency action under paragraph (1), the Secretary shall promptly notify the Governor of each affected State, if any, as determined by the Secretary, and request the Governors so notified to recommend individuals to be appointed to the review board to be established under paragraph (3) and to the Endangered Species Committee for consideration of such application.

"(3)(A) A review board shall be established for purposes of considering an application for exemption and submitting a report to the Endangered Species Committee under this subsection as follows:

"(i) One individual shall be appointed to the board by the Secretary not later than 15 days after an application is submitted pursuant to paragraph (2).

"(ii) One individual shall be appointed to the board by the President, not later than 30 days after an application is sub-

mitted pursuant to paragraph (2) and after consideration of any recommendations received pursuant to paragraph (2)(B). An individual appointed by the President under this subparagraph shall be a resident of a State, if any, in which the agency action will be, or is being, carried out.

"(iii) One administrative law judge shall be selected to serve on the board by the Civil Service Commission in the same manner as administrative law judges are selected under section 3344 of title 5 of the United States Code to be detailed to an agency which occasionally or temporarily is insufficiently staffed with administrative law judges. The use by the review board of such an administrative law judge shall be on a reimbursable basis.

"(B) Members of a review board who are full-time officers or employees of the United States shall receive no additional pay on account of their service on the board. All other members shall be entitled to receive an amount not to exceed the daily equivalent of the annual rate of basic pay in effect for grade GS-18 of the General Schedule for each day during which they are engaged in the actual performance of duties vested in the board. While away from their homes or regular places of business in the performance of services for a review board, members of the board shall be allowed travel expenses, including per diem in lieu of subsistence, in the same manner as persons employed intermittently in the Government service are allowed expenses under section 5703 of title 5 of the United States Code.

"(4) The Secretary shall submit the application to the review board immediately after its appointment under paragraph (3), and the Secretary shall submit to the review board, in writing, his views and recommendations with respect to the application within 60 days after receiving a copy of any application under paragraph (2).

"(5) It shall be the duty of a review board appointed under paragraph (3) to make a full review of the consultation carried out under subsection (a), and within 60 days after its appointment or within such longer time as is mutually agreed upon between the exemption applicant and the Secretary, to make a determination, by a majority vote, (1) whether an irresolvable conflict exists and (2) whether such exemption applicant has—

"(A) carried out its consultation responsibilities as described in subsection (a) in good faith and made a reasonable and responsible effort to develop and fairly consider modifications or reasonable and prudent alternatives to the proposed agency action which will avoid jeopardizing the continued existence of an endangered or threatened species or result in the adverse modification or destruction of a critical habitat;

"(B) conducted any biological assessment required of it by subsection (c); and

"(C) refrained from making any irreversible or irretrievable commitment of resources prohibited by subsection (d).

Any determination by the review board that an irresolvable conflict does not exist or that the exemption applicant has not met the requirements of subparagraph (A), (B), or (C) shall be considered final agency action for purposes of chapter 7 of title 5 of the United States Code.

"(6) If the review board determines that an irresolvable conflict exists and makes positive determinations under subparagraphs (A), (B), and (C) of paragraph (5), it shall proceed to prepare the report to be submitted under paragraph (7).

"(7) Within 180 days after making the determinations under paragraph (6), the review board shall submit to the Committee a report discussing—

"(A) the availability of reasonable and prudent alternatives to the agency action, and the nature and extent of the benefits of the agency action and of alternative courses of action consistent with conserving the species or the critical habitat;

"(B) a summary of the evidence concerning whether or not the agency action is in the public interest and is of national or regional significance;

"(C) appropriate reasonable mitigation and enhancement measures which should be considered by the Committee.

"(8) To the extent practicable within the time required for action under subsection (g) of this section, and except to the extent inconsistent with the requirements of this section, the consideration of any application for an exemption under this section and the conduct of any hearing under this subsection shall be in accordance with sections 554, 555, and 556 (other than subsection (b)(3) of section 556) of title 5, United States Code.

"(9) In carrying out its duties under this subsection, a review board may, and any member of a review board if so authorized by the review board, may—

"(A) sit and act at such times and places, take such testimony, and receive such evidence, as the review board deems advisable;

"(B) subject to the Privacy Act of 1974, request of any Federal agency or applicant information necessary to enable it to carry out such duties, and upon such request the head of such Federal agency shall furnish such information to the review board; and

"(C) use the United States mails in the same manner and upon the same conditions as a Federal agency.

"(10) Upon request of a review board, the head of any Federal agency is authorized to detail, on a nonreimbursable basis, any of the personnel of such agency to the review board to assist it in carry out its duties under this section.

"(11) The Administrator of the General Services Administration shall provide to a review board, on a reimbursable basis, such administrative support services as the review board may request.

"(12) All meetings and records of review boards shall be open to the public.

"(h) EXEMPTION.—(1) The Committee shall make a final determination whether or not to grant an exemption within 90 days of receiving the report of the review board under subsection (g)(7). The Committee shall grant an exemption from the requirements of subsection (a) for an agency action if, by a vote of not less than five of its members voting in person—

"(A) it determines on the record, based on the report of the review board and on such other testimony or evidence as it may receive, that—

"(i) there are no reasonable and prudent alternatives to the agency action;

"(ii) the benefits of such action clearly outweigh the benefits of alternative courses of action consistent with conserving the species or its critical habitat, and such action is in the public interest; and

"(iii) the action is of regional or national significance; and

"(B) it establishes such reasonable mitigation and enhancement measures, including, but not limited to, live propagation, transplantation, and habitat acquisition and improvement, as are necessary and appropriate to minimize the adverse effects of the agency action upon the endangered species, threatened species, or critical habitat concerned.

Any final determination by the Committee under this subsection shall be considered final agency action for purposes of chapter 7 of title 5 of the United States Code.

"(2)(A) Except as provided in subparagraph (B), an exemption for an agency action granted under subsection (h) shall constitute a permanent exemption with respect to all endangered or threatened species for the purposes of completing such agency action: *Provided*, That a biological assessment has been conducted under subsection (c).

"(B) An exemption shall not be permanent under subparagraph (A) if the Secretary finds, based on the best scientific and commercial data available, that such exemption would result in the extinction of the species. If the Secretary so finds, the Committee shall determine within 30 days after such finding whether to grant an exemption for the agency action notwithstanding the Secretary's finding.

"(i) REVIEW BY SECRETARY OF STATE.—Notwithstanding any other provision of this Act, the Committee shall be prohibited from considering for exemption any application made to it, if the Secretary of State, after a review of the proposed agency action and its potential implications, and after hearing, certifies, in writing, to the Committee within 60 days of any application made under this section that the granting of any such exemption and the carrying out of such action would be in violation of an international treaty obligation or other international obligation of the United States. The Secretary of State shall, at the time of such certification, publish a copy thereof in the Federal Register.

"(j) Notwithstanding any other provision of this Act, the Committee shall grant an exemption for any agency action if the Secretary of Defense finds that such exemption is necessary for reasons of national security.

"(k) SPECIAL PROVISIONS.—An exemption decision by the Committee under this section shall not be a major Federal action for purposes of the National Environmental Policy Act of 1969 (42 U.S.C. 4321 et seq.): *Provided*, That an environmental impact statement which discusses the impacts upon endangered species or threatened species or their critical habitats shall have been previously prepared with respect to any agency action exempted by such order.

"(l) COMMITTEE ORDERS.—(1) If the Committee determines under subsection (h) that an exemption should be granted with respect to any agency action, the Committee shall issue an order granting the exemption and specifying the mitigation and enhancement measures established pursuant to subsection (h) which shall be carried out and paid for by the exemption applicant in implementing the agency

action. All necessary mitigation and enhancement measures shall be authorized prior to the implementing of the agency action and funded concurrently with all other project features.

"(2) The applicant receiving such exemption shall include the costs of such mitigation and enhancement measures within the overall costs of continuing the proposed action. Notwithstanding the preceding sentence the costs of such measures shall not be treated as project costs for the purpose of computing benefit-cost or other ratios for the proposed action. Any applicant may request the Secretary to carry out such mitigation and enhancement measures. The costs incurred by the Secretary in carrying out any such measures shall be paid by the applicant receiving the exemption. No later than one year after the granting of an exemption, the exemption applicant shall submit to the Council on Environmental Quality a report describing its compliance with the mitigation and enhancement measures prescribed by this section. Such a report shall be submitted annually until all such mitigation and enhancement measures have been completed. Notice of the public availability of such reports shall be published in the Federal Register by the Council on Environmental Quality.

"(m) NOTICE.—The 60-day notice requirement of section 11(g) of this Act shall not apply with respect to review of any final determination of the Committee under subsection (h) of this section granting an exemption from the requirements of subsection (a) of this section.

"(n) JUDICIAL REVIEW.—Any person, as defined by section 3(13) of this Act, may obtain judicial review, under chapter 7 of title 5 of the United States Code, of any decision of the Endangered Species Committee under subsection (h) in the United States Court of Appeals for (1) any circuit wherein the agency action concerned will be, or is being, carried out, or (2) in any case in which the agency action will be, or is being, carried out outside of any circuit, the District of Columbia, by filing in such court within 90 days after the date of issuance of the decision, a written petition for review. A copy of such petition shall be transmitted by the clerk of the court to the Committee and the Committee shall file in the court the record in the proceeding, as provided in section 2112, of title 28, United States Code. Attorneys designated by the Endangered Species Committee may appear for, and represent the Committee in any action for review under this subsection.

"(o) EXCEPTION ON TAKING.—Notwithstanding sections 4(d) and 9(a) of this Act or any regulations promulgated pursuant to such sections, any action for which an exemption is granted under subsection (h) of this section shall not be considered a taking of any endangered or threatened species with respect to any activity which is necessary to carry out such action.

"(p) EXEMPTIONS IN PRESIDENTIALLY DECLARED DISASTER AREAS.—In any area which has been declared by the President to be a major disaster area under the Disaster Relief Act of 1974, the President is authorized to make the determinations required by subsections (g) and (h) of this section for any project for the repair or replacement of a public facility substantially as it existed prior to the disaster under section 401 or 402 of the Disaster Relief Act of 1974, and which the President determines (1) is necessary to prevent the recurrence of such a natural disaster and to reduce the potential loss of human life, and (2) to involve an emergency situation which does not allow the ordinary procedures of this section to be followed. Notwithstanding

any other provision of this section, the Committee shall accept the determinations of the President under this subsection.

"(q) AUTHORIZATION.—There is authorized to be appropriated to the Secretary to assist review boards and the Committee in carrying out their functions under subsections (e), (f), (g), and (h) of this section not to exceed $600,000 for fiscal year 1979, and not to exceed $300,000 for the period beginning October 1, 1979, and ending March 31, 1980. The Chairman of the Committee shall report to the Congress before the end of fiscal year 1979 with respect to the adequacy of the budget authority contained in this subsection.".

Florida 41 Seminole
Putnam 1 and 2

MAR 22 1979

Regional Director
U.S. Fish and Wildlife Service
17 Executive Park Drive, N.E.
Union Garbide Building
Atlanta, Georgia 30329

In response to your letter of January 29, 1979, we have reviewed the listed species (or those proposed for listing) you identified as likely to be influenced by the proposed Seminole Electric Cooperative, Inc., power generating station in Putnam County, Florida. Specifically these included: the Florida manatee (Trichechus manatus), red-cockaded woodpecker (Picoides borealis Putnam County only), the eastern indigo snake (Drymarchon corais couperi), the bald eagle (Haliaeetus leaucocephalus), the American alligator (Alligator mississippiensis), and possibly the ivory-billed woodpecker (Campephilus principalis) and the Florida panther (Felis concolor coryi).

We have concluded pursuant to Section 7(c) of the Endangered Species Act, as amended, that the proposed project will not jeopardize the continued existence of these species nor result in adverse modification or destruction of critical habitat.

We have based our conclusions on the biological assessment provided in the document entitled: Site Certification Application and Environmental Analysis, Seminole Plant Units No. 1 and No. 2. prepared by Dames and Moore, environmental consultants. A copy of this document was conveyed to the staff of the U.S. Fish and Wildlife Service Area Office, Jacksonville, Florida, on January 4, 1979.

As further requested by your letter, the Dames and Moore document contains information on (1) identification of listed species and critical habitat; (2) a description of the proposed activities; (3) a description of the potential impacts of the construction or associated activities on the listed species or critical habitat; and (4) a discussion, as warranted, of mitigative measures that will be taken to eliminate any adverse effects.

In particular, this information can be found in the following sections of the Site Certification Application and Environmental Analysis:

Chapter 3.0	Station Facilities
Section 2.7.1.6	Endangered species and Biologically Sensitive Areas (Terrestrial Ecology)
Section 2.7.2.4	Endangered Species (Aquatic Ecology)
Section 4.3.2	Impacts on Terrestrial Ecology
Section 4.4	Dredging Impacts
Section 5.2.1	Effects of Intake Structure Location, Design and Capacity
Section 5.8	Mitigative Measures
Section 10.5	Environment Overview of Preferred Corridors

Finally, we have recently been advised that the Site Certification Application and Environmental Analysis has been reviewed by the Endangered Species Specialist at Jacksonville, Florida, and that after informal consultation with representatives of Seminole Electric Cooperative, Inc., and Dames and Moore, he has found the information contained therein to be adequate and accurate and, consequently, concludes that the proposed project will not jeopardize the continued existence of the species listed above, or result in the adverse modification or destruction of critical habitat.

We certainly appreciate the manner in which your staff has worked closely with us throughout this consultation process.

Copies of this letter are being sent to Messrs. Kenneth Prest, Jr., Environmental Licensing Group, Inc., Timothy Doyle, Dames and Moore, Robert Claussen, Seminole Electric Cooperative, Inc., and David Peters U.S. Fish and Wildlife Service.

William R. Dalton

WILLIAM R. DALTON
Director
Southeast Area - Electric

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

United States Department of the Interior
FISH AND WILDLIFE SERVICE
P. O. BOX 95067
ATLANTA, GEORGIA 30347

APR 5 1979

Mr. William R. Dalton
Director, Southeast Area
Rural Electrification Administration
14th and Independence Avenue, S.W.
Washington, D. C. 20250

RECEIVED
APR 10 1979

Dear Mr. Dalton:

This represents the Biological Opinion of the U. S. Fish and Wildlife Service relative to the potential impacts on endangered and threatened species and their Critical Habitats from the proposed power generating station in Putnam County, Florida. This opinion responds to your letter of January 11, 1979, requesting consultation and to your letter of March 22, 1979, which we are considering to be a biological assessment for the following species: Florida manatee (Trichechus manatus), red-cockaded woodpecker (Picoides borealis), eastern indigo snake (Drymarchon corais couperi), bald eagle (Haliaeetus leucocephalus), American alligator (Alligator mississippiensis), ivory-billed woodpecker (Campephilus principalis), and Florida panther (Felis concolor coryi).

Our Biological Opinion is based on the information in Site Certification Application and Environmental Analysis for Seminole Plant Units No. 1 and 2: meeting between the Endangered Species Specialist in the Jacksonville Area Office, representatives of the Seminole Electric Cooperative, Inc., and consultants from Dames and Moore; biological data within our own files; and a review of available literature. Copies of pertinent reports and documents are included in an administrative record available in the Jacksonville Area Office.

The function of the Rural Electrification Administration is to provide loans and loan guarantees to rural electric cooperatives. In this case, the Seminole Electric Cooperative, Inc., is proposing to build two 600-MW coal-fired electric generating units and related facilities near Bostwick in Putnam County, Florida. It should be noted that this opinion relates only to the Bostwick site, since it is the alternative that has been selected by the applicant for construction of the power generating station.

After a careful review of the findings by Fish and Wildlife Service personnel, it is our Biological Opinion that the proposed coal-fired generating units near Bostwick, Florida, are not likely to jeopardize the continued existence of the Florida manatee, the red-cockaded woodpecker, the indigo snake, the bald eagle, the American alligator, the ivory-billed woodpecker, or the Florida panther, or result in destruction or adverse modification of habitat.

However, should the conditions or plans on which this opinion is based be modified, consultation should be reinitiated.

This Biological Opinion is intended to assist the Rural Electrification Administration in meeting its responsibilities under Section 7 of the Amended Endangered Species Act. We thank you for your interest in the Endangered Species program.

Sincerely yours,

Regional Director

Attachments: Step Down Process, Construction Projects
Step Down Process, Non-Construction Projects

Endangered Species Act of 1978
Section 7

STEP DOWN PROCESS
CONSTRUCTION PROJECT

1. Federal Agency requests from Regional Director whether any species which is listed or proposed to be listed may be present.

2. Regional Director advises which species may be present. Minimum information needed in a Biological Assessment:

   A. Identification of proposed and listed species or Critical Habitat determined to be present in area of activity.

   B. Description of proposed activities.

   C. Assessment of potential impacts of the activity on the proposed and listed species or Critical Habitat.

   D. Where an impact is identified to proposed and listed species or Critical Habitat, a discussion of efforts that will be taken to eliminate any adverse effects.

3. Federal Agency has 180 days after the date of receipt of Regional Director's letter or mutually negotiated date to complete Biological Assessment.

4. Federal Agency then reviews assessment and determines if any listed species is affected.

5. Sends a copy of the assessment and their determination to the Regional Director.

6. If Federal Agency determines:

   A. "No effect" - Consultation is <u>not</u> necessary, unless requested by the Regional Director.

   B. "May affect" - Consultation is requested in writing from the Regional Director.

7. Regional Director acknowledges request and must issue a Biological Opinion within 90 days of "date of receipt" or by a mutually negotiated date.

8. Request is assigned to the appropriate Area Office to accomplish the consultation.

9. Area Office must review the information provided as soon as possible to determine if additional information will be needed and identify the type of information needed.

10. If additional information is needed, a letter will be sent to the agency requesting the information and requesting an extension of time to complete the consultation.

11. After receipt of information a Biological Opinion will be issued stating:

    A. Action will promote the conservation of the listed species.

    B. Action is not likely to jeopardize the continued existence of listed species or destroy or adversely modify Critical Habitat.

        (1) Recommendation which would enhance.

    C. Action is likely to jeopardize the continued existence of listed species and/or destroy or adversely modify Critical Habitat.

        (1) Presentation of reasonable and prudent alternatives which will avoid jeopardy to the listed species or destruction or adverse modification of Critical Habitat and which can be taken by the Federal agency, or the permit or license applicant.

    D. Action may jeopardize the continued existence of listed species or destroy or adversely modify Critical Habitat.

        (1) Used only when additional information was unobtainable and,

        (2) No extension of time was mutually agreed to.

12. Reinitiation of Consultation

    A. New information reveals impacts of action that may affect listed species or their habitats.

    B. The Federal action is subsequently modified.

    C. A new species is listed that may be affected by the action.

Endangered Species Act of 1978
Section 7

STEP DOWN PROCESS
NON-CONSTRUCTION PROJECTS

1. Federal agency reviews the project and determines:

   A. "No effect" - Consultation is not necessary, unless requested by the Regional Director.

   B. "May affect" - Consultation is requested in writing from the Regional Director and the agency:

      (1) Provide biological information which includes:

         a. Identification of proposed and listed species or Critical Habitat determined to be present in area of activity.

         b. Description of proposed activities.

         c. Assessment of potential impacts of the activity on the proposed and listed species or Critical Habitat.

         d. Where an impact is identified to proposed and listed species or Critical Habitat, a discussion of efforts that will be taken to eliminate any adverse effects.

      (2) Other relevant information.

2. Regional Director acknowledges request and must issue a Biological Opinion within 90 days of "Date of Receipt," or by a mutually negotiated date.

3. Request is assigned to the appropriate Area Office.

4. Area Office must review the information provided as soon as possible to determine if additional information will be needed and identify the type of information needed.

5. If additional information is needed, a letter will be sent to the agency requesting the information and requesting an extension of time to complete the consultation.

6. After receipt of information, a Biological Opinion will be issued stating:

   A. Action will promote the conservation of the listed species.

   B. Action is not likely to jeopardize the continued existence of listed species or destroy or adversely modify Critical Habitat.

(1) Recommendation which would enhance.

C. Action is likely to jeopardize the continued existence of listed species and/or destroy or adversely modify critical habitat.

(1) Presentation of reasonable and prudent alternatives which will avoid jeopardy to the listed species or destruction or adverse modification of Critical Habitat and which can be taken by the Federal agency, or the permit or license applicant.

D. Action may jeopardize the continued existence of listed species or destroy or adversely modify critical habitat.

(1) Used only when additional information was unobtainable and,

(2) No extension of time was mutually agreed to.

7. Reinitiation of Consultation

A. New information reveals impacts of action that may a fect listed species or their habitats.

B. The Federal action is subsequently modified.

C. A new species is listed that may be affected by the action.

JUL 9 - 1979

Florida 41 Seminole

Mr. Ray R. Vaughn
Deputy Regional Director
U. S. Department of the Interior
Fish and Wildlife Service
P. O. Box 95067
Atlanta, Georgia 30347

By letter dated April 5, 1979, to this office, you rendered a Biological Opinion for the U. S. Fish and Wildlife Service on the impacts to endangered and threatened species and their critical habitats as a result of construction and operation of proposed Seminole Plant Units No. 1 and No. 2 in Putnam County, Florida.

In part you concluded:

> After a careful review of the findings by the Fish and Wildlife Service personnel, it is our Biological Opinion that the proposed coal-fired generating units near Bostwick, Florida, are not likely to jeopardize the continued existence of the Florida manatee, the red-cockaded woodpecker, the indigo snake, the bald eagle, the American alligator, the ivory-billed woodpecker, or the Florida panther, or result in the destruction or adverse modification of habitat.

It was not clear from your letter whether your assessment and conclusion applied to the associated transmission corridors as well as the site proper. Both the Florida Electrical Power Plant Siting Act and the National Environmental Policy Act require the evaluation of associated transmission facilities as part of the proposed project.

If your conclusion is also applicable to the associated transmission facilities proposed to be constructed within the "preferred" corridors to Silver Springs and Putnam, or within the alternative corridor, to Fort White and Suwannee, as discussed within the Draft Environmental Impact Statement and the Site Certification Application and Environmental Analysis, please clarify. If your conclusion does not apply, please expand your determination to include the areas to be occupied by these facilities.

William R. Dalton

WILLIAM R. DALTON
Director
Southeast Area - Electric

United States Department of the Interior
FISH AND WILDLIFE SERVICE
P. O. BOX 95067
ATLANTA, GEORGIA 30347

JUL 19 1979

Mr. William R. Dalton, Director
Southeast Area - Electric
Rural Electrification Administration
U. S. Department of Agriculture
Washington, D. C. 20250

Dear Mr. Dalton:

Your recent letter requested clarification of our letter of April 5, 1979.

We have concluded that our Biological Opinion does apply to the associated transmission facilities proposed to be constructed within the three preferred corridors as discussed in the Draft Environmental Impact Statement and the Site Certification Application and Environmental Analysis for Seminole Power Plant Units No. 1 and No. 2 in Putnam County, Florida.

Sincerely yours,

Acting Regional Director

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Duval Building
9450 Koger Boulevard
St. Petersburg, FL 33702

January 19, 1979

Mr. Kenneth Kumor
U.S. Department of Agriculture
Rural Electrification Administration
Washington, D.C. 20250

Dear Mr. Kumor:

The Endangered Species Act Amendments of 1978, 92 Stat. 3751, makes certain changes in the consultation procedures described in Section 7 of the Endangered Species Act of 1973, 16 USC 1531 et seq.

In your January 11, 1979 letter, you requested information as to whether any species listed or proposed to be listed as a Federal threatened or endangered species may be present in three areas (Bostwick, Sumter and Satsuma) for a proposed electric generating unit and related facilities.

In response to this request, we have no information on hand which would indicate the presence of any endangered or threatened species under the jurisdiction of the Department of Commerce.

Sincerely yours,

Joseph R Sylvester

Dr. Joseph R. Sylvester
Marine Mammal and Endangered
Species Manager

Seminole Electric Cooperative, Incorporated

Suite 108 2410 East Busch Boulevard (813) 933-7406

Tampa, Florida 33612

April 9, 1979

RECEIVED
APR 13 1979
S.E. AREA-ELECTRIC

Mr. Hamilton Oven
Administrator, Power Plant Siting
Bureau of Permitting
Div. of Environmental Permitting
Department of Environmental Regulations
Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Fla. 32301

and

Mr. Gilbert Broyles
Power Planning Officer
Southeast Area Electric Office
Rural Electrification Adm.
U. S. Department of AGriculture
Washington, D. C. 20250

Re: Seminole Plant Units No. 1 and No. 2
C.O.E. Permit Application No. 78Q-1370
File: 620-S.14

Gentlemen:

As arranged with the Corps of Engineers and the National Marine Fisheries Service, a meeting was held in Jacksonville on April 5, 1979 for the purpose of considering an alternate intake and discharge location to minimize their impact on the ecosystem. Attached please find a copy of the agenda for the meeting, (Exhibit I).

In attendance at the meeting were the following:

Larry E. Goldman, U. S. Fish and Wildlife Service
John R. Hall, Natural Marine Fisheries Service
Bob Glassen, for the Fla. DER
Kenneth W. Prest, The Environmental Licensing Group, Inc.
David Lester, Seminole Electric Cooperative, Inc.
Tom Crumlish, Seminole Electric Cooperative, Inc.
Don Quist, Burns and Roe
Bob Wales, Burns and Roe
Nancy Schwall, Corps of Engineers

The need to consider changing the location of the intake and discharge became apparent because of a site survey conducted by a consultant of the National Marine Fisheries Service. In their letter of February 9, 1979 to the Corps of Engineers they pointed out that, contrary to a mistaken report in the Applicant's Environmental Assessment, there was a "....small but important area of vegetated nursery habitat...." along the shoreline where Seminole had planned to build its intake structure (a similar conclusion had been reached by the Department of Environmental Regulations).

Dames and Moore conducted additional studies at the intake location after it determined that their original investigation had been conducted a few thousand feet to the west of the actual proposed site. Their current findings are that there are such grasses as Vallisneria, which constitutes a nursery under Florida law., along the shoreline but that any structure built 300 feet or more offshore would be out of the area of vegetation. It has been mutually agreed to by the participants to the April 5, 1979 meeting that this proposed distance would avoid subject vegetated areas. Furthermore, as required by Florida law the discharge has to be moved further offshore to prevent the mixing zone from coming into contact with these vegetated areas. Attached please find Dames and Moore's letter of April 6, 1979 on the subject (Exhibit II).

As a result of these findings the Applicant proposes to move its intake structure approximately 300 feet offshore and its discharge nozzle approximately 900 feet offshore. The attached sketch (Exhibit III) shows the proposed new locations of these structures. The "Region of P.O.D." is in accordance with the Applicant's Notice to the Department of Natural Resources which is attached as Exhibit IV.

It was agreed at the April 5th meeting that the Applicant would submit an Amendment to its Corps Permit Application No. 78Q-1370 as soon as possible (now scheduled to be submitted by about 4-16-79) so that Public Notice could be sent out by May 1, 1979 with comments due in by June 1, 1979, which is before the June 4, 1979 public hearings in Palatka. The representatives of the Corps agreed to advise the Applicant, before the public hearing, of any significant adverse comments received.

We trust that the information contained in this letter will demonstrate that a solution to the question of the intake location appears to be at hand.

Very truly yours,

T. E. Crumlish

T. E. Crumlish
Project Director

TEC:ld
Att. (4)
cc: Attendees
P. Don Weaver, Jr., U. S. Coast Guard
Ted Bisterfield, EPA
All Parties

Seminole Electric Cooperative, Incorporated

Suite 108 2410 East Busch Boulevard (813) 933-7406

Tampa, Florida 33612

EXHIBIT I

AGENDA

MEETING @ JACKSONVILLE, FLORIDA

APRIL 5, 1979

PROPOSED ALTERNATE INTAKE DESIGN AND DISCHARGE LOCATION

1. Introduction of Participants
2. Discussion of NMFS Findings at Proposed Shoreline Intake Location
   a. Potential Impact on Intake
   b. Potential Impact on Discharge
3. Discussion of Current Intake Screen Test Program — D. Lester
4. Proposed Alternate Intake Design and Location — D. Quist
   a. Review of Burns and Roe Drawings and Description of Intake
5. Proposed Alternate Discharge Location — T. Crumlish
   a. Review "Notice to DNR" and Sketch Showing Zone for Location of Discharge
6. Discussion of June 1979 Hearings — K. Prest
7. Resolution of Discharge Location and Corps Permitting
8. Resolution of Intake Location and Design and Corps Permitting

TEC:ld
4-4-79

DAMES & MOORE

EXHIBIT II

April 9, 1979

Seminole Electric Cooperative, Inc.
2410 East Busch Boulevard
Tampa, Florida 33612

Attention: Mr. Thomas F. Crumlish
Project Manager

Re: Relocation of Plant Intake
and Discharge Points
Seminole Plant Units No. 1 & No. 2

Dear Tom,

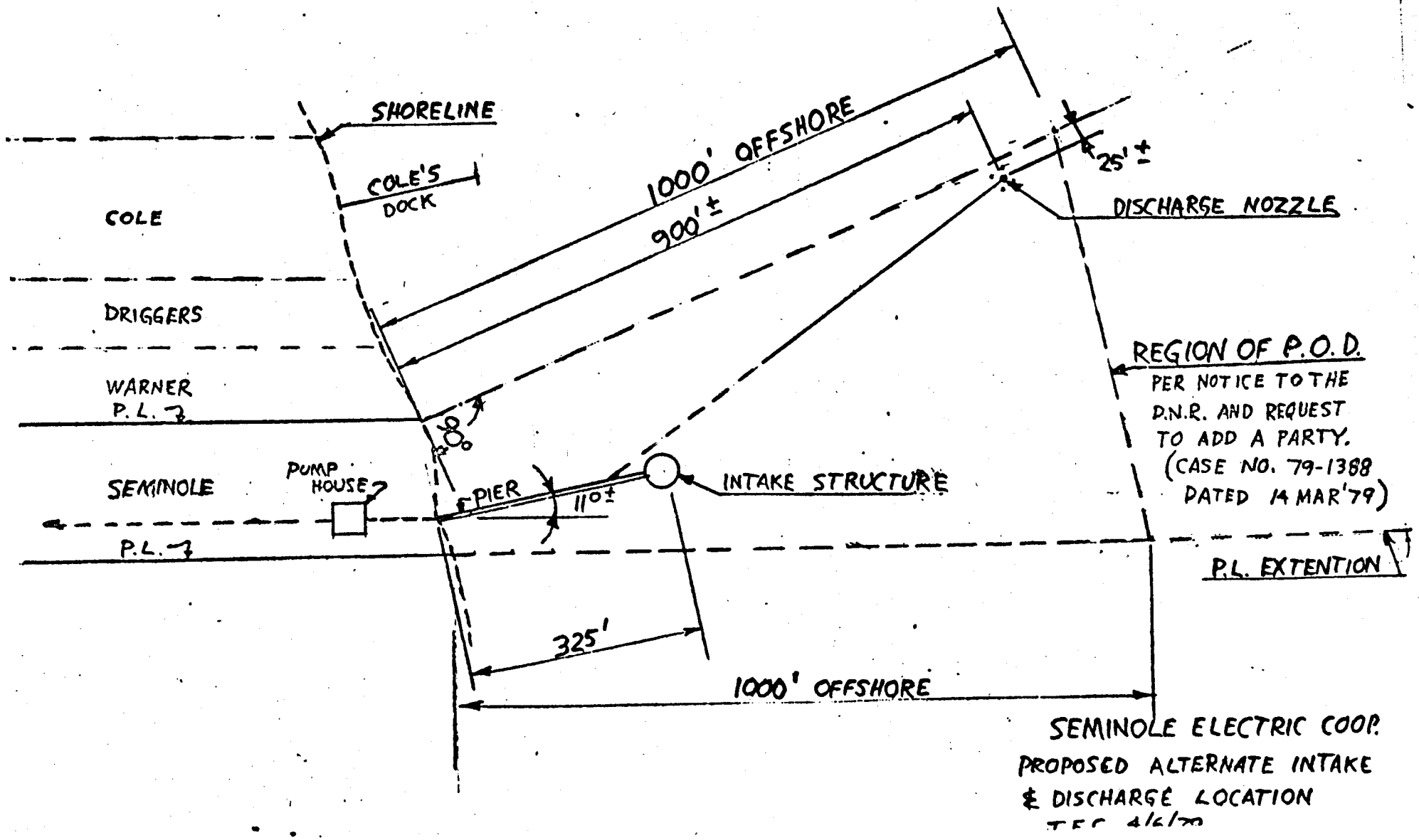
Based on our previous modeling work, we have assessed the changes that would occur if the Point of Discharge (POD) were relocated from its original proposed position at a point about 450 feet from the shoreline to a proposed position about 900 feet offshore. It is our opinion that the resulting mixing zone would assume a size and shape very similar to that previously defined for the 450-foot offshore position, but would center around the new POD location. The mixing zone would be roughly eliptical in shape with the long axis parallel to the shoreline. The short axis would be perpendicular to the shoreline and would be about 900 feet long with the POD located at the geometric center. Therefore, the closest approach of the edge of the mixing zone to the shoreline would be about 450 feet.

In previous investigations, we found that the aquatic macrophytes existed within an area extending about 250 feet from the shoreline and that these macrophytes were being utilized by the biota as a nursery area. We also found little evidence of macrophyte or nursery activity beyond that 250-foot area. It follows, then, that the relocation of the POD to a point 900 feet offshore will prevent the above described mixing zone from encroaching onto the aforesaid macrophyte area.

You have indicated that the intake structure will be relocated to a point 300 feet offshore and that bottom contours will be restored after construction. While construction of the connecting conduit and pier will temporarily disturb the macrophyte area, this offshore position will allow opportunity for the macrophytes to re-establish themselves in the area and will result in no significant permanent disruption of the nursery area.

Very truly yours,

EXHIBIT III



SEMINOLE ELECTRIC COOP.
PROPOSED ALTERNATE INTAKE
& DISCHARGE LOCATION
TEC 4/6/79

STATE OF FLORIDA
DIVISION OF ADMINISTRATIVE HEARINGS

EXHIBIT IV

IN RE: SEMINOLE ELECTRIC COOPERATIVE, INC., SITE CERTIFICATION.

CASE NO. 79-1388

NOTICE TO THE
DEPARTMENT OF NATURAL RESOURCES
AND REQUEST TO ADD A PARTY

Applicant, Seminole Electric Cooperative, Inc., has consulted with Gary Bishop, Department of Natural Resources, and been advised that the corridor, within which Applicant proposes to construct and maintain electrical transmission lines, and the intake and discharge pipelines and structures which Applicant proposes to construct on bottomlands within the St. Johns River, use and pass over properties or works of the State of Florida, or the Department of Natural Resources. Rule 17-17.11(2)(e), F.A.C., requires Applicant to issue appropriate notices at least 60 days prior to the certification hearing where Applicant seeks to use, connect to, or cross over any properties or works of any agency, and provides that the application for a permit to do so shall be an issue addressed in the certification hearing unless waived in writing by the agency involved.

Therefore, notice is hereby given to the Hearing Officer, to the Secretary of the Department of Natural Resources, and to all parties pursuant to Sections 403.508(4)(e) and 403.509(2), F.S. (1978), and Section 17-17.11(2)(e), F.A.C., that Applicant seeks permission to use or cross over properties or works of the State of Florida or the Department of Natural Resources within

on the attached maps, and seeks permission to use the bottomlands of the St. Johns River, within the area shown on the attached river map, for its proposed intake and discharge pipelines and structures.

Pursuant to the same authorities, Applicant requests that the Hearing Officer enter an order adding the Department of Natural Resources as a party to this proceeding in order to allow the Department of Natural Resources the opportunity to address this issue at the certification hearing, or, if the Secretary deems appropriate, to waive this issue in writing prior to the certification hearing, and directing the Department of Environmental Regulation to publish notice of this request as is required by Section 17-17.06(4)(d), F.A.C.

SEMINOLE ELECTRIC COOPERATIVE, INC.

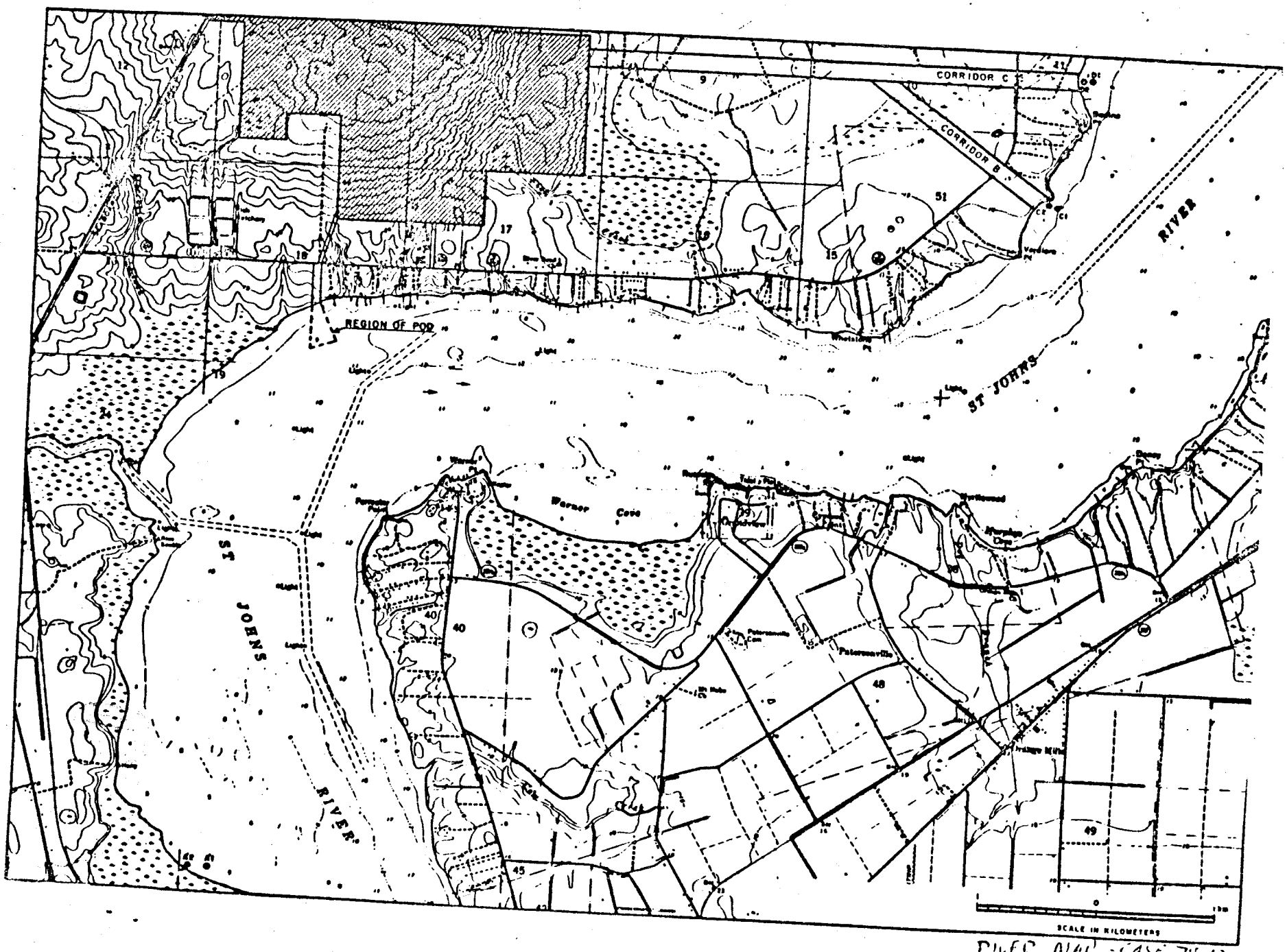
By _____

Roderick K. Shaw, Jr.
Of Allen, Dell, Frank & Trinkle
Post Office Box 2111
Tampa, Florida 33601
Attorneys for Seminole Electric Cooperative, Inc.

CERTIFICATE OF SERVICE

I HEREBY CERTIFY that a copy of the foregoing has been furnished, by mail, to Joseph W. Landers, Jr., Secretary, Department of Natural Resources, 224 Crown Building, 202 Blount Street, Tallahassee, Florida 32301; to Gary Bishop, Department of Natural Resources, 224 Crown Building, 202 Blount Street, Tallahassee, Florida 32301, and to all persons listed on the attached Service Schedule, on this 14 day of March, 1979.

_____
Attorney



RIVER AIM - CASE 74-1300
Re: Notice to DNR

RECEIVED
AUG 20 1979
DIV. ENVIRONMENTAL
PERMITTING