FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION
Office of Intergovernmental Programs

State Clearinghouse Coordination and Review Process

Memorandum

RECEIVED
JUN 15 1995
Bureau of Air Regulation

TO: Syed Arif, Bureau of Air Resources
Joe Bakker, Bureau of Mine Reclamation
Norton Mac Craig, Southwest District

FROM: Carliane D. Johnson
Office of Intergovernmental Programs, M.S. 47

SUBJECT: Draft Supplemental Environmental Impact Statement - Hardee Unit 3, Polk County

SAI#: FL9506060598C

DATE: June 13, 1995

The Office of Intergovernmental Programs has received the attached draft supplemental EIS. Please review the document and provide comments to this office by July 14. In addition, please copy Steve Palmer, Sitting Coordination, with your comments.

If you have any questions, or need more time for your review, you may contact me at 904/487-2231 (suncom 277-2231). Comments may be emailed to me @ johnson_CA or faxed to 904/922-5380.

Thank you.
/cdj

CC: Steve Palmer

DRAFT

SUPPLEMENTAL ENVIRONMENTAL IMPACT STATEMENT

related to the proposed

HARDEE UNIT 3

FLORIDA 41 SEMINOLE

SEMINOLE ELECTRIC COOPERATIVE, INC.

Lead Agency

RURAL UTILITIES SERVICE

U.S. DEPARTMENT OF AGRICULTURE

Cooperating Agency

U.S. ENVIRONMENTAL PROTECTION AGENCY

USDA-RUS (ADM) 95-1-D

DRAFT SUPPLEMENTAL
ENVIRONMENTAL IMPACT STATEMENT
COVER SHEET

PROPOSED FEDERAL ACTIONS RELATED
TO THE CONSTRUCTION AND OPERATION
OF THE PROPOSED
HARDEE UNIT 3

LEAD AGENCY:
RURAL UTILITIES SERVICE

COOPERATING AGENCY:
U.S. ENVIRONMENTAL PROTECTION AGENCY

Seminole Electric Cooperative proposes to construct a 440-megawatt combined cycle unit at the previously certified Hardee Power Station site. The new unit will be known as Hardee Unit 3. The Hardee Power Station site is located 14 kilometers (km) (9 miles) northwest of Wauchula, 26 km (16 miles) south-southwest of Bartow, and 64 km (40 miles) east of Tampa Bay.

A 45-day comment period has been set for this Draft Supplemental Environmental Impact Statement that will end on

Comments and inquiries on this Draft Supplemental Environmental Impact Statement should be sent to:

Lawrence R. Wolfe, Chief
Environmental Compliance Branch
Electric Staff Division
Rural Utilities Service
Ag. Box 1569
Washington, D.C. 20250

This Draft Supplemental Environmental Impact Statement has been approved by:

[signature]

Mr. Wally Beyer
Administrator
Rural Utilities Service

5/22/95
Date

EXECUTIVE SUMMARY

I. INTRODUCTION

This Draft Supplemental Environmental Impact Statement (EIS) has been prepared in compliance with the National Environmental Policy Act, as amended, (42 U.S.C. 4321 et seq.) as implemented by the Council on Environmental Quality regulations, 40 CFR Parts 1500-1508 and the Rural Utilities Service (RUS) Environmental Policies and Procedures, 7 CFR Part 1794. It is a supplement to the Final Environmental Impact Statement issued in January 1991, by the Rural Electrification Administration (predecessor to RUS) for its action related to the Hardee Power Station.

RUS is the lead agency in the preparation of the Draft Supplemental EIS. The U.S. Environmental Protection Agency (EPA) is a cooperating agency. Both agencies' potential actions related to the proposed project are discussed in Section 2.0 of this Draft Supplemental EIS. It is the intent of RUS and EPA that the Draft Supplemental EIS provide a full and fair discussion of significant environmental impacts and inform decision makers and the public of reasonable alternatives which will avoid or minimize adverse impacts and/or enhance the quality of the human environment.

A Site Certification Application/Environmental Analysis submitted by Seminole Electric Cooperative, Inc., to meet the requirements of the Florida Electrical Power Plant Siting Act and RUS Environmental Policies and Procedures provides the basis for the Draft Supplemental EIS for Hardee Unit 3. RUS reviewed the Site Certification Application/Environmental Analysis and believe that it represents a fair and accurate analysis of the potential impacts of Hardee Unit 3 and includes reasonable alternatives. The Site Certification Application/Environmental Analysis is incorporated by reference into the Draft Supplemental EIS for Hardee Unit 3 and is available for inspection to interested parties at the headquarters of RUS, South Agriculture Building, Washington, D.C. 20250, telephone (202) 720-1784, the headquarters of Seminole Electric Cooperative, 16313 North Dale Mabry Highway, Tampa, Florida 33688-2000, telephone (813) 963-0994, and the following libraries:

Bartow Public Library
315 E. Parker Street
Bartow, Florida 33830

Hardee County Library
315 N. 6th Ave., Suite 114
Wauchula, Florida 33873

II. PROJECT DESCRIPTION

The proposed Hardee Unit 3 is a 440 megawatt (MW) natural gas and oil fired combined cycle electric power station to be constructed on the previously certified Hardee Power Station site. Hardee Unit 3 represents an incremental increase in the overall proposed capacity of the Hardee Power Station from 660 to 880 megawatts.

III. ALTERNATIVES

A. No Action;

Under the "no action" alternative, no action would be taken by RUS and/or EPA that would result in federal approval(s) necessary for Seminole Electric Cooperative, Inc., to construct and operate Hardee Unit 3. Due the future projected power requirements of Seminole Electric Cooperative, Inc., and the opportunity to locate generation facilities at an existing generation site with little additional impact on the quality of the human environment, RUS rejects this alternative.

B. Alternative Sites;

Because the proposed facility is an incremental increase in generating capacity the previously sited Hardee Power Station, a formal siting study was not conducted for Hardee Unit 3. A formal site selection study was performed for the Hardee Power Station in 1988.

C. Site Design Alternatives;

The Hardee Power Station site was originally certified for the construction and operation of a 230-hectare (570-acre) cooling reservoir with makeup water from the Floridan aquifer for once-through condenser cooling. Alternatives were considered for the Hardee Unit 3

Project to identify and evaluate all reasonable water sources within a 16-kilometer (10-mile) radius of Hardee Power Station. It is believed that the condenser cooling needs for Hardee Unit 3 can be met by the existing cooling reservoir. The previously certified groundwater allocation for both the reservoir makeup water and plant process water are adequate to meet the requirements of an 880 MW facility at the existing Hardee Power Station.

Other potential water sources, including treated wastewater and water cropping, were identified, but none were found to be superior to the previously certified use of groundwater from the Floridan aquifer.

The originally certified groundwater allocation was a monthly average of 3.8 mgd with a maximum withdrawal of 8.64 mgd. This allocation will not change for Hardee Unit 3.

D. Alternative Fuels;

Currently available coal gasification plant designs are technically feasible as an alternative fuel source for combustion turbines and can be constructed and operated at the Hardee Power Station site in an environmentally suitable manner. The plant layout of Hardee Unit 3 has been designed to allow the potential construction of a coal gasification plant. This alterative is not considered economically feasible at this time. However, if fuel supplies or prices make this type of facility economical in the future, a gasification plant could be separately permitted and constructed as an associated facility of the Hardee Unit 3.

IV. ENVIRONMENTAL IMPACTS

The land in the immediate vicinity of the proposed Hardee Unit 3 site currently is either being used for phosphate mining or is in the process of post-mining reclamation. Most of the land in the general area has already been disturbed by mining activities. The proposed facility will be located on a 20-ha (50-acre) parcel adjacent to the Hardee Power Station's existing units and existing cooling reservoir within the existing Hardee Power Station site. Therefore, general site preparation and construction will have minimal land impacts.

No impacts from disposal of construction wastes are anticipated. Combustible construction wastes (e.g., paper, wood, etc.) will be burned onsite in accordance with applicable regulations. Other construction wastes will be removed from the site for disposal at a facility approved by the Florida Department of Environmental Protection (FDEP). Any garbage (food containers, papers, etc.) will be collected in appropriate waste collection containers and disposed in accordance with FDEP and local regulations. Any waste oils or other chemical wastes generated during construction will be removed from the site and disposed of by a licensed contractor. During construction, the construction labor force will utilize portable chemical toilets. All sanitary sewage will be frequently pumped from the individual toilets for transportation to an approved disposal facility by a licensed contractor.

No adverse impacts to geology and soils are anticipated during operation of Hardee Unit 3.

Payne Creek and its unnamed tributary are the only natural surface water bodies in the immediate vicinity of the Hardee Power Station site. The primary potential impacts to Payne Creek and its unnamed tributary from site preparation and plant construction are erosion and sedimentation due to earthmoving and material placement associated with the plant. Discharges associated with construction dewatering may also be considered a potential impact to the surface waters of Payne Creek and its unnamed tributary. These impacts will be controlled and minimized through proper design and placement of runoff control features and are anticipated to last no longer than 30 days in any wetland area.

Some dewatering will be required during excavation for construction of plant structures. The site facilities requiring dewatering include foundations, circulating water piping, intake and discharge structures, and miscellaneous underground utilities.

The air quality impacts during the construction phase of the project will be associated primarily with the land clearing and site preparation activities. These activities will result in the generation of fugitive particulate matter and an increase in the level of exhaust emissions from construction equipment. The maximum impacts from vehicular exhaust emissions will occur during the construction phase when equipment will be onsite for concrete placement and major equipment installation. Vehicle exhausts include primarily nitrogen oxide and carbon monoxide emissions as well as particulate matter, sulfur dioxide, and volatile organic compounds.

Because the proposed Hardee Unit 3 operational air quality impacts are predicted to be greater than the significant impact levels for SO_2 and PM10, additional modeling was required to address the potential interaction of background sources with the proposed unit. As demonstrated by the air modeling analyses, when the proposed unit's impacts are greater than the significant impact levels, the maximum total PM10 and SO_2 air quality impacts will be in compliance with the applicable SO_2 and PM10 Ambient Air Quality Standards and Prevention of Significant Deterioration Class II increments.

The proposed Hardee Unit 3 operational air quality impacts for PM10 and NO_2 are predicted to be less than the recommended NPS PSD Class I significant impact levels and, therefore, will be in compliance with and maintain the applicable PSD Class I increments at the nearest National Wildlife Refuge. For SO_2, additional modeling was performed to address the potential interaction of the proposed unit with other PSD Class I sources. Based on these results, the impacts from the proposed unit and other sources will comply with and maintain the PSD Class I increments.

Based on the types and numbers of equipment to be used for each construction activity, it is expected that activities associated with the erection of structures and equipment will most likely produce the highest noise impacts in the vicinity of the site. This is because the numbers and types of high noise level equipment to be used for this activity are more extensive than for other construction activities. The exception may be the use of a pile driver for placement of sheet piling, which will be used during construction of the circulating water intake and return structures. This equipment has a very high noise level; however, the noise will be intermittent in nature. It is expected that the level of continuous noise may be greater during the erection phase of the construction project and would therefore represent a worst-case construction noise scenario.

Predicted noise levels of operation of Hardee Unit 3 at the nearest residential area are expected to be slightly above background levels.

The power plant and related onsite facilities such as parking lots, detention ponds, and roads will occupy approximately 20 ha (50 acres) of land. Nearly all of this area will be located on recently mined land that has been reclaimed to upland pasture.

A reclaimed wetland on the site will be crossed by the circulating water pipes. The pipes will be supported on permanent concrete structures, thus filling 0.034 ha (0.085 acre) within the reclaimed wetland. In order to construct the circulating water pipes, 0.089 ha (0.22 acre) within the reclaimed wetland will be cleared. Ecological impacts to the reclaimed wetland are expected to be minor because the only permanent impacts will be concrete support structures and because the area will be maintained as a herbaceous wetland.

Approximately 2.09 ha (5.16 acres) of U.S. Army Corps of Engineers (Corps of Engineers) jurisdictional wetlands will be impacted by construction of the power block area and stormwater detention basin. These impacted areas are characterized by weedy wetland species that colonized low pockets which were inadvertently created during reclamation. Due to the low ecological value of these areas, ecological impacts are expected to be minor. Construction of a retainment berm will impact 0.01 ha (0.03 acre) of highly disturbed herbaceous wetlands, and installing three culverts across two drainage ditchs will impact 0.03 ha (0.08 acre) of the ditch. Both of these impacts are considered minor given the disturbed condition of both the herbaceous wetland and drainage ditch.

The potential impacts to the vegetation communities onsite due to construction activities include sedimentation due to stormwater runoff into the unnamed tributary from laydown areas, roads, and areas under construction, damage to wetlands due to construction dewatering; and tree clearing for intake and discharge pipes to cross the reclamation wetland.

Dewatering activities will occur onsite. The maximum predicted drawdown is 2.4 m (8 ft). The duration of the dewatering will last for 30 days at any given location. This means that saturated water conditions will not occur in the dewatering zone during this period. The unnamed tributary wetland occurs within the predicted zone of dewatering. No significant effects to wetland vegetation are anticipated because of the short duration of dewatering and the fact these wetlands are currently receiving surface water from upgradient areas offsite.

No structures will be placed in Payne Creek. During construction, surface runoff, including water from construction dewatering, will be routed into a detention pond, and erosion prevention measures will be used. Treated runoff, if discharged, will flow into the adjacent unnamed tributary. No adverse ecological impacts to the Payne Creek aquatic system are anticipated.

There will be no physical or operational changes to the reservoir related to Hardee Unit 3 with the exception of the new intake and return structures for the circulating water pipes.

Potential impacts to wildlife communities due to construction activities include vegetation removal and loss of habitat, noise, and road traffic and road kills. The wildlife species present on the site are considered typical of the region. No unique species or habitats or significant populations of recreationally and commercially important species will be affected during construction.

Operational activities within the fenced area of the Hardee Unit 3 facility will preclude wildlife from the immediate area. Wildlife associated with the unnamed tributary to Payne Creek will have access to the tributary from the north since all fenced facilities associated with the Hardee Unit 3 Project will be located south of the tributary.

No threatened or endangered species or critical habitat thereof will be affected by construction and operation of Hardee Unit 3.

No significant archaeological and historic sites or sites listed or eligible for listing on the National Register of Historic Places occur on the Hardee Power Station site. There is expected to be no impact to such sites as a result of construction and operation of Hardee Unit 3.

The site area for the proposed Hardee Unit 3 and cooling reservoir is mostly area that has been previously mined for phosphate and reclaimed. The actual site of the power block is improved pasture surrounded by mined lands. The pasture area is sitting idle. The construction and operation of Hardee Unit 3 will not be incompatible with existing land use and there will be no significant land use impacts.

The Hardee Unit 3 facilities have been designed to comply with all applicable Southwest Florida Water Management District, Hardee County, and Florida Department of Environmental Protection requirements regarding flood protection and control. No structures or fill will be placed in the Payne Creek floodplain; therefore, no reduction in cross-section flow-way or flood storage will occur. No adverse impact on the 100-year flood elevations or flood flows in Payne Creek are anticipated, because stormwater design will comply with SWFWMD regulations that restrict post-development peak flow rates to pre-development flow rates.

With the exception of the water circulating pipes, all structures associated with the Hardee Unit 3 Project will be outside of the unnamed tributary to Payne Creek. The circulating water pipes will cross the unnamed tributary in a manner that will not affect water flow and will minimize impacts to associated wetlands.

The Hardee Power Station site is not located on soils classified as prime farmland. Therefore, construction and operation of Hardee Unit 3 will not have an impact on this resource.

The Hardee Power Station site is not located on land classified as prime rangeland. Therefore, construction and operation of Hardee Unit 3 will not have an impact on this resource.

The Hardee Power Station site is not located on land classified as prime forestland. Therefore, construction and operation of Hardee Unit 3 will not have an impact on this resource.

Payne Creek is not classified as a component of the National Wild and Scenic River System. The construction and operation of the Hardee Unit 3 will have no impact on wild and scenic rivers.

V. POTENTIAL CONTROVERSY

RUS is not aware of any potential controversy arising as a result of the proposed construction and operation of Hardee Unit 3.

VI. MAJOR CONCLUSIONS

There are a number of major conclusions that have been reached as a result of the preparation of this Draft Supplemental EIS. These conclusions are listed as follows:

The environmental review of the proposed Hardee Unit 3 has been conducted in compliance with all Federal statutes, regulations, and Executive Orders related to the RUS and EPA's actions related to the project. This review was also carried out by the State of Florida pursuant to the Florida Electrical Power Plant Siting Act. Both the review to meet Federal requirements and the review to meet State of Florida requirements are consistent and reach the same conclusions.

Construction and operation of the proposed Hardee Unit 3 site will have limited adverse environmental impacts.

There is a demonstrated need for the project.

Reasonable alternatives to constructing Hardee Unit 3 as proposed were considered. RUS' preferred alternatives at this time appear to be the best for environmental, economic and engineering reasons.

The public, local, Federal and State of Florida and other potential interested parties were given opportunities to learn about the proposed project and provide input through both the National Environmental Policy Act review process and the review conducted for the State of Florida pursuant to the Florida Electrical Power Plant Siting Act.

TABLE OF CONTENTS

LIST OF ACROYNMS

AAQS..................ambient air quality standards
BACT...................best available control technology
CFCs....................chlorofluorocarbons
Btu ....British thermal unit
CAA ....Clean Air Act
CFR ....Code of Federal Regulations
cfs ....cubic feet per second
CH_4 ....methane
Cl ....chlorides
cm........................centimeter
CO ....carbon monoxide
CO_2 ....carbon dioxide
COE ....................U.S. Army Corps of Engineers
COS ....carbonyl sulfide
dB ....decibels
dBA ....A-weighted decibels
EPA .....................U.S. Environmental Protection Agency
FAC.....................Florida Administrative Code
FDEP ....Florida Department of Environmental Protection
ft/sec....................feet per second
gpd......................gallons per day
gpd/ft...................gallons per day per foot
gpm.....................gallons per minute
H_2.......................hydrogen
(H_2S)...................hydrogen sulfide
ha........................hectare
HCN ....hydrocyanic acid
HPS.....................Hardee Power Station
km.......................kilometers
km/hr ....kilometers per hour
kg/cm^2 ....kilograms per square centimeter
kW ....kilowatt
m ....meters
m-msl ....meters above mean sea level

LIST OF ACROYNMS

mgd.....................million gallons per day
mg/L....................milligrams per liter
MW.....................megawatt
NO_2....................nitrogen dioxide
N_2O....................nitrous oxide
NO_x....................nitrogen oxide
NTLs ....No-Threat Levels
0_3 ....ozone
Pb ....lead
pC/L ....picocuries per liter
PM ....particulate matter
PSD.....................prevention of significant deterioration
RUS.....................Rural Utilities Service
SO_2.....................sulfur dioxide
SO_4.....................sulfate
SPL......................sound pressure level
TDS.....................total dissolved solids
um ....micrometers
VOC....................volatile organic compound
ug/m^3..................micrograms per cubic meter
ug/L.....................micrograms per liter
umho/cm............micromhos per centimeter

1.0 PROJECT DESCRIPTION

The proposed project that is the subject of this Draft Supplemental Environmental Impact Statement (EIS) is a 440-megawatt (MW) combined cycle electric generating facility to be known as Hardee Unit 3. Hardee Unit 3 involves increasing the previously certified Hardee Power Station ultimate capacity of 660 MW to 880 MW.

The project will consist of one highly efficient 440-MW combined cycle unit that will employ the latest pollution abatement technology and will provide optimum efficiency with regard to electric power generation. The site layout for the Hardee Unit 3 Project showing its relation to the Hardee Power Station existing units is provided in Figure 1.0-1.

As described in the Final EIS for the Hardee Power Station issued by the Rural Electrification Administration in January of 1991, the Hardee Power Station was originally proposed to be completed in three phases (Phases 1A, 1B, and 2), resulting in the construction of 660 MW of generating capacity. (The Rural Electrification Administration has been organized into a new agency identified as RUS.) The first phase consisting of 295 MW has been constructed and is now in operation on January 1, 1993. The next phase consisting of an additional 145 MW would be constructed by the year 2003. This would bring the station up to 440 MW. TECO Power Services is responsible for this 440 MW of the station. As originally proposed, Seminole Electric Cooperative would construct and operate an additional 220 MW at the site at some future date to be established based on need. Instead of constructing 220 MW of additional capacity at the Hardee Power Station site, Seminole Electric Cooperative is now proposing to add 440 MW to the site in 1999. At that time the total station capacity would be 735 MW. When TECO Power Services adds its 145 MW to the station, the Hardee Power Station's total capacity would be 880 MW.

Phase 1A (existing units) consists of a a 220-MW combined cycle unit and a 75-MW stand-alone combustion turbine for a total output of 295-MW. Phase 1B will consist of adding a 75-MW combustion turbine to the Phase 1A stand-alone combustion turbine, two heat recovery steam generators, and a 70-MW steam turbine to complete a second 220-MW combined cycle unit. Phase 1B, also to be owned by TECO Power Services, will increase the total generating output of the Hardee Power Station to 440 MW with an in-service date no later than January 2003. Phase 2 was planned to consist of a third 220-MW combined cycle unit to be constructed by Seminole Electric Cooperative and had no projected in-service date. The proposed Hardee Unit 3 Project is scheduled to be an expansion of Seminole Electric Cooperative's Phase 2 from 220 MW to 440 MW, thus giving the site an ultimate generating capacity of 880 MW. When the proposed Hardee Unit 3 is placed in service on January 1, 1999, the station will have a total generating capacity of 735 MW. The ultimate Hardee Power Station generating capacity of 880 MW would be achieved with the completion of Phase 1B still scheduled no later that January 2003.

The Hardee Unit 3 facility will be constructed through a turnkey contract arrangement with Westinghouse Electric Corporation and Black & Veatch Construction, Inc. This project will consist of two 150-MW Westinghouse Model 501F combustion turbines with dry low NO_x burners totaling 300 MW. Each combustion turbine will be connected to a heat recovery steam generator producing steam for a single 140-MW steam turbine. The overall generating capacity of Hardee Unit 3 Project will be 440 MW.

Fuels to be used include natural gas as the primary fuel and number 2 fuel oil with a 0.05 percent sulfur content as backup. Fuel oil will be delivered to the site via truck and stored in a new single 16.7-million-liter (4.4-million-gallon), above-ground storage tank.

Hardee Unit 3 will connect to the Florida electric transmission grid within the existing Hardee Power Station site; no new offsite transmission lines will be constructed. The Hardee Unit 3 facility will connect onsite with either an existing 46-centimeter (cm) (18-inch) natural gas lateral from the existing Florida Gas Transmission Company system already constructed to the Hardee Power Station site or the proposed SunShine Pipeline Company's natural gas pipeline. Permitting for the natural gas lateral to the Hardee Power Station site, if developed, will be conducted under a separate permitting process by the SunShine Pipeline Company.

Hardee Unit 3 will be located on the 526-hectare (ha) (1,300-acre) Hardee Power Station site in Hardee and Polk counties, approximately 14 km (9 miles) northwest of Wauchula, 26 km (16 miles) south-southwest of Bartow, and 64 km (40 miles) east of Tampa Bay (see Figure 1.0-2). The Hardee Power Station site is bordered on the east by Hardee County Road (CR) 663, a CSX Railroad right-of-way, and CF Industries' Hardee Complex. IMC-Agrico properties surround the remaining portions of the site. Payne Creek flows along the southern and western boundary of the Hardee Power Station site.

1.0 PROJECT DESCRIPTION

The Hardee Power Station site is located in Section 6 of Township 33S, Range 24E, Section 31 of Township 32S, Range 24E, Sections 1, 2, and 12 of Township 33S, Range 23E, and Sections 35 and 36 of Township 32S, Range 23E. Hardee Unit 3 will occupy approximately 20 ha (50 acres) of the Hardee Power Station site. The Hardee Power Station site is currently used for the production of electric power by the 295-MW Hardee Power Station existing units. With the exception of the Hardee Power Station existing units and supporting facilities, which include a 230-ha (570-acre) cooling reservoir, the remainder of the Hardee Power Station site is undeveloped. Portions of the Hardee Power Station site have been mined for phosphate and reclaimed.

The 20-ha (50-acre) area identified for the construction of Hardee Unit 3 currently consists of un-mined and reclaimed land. Areas of the Hardee Power Station site immediately adjacent to Payne Creek are in the 100-year floodplain. However, none of the proposed plant structures associated with the Hardee Unit 3 will be located in the 100-year floodplain of Payne Creek.

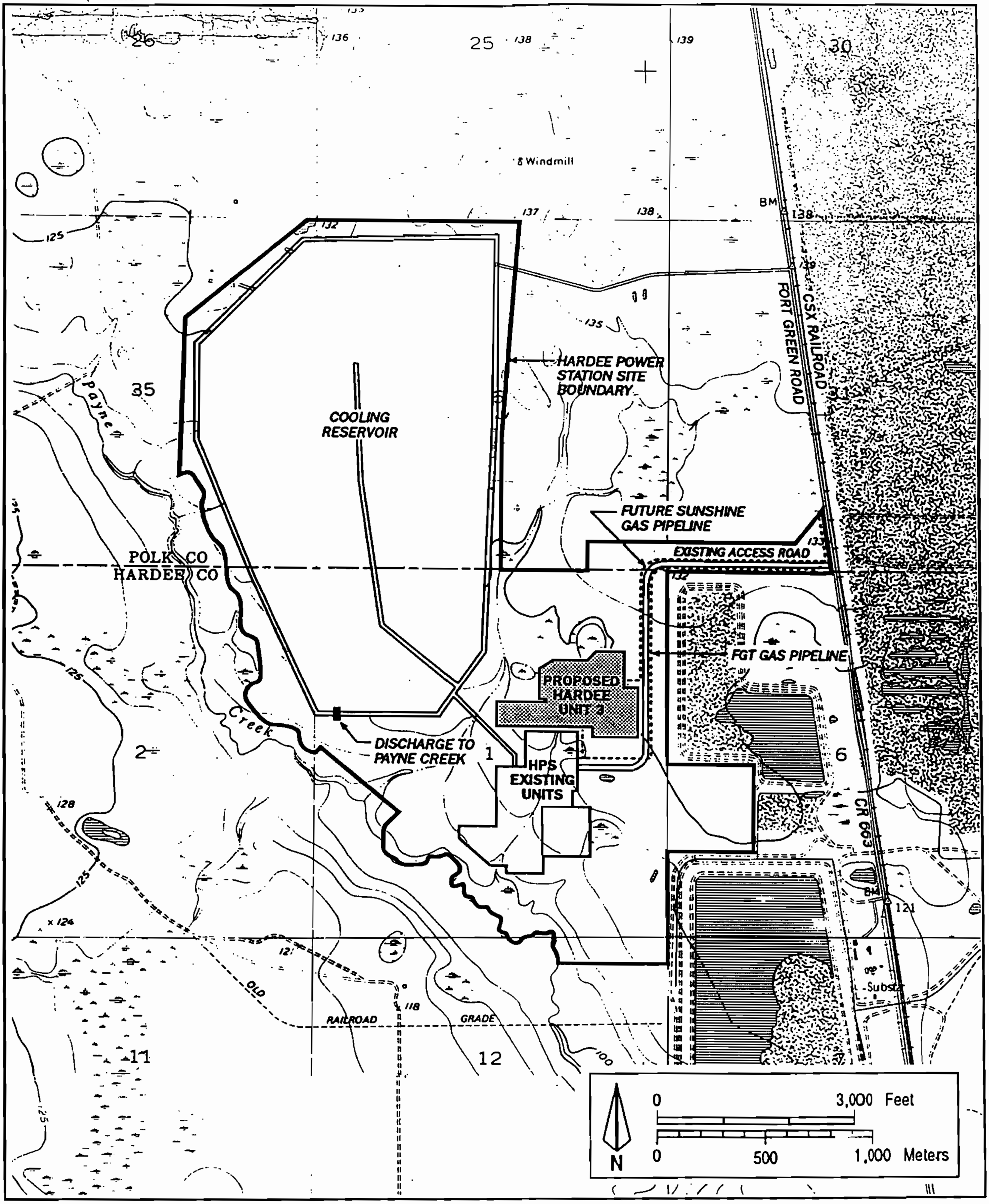

Figure 1.0-1
Hardee Unit 3 Site Boundary and Adjacent Properties

Sources: USGS, 1987; KBN, 1994.

SEMINOLE ELECTRIC COOPERATIVE INCORPORATED

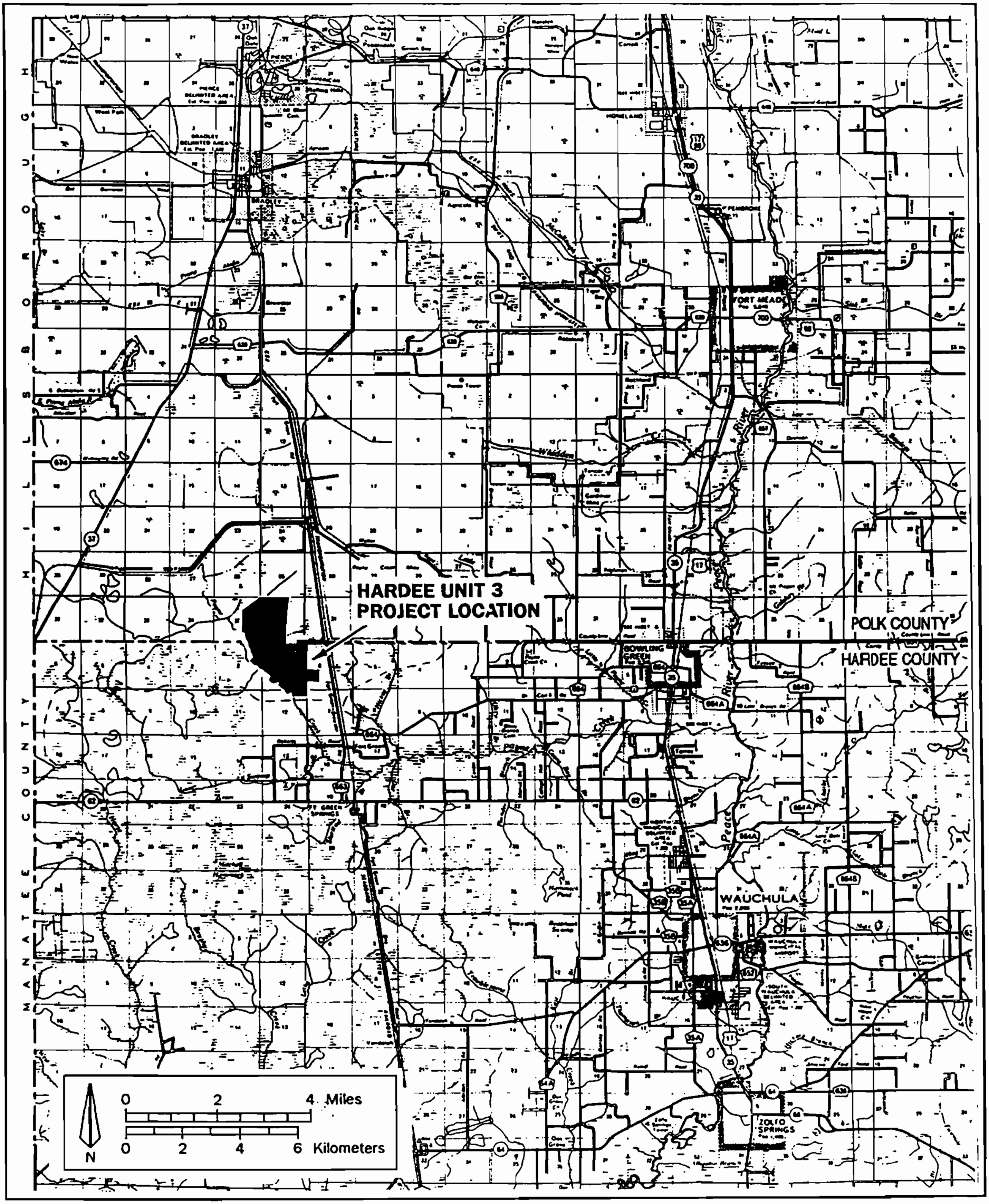

Figure 1.0-2
Location of Hardee Unit 3 Project

Sources: FDOT, 1990; 1992; KBN, 1994.

SEMINOLE ELECTRIC COOPERATIVE INCORPORATED

2.0 FEDERAL AGENCY ACTION RELATED TO THE PROJECT

2.1 Rural Utilities Service

RUS' action related to this project is possible financing assistance to Seminole Electric Cooperative and approval of contracts and related agreements with the turnkey contractor.

2.2 U.S. Environmental Protection Agency

EPA's alternative actions for the original Rural Electrification Administration's Final EIS for the Hardee Power Station issued in 1991 were to issue, issue with conditions, or deny the NPDES permit. EPA's permitting decision was to issue the permit with conditions (NPDES permit No. FL0041751 issued by EPA on February 22, 1991, was effective on February 22, 1991, and will expire on January 31, 1996). To meet EPA's review responsibilities pursuant to the National Environmental Policy Act (NEPA) for this new source, EPA was a cooperating agency on the preparation of the 1991 Rural Electrification Administration EIS. Although the original Final EIS for the Hardee Power Station proposed three units totaling 660 MW, the EPA-issued NPDES permit only addressed Units 1 and 2. Therefore, the presently requested NPDES permit will only address Unit 3 and will be separate from and not a modification of the existing NPDES permit. Unit 3 is now proposed for 440 MW as opposed to 220 MW as in the original Final EIS, which would result in a total Hardee Power Station generating capacity of 880 MW.

On May 23, 1994, EPA Region 4 received an NPDES permit application dated May 16, 1994, from Seminole Electric Cooperative. Specifically, the permit application is for the point source discharge of pollutants from the existing cooling reservoir (which would be utilized by Unit 3) into Payne Creek, and storm water discharge into an unnamed tributary of Payne Creek, which are both waters of the United States.

Similar to the original Rural Electrification Administration's Final EIS for the Hardee Power Station, EPA's alternative actions for the presently requested permit for Hardee Unit 3 have been to issue, issue with conditions, or deny the NPDES permit. Since the action was preliminarily determined to be a new source, NEPA review requirements applied. However, the State of Florida Department of Environmental Protection (FDEP) has applied preliminarily determined to be a new source, NEPA review requirements applied. However, the State of Florida Department of Environmental Protection (FDEP) has applied for authorization to administer the NPDES program. Effective May 1, 1995, FDEP has received such authorization from EPA. Therefore, through program authorization, EPA's permitting role for plant operation is delegated to the FDEP.

Since the program was authorized to the State of Florida on May 1, 1995, NPDES permitting for plant operation becomes a FDEP state action with EPA program oversight as opposed to an EPA federal action. EPA retains, however, its primacy for storm water NPDES permitting through its recently issued (September 25, 1992) General Permit for construction ("Storm Water Discharges From Construction Sites"). As a general permit, applicant coverage would be through an application process separate from the NPDES permit for plant operation. EPA's status as a cooperating agency for this RUS DSEIS and its Final Supplemental EIS review responsibilities for Hardee Unit 3 under Section 309 of the Clean Air Act and Section 102(2)(C) of NEPA also do not change with program authorization.

Had EPA not authorized the NPDES permit program to the State of Florida, EPA would not have made a final decision on the NPDES permit for plant operation until completion of the Final Supplemental EIS for Hardee Unit 3. Now that the program is authorized to the FDEP, the timeframe for the permitting decision is a FDEP action. Nevertheless, EPA recommends that the Final Supplemental EIS for Hardee Unit 3 be completed in order to finalize the RUS decision on its action before the state's final permitting decision is made. A copy of the draft NPDES permit prepared by EPA is Appendix A in this DSEIS.

3.0 FLORIDA ELECTRICAL POWER PLANT SITING ACT

Sections 403.501 through 403.517 of the Florida Statute, known as the Florida Electrical Power Plant Siting Act, establish procedures to be followed for the selection and utilization of sites for electrical generation facilities.

In accordance with these procedures, Seminole Electric Cooperative filed an application to the FDEP for an electric power plant site certification on May 9, 1994. The application was determined to be complete by the FDEP on May 24, 1994.

The content of this document is consistent with the information provided to the FDEP to meet the procedural requirements of the Florida Electrical Power Plant Siting Act.

4.0 NEED FOR HARDEE UNIT 3

4.1 Need for Hardee Unit 3

Seminole Electric Cooperative is a generation and transmission cooperative which generates and transmits bulk supplies of electricity to 11 member distribution cooperatives throughout Florida. More than 1 million consumers in 45 Florida counties rely on Seminole Electric Cooperative for their electricity. Seminole Electric Cooperative's existing generating capabilities consist of two 600 MW coal-fired units near Palatka, Florida, and a 14.4 MW share of Florida Power Corporation's Crystal River Unit 3 nuclear power plant. In addition, Seminole Electric Cooperative owns 70 miles of 230-kilovolt (kV) double-circuit transmission line, 140 miles of 230-kV single-circuit transmission line, and 157 miles of 69-kV transmission line connecting with its existing power plant, substations, and other distribution systems. Seminole Electric Cooperative also purchases backup power from Hardee Power Partners, Limited, an affiliate of TECO Power Services. This backup power is obtained from the Hardee Power Station existing units.

Seminole Electric Cooperative has determined that in order to continue to provide the most reliable, cost-effective service to its customers, it must replace 440 MW of power currently purchased on a partial requirements basis from Florida Power & Light Company with power from another source beginning in 1999. Through a competitive bidding and negotiation process, Seminole Electric Cooperative has determined that the best alternative for displacing that 440 MW of partial requirements purchases is construction and operation of the Hardee Unit 3.

Hardee Unit 3 Project will save Seminole Electric Cooperative's members $20 million during the project's first year of operation, and approximately $299 million in present worth revenue requirements over a 30-year period, compared to continuing to purchase the replaced capacity and energy from Florida Power & Light Company. Hardee Unit 3 also enhances the reliability of Seminole Electric Cooperative's system, defers the need for Seminole Electric Cooperative to add combustion turbine capacity to meet its reliability criterion, and reduces the risk to Seminole Electric Cooperative in the event that Florida Power & Light Company seeks to significantly modify the current partial requirements arrangement.

4.0 NEED FOR HARDEE UNIT 3

The Florida Public Service Commission has made a finding that Seminole Electric Cooperative has a need for 440 MW of additional capacity in 1999. They state in their Order No. PSC-94-0761-FOF-EC dated June 21, 1994, "In addition to enabling Seminole [Electric Cooperative] to meet the obligation it assumed to serve an additional 440 MW of capacity, HPS #3 will improve reliability of Seminole [Electric Cooperative's] system, defer the need for additional combustion turbine capacity, and satisfy a portion of the state's need for additional capacity...in the 1999 time frame to contribute to the reliability and integrity of the electric system of Seminole [Electric Cooperative] and the State of Florida. RUS concurs with the Florida Public Service Commission that Seminole Electric Cooperative, has a demonstrated need for Hardee Unit 3.

It is not possible to predict the fate of the power being purchased by Seminole Electric Cooperative from Florida Power and Light that will be displaced by the operation of Hardee Unit 3. However, it is presumed that Florida Power and Light will generate less power since overall demand will not increase when Hardee Unit 3 comes on line in 1999. Florida Power and Light's generation would be reduced unless other power purchase agreements are established for the electricity that would no longer be purchased by Seminole Electric Cooperative.

The Florida Public Service Commission held a public hearing on the need for Hardee Unit 3 and on June 21, 1994, issued the final order of need to Seminole Electric Cooperative. (See Appendix C.)

4.2 Need for Supplemental EIS

4.2.1 RUS Need

RUS is preparing this Supplemental EIS for its anticipated federal action of providing a loan guarantee to Seminole Electric Cooperative to finance the cost of constructing Hardee Unit 3 to meet its NEPA requirements pursuant to RUS Environmental Policy and Procedures, 7 CFR § 1794.

4.0 NEED FOR HARDEE UNIT 3

RUS Environmental Policy and Procedures do not require a public hearing upon issuance of a Draft Supplemental EIS. At the time of issuance of this document, RUS has no plans to conduct a public hearing subsequent to the completion of the 45-day comment period. Numerous public meeting were held near the Hardee Power Station site by Seminole Electric Cooperative as part of the Florida Electric Power Plant Siting Act process undertaken for the proposed Hardee Unit 3. Public participation in these meetings was sparse and there was no indication resulting therefrom that controversy or unresolved issues warrant further public meetings. However, should RUS believe, based on public input received during the 45-day comment period of the DSEIS, that a public hearing would be beneficial to the NEPA process, the possibility of conducting a public hearing would be taken into consideration.

4.2.2 EPA Need

As indicated previously, EPA's role as a NPDES permitting agency has changed upon EPA authorization of the NPDES permitting program to the State of Florida on May 1, 1995. As such, EPA no longer has a direct federal action for the proposed Hardee Unit 3 since NPDES permitting for plant operation is now a FDEP state action with EPA program oversight as opposed to an EPA federal action. Therefore, EPA's need for NEPA EIS documentation for its new source NPDES permitting decision for Hardee Unit 3 is no longer a relevant requirement. However, the proposed RUS action and RUS need for a Supplemental EIS discussed above remains unchanged.

5.0 ALTERNATIVES

The following subsections discuss the alternatives considered.

5.1 No Action

Under the "no action" alternative, no federal action would be taken by RUS and/or EPA that would be required for Seminole Electric Cooperative to construct and operate Hardee Unit 3. This alternative would mean that the environmental impacts directly associated with the Hardee Unit 3 construction and operation would not occur provided that a federal action by RUS and/or EPA is needed at time of construction. Selection of this alternative would result in hindering the ability of Seminole Electric Cooperative to meet its future projected power requirements and would result in the loss of opportunity to convert previously altered resources that would be ideally suited to the production of electric power.

Due to the future projected power requirements of Seminole Electric Cooperative and the opportunity to locate generation facilities at an existing generation site with little additional impact on the quality of the human environment, RUS rejects this alternative. The environmental impacts, or lack thereof, of the no action alternative are anticipated to be the same as those described in the Final EIS prepared for the Hardee Power Station and issued in 1991.

5.2 Alternative Sites

A multiple-phase site selection study was conducted by Seminole Electric Cooperative in 1987 and 1988 to locate, evaluate, and recommend sites capable of supporting the construction and operation of a 660 MW combined-cycle power plant. The study covered all or portions of 46 counties in Florida (generally corresponding to the applicant's member service area) and was initiated in order to comply with NEPA and RUS environmental requirements.

The results of regional screening, intermediate screening, and detailed study area analysis identified the southwest Polk/northwest Hardee County areas as the highest rated area for power plant development. A 526 hectare (ha) site was acquired and, in the early 1990s, the first phase of power plant development, known as the Hardee Power Station, was constructed on a portion of the site. Hardee Unit 3 represents additional generation capacity that was originally planned to be accommodated at the site.

As described in the Final EIS for the Hardee Power Station issued by the Rural Electrification Administration in January of 1991, the Hardee Power Station was originally proposed to be completed in three phases (Phases 1A, 1B, and 2), resulting in the construction of 660 MW of generating capacity. This 660 MW was divided between TECO Power Services and Seminole Electric Cooperative.

Phase 1A of Hardee Power Station (existing units) consists of a 295-MW generating facility with a 220-MW combined cycle unit and a 75-MW stand-alone combustion turbine. Phase 1A, owned by TECO Power Services, was placed in commercial operation on January 1, 1993. Phase 1B will consist of adding a 75-MW combustion turbine to the Phase 1A stand-alone combustion turbine, two heat recovery steam generators, and a 70-MW steam turbine to complete a second 220-MW combined cycle unit. Phase 1B, also to be owned by TECO Power Services, will increase the total generating output of the Hardee Power Station to 440 MW with an in-service date no later than January 2003. Phase 2 was planned to consist of a third 220-MW combined cycle unit to be constructed by Seminole Electric Cooperative and had no projected in-service date. The proposed Hardee Unit 3 Project is scheduled to be an expansion of Seminole Electric Cooperative's Phase 2 from 220 MW to 440 MW, thus giving the site an ultimate generating capacity of 880 MW. When the proposed Hardee Unit 3 is placed in service on January 1, 1999, the station will have a total generating capacity of 735 MW. The ultimate Hardee Power Station generating capacity of 880 MW would be achieved with the completion of Phase 1B still scheduled no later that January 2003.

Construction and operation of Hardee Unit 3 at the existing Hardee Power Station site ensures the beneficial use of the resources at the site and minimizes overall environmental and land use impacts associated with development of the additional generating capacity.

Specific benefits of locating the Hardee Unit 3 facility at the Hardee Power Station site include:

1. Use of a previously impacted area. The Hardee Power Station site has been used for both phosphate mining and power plant development. In addition, this site has already been developed for the Hardee Power Station site and would therefore result in fewer impacts than development of a green-field site.

2. Potential use of shared facilities. The Hardee Unit 3 project will share a number of facilities with the existing Hardee Power Station including the existing cooling reservoir, transmission lines, access road, Floridan aquifer wells, and switchyard.

3. Additional transmission lines will not be required to support the Hardee Unit 3 facility.

4. Utilization of existing facilities, such as the cooling reservoir, will increase the overall use of dedicated resources.

5. No additional use of groundwater over that previously approved.

Site layout design alternatives analyses were not necessary to establish the preferred site layout for Hardee Unit 3 because extensive environmental studies were conducted for the entire site in the late 1980s and early 1990s. This database was updated for the Hardee Unit 3 project and used to establish an environmentally sensitive site layout that minimizes environmental impacts.

5.3 Site Design Alternatives

The overall site arrangement was developed to take advantage of the space available at the Hardee Power Station site for the addition of Hardee Unit 3 and to limit construction activities to an existing power plant site as opposed to developing a site at an environmentally pristine location. The design of Hardee Unit 3 takes advantage of the location of the existing cooling reservoir, the existing switchyard, and the site topography for sizing and locating the proposed stormwater detention pond. This design was intended to accommodate the facilities in a reasonable manner and minimize both onsite environmental impacts, such as to wetlands, and the initial capital and operational cost of the plant.

The combustion turbines and heat recovery steam generators would be oriented in an east-west configuration to produce an arrangement that is the most cost effective form the standpoint of routing circulating water piping to the existing cooling reservoir and routing the overhead electrical lines through the new switchyard to the existing switchyard. The fuel unloading and storage facilities would be located on the northeast portion of the site to minimize delivery truck traffic into the main power block area. A dedicated water treatment building and associated storage tanks would be located adjacent to the power block. Wastewater treatment systems would also be included in that area. The general services building with control room and administrative offices and facilities would be located between the two combustion turbine/heat recovery steam generator trains. The stormwater detention pond would be located at the southwest corner of the site.

One of the most significant design alternative decisions relating to the steam portion of the proposed combined cycle unit is the selection of the preferred heat rejection system. This system is fundamental in the transfer and/or rejection to the atmosphere of waste heat from the condensation of the turbine exhaust steam. Optimization of the heat rejection system can serve to minimize plant capital and operation costs and environmental impacts.

The Hardee Power Station was originally certified for the construction and operation of a 230-hectare (570-acre) cooling reservoir with makeup from the Floridan aquifer, rainfall, and surface runoff for once-through condenser cooling. A water alternatives study was conducted for the Hardee Unit 3 Project to identify and evaluate all reasonable water sources within a 16-kilometer (10-mile) radius of Hardee Power Station. Results of this study showed that all condenser cooling needs for Hardee Unit 3 could be met by the existing cooling reservoir. Furthermore, the previously certified groundwater allocation for both the reservoir makeup water and plant process water are adequate to meet the requirements of an 880 MW facility at the existing Hardee Power Station. The additional heat load to the cooling reservoir will change the water quality via an increased evaporative flux. Table 5.2.1-1 of the Site Certification Application/Environmental Analysis compares the originally estimated and revised estimated reservoir water quality. The anticipated change in water quality does not affect the facility's ability to meet applicable water quality standards.

Other potential water sources for condenser cooling, including treated wastewater and water cropping, were identified by the water alternative study, but none were found to be superior to the use of the previously certified cooling reservoir with makeup water from the Floridan aquifer.

Other project systems including fuel, generating technology, and disposal options proposed for the Hardee Unit 3 project are consistent with those described in the original Hardee Power Station certification.

The water budget information for the previously certified units are summarized in Table 5.3-1; please refer to Site Certification Application/Environmental Analysis Table 35.0-1 for details of the revised water budget. The originally certified groundwater allocation was a monthly average of 3.8 mgd with a maximum withdrawal of 8.64 mgd. This allocation will not change for Hardee Unit 3.

5.4 Alternative Fuels

The primary fuel proposed for operating the combustion turbines of Hardee Unit 3 will be natural gas with No. 2 fuel oil being used as a secondary fuel when natural gas is unavailable or uneconomical to use. If these fuels become either uneconomical or unavailable, alternative fuels such as synthetic gas may serve as fuel sources. Hardee Unit 3 will have the ability to utilize medium-British-thermal-unit (Btu) gas derived from advanced coal gasification technologies. The site layout has been designed to allow the potential construction of a coal gasification plant. If fuel supplies or prices made this type of facility economical, a gasification plant could be permitted separately and constructed as an associated facility of the Hardee Unit 3. Recent design enhancements of coal gasification processes allow the environmentally acceptable use of medium-Btu synthetic gas in combustion turbines.

Currently available gasification plant designs are technically feasible as an alternative fuel source for combustion turbines and can be constructed and operated at the Hardee Power Station site in an environmentally suitable manner. Any site specific environmental constraints could be overcome by proper design.

Several gasification technologies exist at various levels of development and demonstration to convert coal to medium-Btu synthetic gas (syngas). Three basic designs exist: fixed-bed, fluidized-bed, and entrained-flow gasifiers. Coal gasification is, simply, reacting coal in a reducing (oxygen-deficient) atmosphere with steam or water and oxygen or air to produce a product syngas composed primarily of hydrogen (H_2) and carbon monoxide (CO). The sulfur in the coal is converted to hydrogen sulfide (H_2S) and carbonyl sulfide (COS). Although the gasification process affects the overall plant design, the gasification step is only one part of the overall gasification plant. Other steps include syngas cooling and cleanup.

The gasifier most widely used throughout the world is a fixed-bed design. Most recent research and development of gasifiers for electrical power generation in the United States, however, has focused on the entrained-flow designs (i.e., those by Texaco, Shell, and Destec).

5.5 Conservation

Conservation and load management programs that provide significant demand and energy reductions for peak and overall loads are reflected in Seminole Electric Cooperative's load and energy forecasts and primarily include load management, heat rate improvement, oversize transmission systems, and street light changeout programs. The demand side management programs of Seminole Electric Cooperative and its member distribution cooperatives are divided into load management and energy conservation programs. Seminole Electric Cooperative coordinates the load management and voltage reduction of its participating distribution members to achieve the optimum utilization of the individual load management systems. The effects of the load management programs are verified on a daily basis by the Seminole Electric Cooperative energy management system computer. Following each period during which the load management functions were exercised, the load estimation program in the energy management computer generates the data for what the load would have been absent the load management functions.

Conservation programs are the responsibility of the individual member systems. Each member has a portfolio of programs tailored to the unique characteristics of its service territory. The customer density, housing size and type, average income, and weather patterns are among the characteristics which vary greatly from member to member. The variety of conservation programs varies accordingly. The conservation program effects will be verified through an analysis of the actual data gathered in the year 2000 compared to 1994 Power Requirements Study Forecast for the year 2000. Seminole Electric Cooperative currently estimates that the demand side management program will displace the need for approximately 13,000 megawatt hours in the year 2000 and 38,500 megawatt hours during the 1995-2000 period.

These programs serve primarily to reduce the amount of Seminole Electric Cooperative's load during peaking hours. Even after the addition of Hardee Unit 3, loads during peak periods within the Florida Power and Light and Florida Power Company's control areas will continue to be met by partial requirements purchases from these companies. Thus while additional conservation would further reduce the cost of Seminole Electric Cooperative's operations by reducing it's partial requirements purchases from Florida Power and Light and/or Florida Power Company, it would not affect either the amount or timing of Seminole Electric Cooperative's need for capacity to cost-effectively replace partial requirements purchases.

Table 5.3-1 Total Floridan Aquifer Well Requirements for Originally Certified Hardee Power Station

Water Use	Average Annual Requirements (gpd)
Reservoir Makeup	1,203,800
Units 1a, 1b, & 2 Service Water	613,000
Total Floridan Aquifer Water Req.	1,816,800
Summary of Reservoir Water Balance	
Reservoir Water Inflows:	
Direct Rainfall	2,224,900
Surface Runoff	311,500
Wastewater Discharge	129,500
Deep Well Makeup	1,203,800
Total Reservoir Inflow	3,869,700
Reservoir Water Outflows:	
Leakance Losses	336,000
Dike Seepage Losses	92,000
Evaporation	3,434,400
Discharge to Payne Creek	7,300
Total Reservoir Outflow	3,869,700

6.0 AFFECTED ENVIRONMENT

6.1 Geology and Soils

Geology and soils of the overall Hardee Power Station site were described in the Draft and Final Environmental Impact Statements for the Hardee Power Station. Since Hardee Unit 3 is proposed to be located on the Hardee Power Station site and this Draft Supplemental EIS is a supplement to the Final EIS for the Hardee Power Station, information on geology and soils is incorporated into this section by reference and will not be duplicated herein.

6.2 Water Resources

6.2.1 Surface Water

The Hardee Power Station site is in the Polk Upland physiographic region with land surface elevations ranging from 30 to 40 m (100 to 130 ft) above sea level. The site is near the headwaters of Payne Creek, approximately 16 km (10 miles) from the confluence of the creek with the Peace River. This confluence is approximately 129 km (80 miles) from the mouth of the Peace River at Charlotte Harbor on the Gulf of Mexico. Prominent site features are the existing Hardee Power Station units (covering approximately 20 ha (50 acres)) and the 230-ha (570-acre) cooling reservoir.

Cooling Reservoir

The existing 230-ha (570-acre) cooling reservoir was designed and constructed to satisfy at a minimum the engineering design and operational criteria (e.g., sufficient water supply and heat rejection capabilities) for the 660-MW Hardee Power Station.

The cooling reservoir was constructed on reclaimed phosphate land as part of reclamation efforts by Agrico for its approved mining operations. The northeastern portion of the reservoir is below grade (i.e., the reservoir water surface is below the adjacent reclaimed ground surface). The south and western edges of the reservoir are above grade (i.e., the reservoir water surface is above the adjacent reclaimed and/or undisturbed ground surface). In these areas, the reservoir has been created and maintained by the construction of a wide berm. The outside slope is 20:1, and the inside slope is 4:1. This very flat, outside slope was selected to create a stable structure with low maintenance and seepage control requirements. Based on Agrico's previous reclamation and reservoir construction experience in the area, this very flat slope provides ideal, stable and low maintenance conditions for the creation of ponds and reservoirs. The minimum cooling reservoir water depth is approximately 10 ft.

Analytical results from a water quality sample obtained from the cooling reservoir in October 1993 are presented in Table 6.2.1-1. In general, water quality in the cooling reservoir was found to be good.

In addition to providing the condenser cooling water supply for the Hardee Power Station existing units, the cooling reservoir also functions as the fundamental component of the heat dissipation/rejection system. In the circulating water system, cooling water from the cooling reservoir is pumped through the condenser to condense the turbine exhaust steam for the Hardee Power Station existing units. This heated water is discharged back to the reservoir, where it is cooled through evaporative, radiant, and other natural cooling mechanisms as it flows through the reservoir. After cooling, the water is reused for additional condenser cooling. The existing cooling reservoir will be utilized for similar purposes for the Hardee Unit 3 facility.

Unnamed Tributary

The unnamed tributary to Payne Creek is located immediately to the west of the Hardee Unit 3 project site and receives runoff from the immediate surrounding area. Water levels in the tributary are a function of rainfall events and antecedent moisture conditions in the surrounding soils. Standing water is present year-round in the center portion of the tributary which was mined and reclaimed as an open water body. From the open water system, the tributary grades into a more meandering path through a small forested segment which was not mined. The hydrologic flow in the forested segment is more pronounced than in the open water portion of the tributary. From the project site, the tributary follows in a generally southern direction, eventually entering Payne Creek along the southwestern boundary of the Hardee Power Station site.

Payne Creek

Payne Creek, in the site vicinity, is a meandering stream with a well-defined channel under average flow conditions. Stream dimensions vary from 3 to 6 m (10 to 20 ft) wide with a maximum channel depth of approximately 1.5 m (5 ft). Beyond the channel, the creek flows within a broad floodplain.

Payne Creek and the Peace River to Charlotte Harbor are classified by the State of Florida as Class III surface waters . Charlotte Harbor is classified as a Class II surface water.

The Hardee Unit 3 site consists of gently sloping terrain with gradients from 0 to 6 percent in the direction of Payne Creek. Several wetland areas exist on or adjacent to the site with individual drainageways to Payne Creek. Portions of the Hardee Power Station site and adjacent lands (on both sides of Payne Creek) have been mined for phosphate. After mining was completed, these areas were reclaimed in accordance with approved reclamation plans.

The US Geological Survey has maintained a stream gauging station on Payne Creek near Bowling Green for 14 years (1964-1968 and 1980-present). The station (No. 02295420) is located on the U.S. 17 bridge over the creek approximately 2.4 km (1.5 miles) from the creek mouth at Peace River and is about 19 km (12 miles) southeast of the Hardee Unit 3 site. This station was used to estimate the mean, maximum, and minimum average daily streamflow in Payne Creek near the Hardee Power Station site. The US Geological Survey station flows were multiplied by the ratio of drainage areas for the two locations to determine the flows in Payne Creek at the discharge location near the Hardee Power Station site. These calculations yield an average annual Payne Creek flow near the Hardee Power Station site of 0.62 cubic meter per second (m^3/s) [22 cubic feet per second (cfs)], or approximately 0.9 cfs per square mile.

The low flows in Payne Creek near the Hardee Power Station site were estimated using low-flow frequency analyses of the low flows at the Payne Creek-Bowling Green USGS station (USGS, 1984), corrected to the Hardee Power Station site location using the ratio of drainage areas. The low flows for durations from 1 to 183 days and recurrence intervals from 2 to 20 years are shown in Table 6.2.1-2. Seven-day low flows of 0.03 m^3/s (1.0 cfs) or less can be expected to occur with a recurrence interval of 2 years. Thirty-day low flows of 0.06 m^3/s (2.0 cfs) or less can also be expected to occur with a recurrence interval of 2 years. Given the relatively small drainage area of Payne Creek at the Hardee Power Station site, regular periods of low flow routinely occur.

Flood flows in Payne Creek near the site were estimated from a technique described in US Geological Survey publication WRI 82-4012 (1982). The US Geological Survey developed a series of regression equations from long-term discharge stations using the independent parameters drainage area, slope, and lake area in the basin. The regression equation applicable to the site area, the regression constants and exponents, and the resulting flows are given in Table 6.2.1-3 for recurrence intervals from 2 to 500 years. The peak 10-year flow at the Hardee Power Station site is estimated to be 50.7 m^3/s (1,810 cfs); the peak 25-year flow is estimated to be 70.8 m^3/s (2,530 cfs).

During the period of site-specific stream gauging (October 11, 1988, through April 13, 1989), the Payne Creek discharge varied substantially. The highest Payne Creek discharge (1.05 m^3/s; 37.6 cfs) was observed on January 25, 1989; the lowest Payne Creek discharge (0.04 m^3/s; 1.6 cfs) was observed on April 11-13, 1989. The Payne Creek discharge hydrograph is presented in Figure 6.2.1-1.

Based on this streamflow hydrograph, there was a slow and steady decrease in the baseflow (i.e., non-storm event runoff) from October to April, with occasional short-term rises due to area rainfall. The creek network drains the watershed relatively rapidly; frequent or sustained rain, such as the summer months' rainfall, is required to increase this baseflow.

Streamflow measurements were taken once a month near the Hardee Power Station site from October 1988 through April 1989 (PC-2) and downstream of the site near Bowling Green from December 1988 through April 1989 (PC-4, USGS Station No. 02295420). The locations of these two stations are presented in Figure 6.2.1-2. Table 6.2.1-4 gives a summary of the recorded stages and streamflows at Station PC-2, near the Hardee Power Station site.

Chemical Characteristics

Prior studies of surface water quality in the site vicinity have been performed by phosphate mining companies as part of permit approval or monitoring programs for Development of Regional Impacts, National Pollutant Discharge Elimination System permit approval programs, mining and reclamation plans, and related environmental permits. Two different water quality studies were conducted in Payne Creek near the site, by Agrico and by CFI (conducted by Dames and Moore). The Agrico study consists of four annual reports for the period 1983-1986. The CFI (Dames and Moore) study encompassed the period from July 1975 through January 1976. Water quality samples collected during these two studies represent data collected from four different station locations (Stations 1, 2, 3, and 4). Data from the two studies are combined and summarized in Table 6.2.1-5. These four station locations are shown in Figure 6.2.1-3.

For this previous data, the mean values (at any station) for 5 of the 46 parameters tested exceeded Class III water quality standards. These parameters included: dissolved oxygen, chromium, iron, lead, and zinc. The mean dissolved oxygen concentration failed to meet Class III water quality criteria at three stations. The remaining parameters (i.e., chromium, iron, lead, and zinc) exceeded Class III water quality criteria at two stations and were based on a relatively few number of observations.

In 1993, Seminole Electric Cooperative collected two sets of water quality samples at three of the former water quality stations used in support of the 1989 Site Certification Application (i.e., Stations PC-1, PC-2, and PC-3; see Figure 6.2.1-4). The results of the 1993 analyses are shown in Tables 6.2.1-6, 6.2.1-7, and 6.2.1-8 for Stations PC-1, PC-2, and PC-3, respectively. These tables include the previous monitoring data for comparison purposes.

In general, water quality monitored in Payne Creek as part of the 1993 monitoring program is very good. Only four exceedances of the Class III mercury standard were observed, and one exceedance of the Class III zinc standard was observed. As seen in Tables 6.2.1-6, 6.2.1-7, and 6.2.1-8, water quality in Payne Creek is essentially unchanged over the past 4 years. Exceedances of Class III water quality standards were observed in both data sets for ammonia nitrogen and in the 1993 data for silver at Station PC-3 and radium 226 at Stations PC-1 and PC-3. Based on these analyses, it can still be concluded that the water quality in Payne Creek is very good, and exceedances of Class III water quality standards are random in both a spatial and temporal sense.

Surface water hydrology and water quality field studies were conducted to supply the information needed for impact assessments are listed in the Site Certification Application/Environmental Analysis for Hardee Unit 3.

6.2.2 Ground Water

Shallow Aquifer

Groundwater in this aquifer is classified as G-II. The shallow aquifer at the Hardee Power Station site was initially characterized at five (1 deep) locations (see Figure 6.2.2-1) using 5.1-cm (2-inch) diameter PVC observation wells. These wells were constructed with 1.5-m (5-ft) screens installed at depth intervals of 4.5 to 6 m (15 to 20 ft) below ground.

Falling head borehole permeability testing was conducted in these observation wells on December 11, 1988, and results are shown in Table 6.2.2-1. The objective of these tests was to estimate the permeability and hydrologic characteristics of the shallow aquifer at areas that had not been mined and areas that had been mined. These characteristics are representative of mined and reclaimed portions of the Hardee Power Station site and are therefore considered applicable to the Hardee Unit 3 Project.

Water-level data were collected at the Hardee Unit 3 site during the preliminary geotechnical and foundation engineering study. Groundwater levels in the shallow aquifer were measured at the completion of drilling during the period from April 13 to 29, 1993. The water table surface was encountered at land surface to a maximum depth of 0.8 m (2.7 ft). The April 1993 water levels were used to construct a water table surface contour map as presented in Figure 6.2.2-2. Groundwater flow is predominantly westward with some variation of the water table surface near the west-central portion of the Hardee Unit 3 site. The direction of groundwater flow in this portion of the site may be influenced by localized topography or the interface between native and reclaimed soils.

Saturated flows closely parallel the top of the clayey sand which is considered to be the top of the Bone Valley formation. Continuous monitoring of the shallow aquifer at Southwest Florida Water Management District shallow Well No. 40 near Duette, Florida, indicated water levels fluctuated approximately 3.5 m (11 ft) during a 9-year period of record from 1981 to 1990.

Data from a total of 13 pump tests within a 24-km (15-mile) radius of the site were conducted by Southwest Florida Water Management District. The average values reported for these tests suggest that for the shallow aquifer, the coefficient of transmissivity equals 1,650 square feet per day (ft^2/day) and that the specific yield equals 0.11 or 11 percent by volume. The ratio of horizontal to vertical hydraulic conductivity is on the order of 200.

Water quality in the shallow aquifer is highly dependent on the surface activities and the chemical makeup of the rainfall. Based on the Southwest Florida Water Management District ambient groundwater quality monitoring program, the following regional trends are considered as background levels: total dissolved solids (TDS) concentration is expected to be less than 250 milligrams per liter (mg/L), total hardness less than 180 mg/L, chlorides (Cl) less than 25 mg/L, and sulfates (SO_4) less than 25 mg/L.

Site-specific water quality parameters were characterized during the preconstruction period at Hardee Power Station in February and March 1989, with results listed in Table 6.2.2-2. Pertinent parameters tested met primary and secondary drinking water standards.

Supplemental groundwater quality characterization of the shallow aquifer has been conducted since October 1991 at six monitor well locations at the Hardee Power Station site as a condition of certification for the existing units. These locations, designated Wells Hardee Power Station-1 through Hardee Power Station-6, are distinct from the observation wells installed prior to site certification, as described above. These wells are part of the monitoring plan implemented for the Hardee Power Station existing units to characterize groundwater quality trends in the vicinity of the cooling reservoir and the detention pond, and are described as follow:

-	Hardee Power Station-1 reservoir	Shallow well, upgradient from the cooling
-	Hardee Power Station-2 reservoir	Shallow well, downgradient from the cooling
-	Hardee Power Station-3 reservoir	Deep well, downgradient from the cooling
-	Hardee Power Station-4 reservoir	Shallow well, downgradient from the cooling
-	Hardee Power Station-5 pond	Shallow well, upgradient from the detention
-	Hardee Power Station-6 pond	Shallow well, downgradient from the detention

Monitor well locations are presented in Figure 6.2.2-1 and analytical data are summarized in Table 6.2.2-3.

Intermediate Aquifer

The intermediate aquifer at the Hardee Power Station site was initially characterized at three locations (B-3A, B-10A, and B-12A) using 2-inch-diameter PVC observation wells. These wells were screened between depths of 30 and 60 m (100 and 200 ft) below ground.

Falling head borehole permeability testing was conducted in these observation wells on December 11, 1988, to determine the permeability and hydrologic characteristics of the intermediate aquifer.

Water-level data recorded for the three observation wells constructed in the intermediate aquifer during the preconstruction period (December 1988) at Hardee Power Station indicated the water surface occurred between 3 and 8.5 m (10.2 and 28 ft) below land surface. Regional data reported by USGS (1993a) indicate the Hardee Power Station site is located in the vicinity of a potentiometric surface high for the intermediate aquifer. The contours of the potentiometric surface of the intermediate aquifer reported for September

1992 are presented in Figure 6.2.2-3. The direction of groundwater flow in the intermediate aquifer is toward the south-southeast in the vicinity of the Hardee Power Station site. Continuous monitoring of the intermediate aquifer at Southwest Florida Water Management District Hawthorn Well No. 40 near Duette, Florida, indicated water levels fluctuated approximately 4.3 m (14 ft) during a 10-year period of record from 1981 to 1990.

A total of nine pump tests within a 24-km (15-mile) radius of the site were conducted by Southwest Florida Water Management District. The average values reported for these tests suggest that for the intermediate aquifer, transmissivity equals 1,450 ft^2/day; storativity equals 0.0002; and leakance coefficient equals 0.0002 cubic foot per day per square foot. The ratio of horizontal to vertical hydraulic conductivity is on the order of 2,000.

Based on the Southwest Florida Water Management District (1988, Figure 27) ambient groundwater quality monitoring program, the following regional trends are considered as background levels: TDS is expected to be less than 250 mg/L, total hardness less than 120 mg/L, Cl less than 25 mg/L, and SO_4 between 25 and 250 mg/L. Site-specific water quality results are listed in Table 6.2.2-4. The sampled parameters generally meet state drinking water quality standards.

Floridan Aquifer

The Floridan aquifer was not initially characterized with site-specific data collected at the Hardee Power Station site, but was described on a regional basis. The contours of the regional potentiometric surface of the Floridan aquifer reported by the US Geological Survey for September 1992 are presented in Figure 6.2.2-4. Direction of groundwater flow in the Floridan aquifer is toward the southwest in the vicinity of the Hardee Power Station site. Continuous monitoring of a well completed in the Avon Park Formation of the Floridan aquifer at Southwest Florida Water Management District ROMP No. 40 deep well near Duette, Florida, indicated water levels fluctuated approximately 15.2 m (50 ft) during a 10-year period of record from 1981 to 1990.

Data from a total of 11 pump tests within a 24-km (15-mile) radius of the site were conducted by Southwest Florida Water Management District (Southwest Florida Water

Management District, 1988, Table 4). The average values reported for these tests indicate that for the Floridan aquifer, transmissivity equals 250,000 square foot per day, storativity equals 0.0011, and leakance coefficient equals 0.00021 cubic foot per day per square foot. The ratio of horizontal to vertical hydraulic conductivity is on the order of 2. Based upon the hydrologic data that characterized the Floridan aquifer in the vicinity of the Hardee Power Station site, a water use authorization was issued as part of the original site certification for Hardee Power Station for groundwater withdrawals of 3.8 mgd annual average and 8.64 mgd maximum daily average.

Water quality in the Floridan aquifer is dependent on the recharge from the overlying aquifers. Based on the Southwest Florida Water Management District ambient groundwater quality monitoring program, the following regional trends are considered as background levels: TDS is expected to be less than 350 mg/L, total hardness between 120 and 180 mg/L, Cl less than 25 mg/L, and SO_4 between 25 and 250 mg/L. Additional water quality characteristics are provided in Table 6.2.2-5, based on available data collected offsite.

Supplemental analysis of groundwater samples collected from production Well No. 1 installed at the Hardee Power Station existing facilities has been conducted. Analyses of chloride, sulfate, and TDS conducted on samples collected during 1993 are summarized in Table 6.2.2-6. The sampled parameters generally meet state groundwater quality standards.

6.3 Air Quality

6.3.1 Climate and Meteorology

The meteorological data collected at existing monitoring stations were used to describe the local and regional climatology in the vicinity of the proposed Hardee Unit 3 Project. The closest existing meteorological station to the Hardee Power Station site with complete meteorological data is the primary National Weather Service station located at the Tampa International Airport situated approximately 67 km (42 miles) to the west-northwest of the proposed plant site. The National Weather Service has recorded weather observations for more than 40 years at this site, and these data are the most complete for and representative of the region surrounding the proposed project. The FDEP has approved the use of these meteorological data in previous air permit applications for this area and recommended that these data be used for this project.

6.3.1.1 Temperature

The climate in the Tampa area, including the project site, is subtropical with a marine influence from the Gulf of Mexico. Temperature means and extremes for Tampa are presented in Table 6.3.1-1. The mean annual temperature is approximately 22°C (72°F) with monthly temperatures varying from a maximum of 32.2°C (90.0°F) to a minimum of 10.7°C (51.3°F). Record extreme temperatures range from a low of -7.8° (18°F) to a record high of 37°C (99°F). Although the sun's elevation is nearly zenith during the summertime, temperatures do not exceed 38°C (100°F). The reason can be attributed to the high relative humidities with subsequent cloud cover formation and the abundant convective-type precipitation.

6.3.1.2 Relative Humidity and Precipitation

Relative humidities, which indicate the amount of moisture in the air at a given temperature, are presented in Table 6.3.1-2 for the morning hours of 0100 and 0700 and early afternoon and evening hours of 1300 and 1900. The highest humidities are coincident with the coolest ambient temperatures, which generally occur at 0700, or near dawn. The lowest humidities coincide with the highest ambient temperatures.

Precipitation means and extremes are also presented in Table 6.3.1-2. Approximately 69 percent of the annual precipitation falls during the 6 warmest months, May through October. The mean annual precipitation is approximately 122 cm (48 inches), but this has varied from as little as 74 cm (29 inches) to over 193 cm (76 inches) in the past 46 years. The majority of rain is in the form of short-lived convection showers.

6.3.1.3 Wind Patterns

The Tampa area lies entirely within the trade wind belt (i.e., below 30°N latitude), resulting in predominant winds from the east. However, because of the location of the Gulf of Mexico, moderate to strong late afternoon sea breezes occur on days with strong land heating producing local onshore winds (i.e., wind with a westerly component). Annual and seasonal windroses for the 5-year period from 1982 through 1986 are given in Figures 6.3.1-1 and 6.3.1-2. A summary of the average wind speeds for each season and throughout the year, including calm conditions, is presented in Table 6.3.1-3.

6.3.1.4 Atmospheric Stability

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

During the summer months, unstable stability occurs nearly 40 percent of the time due to strong insolation, whereas unstable stability occurs only 16 percent of the time in the winter months. Neutral stability occurs most frequently during the winter months due to the higher wind speeds in this season. The occurrence of stable stability is nearly uniform throughout the year, with a maximum occurrence of approximately 47 percent in the fall.

6.3.1.5 Mixing Height

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

The seasonal and annual average morning and afternoon mixing depths for Tampa determined using the Holzworth method are listed in Table 6.3.1-4. The highest afternoon mixing depths occur in the spring and the lowest morning depths occur in mid-winter.

Severe Storms

Thunderstorms are the most frequent of severe storms, occurring an average of 87 days per year. These storms occur throughout the year, but about 88 percent occur from May through October.

In the 80-km (50-mile) coastal strip from above Pinellas County to Tampa Bay, there is less than a 10 percent chance that a tropical storm will pass over the Bay area during any given year. For storms of hurricane strength [i.e., wind speeds exceeding 117 kilometers per hour (km/hr) (73 mph)], the chance decreases to 1 in 16 (i.e., 6.2 percent) with a 1 percent chance that the winds will be greater than 200 km/hr (124 mph) (i.e., wind speeds of a great hurricane).

Statistics compiled by the Severe Local Storms (SELS) branch of the National Severe Storms Forecast Center (Pautz, 1969) show that 42 tornadoes were spotted within the 1° latitude by 1° longitude square centered just south of the Tampa area from 1955 to 1967. This averages approximately two tornadoes per year. The tornado recurrence interval for any specific point location within the 1° square was estimated by the methodology of Thom (1963) to be 740 years. Therefore, the mean recurrence interval for a tornado striking a point within this square is 740 years. The most common tornado month is June.

6.3.2 Ambient Air Quality

The existing applicable national and Florida ambient air quality standards (AAQS) are presented in Table 6.3.2-1. Primary national AAQS were promulgated to protect the public health, and secondary national AAQS were promulgated to protect the public welfare from any known or anticipated adverse effects associated with the presence of pollutants in the ambient air. Areas of the country in violation of AAQS are designated as nonattainment areas, and new sources to be located in or near these areas may be subject to more stringent air permitting requirements. Hardee County is classified as an attainment area for all criteria pollutants. Adjacent counties, such as Polk County, are also classified as attainment areas for all criteria pollutants. The nearest nonattainment areas to the project site are Hillsborough and Pinellas counties, which are classified as nonattainment for ozone, and a portion of Hillsorough County, which is classified as nonattainment for lead.

Prevention of significant deterioration (PSD) review is used to determine whether significant air quality deterioration will result from the new or modified source located in attainment areas. Under federal PSD review requirements, all major new or modified sources of air pollutants regulated under the Clean Air Act (CAA) must be reviewed and approved by EPA or an agency delegated with PSD review authority. In Florida, the FDEP has been delegated PSD review authority by EPA.

In promulgating the 1977 CAA Amendments, Congress specified that certain increases above an air quality baseline concentration level of sulfur dioxide (SO_2) and particulate matter (PM) concentrations would constitute significant deterioration. The magnitude of the allowable increment depends on the classification of the area in which a new source (or modification) will be located or have an impact. Three classifications were designated based on criteria established in the CAA Amendments. Initially, Congress promulgated areas as either Class I [national parks, national wilderness areas, and memorial parks larger than 2,024 ha (5,000 acres), and national parks larger than 2,428 ha (6,000 acres)] or as Class II (all areas not designated as Class I). No Class III areas, which would be allowed greater deterioration than Class II areas, were designated. EPA then promulgated as regulations the requirements for classifications and area designations.

On October 17, 1988, EPA promulgated regulations to prevent significant deterioration due to NO_x emissions and established PSD increments for NO_2 concentrations. The EPA class designations and allowable PSD increments are presented in Table 6.3.2-2. Florida has adopted the EPA allowable increments for PM, SO_2, and NO_2. On June 3, 1993, EPA promulgated regulations to establish PSD increments for PM with an aerodynamic diameter of 10 micrometers (um) or less (PM10). These regulations become effective 1 year from the promulgation date or earlier if adopted by Florida; Florida has not yet adopted these regulations.

The term *baseline concentration* evolves from federal and state PSD regulations and denotes a fictitious concentration level corresponding to specified baseline data and certain additional baseline sources. By definition in the PSD regulations, as amended August 7, 1980, baseline concentration means the ambient concentration level which exists in the baseline area at the time of the applicable baseline date. A baseline concentration is determined for each pollutant for which a baseline date is established and includes:

1. The actual emissions representative of sources in existence on the applicable baseline date; and
2. The allowable SO_2 and PM emissions of major stationary sources which commenced construction before January 6, 1975 and NO_x emissions before February 8, 1988 but were not in operation by the applicable baseline date.

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

1. Actual SO_2 and PM emissions from any major stationary source on which construction commenced after January 6, 1975 and NO_x emissions before February 8, 1988; and
2. Actual emission increases and decreases at any stationary source occurring after the baseline date.

Baseline date means the earliest date after August 7, 1977 for SO_2, total suspended particulate (TSP), and PM10 concentrations and February 8, 1988 for NO_2 concentrations, on which the first complete application under 40 CFR 52.21 is submitted by a major stationary source or major modification subject to the requirements of 40 CFR 52.21.

6.3.2.1 Ambient Air Quality Data

The FDEP has approved an exemption from PSD ambient air quality monitoring for this project. The request was made in the Environmental Licensing Plan of Study (KBN, 1993) and the FDEP approved the monitoring exemption in October 1993. The exemption is appropriate because:

1. The facility's impacts of applicable pollutants are expected to be below the *de minimis* impact levels for certain pollutants (e.g. CO, NO_2). For those pollutants, an exemption from monitoring is available under the FDEP rules [62-2.500(3)(e) F.A.C.] for impacts less than *de minimis* impact levels;
2. For those pollutants above the *de minimis* impact levels (i.e., SO_2 and PM10), existing ambient data collected by the FDEP, Tampa Electric Company, and Florida Power Corporation are representative of air quality at the project site; and
3. The air dispersion modeling and monitoring analyses for the Hardee Power Station, proposed to operate at a 660-MW capacity (currently permitted for 295 MW), was exempt from performing preconstruction monitoring. For that project, ambient data collected by the FDEP were used to satisfy the preconstruction monitoring requirements. Since the proposed project will have lower emissions and impacts than those considered for Hardee Power Station, preconstruction monitoring is not warranted since baseline conditions have essentially remained the same since the Hardee Power Station was originally permitted.

The FDEP operates a statewide ambient air monitoring network with monitoring stations nearest to the project site located in Polk County. The network in Polk County consists of several monitoring stations that measure SO_2 and O_3 concentrations. Ambient SO_2 concentrations are measured at monitoring stations located in Mulberry, approximately 28 km (17 miles) from the project site, and in Nichols, located approximately 24 km (15 miles) from the project site. Ambient O_3 concentrations are measured at two monitoring stations, both located in Lakeland, approximately 33 km (21 miles) and 43 km (27 miles) from the project site.

Over the last several years, ambient data have been collected in the vicinity of the site by Tampa Electric Company and Florida Power Corporation. A 1-year program was conducted by Tampa Electric Company at two sites located approximately 10 km (6 miles) to the north of the project site. Ambient SO_2, PM10, and O_3 concentrations were measured from April 1991 through March 1992. A 1-year program was conducted by Florida Power Corporation at one site located approximately 23 km (14 miles) to the northeast of the project site. Ambient SO_2, PM10, and O_3 concentrations were measured from October 1991 through October 1992.

Summaries of observed SO_2, PM10, and O_3 concentrations measured at these stations from 1990 through 1992 are given in Tables 6.3.2-3 through 6.3.2-5.

The SO_2, PM10, and O_3 concentrations observed at these stations are within national and state AAQS. Because these monitors are located in more developed areas and/or in proximity [i.e., within 10 km (6.2 miles)] of major sources, the observed concentrations are considered to be higher than those expected to occur at the proposed facility site.

Given the rural nature of the site, existing concentrations of other criteria pollutants, i.e., carbon monoxide (CO), NO_2, and lead (Pb), which are usually associated with an urban environment, should be well below the AAQS.

6.3.2.2 Existing Air Pollutant Sources

The proposed plant location is in a rural area with minimal number of air pollution sources. The major source near the site is the Hardee Power Station existing units located adjacent to the proposed site. The Hardee Power Station existing units consist of a combined cycle unit (two combustion turbines, associated heat recovery steam generator, and steam turbine) and simple cycle unit (one combustion turbine) with a maximum permitted capacity of 295 MW. Other major air pollution sources are located within 15 km (9 miles) from the site in Polk County. These sources are mainly phosphate rock mining and beneficiation plants. Air pollutant emissions from these sources, in the form of fugitive dusts, are not significant.

Major sources that are proposed for the area include the Tampa Electric Company's Polk Power Station, located approximately 10 kilometers (km) (6 miles) to the north, and Florida Power Corporation's Polk County site, located approximately 19 km (12 miles) to the northeast of the site. The Tampa Electric Company's facility will consist of an integrated coal gasification combined cycle project with maximum electrical generating capacity of 260 MW. The Florida Power Corporation facility will initially consist of four combined cycle generating units with an electrical generating capacity of 470 MW. Both of these proposed facilities have undergone review in the Site Certification Application/Environmental Analysis process; the SCAs were approved in January 1994 by the Site Certification Board, which consists of the Governor and State Cabinet.

Because SO_2 and PM concentrations were determined to be significant due to emissions from Hardee Unit 3 (see Section 5.6 of the Site Certification Application/Environmental Analysis), a detailed review was conducted to determine SO_2 and PM emission sources located within 55 km (34 miles) of the proposed source. Based on emission data developed by the FDEP from previous air permit applications, the major facilities located within 55 km (34 miles) of the site that have SO_2 or PM emissions greater than 20 tons per year (TPY) are presented in Tables 6.3.2-6 and 6.3.2-7, respectively.

Additional major emission sources located more than 55 km (34 miles) from the proposed source were also identified and considered in the air quality modeling analyses.

6.3.2.3 Background Concentrations

Background concentrations are air quality concentrations due to air pollutant sources not explicitly accounted for in the air modeling analysis. Because the site is located near very few major sources of SO_2 or PM emissions, background concentrations are expected to be low. As a result, existing monitoring data are used to estimate background concentrations. The ambient data are collected in areas that are more industrialized and have higher emission densities than the proposed site. Therefore, the estimated background concentrations are considered to be conservative (i.e., higher concentrations than actually exist at the proposed plant site).

For SO_2 concentrations, data collected in 1992 by the FDEP during the periods that TECO and Florida Power Corporation conducted their monitoring programs were reviewed and used in estimating background concentrations. During these monitoring programs, the highest 3-hour, 24-hour, and annual average concentrations were 256, 50, and 11 ug/m^3, respectively. These concentrations were assumed to represent background concentrations.

Similar to the SO_2 concentrations, the PM10 background concentrations were derived from data collected in 1992 by the FDEP during the periods that TECO and Florida Power Corporation conducted their monitoring programs. Based on the data review, the highest 24-hour and annual average concentrations of 70 and 20 ug/m^3 were assumed to represent background concentrations.

Since the proposed Hardee Unit 3 was exempted by the FDEP from ambient air quality monitoring, all information (i.e., meteorology and air quality data) were compiled from offsite monitoring stations maintained and operated by cooperating governmental agencies or from the FDEP-approved PSD monitoring programs operated by other air permit applicants. Ambient air quality data were obtained from the FDEP which operates ambient air monitoring stations in Polk County. No significant changes in these programs are anticipated after Hardee Unit 3 goes into commercial operation.

6.4 Noise

The proposed facility is located in an isolated, undeveloped area (with the exception of the Hardee Power Station existing units and phosphate processing activities) of open-pit mining directly south of the Polk-Hardee County line. The unmined topography is predominantly flat with the exception of overburden spoil mounds that range in length from a few meters to hundreds of meters. Directly west of the proposed site is the cooling water reservoir constructed as part of the Hardee Power Station existing units. Most of the phosphate mining area is unoccupied with the closest residential receptor a little more than 1.6 km (1 mile) south of the proposed facility. Polk County has no adopted noise ordinances or standards, and the Hardee County noise performance standards do not apply to the receiving agriculturally zoned lands surrounding the Hardee Power Station site.

6.0 AFFECTED ENVIRONMENT

6.5 Ecology

An ecological assessment of the overall Hardee Power Station site and Payne Creek was included in the Site Certification Application/Environmental Analysis document prepared for the original Hardee Power Station (Teco Power Services/Seminole Electric Cooperative, 1989). Detailed site-specific data were collected on both aquatic and terrestrial ecological resources including threatened and endangered species. The data collected for the Hardee Power Station site are considered to be representative of the Hardee Unit 3 Project site. The field reconnaissance conducted in 1993 confirmed the conditions of the detailed surveys and provided the basis for the description of the current project area in this section.

6.5.1 Terrestrial

Reclaimed upland pasture is the dominant community on the Hardee Unit 3 site (Figure 6.5.1-1). The power block and other facilities will be built on unmined and reclaimed upland pasture. The dominant grass in the pasture is bahia grass (*Paspalum notatum*).

The upland pasture has been colonized by early successional species which are indicative of highly disturbed habitats. These species include hairy indigo (*Indigofera hersuta*), natal grass (*Rhynchelytrum repens*), bahia grass, camphorweed (*Heterotheca subaxillaris*), dogfennel (*Eupatorium capillifolium*), flattop goldenrod (*Euthamia minor*), aeschynomeme (*Aeschynomeme americana*), and chalky bluestem (*Andropogon glomeratus*).

Areas of the upland pasture were mined for phosphate. Consequently, the soil is less permeable than during pre-mine conditions due to a higher clay content of overburden material. Many moisture-tolerant species occur among the pasture grasses, especially in the transitional areas adjacent to the depressional areas.

Several small depressional areas (ranging from 0.05 to 1.9 ha, or 0.13 to 4.6 acres in size) are present within the reclaimed pasture on the south side of the wetland tributary and were inadvertently created during the reclamation process. These wetlands were presumably historical uplands as suggested by a remaining live oak in the vicinity and photographs taken prior to mining.

6.5.2 Aquatic

Payne Creek and its unnamed tributaries are the only natural aquatic systems in the immediate vicinity of the Hardee Unit 3 facility. Payne Creek is a relatively shallow stream situated on the western boundary of the Hardee Power Station site. Mining and reclamation activities have occurred on both sides of the Payne Creek floodplain (see the following terrestrial systems discussion). The creek bottom is typically a combination of detritus, sand, and silt. The Payne Creek floodplain has been subject to hydrologic change resulting from sedimentation, ditching of its tributaries for agricultural operations, and mining. Field reconnaissance conducted in 1993 showed conditions in Payne Creek to be similar to those reported in the original Site Certification Appliaction (TPS/Seminole Electric Cooperative, 1989).

Based on the results of the ichthyofaunal sampling conducted in 1988 and 1989 Payne Creek is characterized as a typical, and relatively healthy stream ecosystem. From the standpoint of ichthyofaunal composition, the species captured represented the typical suite of fishes expected in a south-central peninsular Florida stream. Although large-mouth bass (*Micropterus salmoides*) was not found in the samples collected, it is likely to occur in Payne Creek. The predominance of two salt-tolerant secondary freshwater species, the flagfish (*Jordanella floridae*) and the sailfin molly (*Poecilia latipinna*), collected in 1988 at the upstream sampling Station (PC-1) and the presence of the walking catfish (*Clarias batrachus*) at this station indicate connections to drainage ditches, which traditionally host this exotic and the previous two species.

Mosquitofishes (*Gambusia holbrooki*), predictably, dominated the catches numerically during the 1988 sampling. This species is ecologically tolerant and is the most abundant fish in Florida freshwaters. The brook silverside (*Labidesthes sicculus*) and the golden shiner (*Notemigonus crysoleucas*), when found in an appropriate habitat such as the upstream station, are frequently abundant. The golden topminnow (*Fundulus chrysotus*) and least killifish (*Heterandria formosa*) are characteristically common components of vegetated habitats.

Ecologically, the ichthyofauna of Payne Creek can be broken down into three major assemblages. The dominant grouping involves killifish (families Cyprinodontidae and Poeciliidae), sunfish (Centrarchidae), and gar (Lepisosteidae). This assemblage characteristically occupies vegetated habitats, including areas with submergent, emergent, and overhanging plants. Next in importance is an open-water group consisting of minnows (Cyprinidae) and a silverside (Atherinidae), plus sunfishes. Adult centrarchids frequently assemble at the interface between vegetated habitats and open water. The third assemblage, involving catfishes (Ictaluridae and Clariidae) and darters (Percidae), is closely associated with the bottom.

Macroinvertebrate sampling for the Hardee Power Station site emphasized benthic infaunal and epifaunal communities (Teco Power Services/Seminole Electric Cooperative, 1989). These sampling efforts were carried out during October 1988 and February 1989, concurrent with the fish surveys (see Figure 6.5.2-1 for sampling locations). A total of 153 macroinvertebrate taxa were collected from Payne Creek during the study.

A total of 90 taxa were collected by the artificial substrates. The midge family Chironomidae were the numerically dominant group of invertebrates collected on the artificial substrates in Payne Creek. This family comprised from 64 to 91 percent of all invertebrates collected (Table 6.5.2-1). *Polypedilum* was the most common genus of Chironomidae occurring on the artificial substrates, and *Polypedilum convictum* was the most common species at the two upstream sites, and occasionally comprised over 40 percent of the total fauna. Simpson and Bode (1980) state that these organisms are filter feeders and that their occurrence seems to be primarily governed by current speed and the amount of suspended material in the water. Other chironomids that were abundant were the *Endochironomus* group, the *Rheotanytarsus exiguus* group, *Tanytarsus* spp., the *Thienemanniella fusca* group, and occasionally the *Corynoneura taris* group. Of these, the *R. exiguus* group, the *T. fusca* group, and the *C. taris* group are also described as occurring in areas of moderate to high flow water containing high amounts of suspended organic matter. The hydropsychid caddisfly larvae, *Cheumatopsyche* sp., was also very abundant. *Cheumatopsyche* are also filter-feeders that require current of adequate speed and substantial quantities of suspended organics. Simpson and Bode (1980) noted that *Cheumatopsyche* and *R. exiguus* are frequently found together and are indicative of a community having an abundance of suspended foodstuffs.

Mayflies and stoneflies are generally an indicator of clean environmental conditions. Although numerically they only comprised a small portion of the fauna (between 2 and 8 percent), due to their large size, as compared with the smaller chironomids, they are actually quite significant in terms of the total amount of food available for fish and the total productivity of the system. Common mayflies included *Stenacron interpunctatum, Stenonema exiguum,* and *Caenis diminuta.*

A total of 82 taxa were collected in 1988 and 1989 by ponar sampling from Payne Creek (Table 6.5.2-2). The rich infauna benthic populations observed in the upstream stations may be due to several reasons. First, much of the creek bottom in this area is covered with leaf packs which provides excellent habitat for these invertebrates. Second, the flow is moderate to swift, which keeps the area just above the substrate well oxygenated. Finally, the creek appears relatively undisturbed in the upstream areas sampled, even though mining and reclamation has occurred in the vicinity of both banks.

Macroinvertebrates from the dip net samples revealed over 50 taxa (Table 6.5.2-3) with grass shrimp, *Palaemonetes paludosus,* and chironomids dominated the vegetation, leaf packs, submerged roots and sticks in the streams. Cambarid crayfish were also abundant.

In summary, the macroinvertebrate community composition in Payne Creek also indicates that the creek is a typical central Florida small sandy bottom stream.

6.5.2.1 Wetlands

The wetland systems located on the Hardee Unit 3 site include a partially mined and reclaimed unnamed tributary wetland, a wetland reclamation site reclaimed by IMC/Agrico, and several low-lying areas which were inadvertently created during the reclamation process.

6.0 AFFECTED ENVIRONMENT

The unnamed tributary wetland forms the northern boundary of the Hardee Unit 3 site. This wetland was partially mined and reclaimed by IMC/Agrico (Program AGR-PC-PC1, 1990). The headwaters of this remnant tributary wetland are fringed by a thick band of primrose willow. Scattered Carolina willow, saltbush (*Baccharis halimifolia*), wax myrtle (*Myrica cerifera*), and dogfennel contribute to this vegetation zone. The headwaters were historically a forested wetland as suggested by the existing dead trees.

The wetland extends southwest and grades into an open-water system. Although the wetland is void of plants in the center, it is lined with different species, including water hyacinth (*Eichornia crassipes*), pickerelweed (*Pontederia cordata*), bulrush (*Scirpus validus*), cattail, fireflag (*Thalia geniculata*), smartweed (*Polygonum hydropiperoides*), buttonbush (*Cephalanthes occidentalis*), primrose willow, and Carolina willow. Duckweed covers the water surface in many areas.

West of the headwater area is a forested segment of the tributary wetland. Live oaks (*Quercus virginiana*) surround the forested segment, and black gums (*Nyssa sylvatica* var. *biflora*) occupy the inner section. Saw palmettos (*Serenoa repens*) form clumps around the base of live oak trees. Although this segment represents an unmined segment of the wetland, the overall health is declining as evidenced by several dead trees. It appears that the natural hydroperiod has changed so the water levels remain high and are affecting the trees. Weedy wetland species are encroaching in and around this forested segment.

The second wetland system located on the Hardee Unit 3 site is an IMC/Agrico wetland reclamation area. Reclamation was required by the former Florida Department of Natural Resources for mining the site (Program AGR-PC-PC1, 1990) and carried out in accordance with the former Florida Department of Environmental Regulation Permit Number 251224079 and U.S. Army Corps of Engineers Permit Number 87IPB-20211. Additionally, several large reclamation areas are currently being constructed directly north of the project site. These reclamation areas will be connected to, and form the western end of, the unnamed tributary wetland.

Native trees were planted approximately 2 years ago at the onsite reclamation areas to reestablish the floodplain around the unnamed tributary wetland and to connect the reclamation areas north of the site to the unnamed tributary wetland. Species planted include slash pine (*Pinus elliottii*), live oak, (*quercus virginiana*) laurel oak (*Quercus laurifolia*), American elm (*Ulmus americana*), dahoon holly (*Ilex cassine*), sweet bay (*Magnolia virginiana*), sweetgum (*Liquidambar styraciflua*), and red maple (*Acer rubrum*).

The third onsite wetland system consists of several small depressional areas scattered among the reclaimed pasture on the south side of the unnamed tributary wetland (Figure 6.5.2-2). These depressional areas were inadvertently created during the reclamation process. These wetlands were presumably historical uplands as suggested by a remaining live oak in the vicinity and photographs taken prior to mining. These depressional wetlands are very poor quality and are colonized primarily by primrose willow (*Ludwigia peruviana*), cattail (*Typha* spp.), and Carolina willow (*Salix caroliniana*). Hemp vine covers many plants.

6.6 Wildlife Resources

The wildlife habitat in the region surrounding the Hardee Unit 3 site has been severely altered by past phosphate mining and reclamation activity. The barren spoil piles and bare ground being reclaimed north of the site provide poor wildlife habitat. The water-filled ditches, excavated ponds, and settling ponds in the general area support wading birds and waterfowl feeding. Much of the previously mined land is being reclaimed to pasture which does not support diverse wildlife populations.

Remnant areas of important wildlife habitats exist in the forested wetlands along Payne Creek. This hardwood habitat supports a greater number of observed and potentially occurring species of animals than the other identified habitats (Tables 6.6-1, 6.6-2,and 6.6-3).

Ubiquitous species (those species actually observed in all habitats), included feral hog, nine-banded armadillo, downy woodpecker, and the blue jay. Feral hogs were abundant in all habitats, and their foraging has created much disturbance, particularly along forest edges.

6.6.1 Threatened & Endangered Species

Species designated by the U.S. Fish and Wildlife Service (USFWS), the Florida Game and Fresh Water Fish Commission (FGFWFC) and the Florida Department of Agriculture and Consumer Services (FDA) as endangered, threatened, species of special concern, commercially exploited, or under review, were included in this category. Sources used to identify such plant and animal species that could potentially occupy the unmined areas of the site included the FNAI database, Florida Committee on Rare and Endangered Plants and Animals (FCREPA) reports, DRI applications for the Agrico site and the CFI mine south of the Agrico site, and endangered species surveys conducted for the Hardee Power Station site. In October 1993, an endangered plant species survey was conducted on the Hardee Unit 3 site.

Species that occur or potentially occur on the Hardee Unit 3 site are listed in Table 6.6.1-1. The probability of their occurrence is assessed.

6.7 Cultural Resources

There are no known significant archaeological or historical resources on the Hardee Power Station site. The general area surrounding the Hardee Power Station site appears to be one with infrequent sites, containing a sparse amount of cultural materials. None of these sites has been considered significant in terms of National Register of Historic Places criteria.

One insignificant prehistoric archaeological site is recorded in the SW1/4 of the NE1/4 of the SW1/4 of Section 1, Township 33 South, Range 23 East. This site is known as 8-Hr-35 in the Florida Master Site File and is located in the Hardee County portion of the Hardee Power Station site. The prehistoric site was found by Jerald Milanich and Raymond Willis who concluded that the site was not significant in terms of National Register of Historic Places criteria under 36 CFR 63. This recommendation was made to the Florida Division of Historical Resources (DHR) which concurred with the recommendation in 1990.

DHR was contacted prior to submittal of the Site Certification Application/Environmental Analysis for the Hardee Unit 3 Project and concluded "that no significant archaeological and historical sites are recorded for or considered likely to be present within the project area...Therefore, it is the opinion of this office that the proposed project will have no effect on any sites listed, or eligible for listing, in the National Register of Historic Places, or otherwise of national, state, or local significance".

6.8 Socioeconomics

6.8.1 Population Statistics

There are no incorporated municipalities within 8 km (5 miles) of the Hardee Unit 3 site. Table 6.8.1-1 lists the nearest communities and their total residential populations for 1980 and 1990. The majority of recent resident population growth has occurred southeast of the site in Wauchula, with a population increase of approximately 8.9 percent in the last decade, whereas Bowling Green and Zolfo Springs experienced decreases in population. Hardee County's unincorporated area population has decreased by 2.8 percent from 13,566 residents in 1980 to 13,191 residents in 1990. Table 6.8.1-2 lists the projected populations for Hardee and Polk counties for the years 1995 and 2000.

The Hardee Unit 3 Project is located in an unincorporated area of Hardee County immediately south of the Hardee/Polk County line, 12 km (7.5 miles) west of Bowling Green. There is no residential population within 1.6 km (1 mile) of the site due to the mining operations and industrial facilities in the area. A low-density residential population exists approximately 4 km (2.5 miles) to the southeast of the site in the unincorporated community of Fort Green Springs.

The cities of Winter Haven and Lakeland are located approximately 40 km (25 miles) north of the site in Polk County. In 1980, the populations for these two cities were 21,119 people and 47,406 people, respectively, or about 21 percent of Polk County's total population. Winter Haven experienced an increase of 17.1 percent, and Lakeland experienced an increase of 48.9 percent between 1980 and 1990 (BEBR, 1991). The cities of Winter Haven and Lakeland are highly urbanized and represent a considerable portion of the population growth in Polk County.

Polk County contained a population of 321,652 people in 1980 and has grown to 405,382 people between 1980 and 1990, an increase of 26 percent (U.S. Bureau of the Census, 1990). In 1980, more than 40 percent of Polk County's population resided in incorporated communities with a majority of that population located in the north-central portion of the county near the cities of Winter Haven and Lakeland.

6.8.2 Employment and Income

Hardee County's labor force totaled 9,368 in 1991, an increase of 9.7 percent from a 1989 labor force of 8,536. This percentage increase is higher than the statewide labor force increase of 3.8 percent. The 1991 count represents 3.9 percent of the Central Florida Region's total labor force. The Central Florida Region consists of DeSoto, Hardee, Highlands, Polk, and Okeechobee counties. DeSoto County had the lowest annualized unemployment rate in the region (7.8 percent), whereas Hardee County had the highest in the region (10.5 percent) and the sixth highest unemployment rate of the 67 counties in Florida.

The labor force in Polk County experienced an increase of 5.3 percent between 1989 and 1991. This increase also represents a larger percentage increase than the statewide labor force increase of 3.8 percent for the same time period. Three out of every four jobs in the Central Florida Region are located within Polk County.

Average monthly employment statistics for Hardee and Polk counties and the Central Florida Region by major industry group are presented in Table 6.8.1-3. Between 1990 and 1991, employment in Hardee County increased in each employment group with the exception of the manufacturing, wholesale trade, and services industries which experienced decreases. Most employment in Hardee County occurs in the agriculture industry. However, most employment in the Central Florida Region occurs in the services and retail trade industries. The services category employs proportionately fewer people in Hardee County than the region and the state. The transportation, communication, and public utilities industry and the construction industry are also a small component of the county economy compared to regional and state percentages. The agriculture category plays a relatively large role in the Hardee County economy.

Employment in Polk County is focused in the retail trade and service industries. In 1991, more than 50 percent of the county labor force was engaged in one of these two industries. Approximately 13 percent of the labor force was employed by the manufacturing industry. While a significant portion of land in Polk County is dedicated to the mining industry, less than 3 percent of the county's workforce is employed in mining.

The majority of employment groups in private, nonfarm industries in Hardee and Polk counties experienced an increase in personal income between 1989 and 1990. The largest increase came from the manufacturing industry in Hardee County and the transportation, communication, and public utilities industry in Polk County. With the exception of the construction industry, all major employment groups experienced increases in personal incomes within the Central Florida Region and the state. Finance, insurance, and real estate showed the slowest personal income growth from 1989 to 1990, posting only a 1.4 percent increase in Hardee County. The slowest growth in Polk County came from the wholesale trade industry, posting only 0.9 percent increase. This pattern is also consistent with regional and state trends that depict slow manufacturing income growth for the same period. The largest industry in Hardee and Polk counties is the service sector, which generated 35.9 and 31.7 percent, respectively, of the total personal income in 1990. The service sector is also the largest industry in the Central Florida Region and the state.

In the farm industry, Hardee County posted a 19.5 percent decrease in total personal income from 1989 to 1990. This decrease which occurred in the farm industry was a significant portion of the 24.5 percent total decrease in personal income experienced in the Central Florida Region.

The government industry produced personal income increases in Hardee County, the Central Florida Region, and the state between 1989 and 1990. The large personal income increases came from the Central Florida Region, primarily due to Polk County government industries, which generated 72.5 percent of the region's personal income in the government sector.

Hardee County contained 5,213 households in 1990 at an average size of 2.87 people per household. This represents a 4.5 percent increase in the number of households from those counted in the 1980 federal census, but a 4.1 percent decrease in household size during the same time period. The average household size is somewhat above the average for the state of 2.45 people per household in 1991 and 2.45 in 1980. The number of households is anticipated to continue to increase and was estimated at approximately 5,750 and 6,180 households in 1995 and 2000, respectively, with an average size of 2.78 and 2.70 people in 1995 and 2000, respectively. Polk County was estimated to contain approximately 160,535 households in 1991 at an average household size of 2.52 people (University of Florida, 1992).

Housing in Hardee County is primarily owner-occupied and single-family structures, a majority of which have been constructed since 1960. In 1989, 46 building permits were issued for new single-family homes, one of which was to be located in the Bowling Green area. Forty-seven new single-family structures were authorized in 1990, and no new permits were issued in Bowling Green (Hardee County Building and Zoning Department, 1991).

Polk County experienced a much higher demand for new housing and authorized 1,828 single-family homes and 50 multi-family structures in 1992 and 2,116 single-family and 23 multi-family structures in 1993. A majority of the new units authorized in Polk County are located in the Lakeland/Winter Haven areas (Polk County Building Department, 1994).

In 1990, the median value of an owner-occupied home was $40,300 in Hardee County and $61,000 in Polk County. Both counties fell below the median for the state of $77,100 (U.S. Bureau of the Census, 1990 Census of Population and Housing). In 1990, the median contract rent for Hardee and Polk counties was $257/month and $300/month, respectively.

6.9 Land Use

Most of the land within an 8-km (5-mile) radius of the site is being actively mined for phosphate or has been reclaimed to pasture or wetlands. Citrus groves are the predominant agricultural activity in the area and occupy several small pockets of land south and southeast of the site.

The only residential community within 8 km (5 miles) is Fort Green Springs which contains about 60 houses (permanent dwellings and mobile homes) and is located about 4 km (2.5 miles) south of the plant site. With the exception of the expansion of the phosphate mining activities to the west and south into Hardee County, no significant changes in land use have occurred in the past 30 years or are likely to occur in the near future based on information obtained by the counties and regional planning councils. Figure 6.9-1 shows the existing land use within an approximate 8-km (5-mile) radius of the proposed plant. Data presented in the map are based on U.S. Geological Survey (USGS) 7.5-minute quadrangle maps of the site area, aerial photographs dated 1988 and 1992, local comprehensive plans, and field reconnaissance during November 1993.

04-20-94

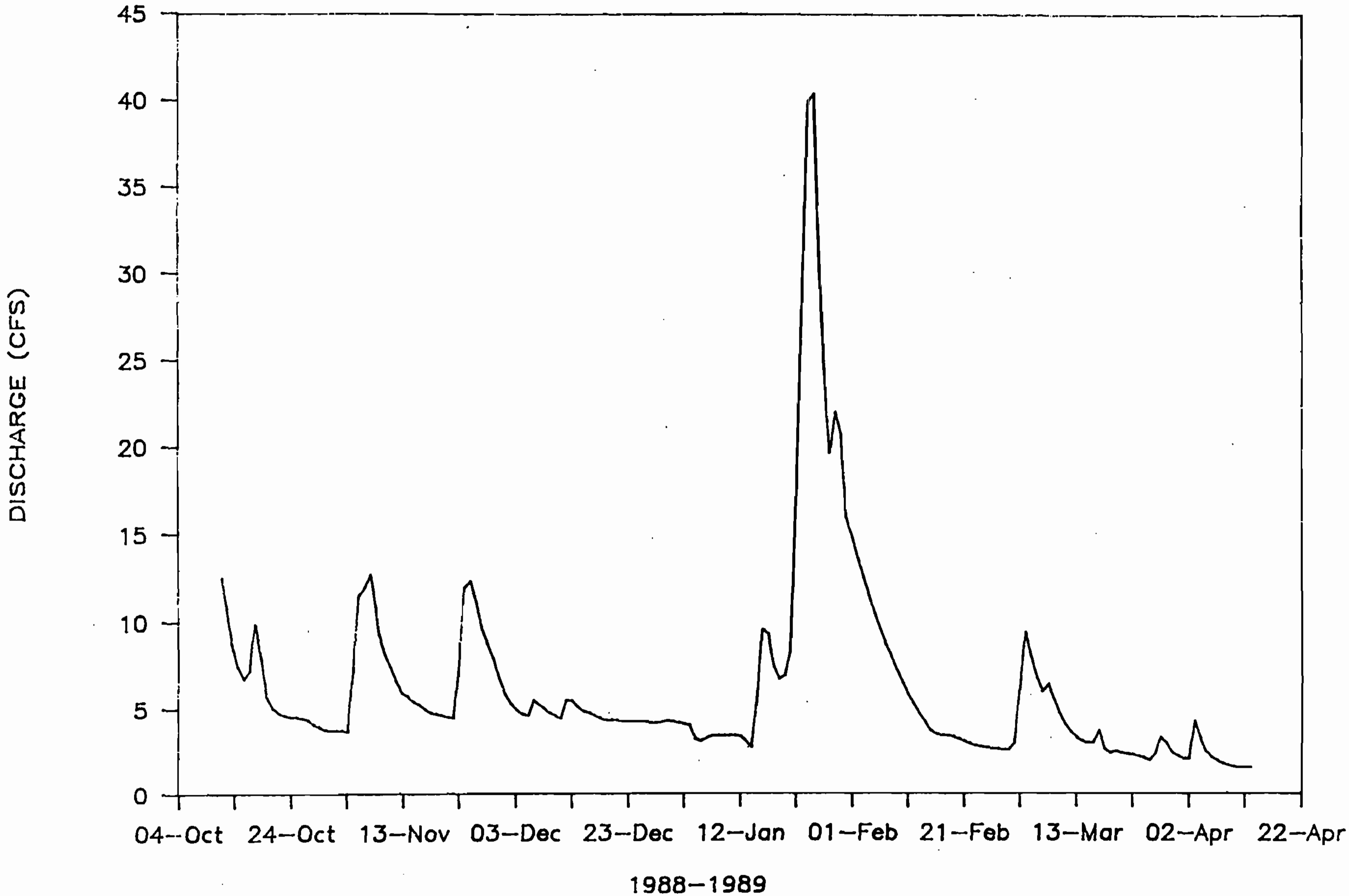

Figure 6.2.1-1
Discharge Hydrograph for Payne Creek Near the HPS Site

Source: TPS/SECI, 1989.

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04-22-94

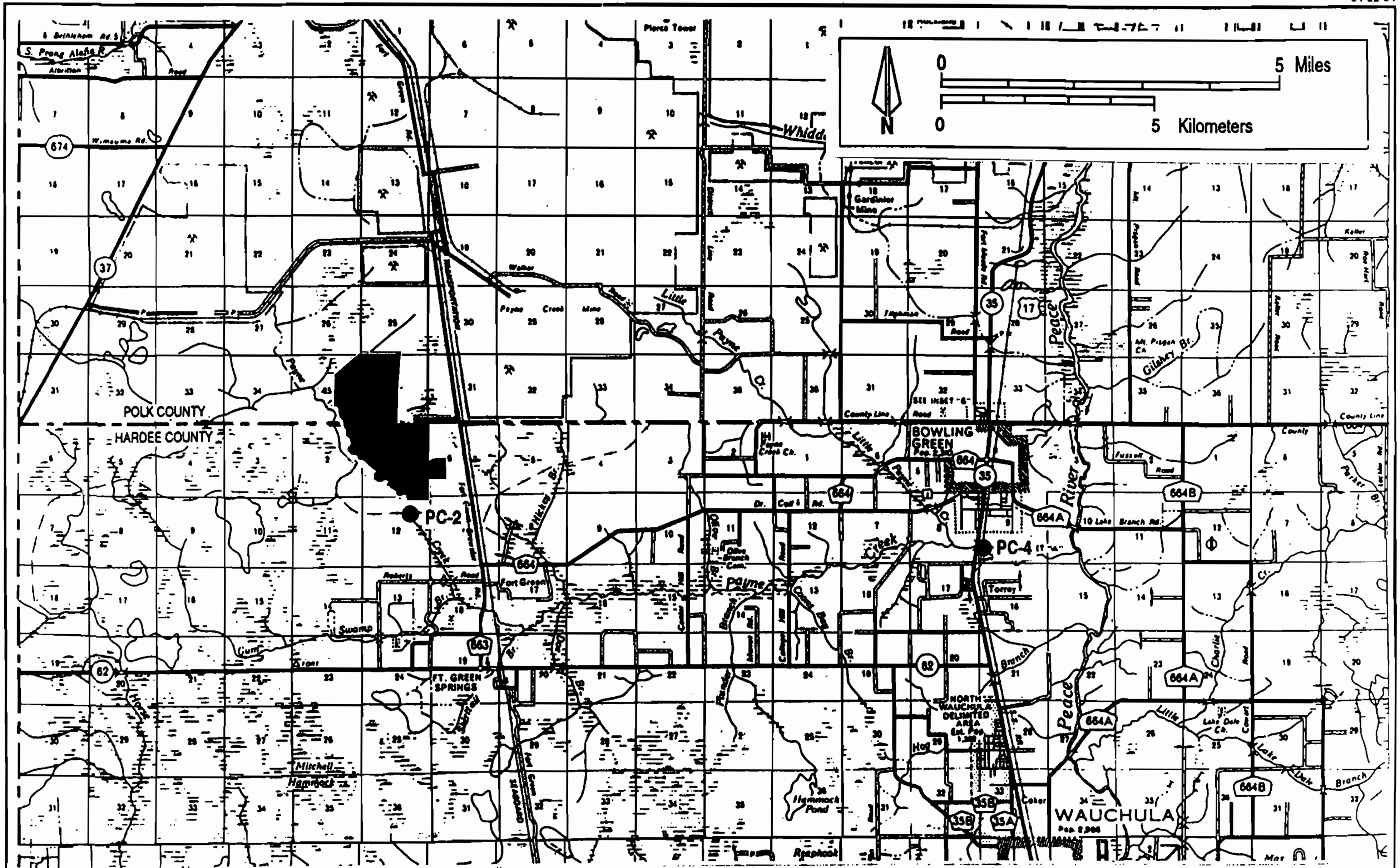

Figure 6.2.1-2
Payne Creek Streamflow Measurement Locations

Source: TPS/SECI, 1989.

SEMINOLE ELECTRIC COOPERATIVE INCORPORATED

03-14-94

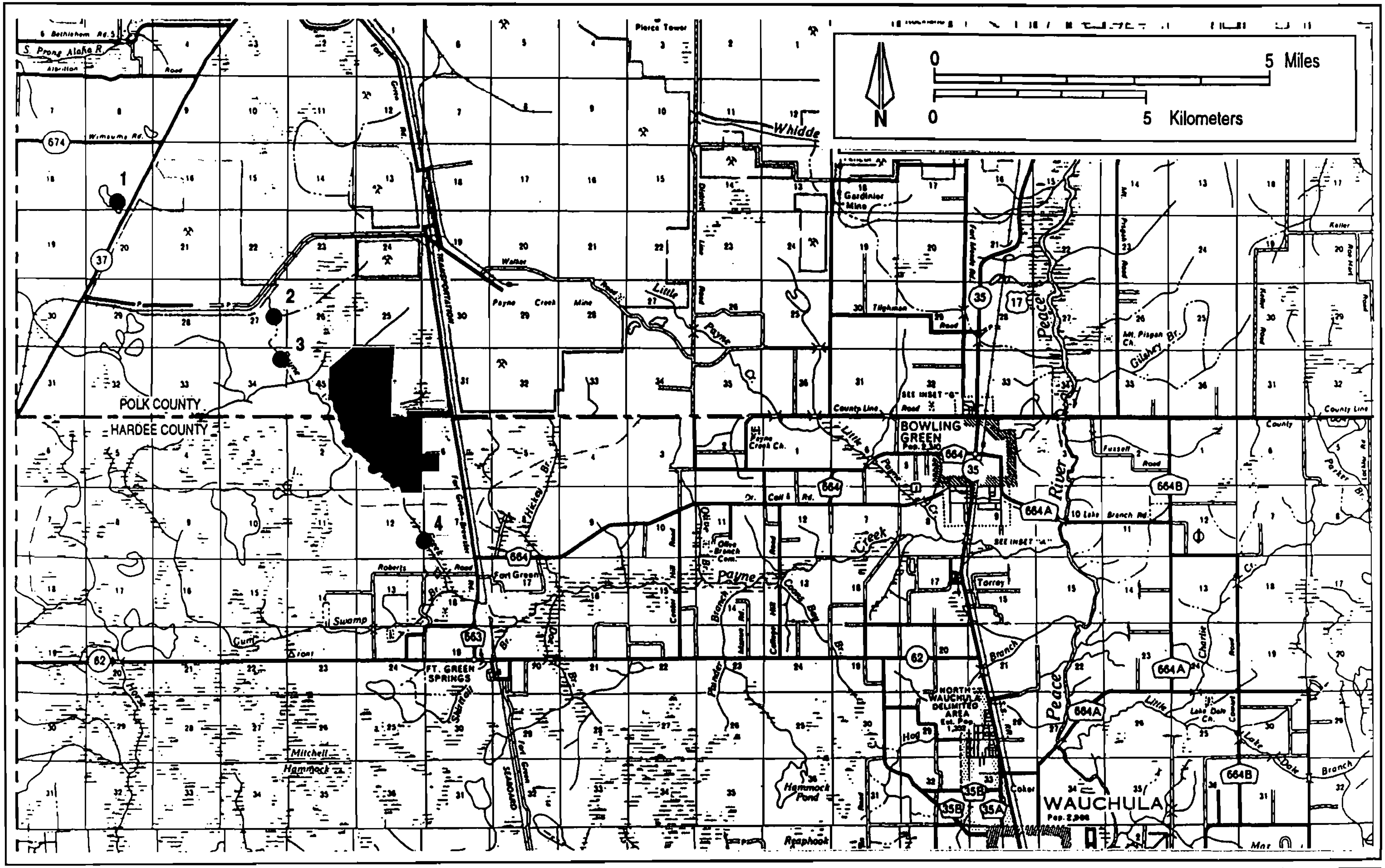

Figure 6.2.1-3
Historic Surface Water Quality Monitoring Locations
for Agrico and Dames & Moore Studies (1975–1986)

Source: TPS/SECI, 1989.

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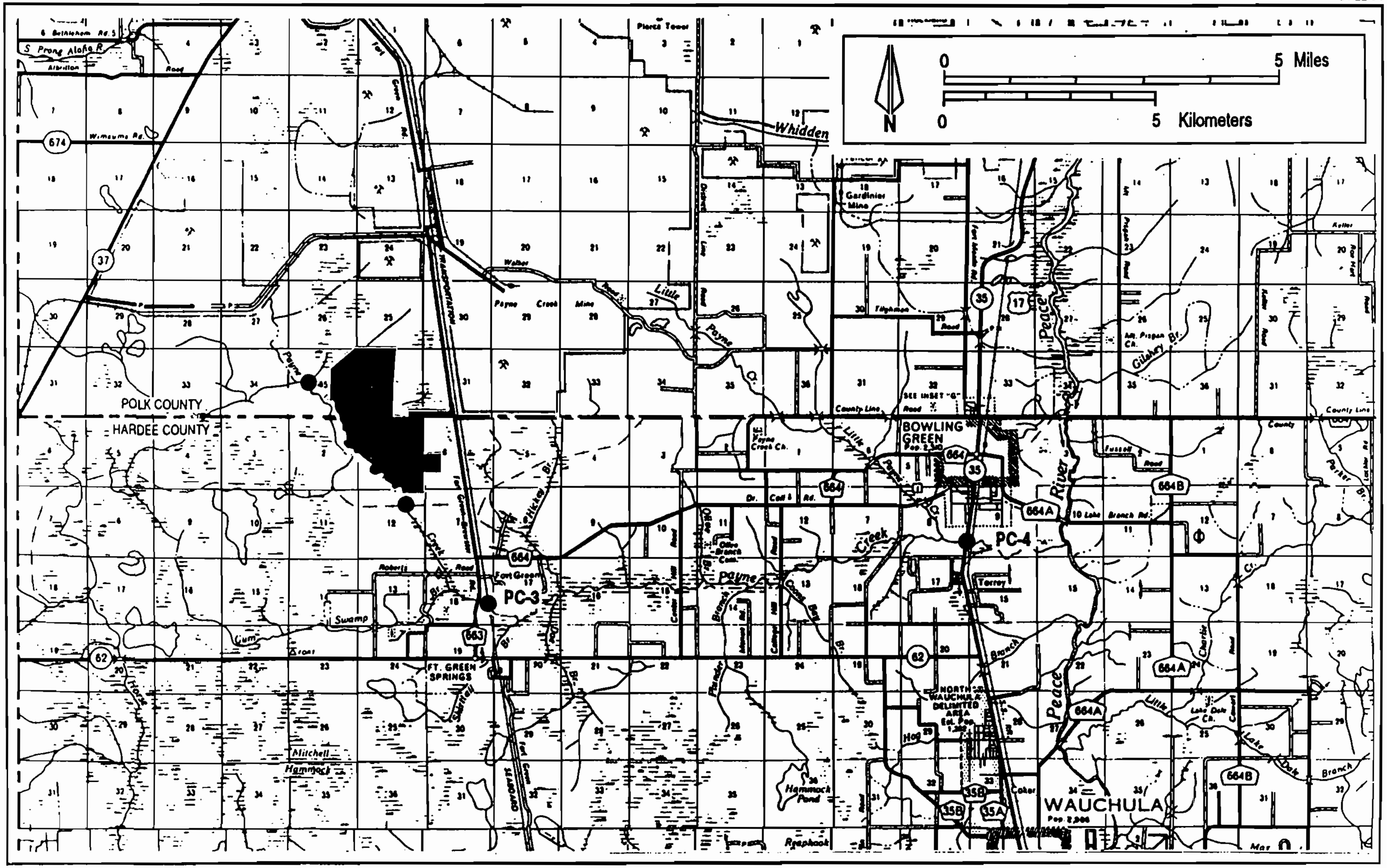

Figure 6.2.1-4
Surface Water Quality Monitoring Locations
(October 1988–March 1989 and September 1993)

Sources: TPS/SECI, 1989; KBN, 1994.

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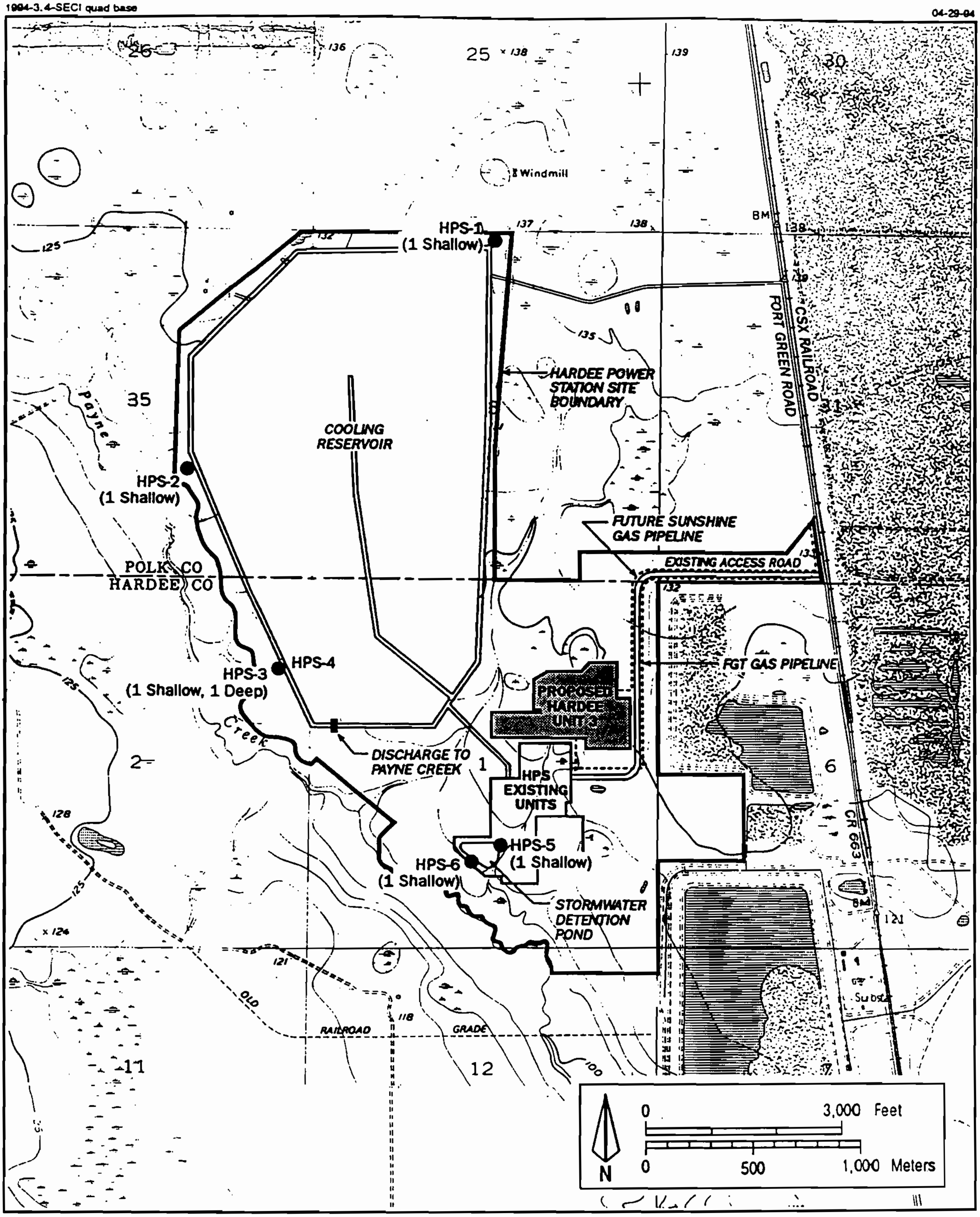

Figure 6.2.2-1
HPS Existing Groundwater Monitoring Well Locations

Sources: USGS, 1987; KBN, 1994.

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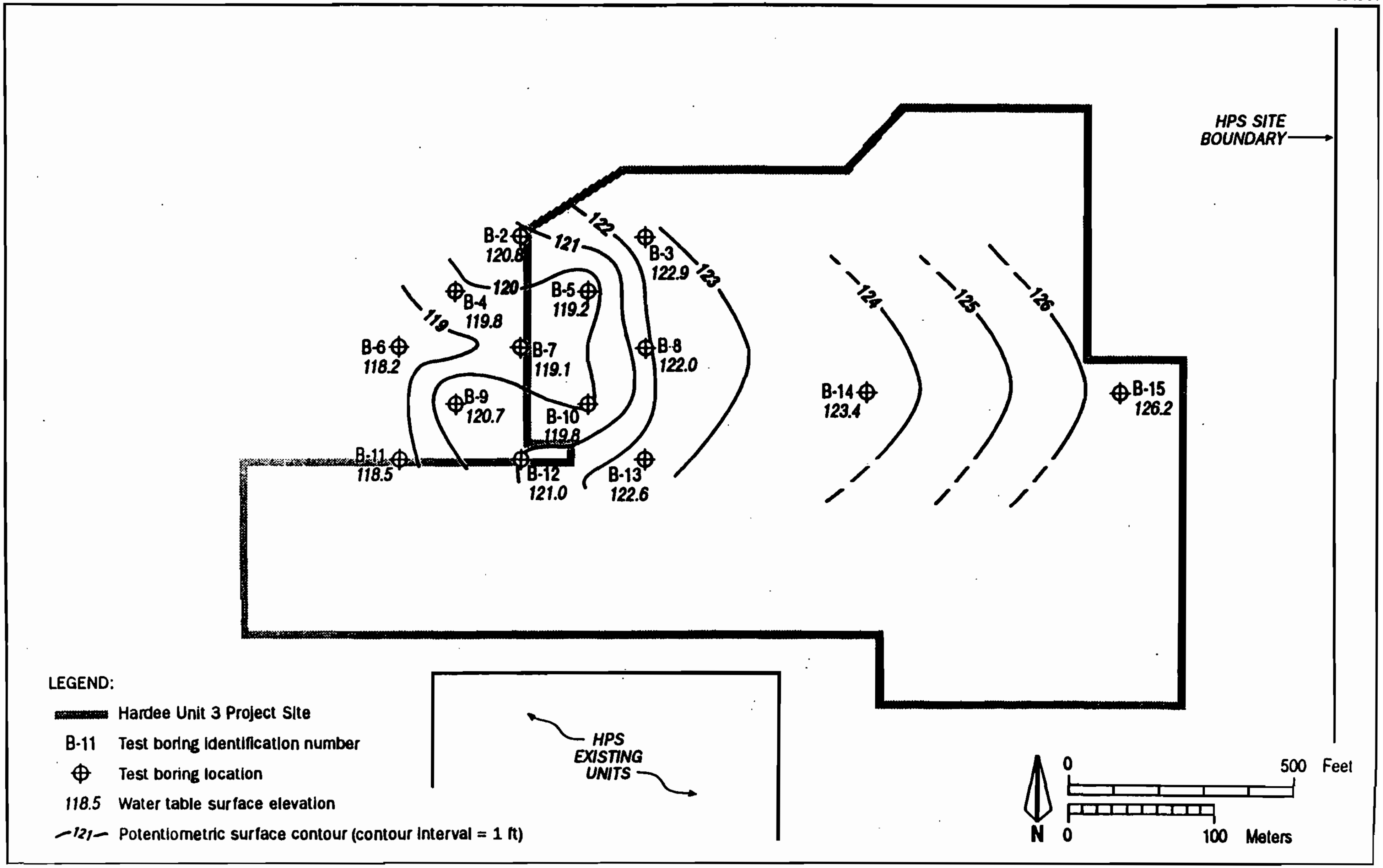

Figure 6.2.2-2
Potentiometric Surface of the Water Table Aquifer at the Hardee Unit 3 Site — April 1993

Sources: AT&E, 1993; KBN, 1994.

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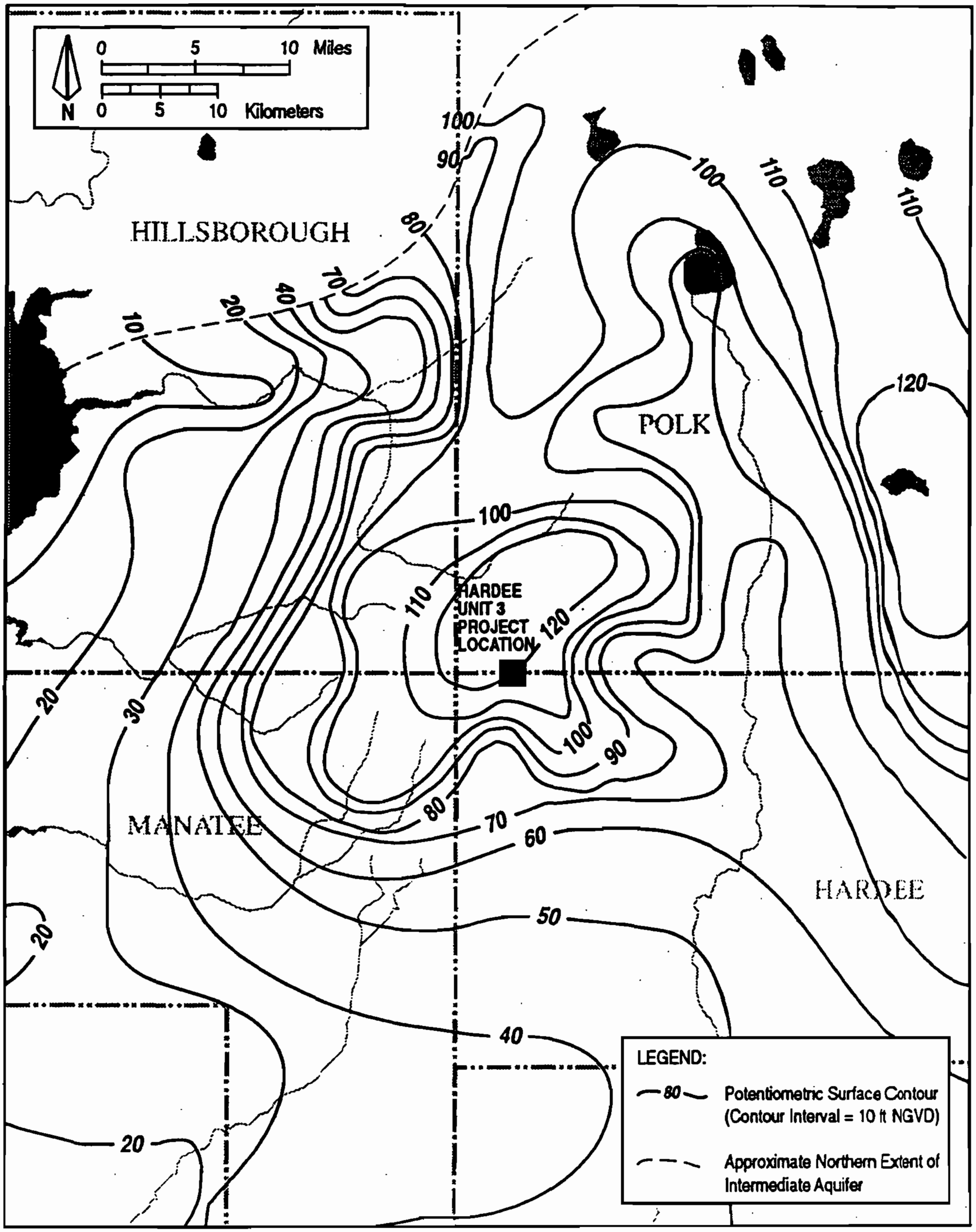

Figure 6.2.2-3
Potentiometric Surface of the Intermediate Aquifer in the Vicinity of the Hardee Unit 3 Site — September 1992

Sources: USGS, 1993a; KBN, 1994.

SEMINOLE ELECTRIC COOPERATIVE INCORPORATED

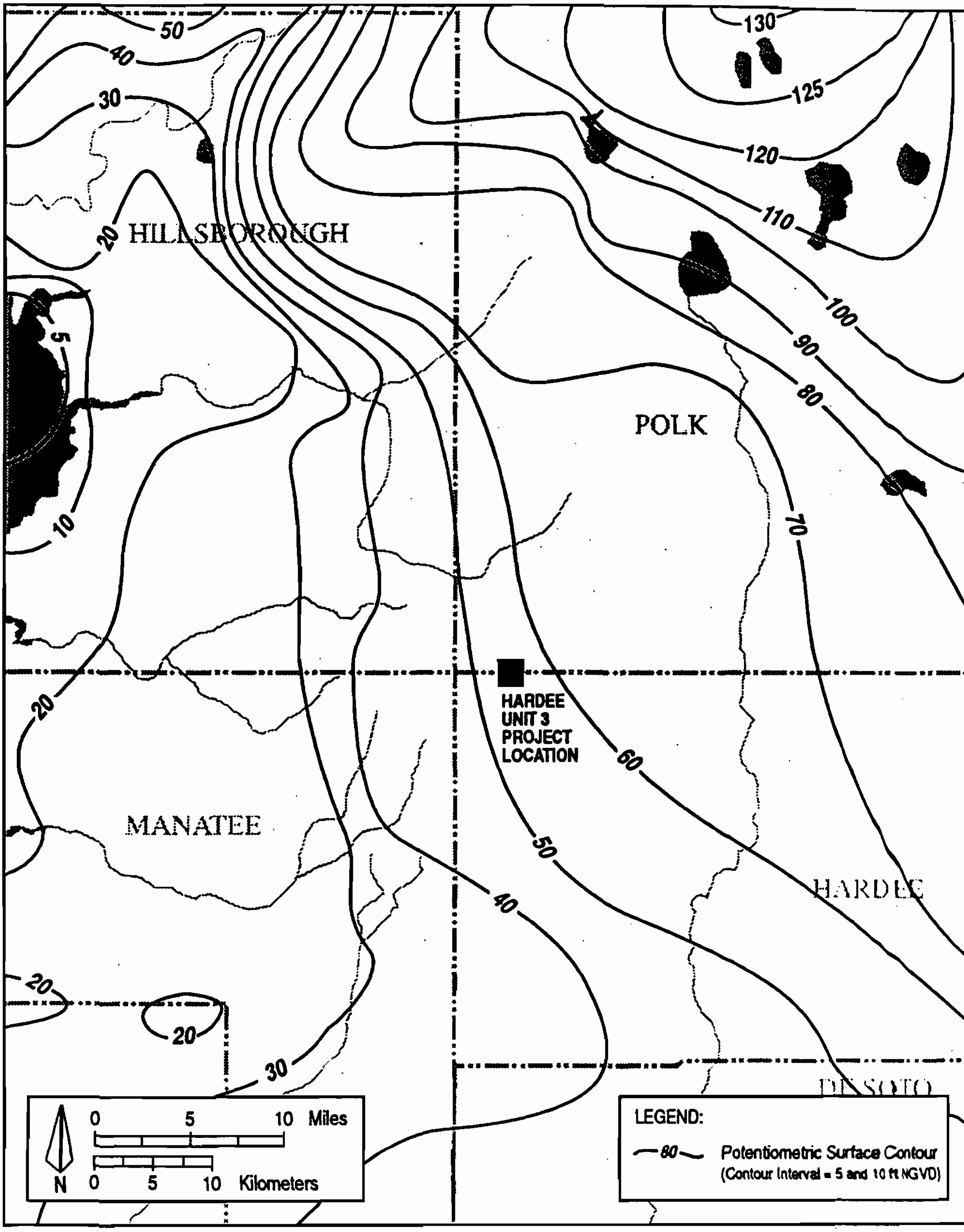

Figure 6.2.2-4
Potentiometric Surface of the Upper Floridan Aquifer in the Vicinity of the Hardee Unit 3 Site — September 1992

Sources: USGS, 1993b; KBN, 1994.

SEMINOLE ELECTRIC COOPERATIVE INCORPORATED

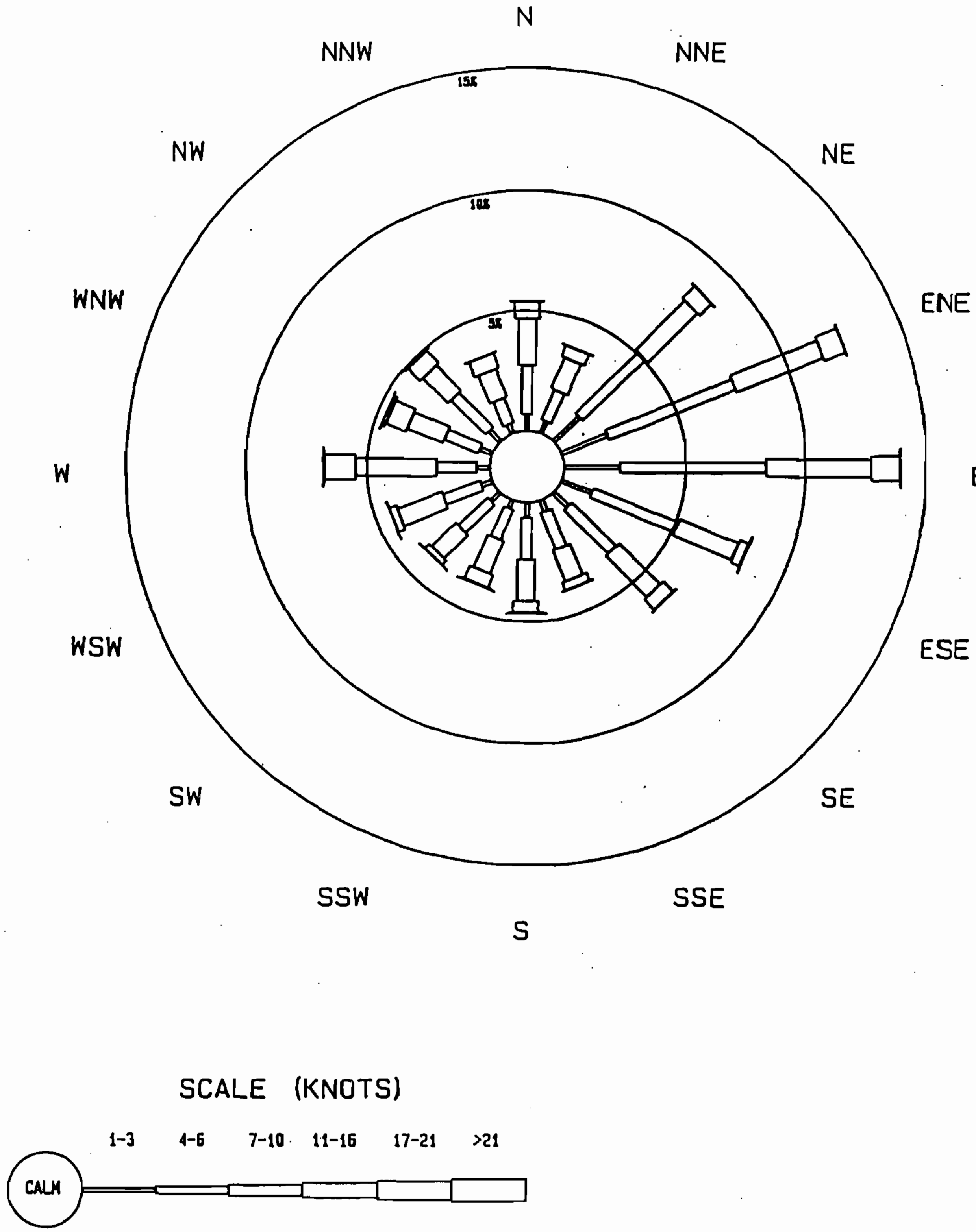

Figure 6.3.1-1
Annual Average Wind Frequency Distribution in Tampa, Florida, 1982–1986

Source: TPS/SECI, 1989.

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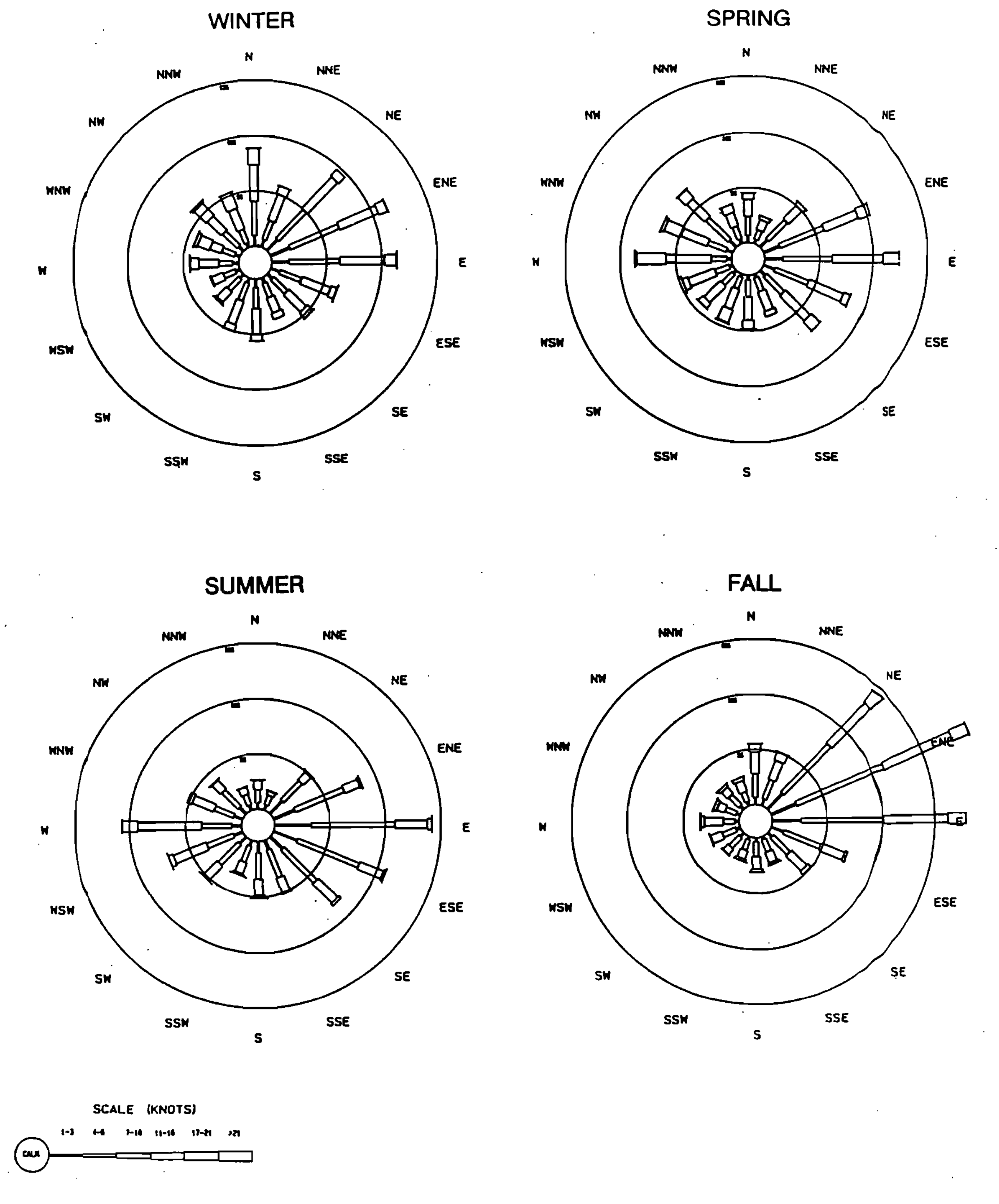

Figure 6.3.1-2
Seasonal Average Wind Frequency Distribution in Tampa, Florida, 1982–1986

Source: TPS/SECI, 1989.

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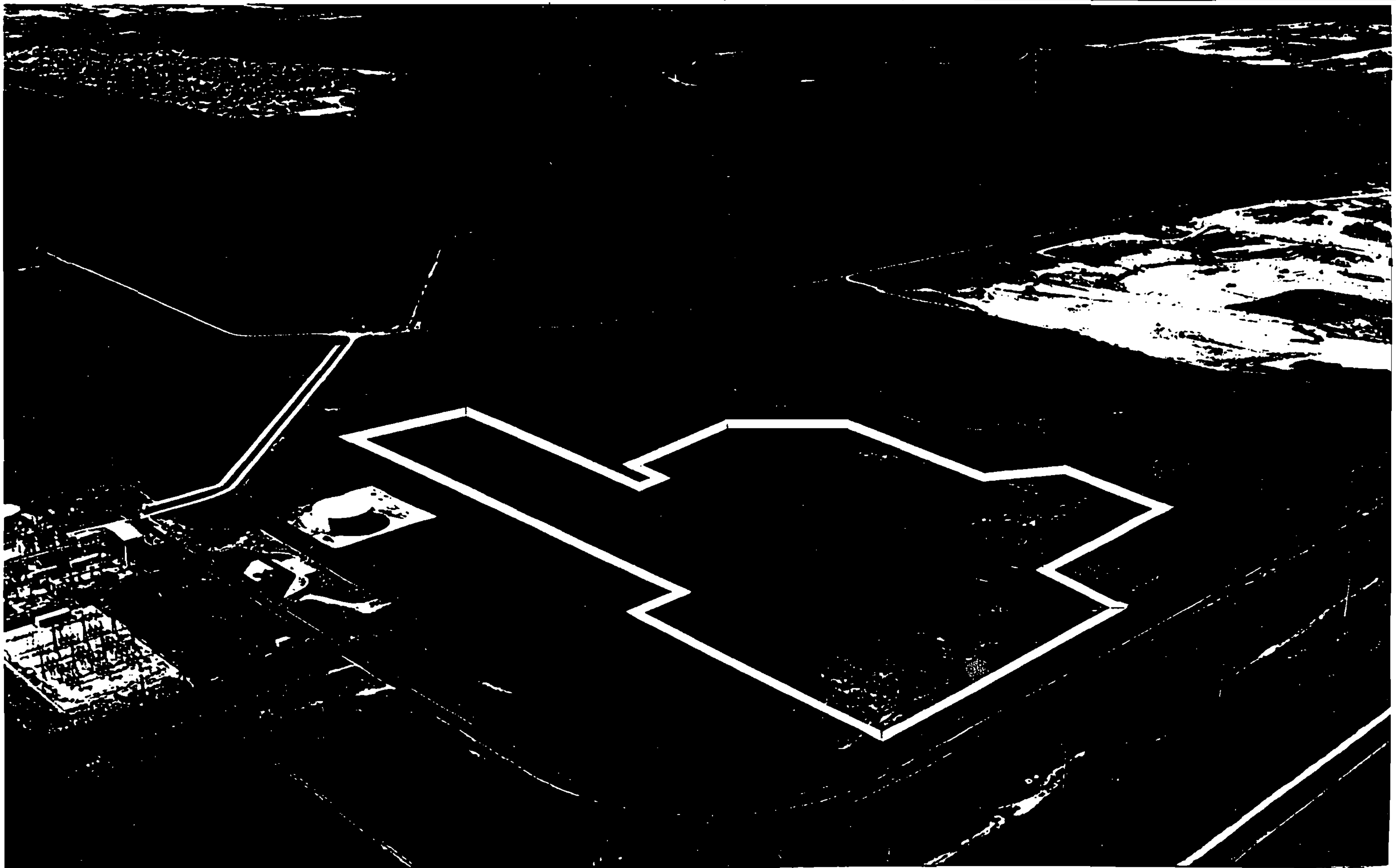

Figure 6.5.1-1
Aerial Photograph of Hardee Unit 3 Project Location

Source: SECI, 1994.

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03-14-94

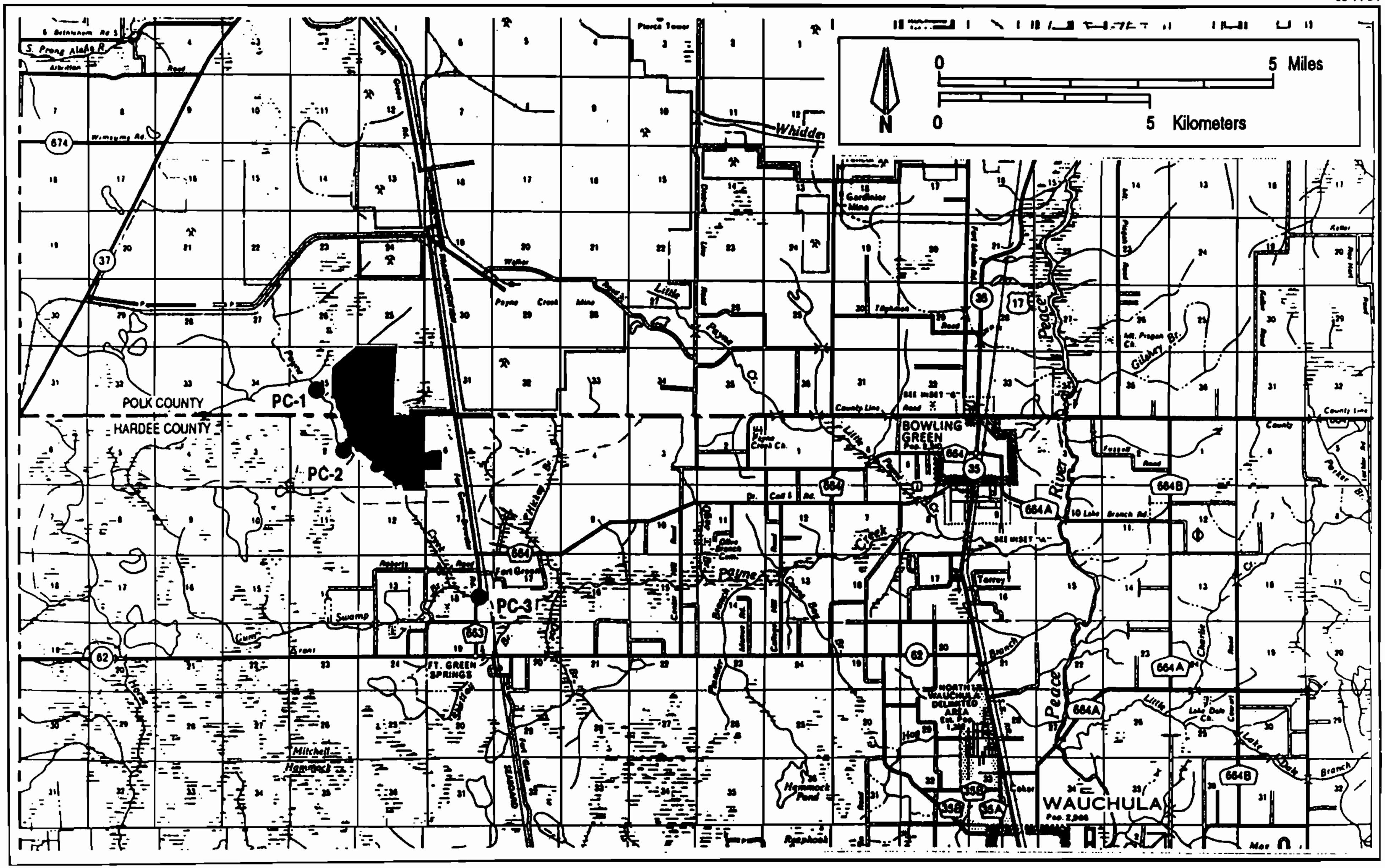

Figure 6.5.2-1
Aquatic Ecology Sampling Station Locations

Source: TPS/SECI, 1989.

SEMINOLE ELECTRIC COOPERATIVE INCORPORATED

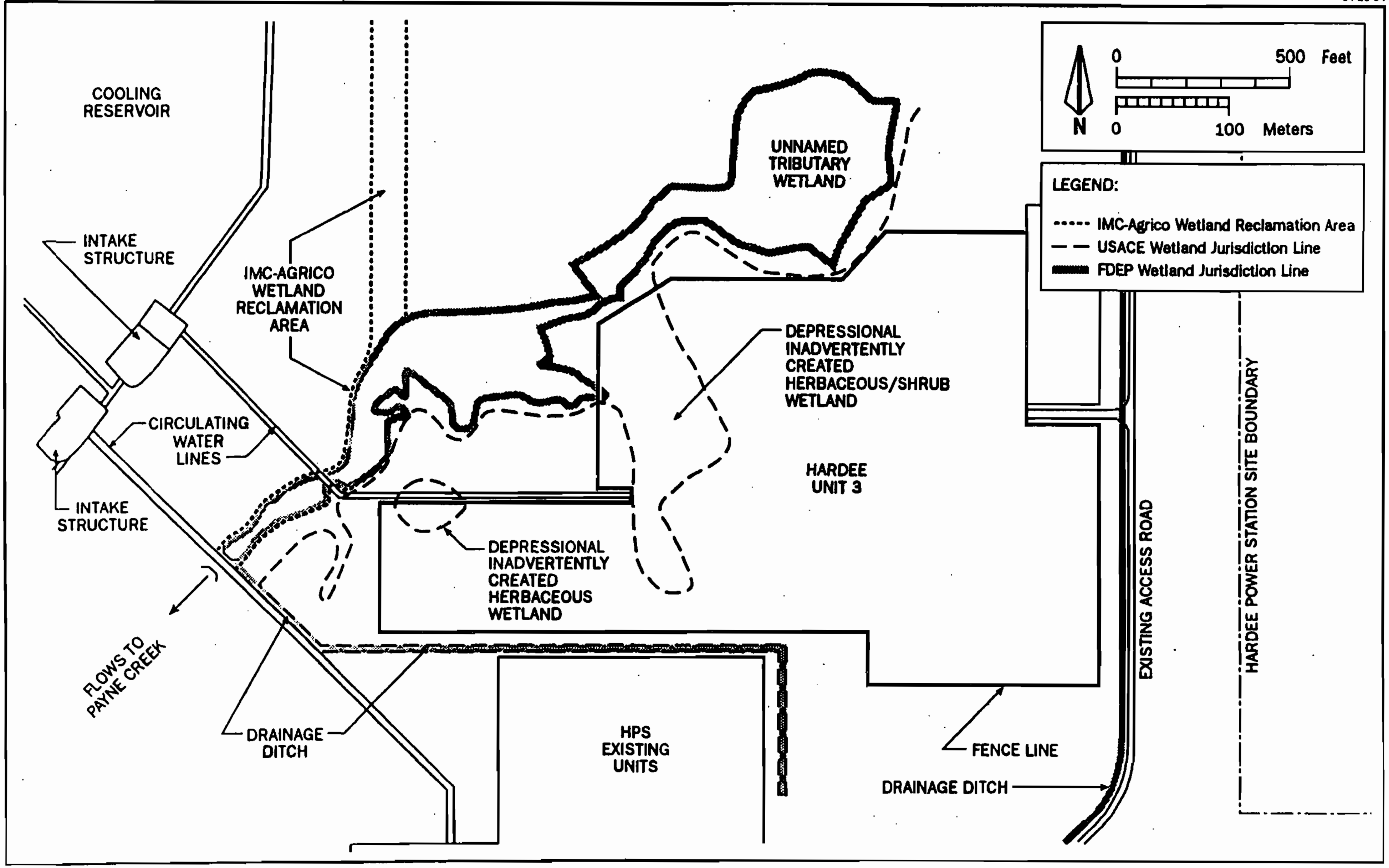

Figure 6.5.2-2
Location of Jurisdictional Wetlands

Source: KBN, 1994.

SEMINOLE ELECTRIC COOPERATIVE INCORPORATED

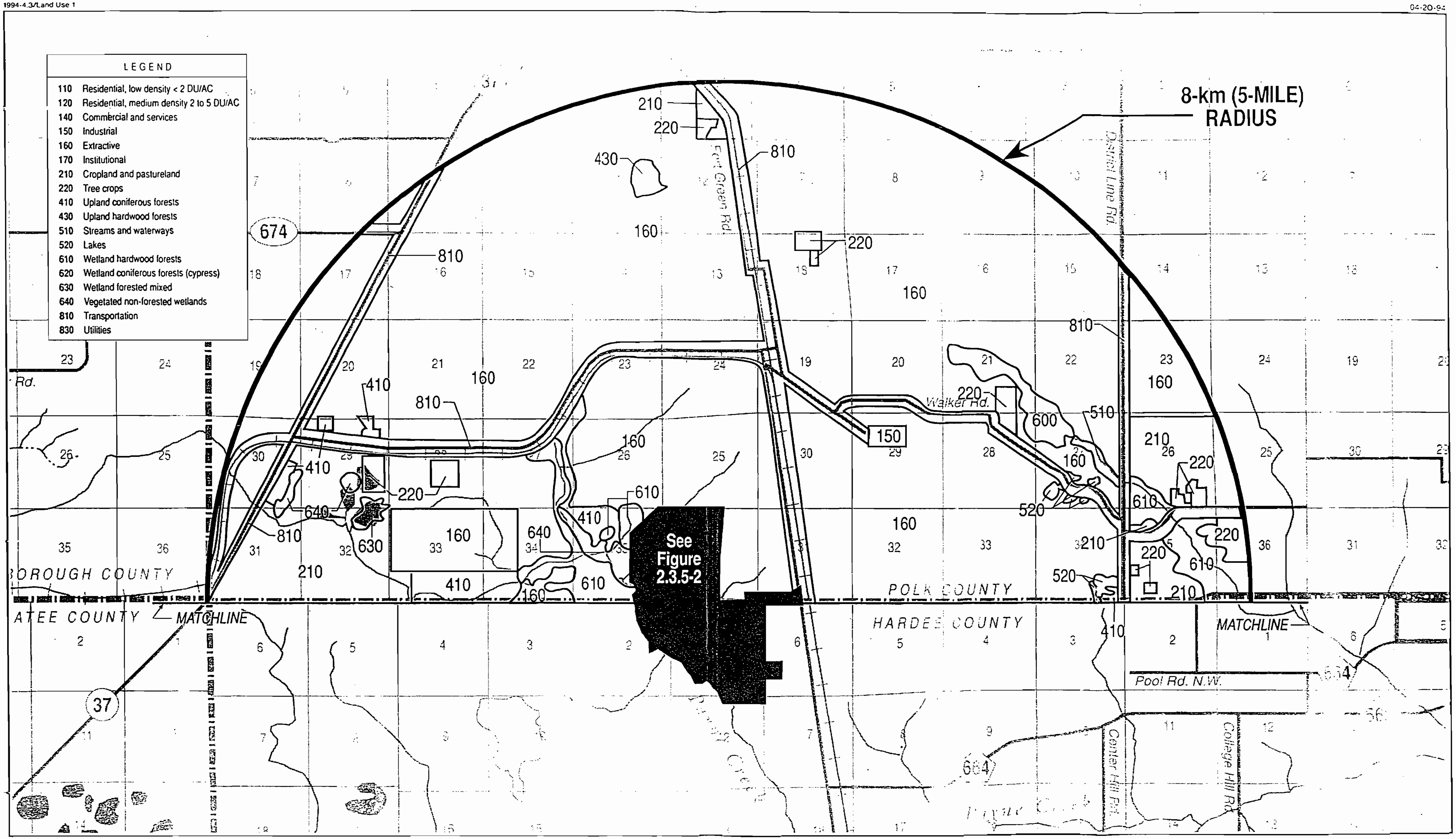

Figure 6.9-1 (Page 1 of 2)
Existing Land Use Within 8 km (5 miles) of the Hardee Unit 3 Site

Sources: FLUCFCS, 1985; KBN, 1994.

SEMINOLE ELECTRIC COOPERATIVE INCORPORATED

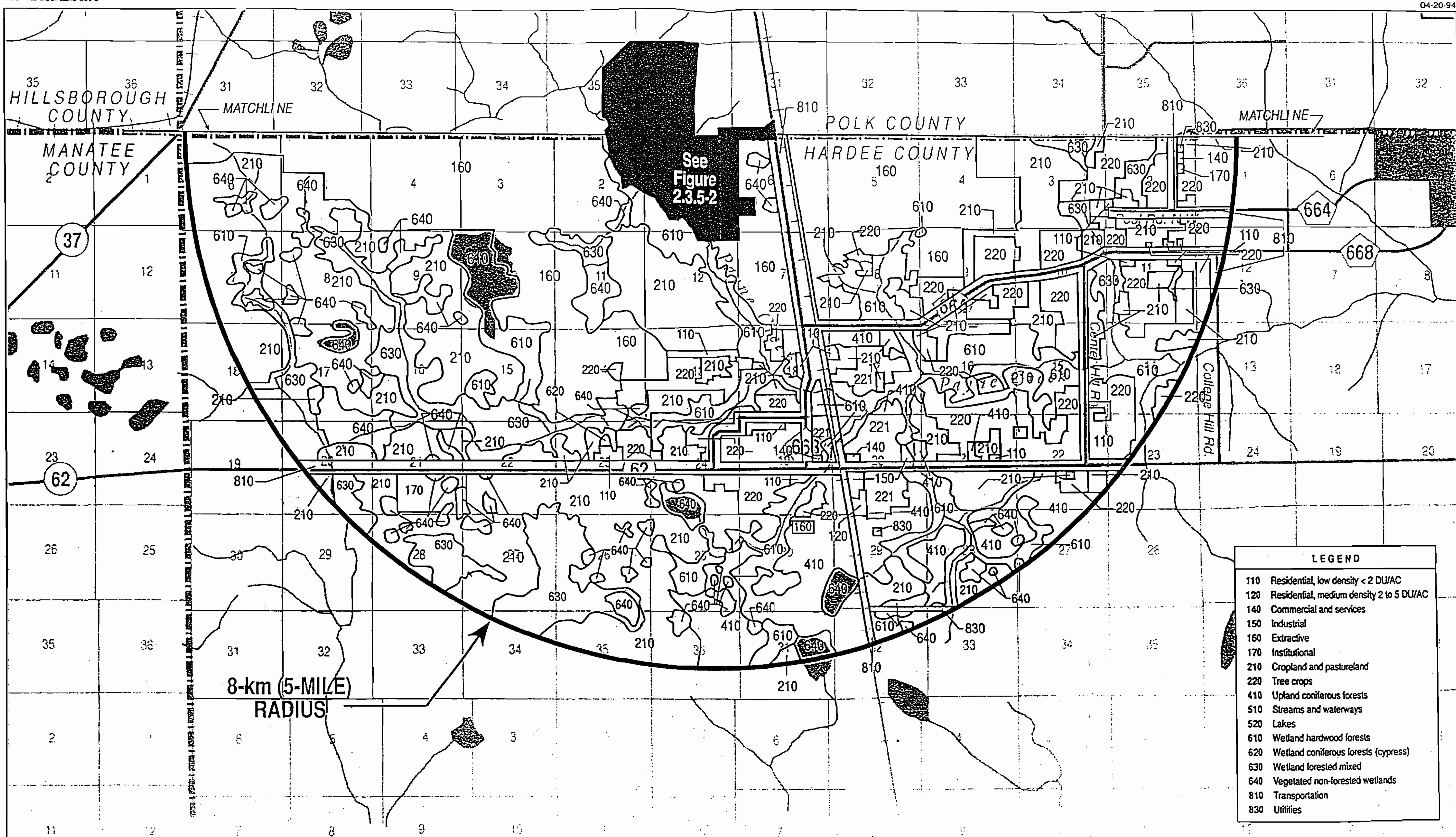

Figure 6.9-1 (Page 2 of 2)
Existing Land Use Within 8 km (5 miles) of the Hardee Unit 3 Site

Sources: FLUCFCS, 1985; KBN, 1994.

SEMINOLE ELECTRIC COOPERATIVE INCORPORATED

Table 6.2.1-1. Summary of Water Quality Conditions in the HPS Cooling Reservoir at the Intake--1993 (Page 1 of 6)

Parameter	Class III Standard	September 1993 Data
Water Quality Data		
Alkalinity (Bicarbonate), mg $CaCO_3$/L	>20	96
Alkalinity (Carbonate), mg $CaCO_3$/L		
Cyanide, mg/L	≤0.0052	<0.005
Fluoride, mg/L	≤10	1.81
Hardness, mg/L as $CaCO_3$		101
Methylene Blue Active Substances, mg/L		
Total Kjeldahl Nitrogen, mg/L		1.57
Ammonia Nitrogen, mg/L		0.046
Organic Nitrogen, mg/L		
Unionized Ammonia, mg/L	≤0.02	<0.005
Nitrate+Nitrite-Nitrogen, mg/L		0.009
Total Nitrogen, mg/L		1.58
Oil and Grease, mg/L	<5	<5
Carbonaceous Biochemical Oxygen Demand, (5-day) mg/L		4.0
Chemical Oxygen Demand, mg/L		44
Orthophosphorus, mg/L		0.347
Total Phosphorus, mg/L		0.816
Sulfate, mg/L		35.3
Turbidity, NTU	<29[a]	10
Aluminum, µg/L		
Antimony, µg/L	≤4,300	<5
Arsenic, µg/L	≤50	<5
Beryllium, µg/L	≤0.13[b]	<0.1
Cadmium, µg/L	0.82[c]	<5
Calcium, mg/L		20.4
Chromium, µg/L	148[c]	<5
Chromium +6, µg/L	≤11	< 10
Copper, µg/L	8.3[c]	< 10
Iron, µg/L	≤1,000	162
Lead, µg/L	1.9[c]	<5
Magnesium, mg/L		12.2
Manganese, µg/L		<5
Mercury, µg/L	≤0.012	<0.2
Nickel, µg/L	111.5[c]	<30

Table 6.2.1-1. Summary of Water Quality Conditions in the HPS Cooling Reservoir at the Intake--1993 (Page 2 of 6)

Parameter	Class III Standard	September 1993 Data
Water Quality Data (Continued)		
Potassium, mg/L		0.6
Selenium, mg/L	≤0.005	<5
Silver, μg/L	≤0.07	<0.07
Sodium, mg/L		24.8
Strontium, Total, μg/L		88
Thallium, μg/L	≤48	<5
Zinc, μg/L	74.9[c] (≤1,000)	73
Total Coliforms, colonies/100 mL	≤1,000[d], ≤2,400 max	3,700
Fecal Coliforms, colonies/100 mL	200[d], 800 max	<1
Chloride, mg/L		17.8
Total Suspended Solids mg/L		16
Total Dissolved Solids, mg/L		185
Silica, dissolved reactive, mg/L		< 1
Radiation Data		
Alpha, Gross (pCi/L) (gross alpha + Radium 226)	≤15	12.5
Beta, Gross (pCi/L)		
Radium 226 (pCi/L) (Radium 226+Radium 228)	≤5	1.0
Radium 228 (pCi/L) (Radium 226+Radium 228)	≤5	<1.0
Volatile Organics (all units μg/L, all compound were analyzed for, but none detected at the specified value)		
Chloromethane	≤470.8[b]	<1
Bromomethane		<1
Dichlorodifluoromethane		<1
Vinyl Chloride		<1
Chloroethane		<1
Methylene Chloride	≤1,580[b]	<1
Trichlorofluoromethane		<1
1,1-Dichloroethene	≤3.2[b]	<1
1,1-Dichloroethane		<1
trans-1,2-Dichloroethene		<1
Chloroform	≤470.8[b]	<1

Table 6.2.1-1. Summary of Water Quality Conditions in the HPS Cooling Reservoir at the Intake--1993 (Page 3 of 6)

Parameter	Class III Standard	September 1993 Data
Volatile Organics (Continued)		
1,2-Dichloroethane		< 1
1,1,1-Trichloroethane	≤173,000	< 1
Carbon Tetrachloride	≤4.42[b]	< 1
Bromodichloromethane		< 1
1,2-Dichloropropane		< 1
Benzene	≤71.28[b]	< 1
Trichloroethene	≤80.7[b]	< 1
Dibromochloromethane	≤22[b]	< 1
1,1,2-Trichloroethane		< 1
cis-1,3-Dichloropropene		< 1
2-Chloroethylvinyl ether		< 1
Bromoform	≤360[b]	< 1
1,1,2,2-Tetrachloroethane	≤10.8[b]	< 1
Tetrachloroethene		< 1
Toluene		< 1
Chlorobenzene		< 1
Ethylbenzene		< 1
1,3-Dichlorbenzene		< 1
1,2-Dichlorbenzene		< 1
1,4-Dichlorbenzene		< 1
para and meta Xylenes		< 1
ortho Xylene		< 1
Styrene		< 1
NTBE		< 5
Semivolatile Organics (all units μg/L, all 1993 compounds were analyzed for, but none were detected at the specified value except for *)		
phenol	≤4,600,000	< 5
2-chlorophenol	≤400	< 5
1,3-dichlorobenzene		< 5
1,4-dichlorobenzene		< 5
1,2-dichlorobenzene		< 5
2-methylphenol		< 5
4-methylphenol		< 5
hexachloroethane		< 5
2-nitrophenol		< 5

Table 6.2.1-1. Summary of Water Quality Conditions in the HPS Cooling Reservoir at the Intake--1993 (Page 4 of 6)

Parameter	Class III Standard	September 1993 Data
Semivolatile Organics (Continued)		
2,4-dimethylphenol		< 5
2,4-dichlorophenol	≤790	< 5
1,2,4-trichlorobenzene		< 5
naphthalene		< 5
hexachlorobutadiene	≤49.7[b]	< 5
4-chloro-3-methyphenol		< 5
2-methylnaphthalene		< 5
hexachlorocyclopentadiene		< 5
2,4,6-trichlorophenol	≤6.5[b]	< 5
2,4,5-trichlorophenol		< 25
2-chloronapthalene		< 5
Diethyl Phthalate		< 5
Acenaphthene	≤2,700	< 5
Acenaphtylene		< 5
2,4-Dinitrophenol	≤14.26	< 25
dimethyl phthalate		< 5
fluorene	≤14,000	< 5
4,6-dinitro-2-methyphenol		< 5
hexachlorobenzene		< 5
pentachlorophenol	≤8.2[b], ≤30 max	< 5
phenanthrene	≤0.031	< 5
anthracene	≤110,000	< 5
di-n-butyl phthalate		32[a]
fluoranthene	≤370	< 5
pyrene	≤11,000	< 5
butyl benzyl phthalate		< 5
benzo(a)anthracene	≤0.031[b]	< 5
bis(2-ethylhexyl)phthalate		< 5
chrysene	≤0.031[b]	< 5
di-n-octyl phthalate		< 5
benzo(b)fluoranthene	≤0.031[b]	< 5
benzo(k)fluoranthene	≤0.031[b]	< 5
benzo(a)pyrene	≤0.031[b]	< 5
Indeno(1,2,3-cd)pyrene	≤0.031[b]	< 5
dibenzo(a,h)anthracene	≤0.031[b]	< 5

Table 6.2.1-1. Summary of Water Quality Conditions in the HPS Cooling Reservoir at the Intake--1993 (Page 5 of 6)

Parameter	Class III Standard	September 1993 Data
Semivolatile Organics (Continued)		
benzo(g,h,i)perylene	≤0.031[b]	<5
Pesticides/PCBs & Herbicides (all units µg/L, all 1993 compounds were analyzed for, but none were detected at the specified value)		
alpha-BHC		<0.05
beta-BHC	≤0.046[b]	<0.05
delta-BHC		<0.05
Lindane	≤0.063[b], <0.08 max	<0.05
Heptachlor	≤0.00021[b], <0.0038 max	<0.05
Aldrin	≤0.00014[b], <3 max	<0.05
Heptachlor epoxide		<0.05
Endosulfan I		<0.05
Dieldrin	≤0.00014[b], <0.0019 max	<0.1
4,4'-DDE		<0.1
Endrin	0.0023	<0.1
Endosulfan II		<0.1
4,4'-DDD		<0.1
Endosulfan sulfate		<0.1
4,4'DDT	0.00059[b], <0.001 max	<0.1
Methoxychlor		<0.5
Endrin ketone		<0.1
alpha-chlordane		<0.5
gamma-chlordane		<0.5
Toxaphene	≤0.0002	<1
PCB-1016		<0.5
PCB-1221		<0.5
PCB-1232		<0.5
PCB-1242		<0.5
PCB-1248		<0.5
PCB-1254		<0.5
PCB-1260		<1
Mirex	≤0.001	<0.5
Chlordane	≤0.00059[b], <0.0043 max	NA
Demeton	≤0.1	NA
Endosulfan	≤0.056	NA
Guthion	≤0.01	NA

Table 6.2.1-1. Summary of Water Quality Conditions in the HPS Cooling Reservoir at the Intake--1993 (Page 6 of 6)

Parameter	Class III Standard	September 1993 Data
Pesticides/PCBs and Herbicides (Continued)		
Malathion	≤0.1	NA
Parathion	≤0.04	NA
Silvex		NA
2,4-D		<1
2,4,5-TP		<1
Organophosphate Pesticides (all units μg/L, all 1993 compounds were analyzed for, but none were detected at the specified value)		
Azinphos methyl		<5
Bolstar		<1
Chloropyriphos		<0.5
Chloropyriphos methyl		<1
Diazinon		<1
Dichlorvos		<1
Disulfoton		<1
Ethoprop		<0.5
Fensulfothion		<5
Fenthion		<1
Merphos		<1
Mevinphos		<5
Perathion methyl		<1
Phorate		<1
Ronnel		<1
Stirofos		<1
Tokuthion		<0.5
Demeton	≤0.1	<1
Coumaphos		<2
Naled		<1
Trichlronate		<1

[a] Above natural background conditions.
[b] Annual average.
[c] Standard calculated according to equation in DEP 17-302.530 and using overall minimum hardness of 66.4 mg/L as $CaCO_3$.
[d] Monthly average.

Sources: TPS/SECI, 1989.
KBN, 1994.

Table 6.2.1-2. Estimated Low Flows on Payne Creek Near the HPS Site

Recurrence Interval (years)	Low-Flow Discharge (cfs) for Various Durations (days)								
	1	3	7	14	30	60	90	120	183
2	0.7	0.8	1.0	1.2	1.7	2.8	3.8	4.9	7.6
5	0.3	0.4	0.5	0.5	0.7	1.1	1.8	2.5	3.8
10	0.3	0.3	0.3	0.4	0.4	0.6	1.2	1.9	2.5
20	0.2	0.2	0.3	0.3	0.3	0.4	0.8	1.5	1.7

Note: Cubic feet per second (cfs) x 0.028 = cubic meters per second (m^3/s).

Source: TPS/SECI, 1989.

Table 6.2.1-3. Estimated Flood Flows on Payne Creek at the HPS Site

Recurrence Interval (years)	Regression Constant C	Regression Exponents B1	B2	B3	Estimated Flood Flow (cfs)
2	93.4	0.756	0.268	-0.803	690
5	192	0.722	0.255	-0.759	1,310
10	274	0.708	0.248	-0.738	1,810
25	395	0.696	0.24	-0.717	2,530
50	496	0.690	0.234	-0.705	3,130
100	609	0.685	0.227	-0.695	3,780
200	779	0.674	0.205	-0.694	4,510
500	985	0.668	0.196	-0.687	5,550

Note: Drainage Area = 25.7 square miles.
Slope = 5 ft/mi.
Non-Contributing Lake Area = 0 percent.

Regression Equation:

$QT = C\ DA^{B1}\ SL^{B2}\ (LK + 3.0)^{B3}$

Cubic feet per second (cfs) x 0.028 = cubic meters per second (m^3/s).

Source: TPS/SECI, 1989.

Table 6.2.1-4. Stage and Flow Data for Payne Creek at Station PC-2 Near the HPS Site

Date	Stage (ft)	Flow (cfs)
October 11, 1988	2.62	12.2
November 8, 1988	2.52	11.6
December 8, 1988	2.06	4.7
January 11, 1989	1.76	2.3
February 15, 1989	1.81	3.0
March 15, 1989	1.85	4.2
April 13, 1989	1.59	1.9

Note: cubic feet per second (cfs) x 0.028 = cubic meters per second (m^3/s).
feet (ft) x 0.3 = meters (m).

Source: TPS/SECI, 1989.

Table 6.2.1-5. Summary of Historic Payne Creek Surface Water Quality in the Vicinity of HPS, 1975-1986 (all available data) (Page 1 of 6)

	Concentration[a]			Number
Parameter/Location	Average	Maximum	Minimum	of Samples
Flow (cfs)				
Station 1	7.00	12.50	2.00	4
Station 2	- -	- -	- -	0
Station 3	- -	- -	- -	0
Station 4	55.80	105.20	10.60	4
Temperature (°F)				
Station 1	74.0	84.2	60.0	22
Station 2	72.9	85.0	59.0	8
Station 3	71.4	85.0	58.0	11
Station 4	72.1	82.0	58.0	22
Total Suspended Solids				
Station 1	5.6	10.4	3.4	12
Station 2	6.4	26.3	1.2	8
Station 3	5.1	28.3	1.0	8
Station 4	2.4	4.2	1.0	12
Total Dissolved Solids				
Station 1	273	374	188	8
Station 2	191	252	141	8
Station 3	194	284	120	11
Station 4	186	244	126	10
Dissolved Oxygen				
Station 1	1.7	4.2	0.1	22
Station 2	2.1	5.0	0.4	8
Station 3	3.2	9.5	0.1	11
Station 4	7.1	9.0	4.4	22
pH				
Station 1	7.1	7.8	6.6	16
Station 2	6.8	7.1	6.3	8
Station 3	7.0	7.2	6.5	11
Station 4	7.4	7.8	6.9	16
Specific Conductivity (μmho/cm)				
Station 1	347	577	191	8
Station 2	215	258	142	8
Station 3	288	860	156	11
Station 4	228	271	135	8

Table 6.2.1-5. Summary of Historic Payne Creek Surface Water Quality in the Vicinity of HPS, 1975-1986 (all available data) (Page 2 of 6)

Parameter/Location	Concentration[a] Average	Maximum	Minimum	Number of Samples
Calcium				
Station 4	25	34	15	2
Magnesium				
Station 4	9.4	12.0	6.9	2
Sodium				
Station 4	8.1	9.0	7.1	2
Total Hardness				
Station 4	100	134	65	2
Bicarbonate Alkalinity (mg/L as $CaCO_3$)				
Station 1	155	283	56	8
Station 2	61	72	50	8
Station 3	64	90	46	11
Station 4	63	98	29	8
Sulfate				
Station 1	22	68	1	4
Station 2	35	59	18	4
Station 3	32	50	17	4
Station 4	37	61	15	4
Chloride				
Station 4	15	17	13	2
Biochemical Oxygen Demand (5-day)				
Station 1	4.88	6.7	2.8	8
Station 2	1.61	4.0	0.9	8
Station 3	1.23	3.0	0.4	11
Station 4	2.46	7.1	0.8	10
Chemical Oxygen Demand				
Station 4	30	47	12	2
Fecal Strep (Number per 100 mL)				
Station 4	183	360	5	2

Table 6.2.1-5. Summary of Historic Payne Creek Surface Water Quality in the Vicinity of HPS, 1975-1986 (all available data) (Page 3 of 6)

Parameter/Location	Concentration[a] Average	Maximum	Minimum	Number of Samples
Fluoride				
Station 1	1.32	1.88	0.74	16
Station 2	0.82	1.88	0.46	8
Station 3	0.94	1.91	0.56	11
Station 4	1.16	1.78	0.37	16
Silicon				
Station 1	2.22	3.30	1.20	4
Station 2	- -	- -	- -	0
Station 3	- -	- -	- -	0
Station 4	3.02	3.84	2.60	4
Sulfide				
Station 4	0.02	0.04	0.00	2
Turbidity (NTU)				
Station 1	2.9	6.2	0.5	16
Station 2	3.6	15.0	1.0	8
Station 3	2.9	18.0	0.8	11
Station 4	2.3	10.0	0.5	18
Ammonia				
Station 1	0.16	0.51	<0.02	8
Station 2	0.29	0.90	0.03	8
Station 3	0.15	0.36	0.02	8
Station 4	0.04	0.09	0.02	8
Nitrate				
Station 1	0.90	5.90	<0.01	11
Station 2	0.15	0.36	<0.01	8
Station 3	0.33	1.25	<0.01	11
Station 4	0.18	1.00	<0.01	12
Nitrite				
Station 1	0.01	0.02	<0.01	8
Station 2	0.06	0.39	<0.01	8
Station 3	0.02	0.05	<0.01	8
Station 4	0.01	0.02	<0.01	8

Table 6.2.1-5. Summary of Historic Payne Creek Surface Water Quality in the Vicinity of HPS, 1975-1986 (all available data) (Page 4 of 6)

Parameter/Location	Concentration[a] Average	Maximum	Minimum	Number of Samples
Total Kjeldahl Nitrogen				
Station 1	0.79	1.14	0.37	8
Station 2	0.62	1.44	0.17	8
Station 3	0.34	0.63	0.16	8
Station 4	0.59	2.70	0.22	10
Total Nitrogen				
Station 1	2.31	12.70	0.41	12
Station 2	0.83	1.76	0.37	8
Station 3	0.71	2.65	0.23	11
Station 4	0.51	1.42	0.02	12
Total Phosphate				
Station 1	0.51	0.60	0.42	4
Station 2	- -	- -	- -	0
Station 3	0.36	0.50	0.18	3
Station 4	0.45	0.58	0.28	4
Total Phosphorus				
Station 1	0.74	1.12	0.35	8
Station 2	0.62	1.80	0.29	8
Station 3	0.45	0.72	0.15	8
Station 4	0.47	0.79	0.25	8
Arsenic				
Station 1	0.009	0.030	<0.001	4
Station 2	0.009	0.030	<0.001	4
Station 3	0.009	0.030	<0.001	4
Station 4	0.006	0.030	<0.001	6
Barium				
Station 1	- -	- -	- -	0
Station 2	- -	- -	- -	0
Station 3	<0.01	<0.01	<0.01	3
Station 4	- -	- -	- -	0
Beryllium				
Station 1	- -	- -	- -	0
Station 2	- -	- -	- -	0
Station 3	0.24	0.69	<0.01	3
Station 4	- -	- -	- -	0

Table 6.2.1-5. Summary of Historic Payne Creek Surface Water Quality in the Vicinity of HPS, 1975-1986 (all available data) (Page 5 of 6)

Parameter/Location	Concentration[a] Average	Maximum	Minimum	Number of Samples
Cadmium				
Station 1	0.01	0.02	<0.005	4
Station 2	0.01	0.02	<0.005	4
Station 3	0.01	0.01	<0.005	4
Station 4	0.01	0.01	<0.002	6
Chromium				
Station 1	- -	- -	- -	0
Station 2	- -	- -	- -	0
Station 3	0.07	0.10	<0.01	3
Station 4	0.03	0.03	<0.02	2
Copper				
Station 1	- -	- -	- -	0
Station 2	- -	- -	- -	0
Station 3	0.01	0.01	<0.01	3
Station 4	0.02	0.03	<0.01	2
Iron				
Station 1	1.21	2.94	0.22	8
Station 2	1.30	5.60	0.32	8
Station 3	0.81	4.77	0.05	11
Station 4	0.33	1.01	0.10	10
Lead				
Station 1	0.02	0.05	<0.01	4
Station 2	0.02	0.05	<0.01	4
Station 3	0.07	0.20	<0.01	7
Station 4	0.02	0.05	<0.01	6
Manganese				
Station 1	0.03	0.05	0.02	8
Station 2	0.03	0.06	0.01	8
Station 3	0.02	0.05	0.01	8
Station 4	0.02	0.05	0.01	8
Nickel				
Station 4	0.01	0.01	<0.002	2
Selenium				
Station 4	0.0025	0.005	<0.014	2

Table 6.2.1-5. Summary of Historic Payne Creek Surface Water Quality in the Vicinity of HPS, 1975-1986 (all available data) (Page 6 of 6)

Parameter/Location	Concentration[a] Average	Maximum	Minimum	Number of Samples
Zinc				
Station 1	- -	- -	- -	0
Station 2	- -	- -	- -	0
Station 3	0.04	0.05	<0.01	3
Station 4	0.07	0.10	0.04	2
Hexane Solubles				
Station 4	22	24	20	2
Methyl Blue Active Substances				
Station 4	0.13	0.25	<0.01	2
Phenols				
Station 4	0.01	0.03	0.00	2
Gross Alpha (pCi/L)				
Station 1	4.7	14.0	<0.1	8
Station 2	1.5	7.5	<0.1	8
Station 3	2.1	8.4	<0.1	11
Station 4	3.2	10.2	<0.1	8

Note: All values are total concentrations unless noted.
Cubic feet per second (cfs) x 0.028 = cubic meters per second (m^3/s).
Degrees Fahrenheit (°F) - 32 x 5/9 = degrees Celsius (°C).

[a] All values mg/L unless otherwise noted.

Source: TPS/SECI, 1989.

Table 6.2.1-6. Summary of Water Quality Conditions in Payne Creek--PC-1, 1988 - 1989 and 1993 (Page 1 of 5)

Parameter	Class III Standard	1988-1989 Data Max	1988-1989 Data Min	1988-1989 Data Mean	1993 Data September	1993 Data December
Water Quality Data						
Alkalinity (Bicarbonate), mg $CaCO_3$/L	>20	60	48	50.67	56	64
Alkalinity (Carbonate), mg $CaCO_3$/L		<0.5	<0.5	<0.5	--	<1
Cyanide, mg/L	≤0.0052	<0.004	<0.004	0.004	<0.005	<0.005
Fluoride, mg/L	≤10	0.8	0.6	0.7	0.247	0.419
Hardness, mg/L as $CaCO_3$		85.4	77.8	74.98	66.4	79.7
Methylene Blue Active Substances, mg/L		0.05	<0.025	0.029	--	--
Total Kjeldahl Nitrogen, mg/L		0.864	0.338	0.656	0.5	0.38
Ammonia Nitrogen, mg/L		0.345	<0.005	0.084	0.01	<0.005
Organic Nitrogen, mg/L		0.743	0.323	0.574	--	0.38
Unionized Ammonia, mg/L	≤0.02	--	--	--	<0.005	<0.005
Nitrate+Nitrite-Nitrogen, mg/L		0.608	0.19	0.358	0.047	0.166
Total Nitrogen, mg/L		1.42	0.772	1.014	0.55	0.55
Oil and Grease, mg/L	<5	<5	<5	<5	<5	<5
Carbonaceous Biochemical Oxygen Demand, 5-day, mg/L		<1	<1	<1	1.2	<1.0
Chemical Oxygen Demand, mg/L		66	<10	29.5	61	30
Orthophosphorus, mg/L		0.5	0.288	0.38	0.518	0.256
Total Phosphorus, mg/L		0.573	0.318	0.392	0.629	0.284
Sulfate, mg/L		25	9.2	19.98	18.2	27.4
Turbidity, NTU	<29[a]	1.6	0.8	1.142	1.4	0.6
Aluminum, µg/L		137	45	83.17	78	27
Antimony, µg/L	≤4,300	<10	<10	10	<5	--
Arsenic, µg/L	≤50	<5	<5	<5	<5	<5
Beryllium, µg/L	≤0.13[b]	<3	<3	<3	<0.1	<0.1
Cadmium, µg/L	0.82[c]	<0.4	<0.4	0.4	<5	<5
Calcium, mg/L		17.4	12.3	15.37	12.9	16
Chromium, µg/L	148[c]	<10	<10	10	<5	<5
Chromium +6, µg/L	≤11	--	--	--	<10	<10
Copper, µg/L	8.3[c]	<7	<6	6.333	<10	<10
Iron, µg/L	≤1,000	648	224	338.5	661	171
Lead, µg/L	1.9[c]	6.7	<5	5.283	<5	6.7
Magnesium, mg/L		10.2	7	8.9	8.31	--
Manganese, µg/L		16	3	6.533	18	6.7
Mercury, µg/L	≤0.012	0.5	<0.200	0.25	<0.200	<0.2
Nickel, µg/L	111.5[c]	<17	<12	14.83	<30	<30
Potassium, mg/L		0.9	<0.5	0.7	<0.500	<0.5
Selenium, mg/L	≤0.005	<5	<5	<5	<5	<5
Silver, µg/L	≤0.07	<0.08	<0.08	0.08	<0.070	<0.07
Sodium, mg/L		9.8	6.3	7.783	10.3	13.2
Thallium, µg/L	≤48	--	--	--	<5	<5
Zinc, µg/L	74.9[c] (≤1,000)	7.0	<5	5.333	<10	10

Table 6.2.1-6. Summary of Water Quality Conditions in Payne Creek–PC-1, 1988 - 1989 and 1993 (Page 2 of 5)

Parameter	Class III Standard	1988-1989 Data			1993 Data	
		Max	Min	Mean	September	December
Water Quality Data (Continued)						
Total Coliforms, colonies/100 mL	≤1,000[d], ≤2,400 max	364	46	153.2	400	1,000
Fecal Coliforms, colonies/100 mL	200[d], 800 max	73	<1	28.83	<1	180
Radiation Data						
Alpha, Gross (pCi/L) gross alpha + Radium 226	≤15	3.6	0.5	1.967	0.8	<0.6
Beta, Gross (pCi/L)		2.3	0	0.917	0.8	<1.4
Radium 226 (pCi/L) Radium 226 + Radium 228	≤5	0.8	0.3	0.667	0.4	0.4
Radium 228 (pCi/L) Radium 226 + Radium 228	≤5	1.3	0	0.433	<1.000	<1.000
Strontium-90 (pCi/L)		<0.500	<0.500	0.5	<1.000	<1.2
Chlorophyll-a, mg/m^3		<1	<1	<1	3.2	<1.0
Chloride, mg/L		12.6	12.6	12.6	–	–
Total Dissolved Solids, mg/L		126	126	126	–	–
Silica, dissolved reactive, mg/L		3.1	3.1	3.1	6.44	6.14
Volatile Organics (all units µg/L, all compound were analyzed for, but none detected at the specified value)						
Chloromethane	≤470.8[b]	–	–	–	<1	NA
Bromomethane		–	–	–	<1	NA
Dichlorodifluoromethane		–	–	–	<1	NA
Vinyl Chloride		–	–	–	<1	NA
Chloroethane		–	–	–	<1	NA
Methylene Chloride	≤1,580[b]	–	–	–	<1	NA
Trichlorofluoromethane		–	–	–	<1	NA
1,1-Dichloroethene	≤3.2[b]	–	–	–	<1	NA
1,1-Dichloroethane		–	–	–	<1	NA
trans-1,2-Dichloroethene		–	–	–	<1	NA
Chloroform	≤470.8[b]	–	–	–	<1	NA
1,2-Dichloroethane		–	–	–	<1	NA
1,1,1-Trichloroethane	≤173.000	–	–	–	<1	NA
Carbon Tetrachloride	≤4.42[b]	–	–	–	<1	NA
Bromodichloromethane		–	–	–	<1	NA
1,2-Dichloropropane		–	–	–	<1	NA
Benzene	≤71.28[b]	–	–	–	<1	NA
Trichloroethene	≤80.7[b]	–	–	–	<1	NA
Dibromochloromethane	≤22[b]	–	–	–	<1	NA
1,1,2-Trichloroethane		–	–	–	<1	NA
cis-1,3-Dichloropropene		–	–	–	<1	NA
2-Chloroethylvinyl ether		–	–	–	<1	NA
Bromoform	≤360[b]	–	–	–	<1	NA
1,1,2,2-Tetrachloroethane	≤10.8[b]	–	–	–	<1	NA
Tetrachloroethene		–	–	–	<1	NA
Toluene		–	–	–	<1	NA

Table 6.2.1-6. Summary of Water Quality Conditions in Payne Creek--PC-1, 1988 - 1989 and 1993 (Page 3 of 5)

Parameter	Class III Standard	1988-1989 Data Max	1988-1989 Data Min	1988-1989 Data Mean	1993 Data September	1993 Data December
Volatile Organics (Continued)						
Chlorobenzene		--	--	--	<1	NA
Ethylbenzene		--	--	--	<1	NA
1,3-Dichlorbenzene		--	--	--	<1	NA
1,2-Dichlorbenzene		--	--	--	<1	NA
1,4-Dichlorbenzene		--	--	--	<1	NA
para and meta Xylenes		--	--	--	<1	NA
ortho Xylene		--	--	--	<1	NA
Styrene		--	--	--	<1	NA
NTBE		--	--	--	<5	NA
Semivolatile Organics (all units μg/L, all 1993 compounds were analyzed for, but none were detected at the specified value)						
phenol	≤4,600,000	<5	<5	<5	<5	NA
2-chlorophenol	≤400	--	--	--	<5	NA
1,3-dichlorobenzene		<10	<10	<10	<5	NA
1,4-dichlorobenzene		<10	<10	<10	<5	NA
1,2-dichlorobenzene		<10	<10	<10	<5	NA
2-methylphenol		--	--	--	<5	NA
4-methylphenol		--	--	--	<5	NA
hexachloroethane		<10	<10	<10	<5	NA
2-nitrophenol		--	--	--	<5	NA
2,4-dimethylphenol		--	--	--	<5	NA
2,4-dichlorophenol	≤790	--	--	--	<5	NA
1,2,4-trichlorobenzene		<10	<10	<10	<5	NA
naphthalene		--	--	--	<5	NA
hexachlorobutadiene	≤49.7[b]	<10	<10	<10	<5	NA
4-chloro-3-methyphenol		--	--	--	<5	NA
2-methylnaphthalene		--	--	--	<5	NA
hexachlorocyclopentadiene		<10	<10	<10	<5	NA
2,4,6-trichlorophenol	≤6.5[b]	--	--	--	<5	NA
2,4,5-trichlorophenol		--	--	--	<2.5	NA
2-chloronaphthalene		<10	<10	<10	<5	NA
Diethyl Phthalate		--	--	--	<5	NA
Acenaphthene	≤2,700	--	--	--	<5	NA
Acenaphtylene		--	--	--	<5	NA
2,4-Dinitrophenol	≤14.26	--	--	--	<2.5	NA
dimethyl phthalate		--	--	--	<5	NA
fluorene	≤14,000	--	--	--	<5	NA
4,6-dinitro-2-methylphenol		--	--	--	<5	NA
hexachlorobenzene		--	--	--	<5	NA
pentachlorophenol	≤8.2[b], ≤30 max	--	--	--	<5	NA
phenanthrene	≤0.031	--	--	--	<5	NA
anthracene	≤110,000	--	--	--	<5	NA

Table 6.2.1-6. Summary of Water Quality Conditions in Payne Creek--PC-1, 1988 - 1989 and 1993 (Page 4 of 5)

Parameter	Class III Standard	1988-1989 Data Max	1988-1989 Data Min	1988-1989 Data Mean	1993 Data September	1993 Data December
Semivolatile Organics (Continued)						
di-n-butyl phthalate		–	–	–	<5	NA
fluoranthene	≤370	–	–	–	<5	NA
pyrene	≤11,000	–	–	–	<5	NA
butyl benzyl phthalate		–	–	–	<5	NA
benzo(a)anthracene	≤0.031[b]	–	–	–	<5	NA
bis(2-ethylhexyl)phthalate		–	–	–	<5	NA
chrysene	≤0.031[b]	–	–	–	<5	NA
di-n-octyl phthalate		–	–	–	<5	NA
benzo(b)fluoranthene	≤0.031[b]	–	–	–	<5	NA
benzo(k)fluoranthene	≤0.031[b]	–	–	–	<5	NA
benzo(a)pyrene	≤0.031[b]	–	–	–	<5	NA
Indeno(1,2,3-cd)pyrene	≤0.031[b]	–	–	–	<5	NA
dibenzo(a,h)anthracene	≤0.031[b]	–	–	–	<5	NA
benzo(g,h,i)perylene	≤0.031[b]	–	–	–	<5	NA
Pesticides/PCBs & Herbicides (all units μg/L, all 1993 compounds were analyzed for, but none were detected at the specified value)						
alpha-BHC		–	–	–	<0.05	NA
beta-BHC	≤0.046[b]	–	–	–	<0.05	NA
delta-BHC		–	–	–	<0.05	NA
Lindane	≤0.063[b], <0.08 max	<0.010	<0.010	<0.010	<0.05	NA
Heptachlor	≤0.00021[b], <0.0038 max	<0.001	<0.001	<0.001	<0.05	NA
Aldrin	<0.00014[b], <3 max	<0.003	<0.003	<0.003	<0.05	NA
Heptachlor epoxide		–	–	–	<0.05	NA
Endosulfan I		–	–	–	<0.05	NA
Dieldrin	≤0.00014[b], <0.0019 max	<0.003	<0.003	<0.003	<0.1	NA
4,4'-DDE		–	–	–	<0.1	NA
Endrin	0.0023	0.004	0.004	0.004	<0.1	NA
Endosulfan II		–	–	–	<0.1	NA
4,4'-DDD		–	–	–	<0.1	NA
Endosulfan sulfate		–	–	–	<0.1	NA
4,4'DDT	0.00059[b], <0.001 max	<0.001	<0.001	<0.001	<0.1	NA
Methoxychlor		<0.030	<0.030	<0.030	<0.5	NA
Endrin ketone		–	–	–	<0.1	NA
alpha-chlordane		–	–	–	<0.5	NA
gamma-chlordane		–	–	–	<0.5	NA
Toxaphene	≤0.0002	<0.005	<0.005	<0.005	<1	NA
PCB-1016		<0.001	<0.001	<0.001	<0.5	NA
PCB-1221		<0.001	<0.001	<0.001	<0.5	NA
PCB-1232		<0.001	<0.001	<0.001	<0.5	NA
PCB-1242		<0.001	<0.001	<0.001	<0.5	NA
PCB-1248		<0.001	<0.001	<0.001	<0.5	NA
PCB-1254		<0.001	<0.001	<0.001	<0.5	NA

Table 6.2.1-6. Summary of Water Quality Conditions in Payne Creek—PC-1, 1988 - 1989 and 1993 (Page 5 of 5)

Parameter	Class III Standard	1988-1989 Data Max	Min	Mean	1993 Data September	December
Pesticides/PCBs and Herbicides (Continued)						
PCB-1260		<0.001	<0.001	<0.001	<1	NA
Mirex	≤0.001	<0.001	<0.001	<0.001	<0.5	NA
Chlordane	≤0.00059[b], <0.0043 max	<0.010	<0.010	<0.010	–	NA
Demeton	≤0.1	<0.100	<0.100	<0.100	–	NA
Endosulfan	≤0.056	<0.003	<0.003	<0.003	–	NA
Guthion	≤0.01	<0.010	<0.010	<0.010	–	NA
Malathion	≤0.1	<0.100	<0.100	<0.100	–	NA
Parathion	≤0.04	<0.040	<0.040	<0.040	–	NA
Silvex		<20	<20	<20	–	NA
2,4-D		<10	<10	<10	<1	NA
2,4,5-TP		–	–	–	<1	NA
Organophosphate Pesticides (all units µg/L, all 1993 compounds were analyzed for, but none were detected at the specified value)						
Azinphos methyl		–	–	–	<5	NA
Bolstar		–	–	–	<1	NA
Chloropyriphos		–	–	–	<0.5	NA
Chloropyriphos methyl		–	–	–	<1	NA
Diazinon		–	–	–	<1	NA
Dichlorvos		–	–	–	<1	NA
Disulfoton		–	–	–	<1	NA
Ethoprop		–	–	–	<0.5	NA
Fensulfothion		–	–	–	<5	NA
Fenthion		–	–	–	<1	NA
Merphos		–	–	–	<1	NA
Mevinphos		–	–	–	<5	NA
Perathion methyl		–	–	–	<1	NA
Phorate		–	–	–	<1	NA
Ronnel		–	–	–	<1	NA
Stirofos		–	–	–	<1	NA
Tokuthion		–	–	–	<0.5	NA
Demeton	≤0.1	–	–	–	<1	NA
Coumaphos		–	–	–	<2	NA
Naled		–	–	–	<1	NA
Trichlronate		–	–	–	<1	NA

Note: NA = not applicable.

[a] Above natural background conditions.
[b] Annual average.
[c] Standard calculated according to equation in DEP 17-302.530 and using overall minimum hardness of 66.4 mg/L as $CaCO_3$.
[d] Monthly average.

Sources: TPS/SECI, 1989.
KBN, 1994.

Table 6.2.1-7. Summary of Water Quality Conditions in Payne Creek--PC-2, 1988 - 1989 and 1993 (Page 1 of 5)

Parameter	Class III Standard	1988-1989 Data			1993 Data	
		Max	Min	Mean	September	December
Water Quality Data						
Alkalinity (Bicarbonate), mg $CaCO_3$/L	>20	68	44	54.67	77	83
Alkalinity (Carbonate), mg $CaCO_3$/L		<0.5	<0.5	<0.5	–	<1
Cyanide, mg/L	≤0.0052	<0.004	<0.004	0.004	<0.005	<0.005
Fluoride, mg/L	≤10	0.9	0.6	0.75	0.772	0.738
Hardness, mg/L as $CaCO_3$		84.7	68.5	77.32	67.9	80.6
Methylene Blue Active Substances, mg/L		0.054	<0.025	0.03	–	–
Total Kjeldahl Nitrogen, mg/L		0.883	0.245	0.645	0.53	0.42
Ammonia Nitrogen, mg/L		0.325	<0.005	0.066	0.015	<0.005
Organic Nitrogen, mg/L		0.747	0.239	0.579	–	0.42
Unionized Ammonia, mg/L	≤0.02	–	–	–	<0.005	<0.005
Nitrate+Nitrite-Nitrogen, mg/L		0.845	0.209	0.456	0.125	0.131
Total Nitrogen, mg/L		1.73	0.631	1.099	0.66	0.55
Oil and Grease, mg/L	<5	<5	<5	<5	<5	<5
Carbonaceous Biochemical Oxygen Demand, 5-day, mg/L		1.7	<1	1.117	1.13	<1.0
Chemical Oxygen Demand, mg/L		75	<10	31.67	50	44
Orthophosphorus, mg/L		0.509	0.243	0.368	0.53	0.312
Total Phosphorus, mg/L		0.624	0.332	0.399	0.634	0.354
Sulfate, mg/L		25.3	17.4	22.25	18.6	30.5
Turbidity, NTU	<29[a]	2.3	0.8	1.533	2.1	1.1
Aluminum, µg/L		220	32	111.7	108	36
Antimony, µg/L	≤4,300	<10	<10	10	<5	–
Arsenic, µg/L	≤50	<5	<5	<5	<5	<5
Beryllium, µg/L	≤0.13[b]	<3	<3	<3	<0.1	<0.1
Cadmium, µg/L	0.82[c]	0.5	<0.4	0.417	<5	<5
Calcium, mg/L		17.1	13.6	15.97	13.6	16.6
Chromium, µg/L	148[c]	<10	<10	10	<5	5.3
Chromium +6, µg/L	≤11	–	–	–	<10	<10
Copper, µg/L	8.3[c]	12	<6	7.667	<10	<10
Iron, µg/L	≤1,000	542	210	279.3	452	172
Lead, µg/L	1.9[c]	9.8	<5	7.1	<5	9.1
Magnesium, mg/L		10.2	7.6	9.05	8.24	–
Manganese, µg/L		16	3.2	7.133	10	7.2
Mercury, µg/L	≤0.012	0.5	<0.200	0.25	<0.200	<0.2
Nickel, µg/L	111.5[c]	35	<12	17.83	<30	<30
Potassium, mg/L		0.9	<0.5	0.78	<0.500	<0.5
Selenium, mg/L	≤0.005	<5	<5	<5	<5	<5
Silver, µg/L	≤0.07	<0.08	<0.08	0.08	<0.070	<0.07
Sodium, mg/L		8.8	6.8	7.933	19.5	22.2
Thallium, µg/L	≤48	–	–	–	<5	<5
Zinc, µg/L	74.9[c] (≤1,000)	36	<5	11	50	22
Total Coliforms, colonies/100 mL	≤1,000[d], ≤2,400 max	600	<1	236.7	1200	2,600

Table 6.2.1-7. Summary of Water Quality Conditions in Payne Creek--PC-2, 1988 - 1989 and 1993 (Page 2 of 5)

Parameter	Class III Standard	1988-1989 Data			1993 Data	
		Max	Min	Mean	September	December
Water Quality Data (Continued)						
Fecal Coliforms, colonies/100 mL	200[d], 800 max	64	9	53	<1	20
Radiation Data						
Alpha, Gross (pCi/L) gross alpha + Radium 226	≤15	3	0.2	1.683	1.4	1.4
Beta, Gross (pCi/L)		5.5	1	2.4	1.1	<1.5
Radium 226 (pCi/L) Radium 226+Radium 228	≤5	0.6	0.1	0.517	0.2	0.3
Radium 228 (pCi/L) Radium 226+Radium 228	≤5	0.1	0	0.017	<1	<1.0
Strontium-90 (pCi/L)		<0.500	<0.500	0.5	<1.000	<1.2
Chlorophyll-a, mg/m³		<1	<1	<1	2.7	<1.0
Chloride, mg/L		11.6	11.6	11.6	–	–
Total Dissolved Solids, mg/L		125	125	125	–	–
Silica, dissolved reactive, mg/L		2.8	2.8	2.8	6	4.81
Volatile Organics (all units μg/L, all compound were analyzed for, but none detected at the specified value)						
Chloromethane	≤470.8[b]	–	–	–	<1	NA
Bromomethane		–	–	–	<1	NA
Dichlorodifluoromethane		–	–	–	<1	NA
Vinyl Chloride		–	–	–	<1	NA
Chloroethane		–	–	–	<1	NA
Methylene Chloride	≤1,580[b]	–	–	–	<1	NA
Trichlorofluoromethane		–	–	–	<1	NA
1,1-Dichloroethene	≤3.2[b]	–	–	–	<1	NA
1,1-Dichloroethane		–	–	–	<1	NA
trans-1,2-Dichloroethene		–	–	–	<1	NA
Chloroform	≤470.8[b]	–	–	–	<1	NA
1,2-Dichloroethane		–	–	–	<1	NA
1,1,1-Trichloroethane	≤173,000	–	–	–	<1	NA
Carbon Tetrachloride	≤4.42[b]	–	–	–	<1	NA
Bromodichloromethane		–	–	–	<1	NA
1,2-Dichloropropane		–	–	–	<1	NA
Benzene	≤71.28[b]	–	–	–	<1	NA
Trichloroethene	≤80.71[b]	–	–	–	<1	NA
Dibromochloromethane	≤22[b]	–	–	–	<1	NA
1,1,2-Trichloroethane		–	–	–	<1	NA
cis-1,3-Dichloropropene		–	–	–	<1	NA
2-Chloroethylvinyl ether		–	–	–	<1	NA
Bromoform	≤360[b]	–	–	–	<1	NA
1,1,2,2-Tetrachloroethane	≤10.8[b]	–	–	–	<1	NA
Tetrachloroethene		–	–	–	<1	NA
Toluene		–	–	–	<1	NA
Chlorobenzene		–	–	–	<1	NA
Ethylbenzene		–	–	–	<1	NA

Table 6.2.1-7. Summary of Water Quality Conditions in Payne Creek--PC-2, 1988 - 1989 and 1993 (Page 3 of 5)

Parameter	Class III Standard	1988-1989 Data			1993 Data	
		Max	Min	Mean	September	December
Volatile Organics (Continued)						
1,3-Dichlorbenzene		--	--	--	<1	NA
1,2-Dichlorbenzene		--	--	--	<1	NA
1,4-Dichlorbenzene		--	--	--	<1	NA
para and meta Xylenes		--	--	--	<1	NA
ortho Xylene		--	--	--	<1	NA
Styrene		--	--	--	<1	NA
NTBE		--	--	--	<5	NA
Semivolatile Organics (all units µg/L, all 1993 compounds were analyzed for, but none were detected at the specified value)						
phenol	≤4,600,000	<5	<5	<5	<5	NA
2-chlorophenol	≤400	--	--	--	<5	NA
1,3-dichlorobenzene		<10	<10	<10	<5	NA
1,4-dichlorobenzene		<10	<10	<10	<5	NA
1,2-dichlorobenzene		<10	<10	<10	<5	NA
2-methylphenol		--	--	--	<5	NA
4-methylphenol		--	--	--	<5	NA
hexachloroethane		<10	<10	<10	<5	NA
2-nitrophenol		--	--	--	<5	NA
2,4-dimethylphenol		--	--	--	<5	NA
2,4-dichlorophenol	≤790	--	--	--	<5	NA
1,2,4-trichlorobenzene		<10	<10	<10	<5	NA
naphthalene		--	--	--	<5	NA
hexachlorobutadiene	≤49.7[b]	<10	<10	<10	<5	NA
4-chloro-3-methyphenol		--	--	--	<5	NA
2-methylnaphthalene		--	--	--	<5	NA
hexachlorocyclopentadiene		<10	<10	<10	<5	NA
2,4,6-trichlorophenol	≤6.5[b]	--	--	--	<5	NA
2,4,5-trichlorophenol		--	--	--	<2.5	NA
2-chloronaphthalene		<10	<10	<10	<5	NA
Diethyl Phthalate		--	--	--	<5	NA
Acenaphthene	≤2,700	--	--	--	<5	NA
Acenaphtylene		--	--	--	<5	NA
2,4-Dinitrophenol	≤14.26	--	--	--	<2.5	NA
dimethyl phthalate		--	--	--	<5	NA
fluorene	≤14,000	--	--	--	<5	NA
4,6-dinitro-2-methylphenol		--	--	--	<5	NA
hexachlorobenzene		--	--	--	<5	NA
pentachlorophenol	≤8.2[b], ≤30 max	--	--	--	<5	NA
phenanthrene	≤0.031	--	--	--	<5	NA
anthracene	≤110,000	--	--	--	<5	NA
di-n-butyl phthalate		--	--	--	<5	NA
fluoranthene	≤370	--	--	--	<5	NA
pyrene	≤11,000	--	--	--	<5	NA

Table 6.2.1-7. Summary of Water Quality Conditions in Payne Creek–PC-2, 1988 - 1989 and 1993 (Page 4 of 5)

Parameter	Class III Standard	1988-1989 Data Max	1988-1989 Data Min	1988-1989 Data Mean	1993 Data September	1993 Data December
Semivolatile Organics (Continued)						
butyl benzyl phthalate		–	–	–	<5	NA
benzo(a)anthracene	≤0.031[b]	–	–	–	<5	NA
bis(2-ethylhexyl)phthalate		–	–	–	<5	NA
chrysene	≤0.031[b]	–	–	–	<5	NA
di-n-octyl phthalate		–	–	–	<5	NA
benzo(b)fluoranthene	≤0.031[b]	–	–	–	<5	NA
benzo(k)fluoranthene	≤0.031[b]	–	–	–	<5	NA
benzo(a)pyrene	≤0.031[b]	–	–	–	<5	NA
Indeno(1,2,3-cd)pyrene	≤0.031[b]	–	–	–	<5	NA
dibenzo(a,h)anthracene	≤0.031[b]	–	–	–	<5	NA
benzo(g,h,i)perylene	≤0.031[b]	–	–	–	<5	NA
Pesticides/PCBs & Herbicides (all units μg/L, all 1993 compounds were analyzed for, but none were detected at the specified value)						
alpha-BHC		–	–	–	<0.05	NA
beta-BHC	≤0.046[b]	–	–	–	<0.05	NA
delta-BHC		–	–	–	<0.05	NA
Lindane	≤0.063[b], <0.08 max	<0.010	<0.010	<0.010	<0.05	NA
Heptachlor	≤0.00021[b], <0.0038 max	<0.001	<0.001	<0.001	<0.05	NA
Aldrin	≤0.00014[b], <3 max	<0.003	<0.003	<0.003	<0.05	NA
Heptachlor epoxide		–	–	–	<0.05	NA
Endosulfan I		–	–	–	<0.05	NA
Dieldrin	≤0.00014[b], <0.0019 max	<0.003	<0.003	<0.003	<0.1	NA
4,4'-DDE		–	–	–	<0.1	NA
Endrin	0.0023	0.004	0.004	0.004	<0.1	NA
Endosulfan II		–	–	–	<0.1	NA
4,4'-DDD		–	–	–	<0.1	NA
Endosulfan sulfate		–	–	–	<0.1	NA
4,4'DDT	0.00059[b], <0.001 max	<0.001	<0.001	<0.001	<0.1	NA
Methoxychlor		<0.030	<0.030	<0.030	<0.5	NA
Endrin ketone		–	–	–	<0.1	NA
alpha-chlordane		–	–	–	<0.5	NA
gamma-chlordane		–	–	–	<0.5	NA
Toxaphene	≤0.0002	<0.005	<0.005	<0.005	<1	NA
PCB-1016		<0.001	<0.001	<0.001	<0.5	NA
PCB-1221		<0.001	<0.001	<0.001	<0.5	NA
PCB-1232		<0.001	<0.001	<0.001	<0.5	NA
PCB-1242		<0.001	<0.001	<0.001	<0.5	NA
PCB-1248		<0.001	<0.001	<0.001	<0.5	NA
PCB-1254		<0.001	<0.001	<0.001	<0.5	NA
PCB-1260		<0.001	<0.001	<0.001	<1	NA
Mirex	≤0.001	<0.001	<0.001	<0.001	<0.5	NA
Chlordane	≤0.00059[b], <0.0043 max	<0.010	<0.010	<0.010	--	NA
Demeton	≤0.1	<0.100	<0.100	<0.100	--	NA

Table 6.2.1-7. Summary of Water Quality Conditions in Payne Creek--PC-2, 1988 - 1989 and 1993 (Page 5 of 5)

Parameter	Class III Standard	1988-1989 Data			1993 Data	
		Max	Min	Mean	September	December
Pesticides/PCBs and Herbicides (Continued)						
Endosulfan	≤0.056	<0.003	<0.003	<0.003	–	NA
Guthion	≤0.01	<0.010	<0.010	<0.010	–	NA
Malathion	≤0.1	<0.100	<0.100	<0.100	–	NA
Parathion	≤0.04	<0.040	<0.040	<0.040	–	NA
Silvex		<20	<20	<20	–	NA
2,4-D		<10	<10	<10	<1	NA
2,4,5-TP		–	–	–	<1	NA
Organophosphate Pesticides (all units µg/L, all 1993 compounds were analyzed for, but none were detected at the specified value)						
Azinphos methyl		–	–	–	<5	NA
Bolstar		–	–	–	<1	NA
Chloropyriphos		–	–	–	<0.5	NA
Chloropyriphos methyl		–	–	–	<1	NA
Diazinon		–	–	–	<1	NA
Dichlorvos		–	–	–	<1	NA
Disulfoton		–	–	–	<1	NA
Ethoprop		–	–	–	<0.5	NA
Fensulfothion		–	–	–	<5	NA
Fenthion		–	–	–	<1	NA
Merphos		–	–	–	<1	NA
Mevinphos		–	–	–	<5	NA
Perathion methyl		–	–	–	<1	NA
Phorate		–	–	–	<1	NA
Ronnel		–	–	–	<1	NA
Stirofos		–	–	–	<1	NA
Tokuthion		–	–	–	<0.5	NA
Demeton	≤0.1	–	–	–	<1	NA
Coumaphos		–	–	–	<2	NA
Naled		–	–	–	<1	NA
Trichlronate		–	–	–	<1	NA

Note: NA = not applicable.

[a] Above natural background conditions.
[b] Annual average.
[c] Standard calculated according to equation in DEP 17-302.530 and using overall minimum hardness of 66.4 mg/L as $CaCO_3$.
[d] Monthly average.

Sources: TPS/SECI, 1989.
KBN, 1994.

Table 6.2.1-8. Summary of Water Quality Conditions in Payne Creek—PC-3, 1988 - 1989 and 1993 (Page 1 of 5)

Parameter	Class III Standard	1988-1989 Data			1993 Data	
		Max	Min	Mean	September	December
Water Quality Data						
Alkalinity (Bicarbonate), mg $CaCO_3$/L	>20	60	36	53	73	78
Alkalinity (Carbonate), mg $CaCO_3$/L		<0.5	<0.5	<0.5	–	<1
Cyanide, mg/L	≤0.0052	<0.004	<0.004	0.004	<0.005	<0.005
Fluoride, mg/L	≤10	1.3	0.5	0.867	1.04	0.707
Hardness, mg/L as $CaCO_3$		112	71.9	86.63	77	82.5
Methylene Blue Active Substances, mg/L		0.033	<0.025	0.026	–	–
Total Kjeldahl Nitrogen, mg/L		1.53	0.566	0.87	0.93	0.52
Ammonia Nitrogen, mg/L		0.486	<0.005	0.106	0.03	0.020
Organic Nitrogen, mg/L		1.53	0.542	0.766	–	0.5
Unionized Ammonia, mg/L	≤0.02				<0.005	<0.005
Nitrate+Nitrite-Nitrogen, mg/L		0.951	0.4	0.619	0.335	0.488
Total Nitrogen, mg/L		2.17	1.06	1.49	1.26	1.01
Oil and Grease, mg/L	<5	<5	<5	<5	<5.0	<5.0
Carbonaceous Biochemical Oxygen Demand, 5-day, mg/L		2.4	<1	1.3	2.4	<1.0
Chemical Oxygen Demand, mg/L		78	<10	40.33	61	55
Orthophosphorus, mg/L		0.572	0.378	0.482	0.739	0.457
Total Phosphorus, mg/L		0.703	0.444	0.529	0.946	0.511
Sulfate, mg/L		49.7	16.9	30.08	25.4	29.6
Turbidity, NTU	<29[a]	6.1	1	2.567	2.7	1.8
Aluminum, µg/L		169	74	117.7	576	216
Antimony, µg/L	≤4,300	<10	<10	10	<5	–
Arsenic, µg/L	≤50	<5	<5	<5	<5	<5
Beryllium, µg/L	≤0.13[b]	<3	<3	<3	<0.1	<0.1
Cadmium, µg/L	0.82[c]	<0.4	<0.4	0.4	<5	<5
Calcium, mg/L		24.9	15.7	18.65	17	17.4
Chromium, µg/L	148[c]	<10	<10	10	5.1	6.8
Chromium +6, µg/L	≤11	–	–	–	<10	<10
Copper, µg/L	8.3[c]	<7	<6	6.333	<10	<10
Iron, µg/L	≤1,000	440	215	261.5	617	745
Lead, µg/L	1.9[c]	9.6	<5	5.967	<5	6.3
Magnesium, mg/L		12	7.7	9.717	8.39	–
Manganese, µg/L		15	7	9.95	12	21
Mercury, µg/L	≤0.012	0.4	<0.200	0.233	<0.200	<0.2
Nickel, µg/L	111.5[c]	<17	<12	14.83	<30	<30
Potassium, mg/L		2.6	1.7	2.2	1.3	1.5
Selenium, mg/L	≤0.005	<5	<5	<5	<5	<5
Silver, µg/L	≤0.07	<0.08	<0.08	0.08	0.21	0.21
Sodium, mg/L		11	7.5	9.15	20.7	20.7
Thallium, µg/L	≤48	–	–	–	<5	<5
Zinc, µg/L	74.9[c] (≤1,000)	8.8	<5	5.983	18	26
Total Coliforms, colonies/100 mL	≤1,000[d], ≤2,400 max	2,000	45	698.5	8,400	1,600

Table 6.2.1-8. Summary of Water Quality Conditions in Payne Creek--PC-3, 1988 - 1989 and 1993 (Page 2 of 5)

Parameter	Class III Standard	1988-1989 Data			1993 Data	
		Max	Min	Mean	September	December
Water Quality Data (Continued)						
Fecal Coliforms, colonies/100 mL	200[d], 800 max	327	36	169.5	60	200
Radiation Data						
Alpha, Gross (pCi/L) (gross alpha + Radium 226)	≤15	3.5	0	1.583	3.5	1.8
Beta, Gross (pCi/L)		6.1	1.8	3.517	2.9	3.0
Radium 226 (pCi/L) (Radium 226+Radium 228)	≤5	1.1	0	0.7	0.4	0.5
Radium 228 (pCi/L) (Radium 226+Radium 228)	≤5	1.7	0	0.75	<1	<1.0
Strontium-90 (pCi/L)		<0.500	<0.500	0.5	<1	<1.2
Chlorophyll-a, mg/m³		<1	<1	6.78	8.5	1.9
Chloride, mg/L		15.2	15.2	15.2	--	--
Total Dissolved Solids, mg/L		149	149	149	--	--
Silica, dissolved reactive, mg/L		4.8	4.8	4.8	5.9	5.98
Volatile Organics (all units µg/L, all compound were analyzed for, but none detected at the specified value)						
Chloromethane	≤470.8[b]	--	--	--	<1	NA
Bromomethane		--	--	--	<1	NA
Dichlorodifluoromethane		--	--	--	<1	NA
Vinyl Chloride		--	--	--	<1	NA
Chloroethane		--	--	--	<1	NA
Methylene Chloride	≤1,580[b]	--	--	--	<1	NA
Trichlorofluoromethane		--	--	--	<1	NA
1,1-Dichloroethene	≤3.2[b]	--	--	--	<1	NA
1,1-Dichloroethane		--	--	--	<1	NA
trans-1,2-Dichloroethene		--	--	--	<1	NA
Chloroform	≤470.8[b]	--	--	--	<1	NA
1,2-Dichloroethane		--	--	--	<1	NA
1,1,1-Trichloroethane	≤173,000	--	--	--	<1	NA
Carbon Tetrachloride	≤4.42[b]	--	--	--	<1	NA
Bromodichloromethane		--	--	--	<1	NA
1,2-Dichloropropane		--	--	--	<1	NA
Benzene	≤71.28[b]	--	--	--	<1	NA
Trichloroethene	≤80.7[b]	--	--	--	<1	NA
Dibromochloromethane	≤22[b]	--	--	--	<1	NA
1,1,2-Trichloroethane		--	--	--	<1	NA
cis-1,3-Dichloropropene		--	--	--	<1	NA
2-Chloroethylvinyl ether		--	--	--	<1	NA
Bromoform	≤360[b]	--	--	--	<1	NA
1,1,2,2-Tetrachloroethane	≤10.8[b]	--	--	--	<1	NA
Tetrachloroethene		--	--	--	<1	NA
Toluene		--	--	--	<1	NA
Chlorobenzene		--	--	--	<1	NA
Ethylbenzene		--	--	--	<1	NA

Table 6.2.1-8. Summary of Water Quality Conditions in Payne Creek–PC-3, 1988 - 1989 and 1993 (Page 3 of 5)

Parameter	Class III Standard	1988-1989 Data			1993 Data	
		Max	Min	Mean	September	December
Volatile Organics (Continued)						
1,3-Dichlorbenzene		–	–	–	<1	NA
1,2-Dichlorbenzene		–	–	–	<1	NA
1,4-Dichlorbenzene		–	–	–	<1	NA
para and meta Xylenes		–	–	–	<1	NA
ortho Xylene		–	–	–	<1	NA
Styrene		–	–	–	<1	NA
NTBE		–	–	–	<5	NA
Semivolatile Organics (all units µg/L, all 1993 compounds were analyzed for, but none were detected at the specified value)						
phenol	≤4,600,000	<5	<5	<5	<5	NA
2-chlorophenol	≤400	–	–	–	<5	NA
1,3-dichlorobenzene		<10	<10	<10	<5	NA
1,4-dichlorobenzene		<10	<10	<10	<5	NA
1,2-dichlorobenzene		<10	<10	<10	<5	NA
2-methylphenol		–	–	–	<5	NA
4-methylphenol		–	–	–	<5	NA
hexachloroethane		<10	<10	<10	<5	NA
2-nitrophenol		–	–	–	<5	NA
2,4-dimethylphenol		–	–	–	<5	NA
2,4-dichlorophenol	≤790	–	–	–	<5	NA
1,2,4-trichlorobenzene		<10	<10	<10	<5	NA
naphthalene		–	–	–	<5	NA
hexachlorobutadiene	≤49.7[b]	<10	<10	<10	<5	NA
4-chloro-3-methyphenol		–	–	–	<5	NA
2-methylnaphthalene		–	–	–	<5	NA
hexachlorocyclopentadiene		<10	<10	<10	<5	NA
2,4,6-trichlorophenol	≤6.5[b]	–	–	–	<5	NA
2,4,5-trichlorophenol		–	–	–	<2.5	NA
2-chloronaphthalene		<10	<10	<10	<5	NA
Diethyl Phthalate		–	–	–	<5	NA
Acenaphthene	≤2,700	–	–	–	<5	NA
Acenaphtylene		–	–	–	<5	NA
2,4-Dinitrophenol	≤14.26	–	–	–	<2.5	NA
dimethyl phthalate		–	–	–	<5	NA
fluorene	≤14,000	–	–	–	<5	NA
4,6-dinitro-2-methylphenol		–	–	–	<5	NA
hexachlorobenzene		–	–	–	<5	NA
pentachlorophenol	≤8.2[b], ≤30 max	–	–	–	<5	NA
phenanthrene	≤0.031	–	–	–	<5	NA
anthracene	≤110,000	–	–	–	<5	NA
di-n-butyl phthalate		–	–	–	<5	NA
fluoranthene	≤370	–	–	–	<5	NA
pyrene	≤11,000	–	–	–	<5	NA

Table 6.2.1-8. Summary of Water Quality Conditions in Payne Creek--PC-3, 1988 - 1989 and 1993 (Page 4 of 5)

Parameter	Class III Standard	1988-1989 Data			1993 Data	
		Max	Min	Mean	September	December
Semivolatile Organics (Continued)						
butyl benzyl phthalate		–	–	–	<5	NA
benzo(a)anthracene	≤0.031[b]	–	–	–	<5	NA
bis(2-ethylhexyl)phthalate		–	–	–	<5	NA
chrysene	≤0.031[b]	–	–	–	<5	NA
di-n-octyl phthalate		–	–	–	<5	NA
benzo(b)fluoranthene	≤0.031[b]	–	–	–	<5	NA
benzo(k)fluoranthene	≤0.031[b]	–	–	–	<5	NA
benzo(a)pyrene	≤0.031[b]	–	–	–	<5	NA
Indeno(1,2,3-cd)pyrene	≤0.031[b]	–	–	–	<5	NA
dibenzo(a,h)anthracene	≤0.031[b]	–	–	–	<5	NA
benzo(g,h,i)perylene	≤0.031[b]	–	–	–	<5	NA
Pesticides/PCBs & Herbicides (all units μg/L, all 1993 compounds were analyzed for, but none were detected at the specified value)						
alpha-BHC		–	–	–	<0.05	NA
beta-BHC	≤0.046[b]	–	–	–	<0.05	NA
delta-BHC		–	–	–	<0.05	NA
Lindane	≤0.063[b], <0.08 max	<0.010	<0.010	<0.010	<0.05	NA
Heptachlor	≤0.00021[b], <0.0038 max	<0.001	<0.001	<0.001	<0.05	NA
Aldrin	≤0.00014[b], <3 max	<0.003	<0.003	<0.003	<0.05	NA
Heptachlor epoxide		–	–	–	<0.05	NA
Endosulfan I		–	–	–	<0.05	NA
Dieldrin	≤0.00014[b], <0.0019 max	<0.003	<0.003	<0.003	<0.1	NA
4,4'-DDE		–	–	–	<0.1	NA
Endrin	0.0023	0.004	0.004	0.004	<0.1	NA
Endosulfan II		–	–	–	<0.1	NA
4,4'-DDD		–	–	–	<0.1	NA
Endosulfan sulfate		–	–	–	<0.1	NA
4,4'DDT	0.00059[b], <0.001 max	<0.001	<0.001	<0.001	<0.1	NA
Methoxychlor		<0.030	<0.030	<0.030	<0.5	NA
Endrin ketone		–	–	–	<0.1	NA
alpha-chlordane		–	–	–	<0.5	NA
gamma-chlordane		–	–	–	<0.5	NA
Toxaphene	≤0.0002	<0.005	<0.005	<0.005	<1	NA
PCB-1016		<0.001	<0.001	<0.001	<0.5	NA
PCB-1221		<0.001	<0.001	<0.001	<0.5	NA
PCB-1232		<0.001	<0.001	<0.001	<0.5	NA
PCB-1242		<0.001	<0.001	<0.001	<0.5	NA
PCB-1248		<0.001	<0.001	<0.001	<0.5	NA
PCB-1254		<0.001	<0.001	<0.001	<0.5	NA
PCB-1260		<0.001	<0.001	<0.001	<1	NA
Mirex	≤0.001	<0.001	<0.001	<0.001	<0.5	NA
Chlordane	≤0.00059[b], <0.0043 max	<0.010	<0.010	<0.010	–	NA
Demeton	≤0.1	<0.100	<0.100	<0.100	–	NA

Table 6.2.1-8. Summary of Water Quality Conditions in Payne Creek--PC-3, 1988 - 1989 and 1993 (Page 5 of 5)

Parameter	Class III Standard	1988-1989 Data			1993 Data	
		Max	Min	Mean	September	December
Pesticides/PCBs and Herbicides (Continued)						
Endosulfan	≤0.056	<0.003	<0.003	<0.003	--	NA
Guthion	≤0.01	<0.010	<0.010	<0.010	--	NA
Malathion	≤0.1	<0.100	<0.100	<0.100	--	NA
Parathion	≤0.04	<0.040	<0.040	<0.040	--	NA
Silvex		<20	<20	<20	--	NA
2,4-D		<10	<10	<10	<1	NA
2,4,5-TP		--	--	--	<1	NA
Organophosphate Pesticides (all units µg/L, all 1993 compounds were analyzed for, but none were detected at the specified value)						
Azinphos methyl		--	--	--	<5	NA
Bolstar		--	--	--	<1	NA
Chloropyriphos		--	--	--	<0.5	NA
Chloropyriphos methyl		--	--	--	<1	NA
Diazinon		--	--	--	<1	NA
Dichlorvos		--	--	--	<1	NA
Disulfoton		--	--	--	<1	NA
Ethoprop		--	--	--	<0.5	NA
Fensulfothion		--	--	--	<5	NA
Fenthion		--	--	--	<1	NA
Merphos		--	--	--	<1	NA
Mevinphos		--	--	--	<5	NA
Perathion methyl		--	--	--	<1	NA
Phorate		--	--	--	<1	NA
Ronnel		--	--	--	<1	NA
Stirofos		--	--	--	<1	NA
Tokuthion		--	--	--	<0.5	NA
Demeton	≤0.1	--	--	--	<1	NA
Coumaphos		--	--	--	<2	NA
Naled		--	--	--	<1	NA
Trichlronate		--	--	--	<1	NA

Note: NA = not applicable.

[a] Above natural background conditions.
[b] Annual average.
[c] Standard calculated according to equation in DEP 17-302.530 and using overall minimum hardness of 66.4 mg/L as $CaCO_3$.
[d] Monthly average.

Sources: TPS/SECI, 1989.
KBN, 1994.

Table 6.2.2-1. Results of Permeability Testing of Shallow Water Table Observation Wells at the HPS Site (December 1988)

Piezometer No.	Ground Surface Elevation (ft-msl)	Groundwater Elevation (ft-msl)	Permeability (cm/sec)
P-1	122.3	118.8	2.0×10^{-4}
P-2	114.2	109.4	2.0×10^{-4}
P-3	121.7	114.3	4.9×10^{-4}
P-10	127.4	123.9	1.3×10^{-4}
P-11	113.1	109.8	1.7×10^{-4}
P-12	126.3	121.7	3.2×10^{-4}

Note: cm/sec x 0.04 = inch/sec.
ft-msl x 0.3 = m-msl.

Source: TPS/SECI, 1989.

Table 6.2.2-2. Water Quality Characteristic of the Shallow Aquifer at the HPS Site (February/March 1989)

Parameters	Concentration	
	Well P3[a]	Well P12[a]
Total Alkalinity, mg/L as $CaCO_3$	6.0	12.0
Chloride, mg/L	15.5	24.2
Nitrate + Nitrite as Nitrogen, mg/L	<0.005	0.009
Ortho-Phosphorus, mg/L	0.980	1.70
Silica, Total, mg/L	16.8	21.2
Silica, Dissolved, mg/L	5.21	9.83
Total Dissolved Solids, mg/L	78.7	111
Total Suspended Solids, mg/L	93.3	694
Specific Conductance, μmho/cm	120	222
Sulfate, mg/L	4.1	3.2
Total Calcium, mg/L	10.8	26.3
Total Iron, mg/L	7.9	10.3
Total Magnesium, mg/L	3.0	6.7
Total Manganese, μg/L	14	12
Total Potassium, mg/L	0.96	1.77
Total Sodium, mg/L	7.5	16.6
Dissolved Iron, mg/L	0.67	2.37
Dissolved Manganese, μg/L	4.0	6.0

[a] These wells are 9.1 m (30 ft) below present existing grade.

Source: TPS/SECI, 1989.

Table 6.2.2-3. Results of Groundwater Monitoring Conducted at the HPS Site During 1993 (Page 1 of 6)

Parameter	Sampling Date	Units	Concentration in Monitor Well					
			HPS-1	HPS-2	HPS-3	HPS-4	HPS-5	HPS-6
Total Metals								
Aluminum	1/26/93	mg/L	<0.5	<0.5	0.95	<0.5	7.1	<0.5
	7/22/93	mg/L	<0.2	<0.2	0.9	<0.2	6.6	<0.2
	Max. Value	mg/L	120	8.8	8.6	1.1	75	77
	Min. Value	mg/L	<0.2	<0.2	0.9	<0.2	3.4	<0.2
Arsenic	1/26/93	µg/L	15	<10	<10	<10	<10	<10
	7/22/93	µg/L	15	<10	<10	<10	<10	<10
	Max. Value	µg/L	20	<10	18	<10	<10	<10
	Min. Value	µg/L	<10	<10	<10	<10	<10	<10
Beryllium	1/26/93	mg/L	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
	7/22/93	mg/L	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
	Max. Value	mg/L	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
	Min. Value	mg/L	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Cadmium	1/26/93	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	7/22/93	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
	Max. Value	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	Min. Value	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005

Table 6.2.2-3. Results of Groundwater Monitoring Conducted at the HPS Site During 1993 (Page 2 of 6)

Parameter	Sampling Date	Units	Concentration in Monitor Well					
			HPS-1	HPS-2	HPS-3	HPS-4	HPS-5	HPS-6
Total Metals (continued)								
Chromium	1/26/93	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	7/22/93	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	Max. Value	mg/L	0.42	<0.05	0.007[a]	<0.05	0.23	0.20
	Min. Value	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Copper	1/26/93	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	7/22/93	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	Max. Value	mg/L	0.007[a]	<0.05	<0.05	<0.05	<0.05	<0.05
	Min. Value	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Iron	1/26/93	mg/L	48	2.9	23	21	2.2	11
	7/22/93	mg/L	41	4.7	21	25	1.9	13
	Max. Value	mg/L	48	4.7	46	25	12	41
	Min. Value	mg/L	10	1.2	21	1.3	1.9	9.3
Lead	1/26/93	µg/L	<5	<5	<5	<5	8	<5
	7/22/93	µg/L	<5	<5	<5	<5	<5	<5
	Max. Value	µg/L	36	10	<5	<5	90	51
	Min. Value	µg/L	<5	<5	<5	<5	<5	<5

Table 6.2.2-3. Results of Groundwater Monitoring Conducted at the HPS Site During 1993 (Page 3 of 6)

Parameter	Sampling Date	Units	Concentration in Monitor Well					
			HPS-1	HPS-2	HPS-3	HPS-4	HPS-5	HPS-6
Total Metals (continued)								
Mercury	1/26/93	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
	7/22/93	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
	Max. Value	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
	Min. Value	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Nickel	1/26/93	mg/L	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
	7/22/93	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Max. Value	mg/L	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
	Min. Value	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Selenium	1/26/93	µg/L	<10	<10	<10	<10	<10	<10
	7/22/93	µg/L	<10	<10	<10	<10	<10	<10
	Max. Value	µg/L	<10	<10	<10	<10	<10	<10
	Min. Value	µg/L	<10	<10	<10	<10	<10	<10
Zinc	1/26/93	mg/L	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	7/22/93	mg/L	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	Max. Value	mg/L	0.06	0.06	0.15	0.07	0.07	0.066
	Min. Value	mg/L	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02

Table 6.2.2-3. Results of Groundwater Monitoring Conducted at the HPS Site During 1993 (Page 4 of 6)

Parameter	Sampling Date	Units	Concentration in Monitor Well					
			HPS-1	HPS-2	HPS-3	HPS-4	HPS-5	HPS-6
Radionuclides								
Gross alpha (total)	1/26/93	pCi/L	12.±2.4	2.8±1.5	3.0±1.2	2.0±1.0	32.7±4.4	3.9±1.2
	7/22/93	pCi/L	12.8±2.5	5.0±2.0	8.7±2.4	3.8±1.4	14.1±2.4	13.2±2.3
	Max. Value	pCi/L	884.±53	108.±12.4	26.2±7.6	12.6±3.1	1528.±102	424.±46
	Min. Value	pCi/L	12.±2.4	2.1±1.4	3.0±1.2	2.0±1.0	14.1±2.4	6.6±1.7
Gross alpha (dissolved)	1/26/93	pCi/L	4.0±1.4	2.1±1.3	4.1±1.7	1.9±0.9	4.5±1.4	3.7±1.2
	7/22/93	pCi/L	11.4±2.4	4.5±1.8	3.2±1.3	3.0±1.3	8.5±1.8	6.3±1.6
	Max. Value	pCi/L	15.4±3.1	4.5±1.8	5.9±2.0	4.4±1.5	81.±5.3	10.9±2.6
	Min. Value	pCi/L	3.5±1.2	1.4±0.8	3.0±1.2	1.5±1.2	4.5±1.4	6.1±1.6
Radium 226 (total)	1/26/93	pCi/L	3.6±0.3	2.0±0.3	1.1±0.2	0.3±0.1	3.2±0.3	0.4±0.2
	7/22/93	pCi/L	2.3±0.3	2.4±0.3	1.1±0.2	0.6±0.1	1.8±0.2	0.6±0.1
	Max. Value	pCi/L	125.±2.7	9.9±0.6	3.3±0.3	1.4±0.2	193.±4.7	42.1±1.9
	Min. Value	pCi/L	1.8±0.2	0.2±0.1	0.2±0.2	0.1±0.1	1.8±0.2	0.0±0.1
Radium 226 (dissolved)	1/26/93	pCi/L	2.5±0.3	1.4±0.2	0.5±0.2	0.2±0.1	1.6±0.2	0.3±0.1
	7/22/93	pCi/L	2.0±0.2	2.4±0.3	0.5±0.1	0.5±0.2	1.2±0.2	0.4±0.1
	Max. Value	pCi/L	5.3±0.5	2.4±0.3	0.7±0.2	0.5±0.2	2.4±0.4	0.6±0.1
	Min. Value	pCi/L	0.7±0.1	0.1±0.1	0.1±0.1	0.0±0.1	0.9±0.2	0.0±0.1

Table 6.2.2-3. Results of Groundwater Monitoring Conducted at the HPS Site During 1993 (Page 5 of 6)

Parameter	Sampling Date	Units	Concentration in Monitor Well					
			HPS-1	HPS-2	HPS-3	HPS-4	HPS-5	HPS-6
Chloride	1/26/93	mg/L	14	8.5	49	17	6.1	21
	7/22/93	mg/L	13	12	57	18	9	17
	Max. Value	mg/L	17	12	83	22	11	34
	Min. Value	mg/L	8.5	5.0	49	10	5.3	17
Color (apparent)	1/26/93	PCU	750	70	750	450	880	50
	7/22/93	PCU	350	65	600	300	1000	35
	Max. Value	PCU	1000	500	1500	900	4000	1000
	Min. Value	PCU	25	35	600	45	650	20
Color (true)	1/26/93	PCU	700	20	630	350	810	40
	7/22/93	PCU	300	25	500	300	800	35
	Max. Value	PCU	700	40	1300	750	3000	250
	Min. Value	PCU	40	20	500	20	600	25
Oxidation-Reduction Potential	1/26/93	Eh	29	53	130	75	230	32
	7/22/93	Eh	4.1	7.4	63.7	45.6	157.8	27.2
	Max. Value	Eh	280	240	303	260	320	290
	Min. Value	Eh	4.1	7.4	72	36.2	98	27.2

Table 6.2.2-3. Results of Groundwater Monitoring Conducted at the HPS Site During 1993 (Page 6 of 6)

Parameter	Sampling Date	Units	Concentration in Monitor Well HPS-1	HPS-2	HPS-3	HPS-4	HPS-5	HPS-6
Sulfite (field)	1/26/93	mg/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
	7/22/93	mg/L	<2.0	<2.0	6.0	<2.0	<2.0	<2.0
	Max. Value	mg/L	0.4	1.2	6.0	0.4	5.0	1.2
	Min. Value	mg/L	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Sulfate	1/26/93	mg/L	<5	<5	<5	<5	7	13
	7/22/93	mg/L	<5	10	<5	<5	<5	12
	Max. Value	mg/L	2.3	10	<5	<5	21	72
	Min. Value	mg/L	<5	<5	<5	<5	<5	12
Total Dissolved Solids	1/26/93	mg/L	200	370	370	270	250	120
	7/22/93	mg/L	150	470	440	330	230	130
	Max. Value	mg/L	330	470	460	360	930	140
	Min. Value	mg/L	91	260	250	200	160	120

Note: Groundwater samples collected by Pace Incorporated personnel on the dates indicated.
Groundwater sample analysis excluding radionuclides conducted by Pace Incorporated; analysis for radionuclide parameters conducted by Thornton Laboratories, Inc.

mg/L = milligram per liter
μg/L = microgram per liter
pCi/L = picoCurie per liter
Eh = redox potential
PCU = platinum cobalt units

[a] Reporting limit indicated by Pace Incorporated for samples collected June 30, 1992, was an order of magnitude different than for other sampling events; maximum value reported for this one sampling event was at a lower concentration than the reporting limit for the other events.

Source: Hardee Power Partners, Inc., 1991 - 1993.

Table 6.2.2-4. Water Characteristics (Inorganics) at the HPS Site for Intermediate Aquifer--Well P12A (February/March 1989) (Page 1 of 2)

Parameter	Concentration
Total Alkalinity, mg/L as $CaCO_3$	216
Chloride, mg/L	27.9
Nitrate + Nitrite as Nitrogen, mg/L	0.072
Ortho-phosphorus, mg/L	0.034
Silica, Total, mg/L	58.1
Cyanide, mg/L	<0.004
Total Dissolved Solids, mg/L	327
Total Suspended Solids, mg/L	23
Specific Conductance, μmho/cm	458
Sulfate, mg/L	21
Fluoride, mg/L	1.80
MBAS, mg/L	0.14
Ammonia Nitrogen, mg/L	0.33
TKN, mg/L	0.79
Oil and Grease, mg/L	<5
BOD, mg/L	5.4
COD, mg/L	<10
Turbidity, NTU	6.8
Aluminum, μg/L	67
Antimony, μg/L	<10
Arsenic, μg/L	2.0
Beryllium, μg/L	<2
Cadmium, μg/L	0.5
Calcium, mg/L	43.0
Chromium, μg/L	<11
Copper, μg/L	<7
Iron, μg/L	198
Lead, μg/L	<3
Magnesium, mg/L	19.8
Manganese, μg/L	<6
Mercury, μg/L	<0.2
Nickel, μg/L	<26
Potassium, mg/L	4.4
Selenium, μg/L	<2
Silver, μg/L	<0.05
Sodium, mg/L	35.6
Zinc, μg/L	18.0
Phenols, μg/L	<5
Aldrin, μg/L	<0.003
Dieldrin, μg/L	<0.0003
Chlordane, μg/L	<0.01
4,4'DDT, μg/L	<0.001
Demeton, μg/L	<0.1

Table 6.2.2-4. Water Characteristics (Inorganics) at the HPS Site for Intermediate Aquifer--Well P12A (February/March 1989) (Page 2 of 2)

Parameter	Concentration
Endosulfan, μg/L	<0.003
Endrin, μg/L	<0.004
Guthion, μg/L	<0.01
Heptachlor, μg/L	<0.001
Lindane, μg/L	<0.01
Malathion, μg/L	<0.1
Methoxychlor, μg/L	<0.03
Myrex, μg/L	<0.001
Parathion, μg/L	<0.04
2,4-D, μg/L	<10
Silvex, μg/L	<20
Toxaphene, μg/L	<0.005
PCB-1016, μg/L	<0.001
PCB-1221, μg/L	<0.001
PCB-1232, μg/L	<0.001
PCB-1242, μg/L	<0.001
PCB-1248, μg/L	<0.001
PCB-1260, μg/L	<0.001
Chlorinated Hydrocarbons	
2-Chloronapthalene, μg/L	<10
1,2-Dichlorobenzene, μg/L	<10
1,3-Dichlorobenzene, μg/L	<10
1,4-Dichlorobenzene, μg/L	<10
Hexachlorobenzene, μg/L	<10
Hexachlorobutadiene, μg/L	<10
Hexachlorocyclopentadiene, μg/L	<10
Hexachloroethane, μg/L	<10
1,2,4-Trichlorobenzene, μg/L	<10
Gross Alpha, pCi/L	2.2±2.3
Gross Beta, pCi/L	5.7±4.2
Radium 226, pCi/L	4.1±0.1
Radium 228, pCi/L	0.0±1.0
Strontium 90, pCi/L	<0.5

Source: TPS/SECI, 1989.

Table 6.2.2-5. Water Quality Characteristics for the Lower Floridan Aquifer (Page 1 of 2)

Parameter	Value
Calcium, mg/L as $CaCO_3$	113
Magnesium, mg/L as $CaCO_3$	49
Sodium, mg/L as $CaCO_3$	37
Potassium, mg/L as $CaCO_3$	8
Total Hardness, mg/L as $CaCO_3$	162
Alkalinity, mg/L as $CaCO_3$	160
Sulfate, mg/L as $CaCO_3$	26
Chloride, mg/L	21
Silica, mg/L	27
Fluoride, mg/L	2.0
Cyanide, mg/L	<0.005
MBAS, mg/L	<0.180
Oil and Grease, mg/L	<5
Turbidity, NTU	14
pH, units	7.5
Total Dissolved Solids, mg/L	342
Specific Conductivity, μmho/cm	320
Total Kjeldahl Nitrogen, mg/L	0.39
Ammonia Nitrogen, mg/L	0.20
Organic Nitrogen, mg/L	0.19
Nitrate+Nitrite-Nitrogen, mg/L	0.031
Total Nitrogen, mg/L	0.421
Orthophosphorus, mg/L	0.20
Total Phosphorus, mg/L	0.20
Arsenic, μg/L	<10
Barium, μg/L	75
Beryllium, μg/L	<0.1
Cadmium, μg/L	<0.7
Chromium, μg/L	13
Copper, μg/L	7

Table 6.2.2-5. Water Quality Characteristics for the Lower Floridan Aquifer (Page 2 of 2)

Parameter	Value
Calcium, mg/L as $CaCO_3$	113
Iron, µg/L	420
Lead, µg/L	1
Manganese, µg/L	28
Mercury, µg/L	<0.2
Nickel, µg/L	23
Selenium, µg/L	16
Silver, µg/L	<0.07
Strontium, µg/L	300
Zinc, µg/L	143
Alpha, Gross (pC/L)	8.4
Radium 226 (pC/L)	3.0

Sources: TPS/SECI, 1989.
KBN, 1994.

Table 6.2.2-6. Results of Groundwater Analyses Conducted at HPS Production Well No. 1

Parameter	Sampling Date	Concentration (mg/L)
Chloride	4/6/93	8.4
	7/7/93	16.2
Sulfate	4/6/93	86.7
	7/7/93	179
Total Dissolved Solids	4/6/93	281
	7/7/93	285

Note: mg/L = milligrams per liter.

Groundwater samples collected by HPS personnel on the dates indicated.
Groundwater sample analysis conducted by Tampa Electric Company, Central Testing Laboratory.

Source: Hardee Power Partners, Inc., 1993.

Table 6.3.1-1. Temperature Means and Extremes (°F) Measured at Tampa International Airport

Month	Daily Temperatures[a]			Extremes[b]	
	Mean	Maximum	Minimum	Maximum	Minimum
January	60.8	70.2	51.3	86	21
February	62.2	71.7	52.7	88	24
March	66.7	76.2	57.2	91	29
April	71.4	81.1	61.7	93	40
May	77.0	86.4	67.5	98	49
June	80.8	89.2	72.4	99	53
July	82.0	89.8	74.1	97	63
August	82.1	90.0	74.1	98	67
September	80.6	88.6	72.6	96	57
October	74.7	83.3	66.0	94	40
November	67.3	76.7	57.9	90	23
December	62.0	71.5	52.6	86	18
Annual	72.3	81.2	63.4	99	18

Note: °C = 5/9 (°F-32)

[a] 30-year period of record, 1963 to 1992.
[b] 46-year period of record, 1947 to 1992.

Source: NOAA, 1992.

Table 6.3.1-2. Precipitation and Diurnal Relative Humidity Measured at Tampa International Airport

Month	Precipitation (inches)			Humidity[c] (%) hour (LT)			
	Mean[a]	Maximum[b]	Minimum[b]	0100	0700	1300	1900
January	2.21	8.02	T	85	86	59	73
February	2.77	7.95	0.21	83	86	56	69
March	3.02	12.64	0.06	83	87	55	67
April	2.00	6.59	T	82	87	51	62
May	3.05	17.64	0.10	82	86	52	62
June	6.79	13.75	1.86	84	87	60	69
July	7.67	20.59	1.65	86	88	63	73
August	7.95	18.59	2.35	87	90	64	76
September	6.48	13.98	1.28	87	91	62	75
October	2.60	7.36	0.09	86	89	57	72
November	1.65	6.12	T	86	88	57	74
December	2.02	6.66	0.07	85	87	59	74
Annual	48.20	76.57	28.89	85	88	58	71

Note: LT = local time.
T = trace amount.

inches x 2.540 = cm.

[a] 30-year period of record, 1963 to 1992.
[b] 46-year period of record, 1947 to 1992.
[c] 29-year period of record, 1964 to 1992.

Source: NOAA, 1992.

Table 6.3.1-3. Wind Direction and Wind Speed Measured at Tampa International Airport[a]

Season	Average Wind Speed (mph)	Calm (%)	Prevailing Wind Direction	Prevailing Wind Average Wind Speed (mph)
Winter	7.9	6.7	East-northeast, East	7.6 7.9
Spring	8.3	6.4	East	8.4
Summer	6.4	10.2	East	6.4
Fall	7.2	7.0	East-northeast	7.7
Annual	7.5	7.6	East	7.6

Note: mph x 1.6093 = km/hr.

[a] 5-year period of record, 1982 to 1986.

Source: NOAA, 1986.

Table 6.3.1-4. Morning and Afternoon Mixing Heights Determined at Tampa International Airport[a]

Season	Mixing Height (m)	
	Morning	Afternoon
Winter	464	1,041
Spring	562	1,500
Summer	760	1,428
Fall	565	1,305
Annual	588	1,320

[a] 5-year period of record, 1982 to 1986.

Source: NOAA, 1986.

Table 6.3.2-1. National and State of Florida Ambient Air Quality Standards (AAQS)

		AAQS (μg/m³)		
		National		State of Florida
Pollutant	Averaging Time	Primary Standard	Secondary Standard	
Particulate Matter (PM10)	Annual Arithmetic Mean	50	50	50
	24-Hour Maximum[a]	150	150	150
Sulfur Dioxide	Annual Arithmetic Mean	80	NA	60
	24-Hour Maximum[b]	365	NA	260
	3-Hour Maximum[b]	NA	1,300	1,300
Carbon Monoxide	8-Hour Maximum[b]	10,000	NA	10,000
	1-Hour Maximum[b]	40,000	NA	40,000
Nitrogen Dioxide	Annual Arithmetic Mean	100	100	100
Ozone	1-Hour Maximum[a]	235	235	235
Lead	Calendar Quarter	1.5	1.5	1.5

Note: NA = not applicable.
PM10 = particulate matter with an aerodynamic diameter ≤10 μm.
μg/m³ = micrograms per cubic meter.

[a] Maximum concentration not to be exceeded more than an average of 1 calendar day per year.
[b] Maximum concentration not to be exceeded more than once per year.

Sources: 40 CFR, Parts 50 and 52.
Florida Administrative Code (F.A.C.), Chapter 17-2.

Table 6.3.2-2. Federal and State of Florida PSD Allowable Increments

Pollutant/Averaging Time	Allowable Increment ($\mu g/m^3$) Class I	Class II	Class III
Particulate Matter (TSP)			
Annual Geometric Mean	5	19	37
24-Hour Maximum[a]	10	37	75
Particulate Matter (PM10)[c]			
Annual Arithmetic Mean	4	17	34
24-Hour Maximum[a]	8	30	60
Sulfur Dioxide			
Annual Arithmetic Mean	2	20	40
24-Hour Maximum[a]	5	91	182
3-Hour Maximum[a]	25	512	700
Nitrogen Dioxide[b]			
Annual Arithmetic Mean	2.5	25	50

Note: PM10 = particulate matter with an aerodynamic diameter less than or equal to 10 μm.
TSP = total suspended particulate.

[a] Maximum concentration not to be exceeded more than once per year.
[b] Not yet adopted by the State of Florida.
[c] Final regulations were promulgated in Federal Register, 58 FR 31622, June 3, 1993; become effective one year after promulgation date or earlier if adopted by State of Florida.

Source: 40 CFR Part 52, Section 52.21.
Florida Administrative Code, Chapter 17-2.

Table 6.3.2-3. Ambient SO_2 Concentrations for Air Monitoring Stations Located Within 55 km of the Hardee Unit 3 Project--1990 to 1992

Location		Site	UTM Coordinates (km)[a]		Period		Number of	Concentration ($\mu g/m^3$)				
								3-Hour		24-Hour		
City	County	Number	East	North	Year	Months	Observations	1st	2nd	1st	2nd	Annual
Mulberry	Polk	2860-006-F02	405.5	3086.0	1992	January-December	8,655	256	151	39	38	10
			(1°; 28.3 km)		1991	February-December	7,118	203	176	42	40	12
Nichols	Polk	3680-010-F02	399.5	3081.3	1992	January-December	8,205	213	183	50	48	11
			(347°; 24.2 km)		1991	January-December	8,542	179	167	67	58	10
					1990	January-December	8,612	341	252	66	62	9
Lakeland	Polk	2160-004-F02	412.75	3108.5	1991	January-January	252	31	16	7	5	3
			(9°; 51.4 km)		1990	January-December	8,683	122	122	42	27	5
Homeland[b]	Polk	3680-037-J02	418.7	3076.35	1992	January-October	6,040	170	161	42	42	7
			(36°; 23.1 km)		1991	October-December	1,657	72	49	31	29	6
Nichols[c]	Polk	3680-036-J01	400.9[illegible]	3066.2	1992	January-March	1,920	199	—	42	—	10
			(330°; 9.8 km)		1991	April-December	5,694	202	136	42	40	8

[a] Relative location to proposed Hardee Unit 3 east and north UTM coordinates (km) of 405.0 and 3057.7, respectively, given in parentheses.
[b] Monitoring station from Florida Power Corporation's Polk County site.
[c] Monitoring station from Tampa Electric Company's Polk Power Station site.

Sources: FDEP, 1990, 1991, 1992. KBN, 1994.

Table 6.3.2-4. Ambient PM10 Concentrations for Air Monitoring Stations Located Within 55 km of the Hardee Unit 3 Project--1991 to 1992

Location		Site	UTM Coordinates (km)[a]		Period		Number	Concentration ($\mu g/m^3$)		
							of	24-Hour		
City	County	Number	East	North	Year	Months	Observations	1st	2nd	Annual
Homeland[b]	Polk	3680-037-J02	418.7	3076.35	1992	January-October	46	70	44	20
			(36°; 23.1 km)		1991	October-December	13	38	24	17
Homeland[b]	Polk	3680-037-J09	418.7	3076.35	1992	January-October	42	60	42	20
			(36°; 23.1 km)							
Nichols[c]	Polk	3680-035-J01	401.1	3067.4	1992	January-March	16	28	20	14
			(338°; 10.5 km)		1991	March-December	26	43	34	18
Nichols[c]	Polk	3680-036-J01	400.1	3066.2	1992	January-March	16	30	26	14
			(330°; 9.8 km)		1991	March-December	30	48	45	19

[a] Relative location to proposed Hardee Unit 3 east and north UTM coordinates (km) of 405.0 and 3057.7, respectively, given in parentheses.
[b] Monitoring station from Florida Power Corporation's Polk County site.
[c] Monitoring station from Tampa Electric Company's Polk Power Station site.

Sources: FDEP, 1990, 1991, 1992. KBN, 1994.

Table 6.3.2-5. Ambient O_3 Concentrations for Air Monitoring Stations Located Within 55 km of the Hardee Unit 3 Project--1991 to 1992

Location		Site Number	UTM Coordinates (km)[a]			Period		Number of Observations	Concentration [ppm ($\mu g/m^3$)] 1-Hour	
City	County		East	North	Relative location	Year	Months		1st	2nd
Lakeland	Polk	2160-005-G01	401.588	3090.755	(354°; 33.2 km)	1992	June-December	4,678	0.098 (192)	0.082 (161)
Lakeland	Polk	2160-006-G01	404.435	3100.652	(359°; 43.0 km)	1992	June-December	4,360	0.108 (212)	0.107 (210)
Homeland[b]	Polk	3680-037-J02	418.7	3076.35	(36°; 23.1 km)	1992	January-October	6,525	0.095 (186)	0.095 (186)
						1991	October-December	1,845	0.076 (149)	0.076 (149)
Nichols[c]	Polk	3680-036-J01	400.1	3066.2	(330°; 9.8 km)	1992	January-March	1,911	0.075 (147)	—
						1991	April-December	5,911	0.098 (192)	0.096 (188)

[a] Relative location to proposed Hardee Unit 3 east and north UTM coordinates (km) of 405.0 and 3057.7, respectively, given in parentheses.
[b] Monitoring station from Florida Power Corporation's Polk County site.
[c] Monitoring station from Tampa Electric Company's Polk Power Station site.

Sources: FDEP, 1990, 1991, 1992. KBN, 1994.

Table 6.3.2-6. SO_2 Emission Sources (>20 TPY) Within 55 km of the Hardee Unit 3 Project (Page 1 of 2)

Facility Name	UTM Coordinates (km)		Coordinates Relative to Hardee Unit 3[a]				Maximum Allowable Emissions[b] (TPY)
			Cartesian (km)		Polar		
	East	North	X	Y	Distance (km)	Direction (degrees)	
TPS Hardee Power Station (295 MW)[c]	404.8	3057.3	-0.2	-0.4	0.4	207	2,412
TECO - Polk Power Station[c]	402.5	3067.4	-2.5	9.7	10.0	345	2,010
Imperial Phosphate (Brewer)[c]	404.8	3069.5	-0.2	11.8	11.8	359	275
Gardinier Fort Meade	415.3	3063.3	10.3	5.6	11.7	61	1,173
IMC-Agrico Chem - S. Pierce[c]	407.5	3071.3	2.5	13.6	13.8	10	4,377
Mobil Mining - Big Four Mine[c]	394.8	3067.7	-10.2	10.0	14.3	314	589
U.S. Agri-Chemicals Ft. Meade[c]	416.0	3069.0	11.0	11.3	15.8	46	3,438
Central Florida Power	416.2	3069.2	11.2	11.5	16.1	46	38
City of Wauchula	418.4	3047.0	13.4	-10.7	17.1	129	180
FPC - Polk[c]	414.3	3073.9	9.3	16.2	18.7	30	859
Farmland Industries Green Bay[c]	409.5	3079.5	4.5	21.8	22.3	12	4,087
IMC Agrico Chem- New Wales[c]	396.6	3078.9	-8.4	21.2	22.8	338	13,921
Mulberry Cogeneration[c]	413.6	3080.6	8.6	22.9	24.5	21	464
IMC Agrico Chem - Noralyn Mine	414.7	3080.3	9.7	22.6	24.6	23	505
CF Industries Bartow - Bonnie Mine Road[c]	408.4	3082.4	3.4	24.7	24.9	8	4,982
Kaplan Industries	418.3	3079.3	13.3	21.6	25.4	32	398
American Orange Corp.	429.8	3047.3	24.8	-10.4	26.9	113	198
IMC Agrico/Conserve Nichols[c]	398.4	3084.2	-6.6	26.5	27.3	346	1,593
Mulberry Phosphates (Royster)[c]	406.8	3085.1	1.8	27.4	27.6	4	2,013
Geologic Recovery	401.8	3085.8	-3.2	28.1	28.3	354	98
Mobil Mining -Nichols[c]	398.4	3085.3	-6.6	27.6	28.4	347	2,304
Cargill/Seminole Fertilizer Bartow[c]	409.8	3087.0	4.8	29.3	29.7	9	5,000
IMC Fertilizer - Prairie	402.9	3087.0	-2.1	29.3	29.4	356	109
Orange Co.	418.7	3083.6	13.7	25.9	29.3	28	26
Imperial/Pavex Corp - W Bartow	413.0	3086.2	8.0	28.5	29.6	16	75
FPL - Manatee	367.2	3054.1	-37.8	-3.6	38.0	265	83,351
Laidlaw Env. Services	424.7	3091.9	19.7	34.2	39.5	30	240
Consolidated Minerals Plant City	393.8	3096.3	-11.2	38.6	40.2	344	809
Citrus Hill	447.9	3068.3	42.9	10.6	44.2	76	411
Cargill Citro-America	447.9	3068.3	42.9	10.6	44.2	76	223
Ridge Cogeneration[c]	416.7	3100.4	11.7	42.7	44.3	15	480
Lakeland City Power Larsen[c]	409.2	3102.8	4.2	45.1	45.2	5	5,024
TECO - Big Bend[c]	361.9	3075.0	-43.1	17.3	46.4	292	237,854
FPL-Avon Park	451.4	3050.5	46.4	-7.2	47.0	99	67
Macasphalt Winter Haven	423.1	3101.5	18.1	43.8	47.4	22	48

Table 6.3.2-6. SO_2 Emission Sources (>20 TPY) Within 55 km of the Hardee Unit 3 Project (Page 2 of 2)

			Coordinates Relative to Hardee Unit 3[a]				
					Polar		Maximum Allowable Emissions[b]
	UTM Coordinates (km)		Cartesian (km)		Distance	Direction	
Facility Name	East	North	X	Y	(km)	(degrees)	(TPY)
Cargill/Gardinier Riverview[c]	363.4	3082.4	-41.6	24.7	48.4	301	5,872
Lakeland City Power McIntosh[c]	408.5	3105.8	3.5	48.1	48.2	4	30,567
Auburndale Cogen[c]	420.8	3103.3	15.8	45.6	48.3	19	222
Owens-Brockway	423.4	3102.8	18.4	45.1	48.7	22	120
Coca Cola Auburndale	421.6	3103.7	16.6	46.0	48.9	20	709
Adams Packing Auburndale	421.1	3104.2	16.1	46.5	49.2	19	94
SFE Processing	421.7	3104.2	16.7	46.5	49.4	20	188
Hillsborough RRF[c]	368.2	3092.7	-36.8	35.0	50.8	314	771
CLM/Pacific Chloride	361.8	3088.3	-43.2	30.6	52.9	305	702
TECO - Gannon	360.0	3087.5	-45.0	29.8	54.0	304	93,265
Gulf Coast Lead	364.0	3093.5	-41.0	35.8	54.4	311	1,498
Alcoma Packing	451.6	3085.5	46.6	27.8	54.3	59	327
Additional Sources Outside 55 km Considered in Modeling Analysis							
Lafarge Corp.	357.7	3090.6	-47.3	32.9	57.6	305	20,293
TECO - Hookers Point	358.0	3091.0	-47.0	33.3	57.6	305	13,524
FPC - Bartow	342.4	3082.6	-62.6	24.9	67.4	292	62,618
FPC - Higgins	336.5	3098.4	-68.5	40.7	79.7	301	19,619
FPC - Intercession City[c]	446.3	3126.0	41.3	68.3	79.8	31	17,667

Note: Screening area of 55 km for the proposed unit is based on the project's estimated significant impact distance of 5 km plus 50 km.

[a] Proposed Hardee Unit 3 east and north UTM coordinates (km): 405.0 and 3057.7.
[b] Generally based on the facility's maximum hourly emission rate for entire year.
[c] A PSD increment-consuming source is located at this facility.

Source: KBN, 1994.

Table 6.3.2-7. Particulate Matter (PM) Emission Sources Within 55 km of the Hardee Unit 3 Project (Page 1 of 4)

Facility Name	UTM Coordinates (km) East	UTM Coordinates (km) North	Coordinates Relative to Hardee Unit 3[a] Cartesian (km) X	Cartesian (km) Y	Polar Distance (km)	Polar Direction (degrees)	Maximum Allowable Emissions[b] (TPY)
TPS Hardee Power Station (295 MW)[c]	404.8	3057.3	-0.2	-0.4	0.4	207	33
TECO Polk	402.5	3067.4	-2.5	9.7	10.0	346	438
Gardinier Fort Meade	415.3	3063.3	10.3	5.6	11.7	61	132
Imperial Phosphate (Brewer)[c]	404.8	3069.5	-0.2	11.8	11.8	359	162
IMC-Agrico Chemical South Pierce[c]	407.5	3071.3	2.5	13.6	13.8	10	858
Mobil Big Four Mine	394.8	3067.7	-10.2	10.0	14.3	314	68
US Agri-Chemicals Fort Meade[c]	416.0	3069.0	11.0	11.3	15.8	46	1,066
Central Florida Power	416.2	3069.2	11.2	11.5	16.1	46	47
Florida Privitization Inc	418.3	3048.0	13.3	-9.7	16.5	126	281
City of Wachula	418.4	3047.0	13.4	-10.7	17.1	129	21
Estech/Swift	411.5	3074.2	6.5	16.5	17.7	22	311
FPC-POLK[c]	414.3	3073.9	9.3	16.2	18.7	30	149
Estech-Duette Phosphate Mine	388.9	3047.2	-16.1	-10.5	19.2	237	751
IMC Kingsford	398.2	3075.7	-6.8	18.0	19.2	339	417
IMC-Agrico Chemical Co Pierce[c]	403.7	3079.0	-1.3	21.3	21.3	357	841
C & M Products Co	405.5	3079.1	0.5	21.4	21.4	1	162
Farmland Industries Green Bay Plant[c]	409.5	3079.5	4.5	21.8	22.3	12	503
IMC-Agrico New Wales	396.6	3078.9	-8.4	21.2	22.8	338	1,427
Ewell Ind Bonnie Mine Rd	407.7	3080.9	2.7	23.2	23.4	7	96
Mulberry Cogeneration[c]	413.6	3080.6	8.6	22.9	24.5	21	70
IMC-Agrico Noralyn Mine	414.7	3080.3	9.7	22.6	24.6	23	1,690
Ridge Pallets Inc	419.1	3078.1	14.1	20.4	24.8	35	96
CF Industries Bartow Bonnie Mine Road[c]	408.4	3082.4	3.4	24.7	24.9	8	1,748
Bio-Medical Service Corp of GA	413.9	3081.3	8.9	23.6	25.2	21	46
IMC/Uranium Recovery CF Industries[c]	408.4	3082.8	3.4	25.1	25.3	8	1,212
Kaplan Industries	418.3	3079.3	13.3	21.6	25.4	32	53
American Orange Corp	429.8	3047.3	24.8	-10.4	26.9	113	181
Orange Cogen[c]	414.8	3083.0	9.8	25.3	27.1	21	44
IMC-Agrico/Conserve Nichols[c]	398.4	3085.2	-6.6	26.5	27.3	346	1,598
Mulberry Phosphates (Royster)	406.8	3085.1	1.8	27.4	27.6	4	1,394
Kaiser Aluminum	408.3	3085.5	3.3	27.8	28.0	7	106
Mobil Mining & Minerals Nichols	398.4	3085.3	-6.6	27.6	28.4	347	991
Orange Co of Florida	418.7	3083.6	13.7	25.9	29.3	28	119
IMC Fertilizer Prairie	402.9	3087.0	-2.1	29.3	29.4	356	288
Purina Mills	402.0	3087.0	-3.0	29.3	29.5	354	88
Pavex	413.0	3086.2	8.0	28.5	29.6	16	44

Table 6.3.2-7. Particulate Matter (PM) Emission Sources Within 55 km of the Hardee Unit 3 Project (Page 2 of 4)

Facility Name	UTM Coordinates (km) East	UTM Coordinates (km) North	Coordinates Relative to Hardee Unit 3[a] Cartesian (km) X	Cartesian (km) Y	Polar Distance (km)	Polar Direction (degrees)	Maximum Allowable Emissions[b] (TPY)
Cargill/Seminole Fertilizer[c]	409.8	3087.0	4.8	29.3	29.7	9	544
Ridge Pallets Inc.	418.6	3084.1	13.6	26.4	29.7	27	165
US Agri-Chemicals Bartow[c]	413.2	3086.3	8.2	28.6	29.8	16	444
Florida Rock Industries	416.8	3085.8	11.8	28.1	30.5	23	57
Ewell Ind S Florida Ave	406.3	3092.9	1.3	35.2	35.2	2	348
All Sun Products	413.5	3093.8	8.5	36.1	37.1	13	318
FPL - Manatee	367.2	3054.1	-37.8	-3.6	38.0	265	40,765
Manatee Scrap Processing	366.9	3053.8	-38.1	-3.9	38.3	264	108
Sun Pac Foods	422.7	3092.6	17.7	34.9	39.1	27	62
Lykes Pasco Packing	412.4	3096.5	7.4	38.8	39.5	11	48
Consolidated Minerals Inc Plant City	393.8	3096.3	-11.2	38.6	40.2	344	749
Pavers Incorporated	414.0	3098.2	9.0	40.5	41.5	13	479
Schering Berlin Polymers	410.7	3098.9	5.7	41.2	41.6	8	30
Rinker Cencon Corp	412.4	3099.0	7.4	41.3	42.0	10	159
Quikrete of Florida	412.8	3099.0	7.8	41.3	42.0	11	253
Zipperer S. Agape Mortuary Services	363.0	3064.7	-42.0	7.0	42.6	279	21
Florida M&M	362.2	3066.2	-42.8	8.5	43.6	281	21
Alumax Extrusions	385.6	3097.0	-19.4	39.3	43.8	334	172
Ero Industries	427.5	3095.6	22.5	37.9	44.1	31	33
Citrus Hill Mfg	447.9	3068.3	42.9	10.6	44.2	76	66
Florida Brick & Clay Co	384.9	3097.1	-20.1	39.4	44.2	333	26
Ridge Cogeneration[c]	416.7	3100.4	11.7	42.7	44.3	15	414
Union Camp Corp	402.0	3102.0	-3.0	44.3	44.4	356	47
Amcon Concrete	364.0	3075.0	-41.0	17.3	44.5	293	39
Erly Juice Inc	399.0	3101.8	-6.0	44.1	44.5	352	117
Florida Tile	405.4	3102.4	0.4	44.7	44.7	1	309
C-Cure of Florida	386.0	3098.7	-19.0	41.0	45.2	335	21
Lakeland City Power Larsen[c]	409.2	3102.8	4.2	45.1	45.3	5	107
Monier Roof Tile	414.0	3102.5	9.0	44.8	45.7	11	44
Driggers Concrete	360.0	3065.9	-45.0	8.2	45.7	280	21
Palm Harbor Homes	391.8	3101.5	-13.2	43.8	45.7	343	22
Vigoro Industries	427.9	3097.4	22.9	39.7	45.8	30	136
Westcon	375.3	3092.8	-29.7	35.1	46.0	320	21
TECO Big Bend[c]	361.9	3075.0	-43.1	17.3	46.4	292	6,014
Citrus World	441.0	3087.3	36.0	29.6	46.6	51	601

Table 6.3.2-7. Particulate Matter (PM) Emission Sources Within 55 km of the Hardee Unit 3 Project (Page 3 of 4)

			Coordinates Relative to Hardee Unit 3[a]				
					Polar		Maximum Allowable Emissions[b]
	UTM Coordinates (km)		Cartesian (km)		Distance	Direction	
Facility Name	East	North	X	Y	(km)	(degrees)	(TPY)
IMC-Agrico Chemical Big Bend	362.1	3076.1	-42.9	18.4	46.7	293	195
Macasphalt	423.1	3101.5	18.1	43.8	47.4	22	70
Florida Rock Industry	365.8	3085.0	-39.2	27.3	47.8	305	21
Lakeland City Power McIntosh[c]	408.5	3105.8	3.5	48.1	48.2	4	15,151
Auburndale Cogeneration[c]	420.8	3103.3	15.8	45.6	48.3	19	161
Florida Mining & Materials Alabama Lane	420.8	3103.4	15.8	45.7	48.4	19	40
Cargill/Gardinier Fertilizer Riverview	363.4	3082.4	-41.6	24.7	48.4	301	880
Owens-Brockway Glass Container	423.4	3102.8	18.4	45.1	48.7	22	189
Packaging Corp of America	423.4	3102.8	18.4	45.1	48.7	22	38
Coca Cola	421.6	3103.7	16.6	46.0	48.9	20	387
Adams Packing Association	421.1	3104.2	16.1	46.5	49.2	19	144
Eger Concrete Lake Ida & 5th St	428.1	3102.0	23.1	44.3	50.0	28	49
S I Lime Co Division of Longview Lime	362.9	3084.7	-42.1	27.0	50.0	303	48
R C Martin Concrete Products	368.6	3092.1	-36.4	34.4	50.1	313	28
Graves Enterprises Riverview	363.1	3085.3	-41.9	27.6	50.2	303	350
The Florida Brewery	422.8	3104.7	17.8	47.0	50.3	21	121
Hillsborough Co Resource Recovery	368.2	3092.7	-36.8	35.0	50.8	314	172
John Carlos Florida	426.2	3104.1	21.2	46.4	51.0	25	29
Reed Minerals Division	362.2	3085.5	-42.8	27.8	51.0	303	70
Eastern Electric Apparatus Repair Cp	366.6	3092.0	-38.4	34.3	51.5	312	21
Southeastern Galvanizing Division	368.5	3094.5	-36.5	36.8	51.8	315	21
City of Tampa Dept.	364.0	3089.5	-41.0	31.8	51.9	308	48
Kearney Development Company	368.7	3094.8	-36.3	37.1	51.9	316	21
Gaylord Container Corp	366.3	3092.3	-38.7	34.6	51.9	312	108
Southeastern Wire	368.3	3094.5	-36.7	36.8	52.0	315	21
GAF Building Materials Corp	362.2	3087.2	-42.8	29.5	52.0	305	57
Florida Rock Industries	428.0	3105.2	23.0	47.5	52.8	26	55
Leisey Shell Corp	352.7	3064.8	-52.3	7.1	52.8	278	20
Nitram	362.5	3089.0	-42.5	31.3	52.8	306	218
GNB Inc (PAC CHL)	361.8	3088.3	-43.2	30.6	52.9	305	25
Paktank Florida	360.8	3087.3	-44.2	29.6	53.2	304	178
Amcon Products	364.6	3092.8	-40.4	35.1	53.5	311	32
Florida Steel Corp	364.6	3092.8	-40.4	35.1	53.5	311	144
Bay Concrete	365.1	3093.8	-39.9	36.1	53.8	312	37
IMC Port Sutton Terminal	360.1	3087.5	-44.9	29.8	53.9	304	442

Table 6.3.2-7. Particulate Matter (PM) Emission Sources Within 55 km of the Hardee Unit 3 Project (Page 4 of 4)

Facility Name	UTM Coordinates (km) East	UTM Coordinates (km) North	Coordinates Relative to Hardee Unit 3[a] Cartesian (km) X	Cartesian (km) Y	Polar Distance (km)	Polar Direction (degrees)	Maximum Allowable Emissions[b] (TPY)
TECO Gannon	360.0	3087.5	-45.0	29.8	54.0	304	5,855
Florida Mega-Mix	364.5	3093.4	-40.5	35.7	54.0	311	22
CSX Transportation Inc	361.0	3089.0	-44.0	31.3	54.0	305	404
David J Joseph Co	364.0	3092.9	-41.0	35.2	54.0	311	123
The Gibson-Homans	365.5	3094.8	-39.5	37.1	54.2	313	21
Holman Inc	359.5	3087.3	-45.5	29.6	54.3	303	55
Holman Inc	359.3	3087.1	-45.7	29.4	54.3	303	54
Gulf Coast Lead	364.0	3093.5	-41.0	35.8	54.4	311	25
Eastern Association Terminal	360.2	3088.9	-44.8	31.2	54.6	305	534
Glen-Mar Concrete Products	363.2	3093.3	-41.8	35.6	54.9	310	22
Additional Sources Outside 55 km Considered in the Modeling Analysis							
TECO Hooker's Point	358.0	3091.0	-47.0	33.3	57.6	305	1,232
LaFarge Corp	357.7	3090.6	-47.3	32.9	57.6	305	1,207
CF Industries Zephyrhills	388.0	3116.0	-17.0	58.3	60.7	344	1,006
FPC - Bartow	342.4	3082.6	-62.6	24.9	67.4	292	9,244
FPC - Higgins	336.5	3098.4	-68.5	40.7	79.7	301	1,082
FPC - Intercession City[c]	446.3	3126.0	41.3	68.3	79.8	31	809

Note: Screening area of 55 km for the proposed unit is based on the project's estimated significant impact distance of 5 km plus 50 km.

[a] Proposed Hardee Unit 3 east and north UTM coordinates (km): 405.0 and 3057.7.
[b] Generally based on the facility's maximum hourly emission rate for entire year.
[c] A PSD increment-consuming source is located at this facility.

Source: KBN, 1994.

Table 6.5.2-1. Density, Diversity, and Number of Taxa of Macroinvertebrates Collected from Payne Creek Using Artificial Substrates During October/November 1988 and February/March 1989

	October/November 1988			February/March 1989		
	PC-1	PC-2	PC-3	PC-1	PC-2	PC-3
Density[a]	14,296	23,247	[b]	31,821	23,385	7,006
Diversity	3.62	3.14	[b]	2.74	3.58	4.11
Number of Taxa	32	39	[b]	34	39	38
<u>Percent Composition</u>						
Ephemeroptera	5	2	[b]	<1	4	8
Chironomidae	64	89	[b]	80	91	81
Mollusca	<1	<1	[b]	<1	2	4
Other	30	8	[b]	18	3	7

[a] Per square meter.
[b] Samples vandalized.

Source: TPS/SECI, 1989.

Table 6.5.2-2. Density, Diversity, and Number of Taxa of Macroinvertebrates Collected from Payne Creek by Ponar Grab Samples in October 1988 and February 1989

	October/November 1988			February/March 1989		
	PC-1	PC-2	PC-3	PC-1	PC-2	PC-3
Density[a]	13,090	12,090	3,636	27,270	26,906	2,818
Diversity	3.38	4.50	2.07	4.02	4.14	3.75
Number of Taxa	35	47	11	32	35	18
Percent Composition						
Oligochaeta	28	12	61	14	6	19
Ephemeroptera	8	20	< 1	3	5	1
Chironomidae	7	21	11	52	61	74
Mollusca	47	38	26	13	7	1
Other	10	9	1	18	21	5

[a] Per square meter.

Source: TPS/SECI, 1989.

Table 6.5.2-3. Macroinvertebrates Collected in Qualitative Dip Net Samples from Payne Creek During October 1988 and February 1989 (Page 1 of 2)

		October 1988			February 1989		
Scientific Name	Common Name	PC-1	PC-2	PC-3	PC-1	PC-2	PC-3
Turbellaria	Flatworm		F	F			
Prostoma rubrum	Probiscus worm			P			
Lumbriculidae	Aquatic earthworm						P
Tubificidae	Aquatic earthworm		P	P			
Hirunidea	Aquatic earthworm						P
Batracobdella phalera	leech	P		P			
Hyalella azteca	Scud	F	C	C		F	C
Gammaridae	Scud	P					
Cambarinae	Crayfish		C	P		F	
Palaenometes paludosus	Shrimp	P	C	AA	C	C	AA
Perlidae	Stonefly		P				
Baetis sp.	Mayfly	A	F				
Callibaetis floridanus	Mayfly			F			
Pseudocloeon alachua	Mayfly						P
Caenis diminuta	Mayfly	A		P			
Stenacron interpunctatum	Mayfly	F		C			
Stenonema spp.	Mayfly		P				
S. exiguum	Mayfly				F		
Chloroterpes hubbelli	Mayfly		F				
Tricorythodes albilineatus	Mayfly				P		
Hetaerina sp.	Damselfly						F
Argia sedula	Damselfly				F	P	F
Anomalagrion hastatum	Damselfly					F	
Nehallenia sp.	Damselfly	A		P	F	P	F
Aeschnidae	Dragonfly			P			
Gomphus minutus	Dragonfly		P		P		
Hagenius brevistypus	Dragonfly				P		
Brachymesia gravida	Dragonfly	F			P	F	
Macromia sp.	Dragonfly		P			F	F
M. taeniolata	Dragonfly				F	F	
Cheumatopsyche sp.	Caddisfly	AA			AA		
Hydropsyche sp.	Caddisfly						F
Hydroptilidae	Caddisfly						
Cyrnellus sp.	Caddisfly		F				
Polycentropus sp.	Caddisfly			P		F	
Homoptera	True bug			P			
Pelocoris sp.	True bug			F			
Ranatra sp.	True bug					C	F
Lepidoptera	Aquatic Caterpillar		F	P		F	F
Chrysomelidae	Weevil beetle		F				
Dubiraphia sp.	Riffle beetle	C					
Heterelmis vulnerata	Riffle beetle	P				P	
Stenelmis fusca group	Riffle beetle						
Gyrinidae	Whirligid beetle	F					
Dineutus sp. (larvae)	Whirligid beetle	F					P

Table 6.5.2-3. Macroinvertebrates Collected in Qualitative Dip Net Samples from Payne Creek During October 1988 and February 1989 (Page 2 of 2)

Scientific Name	Common Name	October 1988			February 1989		
		PC-1	PC-2	PC-3	PC-1	PC-2	PC-3
Haliplidae	Crawling beetle		F	C			
Helodida	Beetle			P	C	F	
Noteridae	Burrowing water beetle						F
Ceratopogonidae	Biting midges						
Chirionomidae	Midges	AA	AA	AA	AA	AA	A
Simulium sp.	Blackflies						P
Stratiomyiidae	Soldier flies			F			
Tabanidae	Horseflies		F				
Tipulidae	Craneflies			P		P	
Laevipex floridana	Limpet		P	P			
Pseudosuccinea columella	Pond snail		P				
Planorbella scalaris	Mesa rams-horn	P		P			
Pomacea paludosa	Apple snail			P			P
Corbicula fluminea	Asiatic clam		F		P	F	P

Note: AA = very abundant (>20 organisms).
A = abundant (11 to 20 organisms).
C = common (6 to 10 organisms).
F = few (2 to 5 organisms).
P = present (1 organism).

Source: TPS/SECI, 1989.

Table 6.6-1. Mammal Species Observed or Which Potentially Occur in the Vicinity of the HPS Site

Common Name	Scientific Name	Mesic Hardwoods	Pasture	Upland Oak-Palmetto
Opossum	*Didelphis virginiana*	P	P	P
Least shrew	*Cryptotis parva*			
Shorttail shrew	*Blarina brevicauda*	P	P	P
Eastern mole	*Scalopus aquaticus*		P	P
Big brown bat	*Eptesicus fuscus*	P	P	P
Seminole bat	*Lasiurus seminolus*	P	P	P
Eastern yellow bat	*Lasiurns intermedius*	P	P	P
Evening bat	*Nycticeius humeralis*	P	P	P
Eastern big-eared bat	*Plectotus rafinesquei*		P	P
Mexican free-tailed bat	*Tadarida braziliensis*		P	P
Black bear	*Ursus braziliensis*	P		P
Raccoon	*Procyon lotor*	O		P
Longtail weasel[a]	*Mustela frenata*	P		
Mink	*Mustela vison*	P		
River otter	*Lutra canadensis*	O		
Spotted skunk	*Spilogale putorius*	P		P
Striped skunk	*Mephitis mephitis*	P		P
Gray fox	*Urocyon cinereoargenteus*	P	P	P
Bobcat	*Lynx rufus*	O	P	P
Eastern gray squirrel	*Sciurus carolinensis*	O		O
Eastern fox squirrel	*Sciurus niger*	P		P
Southern flying squirrel	*Glaucomys volans*	P		
Southeastern pocket gopher	*Geomys pinetis*		P	P
Eastern harvest mouse	*Reithrodontomys humulis*		P	
Cotton mouse	*Peromyscus gossypinus*	P		
Florida mouse	*Peromyscus floridanus*		P	P
Eastern woodrat	*Neotoma floridana*	P	P	P
Rice rat	*Oryzomys palustris*	P		
Hispid cotton rat	*Sigmodon hispidus*		P	P
Round-tailed muskrat[a]	*Neofiber alleni*	P		
Eastern cottontail	*Sylvilagus floridanus*	P	P	P
Marsh rabbit	*Sylvilagus palustris*	P		
White-tailed deer	*Odocoileus virginianus*	P	P	P
Armadillo	*Dasypus novemcinctus*	O	O	O
Wild hog	*Sus scrofa*	O	O	O

Note: O = observed on the site.
P = potentially occurring on the site.

[a] Listed species. See Table 2.3.6-10.

Source: TPS/SECI, 1989.

Table 6.6.1-1. Threatened and Endangered Plant Species Potentially Occurring on or Near the Hardee Unit 3 Site

Scientific Name	Common Name	Status[a] USFWS	Status[a] FDA	General Habitat Association	Probability of Occurrence[b]
Habenaria repens	Water spider orchid		T	Wetlands	M
Hartwrightia floridana	Hartwrightia	C2	T	Marsh grassland or boggy swales Blooms Sept-Nov	L
Phlebodium aureum	Golden polypody		T	Epiphytic in hammocks	M
Pteroglossapsis ecristata	Wild coco	C2	T	Dry sandy pinelands Blooms in Fall	L
Tillandsia setacea	Red needle-leaf air plant		T	Epiphytic in hammocks	M
Vittaria lineata	Shoestring fern		T	Epiphytic in hammocks	M
Osmunda cinnamomum	Cinnamon fern		CE	Moist, shady forests	P
Thelypteris hispidula	Hairy maiden fern		T	Moist, shady forests	P
Thelypteris interrupta	Spreading tri-vein fern		T	Moist, shady forests	P

Note: FDA = Florida Department of Agriculture and Consumer Services.
USFWS = U.S. Fish and Wildlife Service.

[a] Status: C2 = under review for listing by USFWS, but substantial evidence of biological vulnerability and/or threat is lacking.
CE = commercially exploited.
T = threatened.

[b] Probability of occurrence onsite:
L = low probability of presence.
M = moderate probability of presence.
P = present on site.

Source: KBN, 1994.

Table 6.6-2. Birds Observed or Which Potentially Occur in the Vicinity of the HPS Site (Page 1 of 2)

Common Name	Scientific Name	Forested Wetlands	Pasture	Upland Oak-Palmetto	Water Bodies	Seasonal Status[a]
Double-Crested Cormorant	*Phalacrocorax auritus*				P	P
White Pelican	*Pelecanus erythrorhynchos*				P	W
Limpkin[b]	*Aramus guarauna*	P			P	R
Little Blue Heron[b]	*Egretta caerulea*	P			O	R
Snowy Egret[b]	*Egretta thula*	P			O	R
Tricolored Heron[b]	*Egretta tricolor*	P			P	R
Florida Sandhill Crane[b]	*Grus canadensis pratensis*	P	P		O	R
Wood Stork[b]	*Mycteria americana*	P			O	R
Killdeer	*Charadrius vociferus*		O			RW
Red-Shouldered Hawk	*Buteo lineatus*	O	O	P		R
Red-Tailed Hawk	*Buteo jamaicensis*	P	O	P		R
American Kestrel[b]	*Falco sparverius*	P	O			RW
Peregrine Falcon[b]	*Falco peregrinus*	P	P		P	W
Bald Eagle[b]	*Haliaeetus leucocephalus*	P			O	R
Black Vulture	*Coragypes atratus*	P	P	P	O	RW
Audubon's Crested Caracara[b]	*Polyborus plancus*		P			R
Burrowing Owl[b]	*Athene cunicularia floridana*					R
Northern Bobwhite	*Colinus virginianus*	O	P	P		RW
Belted Kingfisher	*Megaceryle alcyon*	O				W
Red-Bellied Woodpecker	*Melanerpes carolinus*	O	O	P		R
Downy Woodpecker	*Picoides pubescens*	O	O	O		R
Pileated Woodpecker	*Dryocopus pileatus*	O				R
Yellow-Bellied Sapsucker	*Sphyrapicus varius*	O		P		W
Great Crested Flycatcher	*Myiarchus crinitus*	O				S
Eastern Phoebe	*Sayornis phoebe*	O				W
Tree Swallow	*Iridoprocne bicolor*	O		O		R
Blue Jay	*Cyanocitta cristata*	O	O	O		R
Tufted Titmouse	*Parus bicolor*	O		O		R
Carolina Wren	*Thyrothorus ludovicianus*	O		P		R
House Wren	*Troglodytes aedon*	O	O			w
Ruby Crowned Kinglet	*Regulus calendula*	O		O		W
Blue-Gray Gnatcatcher	*Polioptila caerulea*	O		O		RW
Brown Thrasher	*Toxostoma rufum*	O				R
Northern Mockingbird	*Mimus polyglottos*	O	O	P		R

Table 6.6-2. Birds Observed or Which Potentially Occur in the Vicinity of the HPS Site (Page 2 of 2)

Common Name	Scientific Name	Forested Wetlands	Pasture	Upland Oak-Palmetto	Water Bodies	Seasonal Status[a]
Gray Catbird	*Dumetella carolinensis*	O	O			W
Loggerhead Shrike	*Lanius ludovicianus*		O			R
White-Eyed Vireo	*Vireo griseus*	O	O			R
Black-and-White Warbler	*Mniotila varia*	O				W
Yellow-Throated Warbler	*Dendroica dominica*	O				W
Yellow-Rumped Warbler	*Dendroica coronata*	O				W
Palm Warbler	*Dendroica palmarum*	O	O	P		W
Common Yellowthroat	*Geothlypis trichas*	O				R
Red-Winged Blackbird	*Agelaius phoeniceus*		O			R
Eastern Meadowlark	*Sturnella magna*		O			R
Northern Cardinal	*Cardinalis cardinalis*	O		O		R
Rufous-Sided Towhee	*Pipilo erythropthalmus*	O	P	P		RW
Henslows Sparrow	*Ammodramus henslowii*		O			W
Bachman's sparrow[b]	*Aimophila aestivalis*		P			R

Note: O = observed on the site.
P = potentially occurring on the site.

[a] Seasonal Status:
W = winter resident.
S = summer resident.
R = year-round resident.
RW = resident in area but numbers augmented by wintering birds from the north.

[b] Listed species. See Table 2.3.6-10.

Source: TPS/SECI, 1989.

Table 6.6-3. Terrestrial Reptiles and Amphibians Observed or Which Potentially Occur in the Vicinity of the HPS Site (Page 1 of 2)

Common Name	Scientific Name	Mesic Hardwoods	Open Pine-Pasture	Upland Oak-Palmetto
Eastern coachwhip	*Masticophis flagellum*	P	P	P
Florida pine snake	*Pituophis melaneucus mugitus*			P
Yellow rat snake	*Elaphe obsoleta quadrivittata*	P		P
Corn snake	*Elaphe guttata guttata*	P	P	P
Florida scarlet snake	*Cemophora coccinea coccinea*		P	P
Scarlet king snake	*Lampropeltis triangulum elapsoides*			P
Florida king snake	*Lampropeltis getulus floridana*	P		
Short-tailed snake	*Stilosoma extenuatum*			P
Peninsula crowned snake	*Tantilla relicta*	P		P
Eastern Indigo snake[a]	*Drymarchon corais couperi*	P		P
Florida cottonmouth	*Agkistrodon piscivorous conanti*	P		
Dusky pygmy rattlesnake	*Sistrurus miliaris barbouri*	P	P	
Eastern diamondback rattlesnake	*Crotalus adamanteus*	P	P	P
Eastern coral snake	*Micrurus fulvius fulvius*	P	P	P
Southern dusky salamander	*Desmognathus auriculatus*	P		
Slimy salamander	*Plethodon glutinosus*	P		
Dwarf salamander	*Eurycea quadridigitata*	P		
Eastern spadefoot toad	*Scaphiopus holbrooki*		P	P
Eastern narrowmouth toad	*Gastrophyrne carolinensis*	P		
Southern toad	*Bufo terrestris*	P	P	P
Oak toad	*Bufo quericus*	P	P	P
Florida box turtle	*Terrepene carolina bauri*	P	P	
Gopher tortoise	*Gopherus polyphemus*	P	P	P
American alligator[a]	*Alligator mississippiensis*	O		
Green anole	*Anolis carolinensis*	O		P
Southern fence lizard	*Sceloperus undulatus undulatus*	P		P
Ground skink	*Scincella laterale*	P		P
Southeastern five-lined skink	*Eumeces inexpectatus*	P		P
Peninsula mole skink	*Eumeces egregins onocrepis*		P	P
Six-line race runner	*Cnemidophorus sexlineatus*		P	P
Eastern glass lizard	*Ophisaurus ventralis*	P	P	
Island glass lizard	*Ophisaurus compressus*		P	P
Slender glass lizard	*Ophisaurus attenuatus*		P	
Worm lizard	*Rhineura floridana*		P	P
Florida green water snake	*Nerodia cyclopian floridana*	P		
Brown water snake	*Nerodia taxispilota*	P		
Florida water snake	*Nerodia sipedon pictiventris*	P		
Florida brown snake	*Storeria dekayi victa*	P		P
Eastern garter snake	*Thamnophis sirtalis*	P		
Peninsula ribbon snake	*Thamnophis sauritus*	P		
Pine woods snake	*Rhadinaea flavilata*	P		
Florida red-bellied snake	*Storeria occipitomaculata*	P	P	
Eastern hognose snake	*Heterodon platyrhinos*		P	P
Southern hognose snake	*Heterodon simus*		P	P
Southern ringneck snake	*Diadophis punctatus*	P		
Rough green snake	*Opheodrys aestivus*	P		
Southern black racer	*Colaber constrictor priapus*	P	P	P

Table 6.6-3. Terrestrial Reptiles and Amphibians Observed or Which Potentially Occur in the Vicinity of the HPS Site (Page 2 of 2)

Common Name	Scientific Name	Mesic Hardwoods	Open Pine-Pasture	Upland Oak-Palmetto
Barking treefrog	*Hyla gratiosa*	P		
Green treefrog	*Hyla cinerea*	O		
Squirrel treefrog	*Hyla squirella*	P		
Pine woods treefrog	*Hyla femoralis*	P		
Florida chorus frog	*Psuedracris negrita verrucosa*	P		
Bullfrog	*Rana catesbeiana*	O		
Pig frog	*Rana grylio*	P		
Southern leopard frog	*Rana sphenocephala*	O		
Florida gopher frog	*Rana areolat aesopus*	P		

Note: O = observed on the site.
P = potentially occurring on the site.

[a] Listed species. See Table 2.3.6-10.

Source: TPS/SECI, 1989.

Table 6.8.1-1. Historic Populations for Selected Communities and Unincorporated Areas in Hardee and Polk Counties

Community	Population 1980	Population 1990	Percent Change (1980-1990)
Unincorporated Hardee County	13,566	13,191	-2.8
Bowling Green	2,310	1,836	-20.5
Wauchula	2,986	3,253	8.9
Zolfo Springs	1,495	1,219	-18.5
Unincorporated Polk County	190,071	242,195	27.4
Bartow	14,780	14,716	-0.4
Fort Meade	5,546	4,976	-11.5
Frostproof	2,995	2,808	-6.7
Lakeland	47,406	70,576	49.9
Winter Haven	21,119	24,725	17.1

Note: The 1990 population counts are subject to adjustment for undercount or overcount by the U.S. Bureau of the Census.

Source: U.S. Bureau of the Census, 1990.

Table 6.8.1-2. Projected Population for Hardee and Polk Counties

Area	Projected Population 1995	Projected Population 2000
Hardee County		
Unincorporated Population	16,144	16,883
Total Population	24,496	25,723
Polk County		
Unincorporated Population	275,814	487,200
Total Population	443,747	477,857

Sources: Polk County Planning Department, 1994.
Hardee County Comprehensive Plan, 1992.

Table 6.8.1-3. 1991 Average Monthly Employment by Major Industry Group for Hardee County, Polk County, the Central Florida Region, and Florida

Industry	Hardee County	Polk County	Central Florida Region	Florida
Agriculture, Forestry, and Fishing	2,387	10,433	19,274	149,784
Mining	ND	3,820	3,820	8,147
Construction	181	8,019	9,931	283,999
Manufacturing	312	20,653	22,688	491,919
Transportation, Communication, and Public Utilities	169	8,152	9,615	315,448
Wholesale Trade	296	7,504	8,839	287,354
Retail Trade	1,094	33,612	42,806	1,120,022
Finance, Insurance, Real Estate	209	7,433	8,965	359,575
Services	1,603	44,588	58,791	1,904,943
Government	670	10,480	13,963	371,986
Other	ND	189	189	13,022
TOTAL	6,921	154,883	196,181	5,306,199

ND = Not disclosed.

Source: State of Florida, Department of Labor and Employment Security, Bureau of Labor Market Information, "Employment, Wages, and Contributions Report" (ES-202), unpublished data.

7.0 ENVIRONMENTAL IMPACTS

7.1 Geology and Soils

7.1.1 Construction Impacts

The land in the immediate vicinity of the proposed Hardee Unit 3 site currently is either being used for phosphate mining or is in the process of post-mining reclamation. Most of the land in the general area has already been disturbed by mining activities. The proposed facility will be located on a 20 ha (50-acre) parcel adjacent to the Hardee Power Station existing units and existing cooling reservoir within the existing Hardee Power Station site. Therefore, general site preparation and construction will have minimal land impacts.

The Hardee Unit 3 power block will be constructed primarily on land that has been disturbed by mining and reclamation activities; other facility structures will be located on both unmined and mined land. The 230-ha (570-acre) existing cooling reservoir was constructed during the first phase of the Hardee Power Station buildout entirely on mined lands. The cooling reservoir will not be expanded in size to accommodate Hardee Unit 3. The existing access road, which is 8 meters (26 feet) wide with a 6 meters (20 ft) wide paved center section and a 1 meter (3 ft) shoulder on either side will provide access to the Hardee Unit 3 facility from Fort Green Road in Polk County which becomes County Road 663 at the Hardee County line. No new access roads will be constructed for Hardee Unit 3. Although the Hardee Unit 3 site is relatively flat, local site grading and leveling will be necessary for construction. Impacts to terrain will be minor. No blasting is anticipated for construction of the Hardee Unit 3 Project.

Laydown areas for equipment and supplies will be graded and surfaced with aggregate. These areas will be used for the storage of construction materials.

No impacts from disposal of construction wastes are anticipated. Combustible construction wastes (e.g., paper, wood, etc.) will be burned onsite in accordance with applicable regulations. Other construction wastes will be removed from the site for disposal at a facility approved by the FDEP. Any garbage (food containers, papers, etc.) will be collected in appropriate waste collection containers and disposed in accordance with FDEP and local regulations. Any waste oils or other chemical wastes generated during construction will be removed from the site and disposed of by a licensed contractor. During construction, the construction labor force will utilize portable chemical toilets. All sanitary sewage will be frequently pumped from the individual toilets for transportation to an approved disposal facility by a licensed contractor.

7.1.2 Operation Impacts

No adverse impacts to geology and soils are anticipated during operation of Hardee Unit 3.

7.2 Water Resources

7.2.1 Surface Water

7.2.1.1 Construction Impacts

Payne Creek and its unnamed tributary are the only natural surface water bodies in the immediate vicinity of the Hardee Power Station site. The primary potential impacts to Payne Creek and its unnamed tributary from site preparation and plant construction are erosion and sedimentation due to earthmoving and material placement associated with the plant. Discharges associated with construction dewatering may also be considered a potential impact to the surface waters of Payne Creek and its unnamed tributary. These impacts will be controlled and minimized through proper design and placement of runoff control features.

Runoff from areas of the site disturbed by construction activities, including material laydown areas, and dewatering flows, will be collected in pipes, an open channel system, and/or catch basin and directed to the permanent site stormwater detention pond. This pond will be located adjacent to the power block area and will be built early during construction to serve as a construction runoff detention pond. Sediments which are trapped by and accumulate in the stormwater detention pond will be removed as necessary. The construction drainage system will follow the layout of the permanent ditch system. The treated runoff will be discharged into the unnamed wetland tributary.

With the exception of new cooling water intake and return structures, no changes to the existing cooling reservoir structure will be made as part of Hardee Unit 3. The design of the cooling water intake and return structures will be similar to those constructed for Hardee Power Station existing units.

7.2.1.2 Operation Impacts

Liquid waste effluents from operation of the Hardee Power Station will be routed to the cooling reservoir. Prior to discharge to the reservoir, these wastes (exclusive of condenser cooling water) will receive treatment such as chemical neutralization, precipitation, sedimentation, oil and grease removal, and/or biological treatment. Effluent limitations and monitoring requirements prior to discharge to the reservoir have been proposed for these waters in the draft NPDES permit. (See Appendix A.) Due to the water storage volume provided above normal reservoir operating level, discharges from the cooling reservoir to Payne Creek are expected to occur only as overflow caused by infrequent, high intensity rainfall in excess of a 24-hour event with a probable recurrence interval of once in ten years. Discharges from the reservoir are also limited in the permit.

Intermittent shock clorination is planned for the plant condenser cooling water system to control biofouling. Due to natural decay and a combination of chlorine with other chemicals within the reservoir, it is expected that the reservoir overflow will not contain detectable concentrations of total residual chlorine.

Based on the cooling reservoir design, it is expected that the maximum discharge temperature will not exceed 35 degrees Celsius (5 degrees Fahrenheit). This temperature is not expected to cause an impact in Payne Creek during the infrequent periods of discharge. Mixing zones of 15 meters (50 feet) for temperatures, cyanide, total cadmium, iron, lead, mercury and silver are proposed in the draft NPDES permit. In-reservoir, upstream and monitoring is also proposed for numerous potential pollutants from the station to assure that seepage from the reservoir to the groundwater will not result in a violation of Florida water quality standards criteria in Payne Creek.

7.2.2 Ground Water

7.2.2.1 Construction Impacts

Some dewatering will be required during excavation for construction of plant structures. The site facilities requiring dewatering include:

1. Foundations,
2. Circulating water piping,
3. Intake structure, and
4. Miscellaneous underground utilities.

The circulating water piping system will require the most extensive dewatering. The dewatering flow is estimated to be 315 liters per minute per 30 meters of pipe (83 gallons per minute per 100 linear feet), regardless of pipe size. Assuming 152 meters (500 linear feet) of pipe is excavated and dewatered at a time, a dewatering flow of 1,575 liters per minute (332 gallons per minute) would be anticipated, with a radius of influence of approximately 91.4 meters (300 feet). These flows would exist during the construction period, which will last approximately 1 month for each 152-meter (500-foot) section. The total period for dewatering will be 6 months. After construction, granular backfill will be used in the circulating water trench so that natural groundwater flow is not disrupted.

The intake structure located in the southeast reservoir berm will be constructed within a sheetpile enclosure which will minimize dewatering. The dewatering flow for the system is estimated to be approximately 828 liters per minute (218 gallons per minute) for a 1-month period.

The underground utilities will be installed in shallow trenches. The shallow groundwater table will require open trench sumping to control groundwater. Based on the anticipated length of open trench, the quantity of dewatering is estimated to be on the order of 380 liters per minute (100 gallons per minute).

The primary impact of dewatering is that groundwater from the surficial aquifer will be withdrawn and the aquifer phreatic line will be depressed locally. To minimize the impact of dewatering, the pumpage from wellpoints in the power block area will be directed to the detention pond, which provides for natural infiltration and replenishment of the surficial aquifer. Thus, the dewatering flows removing groundwater are balanced a short distance away by recharge from the detention pond.

Dewatering can cause increases in vertical stresses. In this case, the increase will not be significant enough to cause settlement or depressions. Foundations in the power block area will not be at risk because they will be constructed following the completion of dewatering activities.

Chemical effects of dewatering will result primarily from oxidation of the groundwaters. The sands of the surficial aquifer are predominantly quartzitic, although soluble calcite will liberate calcium ions and bicarbonate anions, which will increase the hardness of the water.

No impacts to the intermediate aquifer are predicted since the excavation/dewatering will be limited to the surficial aquifer groundwater regime.

7.2.2.2 Operation Impacts

There will be no direct chemical or biocide discharges to groundwater. Possible indirect discharges could occur from seepage from the cooling reservoir and the runoff detention pond and as accidental spills from chemical handling and storage areas.

The cooling reservoir is constructed of *in-situ* earth materials creating a permeable filter bed. Given the depth of the reservoir, seepage is primarily to the surficial aquifer. The reservoir receives direct rainfall, surface runoff, wellwater from the Floridan aquifer as makeup and various treated plant wastewater flows. This results in a minimum of 30:1 dilution for wastewaters prior to any seepage to groundwater. It also results in an increase in concentration of various water quality parameters over time. These concentrations are expected to remain localized in the immediate vicinity of the reservoir. Concentrations at the end of 30 years should be indistinguishable from background levels within 0.4 km (0.25 mile) of the reservoir.

At the edge of the zone of discharge [as defined in the existing conditions of certification for the Hardee Power Station (100 ft from the outside toe of the cooling reservoir)], groundwater concentrations will meet the applicable groundwater quality standards. This established zone of discharge continues to be in compliance with FDEP regulations, Chapter 17-28.700(4), Florida Administrative Code. The edge of this zone of discharge is within the Hardee Power Staion property boundary and will not threaten or impair any present or future water supplies.

Seepage from the runoff detention pond will be discontinuous and much less than seepage from the cooling reservoir. In addition, there is no recycling activity to concentrate water quality parameters. The pond will be designed to satisfy criteria for maintenance of water quality. As a result, no adverse impact to groundwater quality should occur.

Impacts to groundwater resulting from accidental spills will also be precluded by design of the chemical (including oil) storage and handling areas. Berms and impermeable liners will surround oil, acid and caustic tanks such that any spills are contained and seepage to groundwater is prevented.

The 880-MW power plant configuration will have the same groundwater allocation as the previously licensed 660-MW configuration (i.e., average monthly withdrawal of 3.8 mgd and a maximum monthly withdrawal of 8.64 mgd). There will be no incremental impacts on consumptive use from the Hardee Unit 3 Project because water use will not change.

There will be no incremental impacts related to water table aquifer recharge from the Hardee Unit 3 because no physical modification to the cooling reservoir will be made.

7.0 ENVIRONMENTAL IMPACTS

7.3 Air Quality

7.3.1 Construction Impacts

The air quality impacts during the construction phase of the project will be associated primarily with the land clearing and site preparation activities. These activities will result in the generation of fugitive particulate matter and an increase in the level of exhaust emissions from construction equipment. Air emissions will be temporary and will vary substantially from day to day during each phase of construction depending on the level of activity, the specific operations, and prevailing weather conditions.

Activities that may produce fugitive particulate matter emissions include building and road construction. These emissions will be associated with land clearing, ground excavation, cut and fill operations, and actual construction of the facility when approximately 20 ha (50 acres) of the facility site will be exposed. A large portion of the fugitive emissions will result from vehicular traffic over roads at the construction site (e.g., heavy-equipment traffic and traffic due to construction workers entering and leaving the site).

Wind erosion from the exposed land areas may also be a source of fugitive dust. Because of the variable nature of such emissions, emissions of fugitive particulate matter are extremely difficult to quantify. The emissions are dependent upon a number of factors, including specific activities conducted, level of activity, and meteorological conditions.

The maximum impacts from vehicular exhaust emissions will occur during the construction phase when equipment will be onsite for concrete placement and major equipment installation. Vehicle exhausts include primarily nitrogen oxide and carbon monoxide emissions as well as particulate matter, sulfur dioxide, and volatile organic compounds. However, air quality impacts from construction-related vehicle exhaust emissions are expected to be negligible.

7.3.2 Operation Impacts

The proposed Hardee Unit 3 facility will be a new air pollution source that will result in increases in air emissions in Hardee County. EPA has implemented regulations requiring a PSD review for new or modified sources that increase air emissions above certain threshold amounts. Because the threshold amounts will be exceeded by the proposed project, the project is subject to PSD review. PSD regulations are promulgated under 40 Code of Federal Regulations (CFR) Part 52.21 and implemented through delegation to the FDEP. Florida's PSD regulations are codified in Chapter 62-212.400, F.A.C. These regulations incorporate the EPA PSD regulations by reference.

Based on the emissions from the proposed project, a PSD review is required for each of the following regulated pollutants:

- particulate matter (PM) as total suspended particulate matter (TSP),
- particulate matter with aerodynamic diameter of 10 microns or less (PM10),
- sulfur dioxide (SO_2),
- nitrogen dioxide (NO_2),
- carbon monoxide (CO),
- volatile organic compounds (VOC), and
- other trace elements.

Hardee County has been designated as an attainment area for all criteria pollutants [i.e., ozone (O_3), PM10, SO_2, CO, and NO_2] and is classified as a PSD Class II area for PM(TSP), SO_2, and NO_2; therefore, the PSD review will follow regulations pertaining to such designations.

A pollutant applicability analysis for Hardee Unit 3 was presented in Section 3.5.2.1 and Section 7.1 of the Air Permit Application, Appendix 10.1.5 of the Site Certification Application/Environmental Analysis. Section 3.5.2.1 discusses justification for the pollutants which must undergo PSD review based on the project's potential emissions compared to the PSD significant emission rates. For those pollutants subject to PSD review, the project's impacts were evaluated relative to significant impact levels. More detailed discussions about the project's impacts relative to significant impact levels are presented in Section 7.1.

The general modeling approach followed EPA and FDEP modeling guidelines for determining compliance with AAQS and PSD increments. In general, when model predictions are used to determine compliance with AAQS and PSD increments, current policies stipulate that the highest annual average and highest, second-highest short-term (i.e., 24 hours or less) concentrations are to be compared to the applicable standard when a 5-year period of meteorological data is used. The highest, second-highest concentration is calculated for a receptor field by:

1. Eliminating the highest concentration predicted at each receptor,
2. Identifying the second-highest concentration at each receptor, and
3. Selecting the highest concentration among these second-highest concentrations.

This approach is consistent with the air quality standards, which permit a short-term average concentration to be exceeded once per year at each receptor.

To develop the maximum short-term concentrations for the proposed facility, the general modeling approach was divided into screening and refined phases. The basic difference between the two phases is that the receptor grid used to predict concentrations in the refined phase is more dense than that used in the screening phase.

After final lists of highest annual and highest, second-highest short-term concentrations were developed, the refined phase of the analysis was conducted by predicting concentrations for a refined receptor grid centered on the receptor at which the highest annual or highest, second-highest short-term concentration from the screening phase was produced. The air dispersion model was executed for the entire year with the refined receptor grid. A set of input and output computer files for the air dispersion modeling was submitted to FDEP.
This approach was used to ensure that valid highest, second-highest concentrations were obtained.

7.0 ENVIRONMENTAL IMPACTS

A conservative approach was used in determining compliance with the PM10 AAQS. Instead of relying on the statistical approach as described, the highest, second-highest 24-hour concentration was determined for each year of the 5 years of analysis. These results indicated that the highest, second-highest PM10 concentrations were well below the applicable AAQS. The overall highest, second-highest 24-hour concentration is greater than the sixth highest value over the 5-year period.

As discussed in Sections 6 and 7 of the Air Permit Application, Appendix 10.1.5, the air quality modeling analyses were performed in screening and refined phases to determine compliance with ambient standards. Concentrations for the screening phase were predicted using a coarse receptor grid and a 5-year meteorological record. After a final list of maximum annual and short-term average concentrations was developed, concentrations were predicted in the refined phase for a refined receptor grid centered on the receptor at which the highest annual or highest, second-highest short-term concentrations were predicted. Not all years were used in the refined analysis.

Detailed results from the air quality modeling are presented in Tables 7-6 through 7-16 of Appendix 10.1.5 of the Site Certification Application/Environemntal Analysis which include the model results from the screening phase for each year of meteorological data and appropriate model results from the refined phase.

The selection of a model was based on its applicability to simulate impacts in areas surrounding the proposed facility. Within 3.0 km of the proposed facility, the terrain can be described as simple, i.e., flat to gently rolling. As defined in the EPA modeling guidelines, simple terrain is considered to be an area where the terrain features are all lower in elevation than the top of the stack(s) under evaluation. Beyond 3.0 km and within 10 km of the proposed facility's site, the terrain has maximum elevations of 6.1 m (20 ft) above ground elevation at the facility. These areas are also considered to be simple since the stacks being modeled are greater than the terrain elevation. Therefore, a simple terrain model was used to predict maximum ground-level concentrations.

The Industrial Source Complex Short Term (ISCST2) dispersion model, Version 93109, (EPA, 1993a) was used to evaluate the pollutant emissions from proposed facility and existing major facilities. This model is contained in EPA's User's Network for Applied

Modeling of Air Pollution (UNAMAP), Version 6 (EPA, 1988). The ISCST2 model is applicable to sources located in either flat or rolling terrain where terrain heights do not exceed stack heights.

The ISCST2 model has rural and urban options which affect the wind speed profile exponent law, dispersion rates, and mixing-height formulations used in calculating ground level concentrations. The criteria used to determine when the rural or urban mode is appropriate are based on land use near the proposed plant's surroundings (Auer, 1978). If the land use is classified as heavy industrial, light-moderate industrial, commercial, or compact residential for more than 50 percent of the area within a 3 km radius circle centered on the proposed source, the urban option should be selected. Otherwise, the rural option is more appropriate. Based on a review of the land use around the facility and discussions with the FDEP, the rural mode was selected because of the lack of substantial residential, industrial and commercial development within 3 km of the proposed facility site. For modeling analyses that will undergo regulatory review, such as PSD permit applications, the following model features are recommended by EPA (1993b) for rural mode and are referred to as the regulatory default options in the ISCST model:

1. Final plume rise at all receptor locations,
2. Stack-tip downwash,
3. Buoyancy-induced dispersion,
4. Default wind speed profile coefficients for rural mode,
5. Default vertical potential temperature gradients, and
6. Calm wind processing.

In this analysis, the EPA regulatory default options were used to address maximum impacts.

Meteorlogical Data

Meteorological data used in the ISCST2 model to determine air quality impacts consisted of a concurrent 5-year period of hourly surface weather observations and twice-daily upper air soundings from the National Weather Service (NWS) stations at Tampa

International Airport and Ruskin, respectively. The 5-year period of meteorological data was from 1982 through 1986.

The FDEP has recommended the use of Tampa/Ruskin meteorological data for the 5-year period of 1982 to 1986 in evaluating the potential air quality impacts for numerous air construction permits and modifications to operating permits over the last 8 years. This data have consistently been used on recent air permit applications that have undergone new source review as part of Florida's Site Certification Application process. In fact, the air impact analyses for the original Site Certification Application/Environmental Analysis for the Hardee Power Station were performed using the 1982 to 1986 dataset.

The NWS station in Tampa, located approximately 67 km to the west-northwest of the proposed site, was selected for use in the study because it is the closest primary weather station to the study area with similar surrounding topographical feature. In addition, FDEP requested the use of these meteorological data. This station also has the most readily available and complete database which is representative of the plant site.

Emission Inventory

Stack and operating parameters and emission rates of criteria pollutants for the CTs were developed from design data supplied by the turbine manufacturer, Westinghouse, Inc., selected by Seminole Electric Cooperative for this project. The design data were developed for the turbines firing natural gas and distillate fuel oil and operating at 50, 75, and 100 percent of maximum capacity. Because the inlet ambient air temperature directly affects turbine combustion and operation, design data were also provided for four ambient air temperatures that cover the range of temperatures for the project site location: 32, 59, 72, and 95°F. Air dispersion modeling was performed for the three operating loads and two extreme ambient temperatures of 32 and 95°F to provide a range of operating conditions that will potentially produce maximum ground-level impacts. These modeling scenarios encompass the operating conditions that will produce the maximum emissions on a short-term basis (i.e., 100 percent load at 32 °F) and the minimum plume rise (i.e., 50 percent load at 95°F).

7.0 ENVIRONMENTAL IMPACTS

For most pollutants, the highest air impacts were based on the use of fuel oil since the maximum hourly and annual emission rates are generated with fuel oil combustion. For NO_x, the annual impacts were also estimated for the PSD Class I increment consumption based on the turbines firing fuel oil (1,500 hours), natural gas (7,260 hours), and natural gas for power augmentation (2,000 hours).

In summary, the operating scenarios considered for the proposed turbines were as follows:

A. All pollutants and averaging periods when firing distillate fuel oil:
   1. Operating loads of 100, 75, and 50 percent; and
   2. Ambient temperatures of 32 and 95°F.

B. Additional analyses for NO_x concentrations (annual averaging period) for assessing impacts in the PSD Class I area for the following combinations of annual fuel combustion (turbines operating at 100 percent load):

   1. Distillate fuel oil (1,500 hours) at 32 and 95°F
   2. Natural gas (7,260 hours) 32 and 95°F.

This modeling provided initial evaluations to determine the source's impacts relative to the significant impact levels and, where applicable, the distance at which the proposed source's impacts are below the significant impact levels. Based on this modeling, subsequent modeling analyses were performed based on the operating load which produced the maximum potential impacts for applicable pollutants and averaging times.

For AAQS and PSD Class II analyses, preliminary modeling indicated that the proposed facility's impacts were below the significant impact levels for the applicable pollutants (i.e., CO, NO_2), except for SO_2 and PM. As a result, further modeling of CO and NO_2 for comparison to applicable AAQS and PSD Class II increments was not required. Because the modeling demonstrated that the facility's impacts were predicted to be above the significant impact levels for SO_2 and PM, further modeling for these pollutants are required. The maximum SO_2 and PM concentrations from the proposed source were predicted to be greater than the significant impact levels at a distance of approximately 1 km from the facility for both pollutants. This distance was used to limit receptor locations and background sources to be modeled.

Emission inventories for background sources of SO_2 and PM were developed from available databases, such as FDEP's Air Pollution Inventory System (APIS), previous studies performed by KBN, and recent air construction permit applications submitted in Polk County (e.g., Tampa Electric Company's Polk Power Station and Florida Power Corporation's Polk Power Park).

Emission inventories of background sources were developed for the proposed source's modeling area and screening area. The modeling area is defined as the significant impact area for the proposed source. The screening area extends 50 km beyond the modeling area. Within the modeling area, cumulative impact analyses are performed for the proposed source and all identified background sources located in the modeling and screening areas. Additional background sources beyond the screening area are also included in the modeling.

In order to reduce the model computation time, the "Screening Threshold" method developed by the North Carolina Department of Natural Resources and Community Development, and approved by EPA and FDEP, was used to effectively model facilities within the screening area that are most likely to interact with the proposed facility.

For this analysis, the long-term criterion was used since fewer background facilities would be eliminated than with the short-term criterion. Also, the total emissions from a facility were used rather than emissions from individual sources for comparison to the screening threshold value. Both methods result in a more conservative approach to produce higher-than-expected concentrations. Those facilities with maximum allowable emissions that are below the calculated "screening threshold" were eliminated from further consideration in the AAQS and PSD Class II modeling analyses.

As discussed in Section 6.3.2 of the Air Permit Application, Appendix 10.1.5 of the Site Certification Application/Environmental Analysis, the screening threshold value was evaluated for both the short-term and long-term averaging periods to potentially eliminate sources from further modeling evaluation. However, the long-term criterion was used since fewer facilities would be eliminated from the analysis than with the short-term criterion. Also, the total emissions from a facility were used rather than emissions from individual sources for comparison to the screening threshold.

The specific sources included in the modeling (i.e., individual point sources) are presented in detail in Attachments C and D to the Air Permit Application, Appendix 10.1.5.

Summaries of the SO_2 and PM background emission facilities considered in the modeling analyses and those eliminated using the screening threshold technique are given in Tables 7.3-1 and 7.3-2. As indicated, most of the SO_2 emission sources (either existing sources or sources with air construction permits but not yet operating) are located more than 10 km from the proposed facility. Similar to the SO_2 emission facilities, most of the PM emissions occur beyond 10 km from the proposed facility.

The predicted maximum impact concentrations for applicable pollutants (i.e., SO_2, PM10, and NO_2) are compared to the National Park Service's significant impact levels in Tables 7-4 and 7-5 of the of the Air Permit Application, Appendix 10.1.5 of the Site Certification Application/Environmental Analysis. Based on discussions with the FDEP, the National Park Service significant impact levels were used in the analysis instead of other levels recommended by EPA in other EPA Regions. The National Park Service levels are lower than those recommended by EPA.

For PSD Class I analyses, preliminary modeling indicated that the proposed facility's impacts were below the National Park Service (NPS)-recommended PSD Class I significant impact levels for PM and NO_2, but not for SO_2. As a result, further modeling of PM and NO_2 for comparison to applicable PSD Class I increments was not required. Because the modeling demonstrated that the facility's impacts were predicted to be above the National Park Service-recommended PSD Class I significant impact levels for SO_2, further modeling for this pollutant is required. Emission inventories for SO_2 were developed from available databases, as previously discussed for developing inventories for the AAQS and PSD Class II analyses.

Receptor Locations

The general modeling approach considered screening and refined phases to address compliance with maximum allowable PSD Class II increments and AAQS. In the ISCST modeling, concentrations were predicted for the screening phase using several receptor grids. The locations of the receptors were based on identifying the significant impact areas and the areas in which maximum concentrations would be expected due to the proposed source. For determining the significant impact areas, a total of 397 receptors were located in a radial grid centered on the proposed facility. The grid extended from the plant property out to 5.0 km from the plant site. After the significant impact areas were determined (i.e., 1.0 km for SO_2 and PM10), a total of 277 receptors were located in a radial grid that was centered on the proposed facility and extended out to 1 km. The specific locations of each receptor in each grid are presented in the PSD Permit Application.

After the screening modeling was completed, refined short-term modeling was conducted using a receptor grid centered on the receptor which had the highest, second-highest short-term concentrations. The receptors were located at intervals of 100 m between the distances considered in the screening phase along nine radials, at 2 degree increments, centered on the radial which the maximum concentration was produced.

To ensure that a valid short-term highest, second-highest concentration was calculated, concentrations were predicted for the refined grid for the entire year during which highest, second-highest concentration was predicted from the screening receptor grid. Refined modeling analysis was also performed for the annual average period. Concentrations were calculated at the receptor and for the entire year during which the highest annual average concentration was predicted in the screening analysis.

For PSD Class I analysis, the maximum concentrations were predicted at 13 receptors surrounding the PSD Class I area of the Chassahowitzka NWR, the closest PSD Class I area. These receptors have been provided by FDEP for use on previous applications.

Background Concentrations

To estimate total air quality concentrations, a background concentration must be added to the modeling results. Background concentrations are concentrations due to sources not associated with the proposed source. These concentrations consist of two components: impacts due to other modeled emission sources (i.e., non-project related) and impacts due to sources not explicitly modeled. Background concentrations due to other modeled sources were predicted with the air dispersion model based on the data developed in the emission inventory. Background concentrations due to sources not explicitly modeled were based on the highest concentrations measured at nearby stations. The background concentrations are added to the maximum concentrations predicted from the modeled source to produce the total air quality concentrations.

The background 3-hour, 24-hour, and annual average SO_2 concentrations are assumed to be 256, 50, and 11 ug/m^3, respectively. For PM concentrations, the background 24-hour and annual average concentrations are assumed to be 70 and 20 ug/m^3, respectively. These background levels were added to model-predicted concentrations to estimate total air quality levels for comparison to AAQS.

The quality assurance procedures used to collect ambient air monitoring data from networks operated by Tampa Electric Company and Florida Power Corporation were discussed in the Site Certification Applications for each of these projects. Prior to initiation of the monitoring programs, monitoring protocols were submitted to the FDEP for approval. After approval by FDEP, the monitoring data were collected in accordance to 40 CFR Part 58.

The locations of the air quality monitors used in developing background concentrations are presented in Section 5.0, Tables 5-1 through 5-3 of the Air Permit Application, Appendix 10.1.5 of the Site Certification Application/Environmental Analysis.

There has been minimal industrial or commercial growth in the area of Hardee Unit 3, indicating minimal, if any, increases of potential air emissions or air quality levels since the monitoring data were collected.

7.0 ENVIRONMENTAL IMPACTS

Building Downwash Considerations

Based on the building dimensions associated with buildings or structures at the proposed facility, the stack for the proposed unit will be less than GEP. Therefore, the potential for building downwash to occur is considered in the modeling analysis.

The procedures used for addressing the effects of building downwash are those recommended in the ISC Dispersion Model User's Guide. The building height, length, and width, which are input for each wind direction representing a 10-degree sector, are used to modify the dispersion parameters.

Building downwash was addressed when modeling other sources that were considered critical in evaluating the potential interaction of other sources with the Hardee Unit 3. Building downwash was explicitly modeled for Hardee Units 1 and 2. Other emission sources were located 10 km or more from Hardee Unit 3. As a result, building downwash effects of other sources would be considered negligible in evaluating the potential interaction of these sources with Hardee Unit 3.

Supplementary PSD Class I Area Impacts

A long-range transport modeling analysis was used as a supplemental air quality evaluation to determine compliance with the PSD Class I increment consumption for SO_2 concentrations at the Chassahowitzka National Wildlife Area. Potential violations of the 3-hour and 24-hour PSD Class I increments were predicted with the ISCST2 model, which required the use of a refined model that accounts for long-range transport. This modeling analysis used the long-range transport model, MESOPUFF II, to address impacts from the proposed Hardee Unit 3 as well as other PSD increment consuming and expanding sources. The procedures and methods used to develop inputs and tasks performed in the MESOPUFF modeling analysis are presented in Section 6.9.2 of the Air Permit Application, Appendix 10.1.5.

The analysis is based on the MESOPUFF II Modeling Protocol developed by the Interagency Workgroup on Air Quality Modeling (IWAQM).

7.0 ENVIRONMENTAL IMPACTS

Toxic Air Pollutant Analysis

Maximum air quality impacts of toxic air pollutants from the proposed source alone were modeled with the ISCST2 model for comparison to the no-threat levels established by FDEP (Version 3).

Model Results - Proposed Facility

For the screening modeling analysis, a summary of the maximum SO_2, PM10, NO_2, CO, arsenic, beryllium, and sulfuric acid mist concentrations due to the proposed facility is presented in Table 7.3-3. These results are presented for a range of conditions for combined cycle and simple cycle operations that could produce high impacts. This analysis was performed for fuel oil combustion since the hourly emissions are generally higher with the use of fuel oil than natural gas. The conditions were as follows:

1. Combined cycle operation
   a. Baseload (100 percent) at ambient temperatures of 32 and 95°F
   b. 75 percent load at ambient temperatures of 32 and 95°F
   c. 50 percent load at ambient temperatures of 32 and 95°F

2. Simple cycle operation
   a. Baseload at ambient temperatures of 32 and 95°F
   b. 75 percent load at ambient temperatures of 32 and 95°F
   c. 50 percent load at ambient temperatures of 32 and 95°F

The maximum predicted 3-hour, 24-hour, and annual SO_2 concentrations are 70.5, 28.1, and 0.19 ug/m^3, respectively. The maximum 24-hour concentration is above the *de minimis* monitoring level and, therefore, preconstruction monitoring data are required to be submitted by the Applicant as part of the permit application. Existing monitoring data collected by the FDEP and other monitoring stations (i.e., TECO and Florida Power Corporation) are being used in this application to satisfy preconstruction monitoring requirements and to establish background concentrations.

7.0 ENVIRONMENTAL IMPACTS

The maximum predicted 24-hour and annual average PM10 concentrations are 21.9 and 0.12 ug/m^3, respectively. The maximum 24-hour concentration is above the *de minimis* monitoring level, and, therefore, preconstruction monitoring is required for the permit application. Similar to the SO_2 analysis, existing monitoring data collected by FDEP and other monitoring stations are being used to satisfy the preconstruction monitoring requirements and establish background concentrations.

The maximum predicted annual NO_2 concentration is 0.6.1 ug/m^3, which is below the *de minimis* monitoring level. Preconstruction monitoring requirements is not required for the permit application.

The maximum predicted 1-hour and 8-hour average CO concentrations are 256 and 116 ug/m^3, respectively. These maximum values are less than the significance levels. The maximum 8-hour concentration is also less than the *de minimis* monitoring levels and, therefore, preconstruction monitoring is not required. Because the maximum predicted impacts due to the proposed facility are less than the CO significance levels, additional modeling is not required for this pollutant.

The maximum predicted 24-hour average beryllium concentration is 0.0014 ug/m^3, which is greater than the *de minimis* monitoring levels of 0.001 Ug/m^3. This maximum concentration was predicted for the combustion turbines operating at 50 percent load during combined cycle mode. At 100 percent load, the maximum predicted 24-hour concentration is less than the *de minimis* concentration. Also, the maximum beryllium concentrations are predicted to be less than the No-Threat Levels (NTLs) for all operating loads. Because of the limited number of hours of expected fuel oil usage (1,500 hours or less) and the limited operation of the turbines, preconstruction monitoring is not warranted for this project.

For sulfuric acid mist and arsenic, there are no significant impact or *de minimis* monitoring levels established by EPA. However, these pollutants were addressed as toxic air pollutants for comparison to the Florida NTLs.

7.0 ENVIRONMENTAL IMPACTS

Model Results - Total Air Quality Impact

From the refined modeling analysis, summaries of the maximum total SO_2 and PM10 concentrations predicted for comparison to the AAQS are presented in this section. The total concentrations are determined from the impacts of the modeled sources added to the background concentration determined from monitoring data.

SO_2 Concentrations

The 3-hour and 24-hour results are based on the maximum concentrations predicted when the Hardee Unit 3 facility was predicted to have significant impacts. (See Table 7.3-4.) Based upon the refined analysis results, the maximum total predicted SO_2 concentrations, including a non-modeled background concentration are as follows:

449 ug/m^3, HSH 3-hour average, or 35 percent of the AAQS of 1,300 ug/m^3

141 ug/m^3, HSH 24-hour average, or 54 percent of the AAQS of 260 ug/m^3

30 ug/m^3, annual average, or 50 percent of the AAQS of 60 ug/m^3

The AAQS modeling analysis indicates that the SO_2 air quality within the significant impact distance from the proposed plant will be in compliance with the AAQS, when the proposed unit was predicted to have a significant impact.

Based on these results, the maximum impacts predicted by the proposed plant by itself and together with other emission sources (when the proposed plant's impacts are predicted to be significant), including non-modeled background concentrations, will ensure compliance and maintenance of the AAQS.

PM10 Concentrations

The maximum refined PM10 concentrations for comparison to the AAQS are presented in Table 7.3-4. Based upon the refined analysis results, the maximum total predicted PM10 concentrations, including a non-modeled background concentration are as follows:

102 ug/m^3, HSH 24-hour average, or 68 percent of the AAQS of 150 ug/m^3

24 ug/m^3, annual average, or 48 percent of the AAQS of 50 ug/m^3

The AAQS modeling analysis, therefore, indicates that the PM10 air quality within the significant impact distance from the proposed plant will be in compliance with the AAQS.

Based on these results, the maximum impacts predicted by the proposed plant by itself and together with other emission sources, including non-modeled background concentrations, will ensure compliance and maintenance of the AAQS.

PSD Class II Increment Consumption

SO_2 Concentrations

Results of the PSD Class II refined analysis are presented in Table 7.3-5. The 3-hour and 24-hour results are based on the maximum concentrations predicted when the proposed Hardee Unit 3 was predicted to have a significant impact. The maximum predicted Class II increment consumptions due to all increment consuming sources from the refined analyses are:

162 ug/m^3, HSH 3-hour average, or 32 percent of the allowable increment of 512 ug/m^3

46.7 ug/m^3, HSH 24-hour average, or 51 percent of the allowable increment of 91 ug/m^3

-3.8 ug/m^3, annual average, or less than 0 percent of the allowable increment of 20 ug/m^3

The PSD Class II modeling analysis indicates that the predicted maximum annual concentrations will be in compliance with the annual PSD Class II increment, when the proposed unit was predicted to have a significant impact.

Based on these results, the maximum impacts predicted by the proposed plant by itself and together with other emission sources (when the proposed plant's impacts are predicted to be significant) will ensure compliance and maintenance of PSD Class II increments.

PM10 Concentrations

The maximum predicted PM10 PSD Class II increment consumption impacts due to all increment- consuming sources from the refined analysis, presented in Table 7.3-5, are as follows:

14 ug/m^3, HSH 24-hour average, or 47 percent of the allowable increment of 30 ug/m^3

.6 ug/m^3, annual average, or 4 percent of the allowable increment of 17 ug/m^3

Based on these results, the maximum impacts predicted by the proposed plant by itself and together with other emission sources will ensure compliance and maintenance of PSD Class II increments.

PSD Class I Increment Consumption

The maximum potential impacts from the proposed Hardee Unit 3 facility only predicted at the PSD Class I area of the Chassahowitzka National Wildlife Area for SO_2, NO_2, and PM10 concentrations are presented in Table 7.3-6. The maximum impacts for each pollutant were compared to the NPS-recommended significant impact levels for PSD Class I areas. The results indicated that SO_2 is the only pollutant that is predicted to exceed the NPS-recommended significant impact levels. Based on these results, a PSD Class I impact assessment for SO_2 concentrations was performed with other PSD increment consuming sources to determine compliance with allowable PSD Class I increments. The results of the Class I analysis for SO_2 concentrations are presented in Table 7.3-9. The results indicate the maximum PSD increment consumed at the PSD Class I areas is predicted to be above the allowable PSD Class I increments for 3-hour and 24-hour averaging periods.

The maximum predicted Class I increment consumption due to all increment consuming sources from the refined analysis is:

26.1 ug/m^3, HSH 3-hour average, or 104 percent of the allowable increment of 25 ug/m^3

6.4 ug/m^3, HSH 24-hour average, or 130 percent of the allowable increment of 5 ug/m^3

0.3 ug/m^3, annual average, or less than 15 percent of the allowable increment of 2 ug/m^3

Additional modeling was performed with the ISCST2 model to determine the number of potential violations of the 3-hour and 24-hour PSD Class I SO_2 increments and the proposed project's contribution to those predicted violations. A summary of the results that show the number of predicted violations and the project's predicted contributions to those violations is presented in Table 7.3-8. Based on these results, additional modeling was performed using the MESOPUFF II model for the proposed project and other PSD emission sources located more than 50 km from the PSD Class I area. These results were added to the ISCST2 model results for sources located within 50 km of the Class I area to produce the total PSD Class I increment consumption.

A summary of the maximum SO_2 concentrations predicted for the proposed Hardee Unit 3 plant at the PSD Class I area using the MESOPUFF II model is presented in Table 7.3-9. The MESOPUFF II results indicate that, for the periods during which the ISCST2 model predicted potential violations and the proposed project's contribution was greater than the NPS significant impact levels, the proposed project's impacts are less than the significant impact levels. When the proposed source was modeled for 1 year with the MESOPUFF II model, there was only one 24-hour period during which the proposed source was predicted to have a significant impact. When other sources were modeled for this period (i.e., using the MESOPUFF II model for the PSD emission sources located more than 50 km and the ISCST2 model for sources located within 50 km of the Class I area), the total impacts were predicted to be less than the PSD Class I increment. Based on these results, the maximum impacts predicted by the proposed Hardee Unit 3 facility by itself and together with other emission sources will ensure compliance and maintenance of PSD Class I increments.

Summary

Based on the results of the air quality modeling analyses, Hardee Unit 3 is expected to comply with applicable AAQS and PSD increments. Within the AAQS and PSD Class II areas, the maximum impacts of the proposed unit alone are predicted to be less than significant impact levels for CO and NO_2. As a result, the proposed unit will be in compliance with and maintain applicable AAQS and PSD Class II increments.

Because the proposed Hardee Unit 3 impacts are predicted to be greater than the significant impact levels for SO_2 and PM10, additional modeling was required to address the potential interaction of background sources with the proposed unit. As demonstrated by the air modeling analyses, when the proposed unit's impacts are greater than the significant impact levels, the maximum total PM10 and SO_2 air quality impacts will be in compliance with the applicable SO_2 and PM10 AAQS and PSD Class II increments.

The proposed Hardee Unit 3 impacts for PM10 and NO_2 are predicted to be less than the recommended NPS PSD Class I significant impact levels and, therefore, will be in compliance with and maintain the applicable PSD Class I increments. For SO_2, additional modeling was performed to address the potential interaction of the proposed unit with other PSD Class I sources. Based on these results, the impacts from the proposed unit and other sources will comply with and maintain the PSD Class I increments.

7.3.2.1 Mercury Abatement

Mercury emissions will be minimized by the combustion of natural gas as the primary fuel for Hardee Unit 3. The use of this fuel is considered to be insignificant for regulatory review by EPA and Florida since the maximum projected emissions of mercury is approximately four times lower than the Prevention of Significant Deterioration (PSD) significant emission rate of 0.6 tons per year (TPY). Although fuel oil is proposed as a secondary fuel, the combustion of fuel oil will be limited to no more than 3,000 hours for the two turbines per year based on maximum operating capacity.

The plant will be in compliance with all applicable air quality regulations pertaining to mercury. Although the plant's emissions will be below the PSD significant emission rate for mercury, an air quality impact analysis was performed. The maximum mercury concentrations were predicted to be below the Air Reference Concentrations (formerly No Threat Levels) established by FDEP (FDEP) to assess impacts of toxic air pollutants. As a result, the plant's mercury emissions are not expected to pose a significant risk to the general public.

7.3.2.2 Greenhouse Gas Emissions

Solar radiation is light energy that reaches earth and is absorbed and re-radiated back to the atmosphere as infrared energy. However, the CO_2 in the lower atmosphere tends to trap the heat causing absorption of the heat resulting in warming of the atmosphere and earth's surface. This phenomena has been identified as the "greenhouse effect" which affects the overall climatic conditions of the earth.

Gases, such as CO_2, methane, nitrous oxide (N_2O), chlorofluorocarbons (CFCs), and other trace gases that can cause the greenhouse effect are called "greenhouse gases." The largest single factor affecting greenhouse gas emissions is the production of energy from carbon-based fuels. Based on the atmospheric concentrations, residence times, and radiative forcing, the relative contribution of each of these greenhouse gases to global warming potential has been determined. These relative contributions to the global warming potential (based on 1985 data) are as follows:

- CO_2 - 71.5 percent
- CFC - 9.5 percent
- Methane - 9.2 percent
- CO - 6.5 percent
- N_2O - 3.1 percent

7.0 ENVIRONMENTAL IMPACTS

Primarily anthropogenic activities alter the levels of greenhouse gases in the atmosphere. The estimated contribution of these activities to greenhouse warming include energy production and use (57 percent), industrial activities that use CFCs (17 percent), agricultural practices (14 percent), land-use modifications and deforestation (9 percent), and other industrial activities.

The proposed Hardee Unit 3 is to be a 440 MW combined cycle unit which includes two 150 MW (nominal) combustion turbines each equipped with a heat recovery steam generator which will produce steam to drive a single 140 MW steam turbine. The two combustion turbines will utilize natural gas as the primary fuel. Number 2 oil will be the backup fuel for the combustion turbines. No auxiliary fuel firing will occur in the heat recovery steam generator.

The following are the projected maximum greenhouse gas emissions for Hardee Unit 3 (tons per year):

Greehouse Gases	Gas	Oil	Total
CO_2	1,726,412	440,959	2,167,007
N_2O	100	120	220
CO	490	128	618
VOC	70	29	99
Methane	21	7	28

The following assumptions were made to develop the estimates:

1. Each combustion turbine would burn the equivalent of 1,500 hours per year of fuel oil with the combustion turbines at full load.

2. Natural gas would be utilized for 7,260 hours per year.

3. The CO_2, N_2O, and methane emission rates were calculated using U.S. Department of Energy emission factors.

7.0 ENVIRONMENTAL IMPACTS

The total estimated annual emissions of greenhouse gases would be 2,167,007 tons of CO_2, 618 tons of CO, 220 tons of N_2O, 99 tons of VOC, and 28 tons of methane.

As stated in Section 4.0 of this document, Hardee Unit 3 will be used to replace 440 MW of power purchased on a partial requirements basis from the Florida Power and Light Company. This purchased power is primarily generated by generation stations being fired with Number 6 oil. According to the U.S. Department of Energy, natural gas emits 33 percent less CO2 than residual oil. Therefore, the combined cycle technology proposed for Hardee Unit 3 will result in the production of less CO_2 per unit of electricity produced than the current purchase power arrangement.

Seminole Electric Cooperative and its members promote a number of techniques for reducing fossil fuel consumption which in turn reduces the emissions of greenhouse gases. These techniques include conservation, energy efficiency improvements in the generation and delivery of electrical power, the use of alternate fuels, and various generating technologies

Seminole Electric Cooperative is participating in the Climate Challenge Participation Accord which is a joint, voluntary effort of the U.S. Department of Energy and the electric utility industry undertaken in pursuit of the President's goals for reducing greenhouse gas emissions. In this accord, Seminole has made the following commitments:

Construct a 440 MW natural gas fired combined cycle generation plant to replace power purchased from other sources which will result in the reduction in CO_2 by approximately 1,070,000 short tons in the year 2000.

Implement a heat rate improvement program at its existing generation facilities which would reduce CO_2 emissions by approximately 270,000 short tons in the year 2000.

Use optimization evaluation process to select optimal conductor sizes on new transmission projects which will reduce CO_2 emissions by approximately 50,000 short tons in the year 2000 and a total reduction of 350,000 short tons for the 1993-2000 time period.

Recycle fly ash and bottom ash from its coal-fired generating facility as a substitute aggregate to cement industries in Florida, the result of which will reduce CO_2 emissions by approximately 37,500 short tons in the year 2000.

Continue present ongoing demand side management programs to include coordinated direct load control and voltage reduction; residential and commercial audits; fix-up programs; lighting conversion; water and space heater programs; and public awareness campaigns, the result of which will reduce CO_2 emissions by approximately 13,000 short tons in the year 2000, with a total of 38,000 short tons of CO_2 for the 1995-2000 period.

Continue its lighting replacement project at its headquarters facility that will result in a reduction of CO_2 emissions by approximately 400,000 pounds in the year 2000.

7.4 Noise

7.4.1 Construction Impacts

Construction of Hardee Unit 3 is expected to occur in four phases:

1. Site preparation,
2. Foundations,
3. Erection of structures and equipment, and
4. Facility startup.

Typically, construction equipment associated with site preparation includes heavy earth-moving equipment necessary to excavate and grade the site. Construction of foundation structures includes pouring of concrete and the placement of supporting piles, Where erection of equipment typically includes the use of cranes and heavy equipment to move and secure power plant equipment and structures. Startup activities include site finishing and cleanup, plant startup, and system blow-out.

Based on the types and numbers of equipment to be used for each construction phase, it is expected that activities associated with the erection of structures and equipment will most likely produce the highest noise impacts in the vicinity of the site. This is because the numbers and types of high noise level equipment to be used for this phase are more extensive than for other phases of construction. The exception may be the use of a pile driver for placement of sheet piling, which will be used during construction of the circulating water intake and return structures. This equipment has a very high noise level, i.e., 101 A-weighted decibels (dBA) at 15 meters (50 feet); however, the noise is intermittent in nature. It is expected that the level of continuous noise may be greater during the erection phase of the construction project and would therefore represent a worst-case construction noise scenario.

A list of equipment to be used for erecting structures and equipment, along with the quantity, usage factor, and average sound pressure level at a distance of 15 meters (50 ft) from the source, is presented in Table 7.4-1. The usage factor is based on the fraction of daylight hours that the equipment will be operating. As shown, it is estimated that 28 pieces of construction equipment will be used for this construction phase of the project, with the air compressor being used most often. Average equipment sound pressure levels range from 78 to 88 dBA at 15 meters (50 feet). Predicted noise levels were developed using the NOISECALC model. Noise sources can be entered as octave-band sound power levels or as octave-band sound pressure levels at a given reference distance. If sound pressure levels are entered, NOISECALC will back-calculate the sound power level based on the reference distance provided. Coordinates, either polar or rectangular, can be specified by the user for source and receiver locations. All noise sources are assumed to be point sources; line sources can be simulated by several point sources. Sound propagation is calculated by accounting for hemispherical spreading and three other user-identified attenuation options: atmospheric attenuation, path-specific attenuation, and barrier attenuation.

Atmospheric attenuation is calculated using the data specified by the American National Standard Institute Method for Calculation of the Absorption of Sound by the Atmosphere. Path-specific attenuation can be specified to account for the effects of vegetation, foliage, and wind shadow. Directional source characteristics and reflection can be simulated using path-specific attenuation. Attenuation due to barriers can be specified by giving the coordinates and height of the barrier. Barrier attenuation is calculated by assuming an infinitely long barrier perpendicular to the source-receptor path.

Total and A-weighted sound pressure levels were calculated by the model. Background noise levels were incorporated into the program and were used to calculate overall sound pressure levels. For the purposes of this analysis, only atmospheric attenuation was included in the analysis in order to present worst-case construction noise impacts.

Worst-case noise impacts were predicted for the construction equipment proposed for use during the equipment and structures erection phase of the project. Construction activities for Hardee Unit 3 are expected to occur during daytime hours only. For the purpose of this analysis, equipment was assumed to operate continuously, simultaneously, and at peak load conditions. For the modeling analysis, construction equipment was placed at various locations around the plant site to most adequately simulate an area of typical operation for that equipment type. Because NOISECALC assumes that all of the construction equipment will be operating continuously <u>and</u> at peak levels, the noise level impacts predicted by the model are conservative in nature. In reality, not all of the construction equipment will be operating simultaneously nor at peak load conditions. Therefore, actual noise level impacts due to construction activities are anticipated to be lower than predicted by the modeling analyses.

Octave band data for each equipment type were developed using U.S. Environmental Protection Agency's *Noise From Construction Equipment and Operations, Building Equipment, and Home Appliances*. These octave bands were developed based on sound levels measured at 15 meters (50 feet) from the equipment type. Octave band data were available for all equipment types projected for use for the project except the trencher. Because no octave band data were available, the use of the trencher was excluded from the modeling analysis.

Noise levels were predicted at six receiver sites: at the north property boundary, at two sites along the east property boundary, at the south property boundary, along the west property boundary, and at the nearest residence located south of the site along Roberts Road. These sites are depicted in Figure 7.4-1.

The approximate distances of the noise impact receptors to the power block are:

Receptor Site Number	Distance to Power Block (m)
A	600
B	500
C	1,000
D	1,300
E	1,000
F	2,900

The number of individuals residing in the area of Site F (Roberts Road) is less than 50.

Predicted noise levels for each receiver site are presented and take into account representative background levels at each site. These background levels include the operation of a portion of the existing combined cycle units at the Hardee Power Station facility. The background level at the residential area was determined based on a previous noise study for the Hardee Power Station.

As presented, predicted construction noise impacts at the property boundary range from 54.9 dBA at Receiver Site D to 68.9 dBA at Receiver Site B. EPA recommends an outdoor target noise level of 70 dBA L_{eq} (24) for all areas and an outdoor noise level of 55 dBA DNL for residential areas and 55 dBA L_{eq} (24) and 55 dBA L_{eq} (24) for community areas. Predicted construction noise impacts under average conditions in the vicinity of the plant are below the EPA 70 dBA target level for all areas, but are similar to or above the EPA target level of 55 dBA level for residences and community areas. Again, the predicted impacts assume simultaneous and peak load operation of all projected construction equipment. In reality, construction noise will be more intermittent in nature, with equipment not always operating at peak load. Projected noise levels will most likely be lower during the construction phase of the project.

Predicted construction noise levels at the nearest residence (Receiver Site F) located 2,900 meters (1.8 miles) from the power block are predicted be to be approximately 46.6 and 50.8 dBA for the daytime L_{eq} and L_{dn} values, respectively. Thererfore, consturction noise levels at the residential area are expected to be below EPA's target level of 55 dBA during average construction conditions.

Single-event noise sources were not modelled since they are of such short duration and are infrequent. Also, the noise impacts generated by the potential coal gasification plant were not predicted since it is not part of the application. However, should coal gasification become par of the power plant's design, noise impacts will be determined in support of the facility's permitting process.

The public will be notified in advance (i.e., by posting notices on the property) of any predictable single-event noise that could be intrusive.

7.4.2 Operation Impacts

The noise monitoring data collected during the onsite field sampling effort were utilized in the noise impact analysis at the proposed property boundaries. The impact analysis was performed using NOISECALC, a sound propagation computer program.

EPA has developed indoor and outdoor noise level criteria for various land use categories that were promulgated as a guideline for protecting public health and welfare. These criteria are related to short-term sound pressure level (SPL) measurement periods, i.e., 24-hour equivalent SPL [L_{eq} (24)] and day-night average SPL (L_{dn}). The L_{eq} is the equivalent constant SPL that would be equal in sound energy to the varying SPL over the same period of time. The L_{dn} is the 24-hour average SPL calculated for the two daily time periods, i.e., day and night, with a 10 dBA weighting added to the nighttime SPL. EPA recommends an outdoor target noise level of 70 dBA L_{eq} (24) for all areas and an outdoor noise level of 55 dBA DNL for residential areas and 55 dBA L_{eq} (24) and 55 dBA L_{eq} (24) for community areas.

Predicted construction noise impacts under average conditions in the vicinity of the plant are below the EPA 70 dBA target level for all areas, but are similar to or above the EPA target level of 55 dBA level for residences and community areas.

Table 7.4-2 presents the proposed facility's octave band input data, based upon preliminary engineering design information, that was used in the NOISECALC program. Noise impacts were predicted at each of the receiver sites depicted in Figure 7.4-2. The program calculated SPLs due to the proposed facility, utilizing the onsite background and minimum L_{eq} noise levels. (See Tables 7.4-3 and 7.4-4.) As indicated, the maximum calculated SPL impact with the background levels taken into account was 64.7 dBA at Receiver Site B for background L_{eq} and 64.6 dBA at Receiver Site B for minimum background. The minimum predicted SPL impacts occurred at Receiver Site F (residences) with a value of 48.1 dBA for minimum and L_{eq} background. The overall predicted noise impacts of the proposed facility at the property boundary are below the EPA guideline value of 70 dBA. Since attenuation factors, such as ground cover, foliage, etc., were not used in determining the noise impacts, the actual impact of the proposed facility at the property boundary will most likely be less than predicted by the model.

Predicted noise levels at the nearest residential area are expected to be slightly above background levels. Assuming a noise level of 48.1 dBA for daytime and nighttime, the corresponding calculated L_{dn} value is 54.5 dBA, which is below the EPA guideline of 55 dBA for residential areas.

Single-event noise sources were not modelled since they are of such short duration and are infrequent. Also, the noise impacts generated by the potential coal gasification plant were not predicted since it is not part of the application. However, should coal gasification become par of the power plant's design, noise impacts will be determined in support of the facility's permitting process.

The public will be notified in advance (i.e., by posting notices on the property) of any predictable single-event noise that could be intrusive.

7.0 ENVIRONMENTAL IMPACTS

7.5 Ecology

7.5.1 Aquatic

7.5.1.1 Construction Impacts

The power plant and related onsite facilities such as parking lots, detention ponds, and roads will occupy approximately 20 ha (50 acres) of land. Nearly all of this area will be located on recently mined land that has been reclaimed to upland pasture.

The reclaimed wetland will be crossed by the circulating water pipes. The pipes will be supported on permanent concrete structures, thus filling 0.034 ha (0.085 acre) within the reclaimed wetland. In order to construct the circulating water pipes, 0.089 ha (0.22 acre) within the reclaimed wetland will be cleared. Temporary pads will be built on both sides of the reclaimed wetland to construct the circulating water pipes. After construction of the pipes is complete, the pads will be removed, and the impacted area will be revegetated with native herbaceous wetland species. The impacted area will then be maintained as a herbaceous wetland. Ecological impacts to the reclaimed wetland are expected to be minor because the only permanent impacts will be concrete support structures and because the area will be maintained as a herbaceous wetland.

Approximately 2.09 ha (5.16 acres) of Corps of Engineers jurisdictional wetlands will be impacted by construction of the power block area and stormwater detention basin. These impacted areas are characterized by weedy wetland species that colonized low pockets which were inadvertently created after reclamation occurred. Due to the low ecological value of these areas, ecological impacts are expected to be minor. Construction of a retainment berm will impact 0.01 ha (0.013 acre) of highly disturbed herbaceous wetlands, and installing two culverts across a drainage ditch will impact 0.03 ha (0.07 acre) of the ditch. Both of these impacts are considered minor given the disturbed condition of both the herbaceous wetland and drainage ditch.

7.0 ENVIRONMENTAL IMPACTS

The potential impacts to the vegetation communities onsite due to construction activities include the following:

1. Sedimentation due to stormwater runoff into the tributary from laydown areas, roads, and areas under construction;
2. Damage to wetlands due to construction dewatering; and
3. Tree clearing [approximately 12 m (40 ft) wide] for intake and discharge pipes to cross the reclamation wetland.

Uncontrolled stormwater runoff into Payne Creek and onsite wetlands will be prevented by the implementation of temporary and permanent water collection and detention measures. Erosion and sediment control measures employed during construction will include seeding and mulching exposed areas, minimizing unnecessary clearing of vegetation, and redirecting stormwater runoff by using dikes, basins, and sediment curtains. The detention basin will be constructed for control and treatment of stormwater.

Dewatering activities will occur onsite. The maximum predicted drawdown is 2.4 m (8 ft). The zone of drawdown influence is predicted to extend 152 meters (500 feet). The duration of the dewatering will last for 30 days at any given location. This means that saturated water conditions will not occur in the dewatering zone during this period. The unnamed tributary wetland occurs within the predicted zone of dewatering. No significant effects to wetland vegetation are anticipated because of the short duration of dewatering and the fact these wetlands are currently receiving surface water from upgradient areas offsite.

No structures will be placed in Payne Creek. During construction, surface runoff, including water from construction dewatering, will be routed into a detention pond, and erosion prevention measures will be used. Treated runoff, if discharged, will flow into the adjacent unnamed tributary. No adverse ecological impacts to the Payne Creek aquatic system are anticipated.

7.5.1.2 Operation Impacts

There will be no physical or operational changes to the reservoir related to Hardee Unit 3 with the exception of the new intake and return structures for the circulating water pipes. The reservoir will function as the condenser cooling water supply, condenser cooling point of discharge, and heat dissipation system for the total 880-MW HPS, including the TPS 440-MW Units 1A and 1B and the Seminole Electric Cooperative 440-MW Hardee Unit 3. The cooling reservoir has been designed to: (1) collect, store, and supply water for use in condenser cooling, and (2) reject heat through evaporative, radiation, and other cooling mechanisms.

As a recirculating/recycling cooling system, the reservoir is designed to maximize water reuse and minimize groundwater withdrawals. Reservoir water will include direct rainfall, runoff and seepage from the upland watershed, treated wastewaters, and as necessary pumped deep well (Floridan aquifer) water. To accommodate the infrequent discharges (i.e., in response to the 10-year, 24-hour rainfall event), the reservoir has an existing overflow to Payne Creek.

To evaluate the potential discharge impacts of the cooling reservoir operation on the adjacent Payne Creek, several component analyses were conducted. First, a reservoir thermal analysis was conducted to determine the reservoir performance and operating conditions during the annual cycle, including a determination of the "cooled" recirculating water/reservoir discharge temperature. Second, a long-term reservoir water balance analysis was conducted to determine water makeup requirements and reservoir discharge conditions. Finally, a mixing zone analysis was conducted to determine the extent of thermal impacts in Payne Creek due to potential reservoir discharges. The reservoir point of discharge has been defined in the conditions of certification as the point were the reservoir overflow meets Payne Creek.

To evaluate and predict cooling reservoir performance (e.g., temperature and evaporation), a monthly thermal model analysis was performed. The thermal model was developed based on work by Sonnichsen (1975) and utilized an energy budget/equilibrium temperature approach for determining the exchange of energy between air and water. This approach uses a variety of available meteorological data (e.g., 37 years of air temperature, dewpoint, relative humidity, wind speed, etc.).

The modeling conducted in this analysis was a real-time simulation of 37 years of meteorological data. The reservoir water temperatures have been estimated for each of the 444 months of historical data. As noted elsewhere, the average load scenario is defined as the expected station demand that ranges from 27 to 100 percent for Units 1A and 1B and from 28 to 100 percent for Unit 3. The annual average load factor for the average load scenario is approximately 57 percent for the "average load" scenario. The maximum load scenario is defined as all HPS units (i.e., Units 1A and 1B and Hardee Unit 3) operating at 100 percent load. For reporting purposes, monthly average and monthly maximum values are presented for each of the two load scenarios (i.e., average load and maximum load). Thus, the cases presented in the following discussions are defined as follows:

1. Average operating conditions, average monthly temperature–When the station is operating under average load conditions, the average value for a given month (e.g., the average of the estimated 37 June temperatures equals the June average monthly temperature).
2. Average operating conditions, maximum monthly temperature–When the station is operating under average load conditions, the maximum value for a given month (e.g., the maximum of the estimated 37 June temperatures equals the June maximum monthly temperature).
3. Maximum operating conditions, average monthly temperature–When the station is operating under maximum load conditions, the average value for a given month (e.g., the average of the estimated 37 June temperatures equals the June average monthly temperature).
4. Maximum operating conditions, maximum monthly temperature–When the station is operating under maximum load conditions, the maximum value for a given month (e.g., the maximum of the estimated 37 June temperatures equals the June maximum monthly temperature).

The proposed incremental thermal increase in the cooling reservoir from Hardee Unit 3 will not be significantly different from the expected discharge from the originally certified

HPS. Reservoir discharge could occur only during very intensive, wet periods, such as hurricanes or major frontal storms, i.e., 10-year, 24-hour storm. These periods of discharge will coincide with natural high flow in the creek, thus the effluent will be subject to significant dilution.

The predicted maximum average reservoir temperature under average load conditions is conservatively estimated to be 31.8°C (89.3°F) during July and the maximum monthly temperature under average load conditions is 35.4°C (95.7 °F) during June. The predicted maximum average discharge temperature conditions are within the acceptable water quality criteria for peninsular Florida, and thus should not affect the aquatic resources. Discharge of effluent at the predicted maximum worst-case temperature will exceed the water quality temperature limitation for peninsular Florida [criterion of 33°C (92°F) versus discharge of 35.4°C (95.7°F)]. However, applicable temperature criterion will be met outside the established mixing zone. Based on creek flow and anticipated dilution, the temperature impacts under worst-case conditions should be localized in the immediate vicinity of the point of discharge. At a distance of 25 m (75 ft), the thermal plume will approximate background conditions. It is anticipated that there will be no impacts to aquatic life are anticipated outside the mixing zone.

Impingement and entrainment effects are not potential sources of impact because all plant make up water will be groundwater, surface runoff and precipitation. Surface waters will not be used as a source of makeup water.

Based on the assumption that the highest Payne Creek water temperature of 30°C (86°F) occurs during July, and that the estimated average worst-case plant discharge during the summer is 35.4°C (95.7°F), a temperature differential of 5.4°C (9.7°F) may occur within the mixing zone under ambient conditions.

Payne Creek water temperatures are within 1.1°C (2°F) of ambient for 90 percent of the stream's width at the edge of the thermal mixing zone. Thus, the potential for greatest thermal shock will be localized within 8 m (25 ft) downstream from the discharge point which is within the currently permitted mixing zone (see Table 7.5.1-1). During the summer, aquatic organisms are acclimated to high-temperature conditions and are more tolerant to higher temperatures. Fish and invertebrates can detect and avoid areas of thermal stress. Because of the localized area of impact, no thermal blockage to movement by aquatic animals will occur. Additional modeling was carried out to evaluate potential worst-case conditions during the winter months. The assumptions included a reservoir temperature of 27°C (80°F) and a creek temperature of 21.1°C (70°F). The model predicted that the cooling reservoir discharge will be quickly diluted by Payne Creek flows. Within the currently certified mixing zone [60 m (200 ft)], the plume temperature is predicted to be $<$1.1°C ($<$2.0°F) above background.

A draft National Pollutant Discharge Elimination System permit for Hardee Unit 3 is Appendix A to this document.

7.5.2 Wildlife

7.5.2.1 Construction Impacts

Potential impacts to wildlife communities due to construction activities include the following:

1. Vegetation removal and loss of habitat,
2. Noise, and
3. Road traffic and road kills.

Most of the wildlife habitat area has been previously altered by mining operations. Some wildlife habitats, i.e., floodplain forest of Payne Creek, do exist on the HPS site. Since these habitats will not be impacted by construction of the Hardee Unit 3 Project, no significant impacts on local or regional wildlife habitats will occur.

The increased noise from construction equipment may cause temporary avoidance behavior in area wildlife. This behavior is expected to be minimal since existing wildlife are acclimated to the noise generated by existing mining and power plant operations.

Wildlife habitats such as wetlands, water bodies, etc., are currently accessible by existing roads. Any additional traffic to these areas will not affect wildlife conditions in these habitats.

A temporary increase in road kills may be expected from construction traffic. Some small mammals (e.g., opossums) and reptiles (e.g., snakes) may be killed. No important wildlife species are expected to be affected.

The wildlife species present on the site are considered typical of the region. No unique species or habitats or significant populations of recreationally and commercially important species will be affected during construction.

7.5.2.2 Operation Impacts

The existing cooling reservoir is used for foraging and resting habitat by wading birds and other avian species as well as mammals, reptiles, and amphibians. No adverse impacts will occur to fauna utilizing the cooling reservoir as a result of the additional thermal loading from Hardee Unit 3.

Operational activities within the fenced area of the Hardee Unit 3 facility will preclude wildlife from the immediate area. Wildlife associated with the unnamed tributary to Payne Creek will have access to the tributary from the north since all facilities associated with the Hardee Unit 3 Project will be located south of the tributary.

7.5.2.3 Threatened & Endangered Species

No threatened or endangered species or critical habitat will be affected by construction and operation of Hardee Unit 3.

7.5.2.4 Biodiversity

There would be no significant adverse effects to local or regional biodiversity from the construction and operation of the Hardee Unit 3. Since the plant site is reclaimed upland pasture previously mined, no significant ecological or wildlife resources occur on the site. The reclaimed upland pasture that will be lost is not considered an ecological resource with either local or regional biodiversity significance. A total of 5.5 acres of jurisdictional wetlands would be affected by Hardee Unit 3. These wetlands are primarily depressional wetlands inadvertently created during reclamation to pasture by previous mining activities or are the edges of reclaimed wetlands. The wetlands that would be lost due to construction of Hardee Unit 3 are not ecological resources with either local or regional biodiversity significance. They are not a significant source of genetic or biological diversity. Biodiversity restoration will be incorporated in project construction by replacing the wetlands on site to be lost with more ecologically important wetlands. This wetland restoration is discussed in Section 8.2.1 of this DSEIS.

Vegetation communities and wildlife habitat would be relatively undisturbed by the construction and operation of Hardee Unit 3. Clearing and construction impacts associated with Hardee Unit 3 would be limited to less than 50 acres of the Hardee Power Station site with the exception air impacts, noise, and moving construction equipment to and from the site. Clearing and construction activities would expose soils to erosion by wind and water. Fugitive dust from clearing operations may affect vegetation in the vicinity of the site by possibly coating leaf surfaces temporarily with dust thereby reducing evapotranspiration and photosynthesis. Such impacts to plants would be most extreme during brief dry periods in the spring at the height of construction activities on Hardee Unit 3. This activity would be of a short-termed duration and would not be expected to cause any long-term effect to plant species surrounding the plant site. Seminole Electric Cooperative would have a soil erosion and sedimentation plan acceptable to the FDEP prior to beginning clearing or construction activities on the project. Implementing this plan would greatly reduce the likelihood of impacts to off-site vegetative resources.

Clearing and construction impacts to wildlife resources at the site would most likely result in displacement or mortality due to noise and/or operation of construction equipment during grading and site preparation. Consideration of any effects due to clearing or construction activities would be tempered by the fact there is already a combined cycle generation station in operation at the site. This area is already disturbed and clearing will be limited to less than 50 acres. In addition, the area surrounding the site had been extensively disturbed by past and ongoing mining activities.

Species inhabiting the reservoir and areas surrounding the site could be temporarily displaced while clearing and construction activities are underway. However, once clearing and construction activities have been completed, habitat surrounding the plant site and the existing cooling reservoir is not expected to diminish in quality and would be expected to attract or species similar to those displaced.

7.5.3 Eco-Risk

Potential impacts to vegetation and wildlife due to plant operation are limited since the proposed facility will use the existing reservoir for condenser cooling, be constructed on previously impacted and cleared land, and located adjacent to an existing power plant.

No incremental change in water quality is predicted from operation of Hardee Unit 3. The estimated cooling reservoir water quality characteristics after thirty years of operation under maximum conditions are presented in the Site Certification Application/Environmental Analysis Table 5.2.1-1. A few parameters shown in this table are predicted to exceed FDEP Class III surface water quality criteria and EPA's water quality criteria for chronic effects but these effects are not considered significant adverse effects to fish and wildlife resources in the area or region. The potential for significant adverse bioaccumulation in wildlife using the reservoir is very low because of the predicted low concentrations and the low exposure potential for individuals of given species of wildlife that occur in the area. Because of the presence of other suitable habitats in the vicinity of the cooling reservoir, individual animals will not forage solely in the reservoir. There are no wading bird rookeries in the area; most wading bird usage of the reservoir will be by transients. Similarly for other wildlife species, the reservoir will provide only a fraction of an animal's food resources. Thus, the potential for bioaccumulation of potential contaminants listed in Table 5.2.1-1 is low.

The thermal mixing zone and cooling reservoir are not anticipated to impact aquatic life. Modeling has shown that discharge will occur once in 37 years. From a biological perspective this means discharge will occur very infrequently and when Payne Creek is under very high flood conditions. The likelihood of exposure of fish and wildlife in the Payne Creek Basin to these mixing zones is very unlikely. In addition, no chemical or biocide waste impacts are anticipated from discharges to Payne Creek from the cooling reservoir.

As part of the wetland mitigation required for the Hardee Power Station, littoral zones were created in the cooling reservoir. There is the potential that some aquatic dependent species such as wading birds will forage in the cooling pond. Existing security fences encompassing the reservoir do not restrict mammal or bird usage. Public fishing is not allowed in the cooling reservoir.

Toxic effects from proposed plant air emissions are not expected on soils, vegetation, and wildlife. The basis for these conclusions are provided in the Site Certification Application/Environmental Analysis, Sections 5.1.2, 5.2.1, and 5.6.1.4, respectively.

7.6 Cultural Resources

Construction and Operation

No significant archaeological and historic sites or sites listed or eligible for listing on the National Register of Historic Places occur on the Hardee Power Station site. Therefore, tAmbient SO2 Concentrations for Air Monitoring Stations Within 35 Miles of Site is expected to be no impact to such sites as a result of construction and operation of Hardee Unit 3. If any sites are found during construction Seminole Electric Cooperative will implement a "chance/find" procedure where a certified archaeologist will evaluate the site and will determine the significance of the find in consultation with the Division of Historical Resources and RUS. If the site is considered eligible for listing on the National Register of Historic Places, RUS will take appropripate action necessary to ensure compliance with Section 106 of the National Historic Preservation Act.

7.7 Land Use

Construction and Operation

The site area for the proposed Hardee Unit 3 is mostly area that has been previously mined for phosphate and has been reclaimed. The actual site of the power block is reclaimed pasture surrounded by mined lands. The pasture area is sitting idle. The construction and operation of Hardee Unit 3 will not be incompatible with existing land use and there will be no significant land use impacts.

7.8 Socioeconomics

Construction and Operation

The socioeconomic benefits of Hardee Unit 3 will be realized by the actual construction and operation of the project. These benefits will include property tax revenues, and the construction and operational employment.

It is estimated that the Hardee Unit 3 project will increase the Hardee County ad valorem tax revenues by 82 million dollars over its 30-year life expectancy. Given the current Hardee County millage rates it is assumed that 52.6 percent or $43.1 million of this revenue will go towards the counties general fund while 44.9 percent ($36.8 million) and 2.6 percent ($2.1 million) will go towards the counties school district and the Southwest Florida Water Management District and Peace River Basin Taxing Authority respectively.

Direct employment benefits will include the employment of an average of 229 construction workers and supervisors with an estimated payroll of $70.2 million over a 24-month period. Operation employment benefits includes an expected annual payroll of $2.7 million for the estimated 35 newly created positions.

The indirect employment benefits by the projects construction and operation were calculated using the U.S. Department of Commerce Bureau of Economic Analysis's Regional Input-Output Modeling System (RIMS II). These multipliers calculate indirect employment and income generated from the construction of the Hardee Unit 3 project. The number of jobs anticipated to be created due to construction is based on the total amount of construction expenditures and is forecasted to be 35.1 jobs per million dollars of construction expenditures. Since the Hardee Unit 3 project has a construction budget of 260 million dollars it is anticipated that the number of jobs created statewide will be estimated at 9,126, both directly and indirectly related to the projects construction.

Using the RIMS II model regional multipliers for electric power plant construction, the indirect income for the region over the construction period is calculated to $77.2 million and $472,901 for annual operation.

Local population will benefit from the Hardee Unit 3 project due to the needs for numerous trades during both construction and operation. This particular region of the state has the ability to supply considerable labor force to the project due to previous and current phosphate mining and power plant construction and operation activities in the region. Where training is required, both Polk County and Seminole Electric Cooperative provide training for the numerous trades that will be utilized by the proposed project.

7.8.1 Environmental Justice

Executive Order 12898 entitled, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, directs federal agencies under authority of the Executive Office to promote and support equitable environmental protection to people and communities regardless of race, ethnicity, or economic status. "Each federal agency shall conduct its programs, policies, and activities that substantially affect human health or the environment, in a manner that ensures that such programs, policies, and activities do not have the effect of excluding persons (including populations) from participation in, denying persons (including populations) the benefits of, or subjecting persons (including populations) to discrimination under, such programs, policies and activities because of their race, color, or national origin." (Section 2-2 of the Executive Order.)

According to the U.S. Census, the Hardee Power Station site is located in the area designated BNA 9702. This unit has a total population of 3,939, of which 7.4 percent, or 292, are black. The total black population for the county in 1992 is estimated to be around 5 percent according to the Bureau of Economic and Business Research. Income data as it relates to the project is presented in the Site Certification Application/Environmental Analysis in sections 2.2.7 and 7.1.2.

There is no indication that any communities consisting predominantly of poor and/or minority populations will incur a disproportionate burden of the environmental impacts resulting from construction and operation of Hardee Unit 3. In addition, the populations near the Hardee Power Station site are relatively sparse and human health risk concerns are not expected to be significant on any community regardless of race, ethnicity, or economic status. The construction of Hardee Unit 3 would have an expected positive impact to the surrounding area in the form of construction wages and county tax revenues. Seminole Electric Cooperative would post signs at the construction site to notify interested parties of its intent to hire construction laborers for the project.

7.8.2 Induced Impacts

The Hardee Unit 3 project is proposed to supply electrical power to the membership service area that is currently being supplied by Seminole Electric Cooperative purchase from another utility. Because the supply of electrical power is presently available, little induced land development is anticipated. If any induced development occurs, environmental impacts would be reviewed/regulated by applicable federal, state, and local permitting and approval processes.

7.9 Floodplains

Construction and Operation

As part of its mining/reclamation permit approval program, Agrico conducted a 100-year flood elevation study for Payne Creek. Based on this study, the 100-year flood elevation in the vicinity of the Hardee Power Station site generally corresponds with the limits of the forested floodplain and related wetland vegetation associated with Payne Creek and does not extend to the project area. The flood study indicated that the floodplain elevation was generally about elevation 33.5 meters above mean sea level (110 feet) while the Hardee Power Station site is generally higher than 37.2 meters mean sea level (122 feet). These flood elevation study results were submitted to regulatory agencies as part of the approval process for Agrico's mining and reclamation plan.

All Hardee Unit 3 facilities have been designed to comply with all applicable Southwest Florida Water Management District, Hardee County, and FDEP requirements regarding flood protection and control. No structures or fill will be placed in the Payne Creek floodplain; therefore, no reduction in cross-section flow-way or flood storage will occur. No adverse impact on the 100-year flood elevations or flood flows in Payne Creek are anticipated, because stormwater design will comply with SWFWMD regulations that restrict postdevelopment peak flow rates to predevelopment flow rates.

With the exception of the water circulating pipes, all structures associated with the Hardee Unit 3 Project will be outside of the unnamed tributary to Payne Creek. The circulating water pipes will cross the unnamed tributary in a manner that will not affect water flow and will minimize impacts to associated wetlands.

7.0 ENVIRONMENTAL IMPACTS

7.10 Prime Farmland

Construction and Operation

The proposed Hardee Power Station site is not located on soils classified as prime farmland. Therefore, construction and operation of Hardee Unit 3 will not have an impact on this resource.

7.11 Prime Rangeland

Cosntruction and Operation

The proposed Hardee Power Station site is not located on land classified as prime rangeland. Therefore, construction and operation of Hardee Unit 3 will not have an impact on this resource.

7.12 Prime Forestland

Construction and Operation

The proposed Hardee Power Station site is not located on land classified as prime forestland. Therefore, construction and operation of Hardee Unit 3 will not have an impact on this resource.

7.13 Wild and Scenic Rivers

Construction and Operation

Payne Creek is not classified as a component of the National Wild and Scenic River System. The construction and operation of the Hardee Unit 3 will have no impact on wild and scenic rivers.

7.14 Human Health

7.14.1 Toxic Air Pollutants

The maximum impacts of regulated and nonregulated toxic air pollutants that will be emitted by the proposed Hardee Unit 3 plant are presented in Table 7.3-10. These impacts represent the highest impacts predicted from the screening analysis for the combined cycle operation at 100, 75, and 50 percent load and for ambient temperatures of 32°F and 95°F.

The maximum 8-hour, 24-hour, and annual concentrations are compared to the Florida NTLs. As shown, the predicted impacts are below the NTLs for all pollutants and averaging times, except for sulfuric acid mist for the 8-hour and 24-hour averaging periods. The NTLs are not environmental standards but, rather, evaluation tools to determine if an apparent threat to the public health may exist. For sulfuric acid mist, the maximum concentrations are predicted to occur during 75-percent and 50-percent operating loads at locations along the fenced property around the Hardee Unit 3 site. Since the emission estimates are based on conservative assumptions (more than 10 percent of the SO_2 is assumed to be converted to sulfuric acid mist) and impacts at locations off of Seminole Electric Cooperative's property (where the public health would be of greatest concern) will be much lower than the NTLs, the predicted sulfuric acid mist impacts due to the proposed facility are not expected to pose a threat to public health. Therefore, the emissions from the proposed facility are not expected to pose a significant health risk to the public.

7.14.2 Electric and Magnetic Fields

Some epidemiological studies have suggested that a link may exist between exposure to power-frequency electric and magnetic fields (EMFs) and certain types of of cancer, primarily leukemia and brain cancer. Other studies have found no such link. Laboratory researchers are studying how such an association is biologically possible. At this point, there is no scientific consensus about the EMF issue-except a general agreement that better information is needed. A national EMF research effort is under way, and major study results are expected in the next few years.

A booklet prepared by the National Institute of Environmental Health Sciences and the U.S. Department of Energy entitled, "Questions and Answers About EMF: Electric and Magnetic Fields Associated with the Use of Electric Power" provides some basic information on EMF, studies regarding EMF, and government actions related thereto. This booklet can be purchased from:

Superintendent of Documents
U.S. Government Printing Office
Washington, DC 20402
Phone: (202) 512-1800

7.15 Pollution Prevention

Hardee Unit 3 will minimize pollution through the practice of reducing the amounts or eliminating the pollutants that could enter the environment. This practice is required under the Pollution Prevention Act of 1990 which defines source reduction as any practice that "reduces the amount of any hazardous substances, pollutant, or contaminant entering any waste stream or otherwise released into the environment (including fugitive emissions) prior to recycling, treatment, or disposal; thereby reducing the hazards to public health and the environment associated with the release of such substances, pollutants, or contaminants."

The minimization of potential environmental impacts were a major part of the site selection for Hardee Unit 3. From the initial selection of the location and type of plant, impacts were minimized by the use of a previously disturbed site and by the combined cycle technology using clean fuels and utilizing waste heat for power production. Specific areas of pollution prevention include:

- Utilization of natural gas as the primary fuel

- Utilization of low sulfur (0.05 percent or less) fuel oil for a maximum of 1,500 hours per year per combustion turbine based on maximum operating capacity
- The combustion turbines will utilize dry low-NOx combustors which will limit NOx emissions to 15 ppmvd corrected to 15 percent oxygen when burning natural gas
- When burning fuel oil, water injection will limit NOx emissions to 42 ppmvd corrected to 15 percent oxygen
- Use of combined cycle technology using natural gas and fuel oil to reduce emissions of metals, acid gases, and organics as compared to coal as a fuel source
- Siting of the facilities within the proposed Hardee Power Station site to avoid and minimize potential impacts to sensitive environmental resources such as wetlands
- Directions to design engineers to review ongoing design efforts and to modify designs and systems which could decrease impacts by pollution prevention or measures to avoid impacts
- Extensive reuse of water for cooling of the condensers by the use of the cooling reservoir
- Treatment and reuse of wastewater to avoid discharges of potentially contaminated water
- Utilization of the cooling reservoir which discharges only in extreme storm events and captures water runoff and rainfall which minimizes groundwater withdrawals
- Use of lined petroleum tank storage areas with storm water runoff collection systems to avoid potential contamination impacts to groundwater and surface water
- Utilization of construction techniques such as control of fugitive dust emissions from equipment operation

- Use of turbidity and sedimentation barriers around the construction site to minimize offsite sediment loading
- Seminole Electric and its members have implemented load management programs to meet a significant portion of its power needs, thereby avoiding construction of additional power plants

The proposed strategy of using good quality fuel and low-NOx combustors as the Best Available Control Technology (BACT) for the combustion turbines has been incorporated to control the amount of pollutants generated and released into the environment. The FDEP has accepted this proposed strategy as BACT.

Control technology for wastewater will include sedimentation basins, neutralization and filtration. All onsite stormwater will be treated in a wet detention system that will include sedimentation and biological filtration. In addition, Best Management Practices, in accordance with the NPDES draft permit will be implemented to incorporate pollution prevention and minimize the release of pollutants into the environment. Other management tools will include the development and implementation of plans such as the Spill Prevention Control and Countermeasure Plan, a Hazardous Waste Management Plan, and an Emergency Response Plan which will aid in the minimization of ecological impacts.

7.16 Cumulative Impacts

Current FDEP policy addressing hazardous air pollutants or toxic air pollutants is generally specific to a particular project and does not necessarily require a cumulative impact analysis that includes background air emission sources. FDEP's strategy regarding impacts from air toxic emissions is a listing of Air Reference Concentrations, previously called NTLs. Historically, FDEP permitting decisions for power plant facilities used the NTLs as a screening technique to evaluate potential air toxic impacts. If the impacts of a project were less than the NTLs, then further analysis was considered unnecessary. In fact, FDEP's strategy for air toxic evaluations indicates that the air toxic strategy should be used as a tool during preconstruction review where an apparent public health threat exists. Because the NTLs are not environmental standards, a permit should not be denied automatically even if a concentration is predicted in excess of the NTLs.

Any single hazardous air pollutants emitted from Hardee Unit 3 would be less that 10 tons per year. As a result, the facility is not classified as a major source under Title III of the Clean Air since the emissions of any single hazardous air pollutants is less than 10 tons per year while the total emissions from all hazardous air pollutants is less than 25 tons per year. The potential maximum emission rates of each hazardous air pollutant from Hardee Unit 3 were estimated and presented in Attachment A to the Air Permit Application, Appendix 10.1.5 of the Hardee Unit 3 Site Certification Application/Environmental Analysis.

Current FDEP policy addressing hazardous air pollutant or toxic air pollutants is generally specific to a particular project and does not necessarily require a cumulative impact analysis that includes background air emission sources. The FDEP strategy regarding impacts from air toxic emissions is a listing of Air Reference Concentrations, previously called No-Threat Levels (NTLs). Historically, FDEP's permitting decisions for power plant facilities used the NTLs as a screening technique to evaluate potential air toxic impacts. If the impacts of a project were less than the NTLs, then further analysis was considered unnecessary.

In fact, FDEP's strategy for air toxic evaluations indicate that the air toxic strategy should be used as a tool during pre-construction review where an apparent public health threat exists. Because the NTLs are not environmental standards, a permit should not be denied automatically even if a concentration is predicted in excess of the NTLs.

Since the Hardee Unit 3 project will be owned and operated by Seminole Electric Cooperative, the air impact analysis addressed the impact from this facility alone. Indeed, the air quality impacts predicted for the project were less than the NTLs using distillate fuel oil which is not the primary fuel anticipated for use at the plant. Since natural gas, a cleaner fuel than fuel oil, will be the primary fuel used, ambient air impacts for toxic air pollutants will be lower than those presented in the permit application. Therefore, the project is not expected to pose a significant health threat to the public.

7.0 ENVIRONMENTAL IMPACTS

The nitrogen oxide (NOx) and volatile organic compound (VOC) emissions increase from Hardee Unit 3 represents a relatively low level of NOx and VOC emissions compared to total emissions from sources that could contribute to ozone (O_3) concentrations in the Hillsborough/Pinellas nonattainment area. Based on 1990 emission data presented in the State Implementation Plan redesignation request and attainment/maintenance for the Tampa Bay nonattainment area, the total NOX and VOC emissions from all sources (stationary and mobile) within the Tampa Bay Airshed and a majority of sources within 25 miles of the nonattainment areas amounted to approximately 599 and 491 tons per day (TPD). The Tampa Bay Airshed includes Hillsborough and Pinellas Counties. The 25-mile zone around the nonattainment area includes portions of Pasco, Hernando, DeSoto, Hardee, Lake, Sarasota, Sumter, Manatee, and Polk Counties.

The increase in NOx and VOC emissions from Hardee Unit 3 is projected to be approximately 1,212 and 99 tons per year (TPY), respectively, or 3.3 and 0.3 TPD, respectively. These emissions represent less than 0.6 percent of the total NOx and VOC emissions for the Tampa Bay Airshed and surrounding areas.

The Florida DEP has recently performed air quality modeling analyses for the Hillsborough County/Pinellas County O_2 nonattainment area as part of the proposed revisions to the State Implementation Plan to redesignate the area as attainment. The purpose of the analyses was to determine if projected increases in NOx emissions would significantly affect potential maximum O_3 concentrations. The air quality modeling was based on using the EPA-approved Empirical Kinetics Modeling Approach model with emission inventories of NOx, volatile organic compounds (VOC), and carbon monoxide (CO) developed by each county for the years 1988, 1990, and 2005. The Empirical Kinetics Modeling Approach model, which is an empirical model that can be applied to urban ozone analyses, uses the same chemical kinetic mechanisms used in the more complex and detailed Urban Airshed Model. The DEP analyses were based on developing model input data (i.e., emissions, meteorology, ambient pollutant concentrations) for 3 days in 1988 and had high measured O_3 concentrations and then using the data to assess O_3 concentrations for 1990 and 2005. The emission inventories were projected for the subsequent years.

The air quality modeling analysis did address increment consumption and include applicable PSD emission sources (see Section 7.4 of the Air Permit Application, Appendix 10.1.5 of the SCA/EA). An AQRV analysis was also conducted and presented in detail.

As discussed previously, although the Hardee Unit 3 Plant will increase annual NOx and VOC emissions in the region, the plant's emissions, when added to the total emissions for Hillsborough and Pinellas counties, represent less than 0.6 percent of the total emissiosn for the area. As a result, Hardee Unit 3 is not expected to significantly affect the O_3 concentrations in the Hillsborough and Pinellas Counties.

Table 7.3-1. SO2 Screening Analysis for the AAQS and PSD Class II Inventories for Hardee Unit 3

Facility Name	UTM Coordinates (km) E	UTM Coordinates (km) N	Relative Coordinate to proposed Hardee Unit 3 (km) X	Relative Coordinate to proposed Hardee Unit 3 (km) Y	Distance to Proposed Facility (km)	Direction (degrees)	Screening Emission Threshold (TPY)(a)	Maximum Allowable Emissions (TPY)	Included in AAQS and/or PSD Class II Modeling Analysis?
TPS Hardee Station (295 MW) (b)	404.8	3057.3	-0.2	-0.4	0.4	207	(c)	2,412	YES
TECO - Polk Power Station (b)	402.5	3067.4	-2.5	9.7	10.0	345	100	2,010	YES
Imperial Phosphate (Brewer)(b)	404.8	3069.5	-0.2	11.8	11.8	359	136	275	YES
Gardinier Fort Meade	415.3	3063.3	10.3	5.6	11.7	61	134	1,173	YES
IMC-Agrico Chem - S. Pierce (b)	407.5	3071.3	2.5	13.6	13.8	10	177	4,377	YES
Mobil Mining - Big Four Mine (b)	394.8	3067.7	-10.2	10.0	14.3	314	186	589	YES
Borden Hillsborough (b)	394.6	3069.6	-10.4	11.9	15.8	319	216	(225)	YES
U.S. Agri-Chemicals Ft. Meade (b)	416.0	3069.0	11.0	11.3	15.8	44	215	3,438	YES
Central Florida Power	416.2	3069.2	11.2	11.5	16.1	46	222	38	NO
City of Wauchula	418.4	3047.0	13.4	-10.7	17.1	129	243	180	NO
Estech/Swift (b)	411.5	3074.2	6.5	16.5	17.7	22	255	(4,853)	YES
FPC - Polk (b)	414.3	3073.9	9.3	16.2	18.7	30	274	859	YES
Dolime(b)	404.8	3069.5	-0.2	11.8	11.8	359	136	-355	YES
IMC-Agrico Chem - Pierce (b)	404.1	3079.0	-0.9	21.3	21.3	358	326	(1,645)	YES
Mobil Electrophosphate (b)	405.6	3079.4	0.6	21.7	21.7	2	334	(1,441)	YES
Farmland Industries Green Bay (b)	409.5	3079.5	4.5	21.8	22.3	12	345	4,087	YES
IMC Agrico Chem - New Wales (b)	396.6	3078.9	-8.4	21.2	22.8	338	356	13,921	YES
Mulberry Cogeneration (b)	413.6	3080.6	8.6	22.9	24.5	21	389	464	YES
IMC Agrico Chem - Noralyn Mine Road	414.7	3080.3	9.7	22.6	24.6	23	392	505	YES
CF Industries Bartow Bonnie Mine Road(b)	408.4	3082.4	3.4	24.7	24.9	8	399	4,982	YES
Kaplan Industries	418.3	3079.3	13.3	21.6	25.4	32	407	398	NO
American Orange Corp.	429.8	3047.3	24.8	-10.4	26.9	113	438	198	NO
IMC Agrico/Conserve (b)	398.4	3084.2	-6.6	26.5	27.3	346	446	1,593	YES
Mulberry Phosphates (Royster) (b)	406.8	3085.1	1.8	27.4	27.5	4	449	2,013	YES
Geologic Recovery	401.8	3085.8	-3.2	28.1	28.3	354	466	98	NO
Mobil Mining -Nichols (b)	398.4	3085.3	-6.6	27.6	28.4	347	468	2,304	YES
Cargill/Seminole Fertilizer Bartow (b)	409.8	3087.0	4.8	29.3	29.7	9	494	5,000	YES
IMC Fertilizer - Prairie	402.9	3087.0	-2.1	29.3	29.4	356	488	109	NO
Orange Co.	418.7	3083.6	13.7	25.9	29.3	28	486	26	NO
Imperial/Pavex Corp - W Bartow	413.0	3086.2	8.0	28.5	29.6	16	492	75	NO
US-Agri Chemicals Bartow (b)	413.2	3086.3	8.2	28.6	29.8	16	495	(1,579)	YES
FPL - Manatee	367.2	3054.1	-37.8	-3.6	38.0	265	659	83,351	YES
Laidlaw Env. Services	424.7	3091.9	19.7	34.2	39.5	30	689	240	NO
Consolidated Minerals Plant City	393.8	3096.3	-11.2	38.6	40.2	344	704	809	YES
Citrus Hill	447.9	3068.3	42.9	10.6	44.2	76	784	411	NO
Cargill Citro-America	447.9	3068.3	42.9	10.6	44.2	76	784	223	NO
Ridge Cogeneration (b)	416.7	3100.4	11.7	42.7	44.3	15	785	480	NO
Lakeland City Power Larsen (b)	409.2	3102.8	4.2	45.1	45.2	5	805	5,024	YES
TECO - Big Bend (b)	361.9	3075.0	-43.1	17.3	46.4	292	829	237,854	YES
FPL-Avon Park	451.4	3050.5	46.4	-7.2	47.0	99	839	67	NO

Table 7.3-1. SO2 Screening Analysis for the AAQS and PSD Class II Inventories for Hardee Unit 3

Facility Name	UTM Coordinates (km) E	UTM Coordinates (km) N	Relative Coordinate to proposed Hardee Unit 3 (km) X	Relative Coordinate to proposed Hardee Unit 3 (km) Y	Distance to Proposed Facility (km)	Direction (degrees)	Screening Emission Threshold (TPY)(a)	Maximum Allowable Emissions (TPY)	Included in AAQS and/or PSD Class II Modeling Analysis?
Macasphalt Winter Haven	423.1	3101.5	18.1	43.8	47.4	22	848	48	NO
Cargill/Gardinier Riverview (b)	363.4	3082.4	-41.6	24.7	48.4	301	868	5,872	YES
Lakeland City Power McIntosh (b)	408.5	3105.8	3.5	48.1	48.2	4	865	30,567	YES
Auburndale Cogen (b)	420.8	3103.3	15.8	45.6	48.3	19	865	222	NO
Owens-Brockway	423.4	3102.8	18.4	45.1	48.7	22	874	120	NO
Coca Cola Auburndale	421.6	3103.7	16.6	46.0	48.9	20	878	709	NO
Adams Packing Aurburndale	421.1	3104.2	16.1	46.5	49.2	19	884	94	NO
SFE Processing	421.7	3104.2	16.7	46.5	49.4	20	888	188	NO
Hillsborough RRF	368.2	3092.7	-36.8	35.0	50.8	314	916	771	NO
Borden Polk (b)	414.5	3109	9.5	51.3	52.2	10	943	(184)	NO
CLM/Pacific Chloride	361.8	3088.3	-43.2	30.6	52.9	305	959	702	NO
TECO - Gannon	360.0	3087.5	-45.0	29.8	54.0	304	979	93,265	YES
Gulf Coast Lead	364.0	3093.5	-41.0	35.8	54.4	311	989	1,498	YES
Alcoma Packing	451.6	3085.5	46.6	27.8	54.3	59	985	327	NO
Additional Sources Outside 55km Considered in Modeling Analysis									
Lafarge Corp.	357.7	3090.6	-47.3	32.9	57.6	305	1052	20,293	YES
TECO - Hookers Point	358.0	3091.0	-47.0	33.3	57.6	305	1052	13,524	YES
FPC - Bartow	342.4	3082.6	-62.6	24.9	67.4	292	1247	62,618	YES
FPC - Higgins	336.5	3098.4	-68.5	40.7	79.7	301	1494	19,619	YES
FPC - Intercession City (b)	446.3	3126.0	41.3	68.3	79.8	31	1496	17,667	YES

Note: All facilities with a total maximum allowable SO2 emissions of more than 20 TPY that are within 55 km of the proposed facility are included in the screening analysis.

(a) Screening emissions threshold is 20 x [Distance (km) to facility - 5km], based on North Carolina Screening Method.
A significant impact distance of 5 km was assumed in order to include additional facilities into the inventory.

(b) Indicates PSD sources at this facility
Proposed facility UTM coordinates (km: 405 3057.7
Screening area is 55 km from the proposed facility.

(c) Sources within 5 km of the proposed facility are modeled without regard to the screening criteria.

Source: KBN, 1994

Table 7.3–2. PM Screening Analysis for the AAQS and PSD Class II Inventories for Hardee Unit 3

Facility/Source Name	UTM E (km)	UTM N (km)	Relative Location to Proposed Facility (km)		Distance to Proposed Facility (km)	Direction (degrees)	Screening Threshold Emissions (TPY) (a)	Maximum Allowable Emissions (TPY)	Included in AAQS and PSD Class II Modeling Analysis?
			X	Y					
TPS Hardee Power Station (295 MW) (b)	404.8	3057.3	–0.2	–0.4	0.4	207	(c)	33	YES
TECO Polk (b)	402.5	3067.4	–2.5	9.7	10.0	346	100	438	YES
Gardinier Fort Meade	415.3	3063.3	10.3	5.6	11.7	61	134	132	NO
Imperial Phosphate (Brewer)	404.8	3069.5	–0.2	11.8	11.8	359	136	162	YES
IMC–Agrico Chemical South Pierce (b)	407.5	3071.3	2.5	13.6	13.8	10	177	858	YES
Mobil Big Four Mine	394.8	3067.7	–10.2	10.0	14.3	314	186	68	NO
US Agri–Chemicals Fort Meade (b)	416.0	3069.0	11.0	11.3	15.8	44	215	1,066	YES
Central Florida Power	416.2	3069.2	11.2	11.5	16.1	46	222	47	NO
Florida Privitization Inc	418.3	3048.0	13.3	–9.7	16.5	126	229	281	YES
City of Wachula	418.4	3047.0	13.4	–10.7	17.1	129	243	21	NO
Estech/Swift	411.5	3074.2	6.5	16.5	17.7	22	255	311	YES
FPC–POLK (b)	414.3	3073.9	9.3	16.2	18.7	30	274	149	NO
Estech–Duette Phosphate Mine	388.9	3047.2	–16.1	–10.5	19.2	237	284	751	YES
IMC Kingsford	398.2	3075.7	–6.8	18.0	19.2	339	285	417	YES
C & M Products Co	405.5	3079.1	0.5	21.4	21.4	1	328	162	NO
Farmland Industries Green Bay Plant (b)	409.5	3079.5	4.5	21.8	22.3	12	345	503	YES
IMC–Agrico New Wales	396.6	3078.9	–8.4	21.2	22.8	338	356	1,427	YES
Ewell Ind Bonnie Mine Rd	407.7	3080.9	2.7	23.2	23.4	7	367	96	NO
Mulberry Cogeneration (b)	413.6	3080.6	8.6	22.9	24.5	21	389	70	NO
IMC–Agrico Noralyn Mine	414.7	3080.3	9.7	22.6	24.6	23	392	1,690	YES
Ridge Pallets Inc	419.1	3078.1	14.1	20.4	24.8	35	396	96	NO
C F Industries Bartow Bonnie Mine (b)	408.4	3082.4	3.4	24.7	24.9	8	399	1,748	YES
Bio–Medical Service Corp of GA	413.9	3081.3	8.9	23.6	25.2	21	404	46	NO
Kaplan Industries	418.3	3079.3	13.3	21.6	25.4	32	407	53	NO
American Orange Corp	429.8	3047.3	24.8	–10.4	26.9	113	438	181	NO
Orange Cogen (b)	414.8	3083.0	9.8	25.3	27.1	21	443	44	NO
IMC–Agrico/Conserve (Nichols) (b)	398.4	3084.2	–6.6	26.5	27.3	346	446	1,598	YES
Mulberry Phosphates (Royster)	406.8	3085.1	1.8	27.4	27.5	4	449	1,394	YES
Kaiser Aluminum	408.3	3085.5	3.3	27.8	28.0	7	460	106	NO
Mobil Mining & Minerals Nichols	398.4	3085.3	–6.6	27.6	28.4	347	468	991	YES
Orange Co of Florida	418.7	3083.6	13.7	25.9	29.3	28	486	119	NO
IMC Fertilizer Prairie	402.9	3087.0	–2.1	29.3	29.4	356	488	288	NO
Purina Mills	402.0	3087.0	–3.0	29.3	29.5	354	489	88	NO
Pavex	413.0	3086.2	8.0	28.5	29.6	16	492	44	NO
Cargill/Seminole Fertilizer (b)	409.8	3087.0	4.8	29.3	29.7	9	494	544	YES

Table 7.3-2. PM Screening Analysis for the AAQS and PSD Class II Inventories for Hardee Unit 3

Facility/Source Name	UTM E (km)	UTM N (km)	Relative Location to Proposed Facility (km)		Distance to Proposed Facility (km)	Direction (degrees)	Screening Threshold Emissions (TPY) (a)	Maximum Allowable Emissions (TPY)	Included in AAQS and PSD Class II Modeling Analysis?
			X	Y					
Ridge Pallets Inc.	418.6	3084.1	13.6	26.4	29.7	27	494	165	NO
US Agri-Chemicals Bartow (b)	413.2	3086.3	8.2	28.6	29.8	16	495	444	NO
Florida Rock Industries	416.8	3085.8	11.8	28.1	30.5	23	510	57	NO
Ewell Ind S Florida Ave	406.3	3092.9	1.3	35.2	35.2	2	604	348	NO
All Sun Products	413.5	3093.8	8.5	36.1	37.1	13	642	318	NO
FPL - Manatee	367.2	3054.1	-37.8	-3.6	38.0	265	659	40,765	YES
Manatee Scrap Processing	366.9	3053.8	-38.1	-3.9	38.3	264	666	108	NO
Sun Pac Foods	422.7	3092.6	17.7	34.9	39.1	27	683	62	NO
Lykes Pasco Packing	412.4	3096.5	7.4	38.8	39.5	11	690	48	NO
Consolidated Minerals Inc Plant City	393.8	3096.3	-11.2	38.6	40.2	344	704	749	YES
Pavers Incorporated	414.0	3098.2	9.0	40.5	41.5	13	730	479	NO
Schering Berlin Polymers	410.7	3098.9	5.7	41.2	41.6	8	732	30	NO
Rinker Cencon Corp	412.4	3099.0	7.4	41.3	42.0	10	739	159	NO
Quikrete of Florida	412.8	3099.0	7.8	41.3	42.0	11	741	253	NO
Zipperer S. Agape Mortuary Services	363.0	3064.7	-42.0	7.0	42.6	279	752	21	NO
Florida M&M	362.2	3066.2	-42.8	8.5	43.6	281	773	21	NO
Alumax Extrusions	385.6	3097.0	-19.4	39.3	43.8	334	777	172	NO
Ero Industries	427.5	3095.6	22.5	37.9	44.1	31	782	33	NO
Citrus Hill Mfg	447.9	3068.3	42.9	10.6	44.2	76	784	66	NO
Florida Brick & Clay Co	384.9	3097.1	-20.1	39.4	44.2	333	785	26	NO
Ridge Cogeneration (b)	416.7	3100.4	11.7	42.7	44.3	15	785	414	NO
Union Camp Corp	402.0	3102.0	-3.0	44.3	44.4	356	788	47	NO
Amcon Concrete	364.0	3075.0	-41.0	17.3	44.5	293	790	39	NO
Erly Juice Inc	399.0	3101.8	-6.0	44.1	44.5	352	790	117	NO
Florida Tile	405.4	3102.4	0.4	44.7	44.7	1	794	309	NO
C-Cure of Florida	386.0	3098.7	-19.0	41.0	45.2	335	804	21	NO
Lakeland City Power Larsen (b)	409.2	3102.8	4.2	45.1	45.3	5	806	107	NO
Monier Roof tile	414.0	3102.5	9.0	44.8	45.7	11	814	44	NO
Driggers Concrete	360.0	3065.9	-45.0	8.2	45.7	280	815	21	NO
Palm Harbor Homes	391.8	3101.5	-13.2	43.8	45.7	343	815	22	NO
Vigoro Industries	427.9	3097.4	22.9	39.7	45.8	30	817	136	NO
Westcon	375.3	3092.8	-29.7	35.1	46.0	320	820	21	NO
TECO Big Bend (b)	361.9	3075.0	-43.1	17.3	46.4	292	829	6,014	YES
Citrus World	441.0	3087.3	36.0	29.6	46.6	51	832	601	NO
IMC-Agrico Chemical Big Bend	362.1	3076.1	-42.9	18.4	46.7	293	834	195	NO

Table 7.3-2. PM Screening Analysis for the AAQS and PSD Class II Inventories for Hardee Unit 3

Facility/Source Name	UTM E (km)	UTM N (km)	Relative Location to Proposed Facility (km)		Distance to Proposed Facility (km)	Direction (degrees)	Screening Threshold Emissions (TPY) (a)	Maximum Allowable Emissions (TPY)	Included in AAQS and PSD Class II Modeling Analysis?
			X	Y					
Macasphalt	423.1	3101.5	18.1	43.8	47.4	22	848	70	NO
Florida Rock Industry	365.8	3085.0	-39.2	27.3	47.8	305	855	21	NO
Lakeland City Power McIntosh (b)	408.5	3105.8	3.5	48.1	48.2	4	865	15,151	YES
Auburndale Cogeneration (b)	420.8	3103.3	15.8	45.6	48.3	19	865	161	NO
Florida Mining & Materials Alabama Lan	420.8	3103.4	15.8	45.7	48.4	19	867	40	NO
Cargill/Gardinier Fertilizer Riverview	363.4	3082.4	-41.6	24.7	48.4	301	868	880	YES
Owens-Brockway Glass Container	423.4	3102.8	18.4	45.1	48.7	22	874	189	NO
Packaging Corp of America	423.4	3102.8	18.4	45.1	48.7	22	874	38	NO
Coca Cola	421.6	3103.7	16.6	46.0	48.9	20	878	387	NO
Adams Packing Association	421.1	3104.2	16.1	46.5	49.2	19	884	144	NO
Eger Concrete Lake Ida & 5th St	428.1	3102.0	23.1	44.3	50.0	28	899	49	NO
S I Lime Co Division of Longview Lime	362.9	3084.7	-42.1	27.0	50.0	303	900	48	NO
R C Martin Concrete Products	368.6	3092.1	-36.4	34.4	50.1	313	902	28	NO
Graves Enterprises Riverview	363.1	3085.3	-41.9	27.6	50.2	303	903	350	NO
The Florida Brewery	422.8	3104.7	17.8	47.0	50.3	21	905	121	NO
Hillsborough Co Resource Recovery	368.2	3092.7	-36.8	35.0	50.8	314	916	172	NO
John Carlos Florida	426.2	3104.1	21.2	46.4	51.0	25	920	29	NO
Reed Minerals Division	362.2	3085.5	-42.8	27.8	51.0	303	921	70	NO
Eastern Electric Apparatus Repair Cp	366.6	3092.0	-38.4	34.3	51.5	312	930	21	NO
Southeastern Galvanizing Division	368.5	3094.5	-36.5	36.8	51.8	315	937	21	NO
City of Tampa Dept.	364.0	3089.5	-41.0	31.8	51.9	308	938	48	NO
Kearney Development Company	368.7	3094.8	-36.3	37.1	51.9	316	938	21	NO
Gaylord Container Corp	366.3	3092.3	-38.7	34.6	51.9	312	938	108	NO
Southeastern Wire	368.3	3094.5	-36.7	36.8	52.0	315	939	21	NO
GAF Building Materials Corp	362.2	3087.2	-42.8	29.5	52.0	305	940	57	NO
Florida Rock Industries	428.0	3105.2	23.0	47.5	52.8	26	956	55	NO
Leisey Shell Corp	352.7	3064.8	-52.3	7.1	52.8	278	956	20	NO
Nitram	362.5	3089.0	-42.5	31.3	52.8	306	956	218	NO
GNB Inc (PAC CHL)	361.8	3088.3	-43.2	30.6	52.9	305	959	25	NO
Paktank Florida	360.8	3087.3	-44.2	29.6	53.2	304	964	178	NO
Florida Steel Corp	364.6	3092.8	-40.4	35.1	53.5	311	970	144	NO
Amcon Products	364.6	3092.8	-40.4	35.1	53.5	311	970	32	NO
Bay Concrete	365.1	3093.8	-39.9	36.1	53.8	312	976	37	NO
IMC Port Sutton Terminal	360.1	3087.5	-44.9	29.8	53.9	304	978	442	NO
TECO Gannon	360.0	3087.5	-45.0	29.8	54.0	304	979	5,855	YES

Table 7.3-2. PM Screening Analysis for the AAQS and PSD Class II Inventories for Hardee Unit 3

Facility/Source Name	UTM E (km)	UTM N (km)	Relative Location to Proposed Facility (km) X	Y	Distance to Proposed Facility (km)	Direction (degrees)	Screening Threshold Emissions (TPY) (a)	Maximum Allowable Emissions (TPY)	Included in AAQS and PSD Class II Modeling Analysis?
Florida Mega-Mix	364.5	3093.4	-40.5	35.7	54.0	311	980	22	NO
CSX Transportation Inc	361.0	3089.0	-44.0	31.3	54.0	305	980	404	NO
David J Joseph Co	364.0	3092.9	-41.0	35.2	54.0	311	981	123	NO
The Gibson-Homans	365.5	3094.8	-39.5	37.1	54.2	313	984	21	NO
Holman Inc	359.5	3087.3	-45.5	29.6	54.3	303	986	55	NO
Holman Inc	359.3	3087.1	-45.7	29.4	54.3	303	987	54	NO
Gulf Coast Lead	364.0	3093.5	-41.0	35.8	54.4	311	989	25	NO
Eastern Association Terminal	360.2	3088.9	-44.8	31.2	54.6	305	992	534	NO
Glen-Mar Concrete Products	363.2	3093.3	-41.8	35.6	54.9	310	998	22	NO
Additional Sources Outside 55 km Considered in the Modeling Analysis									
TECO Hooker's Point	358.0	3091.0	-47.0	33.3	57.6	305	1,052	107	NO
LaFarge Corp	357.7	3090.6	-47.3	32.9	57.6	305	1,052	1,207	YES
CF Industries Zephyrhills	388.0	3116.0	-17.0	58.3	60.7	344	1,115	1,006	NO
FPC - Bartow	342.4	3082.6	-62.6	24.9	67.4	292	1,247	9,244	YES
FPC - Higgins	336.5	3098.4	-68.5	40.7	79.7	301	1,494	1,082	NO
FPC - Intercession City (b)	446.3	3126.0	41.3	68.3	79.8	31	1,496	809	NO

Note: All sources with the potential to emit more than 20 TPY of PM, based on maximum allowable within 55km of the proposed facility are included in the screening analysis.
Proposed Facility UTM coordinate 405.0 3057.7
Screening area is a 55 km circle centered on the proposed facility.

(a) Screening emissions threshold is based on the North Carolina screening method, and is equal to 20 x [Distance (km) to facility - 5 km]. A significant impact distance of 5 km was assumed in order to include additional facilities into the inventory. The distance may change pending the final design of the proposed plant.
(b) PSD sources at this facility.
(c) Sources within 5 km of the proposed facility are modeled without regard to the screening criteria.

Source: KBN, 1994.

Table 7.3-3. Summary of Maximum Predicted Impacts for the Proposed Hardee Unit 3, Combined and Simple Cycle--Westinghouse 501FC, Distillate Oil at 100 Percent, 75 Percent, and 50 Percent Operating Loads (Revision 1 - Combined Cycle Only)

Pollutant	Averaging Period	Maximum Predicted Impacts (ug/m³) 100 Percent Load 32 °F	100 Percent Load 95 °F	75 Percent Load 32 °F	75 Percent Load 95 °F	50 Percent Load 32 °F	50 Percent Load 95 °F	De Minimis Monitoring Concentration (ug/m³)	Significant Impact Level (ug/m³)
Combined Cycle									
Sulfur Dioxide	3-hour	34.2	49.9	68.3	70.5	60.9	63.2	NA	25
	24-hour	9.0	15.5	25.0	28.2	25.0	28.6	13	5
	Annual	0.17	0.17	0.19	0.18	0.15	0.15	NA	1
Nitrogen Oxides	Annual	0.56	0.57	0.61	0.58	0.50	0.50	14	1
Carbon Monoxide	1-hour	64.5	90.5	144.8	152.3	251.3	256.0	NA	2,000
	8-hour	18.2	30.4	56.2	63.2	106.4	115.6	575	500
Particulate Matter	24-hour	5.9	10.1	16.6	19.0	19.3	21.9	10	5
	Annual	0.11	0.11	0.12	0.12	0.12	0.12	NA	1
Arsenic	24-hour	0.0009	0.0015	0.0024	0.0027	0.0024	0.0027	NE	NA
Beryllium	24-hour	0.0004	0.0008	0.0012	0.0014	0.0012	0.0014	0.001	NA
Sulfuric Acid Mist	24-hour	1.99	3.44	5.55	6.26	5.56	6.35	NM	NA
Simple Cycle (Not revised for 501FC since combined cycle impacts are higher)									
Sulfur Dioxide	3-hour	9.3	18.6	29.7	36.9	44.4	47.0	NA	25
	24-hour	1.4	3.3	6.1	8.6	11.7	13.7	13	5
	Annual	0.02	0.02	0.02	0.03	0.04	0.05	NA	1
Nitrogen Oxides	Annual	0.07	0.04	0.06	0.06	0.13	0.11	14	1
Carbon Monoxide	1-hour	19.2	33.2	58.6	72.7	159.2	169.4	NA	2,000
	8-hour	3.2	6.3	12.4	16.5	37.6	43.1	575	500
Particulate Matter	24-hour	0.9	2.2	4.1	5.9	9.1	10.6	10	5
	Annual	0.01	0.01	0.01	0.02	0.03	0.04	NA	1
Arsenic	24-hour	0.0001	0.0003	0.0006	0.0008	0.0011	0.0013	NE	NA
Beryllium	24-hour	0.0001	0.0002	0.0003	0.0004	0.0006	0.0007	0.001	NA
Sulfuric Acid Mist	24-hour	0.21	0.51	0.93	1.32	1.80	2.10	NM	NA

Note: NA = not applicable; NM = no ambient measurement method; NE = no monitoring method yet established.

Table 7.3-4. Hardee Unit 3--Ambient Air Quality Impact Analysis

Pollutant	Averaging Time	Modeled Sources Impact ($\mu g/m^3$)	Background Concentration ($\mu g/m^3$)	Maximum Predicted Impact[a] ($\mu g/m^3$)	Florida AAQS ($\mu g/m^3$)
SO_2	Annual	19	11	30	60
	24-hour	91	50	141	260
	3-hour	193	256	449	1,300
PM10	Annual	4	20	24	50
	24-hour	32	70	102	150

[a] Highest, second-highest value over a 5-year period for 3-hour and 24-hour averaging times.

Table 7.3-5. Hardee Unit 3--PSD Class II Increment Analysis

Pollutant	Averaging Time	Maximum Predicted Impact[a] ($\mu g/m^3$)	Allowable Increment ($\mu g/m^3$)
SO_2	Annual	-3.8	20
	24-hour	46.7	91
	3-hour	162	512
PM10	Annual	0.6	17
	24-hour	14.3	30

[a] Highest, second-highest value over a 5-year period for 3-hour and 24-hour averaging times.

Table 7.3-6. Hardee Unit 3--Significant Impact Analysis for PSD Class I Area

Pollutant	Averaging Time	Maximum Predicted Impact ($\mu g/m^3$)	National Park Service (NPS) Significant Impact Level ($\mu g/m^3$)
NO_2	Annual	0.021[a]	0.025
SO_2	Annual	0.012	0.025
	24-hour	0.30	0.07
	3-hour	2.0	0.48
PM10	Annual	0.008	0.08
	24-hour	0.20	0.33

[a] Based on firing oil for 1,500 hours and natural gas for 7,260 hours [(0.040 $\mu g/m^3$ x 1,500/8,760) (oil firing) + 0.017 $\mu g/m^3$ x 7,260/8,760) (natural gas firing)].

Table 7.3-7. Hardee Unit 3--PSD Class I Increment Analysis

Pollutant	Averaging Time	Maximum Predicted Impact[a] ($\mu g/m^3$)	Allowable Increment ($\mu g/m^3$)
SO_2	Annual	0.3	2
	24-hour	6.4[b]	5
	3-hour	2.61[b]	25

[a] Highest, second-highest value over a 5-year period for 3-hour and 24-hour averaging times.
[b] The project has less than significant impacts for all predicted exceedance of SO_2 increments.

Table 7.3-8. Predicted 3-Hour and 24-Hour Violations of the SO2 PSD Class I Increments and Source Contributions From Hardee Unit 3

Date Ending		Receptor UTM Location (km)		Predicted Impacts (ug/m³) (a)		
					Contribution from Hardee Unit 3	
Year	Date (MM/DD)	(E)	(N)	Total Impact	ISCST2	MESOPUFF 5.10 (b)
24-Hour						
1982	6/10	340300	3169800	5.45	0.232	0.004
1982	6/10	340300	3167700	5.08	0.216	0.004
1982	7/15	340700	3171900	5.65	0	NA
1982	9/9	340700	3171900	5.27	0.011	NA
1983	7/30	340300	3165700	5.12	0.005	NA
1983	7/30	340300	3167700	5.06	0.005	NA
1983	10/30	340300	3165700	5.39	0	NA
1984	3/23	340300	3169800	5.09	0.024	NA
1984	3/23	340300	3167700	5.20	0.03	NA
1984	6/17	342000	3174000	5.40	0	NA
1985	11/12	340300	3167700	5.48	0	NA
1985	11/12	340700	3171900	5.14	0	NA
1985	11/16	340300	3165700	5.54	0	NA
1985	11/27	340300	3169800	5.55	0	NA
1986	2/1	340300	3165700	5.72	0	NA
1986	2/1	340300	3169800	5.45	0	NA
1986	3/8	343000	3176200	5.11	0	NA
1986	5/31	343000	3176200	6.42	0.217	0.0001
1986	6/1	340700	3171900	5.32	0	NA
1986	6/1	342000	3174000	6.15	0	NA
1986	6/1	343000	3176200	5.56	0	NA
1986	6/14	340300	3167700	5.14	0.150	0.002
1986	6/24	340700	3171900	5.20	0.098	0.001
1986	7/5	342000	3174000	5.46	0.061	NA
1986	7/12	339000	3183400	5.14	0.19	0.0002
1986	9/27	340300	3169800	5.35	0	NA
1986	9/27	340700	3171900	5.22	0	NA
1986	11/5	340700	3171900	5.54	0	NA
1986	11/5	342000	3174000	5.16	0	NA
1986	11/7	340300	3165700	5.26	0.008	NA
1986	11/11	343700	3178300	5.13	0	NA
1986	12/19	342000	3174000	5.20	0.065	NA
1986	12/19	343000	3176200	5.69	0.065	NA
3-Hour						
1986	11/17	341100	3183400	26.1	0.788	0.0002

Note: The 3-hour and 24-hour PSD Class I increments are 25 and 5 ug/m^3, respectively.

(a) Violations predicted by the ISCST2 model were for the 3-hour and 24-hour averaging times only. No annual violations were predicted.

(b) MESOPUFF results generated only for events where ISCST2 model predicted the proposed facility to have impacts greater than the National Park Service Recommended Significance Levels for the 3-hour (0.48 ug/m^3) and 24-hour (0.07 ug/m^3) averaging periods.

Source: KBN, 1994.

Table 7.3-9. Summary of PSD Class I SO2 Impacts for the Proposed Hardee Unit 3 and Other PSD Sources

Averaging Period	ISCST2 Model Results: Exceedances Number	Exceedances Periods	Violations Number	Violations Periods	Violations with Sig. Impact from Proposed Unit: Number	Periods	Total (ug/m^3)	Proposed (ug/m^3)	MESOPUFF Modeling for ISCST Periods(a) (Violations and Prop. Sig. Imp.) Proposed Only(b) (ug/m^3)
24-hour									
1982	9	5	4	3	2	1	5.08	0.216	0.004
							5.45	0.232	0.004
1983	8	5	3	2	0	0	NA	NA	NA
1984	9	5	3	2	0	0	NA	NA	NA
1985	8	4	4	3	0	0	NA	NA	NA
1986	30	14	19	13	4	4	6.42	0.217	0.0001
							5.14	0.150	0.002
							5.20	0.098	0.001
							5.14	0.190	0.0002
3-hour									
1982	2	1	0	0	0	0	NA	NA	NA
1983	0	0	0	0	0	0	NA	NA	NA
1984	0	0	0	0	0	0	NA	NA	NA
1985	5	1	0	0	0	0	NA	NA	NA
1986	4	3	1	1	1	1	26.1	0.79	0.0002

(a) The periods in MESOPUFF included 3 days before and 2 days after the violation period identified in ISCST.
(b) For 1986, the proposed source was also modeled in MESOPUFF for the entire year.
The proposed source was predicted to have a significant impact for one 24-hour period (0.099 ug/m^3) and no 3-hour periods.
By modeling all sources for that one 24-hour period, the highest impact was predicted to be -5.4 ug/m^3
(modeling was based on ISCST2 model results for sources within 50 km, MESOPUFF results for sources beyond 50 km of the Class I area).

Table 7.3-10. Toxic Air Pollutant Impact Analysis for Proposed Hardee Unit 3 Plant--Maximum Concentrations (Westinghouse 501FC; Revision 1)

Constituent	Averaging Period	Predicted Impacts (ug/m³) Base Load 32°F	Base Load 95°F	75 Percent Load 32°F	75 Percent Load 95°F	50 Percent Load 32°F	50 Percent Load 95°F	Florida NTL (ug/m³)
Generic	Annual	6.60E-02	7.80E-02	9.00E-02	1.00E-01	1.03E-01	1.16E-01	NA
	24-hour	3.51E+00	6.99E+00	1.22E+01	1.58E+01	1.71E+01	2.20E+01	NA
	8-Hour	8.05E+00	1.59E+01	2.69E+01	3.39E+01	3.62E+01	4.48E+01	NA
Arsenic	Annual	1.60E-05	1.64E-05	1.75E-05	1.69E-05	1.44E-05	1.43E-05	2.30E-04
	24-hour	8.52E-04	1.47E-03	2.37E-03	2.67E-03	2.38E-03	2.72E-03	4.80E-01
	8-Hour	1.95E-03	3.35E-03	5.23E-03	5.73E-03	5.04E-03	5.54E-03	2.00E+00
Beryllium	Annual	8.17E-06	8.37E-06	8.94E-06	8.64E-06	7.32E-06	7.31E-06	4.20E-04
	24-hour	4.34E-04	7.50E-04	1.21E-03	1.37E-03	1.21E-03	1.39E-03	4.80E-03
	8-Hour	9.96E-04	1.71E-03	2.67E-03	2.93E-03	2.57E-03	2.82E-03	2.00E-02
Fluoride	Annual	1.06E-04	1.09E-04	1.16E-04	1.12E-04	9.53E-05	9.50E-05	NA
	24-hour	5.65E-03	9.76E-03	1.58E-02	1.78E-02	1.58E-02	1.80E-02	6.00E+00
	8-Hour	1.30E-02	2.23E-02	3.47E-02	3.81E-02	3.34E-02	3.67E-02	2.50E+01
Mercury	Annual	2.88E-05	2.95E-05	3.15E-05	3.05E-05	2.58E-05	2.57E-05	3.00E-01
	24-hour	1.53E-03	2.64E-03	4.28E-03	4.82E-03	4.27E-03	4.87E-03	1.20E-01
	8-Hour	3.51E-03	6.02E-03	9.42E-03	1.03E-02	9.05E-03	9.93E-03	5.00E-01
Sulfuric acid	Annual	3.75E-02	3.84E-02	4.09E-02	3.96E-02	3.36E-02	3.35E-02	NA
	24-hour	1.99E+00	3.44E+00	5.55E+00	6.26E+00	5.56E+00	6.35E+00	2.40E+00
	8-Hour	4.57E+00	7.84E+00	1.22E+01	1.34E+01	1.18E+01	1.29E+01	1.00E+01
Antimony	Annual	7.13E-05	7.31E-05	7.80E-05	7.53E-05	6.38E-05	6.37E-05	3.00E-01
	24-hour	3.79E-03	6.55E-03	1.06E-02	1.19E-02	1.06E-02	1.21E-02	1.20E+00
	8-Hour	8.70E-03	1.49E-02	2.33E-02	2.55E-02	2.24E-02	2.46E-02	5.00E+00
Barium	Annual	6.39E-05	6.53E-05	6.96E-05	6.73E-05	5.71E-05	5.70E-05	5.00E+01
	24-hour	3.40E-03	5.85E-03	9.45E-03	1.06E-02	9.45E-03	1.08E-02	1.20E+00
	8-Hour	7.79E-03	1.33E-02	2.08E-02	2.28E-02	2.00E-02	2.20E-02	5.00E+00
Cadmium	Annual	3.43E-05	3.52E-05	3.74E-05	3.63E-05	3.06E-05	0.00E+00	5.60E-04
	24-hour	1.82E-03	3.15E-03	5.08E-03	5.74E-03	5.07E-03	0.00E+00	1.20E-01
	8-Hour	4.18E-03	7.19E-03	1.12E-02	1.23E-02	1.07E-02	0.00E+00	5.00E-01
Chlorine	Annual	8.43E-05	8.65E-05	9.23E-05	8.92E-05	7.55E-05	7.54E-05	4.00E-01
	24-hour	4.48E-03	7.75E-03	1.25E-02	1.41E-02	1.25E-02	1.43E-02	3.60E+00
	8-Hour	1.03E-02	1.77E-02	2.76E-02	3.02E-02	2.65E-02	2.92E-02	1.50E+01

Table 7.3-10. Toxic Air Pollutant Impact Analysis for Proposed Hardee Unit 3 Plant--Maximum Concentrations (Westinghouse 501FC; Revision 1)

Constituent	Averaging Period	Predicted Impacts (ug/m³) Base Load 32 °F	Base Load 95 °F	75 Percent Load 32 °F	75 Percent Load 95 °F	50 Percent Load 32 °F	50 Percent Load 95 °F	Florida NTL (ug/m³)
Chromium	Annual (a)	2.66E-05	2.72E-05	2.90E-05	2.81E-05	2.38E-05	2.38E-05	8.30E-05
	24-hour	8.25E-03	1.42E-02	2.30E-02	2.59E-02	2.30E-02	2.63E-02	1.20E-01
	8-Hour	1.89E-02	3.25E-02	5.07E-02	5.55E-02	4.88E-02	5.37E-02	5.00E-01
Cobalt	Annual	2.96E-05	3.03E-05	3.24E-05	3.12E-05	2.65E-05	2.65E-05	NA
	24-hour	1.57E-03	2.71E-03	4.40E-03	4.94E-03	4.38E-03	5.01E-03	1.20E-01
	8-Hour	3.61E-03	6.19E-03	9.69E-03	1.06E-02	9.29E-03	1.02E-02	5.00E-01
Copper	Annual	4.24E-03	4.34E-03	4.65E-03	4.49E-03	3.82E-03	3.80E-03	NA
	24-hour	2.26E-01	3.89E-01	6.31E-01	7.09E-01	6.32E-01	7.20E-01	4.80E-01
	8-Hour	5.17E-01	8.88E-01	1.39E+00	1.52E+00	1.34E+00	1.47E+00	2.00E+00
Formaldehyde	Annual	1.32E-03	1.35E-03	1.44E-03	1.40E-03	1.19E-03	1.18E-03	7.70E-02
	24-hour	7.04E-02	1.21E-01	1.96E-01	2.21E-01	1.96E-01	2.24E-01	2.88E+00
	8-Hour	1.61E-01	2.77E-01	4.32E-01	4.74E-01	4.16E-01	4.58E-01	1.20E+01
Manganese	Annual	1.11E-03	1.14E-03	1.21E-03	1.17E-03	9.97E-04	9.94E-04	4.00E-01
	24-hour	5.91E-02	1.02E-01	1.65E-01	1.86E-01	1.65E-01	1.88E-01	1.20E+01
	8-Hour	1.36E-01	2.33E-01	3.63E-01	3.98E-01	3.50E-01	3.84E-01	5.00E+01
Nickel	Annual (a)	6.72E-04	6.87E-04	7.34E-04	7.08E-04	6.00E-04	6.01E-04	4.20E-03
	24-hour	2.09E-01	3.59E-01	5.82E-01	6.53E-01	5.80E-01	6.65E-01	2.40E+00
	8-Hour	4.79E-01	8.19E-01	1.28E+00	1.40E+00	1.23E+00	1.36E+00	1.00E+01
Polycyclic Organic Matter	Annual	9.08E-07	9.30E-07	9.93E-07	9.60E-07	8.15E-07	8.13E-07	NA
	24-hour	4.83E-05	8.33E-05	1.35E-04	1.52E-04	1.35E-04	1.54E-04	NA
	8-Hour	1.11E-04	1.90E-04	2.97E-04	3.25E-04	2.86E-04	3.14E-04	NA
Selenium	Annual	7.65E-05	7.84E-05	8.37E-05	8.09E-05	6.85E-05	6.84E-05	NA
	24-hour	4.07E-03	7.03E-03	1.14E-02	1.28E-02	1.13E-02	1.30E-02	2.00E+00
	8-Hour	9.33E-03	1.60E-02	2.50E-02	2.74E-02	2.40E-02	2.64E-02	4.80E-01
Vanadium	Annual	2.28E-04	2.32E-04	2.47E-04	2.40E-04	2.03E-04	2.03E-04	2.00E+01
	24-hour	1.21E-02	2.08E-02	3.35E-02	3.79E-02	3.37E-02	3.85E-02	1.20E-01
	8-Hour	2.78E-02	4.74E-02	7.39E-02	8.12E-02	7.14E-02	7.84E-02	5.00E-01
Zinc	Annual	2.23E-03	2.28E-03	2.45E-03	2.36E-03	2.00E-03	2.00E-03	NA
	24-hour	1.19E-01	2.04E-01	3.32E-01	3.73E-01	3.31E-01	3.78E-01	NA
	8-Hour	2.72E-01	4.66E-01	7.32E-01	7.99E-01	7.02E-01	7.72E-01	NA

(a) Based on firing fuel oil for 1,500 hours (for other pollutants, fuel oil was assumed to be fired for entire year).

Table 7.3–11. Summary of PSD Class I SO2 Impacts for the Proposed Hardee Unit 3 and Other PSD Sources

Averaging Period	ISCST2 Model Results: Exceedances Number	Exceedances Periods	Violations Number	Violations Periods	Violations with Sig. Impact from Proposed Unit: Number	Periods	Total (ug/m³)	Proposed (ug/m³)	MESOPUFF Modeling for ISCST Periods(a) (Violations and Prop. Sig. Imp.) Proposed Only(b) (ug/m³)
24–hour									
1982	9	5	4	3	2	1	5.08	0.216	0.004
							5.45	0.232	0.004
1983	8	5	3	2	0	0	NA	NA	NA
1984	9	5	3	2	0	0	NA	NA	NA
1985	8	4	4	3	0	0	NA	NA	NA
1986	30	14	19	13	4	4	6.42	0.217	0.0001
							5.14	0.150	0.002
							5.20	0.098	0.001
							5.14	0.190	0.0002
3–hour									
1982	2	1	0	0	0	0	NA	NA	NA
1983	0	0	0	0	0	0	NA	NA	NA
1984	0	0	0	0	0	0	NA	NA	NA
1985	5	1	0	0	0	0	NA	NA	NA
1986	4	3	1	1	1	1	26.4	0.79	0.0002

(a) The periods in MESOPUFF included 3 days before and 2 days after the violation period identified in ISCST.
(b) For 1986, the proposed source was also modeled in MESOPUFF for the entire year.
The proposed source was predicted to have a significant impact for one 24–hour period (0.099 ug/m³) and no 3–hour periods.
By modeling all sources for that one 24–hour period, the highest impact was predicted to be –5.4 ug/m³
(modeling was based on ISCST2 model results for sources within 50 km, MESOPUFF results for sources beyond 50 km of the Class I area).

Table 7.3-12. Toxic Air Pollutant Impact Analysis for Hardee Unit 3--Maximum Concentrations

Constituent	Averaging Period	Predicted Impacts (ug/m³)						Florida NTL (ug/m³)
		Base Load		75 Percent Load		50 Percent Load		
		32°F	95°F	32°F	95°F	32°F	95°F	
Generic	Annual	6.50E-02	7.80E-02	8.80E-02	9.70E-02	1.03E-01	1.15E-01	NA
	24-hour	3.27E+00	7.03E+00	1.07E+01	1.46E+01	1.68E+01	2.17E+01	NA
	8-Hour	7.51E+00	1.60E+01	2.39E+01	3.15E+01	3.57E+01	4.44E+01	NA
Arsenic	Annual	1.58E-05	1.61E-05	1.73E-05	1.63E-05	1.45E-05	1.42E-05	2.30E-04
	24-hour	7.95E-04	1.45E-03	2.10E-03	2.45E-03	2.37E-03	2.68E-03	4.80E-01
	8-Hour	1.83E-03	3.31E-03	4.70E-03	5.28E-03	5.04E-03	5.48E-03	2.00E+00
Beryllium	Annual	8.07E-06	8.24E-06	8.80E-06	8.30E-06	7.44E-06	7.24E-06	4.20E-04
	24-hour	4.06E-04	7.42E-04	1.07E-03	1.25E-03	1.21E-03	1.37E-03	4.80E-03
	8-Hour	9.33E-04	1.69E-03	2.39E-03	2.69E-03	2.58E-03	2.80E-03	2.00E-02
Fluoride	Annual	1.05E-04	1.07E-04	1.14E-04	1.08E-04	9.68E-05	9.43E-05	NA
	24-hour	5.27E-03	9.65E-03	1.39E-02	1.62E-02	1.58E-02	1.78E-02	6.00E+00
	8-Hour	1.21E-02	2.20E-02	3.10E-02	3.50E-02	3.36E-02	3.64E-02	2.50E+01
Mercury	Annual	2.84E-05	2.90E-05	3.09E-05	2.92E-05	2.62E-05	2.55E-05	3.00E-01
	24-hour	1.43E-03	2.61E-03	3.76E-03	4.40E-03	4.28E-03	4.81E-03	1.20E-01
	8-Hour	3.28E-03	5.95E-03	8.40E-03	9.49E-03	9.09E-03	9.85E-03	5.00E-01
Sulfuric acid	Annual	3.64E-02	3.71E-02	3.97E-02	3.74E-02	3.36E-02	3.27E-02	NA
	24-hour	1.83E+00	3.35E+00	4.83E+00	5.63E+00	5.48E+00	6.18E+00	2.40E+00
	8-Hour	4.21E+00	7.63E+00	1.08E+01	1.21E+01	1.16E+01	1.26E+01	1.00E+01
Antimony	Annual	7.06E-05	7.19E-05	7.69E-05	7.25E-05	6.50E-05	6.33E-05	3.00E-01
	24-hour	3.55E-03	6.48E-03	9.35E-03	1.09E-02	1.06E-02	1.19E-02	1.20E+00
	8-Hour	8.15E-03	1.48E-02	2.09E-02	2.35E-02	2.25E-02	2.44E-02	5.00E+00
Barium	Annual	6.31E-05	6.43E-05	6.87E-05	6.48E-05	5.81E-05	5.66E-05	5.00E+01
	24-hour	3.17E-03	5.79E-03	8.36E-03	9.75E-03	9.47E-03	1.07E-02	1.20E+00
	8-Hour	7.29E-03	1.32E-02	1.87E-02	2.10E-02	2.01E-02	2.18E-02	5.00E+00
Cadmium	Annual	3.39E-05	3.46E-05	3.70E-05	3.48E-05	3.12E-05	3.04E-05	5.60E-04
	24-hour	1.71E-03	3.12E-03	4.50E-03	5.24E-03	5.09E-03	5.74E-03	1.20E-01
	8-Hour	3.92E-03	7.10E-03	1.00E-02	1.13E-02	1.08E-02	1.17E-02	5.00E-01
Chlorine	Annual	8.21E-05	8.36E-05	8.95E-05	8.43E-05	7.56E-05	7.36E-05	4.00E-01
	24-hour	4.13E-03	7.54E-03	1.09E-02	1.27E-02	1.23E-02	1.39E-02	3.60E+00
	8-Hour	9.48E-03	1.72E-02	2.43E-02	2.74E-02	2.62E-02	2.84E-02	1.50E+01

Table 7.3-12. Toxic Air Pollutant Impact Analysis for Hardee Unit 3--Maximum Concentrations

Constituent	Averaging Period	Predicted Impacts (ug/m³) Base Load 32°F	Base Load 95°F	75 Percent Load 32°F	75 Percent Load 95°F	50 Percent Load 32°F	50 Percent Load 95°F	Florida NTL (ug/m³)
Chromium	Annual (a)	2.63E-05	2.68E-05	2.86E-05	2.70E-05	2.42E-05	2.36E-05	8.30E-05
	24-hour	7.72E-03	1.41E-02	2.03E-02	2.37E-02	2.30E-02	2.60E-02	1.20E-01
	8-Hour	1.77E-02	3.21E-02	4.54E-02	5.12E-02	4.90E-02	5.31E-02	5.00E-01
Cobalt	Annual	2.93E-05	2.98E-05	3.19E-05	3.01E-05	2.70E-05	2.63E-05	NA
	24-hour	1.47E-03	2.69E-03	3.88E-03	4.52E-03	4.40E-03	4.96E-03	1.20E-01
	8-Hour	3.38E-03	6.13E-03	8.67E-03	9.76E-03	9.34E-03	1.01E-02	5.00E-01
Copper	Annual	4.20E-03	4.28E-03	4.58E-03	4.31E-03	3.87E-03	3.77E-03	NA
	24-hour	2.11E-01	3.86E-01	5.57E-01	6.49E-01	6.31E-01	7.11E-01	4.80E-01
	8-Hour	4.85E-01	8.80E-01	1.24E+00	1.40E+00	1.34E+00	1.45E+00	2.00E+00
Formaldehyde	Annual	1.31E-03	1.33E-03	1.43E-03	1.34E-03	1.20E-03	1.17E-03	7.70E-02
	24-hour	6.58E-02	1.20E-01	1.73E-01	2.02E-01	1.96E-01	2.21E-01	2.88E+00
	8-Hour	1.51E-01	2.74E-01	3.87E-01	4.36E-01	4.18E-01	4.53E-01	1.20E+01
Manganese	Annual	1.10E-03	1.12E-03	1.20E-03	1.13E-03	1.01E-03	9.85E-04	4.00E-01
	24-hour	5.52E-02	1.01E-01	1.46E-01	1.70E-01	1.65E-01	1.86E-01	1.20E+01
	8-Hour	1.27E-01	2.30E-01	3.25E-01	3.66E-01	3.50E-01	3.80E-01	5.00E+01
Nickel	Annual (a)	6.63E-04	6.76E-04	7.23E-04	6.82E-04	6.11E-04	5.95E-04	4.20E-03
	24-hour	1.95E-01	3.56E-01	5.14E-01	6.00E-01	5.82E-01	6.56E-01	2.40E+00
	8-Hour	4.48E-01	8.11E-01	1.15E+00	1.29E+00	1.24E+00	1.34E+00	1.00E+01
Polycyclic Organic Matter	Annual	8.98E-07	9.15E-07	9.79E-07	9.22E-07	8.27E-07	8.06E-07	NA
	24-hour	4.52E-05	8.25E-05	1.19E-04	1.39E-04	1.35E-04	1.52E-04	NA
	8-Hour	1.04E-04	1.88E-04	2.66E-04	2.99E-04	2.87E-04	3.11E-04	NA
Selenium	Annual	7.56E-05	7.71E-05	8.25E-05	7.77E-05	6.97E-05	6.79E-05	NA
	24-hour	3.81E-03	6.95E-03	1.00E-02	1.17E-02	1.14E-02	1.28E-02	2.00E+00
	8-Hour	8.74E-03	1.58E-02	2.24E-02	2.52E-02	2.41E-02	2.62E-02	4.80E-01
Vanadium	Annual	2.24E-04	2.29E-04	2.45E-04	2.31E-04	2.07E-04	2.01E-04	2.00E+01
	24-hour	1.13E-02	2.06E-02	2.98E-02	3.47E-02	3.37E-02	3.80E-02	1.20E-01
	8-Hour	2.59E-02	4.70E-02	6.65E-02	7.49E-02	7.16E-02	7.78E-02	5.00E-01
Zinc	Annual	5.10E-03	5.20E-03	5.57E-03	5.24E-03	4.70E-03	4.58E-03	NA
	24-hour	2.57E-01	4.69E-01	6.77E-01	7.89E-01	7.66E-01	8.64E-01	NA
	8-Hour	5.89E-01	1.07E+00	1.51E+00	1.70E+00	1.63E+00	1.77E+00	NA

(a) Based on firing fuel oil for 1,500 hours (for other pollutants, fuel oil was assumed to be fired for entire year).

Source: KBN, 1994

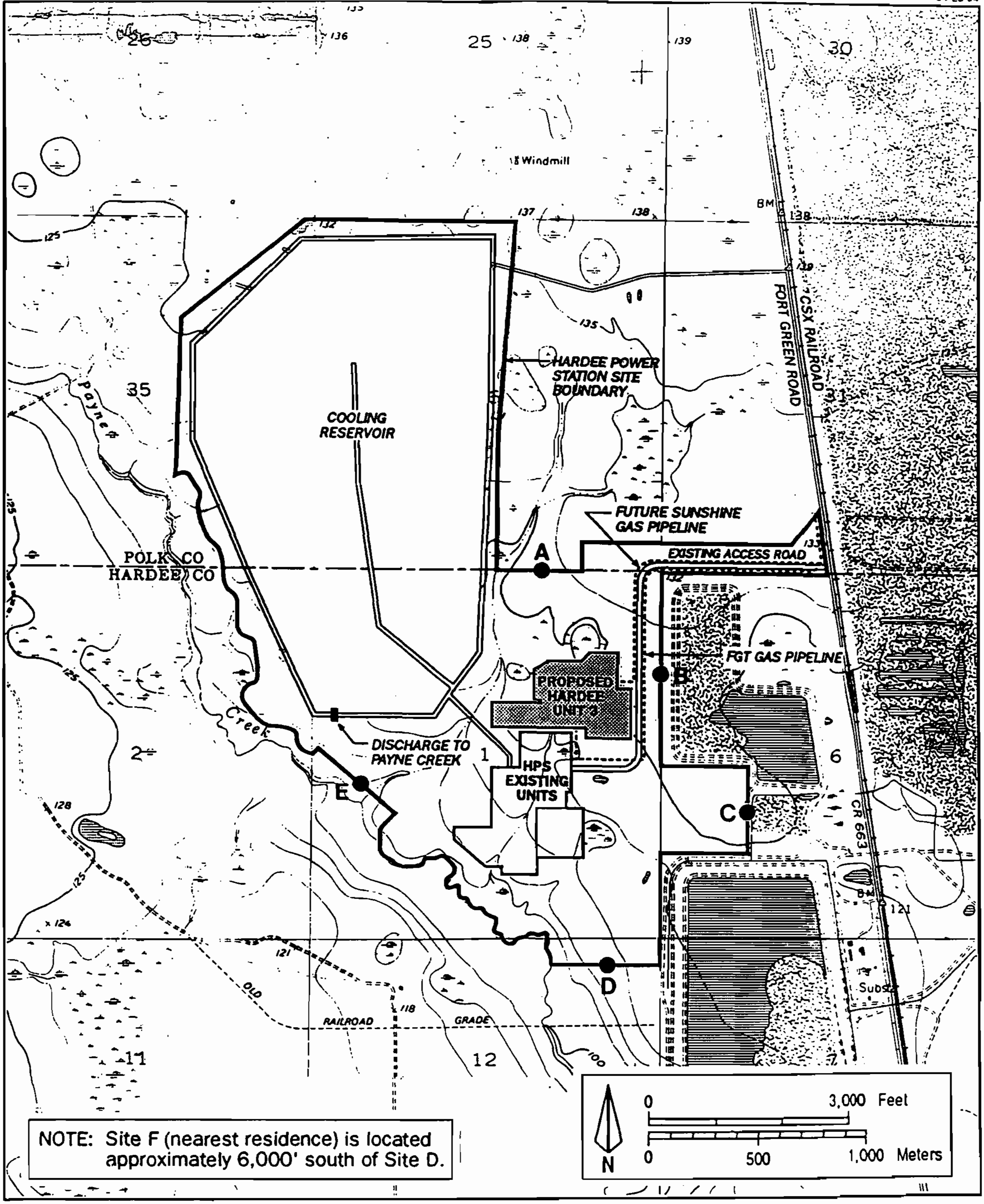

Figure 7.4-1
Receiver Sites Used for the Construction Noise Impact Analysis

Sources: USGS, 1987; KBN, 1994.

SEMINOLE ELECTRIC COOPERATIVE INCORPORATED

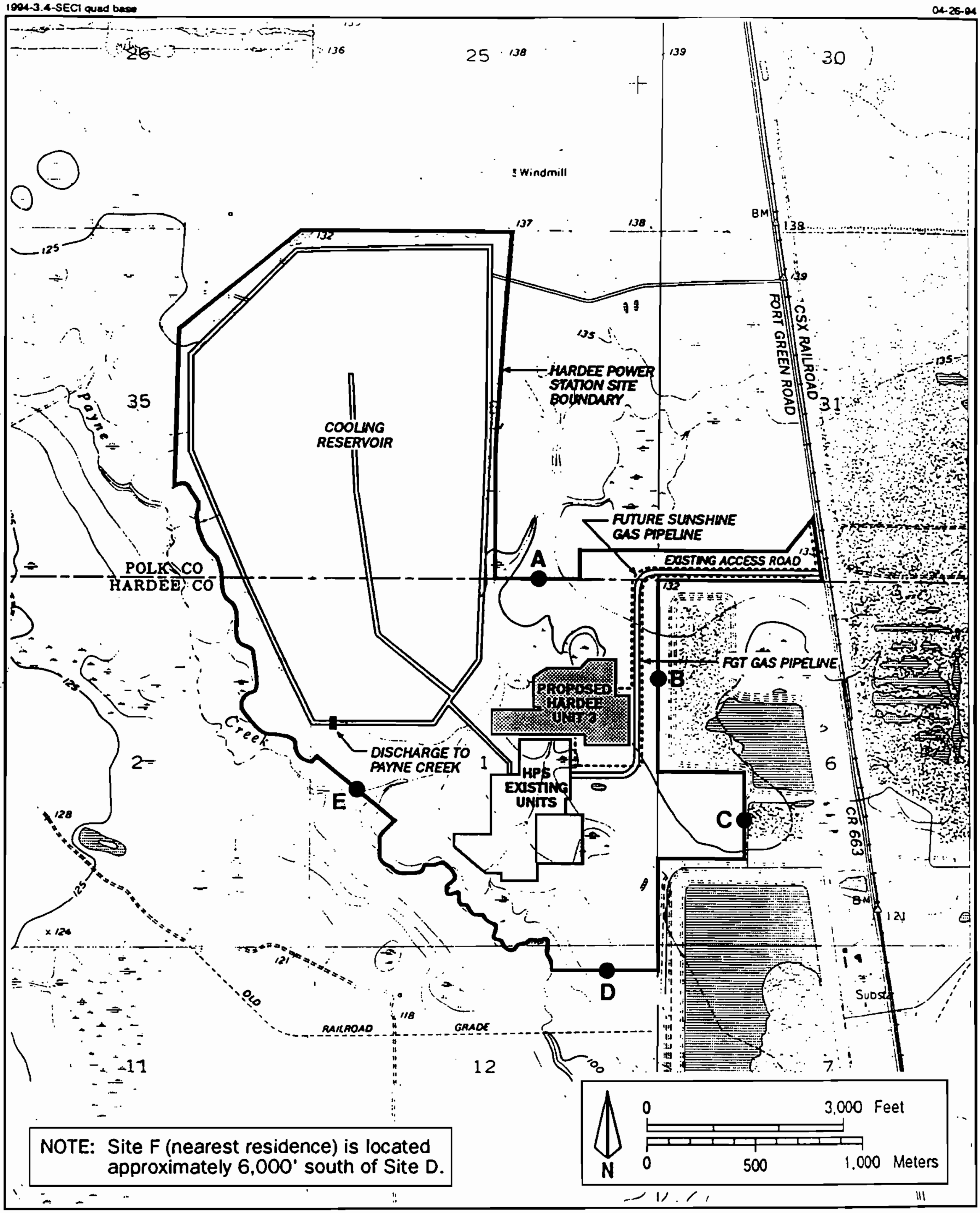

Figure 7.4-2
Receiver Sites Used for the Operational Noise Impact Analysis

Sources: USGS, 1987; KBN, 1994.

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Table 7.4-1. Summary of Noise Data for the Erection of Equipment and Structures Phase of the Construction Project

Equipment Type	Average Noise Level at 50 ft (dBA)[a]	Quantity	Usage Factor	Sound Power Level (dB) for Octave Band Center Frequency									Overall Sound Power Level (dBA)
				31.5	63	125	250	500	1K	2K	4K	8K	
Mobile Crane	83	1	0.12	0.0	111.6	118.6	116.6	114.6	109.6	104.6	98.6	92.6	115.6
Tractor Trailer	88	4	0.13	0.0	0.0	118.6	116.1	113.1	109.6	106.1	102.1	0.0	115.3
Backhoe	85	1	0.02	0.0	111.6	118.6	116.6	114.6	109.6	104.6	98.6	92.6	115.6
Front End Loader	84	1	0.02	0.0	111.6	118.6	116.6	114.6	109.6	104.6	98.6	92.6	115.6
Truck	88	4	0.02	0.0	0.0	118.6	116.1	113.1	109.6	106.1	102.1	0.0	115.3
Trencher	82	1	0.10	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Stationary Crane	88	3	0.08	0.0	115.6	122.6	120.6	118.6	113.6	108.6	102.6	96.6	119.6
Drill	85	1	0.02	0.0	100.6	105.6	106.6	107.6	110.6	111.6	107.6	107.6	116.6
Saw	78	2	0.10	0.0	91.6	86.6	84.6	84.6	96.6	91.6	93.6	96.6	101.2
Torque Wrench	85	10	0.10	0.0	94.6	97.6	98.6	100.6	106.6	110.6	110.6	108.6	116.1
Air Compressor	81	1	0.40	0.0	109.6	101.6	98.6	94.6	102.6	96.6	88.6	79.6	104.5

Note: NA = not available.

[a] For operation of a single unit.

Sources: Black & Veatch, 1994; KBN, 1994.

Table 7.4-2. Summary of Sound Power Levels of Major Noise Sources for Use in the Noise Impact Analysis

Source	Source Location[a] X (m)	Source Location[a] Y (m)	Source Height[b] (m)	Sound Power Level (dB) for Octave Band Center Frequency (Hz) 31.5	63	125	250	500	1K	2K	4K	8K	Overall Sound Power Level (dBA)
Transformer (North CT)	70.8	47.7	3.1	102	108	110	105	107	99	94	89	82	106.4
Transformer (Steam Turbine)	70.1	0.0	3.1	102	108	110	105	107	99	94	89	82	106.4
Transformer (South CT)	70.1	-29.8	3.1	102	108	110	105	107	99	94	89	82	106.4
HRSG (North)	-12.5	40.8	13.3	140	134	132	125	121	114	113	117	108	124.3
HRSG (South)	-12.9	-37.5	13.3	140	134	132	125	121	114	113	117	108	124.3
CT Air Inlet (North)	52.8	30.5	12.2	116	114	112	102	106	108	107	103	105	113.1
CT Air Inlet (South)	52.9	-46.0	12.2	116	114	112	102	106	108	107	103	105	113.1
Generator (North CT)	55.2	48.0	1.5	107	115	122	109	101	108	103	99	98	112.1
Generator (Steam Turbine)	45.7	0.0	1.5	107	115	122	109	101	108	103	99	98	112.1
Generator (South CT)	52.8	-30.5	1.5	107	115	122	109	101	108	103	99	98	112.1
CT Enclosure (North)	32.6	40.3	8.8	111	109	102	96	102	92	95	105	98	107.7
CT Enclosure (South)	34.7	-38.5	8.8	111	109	102	96	102	92	95	105	98	107.7
Mechanical Package (North CT)	38.4	47.4	1.5	110	109	111	102	100	97	97	98	92	104.9
Mechanical Package (South CT)	38.4	-30.0	1.5	110	109	111	102	100	97	97	98	92	104.9
Steam Turbine	33.5	0.0	4.6	113	117	118	115	114	116	114	114	113	121.4
Water Treatment Building	121.3	81.8	6.1	91	99	89	95	87	71	69	60	49	88.7
Circulating Water Pump	-562.5	109.3	4.9	98	103	102	101	100	99	101	97	92	105.9

Note: Data based on representative values for base design equipment.

[a] Relative to a grid center location at the general services building.
[b] Represents the noise source height used for noise modeling purposes.

Sources: Black & Veatch, 1994.
KBN, 1994.

Table 7.4-3. Impact Results Using Average L_{eq} Background[a] Values (all values dBA), Revised 7/20/94

Receiver Site	Description	Background	880-MW Facility w/o Background	880-MW Facility w/Background
A	North Boundary of Proposed Site	48.9	64.2	64.3
B	East Boundary of Proposed Site	50.4	64.5	64.7
C	Southeast Boundary of Proposed Site	50.4	56.5	57.0
D	South Boundary of Proposed Site	48.7	54.7	55.7
E	West Boundary of Proposed Site	48.7	57.5	58.0
F	South of Proposed Site (@ Residences)	45.6[b]	44.4	48.1

[a] Background values include noise emissions factor of 1.4915.
[b] Background value based on a previous analyses for predicted noise levels due to the existing Hardee Power Station.

Source: KBN, 1994.

Table 7.4-4. Impact Results Using Average Minimum Background[a] Values (all values dBA), Revised 7/20/94

Receiver Site	Description	Background	880-MW Facility w/o Background	880-MW Facility w/Background
A	North Boundary of Proposed Site	46.1	64.2	64.3
B	East Boundary of Proposed Site	47.5	64.5	64.6
C	Southeast Boundary of Proposed Site	47.5	56.5	57.0
D	South Boundary of Proposed Site	41.3	54.7	54.9
E	West Boundary of Proposed Site	41.3	57.5	57.6
F	South of Proposed Site (@ Residences)	45.6[b]	44.4	48.1

[a] Background values include noise emissions factor of 1.4915.
[b] Background value based on a previous analyses for predicted noise levels due to the existing Hardee Power Station.

Source: KBN, 1994.

Table 7.5-1. 880-MW HPS Cooling Reservoir Water Discharge and Payne Creek Dispersion Modeling - Maximum (July) Temperature Conditions

Distance Downstream (ft)	Temperature (°F) versus Distance Across Payne Creek										
	0	2	4	6	8	10	12	14	16	18	20
25	89.7	89.5	89.0	88.3	87.6	87.0	86.6	86.3	86.1	86.1	86.0
50	88.6	88.5	88.4	88.1	87.7	87.4	87.1	86.8	86.6	86.4	86.4
75	88.1	88.1	88.0	87.8	87.6	87.4	87.2	87.0	86.9	86.8	86.8
100	87.9	87.8	87.8	87.7	87.6	87.4	87.3	87.2	87.1	87.0	87.0
125	87.7	87.7	87.7	87.6	87.5	87.4	87.4	87.3	87.2	87.2	87.2
150	87.6	87.6	87.6	87.5	87.5	87.4	87.4	87.3	87.3	87.3	87.3
175	87.5	87.5	87.5	87.5	87.5	87.4	87.4	87.4	87.4	87.3	87.3
200	87.5	87.5	87.5	87.5	87.5	87.4	87.4	87.4	87.4	87.4	87.4
225	87.5	87.5	87.5	87.5	87.5	87.4	87.4	87.4	87.4	87.4	87.4
250	87.5	87.5	87.5	87.5	87.5	87.4	87.4	87.4	87.4	87.4	87.4
275	87.5	87.5	87.5	87.5	87.4	87.4	87.4	87.4	87.4	87.4	87.4
300	87.5	87.5	87.5	87.4	87.4	87.4	87.4	87.4	87.4	87.4	87.4
325	87.4	87.4	87.4	87.4	87.4	87.4	87.4	87.4	87.4	87.4	87.4
350	87.4	87.4	87.4	87.4	87.4	87.4	87.4	87.4	87.4	87.4	87.4
375	87.4	87.4	87.4	87.4	87.4	87.4	87.4	87.4	87.4	87.4	87.4
400	87.4	87.4	87.4	87.4	87.4	87.4	87.4	87.4	87.4	87.4	87.4
425	87.4	87.4	87.4	87.4	87.4	87.4	87.4	87.4	87.4	87.4	87.4
450	87.4	87.4	87.4	87.4	87.4	87.4	87.4	87.4	87.4	87.4	87.4
475	87.4	87.4	87.4	87.4	87.4	87.4	87.4	87.4	87.4	87.4	87.4
500	87.4	87.4	87.4	87.4	87.4	87.4	87.4	87.4	87.4	87.4	87.4

Creek Velocity	0.50	ft/sec
Shear Velocity	0.259	ft/sec
Average Creek Depth	2.5	ft
Creek Width	20	ft
Discharge Location	0	ft from shore
Effluent Temperature	97.70	°F
Effluent Discharge Rate	0.330000	cfs
Background Creek Temperature	86.00	°F
Creek Discharge Rate	22.0	cfs
Transverse Mixing Coefficient	0.389	ft^2/sec

Note: °C = (°F - 32) 5/9
ft x 0.3 = m

Source: KBN, 1994.

8.0 MONITORING AND MITIGATION

8.1 Air Quality

Post-construction ambient air quality monitoring is not anticipated to be required for this project since the air quality analyses demonstrate that the proposed project will comply with all applicable ambient standards.

The Hardee Unit 3 Project will be subject to 40 CFR 60, GG. Continuous monitoring of fuel consumption and ratio of water to fuel oil being fired in the turbines will be conducted as requested by Subpart GG, Section 60.334(b). Initial performance testing of the CTs for NO_x and SO_2 emissions will be conducted as stipulated by Subpart GG, Section 60.335.

Initial and periodic performance testing of pollutants emitted by the facility will be conducted pursuant to FDEP and federal requirements. FDEP test methods are specified in Chapter 17-297, F.A.C.

Continuous emission monitoring for NO_x and SO_2 is required for the project because the combustion turbines are defined as new units in EPA's Acid Rain Program. The Acid Rain Program was delineated in Title IV of the CAA Amendments and required EPA to develop the program. EPA's final regulations were promulgated on January 11, 1993, and included permit provisions (40 CFR Part 72), allowance system (Part 73), continuous emission monitoring (Part 75), excess emission procedures (Part 77), and appeal procedures (Part 78).

Under 40 CFR Part 75, specific provisions for monitoring SO_2 emissions (Part 75.11) and NO_2 emissions (Part 75.12) are identified for gas-fired and oil-fired (nonpeaking) units. When an SO_2 CEM is selected to determine mass SO_2 emissions, a flow monitor is also required. Alternatively, SO_2 emissions may be determined using procedures established in Appendix D, Part 75 (flow proportional oil sampling or manual daily oil sampling). For determining NO_x emission, a diluent gas monitor in the NO_x monitoring system may measure either O_2 or CO_2 concentration in the flue gases. CO_2 emissions must also be determined either through a continuous emission monitoring (as a diluent for NO_x monitoring) or calculation. Alternate procedures, test methods, and quality assurance and control procedures are specified in Part 75, Appendices A through I. New units are required to meet the requirements by January 1, 1995, or not later than 90 days after the unit commences commercial operation. The expected inservice date for Hardee Unit 3 is January 1, 1999.

8.2 Water Resources

8.2.1 Surface Water

During construction, a stormwater pond will be provided for contaminated stormwater runoff and dewatering wastes to reduce the discharge of turbidity and silt to Payne Creek.

Soil erosion plans have been developed and are included in Appendix 10.9 of the Site Certification Application/Environmental Analyses. In general, site grading and drainage would be designed to comply with all applicable federal, state, and local regulations. The general site grading would establish a working surface for construction and plant operating areas, provide positive drainage from buildings and structures, and provide adequate soil coverage for underground utilities. Soils excavated from the site material would be removed to the required specified lines and grades. Undesirable material would be removed and replaced with suitable earth material. Drainage ditches would be designed to carry the 25-year, design rainfall event with flows less than eroding velocities. Erosion protection would consist of grassed surfaces in all ditches. Enkamat, or an approved equal erosion control fabric, would be installed to limit erosion at culvert outlets. Drainage culverts would be designed to ensure passage of the 25-year peak runoff flow without producing a headwater elevation above the bottom of the roadway base course. Dewatering equipment would be provided and maintained to remove and dispose of all surface and ground water entering excavations and other parts of the work site. Existing natural and mine reclamation drainage patterns would be altered so that all runoff from the main plant site would be directed to the runoff detention pond. Prior to beginning excavation activities, a silt fence or straw bales would be installed along the site perimeter of the site to trap sediments from construction runoff. During construction, earth disturbances would be minimized as much as practical. Surfaces to be used for parking and roads during construction would be covered with an aggregate material. Final finish grading and seeding would begin when earthmoving operation are completed in the site area.

The Southwest Florida Water Management District has issued its final agency report which includes management and storage of surface waters and the Governing Board of the District has approved the proposed project. These plans and activities will be incorporated into the design and construction of Hardee Unit 3.

All liquid waste effluents from operation of the Hardee Power Station will be routed to the cooling reservoir. Prior to discharge these wastewaters (exclusive of condenser cooling water) will receive treatment - such as chemical neutralization, precipitation, sedimentation, oil and grease removal and/or biological treatment - and combined as a single discharge to the cooling reservoir. Wastewater contaminated with chemicals used to clean the heat recovery steam generator will be removed from the site and properly disposed of.

Comprehensive effluent, in-reservoir and upstream/downstream monitoring in Payne Creek will be implemented to ensure that direct and indirect discharges from the cooling reservoir do not have unacceptable impacts on Payne Creek.

A total of 0.26 acre of forested wetland is proposed to be created on the north side of the unnamed tributary wetland. The mitigation site will be approximately 35 feet wide and extend approximately 324 feet along the tributary wetland. It will be situated between the tributary wetland and an upland reclamation area created by IMC-Agrico. Construction of the wetland would commence with the construction of Hardee Unit 3 which is scheduled for January 1997. Plants species likely to be found in the adjacent floodplain forest in the Polk/Hardee County area would be planted in the created wetland to increase wetland functions in the area, augment natural recruitment of tree and herbaceous species, and increase the density and diversity of tree species in the area.

Wetland monitoring would occur quarterly for the first year and semi-annually thereafter. The mitigation project would be considered successful when the density of trees growing above the herbaceous stratum is equivalent to at least 400 trees per acre. Tree survival, health and vigor assessment, percent cover of desirable species, and percent cover of exotic and nuisance species will be determined during each monitoring event. Maintenance of the mitigation area will include routine removal of nuisance and exotic species with the intent of reducing these species to approximately 0 percent following each maintenance event. At no time will the exotic and nuisance species coverage be allowed to exceed 10 percent.

8.2.2 Groundwater

Groundwater monitoring at the Hardee Unit 3 site is proposed to be conducted in a manner consistent with ongoing activities. Locations for proposed additional monitor wells have been selected to characterize potential impacts to groundwater quality in the surficial aquifer and include the following areas:

1. Upgradient from Hardee Unit 3 site to characterize background conditions,
2. Upgradient from Hardee Unit 3 detention pond,
3. Downgradient from Hardee Unit 3 detention pond, and
4. Downgradient from Hardee Unit 3 power block and upgradient from HPS existing facilities.

It is intended that groundwater monitoring at these locations will characterize ambient groundwater quality trends, identify potential groundwater quality impacts due to plant operation, and provide a means to distinguish between potential sources of impacts.

8.3 Cultural Resources

Should any cultural resource be found during site clearing and/or project construction, clearing and construction activities that could have an affect on the find will be halted and a certified archaeologist will be retained to evaluate the find and consult with RUS and the Florida Department of State, Division of Historical Resources, to determine if the resource is eligible for listing on the National Register of Historic Places. If it is eligible, no activity that may affect the resource will be initiated until RUS has satisfied its obligations pursuant to the Advisory Council on Historic Preservation regulations, 36 CFR Part 800, for implementing the National Historic Preservation Act.

8.4 Noise

Construction contractors will be requested to use low-noise level equipment and noise attenuating devices such as mufflers on construction equipment. Construction activities at the site will only occur during normal daylight working hours.

The public will be notified in advance (i.e., by posting notices on the property) of any predictable single-event noise that could be intrusive.

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APPENDIX A

PROPOSED NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM PERMIT

PERMIT NO. FL0044229
Major Non-POTW

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IV

AUTHORIZATION TO DISCHARGE UNDER THE
NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM

In compliance with the provisions of the Clean Water Act, as amended (33 U.S.C. 1251 et seq.; the "Act"),

Seminole Electric Cooperative, Inc.
Post Office Box 272000
Tampa, Florida 33688-2000

is authorized to discharge from a facility located at

Hardee Power Station
Combined Cycle Unit 3
County Road 663
Hardee County, Fort Green 33834

to receiving waters named

and unnamed tributary and Payne Creek

in accordance with effluent limitations, monitoring requirements and other conditions set forth herein. The permit consists of this cover sheet, Part I 7 pages, Part II 16 pages, Part III 4 pages, and Part IV 5 pages.

This permit shall become effective on February 6, 1996.

This permit and the authorization to discharge shall expire at midnight,

REVISED DRAFT
APR 19 1995

Date Issued	Robert F. McGhee, Acting Director Water Management Division

PART I

A. *EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS* - FINAL

1. During the period beginning on the effective date of this permit and lasting through expiration, the permittee is authorized to discharge from outfall serial number (OSN) ***001[1] - OVERFLOW from COOLING RESERVOIR*** to the Payne Creek from extreme or cumulative storms in excess of the 10-year, 24-hour rainfall event, (includes **SECI**[2] OSN 002 and **TPS**[3] OSN 003, construction dewatering, and condenser cooling water).

a. Such discharges shall be limited and monitored by the permittee as specified below:

	DISCHARGE LIMITATIONS	MONITORING REQUIREMENTS	
EFFLUENT CHARACTERISTIC	Instantaneous Maximum	Measurement Frequency	Sample Type
Flow, MGD	Report	1/Day	Calculation
Temperature, °F	95.0[4]	2/Day	Grab
Alpha, Gross, pC/l	22.2[4]	[6]	Grab
Cadmium, μg/l [5]	2.47[4]	[6]	Grab
Copper, μg/l [5]	8.3[4]	[6]	Grab
Cyanide, mg/l	0.01[4]	[6]	Grab
Dissolved Oxygen, mg/l	Report	[6]	Grab
Iron (Total), mg/l	1.0	[6]	Grab
Lead, μg/l [5]	1.9[4]	[6]	Grab
Mercury, μg/l [5]	0.012[4]	[6]	Grab
Radium 226 and 228, pC/l	6.2[4]	[6]	Grab
Selenium, μg/l [5]	20.0[4]	[6]	Grab
Silver (Total), μg/l	0.008[4]	[6]	Grab
Turbidity, NTU	31[4]	[6]	Grab
Total Dissolved Solids, mg/l	Report	[6]	Grab
Total Residual Chlorine, mg/l	0.01	[6]	Grab
Zinc, μg/l [5]	82.7[4]	[6]	Grab
Additional Monitoring [7]	Report	1/Quarter	Grab

b. The pH shall not be less than 6.0 standard units nor greater than 8.5 standards units and shall be monitored[6] by a grab sample.

SEE NEXT PAGE FOR FOOTNOTES

PART I

A. ***EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS*** - FINAL

1. During the period beginning on the effective date of this permit and lasting through expiration, the permittee is authorized to discharge from outfall serial number (OSN) ***001 - OVERFLOW from COOLING RESERVOIR*** to the Payne Creek from extreme or cumulative storms in excess of the 10-year, 24-hour rainfall event, (includes SECI OSN 002 and TPS OSN 003, construction dewatering, and condenser cooling water).

CONTINUED

c. Discharge of seepage water from the Reservoir as a point source to any stream which enters waters of the U.S. (except back into the reservoir), is not authorized by this permit.

d. There shall be no discharge of floating solids or visible foam in other than trace amounts.

e. Monitoring of the overflow is required only during periods of discharge. "Additional Monitoring" shall commence on commercial operation date of Unit 3.

f. Samples taken in compliance with the monitoring requirements specified above shall be taken at the following locations: point of discharge from the Cooling Reservoir prior to mixing with any other waste stream or discharge to the receiving waters, except that samples for "Additional Monitoring" shall be collected within the Reservoir at the cooling water intake.

Footnotes:

---

[1] Seminole Electric Cooperative, Inc. and TECO Power Services Corporation jointly occupy the **Hardee** Power Station site. SECI is proposing to own and operate a new 440 megawatt (**MW**) **combined** cycle power plant (Unit 3) which is authorized to discharge to waters of the U.S. pursuant to this permit. TPS currently owns and operates Units 1 and 2 which have a buildout capacity of 440 MW (NPDES Permit No. FL0041571). Both permittees will jointly operate the Cooling Reservoir which discharges via OSN 001). See Part III.C for additional conditions.

[2] **SECI** (Seminole Electric Cooperative, Inc.) operates OSN 002.

[3] **TPS** (TECO Power Services Corporation) operates OSN 003.

[4] Notwithstanding the limitations above, effluent from this outfall serial number shall not cause an exceedance of Water Quality Standards criteria contained in Section 17-302 of the Florida Administrative Code (**FAC**) (April 25, 1993) at the edge of the

PART I

A. ***EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS*** **- FINAL**

1. During the period beginning on the effective date of this permit and lasting through expiration, the permittee is authorized to discharge from outfall serial number (OSN) ***001 - OVERFLOW from COOLING RESERVOIR*** to the Payne Creek from extreme or cumulative storms in excess of the 10-year, 24-hour rainfall event, (includes SECI OSN 002 and TPS OSN 003, construction dewatering, and condenser cooling water).

Footnotes continued:

---

mixing zone extending 50 feet downstream from the downstream edge of the overflow spillway (except for temperature which is extends 75 feet) for: cyanide (0.005 mg/l); radioactivity [gross alpha (15 pC/l) and radium 226 and 228 (5 pC/l)]; temperature (92.0°F); temperature rise (5.0°F instantaneous maximum increase above ambient (natural) temperature; and total recoverable cadmium (0.0008 mg/l), total recoverable selenium (0.005 mg/l), total recoverable silver (0.00007 mg/l), and total recoverable zinc (0.075 mg/l); and turbidity (not to exceed 29 NTU above background). Compliance with these limitations shall be deemed met without additional monitoring, if the effluent limitations are less than or equal to those provided above.

[5] Limitations shall be reported in terms of total recoverable metals.

[6] Sampling shall be once per day of discharge but no more than once per week.

[7] Parameters for "Additional Monitoring: shall include: chlorophyll A; cyanide; nitrogen (ammonia, unionized ammonia, organic, total, and total kjeldahl); pH; phosphorus (orthophosphate and total phosphorus); temperature; total berylium cadmium, copper, iron, lead, mercury, selenium, silver, and zinc; total dissolved solids; and turbidity (NTU). This monitoring shall commence with the commercial operation date of Unit 3, with a frequency of once every six months. If any of the above parameters (except pH and temperature) in the Reservoir should reach 80% of the water quality criteria as contained in Section 17-302 of the FAC, the permittee shall notify the Director. Upon such notification, the Director may modify this permit to require increased sampling and may approve mixing zones for parameters that exceed criteria. Monitoring upstream and downstream of the Cooling Reservoir may be required.

PART I

A. *EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS* - FINAL

2. During the period beginning on the effective date of this permit and lasting through expiration, the permittee is authorized to discharge from ***SECI OSN 002***[1] **- *TREATED LOW VOLUME WASTES*** (includes demineralizer regeneration wastes, equipment and floor drains, boiler blowdown, and similar wastes), storm water from diked petroleum off loading and storage areas, and treated domestic wastewater to the Cooling Reservoir.

a. Such discharges shall be limited and monitored by the permittee as specified below:

	DISCHARGE LIMITATIONS		MONITORING REQUIREMENTS	
EFFLUENT CHARACTERISTIC	Daily Average	Daily Maximum	Measurement Frequency	Sample Type
Flow, MGD	Report	Report	1/Month	Instantaneous
Oil and Grease, mg/l	15.0	20.0[2]	1/Month	Grab
Total Suspended Solids, mg/l	30.0	100.0[2]	1/Month	Grab

b. The pH shall not be less than 6.0 standard units nor greater than 9.0 standard units and shall be monitored once/month by a grab sample.

c. There shall be no discharge of floating solids or visible foam in other than trace amounts.

d. Discharge of hydrazine in HRSG blowdown is authorized without discharge limitations or monitoring requirements.

e. Samples taken in compliance with the monitoring requirements specified above shall be taken at the following location(s); combined effluent prior to discharge to the Cooling Reservoir or combination with any other waste stream.

---

[1] Internal serial number assigned for identification and monitoring purposes.

[2] During any month in which only one sample is taken, the applicable limitations are those listed under "Daily Average."

PART I

A. *EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS* - FINAL

3. During the period beginning on the effective date of this permit and lasting through expiration, the permittee is authorized to discharge from ***SECI OSN 003 - STORM WATER DETENTION POND DISCHARGE*** (includes runoff contaminated by construction activities and dewatering wastes during construction and uncontaminated site runoff during operation) to an unnamed tributary to Payne Creek.

a. Such discharges shall be limited and monitored by the permittee as specified below:

	DISCHARGE LIMITATIONS	MONITORING REQUIREMENTS	
EFFLUENT CHARACTERISTIC	Instantaneous Maximum	Measurement Frequency	Sample Type
Flow, MGD	Report	[1]	Calculation
Total Suspended Solids (mg/l)	50.0[2]	[1]	Grab
Construction Dewatering Monitoring (mg/l)	Report[3]	[1]	Grab

b. The pH shall not be less than 6.0 standard units nor greater than 8.5 units and shall be monitored 1/month by a grab sample.

c. There shall be no discharge of floating solids or visible foam in other than trace amounts.

d. The above limitations and monitoring requirements are not applicable during periods of no discharge.

e. At all times, the pond volume shall be adequate to detain the total volume of water equal to a 10-year 24-hour rainfall event[1], maximum dewatering waste flow, and all accumulated silt.

SEE NEXT PAGE FOR FOOTNOTES

PART I

A. *EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS* - FINAL

3. During the period beginning on the effective date of this permit and lasting through expiration, the permittee is authorized to discharge from ***SECI OSN 003 - STORM WATER DETENTION POND DISCHARGE*** (includes runoff contaminated by construction activities and dewatering wastes during construction uncontaminated site runoff during operation) to Payne Creek.

CONTINUED

e. Samples taken in compliance with the monitoring requirements specified above shall be taken at the following location(s): point of discharge from the Detention Pond prior to mixing with any other waste stream or discharge to the receiving waters.

Footnotes:

---

[1] Sampling shall be once per discharge, but no more than once per week.

[2] Applicable to any flow up to the flow resulting from a 10-year 24-hour (10Y24H) rainfall event. Rainfall data shall be reported for any period(s) of discharge in excess of the 10Y24H event.

[3] "Construction Dewatering Monitoring" at the Storm Water Detention Pond discharge shall be conducted only for/during periods in which dewatering waste was/is disharged into the pond, and shall included: cyanide (0.005 mg/l); radioactivity [gross alpha (15 pC/l) and radium 226 and 228 (5 pC/l)]; temperature (92.0°F); oil and grease (5.0 mg/l); and total recoverable cadmium (0.0008 mg/l); total iron (0.03 mg/l); total recoverable selenium (0.005 mg/l), total recoverable silver (0.00007 mg/l), and total recoverable zinc (0.075 mg/l). Effluent from this outfall serial number shall not exceed Water Quality Standards Criteria contained in Section 17-302 of FAC (April 25, 1993) at the Detention Pond discharge. No mixing zone is authorized for this outfall.

B. SCHEDULE OF COMPLIANCE

1. The permittee shall achieve compliance with the effluent limitations specified for discharges in accordance with the following schedule:

   a. Attainment of effluent limitations....................on start of discharge

   b. Erosion and sediment control plan (III.E)

      (1) Implement..............By start of construction
      (2) Reports......Semiannually, starting 6 mo. after start of construction

   c. Best Management Practices (BMP) Plan (Part IV)

      (1) Develop plan.......6 months prior to commercial operation (CO) date of Unit 3
      (2) Implement plan.........By CO date of Unit 3

   d. Additional Monitoring (OSN 001)

      (1) Implement at 1/six months....18 months after CO date of Unit 3

   e. Priority pollutant data (see Part III.D).....Within two years of C.O. date of Unit 3

2. Not 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 specified actions being required by identified dates, a written notice of compliance or noncompliance, any remedial actions taken, and probability of meeting the next scheduled requirement.

Part II

STANDARD CONDITIONS FOR NPDES PERMITS

SECTION A. GENERAL CONDITIONS

1. Duty to Comply

The permittee must comply with all conditions of this permit. Any permit noncompliance constitutes a violation of the Clean Water Act and is grounds for enforcement action; for permit termination, revocation and reissuance, or modification; or for denial of a permit renewal application.

2. Penalties for Violations of Permit Conditions

Any person who violates a permit condition is subject to a civil penalty not to exceed $25,000 per day for each violation. Any person who negligently violates any permit condition is subject to criminal penalties of $2,500 to $25,000 per day of violation, or imprisonment for not more than 1 year, or both. Any person who knowingly violates permit conditions is subject to criminal penalties of $5,000 to $50,000 per day of violation, or imprisonment for not more than 3 years, or both. Also, any person who violates a permit condition may be assessed an administrative penalty not to exceed $10,000 per violation with the maximum amount not to exceed $125,000. [Ref: 40 CFR 122.41(a)]

3. Duty to Mitigate

The permittee shall take all reasonable steps to minimize or prevent any discharge in violation of this permit which has a reasonable likelihood of adversely affecting human health or the environment.

4. Permit Modification

After notice and opportunity for a hearing, this permit may be modified, terminated, or revoked 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;

c. A change in any conditions that requires either temporary interruption or elimination of the permitted discharge; or

d. Information newly acquired by the Agency indicating the discharge poses a threat to human health or the environment.

If the permittee believes that any past or planned activity would be cause for modification or revocation and reissuance under 40 CFR 122.62, the permittee must report such information to the Permit Issuing Authority. The submittal of a new application may be required of the permittee. The filing of a request by the permittee for a permit modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance, does not stay any permit condition.

5. Toxic Pollutants

Notwithstanding Paragraph 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 of such pollutant in this permit, this permit shall be modified or revoked and reissued to conform to the toxic effluent standard or prohibition and the permittee so notified.

6. Civil and Criminal Liability

Except as provided in permit conditions on "Bypassing" Section B, Paragraph B-3, and "Upsets" Section b, Paragraph B-4, 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 or 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.

9. Property Rights

The issuance of this permit does not convey any property rights of any sort, 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. Onshore or Offshore Construction

This permit does not authorize or approve the construction of any onshore or offshore physical structures or facilities or the undertaking of any work in any waters of the United States.

11. 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 thereby.

12. Duty to Provide Information

The permittee shall furnish to the Permit Issuing Authority, within a reasonable time, any information which the Permit Issuing Authority may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit or to determine compliance with this permit. The permittee shall also furnish to the Permit Issuing Authority upon request, copies of records required to be kept by this permit.

SECTION B. OPERATION AND MAINTENANCE OF POLLUTION CONTROLS

1. Proper Operation and Maintenance

The permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the permittee to achieve compliance with the conditions of this permit. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures. This provision requires the operation of back-up or auxiliary facilities or similar systems which are installed by a permittee only when the operation is necessary to achieve compliance with the conditions of the permit.

2. Need to Halt or Reduce not a Defense

It shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the condition of this permit.

3. Bypass of Treatment Facilities

a. Definitions

(1) "Bypass means the intentional diversion of waste streams from any portion of a treatment facility, which is not a designed or established operating mode for the facility.

(2) "Severe property damage" means substantial physical damage to property, damage to the treatment facilities which causes them to become inoperable, or substantial and permanent loss of natural resources which can reasonably be expected to occur in the absence of a bypass. Severe property damage does not mean economic loss caused by delays in production.

b. Bypass not exceeding limitations.

The permittee may allow any bypass to occur which does not cause effluent limitations to be exceeded, but only if it also is for essential maintenance to assure efficient operation. These bypasses are not subject to the provisions of Paragraphs c. and d. of this section.

c. Notice

(1) Anticipated bypass. If the permittee knows in advance of the need for a bypass, it shall submit prior notice, if possible at least ten days before the date of the bypass; including an evaluation of the anticipated quality and effect of the bypass.

(2) Unanticipated bypass. The permittee shall submit notice of an unanticipated bypass as required in Section D, Paragraph D-8 (24-hour notice).

d. Prohibition of bypass

(1) Bypass is prohibited and the Permit Issuing Authority may take enforcement action against a permittee for bypass, unless:

(a) Bypass was unavoidable to prevent loss of life, personal injury, or severe property damage;

(b) There were no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime. This condition is not satisfied if adequate backup equipment should have been installed in the exercise of reasonable engineering judgement to prevent a bypass which occurred during normal periods of equipment downtime or preventive maintenance; and

(c) The permittee submitted notices as required under Paragraph c. of this section.

(2) The permit Issuing Authority may approve an anticipated bypass, after considering its adverse effects, if the Permit Issuing Authority determines that it will meet the three conditions listed above in Paragraph d.(1) of this section.

4. Upsets

"Upset" means an exceptional incident in which there is unintentional and temporary noncompliance with technology based permit effluent limitations because of factors beyond the reasonable control of the permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, lack of preventive maintenance, or careless or improper operation. An upset constitutes an affirmative defense to an action brought for noncompliance with such technology based permit limitation if the requirements of 40 CFR 122.41(n)(3) are met.

5. Removed Substances

This permit does not authorize discharge of solids, sludge, filter backwash, or other pollutants removed in the course of treatment of control of wastewaters of the United States unless specifically limited in Part 1.

SECTION C. MONITORING AND RECORDS

1. Representative Sampling

Samples and measurements taken as required herein shall be representative of the volume and nature of the monitored discharge. All samples shall be taken at the monitoring points specified in this permit and, unless otherwise specified, before the effluent joins or is diluted by any other wastestream, body of water, or substance. Monitoring points shall not be changed without notification to and the approval of the Permit Issuing Authority.

2. Flow Measurements

Appropriate flow measurements devices and methods consistent with accepted scientific practices shall be selected and used to insure the accuracy and reliability of measurements of the volume of monitored discharges. The devices shall be installed, calibrated and maintained to insure that the accuracy of the measurements are consistent with the accepted capability of that type of device. Devices selected shall be capable of measuring flows with a maximum deviation of less than ±10% from the true discharge rates throughout the range of expected discharge volumes. Once-through condenser cooling water flow which is monitored by pump logs, or pump hour meters as specified in Part I of this permit and based on the manufacture's pump curves shall not be subject to this requirement. Guidance in selection, installation, calibration, and operation of acceptable flow measurement devices can be obtained from the following references:

(1) "A Guide of Methods and Standards for the Measurement of Wat Flow", U.S. Department of Commerce, National Bureau of Standards, NBS Special Publication 421, May 1975, 97 pp. (Available from the U.S. Government Printing Office, Washington, D.C. 20402. Order by SD catalog No. C13.10:421.)

(2) "Water Measurement Manual", U.S. Department of Interior, Bureau of Reclamation, Second Edition, Revised Reprint, 1974, 327 pp. (Available from the U.S. Government Printing Office, Washington, D.C. 20402. Order by catalog No. 127.19/2:W29/2, Stock No. S/N 24003-0027.)

(3) "Flow M sure t in Open Channels and Closed Conduits", U.S. Department of Commerce, National Bureau of Standards, NBS Special Publication 484, October 1977, 982 pp. (Available in paper copy or microfiche from National Technical Information Service (NTIS), Springfield, VA 22151. Order by NTIS No. PB-273 535/5ST.)

(4) "NPDES Compliance Flow Measurement Manual", U.S. Environmental Protection Agency, Office of Water Enforcement, Publication MCD-77, September 1981, 135 pp. (Available from the General Service Administration (8BRC), Centralized Mailing Lists Services, Building 41, Denver Federal Center, Denver, CO. 80255.)

3. Monitoring Procedures

Monitoring must be conducted according to test procedures approved und 40 CFR Part 136, unless other test procedures have been specified in this permit.

4. Penalti for Tampering

The Clean Water Act provides that any person w falsifies, tampers with, or knowingly renders inaccurate, any monitoring device or method required to be maintained under this permit shall, upon conviction, be punished by a fine of not more than $10,000 per violation, or imprisonment for not more than 2 years, or both.

5. Retention of Records

The permittee shall retain records of all monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by this permit, and records of all data used to complete the application for this permit, for a period of at least 3 years from the date of the sample, measurement, report, or application. This period may be extended by the Permit Issuing Authority at any time.

6. Record Contents

Records of monitoring information shall include:

a. The date, exact place, and time of sampling or measurements;

b. The individual(s) who performed the sampling of measurements;

c. The date(s) analyses were performed;

d. The individual(s) who performed the analyses;

e. The analytical techniques or methods used; and

f. The results of such analysis.

7. Inspection and Entry

The permittee shall allow the permit Issuing Authority, or a authorized representative, upon the presentation of credentials and other documents as may be required by law, to;

a. Enter upon the permittee's premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of this permit;

b. Have access to and copy, at reasonable times, any records that must be kept under the conditions of this permit.

c. Inspect at reasonable time any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this permit; and

d. Sample or monitor at reasonable times, for the purposes of assuring permit compliance or as otherwise authorized by the Clean Water Act, any substances or parameters at any location.

SECTION D. REPORTING REQUIREMENTS

1. Change in Discharge

The permittee shall give notice to the Permit Issuing Authority as soon as possible of any planned physical alterations or additions to the permitted Facility. Notice is required only when:

a. The alteration or addition to a permitted facility may meet one of the criteria for determining whether a facility is a new source; or

b. The alteration or addition could significantly change the nature or increase the quantity of pollutants discharged. This notification applies to pollutants which are subject neither to effluent limitations in the permit, nor to notification requirements under Section D, Paragraph D-10(a).

2. Anticipated Noncompliance

The permittee shall give advance notice to the Permit Issuing Authority of any planned change in the permitted facility or activity which may result in noncompliance with permit requirements. Any maintenance of facilities, which might necessitate unavoidable interruption of operation and degradation of effluent quality, shall be scheduled during noncritical water quality periods and carried out in a manner approved by the Permit Issuing Authority.

3. Transfer of Ownership or Control

A permit may be automatically transferred to another if:

a. The permittee notifies the Permit Issuing Authority of the proposed transfer at least 30 days in advance of the proposed transfer date;

b. The notice includes a written agreement between the existing and new permittees containing a specific date for transfer of permit responsibility, coverage, and liability between them; and

c. The Permit Issuing Authority does not notify the existing permittee of his or her intent to modify or revoke and reissue the permit. If this notice is not received, the transfer is effective on the date specified in the agreement mentioned in paragraph b.

4. Monitoring Reports

See Part III of this permit.

5. Additional Monitoring by the Permittee

If the permittee monitors any pollutant more frequently than required by this permit, using test procedures approved under 40 CFR 136 or as specified in this permit, the results of this monitoring shall be included in the calculation and reporting of the data submitted in the Discharge Monitoring Report (DMR). Such increased frequency shall also be indicated.

6. Averaging of Measurements

Calculations for limitations which require averaging of measurements shall utilize an arithmetic mean unless otherwise specified by the Permit Issuing Authority in the permit.

7. Compliance Schedules

Reports of compliance or noncompliance with, or any progress on, interim and final requirements contained in any compliance schedule of this permit shall be submitted no later than 14 days following each schedule date. Any reports of noncompliance shall include the cause of noncompliance, any remedial actions taken, and the probability of meeting the next scheduled requirement.

8. Twenty-Four Hour Reporting

The permittee shall orally report any noncompliance which may endanger health or the environment, within 24 hours from the time the permittee becomes aware of the circumstances. A written submission shall also be provided within 5 days of the time the permittee becomes aware of the circumstances. The written submission shall contain a description of the noncompliance and its cause, the period of noncompliance, including the exact dates and times; and if the noncompliance has not been corrected, the anticipated time it is expected to continue, and steps taken or planned to reduce, eliminate and prevent reoccurrence of the noncompliance. The Permit Issuing Authority may verbally waive the written report, on a case-by-case basis, when the oral report is made.

The following violations shall be included in the 24 hour report when they might endanger health or the environment:

a. An unanticipated bypass which exceeds any effluent limitation in the permit.

b. Any upset which exceeds any effluent limitation in the permit.

9. Other Noncompliance

The permittee shall report in narrative form, all instances of noncompliance not previously reported under Section D, Paragraphs D-2, D-4, D-7, and D-8 at the time monitoring reports are submitted. The reports shall contain the information listed in Paragraph D-8.

10. Changes in Discharges of Toxic Substances

The permittee shall notify the Permit Issuing Authority as soon as it knows or has reason to believe:

a. That any activity has occurred or will occur which would result in the discharge, on a routine or frequent basis, of any toxic substance(s) (listed at 40 CFR 122, Appendix D, Table II and III) which is not limited in the permit, if that discharge will exceed the highest of the following "notification levels":

(1) One hundred micrograms per liter (100 ug/l);

(2) Two hundred micrograms per liter (200 ug/l) for acrolein and acrylonitrile; five hundred micrograms per liter (500 ug/l) for 2,4-dinitrophenol and for 2-methyl-4, 6-dinitrophenol; and one milligram per liter (1 mg/l) for antimony; or

(3) Five (5) times the maximum concentration value reported for that pollutant(s) in the application.

b. That any activity has occurred or will occur which would result in any discharge, on a non-routine or infrequent basis, of a toxic pollutant (listed at 40 CFR 122, Appendix D. Table II and III) which is not limited in the permit, if that discharge will exceed the highest of the following "notification levels":

(1) Five hundred Micrograms per liter (500 ug/l);

(2) One milligram per liter (1 mg/l) for antimony; or

(3) Ten (10) times the maximum concentration value reported for that pollutant(s) in the permit application.

11. Duty to Reapply

If the permittee wishes to continue an activity regulated by this permit after the expiration date of this permit, the permittee must apply for and obtain a new permit. The application shall be submitted at least 180 days before the expiration date of this permit. The Permit Issuing Authority may grant permission to submit an application less than 180 days in advance but not later than the permit expiration date.

Where EPA is the Permit Issuing Authority, the terms and conditions of this permit are automatically continued in accordance with 40 CFR 122.6, only where the permittee has submitted a timely and complete application for a renewal permit and the Permit Issuing Authority is unable, through no fault of the permittee, to issue a new permit before expiration date.

12. Signatory Requirements

All applications, reports, or information submitted to the Permit Issuing Authority shall be signed and certified.

a. All permit applications shall be signed as follows:

(1) For a corporation: by a responsible corporate officer. For the purpose of this Section, a responsible corporate officer means: (1) a president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision-making functions for the corporation, or (2) the manager of one or more manufacturing production facilities employing more than 250 persons or having gross annual sales or expenditures exceeding 25 million (in second quarter 1980 dollars), if authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures.

(2) For a partnership or sole proprietorship: by a general partner or the proprietor, respectively; or

(3) For a municipality, State, Federal, or other public agencies by either a principal executive officer or ranking elected official.

b. All reports required by the permit and other information requested by the Permit Issuing Authority shall be signed by a person described above or by a duly authorized representative only if:

(1) The authorization is made in writing by person described above;

(2) The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity, such as the position of plant manager, operator of a well or a well field, superintendent, position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters for the company. (A duly authorized representative may this be either a named individual or any individual occupying a named position.); and

(3) The written authorization is submitted to the Permit Issuing Authority.

c. Certification. Any person signing a document under paragraphs (a) or (b) of this section shall make the following certification:

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

13. Availability of Reports

Except for data determined to be confidential under 40 CFR Part 2, all reports prepared in accordance with the terms of this permit shall be available for public inspection at the offices of the Permit Issuing Authority. As required by the Act, permit applications, permits and effluent data shall not be considered confidential.

14. Penalties for Falsification of Reports

The Clean Water Act provides that any person who knowingly makes any false material statement, representation, or certification in any record or other document submitted or required to be maintained under this permit, including monitoring reports or reports of compliance or noncompliance, or who knowingly falsifies, tampers with, or renders inaccurate any monitoring device or method required to be maintained under the Clean Water Act, shall, upon conviction, be punished by a fine of not more than $10,000 or by imprisonment for not more than 2 years, or both.

SECTION E. DEFINITIONS

1. Permit Issuing Authority

The Regional Administrator of EPA Region IV or his designee, unless at some time in the future the State receives authority to administer the NPDES program and assumes jurisdiction over the permit; at which time, the Director of the State program receiving the authorization becomes the issuing authority.

2. Act

"Act" means the Clean Water Act (formerly referred to as the Federal Water Pollution Control Act) Public Law 92-500, as amended by Public Laws 95-217, 95-576, 96-483, 97-117, and 100-4, 33 U.S.C. 1251 et seq.

3. Mass/Day Measurements

a. The "average monthly discharges" is defined and the total mass of all daily discharges sampled and/or measured during a calendar month on which daily discharges are sampled and measured, divided by the number of daily discharges sampled and/or measured during such month. It is therefore, and arithmetic mean found by adding the weights of the pollutant found each day of the month and then dividing this sum by the number of days the tests were reported. The limitation is identified as "Daily Average" or "Monthly Average" in Part I of the permit and the average monthly discharge value is reported in the "Average" column under "Quantity" on the Discharge Monitoring Report (DMR).

b. The "average weekly discharge" is defined as the total mass of all daily discharges sampled and/or measured during the calendar week on which daily discharges are sampled and measured, divided by the number of daily discharges sampled and/or measured during such week. It is, therefore, an arithmetic mean found by adding the weights of pollutants found each day of the week and then dividing this sum by the number of days the tests were reported. This limitation is identified as "Weekly Average" in Part I of the permit. Enter the highest weekly average of sample measurements obtained during the reporting period in the "Maximum" column under "Quantity" on the DMR.

c. The "maximum daily discharge" is the total mass (weight) of a pollutant discharged during a calendar day. If only one sample is taken during any calendar day the weight of pollutant calculated from it is the "maximum daily discharge". This limitation is identified as "Daily Maximum", in Part I of the permit and the highest such value recorded during the reporting period is reported in the "Maximum" column under "Quantity" on the DMR.

d. The "average annual discharge" is a rolling average equal to the arithmetic mean of the mass measured in all discharges sampled and/or measured during consecutive reporting periods which comprise one year. For parameters that are measured at least once per month, the annual average shall be computed at the end of each month and is equal to the arithmetic mean of the monthly average of the month being reported and the monthly average of each of the previous eleven months. This limitation is defined as "Annual Average" in Part I of the permit and the average annual discharge value is reported in the "Average" column under "Quantity" on the DMR.

4. Concentration Measurements

a. The "average monthly concentration", other than for fecal coliform bacteria, is the sum of the concentrations of all daily discharges sampled and/or measured during a calendar month on which daily discharges are sampled and measured, divided by the number of daily discharges sampled and/or measured during such month (arithmetic mean of the daily concentration values). The daily concentration value is equal to the concentration of a composite sample or in the case of grab samples is the arithmetic mean (weighted by flow value) of all the samples collected during that calendar day. This limitation is identified as "Monthly Average" or "Daily Average" under "Other Limits" in Part I of the permit and the average monthly concentration value is reported under the "Average" column under "Quality" of the DMR.

b. The "average weekly concentration", other than for fecal coliform bacteria, is the sum of the concentrations of all daily discharges sampled and/or measured during a calendar week on which daily discharges are sampled and measured divided by the number of daily discharges sampled and/or measured during such week (arithmetic mean of the daily concentration values). The daily concentration value is equal to the concentration of a composite sample or in the case of grab samples is the arithmetic mean (weighted by flow value) of all the samples collected during that calendar day. This limitation is identified as "Weekly Average" under "Other Limits" in Part I of the permit. Enter the highest weekly average of sample measurements obtained during the reporting period in the "Maximum" column under "Quality" on the DMR.

c. The "maximum daily concentration" is the concentration of a pollutant discharged during a calendar day. It is identified as "Daily Maximum" under "Other Units" in Part I of the permit and the highest such value recorded during the reporting period is reported under the "Maximum" column under "Quality" on the DMR.

d. The "average annual concentration", other than fecal coliform bacteria, is the rolling average equal to the arithmetic mean of the effluent or influent samples collected during consecutive reporting periods which comprise one year. For parameters that are measured at least once per month, the annual average shall be computed at the end of each month and is equal to the arithmetic mean of the monthly average of the month being reported and the monthly average of each of the previous eleven months. This limitation is identified as "Annual Average" under "Other Limits" in Part I of the permit and the average annual concentration value is reported under the "Average" column under "Quality" on the DMR.

5. Other Measurements

a. The effluent flow expressed as million gallons per day (MGD) is the 24 hour average flow averaged monthly. It is the arithmetic mean of the total daily flows recorded during the calendar month. Where monitoring requirements for flow are specified in Part I of the permit the flow rate values are reported in the "Average" column under "Quantity" on the DMR.

b. An "instantaneous flow measurement" is a measure of flow taken at the time of sampling, when both the sample and flow will be representative of the total discharge.

c. Where monitoring requirements for pH, dissolved oxygen or fecal coliform bacteria are specified in Part I of the permit, the values are generally reported in the "Quality or Concentration" column on the DMR.

d. The "average annual discharge" for fecal coliform bacteria shall be calculated in the same manner as that for mass limitations (see item II.E.3.d.).

6. Types of Samples

a. Composite Samples: A "composite sample" is a combination of not less than 8 influent or effluent portions, of at least 100 ml, collected over the full time period specified in Part I.A. The composite sample must be flow proportioned by either time interval between each aliquot or by volume as it relates to effluent flow at the time of sampling or total flow since collection of the previous aliquot. Aliquots may be collected manually or automatically.

b. Grab Samples: A "grab sample" is a single influent or effluent portion which is not a composite sample. The sample(s) shall be collected at the period(s) most representative of the total discharge.

7. Calculation of Means

a. Arithmetic Mean: The "arithmetic mean" of any set of values is the summation of the individual values divided by the number of individual values.

b. Geometric Mean: The "geometric mean" of any set of values is the N^{th} root of the product of the individual values where N is equal to the number of individual values. The geometric mean is equivalent to the antilog of the arithmetic mean of the logarithms of the individual values. For purposes of calculating the geometric mean, values of zero (0) shall be considered to be one (1).

c. Weighted by Flow Value: "Weighted by flow value" means the summation of each concentration times its respective flow divided by the summation of the respective flows.

8. Calendar Day

A "calendar day" is defined as the period from midnight of one day until midnight of the next day. However, for purposes of this permit, any consecutive 24-hour period that reasonably represents the calendar day may be used for sampling.

9. Hazardous Substance

A "hazardous substance" means any substance designated under 40 CFR Part 116 pursuant to Section 311 of the Clean Water Act.

10. Toxic Pollutants

A "toxic pollutant" is any pollutant listed as toxic under Section 307(a)(1) of the Clean Water Act.

PART III

OTHER REQUIREMENTS

A. MONITORING AND REPORTING

Monitoring results obtained each calendar month must be summarized for that month and reported on a Discharge Monitoring Report (DMR) Form (EPA No. 3320-1), postmarked no later than the 28th day of the month following the completed calendar month. (For example, data for January shall be submitted by February 28th.) Signed copies of these, and all other reports required by Section D of Part II, Reporting Requirements, and notifications and reports required by Part III shall be submitted to the Permit Issuing Authority at the following address:

Environmental Protection Agency
Region IV
Enforcement Section
Water Permits and Enforcement Branch
Water Management Division
345 Courtland Street, N.E.
Atlanta, Georgia 30365

If no discharge occurs during the reporting period, sampling requirements do not apply. "Check" the box indicated "No Discharge," on the DMR.

If a quantitative value is not detectable for any parameter limited or monitored, as required by this permit, the permittee shall report "NODI=B" on the DMR. The analytical test method, as well as the minimum level for the test method selected, shall be attached to and submitted with the DMR. The permittee shall then be considered to be in compliance with the appropriate requirement.

If, during the term of this permit, the facility ceases discharge to surface waters, the Permit Issuing Authority shall be notified immediately upon cessation of discharge. This notification shall be in writing.

B. REOPENER CLAUSE

In accordance with the Clean Water Act (33 U.S.C. Section 1251, et. seq.), effluent limitations based on standards of performance for new sources contained in this permit shall not be made 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 and/or 169 of the Internal Revenue Code of 1954, whichever period ends first. This provision does not limit the authority of the Director to modify the permit to require

PART III

compliance with a toxic effluent limitation promulgated under BAT or toxic pollutant standard established under Section 307(a) of the Act, or to modify, as necessary to assure compliance 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 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.

C. LIABILITY FOR PERMIT VIOLATIONS

OSN 001 is included in this permit and in NPDES Permit No. FL0041571, issued to TECO Power Services Corporation (TPS) and both permittees are authorized to discharge from the Cooling Reservoir to Payne Creek via OSN 001. Both permittees are joint operators of the Cooling Reservoir with respect to discharges from OSN 001. In any civil action (judicial or administrative), EPA or FDEP may allege that the joint operators are jointly and severally liable for penalities, damages, costs and expenses, or corrective actions for violations at OSN 001, and neither permittee shall assert as an affirmative defense that any violations at OSN 001 were caused by the conduct of the other permittee. This provision shall not limit or affect the rights, liability, claims, or defenses that the seperate permittees may have in actions between themselves or with other parties, or in any criminal action arising out of seperate permits.

D. PRIORITY POLLUTANT DATA

The permittee shall complete and submit Items V and VI of the NPDES application Form 2C [see 40 CFR § 122.21 (k)(5)(vi)] for SECI OSN 002 not later than two years after the commercial operation date of Unit 3. In the event that data indicates levels of pollutants in the discharges that are likely to violate state water quality standards at OSN 001, the permit shall be modified, or alternatively revoked and reissued, to include additional limitations, monitoring and/or other appropriate conditions.

PART III

E. EROSION AND SEDIMENT CONTROL

On start of site construction, the permittee shall implement the Erosion and Sediment Control Plan dated January 28, 1994, with associated blueline drawings. Reports shall be submitted semiannually following start of construction and demonstrate the effectiveness of the controls in minimizing water pollution. The first report shall be submitted with the DMR following the sixth full month after start of construction.

The plan shall include (1) topographic map(s) with present and final contours, (2) indicate all pollution control facilities planned, (3) show all point and non-point source rainfall runoff sources to waters of the United States which could possibly be contaminated due to construction activities, (4) provide for monitoring of contaminated runoff sources, and (5) provide an implementation schedule of areas of active construction and installation of control facilities and procedures. Control facilities to be used shall include, but not necessarily be limited to, ponds, swales, dikes, silt curtains, riprap barriers and use of minimal slopes. Stabilization and revegetation (seeding/sodding) of disturbed areas shall be accomplished as soon as practicable after final grade is achieved. Should construction phase runoff pose a threat to water quality, additional measures shall be expeditiously implemented.

A responsible representative of the permittee shall be designated to supervise this program, with necessary authority to expeditiously implement corrective action should problems be encountered. This representative shall tour the site not less than once per week and during any significant rainfall event to assure that the plan and all control facilities are in proper operation. A permanent log of dates of observations, entries, and actions; corrective actions required; actions taken; and implementation of corrective actions shall be maintained on site.

F. POLYCHLORINATED BIPHENYL COMPOUNDS

There shall be no discharge of polychlorinated biphenyl compounds such as those commonly used for transformer fluid.

G. METAL CLEANING WASTES

There shall be no discharge of metal cleaning wastes to any effluent stream which discharges to waters of the United States. "Metal cleaning wastes" means any wastewater (including all rinse waters) resulting from cleaning (with or without chemical cleaning compounds) any metal process equipment whether due to

PART III

preoperational or operational cleaning, including, but not limited to, cleaning of boiler tubes, boiler fireside, air preheaters, stacks, condensers, etc. This definition does not includes exterior rinsing of process equipment. Any metal cleaning wastes disposed of off-site shall be disposed of in an environmentally acceptable manner and in compliance with all applicable Federal and State Regulations. Details of such disposal shall be provided to the Director not less than 30 days prior to any proposed metal cleaning waste disposal off site.

H. TOXIC COMPOUNDS

Discharge of any product registered under the Federal Insecticide, Fungicide, and Rodenticide Act to any waste stream which ultimately may be released to lakes, rivers, streams, or other waters of the United States is prohibited unless specifically authorized elsewhere in this permit. This requirement is not applicable to products used for lawn and agricultural purposes or to the use of herbicides if used in accordance with labeled instructions and any applicable State permit. Discharge of chlorine from the use of chlorine gas, sodium hypochlorite, or other similar chlorination compounds for disinfection in plant potable and service water systems and in sewage treatment is authorized as are similar compounds in OSN 001, Cooling Reservoir discharge. Discharge of hydrazine in HRSG blowdown (SECI 002) via OSN 001 is authorized.

The company shall notify the Director in writing no later than six (6) months prior to instituting use of any biocide or chemical (except chlorine or hydrazine as authorized elsewhere in this permit) used in the cooling systems or any other portion of the treatment system which may be toxic to aquatic life. Such notification shall include:

1. Name and general composition of biocide or chemical
2. Frequencies of use
3. Quantities to be used
4. Proposed effluent concentrations
5. Acute and/or chronic toxicity data (laboratory reports shall be prepared according to Section 12 of EPA document no. EPA/600/4-90/027 entitled, <u>Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters for Freshwater and Marine Organisms</u>, or most current addition.)
6. Product data sheet
7. Product label

PART III

EPA shall review the above information to determine if a major permit modification is necessary. Discharge associated with the use of such biocide or chemical is not authorized without prior approval by the Director.

I. UNAUTHORIZED DISCHARGES

There shall be no discharges to waters of the U.S. of low volume wastes (except as provided by SECI OSN 002 via OSN 001) [including but not limited to wet scrubber air pollution control systems, ion exchange water treatment system, water treatment evaporator blowdown, laboratory and sampling streams, boiler blowdown), floor drains, cooling tower basin cleaning wastes, and recirculating house service water systems; any non-chemical or chemical metal cleaning wastes means any wastewater resulting from cleaning [with or without chemical cleaning compounds] any metal processing equipment including but not limited to boiler tube cleaning, boiler fireside cleaning and air preheater cleaning (this definition does not include exterior rinsing of process equipment); storm water runoff (except as provided by SECI OSN 003) from plant construction, diked petroleum storage or handling areas, coal pile(s), fly ash/bottom ash storage or disposal areas (including that from rainfall events exceeding the 10-year 24-hour storm event); fly ash and/or bottom ash transport water; or cooling tower blowdown.

J. BURNING TOXIC AND HAZARDOUS WASTES

Discharge of any waste resulting from the combustion of toxic, hazardous, or metal cleaning wastes to any waste stream which ultimately discharges to waters of the United States is prohibited, unless specifically authorized elsewhere in this permit.

PART IV

BEST MANAGEMENT PRACTICES/POLLUTION PREVENTION CONDITIONS FOR STEAM ELECTRIC GENERATING FACILITIES

In accordance with Section 304(e) and 402(a)(1) and (2) of the Clean Water Act (CWA) as amended, 33 U.S.C. §§ 1251 et seq., and consistent with the policy of the Pollution Prevention Act of 1990, 42 U.S.C. §§ 13101-13109, the permittee must develop and implement a Best Management Practices plan incorporating pollution prevention measures. References which may be used in developing the plan are "Criteria and Standards for Best Management Practices Authorized Under Section 304(e) of the Act", found at 40 CFR Section 122.44(k), the Storm Water Management Industrial Activities Guidance Manual, EPA/833-R92-002 and other EPA documents relating to Best Management Practice guidance.

1. Definitions

   a. The term **"pollutants"** refers to conventional, non-conventional and toxic pollutants, as appropriate for the NPDES storm water program and toxic pollutants.

   b. Conventional pollutants are: biochemical oxygen demand (BOD), suspended solids, pH, fecal coliform bacteria and oil & grease.

   c. Non-conventional pollutants are those which are not defined as conventional or toxic, such as phosphorus, nitrogen or ammonia. (Ref: 40 CFR Part 122, Appendix D, Table IV)

   d. For purposes of this part, Toxic pollutants include, but are not limited to: a) any toxic substance listed in Section 307(a)(1) of the CWA, any hazardous substance listed in Section 311 of the CWA, and b) any substance (that is not also a conventional or non-conventional pollutant) for which EPA has published an acute or chronic toxicity criterion, or that is a pesticide regulated by the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA).

   e. **"Pollution prevention"** refers to the first category of EPA's preferred hazardous waste management strategy - source reduction.

   f. **"Significant Materials"** is defined as raw materials; fuels; materials such as solvents and detergents; hazardous substances designated under Section 101(14) of CERCLA; and any chemical the facility is required to report pursuant to EPCRA, Section 313; fertilizers; pesticides; and waste products such as ashes, slag and sludge.

g. **"Source reduction"** means any practice which: i) reduces the amount of any pollutant entering a waste stream prior to recycling, treatment or disposal; and ii) reduces the hazards to public health and the environment associated with the release of such pollutant. The term includes equipment or technology modifications, process or procedure modifications, substitution of raw materials, and improvements in housekeeping, maintenance, training, or inventory control. It does not include any practice which alters the physical, chemical, or biological characteristics or the volume of a pollutant through a process or activity which itself is not integral to, or previously considered necessary for, the production of a product or the providing of a service.

h. **"BMP3"** means a Best Management Plan incorporating the requirements of 40 CFR § 125, Subpart K, plus pollution prevention techniques, except where other existing programs are deemed equivalent by the permittee. The permittee shall certify the equivalency of the other referenced programs.

i. **"Reportable Quantity (RQ) Discharge"** A RQ release occurs when a quantity of a hazardous substance or oil is spilled or released within a 24-hour period of time and exceeds the RQ level assigned to that substance under CERCLA or the Clean Water Act. These levels or quantities are defined in terms of gallons or pounds. Regulations listing these quantities are contained at 40 CFR 302.4, 40 CFR 117.21 and 40 CFR 110.

j. The term **"material"** refers to chemicals or chemical products used in any plant operation (i.e., caustic soda, hydrazine, degreasing agents, paint solvents, etc.). It does not include lumber, boxes, packing materials, etc.

2. <u>Best Management Practices/Pollution Prevention Plan</u>

The permittee shall develop and implement a BMP3 plan for the facility which is the source of wastewater and storm water discharges. The plan shall be directed toward reducing those <u>pollutants of concern</u> which discharge, or could discharge, to surface waters to and shall be prepared in accordance with good engineering and good housekeeping practices. For the purposes of this permit, <u>pollutants of concern</u> shall be limited to <u>toxic pollutants</u> and <u>significant materials</u>, as defined above, known to the discharger. The plan shall address all activities which could or do contribute these pollutants to the surface water discharge, including storm water, water and waste treatment, and plant ancillary activities.

3. <u>Signatory Authority & Management Responsibilities</u>

A copy of the BMP3 plan shall be retained at the facility and shall be made available to the permit issuing authority upon request.

The BMP3 plan shall contain a written statement from corporate or plant management indicating management's commitment to the goals of the BMP3 program. The BMP3 plan shall be signed and reviewed by the plant environmental engineering staff and plant management.

BMP3 Plan Requirements

The following requirements may be incorporated by reference from existing facility procedures:

a. **Name and description of facility**

b. **A site map** - At a minimum the site map must include information of the following: discharge points ("outfalls"); drainage patterns; identification of the types of pollutants likely to be discharged from each drainage area; direction of flow; surface water bodies, including any proximate stream, river, lake, or other waterbody receiving storm water discharge from the site; structural control measures (physically constructed features used to control storm water flows); locations of "significant materials" exposed to storm water; locations of industrial activities (such as fueling stations, loading and unloading areas, vehicle or equipment maintenance areas, waste disposal areas, storage areas).

c. **A materials inventory** including the types of materials that are handled, stored, or processed onsite, particularly significant materials. To complete the materials inventory, the permittee must list materials that have been exposed to storm water in the past 3 years (focus on areas where materials are stored, processed, transported, or transferred and provide a narrative description of methods and location of storage and disposal areas, materials management practices, treatment practices, and any structural/nonstructural control measures.

d. **A list of significant spills and leaks of toxic or hazardous materials that have occurred in the past 3 years.** "Significant spills" includes releases in excess of reportable quantities.

e. **A summary of any existing storm water sampling data and a description of the sample collection procedures used.**

f. **A site evaluation summary** - The Site Evaluation Summary should provide a narrative description of activities with a high potential to contaminate storm water at the site, including those associated with materials loading and unloading, outdoor storage, outdoor manufacturing or processing, onsite disposal, and significant dust or particulate generating activities. The summary should also include a description of any pollutants of concern that may be associated with such activities.

g. **A narrative description of the following BMP's:**

(i) - Good Housekeeping Practices

(ii) - Preventive Maintenance The permittee must develop a preventive maintenance program that involves inspections and maintenance of storm water management devices and routine inspections of facility operations to detect faulty equipment. Equipment (such as tanks, containers, and drums) should be checked regularly for signs of deterioration.

(iii) - Visual Inspections Regular inspections shall be performed by qualified, trained plant personnel. Reports shall note when inspections were done, the name of the person who conducted the inspection, which areas were inspected, what problems were found, and what steps were taken to correct any problems.

(iv) - Spill Prevention and Responses Areas where spills are likely to occur and their drainage points must be clearly identified in the BMP3 plan. Employees shall be made aware of response procedures, including material handling and storage requirements, and should have access to appropriate cleanup equipment.

(v) - Sediment and Erosion Control The BMP3 must identify activities that present a potential for significant soil erosion and measures taken to control such erosion.

(vi) - Management of Runoff The permittee must describe existing storm water controls found at the facility and any additional measures that can be implemented to improve the prevention and control of polluted storm water. Examples include: vegetative swales, reuse of collected storm water, infiltration trenches, and detention ponds.

5. Best Management Practices & Pollution Prevention Committee:

A Best Management Practices Committee (Committee) should be established to direct or assist in the implementation of the BMP3 plan. The Committee should be comprised of individuals within the plant organization who are responsible for developing, implementing, monitoring of success, and revision of the BMP3 plan. The activities and responsibilities of the Committee should address all aspects of the facility's BMP3 plan. The scope of responsibilities of the Committee should be described in the plan.

6. Employee Training

Employee training programs shall inform appropriate personnel of the components & goals of the BMP3 plan and shall describe employee responsibilities for implementing the plan. Training shall address topics such as good housekeeping, materials management, recordkeeping & reporting, spill prevention & response, as well as specific waste reduction practices to be employed. The plan shall identify periodic dates for such training.

7. Plan Development & Implementation

The BMP3 plan shall be developed or updated within 3 months after the effective date of this permit and implemented 6 months after the effective date of this permit, unless any later dates are specified by the Director.

In cases of facilities that were not previously required to have a BMP plan, the plan must be developed within 6 months after the plant start-up and implemented within 18 months after plant start-up, unless any later dates are specified by the Director.

8. Plan Review & Modification

If following review by the Permit Issuing Authority, or authorized representative, the BMP3 plan is determined insufficient, he/she may notify the permittee that the BMP3 plan does not meet one or more of the minimum requirements of this Part. Upon such notification from the Permit Issuing Authority, or authorized representative, the permittee shall amend the plan and shall submit to the Permit Issuing Authority a written certification that the requested changes have been made. Unless otherwise provided by the Permit Issuing Authority, the permittee shall have 30 days after such notification to make the changes necessary.

The permittee shall modify the BMP3 plan whenever there is a change in design, construction, operation, or maintenance, which has a significant effect on the potential for the discharge of pollutants to waters of the United States or if the plan proves to be ineffective in achieving the general objectives of reducing pollutants in wastewater or storm water discharges. Modifications to the plan may be reviewed by EPA in the same manner as described above.

9. Annual Site Compliance Evaluation

Qualified personnel must conduct site compliance evaluations at appropriate intervals, but at least once a year. Compliance evaluations shall include:

- inspection of storm water drainage areas for evidence of pollutants entering the drainage system;

- evaluation of the effectiveness of BMP's;

- observations of structural measures, sediment controls, and other storm water BMP's to ensure proper operation;

- revision of the plan as needed within 2 weeks of the inspection, and implementation of any necessary changes within 12 weeks of the inspection; and

- preparation of a report summarizing inspection results and follow-up actions, identifying the date of inspection and personnel who conducted the inspection.

The inspection report shall be signed by the plant environmental engineering staff and plant management and kept with the BMP3 plan.

10. Recordkeeping and Internal Reporting

For at least one year after the expiration of this permit, the permittee shall record and maintain records of spills, leaks, inspections, and maintenance activities. For spills and leaks, records should include information such as the date and time of the incident, weather conditions, cause, and resulting environmental problems.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION IV

345 COURTLAND STREET, N.E.
ATLANTA, GEORGIA 30365

APR 19 1995

INDUSTRIAL FACILITY FACT SHEET

APPLICATION FOR NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM PERMIT TO DISCHARGE TREATED WASTEWATER TO U. S. WATERS

Application No. FL0044229 Application Date: May 23, 1994
Permit Writer: Darryl Williams

1. *SYNOPSIS OF APPLICATION*

A. Name and Address of Applicant

Seminole Electric Cooperative, Inc. (SECI)
Post Office Box 272000
Tampa, Florida 33688-2000

For:

Hardee Power Station
Unit 3[1]
County Road 663
Hardee County, Fort Green, Florida 33834

B. Description of Applicant's Operation

Generation, transmission, and distribution of electricity generally falling under Standard Industrial

[1] On ???, EPA determined that the proposed steam electric generating unit is a new source steam electric power generating point source since applicable New Source Performance Standards (NSPS) were promulgated on November 19, 1982. The steam turbine (ST) electric generating unit is a portion of the combined cycle (CC) module which for convenience is referred to herein as Unit 3. The proposed CC module is essentially a combination of two combustion turbine (CT) electric generating units and one steam turbine electric generating unit, with necessary auxiliary equipment. Gas or oil is burned in the CTs (similar to jet engines), which are connected to generators and produce electricity. Hot exhaust gases (waste heat) from the CTs (two per CC module) is used to generate steam in heat recovery steam generators [HRSGs, one per CT)]. Steam from each HRSG turns a steam turbine, which is connected to a generator (different than those connected to the CTs), and produces additional electricity.

Classification (SIC) code is 4911. Plant fuel is gas (oil as back-up).

C. Production Capacity of Facility

Phase 1A[2] of the Hardee Power Station (HPS) consists of a 295 MW generating facility with a 220 MW combined cycle module and a 75 MW stand-alone combustion turbine (CT). Phase 1A was placed in commercial operation on January 1, 1993. Phase 1B[2] consists of adding a 75 MW CT to the Phase 1A stand-alone CT, two heat recovery steam generators (HRSGs), and a 70 MW steam electric turbine to complete a second 220 MW combined cycle module. Phase 2 was planned to consist of a third 220 MW CC module. The Hardee Unit 3 will be an expansion of Phase 2 from 220 MW to 440 MW, thus giving the site an ultimate generating capacity of 880 MW.

D. Applicant's Receiving Waters

Payne Creek and an unnamed tributary

For a sketch showing the location of the discharge(s), see Attachment A.

Classification: Class III Waters, Fresh Waters
Use Designation: Suitable for Recreation, Propagation, and Maintenance of a Healthy, Well-Balanced Population of Fish and Wildlife.

E. Description of Proposed Pollution Abatement Facilities

The site drainage facilities for Hardee Unit 3 will be constucted and operated separately from the existing HPS units (1 and 2). No changes in the existing design or operations of the site drainage system for the existing units are proposed. During construction, various erosion and sediment control techniques and a storm water detention pond will be used to control construction related runoff and construction dewatering wastes [SECI outfall serial number (OSN) 003]. The pond will be retained for site runoff control after the plant becomes operational. A existing Cooling Reservoir (OSN 001[3]) will be used to cool the heated effluent and the cooling water will be recirculated to the condensers. Thermal modeling indicated that the

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[2] Phases 1A and 1B represent Units 1 and 2, respectively, owned and operated by TECO Power Services (TPS) permitted under NPDES No. FL0041571.

[3] SECI and TPS jointly occupy the Hardee Power Station site. SECI is proposing to own and operate the new Hardee Unit 3 which is permitted under NPDES Permit No. FL0044229. Both permittees will jointly operate the Cooling Reservoir which discharges via OSN 001.

existing Cooling Reservoir has the capacity to accommodate the heat rejection requirements for the full 880 MW. Chlorination of the cooling system is proposed to control biofouling. During operation of the power plant, all liquid waste effluents from operation of the Hardee Unit 3 will be routed to the Cooling Reservoir. Prior to discharge to the reservoir, these wastes (exclusive of condenser cooling water) will receive treatment such as demineralization, chemical neutralization, precipitation, sedimentation, oil and grease removal, and/or biological treatment and combined as a single discharge to the reservoir (SECI OSN 002). Adequate storage volume is to be provided above the normal operating elevation of the reservoir and discharge to Payne Creek is expected to occur only as overflow caused by infrequent, high intensity rainfall in excess of a 10-year 24-hour rainfall event. Wastewater from preoperational and operational cleaning of the heat recovery steam generator, feedwater and condenser piping, power system components, and other similar "metal cleaning operations" will be disposed of off-site in an environmentally acceptable manner.

F. Description of Discharges (as reported by the applicant in the NPDES or Site Certification Applications)

1) *OSN 001* - Overflow from the Cooling Reservoir from extreme or cumulative storms in excess of the 10-year, 24-hour rainfall event (includes SECI OSN 002 and TPS OSN 003, and condenser cooling water)

Flow (**MGD**[4]), operation/construction	- 0.213[5]
Temperature, Average Summer (°F)	- 89.3[6]
Temperature, Maximum Summer (°F)	- 95.7[6]
Temperature, Maximum Winter (°F)	- 76.9[6]
pH Range (std. units)	- 6.0 to 9.0

Pollutants which are expected in significant quantities or which are subject to effluent guideline limitations are as follows:

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[4] **MGD** - million gallons per day

[5] Maximum daily rate (Cooling Reservoir will only discharge due to extreme or cummulative rainfall in excess of the 10-year, 24-hour storm, where unavoidable to prevent loss of life, severe property damage, or damage to the physical integrity of the Cooling Reservoir or its structures)

[6] Based on average load conditions for 880 MW buildout

Effluent Characteristic	Estimated Load
Alpha, Gross (pC/L)[7]	22.2
Cadmium (mg/l)[8]	0.001
Cyanide (mg/l)	0.01
Copper (mg/l)	0.00995
Iron (mg/l)	0.990
Lead (mg/l)	0.0068
Mercury (mg/l)	0.000097
Radium 226 (p/cL)	7.9
Selenium (mg/l)	0.040
Silver (mg/l)	0.00014
Temperature (°F)	95.7
Total Residual Chlorine (mg/l)	NR[9]
Turbidity (NTU)[10]	31
Zinc (mg/l)	0.37

2) *SECI OSN 002* - treated low volume wastes (plant and and equipment drains, demineralizer regeneration wastes, boiler blowdown, water treatment plant wastes, and similar wastes), diked petroleum off loading and storage areas, and treated domestic waste discharged to the Cooling Reservoir (OSN 001)

Average Flow (MGD) - NR
Maximum Flow (MGD) - NR
Temperature (°F) - NR
pH Range (std. units) - 6.0 to 9.0

Pollutants which are expected in significant quantities or which are subject to effluent guideline limitations are as follows:

Effluent Characteristics	Estimated Load
Oil and Grease (mg/l)	<5
Total Suspended Solids (mg/l)	NR

[7] **pC/L** - picocuries per liter
[8] **mg/l** - milligrams per liter
[9] **NR** - Not Reported
[10] **NTU** - Nephelometric turbidity units

3) *SECI OSN 003* - storm water detention pond discharge

Average Flow, Runoff (MGD)	- 0.036
Temperature, Average Summer (°F)	- 89.6
Temperature, Average Winter (°F)	- 64.4
pH Range (std. units)	- 6.0 to 9.0

Pollutants which are expected in significant quantities or which are subject to effluent guideline limitations are as follows:

Effluent Characteristics	Estimated Load
Total Suspended Solids (mg/l)	<100
Oil and Grease, mg/l	<5

2. *PROPOSED EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS*

A. See attached draft permit Pages I-1 through I-7.

3. *BASIS FOR FINAL EFFLUENT LIMITATIONS AND PERMIT CONDITIONS*

The majority of the effluent limitations and conditions for permitting contained in Part I of the permit are based on the following regulations:

A. Federal effluent guidelines for the steam electric power generating point source category (40 CFR Part 423, November 19, 1982, 47 **FR**[11] 52290), New Source Performance Standards (§ 423.15).

A best professional judgement (BPJ) has been made that concentration limitations will be used in lieu of mass limitations in accordance with 40 CFR § 423.15(m). All measurement frequency and sample type requirements are based on BPJ. A limitation on pH range of 6.0 standard units minimum and 9.0 maximum has been proposed in accordance with 40 CFR § 423.15(a), except when limited for direct discharge. For direct discharge, the pH range is limited to 6.0 to 8.5 in accordance with **FAC**[12] Section 17-302.560(21) (April 25, 1993). Limitations and monitoring requirements were required for SECI OSN 002, an internal waste stream, since

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[11] **FR** - Federal Register
[12] **FAC** - Florida Administrative Code

compliance with effluent guidelines can not be demonstrated after dilution and detention time in the Cooling Reservoir.

B. Florida Water Quality Standards: The receiving waters are classified as Surface Waters, Class III Waters - Recreation, Propagation, and Maintenance of a Healthy, Well-Balanced Population of Fish and Wildlife (FAC Chapters 62-4, 62-301, 62-302, 62-600 Series).

Requirements for toxic pollutants are provided in FAC Sections 62-301.200, 62-302.500, and 62-302.560. "All surface waters of the State shall at all places and at all times be free from domestic, industrial, agricultural, or other man-induced non-thermal components of discharges which, alone or in combination with other substances or in combination with other components of discharges (whether thermal or non-thennal) are acutely toxic [Section 62-302.500(1)(d)]." "Acute Toxicity" is defined in Section 62-301.200(1) as: "the presence of one or more substances or characteristics or components of substances in amounts which: (a) are greater than one-third (1/3) of the amount lethal to 50% of the test organisms in 96 hours (96 hr LC50) where the 96 hr LC50 is the lowest value which has been determined for a species significant to the indigenous aquatic commnity; or (b) may reasonably be expected, based upon evaluation by generally accepted scientific methods, to produce effects equal to those of the concentration of the substance specified in (a) above." Criteria for specific pollutants are contained in Section 62-302.560.

C. The Cooling Reservoir is not waters of the U.S. or waters of the State.

D. Specific citations of the regulations and other rationale for the limitations and conditions for each outfall authorized by this permit are as follows:

1) ***OSN 001*** - overflow from the Cooling Reservoir from extreme or cummulative storms in excess of the 10-year, 24-hour rainfall event (includes dewatering wastes during construction and SECI OSN 002, TPS OSN 003 and condenser cooling water during operation).

Limitations are based on Florida **WQS**[13] (FAC Sections 62-302.520 and 62-302.530) or proposed **CSC**[14] or requirements and are as follows:

PARAMETER	POD EFFLUENT LIMITATIONS	MIXING ZONE[15] LIMITATIONS
Alpha, Gross (pC/l)	22.2	5.0
Cadmium (mg/l)	0.00247	0.0008
Copper (mg/l)	0.0083	N/A
Cyanide (mg/l)	0.01	0.005
Iron (mg/l)	1.0	N/A
Lead (mg/l)	0.0019	N/A
Mercury (mg/l)	0.000012	N/A
Radium 226 (pC/l)	6.2	5
Selenium (mg/l)	0.0200	0.005
Temperature (°F)	95.0	92.0
Temperature Rise (°F)	N/A	5.0
Silver (mg/l)	0.000008	0.00007
Turbidity (NTU)	31	29
Total Residual Chlorine (mg/l)	0.01	N/A
Zinc (mg/l)	0.00827	0.075

2) ***SECI OSN 002*** - Treated Low Volume Wastes[16] (includes demineralizer regeneration wastes, oil seperator wastes, oil seperator wastes, domestic wastewater) discharged to the Cooling Reservoir (OSN 001).

Limitations as required by 40 CFR § 423.15(c) are:

Oil and grease - 15 mg/l (average) and 20 mg/l (maximum)
Total suspended solids - 30 mg/l (average) and 100 mg/l (maximum)

Discharge of hydrazine in boiler blowdown is

[13] **WQS** - Water quality standards
[14] **CSC** - Conditions of Certification, Case No. PA 89-25
[15] 50 feet downstream from the downstream edge of the overflow spillway, except for temperature which extends 75 feet.
[16] Low volume waste sources include, but are not limited to, ion exchange water treatment systems, water treatment evaporator blowdown, boiler blowdown, floor drains, laboratory and sampling streams, cooling tower basin cleaning wastes, and blowdown from recirculating house service water systems.

proposed without limitation or monitoring requirements to specifically eliminate reporting requirements under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) to which the permittee might otherwise be subject. Under CERCLA, hydrazine is one of the pollutants for which discharge is subject to reporting requirements, unless discharge is authorized in an NPDES permit. Although hydrazine can be toxic to aquatic organisms if the discharge concentration is sufficiently high, decomposition and evaporation to the atmosphere occur rapidly in boiler blowdown and toxic concentrations will not occur. Additionally, the Cooling Reservoir provides an extended period for oxidation and dilution prior to discharge to Payne Creek.

3) ***SECI OSN 003*** - Storm Water Detention Pond discharge (includes runoff contaminated by construction activity and dewatering wastes during construction and uncontaminated site runoff during operation). Limitations are based on WQS and/or proposed CSC requirements.

Total suspended solids	- 50 mg/l
Construction dewatering monitoring	- BPJ to assure compliance with WQS requirements

4) Part II Conditions: Standard provisions for all major industrial permits.

5) Part III Conditions:

   a) Condition A. Reporting requirements are standard for a major industrial discharger.

   b) Condition B. Reopener clause in accordance with 40 CFR § 122.44(c) and Section 306 of the CWA.

   c) Condition C. SECI and TPS jointly occupy the Hardee Power Station site. Although the permittees own and operate their facilities independantly, they jointly operate theCooling Reservoir which discharges via OSN 001. Condition D was included to specify that EPA and FDEP will recognize each permittee as jointly and severally liable for permit violations occurring at OSN 001.

d) Submission of priority pollutant data is required in accordance with 40 CFR § 122.21(k)(5)(vi) for SECI OSN 002. Condition D is being imposed for an internal waste stream since monitoring and reporting requirements are different for this waste source than for once-through cooling water or cooling system blowdown. Monitoring after combination with condenser cooling water would be meaningless due to dilution. Analysis of priority pollutants in the cooling water is not considered necessary since SECI OSN 002 will be the only source of wastes to the reservoir which could potentially contain priority pollutants.

e) Condition E. Erosion and sediment control plan requirements are based on BPJ to insure protection of waters of the United States.

f) Condition F. Based on BPJ to protect water quality.

g) Condition G. PCB prohibition as required by 40 CFR 423.15(b).

h) Condition H. The applicant has not proposed the discharge of "metal cleaning wastes" as defined in 40 CFR Part 423 and therefore, discharge is being prohibited. Additionally, requirements are included by BPJ to assure that if the basis of the permit changes from that used in the permit application evaluation, appropriate conditions to assure compliance with New Source Performance Standards and WQS would be included in the permit. Proper off-site disposal provisions are included to assure protection of water quality.

i) Condition I. FIFRA and Toxic Compound prohibitions are based on BPJ and the absence of a request for discharge in the application. These compounds may be highly toxic and any proposed discharge would require assessment and possible inclusion of an effluent limitation to insure that toxicity did not occur.

j) Condition J. A BPJ has been made that operation of the domestic treatment plant in accordance with applicable State and county requirements when followed by further oxidation in the cooling reservoir is deemed to produce treatment equivalent to "secondary treatment" and that no monitoring is needed in the NPDES permit. Should future applications for reissuance of the permit indicate an unacceptable increase in fecal coliform organisms and/or nutrients is occurring in the pond, reevaluation of need for limitations at the treatment plant outfall will be reconsidered.

6) **Part IV:** Provisions are included to insure a minimization of the release of pollutants from ancillary sources which have been determined to contribute to pollution, such as material areas, loading and unloading areas, in-plant transfer, process and material handling areas, waste disposal areas, sludge and hazardous waste disposal areas, etc., which may have a significant impact on receiving waters. These requirements are based on Section 304(e) of the Clean Water Act (the Act), 33 U.S.C. § 1342(o)(2) and its implementing regulations at 40 CFR § 122.43(a) to provide for and insure compliance with all applicable requirements of the Act and regulations. Additionally, the Pollution Prevention Act (PPA) of 1990, 42 U.S.C. §§ 13101-13109, gives EPA the authority to develop and implement strategies to promote source reduction existing and proposed programs, 42 U.S.C. § 13103(b).

4. *REQUESTED VARIANCES OR ALTERNATIVES TO REQUIRED STANDARDS*

None requested. Hardee Unit 3 will discharge in accordance with the previously granted mixing zone (Permit No. FL0041751).

5. *EFFECTIVE DATE OF PROPOSED EFFLUENT LIMITATIONS AND COMPLIANCE SCHEDULE*

a. Attainment of effluent limitations....................on start of discharge

b. Erosion and sediment control plan (III.E of the permit)

(1) Implement..............By start of construction
(2) Reports......Semiannually, starting 6 mo. after start of construction

c. Best Management Practices (BMP) Plan (Part IV)

(1) Develop plan.......6 months prior to commercial operation (CO) date
(2) Implement plan.........By CO date of Unit 3

d. Additional Monitoring (OSN 001)

(1) Implement at 1/six months....CO date of Unit 3

e. Priority pollutant data (see Part III.E of the permit).....Within one year of CO date of each unit

6. *STATE CERTIFICATION REQUIREMENTS*

State certification pending.

7. *DISCUSSION OF PREVIOUS PERMIT CONDITIONS*

This is the first permit to be issued for this proposed facility, and there are no previous permit conditions.

8. *EPA CONTACT*

Additional information concerning the permit may be obtained at the address and during the hours noted in Item 9, below from:

Ms. Lena Scott
Public Notice Coordinator
404/347-3004

9. *ADMINISTRATIVE RECORD*

The administrative record including application, draft permit, fact sheet, public notice (after release), State Certification (after receipt), documents cited herein, Draft and Final Environmental Statements (after release), comments received and responses thereto, and other documents contained in the supporting file for the permit, is available by writing EPA Region IV, or for review and copying at 345 Courtland Street, N.E., 4th Floor, Atlanta, Georgia 30365 between the hours of 8:15 A.M. and 4:30 P.M., Monday through Friday. Copies will be provided at a minimal charge per page.

10. PROPOSED SCHEDULE FOR PERMIT ISSUANCE

Draft Permit to Applicant	- February 27, 1995
Draft Permit to State for Certification (60 day comment period)	- March 27, 1995
Proposed Public Notice Date (30 day comment period)	- April 27, 1995
Proposed Date for Issuance of the Draft EIS	- May 1, 1995
Proposed Date for Issuance of the Final EIS	- June 30, 1995
Proposed Permit Issuance Date	- Sept 15, 1995
Proposed Permit Effective Date	- February 6, 1996

11. PROCEDURES FOR THE FORMULATION OF FINAL DETERMINATIONS

a. Comment Period

The Environmental Protection Agency proposes to issue an NPDES permit to this applicant subject to the aforementioned effluent limitations and special conditions. These determinations are tentative and open to comment from the public.

A Draft Environmental Impact Statement (EIS) on this project will be made available to the public on or about May 1, 1995, by the Rural Utilities Services (RUS). The EPA is a cooperating agency in the development of the Environmental Impact Statement.

Copies of the Draft EIS (including Public Notice, Fact Sheet, and draft NPDES) and other information will be available for review at reading rooms at the following locations: Bartow Library, 315 East Parker Street, Bartow, FL 33830 and Hardee County Library, 315 North 6th Avenue, Suite 114, Wauchula, FL 33837. A limited number of copies of the draft EIS are available from:

Mr. Lawrence R. Wolfe
Environmental Compliance Branch
Electrical Staff Division
Rural Utilities Services
South Agricultural Bldg., Rm. 1246
14th St. and Indepen

Interested persons are invited to submit written comments regarding permit issuance on the proposed permit limitations and conditions to the following address:

Office of Public Affairs
Environmental Protection Agency
345 Courtland Street, NE
Atlanta, Georgia 30365

ATTN: Ms. Lena Scott, Public Notice Coordinator

All comments received within thirty (30) days following the date of public notice will be considered in the formulation of final determinations with regard to proposed permit issuance.

Comments on the draft the draft EIS should be sent to the RUS at the above address (copies will be provided to EPA by RUS).

b. Public Hearing

The EPA Regional Administrator will hold a public hearing if there is a significant degree of public interest in a proposed permit or group of permits, or if he determines that useful information and data may be obtained thereby. Public Notice of such a hearing will be circulated at least thirty days prior to the hearing.

c. Issuance of the Permit

After consideration of all written comments and of the requirements and policies in the Clean Water Act (the Act) and appropriate regulations, and, if a public hearing is held, after consideration of all comments, statements and data presented at the hearing, the EPA Regional Administrator will make determinations regarding the permit issuance. If the determinations are substantially unchanged from the tentative determinations outlined above, the Regional Administrator will so notify all persons submitting written comments, and, if a public hearing was held, all persons participating in the hearing. If the determinations are substantially changed, the EPA Regional Administrator will issue a public notice indicating the revised determinations.

Unless a request for an evidentiary hearing is granted, the proposed permit contained in the Regional Administrator's determinations shall become issued and effective and will be the final action of the U.S. Environmental Protection Agency.

d. Evidentiary Hearing

If the determinations are substantially unchanged, any interested person may submit a request for an evidentiary hearing on the permit and its conditions within thirty (30) days of the receipt of the notice described in section c. If the determinations are substantially changed, any interested person may submit a request for an evidentiary hearing within thirty days of the date of the public notice or of the date of becoming aware of the determinations, which ever comes first. Such requests will be considered timely if mailed by certified mail within the thirty day period to the Regional Hearing Clerk, Environmental Protection Agency, 345 Courtland Street, N.E., Atlanta, Georgia 30365. All requests must contain:

(1) The name, mailing address and telephone number of the person making such request.

(2) A clear and concise factual statement of the nature and scope of the interest of the requester.

(3) The names and addresses of all persons whom the requester represents.

(4) A statement by the requester that, upon motion of any party, or sua sponte by the Presiding Officer and without cost or expense to any other party, the requester shall make available to appear and testify, the following:

(i) The requester,
(ii) All persons represented by the requester, and
(iii) All officers, directors, employees, consultants and agents of the requester and the persons represented by the requester.

(5) Specific references to the contested permit terms and conditions as well as suggested revised or alternative permit terms and conditions (not excluding permit denial) which, in the judgement of the requester, would be required to implement the purposes and policies of the Act.

(6) In the case of challenges to the application of control or treatment technologies identified in the statement of basis or fact sheet, identification of the basis for the objection, and the alternative technologies or combination of technologies which the requester believes are necessary to meet the requirements of the Act.

(7) Specific identification of each of the discharger's obligations which should be stayed if the request is granted. If the request contests more than one permit term/condition, then each obligation which is proposed to be stayed must be referenced to the particular contested term/condition warranting the stay.

(8) Each legal or factual question alleged to be at issue and its relevance to the permit decision.

(9) An estimate of the hearing time necessary for adjudication.

(10) Information supporting the request or relied upon which is not already a part of the administrative record required by 40 CFR § 124.18 (48 Federal Register 14272, April 1, 1983).

The granting of a request will stay only the contested portions of the permit. Uncontested provisions of the permit shall be considered issued and effective and the permittee must comply with such provisions. Except, if the permit is for a new source or new discharge, the applicant will be without a permit for the proposed new source or new discharge, pending final Agency action. The final Agency decision on the permit provisions contested at an evidentiary hearing will be made in accordance with Title 40, Code of Federal Regulations, Part 124, Subpart E, found at 48 Federal Register 14278, et seq.

e. Panel Hearing

In the case of an "initial license," including the first grant of an NPDES permit, or the first decision on a requested variance, if the Regional Administrator elects to apply the provisions of Subpart F and so states in the public notice of the draft permit, any person may request the Regional Administrator to hold a panel hearing on the permit. Such a request must be made within the comment period of the notice described above. Requests will be considered timely if mailed by certified mail within the comment period. All requests must contain:

(1) A brief statement of the interest of the person requesting the hearing;

(2) A statement of any objections to the draft permit;

(3) A statement of the issues which such person proposes to raise for consideration of such hearing;

(4) The name, mailing address and telephone number of the person making the request;

(5) A clear and concise factual statement of the nature and scope of the interest of the requester;

(6) The names and addresses of all persons whom the requester represents;

(7) A statement by the requester that, upon motion of any party, or sua sponte by the Presiding Officer and without cost or expense to any other party, the requester shall make available to appear and testify, the following:

(i) The requester,
(ii) All persons represented by the requester, and
(iii) All officers, directors, employees, consultants and agents of the requester and the persons represented by the requester; and

(8) Specific references to the contested permit terms and

conditions, as well as suggested revised or alternative permit terms and conditions (not excluding permit denial) which, in the judgement of the requester, would be required to implement the purposes and policies of the Act.

If the permit for which a panel hearing is requested is for a new source or new discharge, the applicant will be without permit for the proposed new source or new discharge, pending final Agency action. Panel hearings will be conducted in accordance with Title 40, Code of Federal Regulations, Part 124, Subpart F, found at 48 Federal Register 14285, et seq.

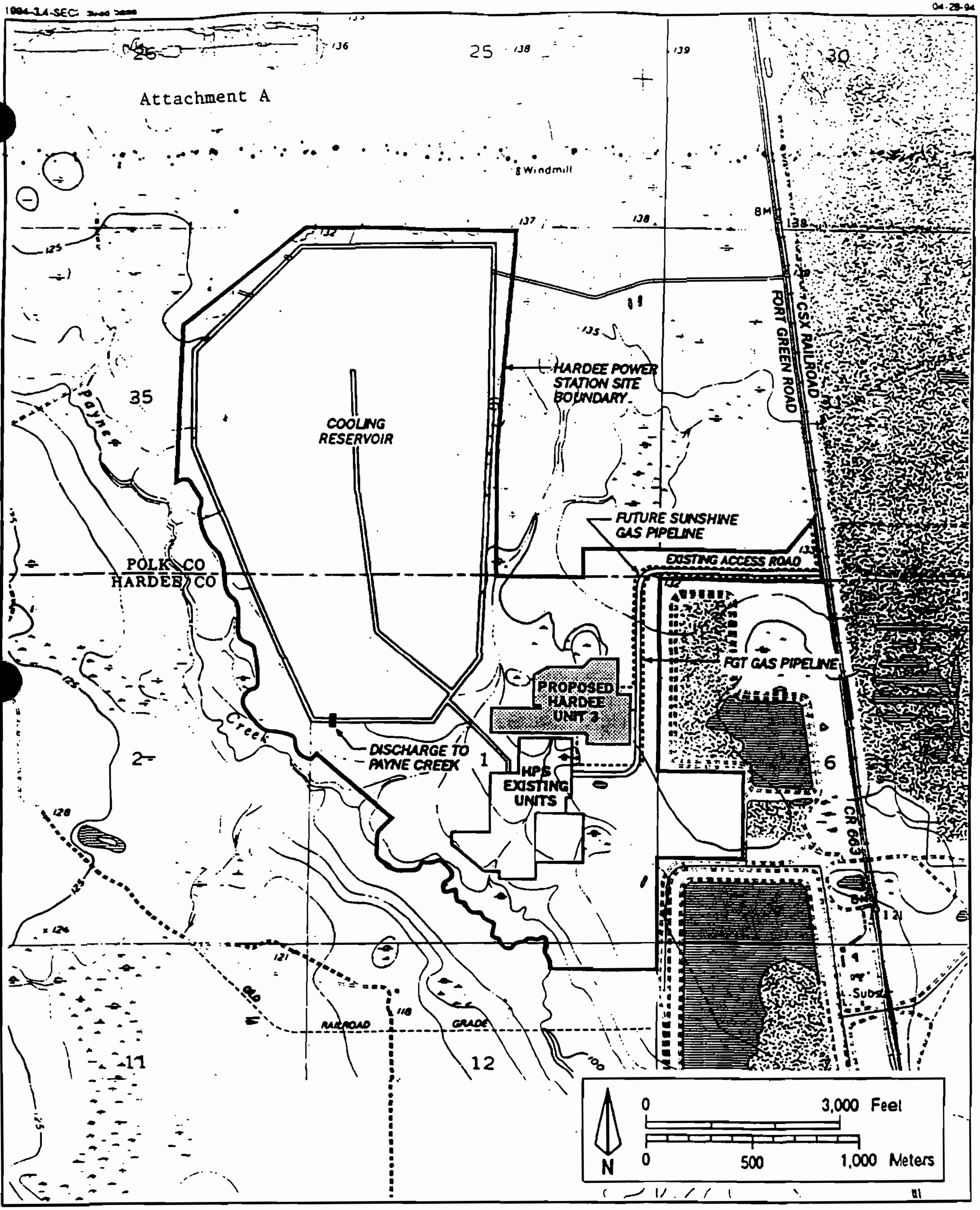

Figure 1.0-1
Hardee Unit 3 Site Boundary and Adjacent Properties

Sources: USGS, 1987; KBN, 1994.

SEMINOLE ELECTRIC COOPERATIVE INCORPORATED

APPENDIX B

DRAFT PSD PERMIT

Department of Environmental Protection

Lawton Chiles
Governor

Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Virginia B. Wetherell
Secretary

February 21, 1995

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

Mr. William C. Walbridge
Executive Vice President
Seminole Electric Cooperative Incorporated
P. O. Box 272000
Tampa, Florida 33688-2000

Dear Mr. Walbridge:

Attached is a copy of the Technical Evaluation and Preliminary Determination, proposed permit and the Best Available Control Technology evaluation to construct a 440 MW combined cycle power plant consisting of two gas turbine generators, associated heat recovery steam generators and a single steam turbine-generator.

Submit any written comments for consideration concerning the Department's proposed action to Mr. A. A. Linero of the Bureau of Air Regulation. If there any questions, please call Mr. Syed Arif at (904)488-1344.

Sincerely,

C. H. Fancy, P.E.
Chief
Bureau of Air Regulation

CHF/SA/bjb

Attachments

cc: B. Thomas, SWD
S. Palmer, DEP
J. Harper, EPA
J. Bunyak, NPS
L. Novak, Polk County
D. Roberts, HBGS ✓
K. Kosky, P.E., KBN

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

CERTIFIED MAIL

In the Matter of an
Application for Permit by:

DEP File No. PSD-FL-214
(PA-89-25SA)
Hardee and Polk Counties

Seminole Electric Cooperative Incorporated
P. O. Box 272000
Tampa, FL 33688-2000
________________________________/

INTENT TO ISSUE

The Department of Environmental Protection (Department) hereby gives notice of its intent to issue a PSD permit (copy attached) for the proposed project as detailed in the application specified above for the reasons stated in the attached Technical Evaluation and Preliminary Determination.

The applicant, Seminole Electric Cooperative Incorporated, applied on May 9, 1994, to the Department of Environmental Protection for a permit to construct a 440 MW combined cycle power plant consisting of two gas turbine generators, associated heat recovery steam generators, and a single steam turbine-generator. The proposed facility will be located near Bowling Green, Hardee County, Florida.

The Department has permitting jurisdiction under the provisions of Chapter 403, Florida Statutes (F.S.), and Chapters 62-212 and 62-4, Florida Administrative Code (F.A.C.). The project is not exempt from permitting procedures. The Department has determined that a construction permit is required for the proposed work.

Pursuant to Section 403.815, F.S. and Rule 62-103.150, F.A.C., you (the applicant) are required to publish at your own expense the enclosed Notice of Intent to Issue Permit. The notice shall be published one time only within 30 days in the legal ad section of a newspaper of general circulation in the area affected. For the purpose of this rule, "publication in a newspaper of general circulation in the area affected" means publication in a newspaper meeting the requirements of Sections 50.011 and 50.031, F.S., in the county where the activity is to take place. The applicant shall provide proof of publication to the Department's Bureau of Air Regulation, 2600 Blair Stone Road, Tallahassee, Florida 32399-2400, within seven days of publication. Failure to publish the notice and provide proof of publication within the allotted time may result in the denial of the permit.

The Department will issue the permit with the attached conditions unless a petition for an administrative proceeding (hearing) is filed pursuant to the provisions of Section 120.57, F.S.

A person whose substantial interests are affected by the Department's proposed permitting decision may petition for an administrative proceeding (hearing) in accordance with Section 120.57, F.S. The petition must contain the information set forth below and must be filed (received) in the Office of General Counsel of the Department at 2600 Blair Stone Road, Tallahassee, Florida 32399-2400. Petitions filed by the permit applicant and the parties listed below must be filed within 14 days of receipt of this intent. Petitions filed by other persons must be filed within 14 days of publication of the public notice or within 14 days of their receipt of this intent, whichever first occurs. Petitioner shall mail a copy of the petition to the applicant at the address indicated above at the time of filing. Failure to file a petition within this time period shall constitute a waiver of any right such person may have to request an administrative determination (hearing) under Section 120.57, F.S.

The Petition shall contain the following information;

(a) The name, address, and telephone number of each petitioner, the applicant's name and address, the Department Permit File Number and the county in which the project is proposed;
(b) A statement of how and when each petitioner received notice of the Department's action or proposed action;
(c) A statement of how each petitioner's substantial interests are affected by the Department's action or proposed action;
(d) A statement of the material facts disputed by Petitioner, if any;
(e) A statement of facts which petitioner contends warrant reversal or modification of the Department's action or proposed action;
(f) A statement of which rules or statutes petitioner contends require reversal or modification of the Department's action or proposed action; and,
(g) A statement of the relief sought by petitioner, stating precisely the action petitioner wants the Department to take with respect to the Department's action or proposed action.

If a petition is filed, the administrative hearing process is designed to formulate agency action. Accordingly, the Department's final action may be different from the position taken by it in this intent. Persons whose substantial interests will be affected by any decision of the Department with regard to the application have the right to petition to become a party to the proceeding. The petition must conform to the requirements specified above and be filed (received) within 14 days of receipt of this intent in the Office of General Counsel at the above address of the Department. Failure to petition within the allowed time frame constitutes a waiver of any right such person has to request a hearing under Section 120.57, F.S., and to participate as a party to this proceeding. Any subsequent intervention will only be at the approval of the presiding officer upon motion filed pursuant to Rule 28-5.207, F.A.C.

Executed in Tallahassee, Florida.

STATE OF FLORIDA DEPARTMENT
OF ENVIRONMENTAL PROTECTION

C. H. Fancy, P.E., Chief
Bureau of Air Regulation
2600 Blair Stone Road
Tallahassee, Florida 32399
904-488-1344

CERTIFICATE OF SERVICE

The undersigned duly designated deputy clerk hereby certifies that this INTENT TO ISSUE and all copies were mailed by certified mail before the close of business on 2/21/95 to the listed persons.

Clerk Stamp

FILING AND ACKNOWLEDGMENT
FILED, on this date, pursuant to §120.52(11), Florida Statutes, with the designated Department Clerk, receipt of which is hereby acknowledged.

Charlotte J Hayes 2/21/95
Clerk Date

Copies furnished to:

cc: B. Thomas, SWD
S. Palmer, DEP
J. Harper, EPA
J. Bunyak, NPS
L. Novak, Polk County
D. Roberts, HBGS
K. Kosky, P.E., KBN

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
NOTICE OF INTENT TO ISSUE PERMIT

PSD-FL-214
(PA-89-25SA)

The Department of Environmental Protection (Department) gives notice of its intent to issue a permit to Seminole Electric Cooperative Incorporated, P. O. Box 272000, Tampa, FL 33688, to construct a 440 MW combined cycle power plant consisting of two gas turbine generators, associated heat recovery steam generators, and a single steam turbine-generator. The proposed facility will be located in Hardee and Polk Counties, Florida. A determination of Best Available Control Technology was required. The maximum predicted increase in nitrogen dioxide concentrations due to the project are less than the respective PSD Class I and II significant impact levels, thus no nitrogen dioxide PSD increment consumption was calculated for this project. The maximum predicted increases in particulate matter less than 10 microns (PM_{10}) concentrations due to the project are less than the respective PSD Class I significant impact levels, thus no PSD Class I PM_{10} increment consumption was calculated for this project. The maximum predicted PSD Class II PM_{10} increments to be consumed by the proposed project are the following: 21.5 ug/m^3, 24-hour average, or 72% of the available 24-hour increment of 30 ug/m^3; and, 0.12 ug/m^3, annual average, or less than one percent of the available annual increment of 17 ug/m^3. The maximum predicted PSD Class II sulfur dioxide increments to be consumed by the proposed project are the following: 65.1 ug/m^3, 3-hour average, or 13% of the available 3-hour increment of 512 ug/m^3; 27.8 ug/m^3, 24-hour average, or 31% of the available 24-hour increment of 91 ug/m^3; and, 0.18 ug/m^3, annual average, or less than one percent of the available increment of 20 ug/m^3. The maximum predicted PSD Class I sulfur dioxide increments to be consumed by the proposed project are the following: 1.9 ug/m^3, 3-hour average, or 8% of the available 3-hour increment of 25 ug/m^3; 0.3 ug/m^3, 24-hour average, or 6% of the available 24-hour increment of 5 ug/m^3; and, 0.012 ug/m^3, annual average, or less than one percent of the available annual increment of 2 ug/m^3. The Department is issuing this Intent to Issue for the reasons stated in the Technical Evaluation and Preliminary Determination.

A person whose substantial interests are affected by the Department's proposed permitting decision may petition for an administrative proceeding (hearing) in accordance with Section 120.57, Florida Statutes (F.S.). The petition must contain the information set forth below and must be filed (received) in the Office of General Counsel of the Department at 2600 Blair Stone Road, Tallahassee, Florida 32399-2400, within 14 days of publication of this notice. Petitioner shall mail a copy of the petition to the applicant at the address indicated above at the time of filing. Failure to file a petition within this time period shall constitute a waiver of any right such person may have to request an administrative determination (hearing) under Section 120.57, F.S.

The Petition shall contain the following information; (a) The name, address, and telephone number of each petitioner, the applicant's name and address, the Department Permit File Number and the county in which the project is proposed; (b) A statement of how and when each petitioner received notice of the Department's action or proposed action; (c) A statement of how each petitioner's substantial interests are affected by the Department's action or proposed action; (d) A statement of the material facts disputed by Petitioner, if any; (e) A statement of facts which petitioner contends warrant reversal or modification of the Department's action or proposed action; (f) A statement of which rules or statutes petitioner contends require reversal or modification of the Department's action or proposed action; and, (g) A statement of the relief sought by petitioner, stating precisely the action petitioner wants the Department to take with respect to the Department's action or proposed action.

If a petition is filed, the administrative hearing process is designed to formulate agency action. Accordingly, the Department's final action may be different from the position taken by it in this Notice. Persons whose substantial interests will be affected by any decision of the Department with regard to the application have the right to petition to become a party to the proceeding. The petition must conform to the requirements specified above and be filed (received) within 14 days of publication of this notice in the Office of General Counsel at the above address of the Department. Failure to petition within the allowed time frame constitutes a waiver of any right such person has to request a hearing under Section 120.57, F.S., and to participate as a party to this proceeding. Any subsequent intervention will only be at the approval of the presiding officer upon motion filed pursuant to Rule 28-5.207, Florida Administrative Code.

The application is available for public inspection during normal business hours, 8:00 a.m. to 5:00 p.m., Monday through Friday, except legal holidays, at:

Department of Environmental Protection
Bureau of Air Regulation
111 S. Magnolia Drive, Suite 4
Tallahassee, Florida 32301

Department of Environmental Protection
Southwest District
3804 Coconut Palm Drive
Tampa, Florida 33619-8218

Any person may send written comments on the proposed action to Mr. A. A. Linero at the Department of Environmental Protection, Bureau of Air Regulation, Mail Station 5505, 2600 Blair Stone Road, Tallahassee, Florida 32399-2400. All comments received within 14 days of the publication of this notice will be considered in the Department's final determination.

Further, a public hearing can be requested by any person(s). Such requests must be submitted within 30 days of this notice.

Technical Evaluation
and
Preliminary Determination

Seminole Electric Cooperative Incorporated
Hardee & Polk Counties, Florida

440 MW COMBINED CYCLE POWER PLANT

Department File No.: PSD-FL-214
(PA-89-25SA)

Department of Environmental Protection
Division of Air Resources Management
Bureau of Air Regulation

February 21, 1995

SYNOPSIS OF APPLICATION

I. GENERAL INFORMATION

A. Name and Address of Applicant

Seminole Electric Cooperative Incorporated
P. O. Box 272000
Tampa, FL 33688-2000

B. Reviewing and Process Schedule

Date of Receipt of Application: May 9, 1994.

Completeness Review: Department letters dated June 27, 1994; September 21, 1994; and, November 16, 1994.

Response to Incompleteness Letters: Company letters received on August 26, 1994; October 6, 1994; and, November 23, 1994.

Application Completeness Date: November 23, 1994.

C. Facility Location

This facility is located in Hardee and Polk Counties approximately 9 miles northwest of Wauchula and 16 miles south-southwest of Bartow. The UTM coordinates are Zone 17, 405.0 km East and 3057.7 km North.

Facility Identification Code (SIC)

Major Group No. 49 - Electric, Gas and Sanitary Services.

Industry Group No. 491 - Combination Electric, Gas and Other Utility Services.

Industry Group No. 4911 - Electric and Other Services Combined.

D. Project Description

The Seminole Electric Cooperative Incorporated (SECI) facility in Polk and Hardee Counties is classified as a major emitting facility. The proposed project consists of the construction of two gas combustion turbine (CT) generators, associated heat recovery steam generators (HRSGs), and a single steam turbine-generator at a facility adjacent to the Hardee Power Station's existing units located in Hardee and Polk Counties. The facility, referred to as Hardee Unit 3, will consist of two 150 megawatt (MW) Westinghouse Model 501F, or equivalent, advanced CTs. Each CT will be connected to a separate HRSG, which will recover the waste heat to produce steam for utilization in a single 140 MW (net) steam turbine. The facility will have a total nominal generating capacity of 440 MW (net). The primary fuel for the CTs will be natural gas, with distillate (No. 2) fuel oil containing a maximum sulfur content of 0.05 percent, by weight, designated as the backup fuel.

E. Project Emissions

The proposed project will produce potential pollutant emissions of ~~1139~~ 1212 tons per year (TPY) of nitrogen oxides (NO_x); ~~175~~ 182 TPY of sulfur dioxide (SO_2); ~~614~~ 618 TPY of carbon monoxide (CO); ~~145~~ 147 TPY of particulate matter (PM/PM_{10}); 99 TPY of volatile organic compounds (VOC); 0.007 TPY of beryllium (Be); 0.16 TPY of lead (Pb); 0.014 TPY inorganic arsenic (As); 0.025 TPY of mercury (Hg); and, ~~38~~ 39 TPY of sulfuric acid (H_2SO_4) mist. This assumes ~~if~~ full load operation at 8760 hours per year (7,260 hours per year on natural gas and a maximum of 3,000 hours per year per CT between the two CTs on No. 2 fuel oil using a maximum of 0.05 percent sulfur, by weight).

II. RULE APPLICABILITY

The proposed project, construction of a 440 MW combined cycle power plant (SIC 4911) in Polk & Hardee Counties, is subject to the State Power Plant Siting Act (PPSA) and preconstruction review under the provisions of Chapter 403, Florida Statutes, Chapters 62-212 and 62-4, Florida Administrative Code (F.A.C.), and 40 CFR 60 (July 1, 1994 version).

This facility is located in an area designated attainment for all criteria pollutants in accordance with Rule 62-275.400, F.A.C.

The proposed project was reviewed under Rule 62-212.400(5), F.A.C., New Source Review (NSR) for Prevention of Significant Deterioration (PSD), because it will be a major modification to a major facility. This review consisted of a determination of Best Available Control Technology (BACT) and, unless otherwise exempted, an analysis of the air quality impact of the increased emissions. The review also includes an analysis of the project's impacts on soils, vegetation and visibility, along with air quality impacts resulting from associated commercial, residential and industrial growth.

The proposed facility shall be in compliance with all applicable provisions of Chapters 62-212 and 62-4, F.A.C., and the 40 CFR 60 (July 1, 1994 version). The proposed facility shall be in compliance with all applicable provisions of Rules 62-210.650, F.A.C.: Circumvention; Rule 62-210.700, F.A.C.: Excess Emissions; Rule 62-296.800, F.A.C.: Standards of Performance for New Stationary Sources (NSPS); Chapter 62-296, F.A.C.: Stationary Sources - Emissions Monitoring; and, Rule 62-4.130, F.A.C.: Plant Operation-Problems.

The proposed facility shall be in compliance with the New Source Performance Standards (NSPS) for Gas Turbines, Subpart GG, and for volatile organic storage vessels, Subpart Kb, which are contained in 40 CFR 60 and adopted by reference in Rule 62-296.800, F.A.C.

III. TECHNICAL EVALUATION

The applicant proposes to install a 440 MW combined cycle power plant at its facility in Polk and Hardee Counties. The plant will consist of two nominal 150 megawatt (MW) Westinghouse Model 501F, or equivalent CTs that will exhaust through two associated unfired HRSGs, which will supply steam to power a single 140 MW (net) steam turbine generator. The proposed facility will include a 4.4 million gallon fuel oil storage tank. The proposed facility will be capable of producing a nominal 440 MW of electricity.

In 1990, the Hardee Power Station was certified for 660 MW of generation in a phased construction schedule as follows:

1. TECO Power Services - 295 MW (1993) (Phase 1A).
2. TECO Power Services - 145 MW (future unit) (Phase 1B).
3. SECI - 220 MW (date unspecified) (Phase 2).

This new certification does not change Phases 1A and 1B, above, but will increase the SECI certified generation (Phase 2) from 220 MW to 440 MW, with an inservice date of January, 1999. Because of the phased construction activity, the Department looked at the total emissions for the Phase 2 project to see if any additional pollutants (i.e., Hg, Pb, etc.) should be reviewed from the BACT determination process.

The primary fuel to the two CTs will be natural gas. No. 2 fuel oil with a maximum sulfur content of 0.05%, by weight, will be used as a backup fuel for a maximum of 3,000 hours per year between the two CTs. The CTs will be firing natural gas for the remaining hours of operation. The emissions of nitrogen oxides (NO_x) represent a significant proportion of the total emissions generated by this project. The BACT for NO_x, as determined by the Department, will be met by using low-NO_x combustors to limit emissions to 15 ppmvd (corrected to 15% O_2) when burning natural gas and water injection to limit emissions to 42 ppmvd (corrected to 15% O_2) when burning fuel oil. The facility is subject to PSD new source review (NSR) and BACT for NO_x emissions because the proposed increase in annual NO_x emissions exceeds the significant emission rate. Compliance with the emission standards will be determined by stack tests.

Particulate matter (PM/PM_{10}) emissions from the combined cycle combustion turbines will be minimized by combustion control and the use of clean fuels. The Department agrees with the applicant's rationale that there are no feasible methods to control lead, mercury, beryllium and other trace pollutants, except by requiring good quality fuel. The facility is subject to PSD NSR and BACT for PM/PM_{10} emissions because the proposed increase in annual PM/PM_{10} emissions exceeds the significant emission rate. Compliance will be determined by periodic stack tests.

SO_2 and H_2SO_4 mist emissions will be controlled by the use of low sulfur fuel oil. The No. 2 fuel oil, which will be used as a back-up fuel for up to 3,000 hours per year between the two CTs, will have a maximum sulfur content limit of 0.05 percent, by weight. The facility is subject to PSD NSR and BACT for SO_2 and H_2SO_4 mist emissions because the proposed increase in annual SO_2 and H_2SO_4 mist emissions exceeds the significant emission rates. The use of natural gas as the primary fuel and limited use of fuel oil represents BACT for these pollutants. Compliance with the SO_2 and H_2SO_4 mist emission standards will be demonstrated by fuel analysis or stack testing, ~~and/or continuous emission monitoring.~~

CO and VOC emissions will be minimized by combustion control to assure proper fuel mixing and complete fuel combustion. The CO emissions from the proposed combined cycle turbines using dry low-NO_x combustors are 20 ppmvd @ 15% O_2 for natural gas firing and 25 ppmvd @ 15% O_2 for fuel oil firing using water injection. VOC emissions have been based on exhaust concentrations of 5 and 10 ppmvd for natural gas and fuel oil firing, respectively. The facility is subject to PSD NSR and BACT for CO and VOC emissions because the proposed increase in annual CO and VOC emissions exceeds the significant emission rates. Compliance with the emission standards will be determined by stack tests.

The facility is subject to PSD NSR for Be and As. These pollutants are caused primarily by the contaminants in the fossil fuels. Emissions will be controlled by limiting the quantity of fossil fuel that can be burned. Compliance for the pollutants shall be determined by stack tests.

The following table summarizes the maximum emissions of air pollutants subject to PSD review:

Pollutant	Emissions (TPY) Gas*	Oil*	Total**	PSD Significant Emission Rate (TPY)
NO_x	~~911~~ ~~[illegible]~~ 938	~~525~~ 504	~~1139~~ 1212	40
SO_2	~~44~~ 47	~~150~~ 152	~~175~~ 182	40
CO	622	136	~~614~~ 618	100
PM/PM_{10}	~~61~~ 65	100	~~145~~ 147	15
VOC	88	31	99	40
Be	Neg.	0.007	0.007	0.0004
H_2SO_4 Mist	~~9~~ 6	~~33~~ 34	~~38~~ 39	7
As	Neg.	0.014	0.014	Any

* The emissions for gas and oil are based on the worst case ambient temperature condition, which is 32°F, and each CT operating up to 8760 hours on gas and 1500 hours on fuel oil.

** The emissions are based on the ambient temperature of 59°F and each CT operating 7260 hours on gas and 1500 hours on fuel oil. These emissions will be the maximum allowables from the two CTs if any fuel oil is burned at the facility during the year.

IV. AIR QUALITY REPORT

A. Introduction

The proposed project will emit eight pollutants in PSD significant amounts. These pollutants are SO_2, PM/PM_{10}, NO_x, CO and VOC, along with the non-criteria pollutants As, Be, and H_2SO_4 mist.

The air quality impact analyses required by the PSD regulations for these pollutants include:

* An analysis of existing air quality;
* A PSD increment analysis (SO_2, PM_{10}, and NO_2);
* An Ambient Air Quality Standards (AAQS) analysis;
* An analysis of impacts on soils, vegetation, visibility, and of growth-related air quality modeling impacts; and,
* A "Good Engineering Practice" (GEP) stack height determination.

The analysis of existing air quality generally relies on preconstruction monitoring data collected with EPA-approved methods. The PSD increment and AAQS analyses depend on air quality dispersion modeling carried out in accordance with EPA guidelines.

Based on the required analyses, the Department of Environmental Protection (Department) has reasonable assurance that the proposed project, as described in this report and subject to the conditions of approval proposed herein, will not cause or contribute to a violation of any AAQS or PSD increment. However, the following EPA-directed stack height language is included: "In approving this permit, the Department has determined that the application complies with the applicable provisions of the stack height regulations as revised by EPA on July 8, 1985 (50 FR 27892). Portions of the regulations have been remanded by a panel of the U.S. Court of Appeals for the D.C. Circuit in NRDC v. Thomas, 838 F. 2d 1224 (D.C. Cir. 1988). Consequently, this permit may be subject to modification if and when EPA revises the regulation in response to the court decision. This may result in revised emission limitations or may affect other actions taken by the source owners or operators." A discussion of the modeling procedure and required analyses follows.

B. Analysis of Existing Air Quality and Determination of Background Concentrations

Preconstruction ambient air quality monitoring is required for all pollutants subject to PSD NSR. However, an exemption to the monitoring requirement can be obtained if the maximum air quality impact resulting from the projected emissions increase, as determined by air quality modeling, is less than a pollutant-specific de minimus concentration. Pollutants which do not have a specified de minimus level may also be exempt from preconstruction monitoring requirements. In addition, if an acceptable ambient monitoring method for the pollutant has not been established by EPA, monitoring is not required.

Even if preconstruction ambient monitoring is exempted, determination of background concentrations for PSD significant pollutants may be necessary for use in the AAQS analysis for each pollutant. These concentrations may be established from the required preconstruction ambient air quality monitoring analysis or from previously existing representative monitoring data. These background ambient air quality concentrations are added to pollutant impacts predicted by modeling and represent the air quality impacts of sources not included in the modeling.

Table 1 shows that NO_2 and CO impacts from the project are predicted to be less than the de minimus levels. Therefore, preconstruction ambient air quality monitoring is not required for these two pollutants. H_2SO_4 mist, As, and VOC impacts for comparison with de minimus levels are not shown in this table. There are no monitoring de minimus levels or acceptable monitoring techniques for H_2SO_4 mist and As, and the net emissions increase of

VOC is compared to a de minimus monitoring emission rate in tons per year, not a concentration level. For this project, the net emissions increase of VOC is less than the de minimus emissions rate of 100 tons per year. For these reasons, preconstruction ambient air monitoring for H_2SO_4 mist, As and VOC is not required.

Table 1 also shows that SO_2, PM_{10}, and Be impacts from the project are predicted to be greater than de minimus levels. Maximum Be impact is predicted to be greater than the de minimus monitoring level for the 50 percent operating load only. For baseload operation, the maximum predicted Be impact is less than the de minimus monitoring level. In addition, maximum predicted Be impacts are well below the applicable Ambient Reference Concentrations (ARC) shown in Table 7. Therefore, no preconstruction monitoring for Be is required for this project. Preconstruction ambient air quality monitoring, however, is required for SO_2 and PM_{10}. Previously existing representative monitoring data from SO_2 monitors in Mulberry and Nichols and a PM_{10} monitor in Homeland are used to fulfill the monitoring requirements for these two pollutants and to establish background concentrations for use in the AAQS analysis. Background concentrations for PM_{10} and SO_2 are given in the AAQS table, Table 6.

C. Modeling Procedure

The EPA-approved Industrial Source Complex Short-Term (ISCST2) dispersion model was used to evaluate the pollutant emissions from the proposed project, the adjacent existing Hardee facility and other existing major facilities. The model determines ground-level concentrations of inert gases or small particles emitted into the atmosphere by point, area and volume sources. The model incorporates elements for plume rise, transport by the mean wind, Gaussian dispersion, and pollutant removal mechanisms such as deposition. The ISCST2 model allows for the separation of sources, building wake downwash, and various other input and output features. A series of specific model features, recommended by the EPA, are referred to as the regulatory options. The applicant used the EPA recommended regulatory options in each modeling scenario. Direction-specific downwash parameters were used for all sources for which downwash was considered.

Initially, the applicant conducted preliminary modeling for the purpose of determining the worst case fuel/load/operation/temperature scenarios for the proposed project. This preliminary modeling was based on fuel oil combustion since hourly emissions are generally higher with the use of fuel oil than with natural gas. Modeling was performed for three operating loads (100, 75, and 50 percent) at two temperatures (32°F and 95°F) for both simple cycle and combined cycle operation. In general, the "worst case" predicted 1-hour, 8-hour, and 24-hour ground-level ambient air quality impacts occur during 50 percent load conditions at an ambient temperature of 95°F and combined cycle operation; and, the "worst case" 3-hour and annual concentrations occur during 75 percent load conditions and combined cycle operation. These "worst case" conditions were used as input in the significant impact analysis. For determination of the proposed project's significant impact area, the receptor grid consisted of 397 receptors located at the fenced property and at distances of 0.1, 0.2, 0.3, 0.4, 0.6, 1.0, 1.5, 2.0, 3.0, 4.0, and 5.0 km along 36 radials with each radial spaced at 10-degree intervals. For the AAQS and PSD Class II analyses, receptor grids were based on the size of the significant impact area for each pollutant. As shown in Table 2, SO_2 and PM_{10} maximum predicted impacts were greater than significant impact levels. The radius of significant impact for both pollutants is approximately 1 km. Therefore, the receptor grids were located within 1 km of the proposed project at the fenced property and at the following distances: 0.1, 0.2, 0.3, 0.4, 0.5, 0.6, 0.8, and 1.0 km along 36 radials with each radial spaced at 10-degree intervals.

The Chassahowitzka National Wilderness Area (CWNA) is a PSD Class I area that is located 130 km from the project site at its closest point. In the PSD Class I analysis, CWNA is represented by 13 Department-approved standard discrete receptors. For the PSD Class I analysis, the ISCST2 model was used initially as a screening model for estimating impacts on the CWNA. The MESOPUFF II long range transport model was used for a more refined SO_2 impact assessment.

Meteorological data used in the ISCST2 model to determine air quality impacts consisted of a concurrent 5-year period of hourly surface weather observations and twice-daily upper air soundings from the National Weather Service (NWS) station at Tampa. The 5-year period of meteorological data was from 1982 through 1986. The NWS station at Tampa, located approximately 65 km west-northwest of the Hardee site, was selected for use in the study because it is the closest primary weather station to the study area and is most representative of the plant site. The surface observations included wind direction, wind speed, temperature, cloud cover and cloud ceiling.

Since five years of data were used, the highest, second-highest short-term predicted concentrations were compared with the appropriate ambient air quality standards or PSD increments. For the annual averages, the highest predicted yearly average was compared with the standards. For determining the significant impact area, both the highest short-term predicted concentrations and the highest predicted yearly averages were compared to the significant impact levels.

D. Significant Impact Analysis

As stated in the section above, the maximum air quality impacts due to SO_2 and PM_{10} emissions from the proposed project are greater than the significant impact levels. The radii of significant impact for SO_2 and PM_{10} are approximately 1 km.

E. PSD Increment Analysis

1. Class II Area

The PSD increment represents the amount that new sources in an area may increase ambient ground level concentrations of a pollutant. Atmospheric dispersion modeling, as previously described, was performed to quantify the amount of PSD increment consumed. The results, summarized in Table 3, show that the maximum SO_2 and PM_{10} PSD increment consumption will not exceed the allowable Class II PSD increments.

2. Class I Area

A proposed source subject to PSD NSR must conduct a dispersion modeling analysis of its impacts on any PSD Class I area located near the source. The closest receptor point in the Class I CWNA is approximately 130 km from the Hardee project site. Using the ISCST2 model, the applicant determined the maximum predicted impacts from the proposed Hardee Unit 3 only. These impacts were then compared to the National Park Service's (NPS) significant impact levels as shown in Table 4. The results in this table show that SO_2 is the only pollutant with impacts greater than these levels.

Based on the results for SO_2, a more refined PSD Class I impact assessment using ISCST2 and MESOPUFF II was performed. All increment-consuming sources in the area of the CWNA were input into these models. Table 5 shows the results of this assessment. The maximum predicted 3-hour and 24-hour impacts due to all increment-consuming sources exceed the PSD Class I increments on numerous occasions. In order to assess the proposed project's contribution to any predicted Class I exceedances, an analysis was performed to determine all time periods and receptors at which an exceedance was predicted to occur. Both ISCST2 and MESOPUFF II were used in this assessment. For each case, the proposed project's impact was determined and compared to the NPS recommended significant impact levels. The impact of the project was always less than these significance levels at any receptor and for any time period when there were predicted exceedances or violations of increments. Therefore, the proposed project will not contribute significantly to any predicted exceedance or violation of Class I increments and may be permitted by Department rules.

F. AAQS Analysis

For the pollutants subject to an AAQS review, the total impact on ambient air is obtained by adding a "background" concentration to the maximum modeled concentration. This "background" concentration takes into account all sources of a particular pollutant that are not explicitly modeled. The results of the AAQS analysis for SO_2 and PM_{10} are summarized in Table 6. Emissions from the proposed facility are not expected to cause or contribute to a violation of an AAQS.

G. Non-criteria Pollutants

As, Be and H_2SO_4 mist are non-criteria pollutants, which means that neither national AAQS nor PSD increments have been defined for these pollutants. The BACT determination specifies that the control of these pollutants will be through the use of a very clean fuel oil and by limiting the amount of fuel oil consumed. The fuel oil sulfur content will have a maximum limit of 0.05%, by weight.

H. Air Toxics Analysis

The maximum impacts of regulated and non-regulated toxic air pollutants that will be emitted by the project are presented in Table 7. Each pollutant's maximum 8-hour, 24-hour, and annual impact is compared to the Department's draft ARC. As shown in the table, all predicted impacts are less than their respective ARC.

V. ADDITIONAL IMPACTS ANALYSIS

A. Impacts on Soils, Vegetation, and Wildlife

The maximum ground-level concentrations predicted to occur for SO_2, PM_{10}, CO and NO_x, as a result of the proposed project, including background concentrations and all other nearby sources, will be below the associated AAQS. The AAQS are designed to protect both the public health and welfare. As such, this project is not expected to have a harmful impact on soils and vegetation in the PSD Class II area. An air quality related values (AQRV) analysis was done by the applicant for the Class I area. No significant impacts on this area are expected.

B. Impact on Visibility

Visual Impact Screening and Analysis (VISCREEN), the EPA-approved Level I visibility computer model, was used to estimate the impact of the proposed project's stack emissions on visibility in the CWNA. The results indicate that the maximum visibility impacts do not exceed the screening criteria inside or outside the Everglades National Park Class I area. As a result, there is no significant impact on visibility predicted for the Class I area.

C. Growth-Related Air Quality Impacts

There will be a small number of temporary construction workers during construction and even smaller number of new permanent workers after the project is completed. However, there will be no significant impacts on air quality caused by associated population growth.

D. GEP Stack Height Determination

Good Engineering Practice (GEP) stack height means the greater of: (1) 65 m (213 ft) or (2) the maximum nearby building height plus 1.5 times the building height or width, whichever is less. The HRSG stacks and bypass stacks for this project will be 27.4 m (90 ft) and 22.9 m (75 ft), respectively. These stacks will not exceed the GEP stack height and will comply with GEP stack height regulations. However, these stacks will be less than GEP; therefore, the potential for building downwash to occur was considered in the modeling analysis for these stacks.

VI. CONCLUSION

Based on the information presented by the applicant in the above analysis, the Department has been provided reasonable assurances that the proposed project to construct two CTs, associated HRSGs and a steam turbine-generator for a nominal generation of 440 MW, as described in the application and subject to the conditions of approval proposed herein, will not cause or contribute to any violation of any PSD increment, ambient air quality standard, or any other technical provision of Chapters 62-212 and 62-4 of the Florida Administrative Code.

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Seminole Electric Cooperative, Incorporated (SECI), Hardee Unit 3
(PSD-FL-214) (PA89-25SA)

Table 1. Maximum Air Quality Impacts for Comparison to the De Minimus Ambient Levels.

Pollutant	Avg. Time	Max Predicted Impact (ug/m^3)	De Minimus Level (ug/m^3)
SO_2	24-hour	27.8	13
PM_{10}	24-hour	21.5	10
NO_2	Annual	0.6	14
CO	8-hour	115	575
Beryllium *	24-hour	0.0014	0.001

* non-criteria pollutant

Table 2. Significant Impact Analysis for Class II Area

Pollutant	Averaging Time	Max. Predicted Impact (ug/m^3)	Significant Impact Level (ug/m^3)
NO_2	Annual	0.59	1
SO_2	Annual	0.18	1
	24-hour	27.8	5
	3-hour	65.1	25
PM_{10}	Annual	0.12	1
	24-hour	21.5	5
CO	8-hour	115	500
	1-hour	255	2000

Table 3. PSD Class II Increment Analysis

Pollutant	Averaging Time	Max. Predicted Impact[1] (ug/m^3)	Allowable Increment (ug/m^3)
SO_2	Annual	-4.0	20
	24-hour	45.4	91
	3-hour	150	512
PM_{10}	Annual	0.6	17
	24-hour	14	30

1. Highest, second-highest value over a five year period for 3-hour and 24-hour averaging times.

Table 4. Significant Impact Analysis for PSD Class I Area

Pollutant	Averaging Time	Max. Predicted Impact (ug/m^3)	National Park Service (NPS) Significant Impact Level (ug/m^3)
NO_2	Annual	0.022	0.025
SO_2	Annual	0.012	0.025
	24-hour	0.30	0.07
	3-hour	1.9	0.48
PM_{10}	Annual	0.008	0.08
	24-hour	0.20	0.33

Table 5. PSD Class I Increment Analysis

Pollutant	Averaging Time	Max. Predicted Impact[1] (ug/m^3)	Allowable Increment (ug/m^3)
SO_2	Annual	0.3	2
	24-hour	6.4[2]	5
	3-hour	26.1[2]	25

1. Highest, second-highest value over a five year period for 3-hour and 24-hour averaging times.
2. The project has less than significant impacts for all predicted exceedances of SO_2 increments.

Table 6. Ambient Air Quality Impact Analysis

Pollutant	Averaging Time	Modeled Sources Impact (ug/m^3)	Background Conc. (ug/m^3)	Max Predicted Impact[1] (ug/m^3)	Florida AAQS (ug/m^3)
SO_2	Annual	18	11	29	60
	24-hour	88	50	138	260
	3-hour	178	256	434	1,300
PM_{10}	Annual	4	20	24	50
	24-hour	31	70	101	150

1. Highest, second-highest value over a five year period for 3-hour and 24-hour averaging times.

Table 7. Air Toxics Analysis

	8- hour		24- hour		Annual	
Pollutant	Impact (ug/m^3)	ARC (ug/m^3)	Impact (ug/m^3)	ARC (ug/m^3)	Impact (ug/m^3)	ARC (ug/m^3)
Arsenic	0.0055	2	0.0027	0.48	0.000017	0.00023
Beryllium	0.0028	0.02	0.0014	0.0048	0.000009	0.00042
Barium	0.022	5	0.011	1.2	0.00007	50
Cadmium	0.012	0.5	0.006	0.12	0.000037	0.00056
Chlorine	0.028	15	0.014	3.6	.00007	0.4
Chromium+6	0.053	0.5	0.026	0.12	0.00003	0.000083
Cobalt	0.01	0.5	0.005	0.12	-	-
Fluoride	0.037	25	0.018	6	-	-
Formaldehyde	0.45	12	0.22	2.88	0.0014	0.077
Antimony	0.024	5	0.012	1.2	0.00008	0.3
Manganese	0.38	50	0.19	12	.00099	0.4
Mercury	0.0099	0.5	0.0048	0.12	0.000026	0.3
Nickel	1.34	10	0.66	2.4	0.0007	0.0042
Selenium	0.026	0.48	0.013	2	-	-
Vanadium	0.078	0.5	0.038	0.12	0.0002	2
Zinc	1.77	10	0.86	2.4	-	-

Note: ARC = Ambient Reference Concentration

FLORIDA

Department of Environmental Protection

Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Lawton Chiles
Governor

Virginia B. Wetherell
Secretary

PERMITTEE:
Seminole Electric Cooperative Incorporated
P.O. Box 272000
Tampa, FL 33688-2000

Permit Number: PSD-FL-214 (PA-89-25SA)
Expiration Date: January 1, 2000
County: Polk & Hardee
Latitude/Longitude: 27°38'30"N 81°57'45"W
Project: 440 MW Combined Cycle Power Plant

This permit is issued under the provisions of Chapter 403, Florida Statutes, and Florida Administrative Code Chapters 62-212 and 62-4. The above named permittee is hereby authorized to perform the work or operate the facility shown on the application and approved drawings, plans, and other documents attached hereto or on file with the Department and specifically described as follows:

For a 440 MW combined cycle power plant consisting of two 150 MW combustion turbines (CTs), two heat recovery steam generators (HRSGs), a 140 MW steam turbine generator and a 4.4 million gallon fuel oil storage tank. The maximum heat input at 32°F is ~~1,799~~ 1,862 MMBtu/hr/CT (natural gas) and ~~1,972~~ 1,965 MMBtu/hr/CT (oil). The plant will be located at the Polk and Hardee County site near Bowling Green, Florida which is also the site of a 295 MW power plant which is operated by TECO Power Services. The combustion turbines are to be Westinghouse Model 501F or equivalent and equipped with dry low NO_x combustors or an equivalent system for natural gas firing and wet injection for fuel oil firing. The CT will be fired with natural gas and No. 2 low sulfur fuel oil with a sulfur content limit not to exceed 0.05 percent, by weight, as a back-up only.

The source shall be constructed in accordance with the permit application, plans, documents, amendments and drawings, except as otherwise noted in the General and Specific Conditions.

Attachments are listed below:

1. Seminole Electric Cooperative Incorporated's (SECI) application received May 9, 1994.
2. Department's letters dated June 27, September 21, and November 16, 1994.
3. SECI's letters dated August 26, October 6, and November 23, 1994.
4. SECI's letter dated February 9, 1995.

GENERAL CONDITIONS:

1. The terms, conditions, requirements, limitations, and restrictions set forth in this permit are "Permit Conditions" and are binding and enforceable pursuant to Sections 403.161, 403.727, or 403.859 through 403.861, F.S. The permittee is placed on notice that the Department will review this permit periodically and may initiate enforcement action for any violation of these conditions.

2. This permit is valid only for the specific processes and operations applied for and indicated in the approved drawings or exhibits. Any unauthorized deviation from the approved drawings, exhibits, specifications, or conditions of this permit may constitute grounds for revocation and enforcement action by the Department.

3. As provided in Subsections 403.087(6) and 403.722(5), F.S., the issuance of this permit does not convey any vested rights or any exclusive privileges. Neither does it authorize any injury to public or private property or any invasion of personal rights, nor any infringement of federal, state or local laws or regulations. This permit is not a waiver of or approval of any other Department permit that may be required for other aspects of the total project which are not addressed in the permit.

4. This permit conveys no title to land or water, does not constitute State recognition or acknowledgement of title, and does not constitute authority for the use of submerged lands unless herein provided and the necessary title or leasehold interests have been obtained from the State. Only the Trustees of the Internal Improvement Trust Fund may express State opinion as to title.

5. This permit does not relieve the permittee from liability for harm or injury to human health or welfare, animal, or plant life, or property caused by the construction or operation of this permitted source, or from penalties therefore; nor does it allow the permittee to cause pollution in contravention of F.S. and Department rules, unless specifically authorized by an order from the Department.

6. The permittee shall properly operate and maintain the facility and systems of treatment and control (and related appurtenances) that are installed or used by the permittee to achieve compliance with the conditions of this permit, as required by Department rules. This provision includes the operation of backup or auxiliary facilities or similar systems when necessary to achieve compliance with the conditions of the permit and when required by Department rules.

GENERAL CONDITIONS:

7. The permittee, by accepting this permit, specifically agrees to allow authorized Department personnel, upon presentation of credentials or other documents as may be required by law and at a reasonable time, access to the premises, where the permitted activity is located or conducted to:

a. Have access to and copy any records that must be kept under the conditions of the permit;

b. Inspect the facility, equipment, practices, or operations regulated or required under this permit; and,

c. Sample or monitor any substances or parameters at any location reasonably necessary to assure compliance with this permit or Department rules.

Reasonable time may depend on the nature of the concern being investigated.

8. If, for any reason, the permittee does not comply with or will be unable to comply with any condition or limitation specified in this permit, the permittee shall immediately provide the Department with the following information:

a. A description of and cause of non-compliance; and,

b. The period of noncompliance, including dates and times; or, if not corrected, the anticipated time the non-compliance is expected to continue, and steps being taken to reduce, eliminate, and prevent recurrence of the non-compliance.

The permittee shall be responsible for any and all damages which may result and may be subject to enforcement action by the Department for penalties or for revocation of this permit.

9. In accepting this permit, the permittee understands and agrees that all records, notes, monitoring data and other information relating to the construction or operation of this permitted source which are submitted to the Department may be used by the Department as evidence in any enforcement case involving the permitted source arising under the F.S. or Department rules, except where such use is prescribed by Sections 403.73 and 403.111, F.S. Such evidence shall only be used to the extent it is consistent with the Florida Rules of Civil Procedure and appropriate evidentiary rules.

10. The permittee agrees to comply with changes in Department rules and F.S. after a reasonable time for compliance, provided, however, the permittee does not waive any other rights granted by F.S. or Department rules.

GENERAL CONDITIONS:

11. This permit is transferable only upon Department approval in accordance with Rules 62-4.120 and 62-730.300, F.A.C., as applicable. The permittee shall be liable for any non-compliance of the permitted activity until the transfer is approved by the Department.

12. This permit or a copy thereof shall be kept at the work site of the permitted activity.

13. This permit also constitutes:

(X) Determination of Best Available Control Technology (BACT)
(X) Determination of Prevention of Significant Deterioration (PSD)
(X) Compliance with New Source Performance Standards (NSPS)

14. The permittee shall comply with the following:

a. Upon request, the permittee shall furnish all records and plans required under Department rules. During enforcement actions, the retention period for all records will be extended automatically unless otherwise stipulated by the Department.

b. The permittee shall hold at the facility or other location designated by this permit records of all monitoring information (including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation) required by the permit, copies of all reports required by this permit, and records of all data used to complete the application for this permit. These materials shall be retained at least three years from the date of the sample, measurement, report, or application unless otherwise specified by Department rule.

c. Records of monitoring information shall include:

- the date, exact place, and time of sampling or measurements;
- the person responsible for performing the sampling or measurements;
- the dates analyses were performed;
- the person responsible for performing the analyses;
- the analytical techniques or methods used; and,
- the results of such analyses.

GENERAL CONDITIONS:

15. When requested by the Department, the permittee shall within a reasonable time furnish any information required by law which is needed to determine compliance with the permit. If the permittee becomes aware that relevant facts were not submitted or were incorrect in the permit application or in any report to the Department, such facts or information shall be corrected promptly.

SPECIFIC CONDITIONS:

The construction and operation of the project shall be in accordance with all applicable provisions of Chapters 62-210 thru 62-297 and 62-4, Florida Administrative Code (F.A.C.), and 40 CFR 60, Subpart GG, Appendix A, Appendix B, and Appendix F (1994 version). The following emission limitations and conditions reflect the BACT determinations for the 300 megawatts (MW; two 150 MW combined cycle combustion turbines) of generating capacity. Each combustion turbine (CT) will be connected to a heat recovery steam generator (HRSG), which will recover the waste heat to produce steam for utilization in a single 140 MW (net) steam generator. There is no fuel firing in the associated HRSG. The facility will have a total nominal generating capacity of 440 MW (net). In addition to the foregoing, the project shall comply with the following Specific Conditions:

A. General Requirements

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1. Pursuant to Rule 62-212.200(56), F.A.C., Potential to Emit (PTE), the maximum heat input to each Westinghouse 501F CT, or equivalent, at an ambient temperature of 32°F, shall neither exceed ~~1,799~~ MMBtu/hr while firing natural gas nor ~~1,972~~ MMBtu/hr while firing fuel oil.
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2. Pursuant to Rule 62-212.200(56), F.A.C., PTE, the CTs may operate continuously, i.e., 8,760 hrs/year.

3. Pursuant to Rule 62-212.200(56), F.A.C., PTE, only natural gas or No. 2 fuel oil is allowed to be fired in the CTs. The maximum sulfur content limit of the No. 2 fuel oil shall not exceed 0.05 percent, by weight.

4. Pursuant to Rule 62-212.200(56), F.A.C., PTE, the maximum No. 2 fuel oil consumption allowed to be burned is 41,751,000 gallons per year, which is equivalent to 1500 hours per CT per year of operation, (not to exceed 3,000 hrs/yr between the two CTs) ~~at full-load.~~ The No. 2 fuel oil is to be used as a back-up fuel only. at full-load.

5. Pursuant to Rule 62-296.310(3),F.A.C., Unconfined Emissions of Particulate Matter (PM), the emissions of unconfined PM shall be minimized during the construction period by covering or watering dust generating areas.

PERMITTEE:
Seminole Electric Cooperative Inc.
Expiration Date: January 1, 2000

Permit Number: PSD-FL-214
(PA-89-25SA)

SPECIFIC CONDITIONS:

B. Emission Limits

1. Pursuant to Rule 62-212.410, F.A.C., BACT, the maximum allowable emission limitations from two CTs, when firing natural gas or No. 2 fuel oil, shall not exceed the following:

MAXIMUM ALLOWABLE EMISSION LIMITATIONS

POLLUTANT	FUEL	CONCENTRATION	lbs/hr(a)	TPY(b)	TPY(TOTAL)c
NO_x	Gas	15 ppmvd(d)	~~104~~ 106	~~911~~ ~~900~~ 930	~~1139~~ 1212
	Oil	42 ppmvd(e)	~~350~~ 326	~~525~~ 504	
CO	Gas	20 ppmvd	71	622	~~614~~ 618
	Oil	25 ppmvd	91	136	
PM/PM_{10}	Gas		7	~~61~~ 65	~~145~~ 147
	Oil		67	100	
SO_2	Gas		5	44	~~175~~ 182
	Oil		~~100~~ 101	~~150~~ 152	
VOC	Gas	5 ppmvd	10	88	99
	Oil	10 ppmvd	21	31	
Sulfuric Acid Mist	Gas		1	~~9~~ 6	~~38~~ 39
	Oil		22	~~33~~ 34	
Beryllium	Oil		0.0049	0.007	0.007
Arsenic	Oil		0.0097	0.014	0.014
Visible Emissions	Gas		≤ 10 percent opacity		
	Oil		≤ 10 percent opacity		

(a) The emission limitations in lbs/hr/CT are a ~~X~~ blocked 24-hour average.

(b) The annual emission limitations (TPY) for natural gas are based on two CTs operating at full load for 8,760 hours per year. The annual emission limitations (TPY) for fuel oil are based on the equivalent of full-load operation for a maximum of 1500 hours per year for each of the two CTs (not to exceed 3,000 hrs/yr between the two CTs). The emission calculations are also based at a worst case ambient temperature of 32°F.

(c) Maximum allowable emissions from two CTs if any fuel oil is burned at the facility during the year. The emission calculations are also based at an ambient temperature of 59°F.

SPECIFIC CONDITIONS:

(d) The natural gas NO_x allowable emission limitation of 15 ppmvd is corrected to 15 percent O_2. Compliance shall be determined through the initial and annual compliance tests.

(e) The fuel oil NO_x allowable emission limitation of 42 ppmvd is corrected to 15 percent oxygen. Compliance shall be determined through the initial and annual compliance tests. The annual compliance test will be required if the fuel oil is fired for more than 400 hours in the preceding 12-months.

2. The following estimated CT emissions are tabulated for PSD tracking purposes only:

ESTIMATED EMISSIONS

POLLUTANT	FUEL	TPY
Lead	Oil(a,b)	0.16
Fluoride	Oil(a,b)	0.090
Mercury	Gas(c)	0.0003
	Oil(a,b)	0.024

(a) The annual emission limitations (TPY) for fuel oil are based on full-load operation for a total of 3,000 hours per year between the two CTs at an ambient temperature of 59°F.

(b) The No. 2 fuel oil shall have a maximum sulfur content limit of 0.05 percent, by weight.

(c) The annual emission limitation (TPY) for natural gas is based on two CTs operating at full-load for 8,760 hours per year at an ambient temperature of 59°F.

3. The permittee will install a dry low-NO_x combustor system or an equivalent system on each CT. The permittee shall make every practicable effort to achieve the lowest possible NO_x emission rate, but must not exceed 15 ppmvd at 15 percent O_2 per CT on a continuous basis when firing natural gas.

4. After the initial compliance tests on the CTs, the permittee shall operate a certified continuous emissions monitor for NO_x emissions and collect 12 months of monitoring data. The monitor will, at a minimum, meet the requirements of 40 CFR 60, Appendix F's quality assurance procedures. Within 18 months after the initial compliance test, the permittee shall prepare and submit

SPECIFIC CONDITIONS:

for the Department's review an engineering report regarding the collection and the analysis of the data gathered from the monitor. In addition, this report shall include a conclusion regarding the lowest NO_x emission rate that can be consistently achieved with a reasonable operating margin, taking into account long-term performance expectations and assuming good operating and maintenance practices. The report shall also include results of the testing requirements of 40 CFR 60, Appendix F's quality assurance procedures and the actual CEMS data for the period of the study in an acceptable format.

5. The Department will make a determination as to whether to seek to revise the permitted NO_x emission limitation and will base it on the engineering data report submitted by the permittee. If the data demonstrate that a NO_x emission rate of less than 15 ppmvd at 15 percent O_2 is consistently achievable, the NO_x emission limit may be adjusted accordingly, but not lower than 9 ppmvd at 15 percent O_2.

fuel switching

6. Excess emissions from a turbine resulting from start up, shutdown, malfunction, or load change shall be reported in accordance with 40 CFR 60.334(c) and accepted providing (1) best operational practices to minimize emissions are adhered to and (2) the duration of excess emissions shall be minimized, but in no case exceed two hours in any 24-hour period unless specifically authorized by the Department for a longer duration. The permittee shall provide a general description of the procedures to be followed during periods of start up, shutdown, malfunction, or load change to ensure that the best operational practices to minimize emissions will be adhered to and the duration of any excess emissions will be minimized. The description should be submitted to the Department along with the initial compliance test data. The description may be updated as needed by submitting such update to the Department within thirty (30) days of implementation.

fuel switching

C. Performance Testing

1. Initial (I) compliance tests shall be performed on each CT using both fuels. Testing of emissions shall be conducted at 95-100% of the manufacturer's rated heat input based on the average ambient air temperature for the CT during the test. Annual (A) compliance tests shall be performed on the CT with the fuel(s) used for more than 400 hours in the preceding 12-month period. Tests at permit renewal shall also be performed on the non-PSD pollutants. Tests and procedures shall be in accordance with 40 CFR 60.335. Tests shall be conducted using EPA reference methods in accordance with 40 CFR 60, Appendix A, as adopted by reference in Chapter 62-297, F.A.C, and follows:

a. Reference Method 5B for PM (I, A: for oil only; assumption is that all PM is PM_{10}).

SPECIFIC CONDITIONS:

b. Reference Method 9 for VE (I, A).

c. Reference Method 10 for CO (I, A).

d. Reference Method 20 for NOx (I, A).

e. Reference Method 18 or 25A for VOC (I, A).

f. Reference Method 8 for H_2SO_4 Mist (I, A).

g. Trace elements of Beryllium (Be) and Arsenic (As) shall be tested (I, for oil only) using EMTIC Interim Test Methods. As an alternative, EPA Method 104 for Be may be used; or, Be and As may be determined from fuel analysis using either Method 7090 or 7091 and sample extraction using Method 3040, as described in the EPA solid waste regulations SW 846.

h. ASTM D4294 (or equivalent) for sulfur content of distillate oil (I and A), which can be used for determining SO_2 emissions annually.

i. ASTM D1072-80, D3031-81, D4084-82, or D3246-81 (or equivalent) for sulfur content of natural gas (I; and, A if deemed necessary by the Department).

j. No other methods may be used for compliance testing unless prior Departmental approval has been received in writing.

2. The maximum sulfur content of the fuel oil shall not exceed 0.05 percent, by weight. Compliance shall be demonstrated in accordance with the requirements of 40 CFR 60.334(b), which imposes testing for the sulfur content of the fuel oil in the storage tanks on each occasion that fuel is transferred to the storage tanks from any other source. Testing for the fuel oil lower heating value shall also be conducted on the same schedule.

D. Monitoring Requirements

Monitoring of operations shall be in accordance with 40 CFR 60.334. Also, and for each CT, the permittee shall install, operate, and maintain a continuous emission monitoring system (CEMS) to monitor nitrogen oxides in accordance with 40 CFR 60, Appendix F, and, if necessary, a diluent gas (CO_2 or O_2). The Federal Acid Rain Program requirements of 40 CFR 75 shall apply when those requirements are adopted and if applicable.

1. Each CEMS shall meet performance specifications of 40 CFR 60, Appendix B.

SPECIFIC CONDITIONS:

2. CEMS data shall be recorded and reported in accordance with Rule 62-297.500, F.A.C.; 40 CFR 60; and, 40 CFR 75, if it becomes applicable. The record shall include periods of start up, shutdown, load change, and malfunction.

3. A malfunction means any sudden and unavoidable failure of air pollution control equipment or process equipment to operate in a normal or usual manner. Failures that are caused entirely or in part by poor maintenance, careless operation or any other preventable upset condition or preventable equipment breakdown shall not be considered malfunctions.

4. The procedures under 40 CFR 60.13 shall be followed for installation, evaluation, and operation of all CEMS. If applicable, 40 CFR 75 shall apply when the Federal Acid Rain Program is adopted.

5. For purposes of the reports required under this permit, excess emissions are defined as any calculated average emission rate, as determined pursuant to Condition B.6 herein, which exceeds the applicable emission limitation in Condition B.1.

E. Notification, Reporting and Recordkeeping

1. To determine compliance with the natural gas and fuel oil firing heat input limitation, the permittee shall maintain daily records of natural gas and fuel oil consumption for each turbine, and provide the heating value for each fuel during the compliance test. All records shall be maintained for a minimum of five years after the date of each record and shall be made available to representatives of the Department upon request.

2. The project shall comply with all the applicable requirements of Chapters 62-210 through 62-297 and 62-4, F.A.C., and 40 CFR 60, Subparts A and GG. The requirements shall include:

a. 40 CFR 60.7(a)(1) - By postmarking or delivering notification of the start of construction no more than 30 days after such date.

b. 40 CFR 60.7(a)(2) - By postmarking or delivering notification of the anticipated date of the initial start up of each CT not less than 30 days prior to such date.

c. 40 CFR 60.7(a)(3) - By postmarking or delivering notification of the actual start up of each turbine within 15 days after such date.

SPECIFIC CONDITIONS:

d. 40 CFR 60.7(a)(5) - By postmarking or delivering notification of the date for demonstrating the CEMS performance, no less than 30 days prior to such date.

e. 40 CFR 60.7(a)(6) - By postmarking or delivering notification of the anticipated date for conducting the opacity observations no less than 30 days prior to such date.

f. 40 CFR 60.7(b) - By initiating a recordkeeping system to record the occurrence and duration of any start up, shutdown, load change and malfunction of a turbine, malfunction of the air pollution control equipment, and the periods when the CEMS is inoperable.

g. 40 CFR 60.7(c) - By postmarking or delivering a quarterly excess emissions and monitoring system performance report within 30 days after the end of each calendar quarter. This report shall contain the information specified in 40 CFR 60.7(c) and (d).

h. 40 CFR 60.8(a) - By conducting all performance tests within 60 days after achieving the maximum turbine and boiler firing rates, but not more than 180 days after the initial start up of each CT.

i. 40 CFR 60.8(d) - By postmarking or delivering notification of the date of each performance test required by this permit at least 30 days prior to the test date; and,

j. Rule 62-297.345 - By providing stack sampling facilities for each turbine.

k. All notifications and reports required by this specific condition shall be submitted to the Department's Southwest District office. Performance test results shall be submitted within 45 days of completion of such test.

3. The following information shall be submitted to the Department's Bureau of Air Regulation within 90 days after the permittee has made the selection of the following:

a. Description of the final selection of the turbines for installation at the facility. The descriptions shall include the specific make and model numbers and any changes in the proposed method of operation, fuels, emissions or equipment.

b. Description of the CEMS selected. The description shall include the type of sensors and the manufacturer and model numbers of the equipment.

SPECIFIC CONDITIONS:

4. The following protocols shall be submitted to the Department's Southwest District office for approval:

a. CEMS Protocol - Within 90 days after selection of the CEMS, but prior to the initial startup, a CEMS protocol describing the system, its installation, operating and maintenance characteristics and requirements. The protocol shall meet the requirements of 40 CFR 60.13, Appendix B and Appendix F.

b. Performance Test Protocol - At least 90 days prior to conducting the initial performance tests required by this permit, the permittee shall submit to the Department's Southwest District office a protocol outlining the procedures to be followed, the test methods and any differences between the reference methods and the test methods proposed to be used to verify compliance with the conditions of this permit. The Department shall approve the testing protocol provided that it meets the requirements of this permit.

c. Heat Input Curves - Within 90 days after selection of the turbine, manufacturer's curves or equations of heat input corrections to other temperatures shall be provided to the Department. Subject to the approval by the Department for tecnical validity while applying sound engineering principles, the manufacturer's curves shall be used to establish the heat input rates over a range of temperatures for the purposes of compliance determination.

F. Modifications

The permittee shall give written notification to the Department when there is any modification to this facility pursuant to Rule 62-212.200, F.A.C., Definitions - Modifications. This notice shall be submitted sufficiently in advance of any critical date involved to allow sufficient time for review, discussion, and revision of plans, if necessary. Such notice shall include, but not be limited to, information describing the precise nature of the change; modifications to any emission control system; production capacity of the facility before and after the change; and, the anticipated completion date of the change.

G. No. 2 Fuel Oil Storage Tank

The permittee shall be in compliance with the monitoring requirements of 40 CFR 60.116b(a) and (b).

PERMITTEE:
Seminole Electric Cooperative Inc.
Expiration Date: January 1, 2000

Permit Number: PSD-FL-214
(PA-89-25SA)

SPECIFIC CONDITIONS:

H. Additional General Conditions

1. Pursuant to Rule 62-4.090, F.A.C., the permittee, for good cause, may request that this construction permit be extended. Such a request shall be submitted to the Department's Bureau of Air Regulation prior to 60 days before the expiration of the permit.

2. Pursuant to Rules 62-4.055 and 62-4.220, F.A.C., an application for an operation permit must be submitted to the Department's Southwest District office at least 90 days prior to the expiration date of this construction permit. To properly apply for an operation permit, the permittee shall submit the appropriate application form, fee, certification that construction was completed noting any deviations from the conditions in the construction permit, and compliance test reports as required by this permit.

re-draft

STATE OF FLORIDA DEPARTMENT
OF ENVIRONMENTAL PROTECTION

Virginia B. Wetherell, Secretary

Best Available Control Technology (BACT) Determination
Seminole Electric Cooperative Incorporated (SECI)
Hardee and Polk Counties
PSD-FL-214
PA89-25SA

The applicant proposes to install two combined cycle combustion turbine (CT) generators and associated steam cycle at a facility adjacent to the Hardee Power Station's existing units located in Hardee and Polk Counties. The facility, referred to as Hardee Unit 3, will consist of two 150 megawatt (MW) Westinghouse Model 501F, or equivalent, advanced CTs. Each CT will be connected to a heat recovery steam generator (HRSG), which will recover the waste heat to produce steam for utilization in a single 140 MW (net) steam turbine. The facility will have a total nominal generating capacity of 440 MW (net). The primary fuel for the CTs will be natural gas, with distillate fuel oil containing a maximum sulfur content of 0.05 percent, by weight, designated as the backup fuel. Natural gas will be transported to the facility via pipeline and fuel oil will be delivered by truck and stored on site in a 4.4 million gallon above ground storage tank.

In 1990, the Hardee Power Station was certified for 660 MW of generation in a phased construction schedule as follows:

1. TECO Power Services - 295 MW (1993) (Phase 1A).
2. TECO Power Services - 145 MW (future unit) (Phase 1B).
3. SECI - 220 MW (date unspecified) (Phase 2).

This new certification does not change Phases 1A and 1B, above, but will increase the SECI certified generation (Phase 2) from 220 MW to 440 MW, with an inservice date of January, 1999. A simplified flow diagram of Hardee Unit 3 is shown in Figure 1. Because of the phased construction activity, the Department looked at the total emissions from the Phase 2 project to see if any additional pollutants (i.e., Hg, Pb, etc.) should be reviewed from the BACT determination process.

The applicant has indicated the maximum annual air pollutant emission rates associated with the facility, based on 100 percent capacity factor and type of fuel fired, to be as follows:

Pollutant	Emissions (TPY) Fuel Oil	Natural Gas	Natural Gas-Steam for Power Augmentation	Total	PSD Significant Emission Rate (TPY)	Subject to PSD Review?
Potential Emissions (Without Power Augmentation)[a]						
SO_2	140.1	34.8	NA	174.9	40	Yes
PM/PM_{10}	94.1	50.4	NA	144.5	25/15	Yes
NO_x	466.2	673.2	NA	1,139.4	40	Yes
CO	127.9	486.1	NA	614.0	100	Yes
VOC	29.2	69.5	NA	98.7	40	Yes
Lead	0.16	NA	NA	0.16	0.6	No
Arsenic	0.014	NA	NA	0.014	Any	Yes
Beryllium	0.0069	NA	NA	0.0069	0.0004	Yes
Fluoride	0.090	NA	NA	0.090	3	No
Mercury	0.024	0.0003	NA	0.025	0.1	No
Sulfuric Acid Mist	31.1	6.86	NA	38.0	7	Yes
Potential Emissions (With Power Augmentation)[b]						
SO_2	140.1	25.2	9.32	174.6	40	Yes
PM/PM_{10}	94.1	36.5	14.4	145.1	25/15	Yes
NO_x	466.2	487.7	251.5	1,205.4	40	Yes
CO	127.9	352.2	313.4	793.5	100	Yes
VOC	29.2	50.3	17.9	97.5	40	Yes
Lead	0.16	NA	NA	0.16	0.6	No
Arsenic	0.014	NA	NA	0.014	Any	Yes
Beryllium	0.0069	NA	NA	0.0069	0.0004	Yes
Fluoride	0.090	NA	NA	0.090	3	No
Mercury	0.024	0.0002	0.00009	0.025	0.1	No
Sulfuric Acid Mist	31.1	4.97	1.84	37.9	7	Yes

Note: NA = not applicable.

[a] Emission rates are based on two CTs firing fuel oil for 1,500 hours each and natural gas for 7,260 hours at ambient temperature of 59°F (without power augmentation) and relative humidity of 60 percent.
[b] Emission rates are based on two CTs firing fuel oil for 1,500 hours each and natural gas for 7,260 hours at ambient temperature of 59°F and relative humidity of 60 percent. Natural gas combustion includes 2,000 hours of steam for power augmentation at ambient temperature of 80°F and relative humidity of 80 percent.

FIGURE 1

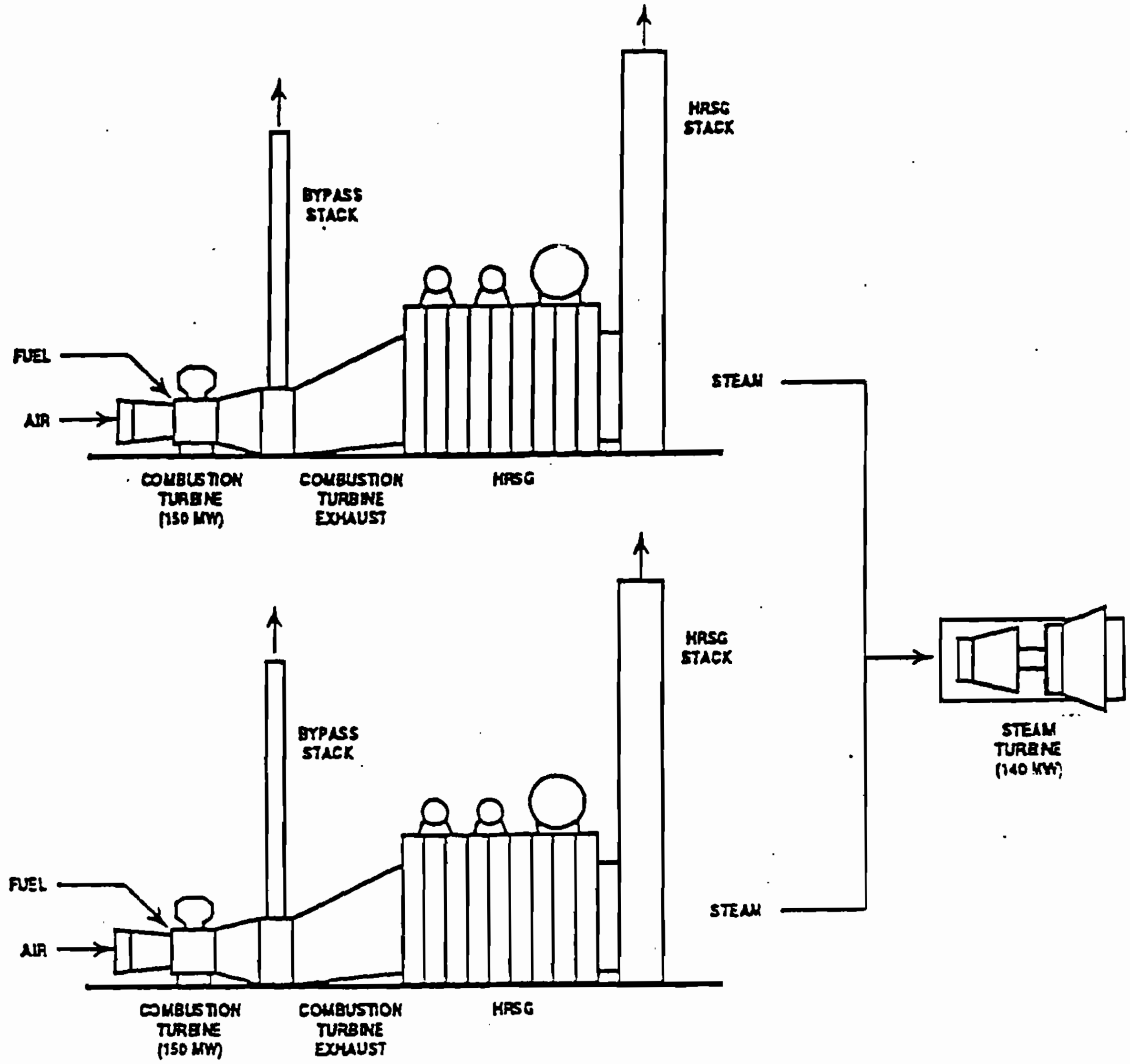

Figure 2-4
Schematic Flow Diagram of Hardee Unit 3 Facility

SEMINOLE ELECTRIC COOPERATIVE INCORPORATED

Rule 62-212.400, Florida Administrative Code (F.A.C.), Stationary Source Preconstruction Review, requires a BACT review for all regulated pollutants emitted in an amount equal to or greater than the significant emission rates listed in the previous table.

Date of Receipt of a BACT Application
May 9, 1994.

BACT Determination Requested by the Applicant

Combined Cycle Combustion Turbines

	Fuel	
Pollutant	Natural Gas	Fuel Oil
NO_x	15 ppmvd @ 15% O_2 at ISO 25 ppmvd @ 15% O_2 at ISO (power augmentation mode) Dry Low NO_x Burners	42 ppmvd @ 15 % O_2 at ISO < w/FBN of 0.015% Water Injection Limited Fuel Oil Operation
SO_2	Firing with Natural Gas	Low Sulfur Fuel Oil (0.05 %, by weight) Limited Fuel Oil Operation
CO	20 ppmvd 50 ppmvd (power augmentation mode) Combustion Control	25 ppmvd Combustion Control Limited Fuel Oil Operation
VOC	5 ppmvd Combustion Control	10 ppmvd Combustion Control
PM/PM_{10}	Combustion Control	Combustion Control Limited Fuel Oil Operation
Beryllium	Good Quality Fuel	Good Quality Fuel Limited Fuel Oil Operation
Inorganic Arsenic	Good Quality Fuel	Good Quality Fuel Limited Fuel Oil Operation
Benzene	Combustion Control	N/A

BACT Determination Procedure

In accordance with Rule 62-212.410, F.A.C., BACT Review, Stationary Source - Preconstruction Review, the BACT determination is based on the maximum degree of reduction of each pollutant emitted which the Department, on a case by case basis, taking into account energy, environmental and economic impacts, and other costs, determines is achievable through application of production processes and available methods, systems, and techniques. In addition, the regulations state that in making the BACT determination the Department shall give consideration to:

(a) Any Environmental Protection Agency determination of BACT pursuant to Section 169, and any emission limitation contained in 40 CFR Part 60 (Standards of Performance for New Stationary Sources) or 40 CFR Part 61 (National Emission Standards for Hazardous Air Pollutants).

(b) All scientific, engineering, and technical material and other information available to the Department.

(c) The emission limiting standards or BACT determinations of any other state.

(d) The social and economic impact of the application of such technology.

The EPA currently stresses that BACT should be determined using the "top-down" approach. The first step in this approach is to determine for the emission source in question the most stringent control available for a similar or identical source or source category. If it is shown that this level of control is technically or economically infeasible for the source in question, then the next most stringent level of control is determined and similarly evaluated. This process continues until the BACT level under consideration cannot be eliminated by any substantial or unique technical, environmental, or economic objections.

The air pollutant emissions from combined cycle power plants can be grouped into categories based upon what control equipment and techniques are available to control emissions from these facilities. Using this approach, the emissions can be classified as follows:

- Combustion Products (e.g., particulate matter and trace metals). Controlled generally by good combustion of clean fuels.

- Products of Incomplete Combustion (e.g., CO and VOCs). Control is largely achieved by proper combustion techniques.

- Acid Gases (e.g., SO_2, NO_x). Controlled generally by gaseous control devices and fuel quality.

Grouping the pollutants in this manner facilitates the BACT analysis because it enables the equipment available to control the type or group of pollutants emitted and the corresponding energy, economic, and environmental impacts to be examined on a common basis. Although all of the pollutants addressed in the BACT analysis may be subject to a specific emission limiting standard as a result of PSD review, the control of "nonregulated" air pollutants is considered in imposing a more stringent BACT limit on a "regulated" pollutant (i.e., particulate matter, sulfur dioxide, fluorides, sulfuric acid mist, etc.), if a reduction in "nonregulated" air pollutants can be directly attributed to the control device selected as BACT for the abatement of the "regulated" pollutants.

BACT POLLUTANT ANALYSIS

COMBUSTION PRODUCTS

Particulate Matter (PM/PM_{10})

The design of the CT system ensures that PM/PM_{10} will be minimized by combustion control and the use of clean fuels. The PM/PM_{10} emissions from the CTs, when burning natural gas and fuel oil, will not exceed 7 lbs/hr/CT (gas) and 67 lbs/hr/CT (oil) for the Westinghouse 501F, or equivalent, (with no power augmentation) at 100% load. The assumption is that all PM emissions are PM_{10} emissions.

Beryllium and Inorganic Arsenic (Be, As)

The Department agrees with the applicant's rationale that there are no feasible methods to control Be, As, and other trace pollutants, except by requiring good quality fuel. Limiting the fuel sulfur content to a maximum of 0.05%, by weight, assures good quality fuel and minimizes any concerns for these pollutants.

PRODUCTS OF INCOMPLETE COMBUSTION

Carbon Monoxide (CO) and Volatile Organic Compounds (VOC)

The emissions of CO exceed the PSD significant emission rate of 100 TPY with the Westinghouse 501F CT. The applicant has indicated that the CO emissions from the proposed combined cycle CTs with dry low-NO_x combustors are 20 ppmvd for natural gas firing (50 ppmvd during power augmentation) and 25 ppmvd for fuel oil firing with water injection. VOC emissions have been based on exhaust concentrations of 5 & 10 ppmvd for natural gas and fuel oil firing, respectively.

The majority of BACT emissions limitations have been based on combustion controls for CO and VOC minimization. Additional control is achievable through the use of catalytic oxidation. Catalytic oxidation is a post-combustion control that has been employed in CO nonattainment areas where regulations have required CO emission levels to be less than those associated with wet injection. These installations have been required to use LAER technology and typically have CO limits in the 10 ppmvd range.

In an oxidation catalyst control system, CO emissions are reduced by allowing unburned CO to react with oxygen at the surface of a precious metal catalyst, such as platinum. Oxidation of CO starts at about 300°F, with efficiencies above 90 percent occurring at temperatures above 600°F. Catalytic oxidation occurs at temperatures 50 percent lower than that of thermal oxidation, which reduces the amount of thermal energy required. For CT/HRSG combinations, the oxidation catalyst can be located directly after the CT or in the HRSG. Catalyst size depends upon the exhaust flow, temperature, and desired efficiency.

The application of oxidation catalyst is not technically feasible for gas turbines fired with fuel oil due to the oxidation of sulfur compounds and excessive formation of H_2SO_4 mist emissions. Catalytic oxidation has not been demonstrated on a continuous basis when using fuel oil.

Use of oxidation catalyst technology would be feasible for a natural gas-fired unit; however, the cost effectiveness of $4,000 per ton of CO removed for the Westinghouse 501F CT unit will have an economic impact on this project.

ACID GASES

Nitrogen Oxides (NO_x)

The emissions of NO_x represent a significant portion of the total emissions generated by this project and need to be controlled, if deemed appropriate. As such, the applicant presented an extensive analysis of the different available technologies for NO_x control.

The applicant has stated that BACT for NO_x will be met by using dry low-NO_x combustors to limit emissions to 15 ppmvd (corrected to 15% O_2 at ISO conditions) when burning natural gas (25 ppmvd corrected to 15% O_2 at ISO conditions during power augmentation) and 42 ppmvd (corrected to 15% O_2 at ISO conditions) with water injection and when burning fuel oil.

A review of the EPA's BACT/LAER Clearinghouse indicates that the lowest NO_x emission limit established to date for a combustion turbine is 4.5 ppmvd at 15% oxygen. This level of control was accomplished through the use of water injection and a selective catalytic reduction (SCR) system.

SCR is a post-combustion method for control of NO_x emissions. The SCR process combines vaporized ammonia with NO_x in the presence of a catalyst to form nitrogen and water. The vaporized ammonia is injected into the exhaust gases prior to passage through the catalyst bed. The SCR process can achieve up to 90% reduction of NO_x with a new catalyst. As the catalyst ages, the NO_x reduction efficiency, while holding ammonia slip emissions constant, will decrease.

The effect of exhaust gas temperature on NO_x reduction depends on the specific catalyst formulation and reactor design. Generally, SCR units can be designed to achieve effective NO_x control over a 100-300°F operating window within the bounds of 450-800°F. The preferable operating window is within the bounds of 600-750°F for effective NO_x control.

Most commercial SCR systems operate over a temperature range of about 600-750°F. At levels above and below this window, the specific catalyst formulation will not be effective and NO_x reduction will decrease. Operating at high temperatures can permanently damage the catalyst through sintering of surfaces. Increased water vapor content in the exhaust gas (as would result from water or steam injection in the gas turbine combustor) can shift the operating temperature window of the SCR reactor to slightly higher levels.

As stated by the applicant, the exhaust temperatures of the proposed combined cycle CTs for this site are between 950°F to 1100°F. However, catalyst can be located in the appropriate temperature range in the HRSG, but the applicant has stated that effective SCR operation will be difficult to maintain under significant load and ambient temperature variations. In this case, application of an SCR system appears to be technically feasible.

Although technically feasible, the applicant has rejected using SCR on the combined cycle units because of economic, energy, and environmental impacts. The applicant has identified the following limitations:

a) Reduced power output.

b) Emissions of unreacted ammonia (slip).

c) Increased H_2SO_4 mist emissions.

d) Disposal of hazardous waste generated (spent catalyst).

e) Ammonium bisulfate and ammonium sulfate particulate matter emissions (ammonium salts) due to the reaction of NH_3 with SO_3 present in the exhaust gases.

f) Cost effectiveness for the application of SCR technology to the project was considered to be $6,802 per ton of NO_x removed when compared to the use of dry low-NO_x combustors.

Since SCR has been determined to be BACT for several combined cycle facilities, the EPA has clearly stated that there must be unique circumstances to consider the rejection of such control on the basis of economics.

In a recent letter from EPA Region IV to the Department regarding the permitting of a combined cycle facility (Tropicana Products, Inc.), the following statement was made:

> "In order to reject a control option on the basis of economic considerations, the applicant must show why the costs associated with the control are significantly higher for this specific project than for other similar projects that have installed this control system or in general for controlling the pollutant."

For fuel oil firing, the cost associated with controlling NO_x emissions must take into account the potential operating problems that can occur with using SCR in the oil firing mode.

A concern associated with the use of SCR on combined cycle projects is the formation of ammonium bisulfate. For the SCR process, ammonium bisulfate can be formed due to the reaction of sulfur in the fuel and the ammonia injected. The ammonium bisulfate formed has a tendency to plug the tubes of the HRSG, thus leading to operational problems. As this is the case, SCR has been judged to be technically infeasible for oil firing in some previous BACT determinations.

The latest information available now indicates that SCR can be used for oil firing provided that adjustments are made in the ammonia to NO_x injection ratio. For natural gas firing operation, NO_x emissions can be controlled with up to a 90 percent efficiency using a 1 to 1 or greater ammonia injection ratio. By lowering the injection ratio for oil firing, testing has indicated that NO_x can be controlled with efficiencies ranging from 60 to approximately 75 percent. When the injection ratio is lowered, there is not a problem with ammonium bisulfate formation since essentially all of the ammonia is able to react with the NO_x present in the combustion gases. Furthermore, by using low sulfur fuel oil with low metal content and limiting excess air, the amount of sulfur trioxide available to form ammonium bisulfate is minimized. Based on this strategy SCR has been both proposed and established as BACT for oil fired combined cycle facilities with NO_x emission limits ranging from 11.7 to 25 ppmvd depending on the efficiency of control established.

The applicant has indicated that the total levelized annual operating cost to install SCR for this project at 100 percent capacity factor and burning natural gas is $4,462,200. Taking into consideration the total annual cost, a cost/benefit analysis of using SCR can now be developed.

For the Westinghouse 501F combined cycle CT and based on the information supplied by the applicant, it is estimated that the maximum annual NO_x emissions using dry low-NO_x combustors will be 1,205 tons/year (assuming 7,260 and 1,500 hours of operation per year while firing natural gas and fuel oil, respectively, including 2,000 hours with power augmentation on natural gas). Assuming that SCR would reduce the NO_x emissions from 15 ppmvd to 9 ppmvd when firing natural gas and from 25 ppmvd to 9 ppmvd during power augmentation mode, and from 42 ppmvd to 15 ppmvd when firing fuel oil, 549 tons of NO_x would be emitted annually. When this reduction of 656 TPY is compared with the application of dry low-NOx combustors and considering the total levelized annual operating cost differential to be $4,462,200, the cost per ton of controlling NO_x is $6,802. These calculated costs are higher than has previously been approved as BACT.

A review of the latest Department BACT determinations show limits of 15 ppmvd (natural gas) using low-NO_x combustor technology fcr combined cycle CTs. Combustion turbine manufacturers are currently developing programs using both steam/water injection and dry low-NO_x combustor technology to achieve a NO_x emission control level of 9 ppmvd when firing natural gas.

Sulfur Dioxide (SO_2)

The applicant has stated that SO_2 emissions will be controlled by using fuel oil with a maximum sulfur content of 0.05%, by weight. This will result in an annual emissions rate of 140 TPY of SO_2 (each CT operating at 1,500 hours per year on fuel oil) plus [illegible]5 TPY of SO_2 when firing natural gas.

In accordance with the "top down" BACT review approach, only two alternatives exist that would result in lower SO_2 emissions. These include the use of a lower sulfur content fuel oil or the use of wet lime injection or limestone-based scrubbers, otherwise known as flue gas desulfurization (FGD).

In developing the NSPS for stationary gas turbines, EPA recognized that FGD technology was inappropriate to apply to these combustion units. EPA acknowledged in the preamble of the proposed NSPS that "Due to the high volumes of exhaust gases, the cost of flue gas desulfurization (FGD) to control SO_2 emissions from stationary gas turbines is considered unreasonable." EPA reinforced this point when, later on in the preamble, they stated that "FGD... would cost about two to three times as much as the gas turbine." The economic impact of applying FGD today would be no different.

Furthermore, the application of FGD would have negative environmental and energy impacts. Sludge would be generated that would have to be disposed of properly, and there would be increased utility (electricity and water) costs associated with the operation of a FGD system. Finally, there is no information in the literature to indicate that FGD has ever been applied to stationary gas turbines burning distillate oil.

The elimination of flue gas control as a BACT option then leaves the use of low sulfur fuel oil as the next option to be investigated. The use of No. 2 fuel oil with a maximum sulfur content limit of 0.05%, by weight, as proposed by the applicant, is acceptable as BACT for this project.

BACT Determination by the Department

Combined Cycle CTs

NO_x Control

The information that the applicant presented indicates that the cost per ton of controlling NO_x for these turbines is $6,802, which is significantly higher when compared with other BACT determinations that require SCR. Operational experience of utilities elsewhere indicates that catalysts are lasting longer than expected. Therefore the Department believes the costs are somewhat lower. Based on the information presented by the applicant, the Department accepts the applicants conclusion that the use of SCR for NO_x control is not justifiable as BACT at this time.

A review of the permitting activities for combined cycle proposals across the nation indicates that SCR has been required and most recently proposed for installations with a variety of operating conditions (i.e., natural gas, fuel oil, coal and various capacity factors). The cost and other concerns expressed by the applicant are accepted and the Department determines that water injection and dry low-NO_x burner design as BACT for NO_x for this project for fuel oil and natural gas, respectively.

The applicant has proposed a NO_x emission limit of ~~104~~ 106 lbs/hr/CT (15 ppmvd for natural gas) without power augmentation. CT manufacturers are currently offering NO_x guarantees of approximately 9 ppmvd. However, these CT manufacturers have no commercial operating experience to validate this guarantee basis. Considering the uncertainty regarding the basis of CT manufacturer's guarantees and the lack of commercial operating experience at this lower emission level, the Department has determined that a NO_x emission limit of 15 ppmvd @ 15% O_2 (104 lbs/hr/CT) for continuous compliance [1-hour average, not corrected to ISO conditions], is required. Several prior CT projects have already been permitted at 15 ppmvd @ 15% O_2 (natural gas) and 42 ppmvd @ 15% O_2 (No. 2 fuel oil). In those prior BACT determinations, no nitrogen or for power augmentation operation. Measured NO_x concentrations shall not be corrected to ISO conditions to determine compliance with these BACT standards. Based on the first 12 months of actual operating data using natural gas, the Department may seek to revise and lower the NO_x emissions standard from 15 ppmvd @ 15% O_2 to no lower than 9 ppmvd @ 15% O_2; again, the NO_x emissions standard will not be ISO corrected.

SO_2 Control

BACT for SO_2 is the burning of No. 2 fuel oil with a maximum sulfur content limit of 0.05%, by weight. The Department accepts the applicant's proposal as BACT for this project.

VOC and CO Control

The Department is in agreement with the applicant's proposal of good combustion and operating practices as BACT for CO and VOCs for this project.

Other Emissions Control

The emission limitations for PM/PM_{10}, Visible Emissions, Be, and As are based on previous BACT determinations for similar facilities. Although the emissions of these pollutants could be controlled by particulate matter control devices, such as a baghouse or scrubber, the amount of emission reductions would not warrant the added expense. The Department accepts the applicant's proposed strategy of requiring good quality fuel for controlling these pollutants as BACT for the two combined cycle CT units.

The BACT emission limits for the Hardee Unit 3 project of two CTs for generating 300 MW and a single 140 MW steam turbine are as follows:

440 MW TOTAL COMBINED CYCLE COMBUSTION TURBINES

Pollutant	Emission Standards/Limitations Oil(a)	Gas(b)	Method of Control
NO_x	42 ppmvd @ 15% O_2	15 ppmvd(c) @ 15% O_2	Water Injection on oil; Dry Low-NO_x Combustor on gas

CO	25 ppmvd	20 ppmvd	Combustion controls; Limited Fuel Oil Operation
PM & PM_{10}	67 lbs/hr	7 lbs/hr	Combustion controls; Limited Fuel Oil Operation
Visible Emissions	≤ 10% Opacity ≤ 10% Opacity		Natural Gas No. 2 Fuel Oil
SO_2	0.05% S	1 gr S/100 scf	No. 2 Fuel Oil (max. 0.05% sulfur content limit, by weight)
VOC	10 ppmvd	5 ppmvd	Combustion controls
Be	--	--	Fuel Quality
As	--	--	Fuel Quality
Benzene	--	--	Fuel Quality

(a) No. 2 fuel oil with a maximum limit of 0.05% sulfur content, by weight. Fuel oil firing shall not exceed an equivalent of 1,500 hours per year per CT at full load (not to exceed 3,000 hrs/yr between the two CTs).
(b) Natural gas firing of up to 8,760 hours per year.
(c) Interim limit. May be retained or lowered (as low as 9 ppmvd at 15% O_2) based on the results of a study of the first 12 months of commercial operation.

<u>Details of the Analysis May be Obtained by Contacting</u>:

Syed Arif, Permit Engineer
Department of Environmental Protection
Bureau of Air Regulation
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Recommended by:

C. H. Fancy, P.E., Chief
Bureau of Air Regulation

________________ 1995
Date

Approved by:

Virginia B. Wetherell, Secretary
Dept. of Environmental Protection

________________ 1995
Date

Attachments 1 - 3

Available Upon Request

ATTACHMENT 4

SEMINOLE ELECTRIC COOPERATIVE INCORPORATED

OVERNIGHT

RECEIVED

FEB 10 1995

Bureau of Air Regulation

February 9, 1995

Bruce Mitchell
Bureau of Air Regulation
Department of Environmental Protection
Magnolia Courtyard
111 So. Magnolia
Tallahassee, FL 32399

Re: Seminole Electric Coop. Inc.; Hardee Unit 3 - Proposed BACT and Permit Conditions

Dear Bruce:

Seminole Electric Cooperative, Inc. (Seminole) appreciated the opportunity to meet with you and Syed Arif to discuss the Bureau's draft BACT analysis and proposed conditions of certification for Seminole's Hardee Unit 3 project. As we discussed in our meeting on January 31, 1995, the two principal issues associated with the permits for this project are the request for higher emission rates for nitrogen oxides (NO_x) and carbon monoxide (CO) during periods of steam augmentation and an increase in NO_x emissions based upon the fuel bound nitrogen content of the low sulfur fuel oil delivered to the project. As explained below, Seminole believes that these requests are justified and consistent with the objective of achieving the lowest emissions from this project, while considering economic and environmental issues.

The Hardee Unit 3 project is a 440 megawatt facility. It will be comprised of 2 150-megawatt Westinghouse 501F combustion turbines, with each CT connected to a single heat recovery steam generator (HRSG). The electrical output from this Seminole-owned facility will replace electricity Seminole currently purchases from other Florida utilities. The project will therefore supply existing demand for electricity by the members of Seminole's 11 electrical cooperatives in Florida. Unlike many recently permitted projects, the Hardee Unit 3 project is not being undertaken to meet future growth and demand. The demand exists today and will continue to exist at a level of 440 megawatts on the planned in-service date of January 1, 1999. The proposed project with the Westinghouse CTs has therefore been sized to best meet this 440 megawatt demand.

16313 NORTH DALE MABRY HIGHWAY • P.O. BOX 272000 • TAMPA, FLORIDA 33688-2000 • (813) 963-0994

Steam Augmentation

As Westinghouse representatives explained in our meeting. during those times when the ambient temperature is above approximately 80°F, the electrical output of the combustion turbines during natural gas firing drops due to the decreased density of the air which is forced through the CT. High ambient temperatures cause the air to expand beyond the abilities of the CT's compressors and evaporative chillers to maintain a minimum air density passing through the CT to achieve the 440 megawatt output.

To compensate for the reduced power output during hot, humid days, high pressure steam must be injected into the combustor, mixing with the high pressure air from the CT compressor, to increase the mass flow through the CT. However, the moisture content of the injected steam affects the stability of the combustor pilot flame. To maintain flame stability, additional fuel is fed to the combustor pilot, resulting in an increase in NO_x emissions. The presence of moisture from the steam also causes carbon monoxide to increase to 50ppm levels.

With dry low NO_x combustors operating on natural gas fuel, the NO_x formed in the combustion process is minimized by designing the combustors to operate at very lean fuel to air ratios, an inherently less stable combustion point than occurs in conventional combustors. Thus, dry low NO_x combustors are less tolerant to the reduction in flame stability caused by steam injection. Power or steam augmentation is achieved differently than with conventional combustors by injecting the steam into the combustor casing rather than directly into the combustor. This form of injection disseminates the steam throughout the internal passages rather than focusing it on the flame, although much of the steam still enters the flame zone. Since the thermal NO_x levels are already so low in these DLN designs, there is not a significant further reduction in NO_x from the steam. In the Westinghouse DLN combustor, a central pilot is used in the design to add stability to the lean premix regions of the combustor. The central pilot operates similar to a conventional combustor and thus impacts the NO_x level of the combustor. As steam augmentation is brought on, the percentage of the total fuel that is injected through the central pilot is increased, thus increasing the NO_x levels from the CT from 15ppm to 25ppm.

While steam augmentation increases NO_x emissions, Seminole believes that this is the most acceptable alternative available to provide the needed 440 megawatts of output, considering both environmental and economic factors. Westinghouse and other CT manufacturers do not have CTs that are incrementally larger in output to provide the needed power during these meteorological conditions. Combustion turbines come in standard megawatt capacities or classes and CT manufacturers therefore are unable to exactly size a CT to a given utility's needs in many circumstances.

The other alternatives available to Seminole to meet its 440 megawatt need in these circumstances include installing a stand-alone 20 to 25 megawatt CT to provide the power during the identified meteorological conditions or to purchase power from another utility. As indicated in the analysis by Ken Kosky of KBN, a simple cycle 25 megawatt CT would cost approximately $15.8 million, with an annualized incremental operating cost of $1,993,320 for both capital and fuel costs. Assuming this standalone CT also achieved an emission rate of 15ppm, the cost effectiveness of removing the incremental 83.3 tons of NO_x by installing a small CT would be $23,930 per ton of NO_x removed. This cost effectiveness value greatly exceeds the value the Department has previously established for NO_x removal.

The second alternative available to Seminole to provide the incremental 20 megawatts would involve contracting with another Florida utility to provide power during these periods. Since all other baseload units with relatively low NO_x rates would already be on line when ambient temperatures reach 80°F and greater, it is most likely that the incremental power Seminole needs would be generated from an existing power plant at a much greater NO_x emission rate. Seminole expects that it would cost Seminole $2.8 million per year to contract with another utility (most likely TECO Energy) to provide this incremental power. With the Hardee Unit 3 operating with steam augmentation, total annual emissions are expected to be 212 tons per year. However, if Hardee Unit 3 is denied steam augmentation and replacement power must be purchased by Seminole from another existing plant, Seminole estimates that total NO_x from the Hardee Unit 3 and the other plant would be at least 226 tons per year. Thus, without steam augmentation, NO_x emissions would <u>increase</u> by 14 tons per year while costing Seminole at least $2.8 million. Thus, Seminole would be forced to pay more money to meet its 440 megawatts of need, while increasing total NO_x emissions when compared to the steam augmentation scenario.

Thus, Seminole believes that the PSD permit and conditions of certification should authorize use of steam augmentation at emission rates of 25ppm for NO_x and 50ppm for CO during natural gas firing of the Hardee Unit 3 during those periods when ambient temperatures exceed 80°F, which is estimated to occur 2,000 hours per year.

<u>Fuel Bound Nitrogen</u>

Based upon the information provided by Westinghouse, Seminole continues in its request that it be granted up to an additional 12ppm for NO_x emissions based on the nitrogen content of the fuel oil delivered to the project. Westinghouse has optimized the new dry low NO_x combustors on the large F class CTs to produce the lowest NO_x levels attainable on natural gas, while still maintaining oil firing capability. In order to achieve low NO_x emissions during natural gas firing, the DLN design limits the options for water injection during oil firing and therefore, the ability to achieve lower NO_x levels. Westinghouse has therefore based its guaranteed NO_x rate of 42ppm during oil firing upon a maximum fuel bound nitrogen content of 0.15% nitrogen.

DLN combustors can only control formation of thermal NO_x; fuel bound nitrogen (FBN) is not subject to combustion controls and is, therefore, "passed" through the machine. To meet the proposed 42ppm NO_x level for fuels with an FBN above 0.015% in fuel oil, the unit operator would be forced to over-control thermal NO_x by adding additional water injection during oil firing. While this may be achievable with conventional combustors or with single fuel (oil only) combustors on smaller CTs, Westinghouse does not believe that can be accomplished with the planned DLN combustor for this F class machine. The DLN is not expected to have any margin in the NO_x rate during oil firing that could be used to buffer the fuel bound nitrogen present in oil. Westinghouse is concerned that to attempt to inject additional water will create stress on the CT components and reduce unit efficiency by increasing the heat rate. Also, operating data during tests on CTs suggest that increasing water injection beyond a water to fuel ratio of 1.0 does not substantially reduce thermal NO_x formation but may significantly increase CO emissions well above proposed allowable levels.

Fuel bound nitrogen is solely a function of the oil refining and supply process. Seminole's investigation indicates that oil refiners are not refining or controlling for nitrogen content in fuel oil. While it appears that lower sulfur fuels (i.e., 0.05% sulfur oil) also have lower nitrogen contents as well, about 25% of the reported samples in one survey indicated that nitrogen content in low sulfur fuel oil still exceeded the threshold of 0.015% nitrogen. Thus, the oil refining industry does not currently continuously produce a low nitrogen/low sulfur fuel oil that would allow Seminole to meet the Department' proposed NO_x level of 42ppm.

Only one fuel oil supplier responded to Seminole's inquiry concerning a guaranteed price for fuel with a specified nitrogen content of no greater than 0.015% nitrogen. That single bidder would charge Seminole an additional 2.27¢ per gallon of fuel oil to supply low sulfur fuel with a nitrogen content of 0.015% or less. Based upon this price premium to Seminole, and assuming a maximum 0.03% nitrogen in the fuel (and an additional 12ppm of NO_x emissions for a total of 54ppm during oil firing) the cost effectiveness of payment of this premium to achieve the Department's proposed 42ppm emission rate would be a minimum of $6,737 per ton of NO_x removed. For fuel oil with a lower FBN content, the cost effectiveness on a per ton removal basis, would be even greater. Therefore, Seminole believes that requiring use of a low nitrogen fuel, which is the effect of the Department's proposed permit limit, is not cost effective and is unnecessary since the average nitrogen content of fuel oil would likely be at or below 0.015% nitrogen in most cases.

Attached for your further reference are the overheads used by Westinghouse and KBN in their presentation at our recent meeting. These are provided to further support Seminole's request for a differential NO_x emission rate during steam augmentation operation and for a fuel bound nitrogen allowance of up to 12ppm. While we hope that this information is useful to the Department in evaluating this request, if there is further information that you need, we are available to provide that information to you. Again, your attention to this request is appreciated.

Sincerely,

Kenneth L. Bachor
Manager, Environmental Licensing

KLB:jwl
Attachment
cc: w/o attachments
Syed Arif, BAR
Steve Palmer, Office of Siting Coordination
Richard Donelan, Office of General Counsel

APPENDIX C

ORDER GRANTING PETITION FOR DETERMINATION OF NEED

RECEIVED
JUN 22 1994
Hopping, Boyd, Green & Sams
cy: GZ KDM DSK LGS

BEFORE THE FLORIDA PUBLIC SERVICE COMMISSION

In Re: Petition for Determination of Need for Proposed Electrical Power Plant to be located in Hardee and Polk Counties By Seminole Electric Cooperative, Incorporated	DOCKET NO. 931212-EC ORDER NO. PSC-94-0761-FOF-EC ISSUED: June 21, 1994

The following Commissioners participated in the disposition of this matter:

J. TERRY DEASON, Chairman
JULIA L. JOHNSON
DIANE K. KIESLING

APPEARANCES:

RICHARD D. MELSON, Esquire, CHERYL G. STUART, Esquire, and JONATHAN T. JOHNSON, Esquire, Hopping, Boyd, Green & Sams, Post Office Box 6526, Tallahassee, Florida 32314.
On behalf of Seminole Electric Cooperative, Inc.

ROBERT V. ELIAS, Esquire, Florida Public Service Commission, 101 E. Gaines Street, Tallahassee, Florida 32399-0863
On behalf of the Commission Staff.

David E. Smith, Esquire, and Prentice P. Pruitt, Esquire, Florida Public Service Commission, 101 E. Gaines Street, Tallahassee, Florida 32399-0862
On behalf of the Commissioners.

ORDER GRANTING PETITION FOR DETERMINATION OF NEED

CASE BACKGROUND

On December 17, 1993, Seminole Electric Cooperative, Inc. (Seminole) filed, pursuant to Section 403.519, Florida Statutes, its Petition to Determine Need for Electric Power Plant. The applicant waived, to the extent applicable, the time requirements in the Power Plant Siting Act and Florida Administrative Code, to permit a Commission decision at the May 31, 1994 regular agenda conference.

Hopping

DOCUMENT NUMBER-DATE
06063

Seminole is the generating and transmission supplier for eleven of Florida's rural electric cooperatives. Seminole currently owns and operates two coal-fired base load generating plants located in Palatka which produce approximately 625 megawatts (MW) each. Seminole also has an ownership interest in Florida Power Corporation's (FPC) Crystal River Unit No. 3 plant which provides approximately 13 megawatts for Seminole's member cooperatives. Seminole also has a contractual agreement with TECO Power Service_, Inc. for back up resources for these units with power generated at Big Bend Unit 4 and Hardee Power Station Units 1 and 2. The balance of system needs, including load growth, are supplied through partial requirements contracts with FPC and Florida Power Light Company (FPL). The partial requirements contract with FPL requires that Seminole give seven years notice of its intent to reduce the amount of Seminole's needs supplied by FPL.

Based on its analysis of future needs and costs, Seminole advised FPL in December of 1991 that, beginning January 1, 1999, Seminole would increase its obligation (and thereby reduce the purchases from FPL) pursuant to the contract by 440 MW.

Seminole proposes to meet that need by constructing, under a turnkey contract with a Black & Veatch/Westinghouse joint venture, a 440 megawatt advanced combined cycle plant to be located at Hardee Power Station (HPS #3) on the border of Polk and Hardee counties.

No other party has intervened in the docket. The final hearing was held on March 30, 1994.

The ultimate issue in this case is whether Seminole's petition meets the statutory requirements of Section 403.519, Florida Statutes, which charges the Commission with consideration of the following criteria when determining the need for an electrical power plant:

- the need for electric system reliability and integrity;
- the need for adequate electricity at a reasonable cost;
- whether the proposed plant is the most cost-effective alternative available; and
- conservation measures taken by or reasonably available to mitigate the need for the proposed plant.

We find that Seminole has provided to the Commission sufficient information on the site, design, engineering characteristics, and transmission requirements of its proposed combined cycle unit to evaluate its proposal.

HPS #3 will be a 440 MW advanced combined cycle generating facility consisting of two Westinghouse 501 F advanced combustion turbines, each of which will drive a 150 MW generator. The combustion gas from each combustion turbine will be exhausted through its own heat recovery steam generator (HRSG). The two HRSGs will produce steam to power a 140 MW Westinghouse steam turbine/generator set. By recovering the energy in the exhaust gases from the combustion turbines and utilizing this energy to produce steam for additional steam powered generation, the combined cycle facility is one of the most efficient power cycles available today.

HPS #3 will be constructed on a 1280 acre site located in northern Hardee County and southern Polk County. The site is owned by Acuera, a subsidiary of Seminole. A portion of the site is currently leased to TECO Power Services, Inc. for its existing 295 MW combined cycle facility and proposed future 145 MW addition. The existing facility provides peaking power to Tampa Electric Company and back-up power to Seminole for its two 600 MW class coal units.

The HPS site was certified in November, 1991 under the Florida Electric Power Plant Siting Act (PPSA) for an ultimate site capacity of 660 MW. As of January 1, 1993, Hardee Power Partners, the operating company for TPS, began operating Hardee Units #1 and #2 at the site consisting of a 220 MW combined cycle unit and a 75 MW combustion turbine. An additional 145 MW has been licensed for addition to the site in 2003, with the remaining 220 MW to be permitted at a later date.

HPS #3 has been conceptually presented to the Florida Department of Environmental Protection (DEP), the Environmental Protection Agency (EPA), and the Rural Electrification Administration (REA), as being a gas/oil-fired 440 MW combined cycle unit to be constructed within the boundaries of the original site certification for the HPS.

The primary fuel for the combined cycle facility will be natural gas which will be supplied to the facility by a natural gas pipe line. The site is currently served by an 18" natural gas lateral which interconnects with the Florida Gas Transmission System nine miles north of the facility in Polk County. The existing lateral will have the capability of supplying gas to fuel the additional 440 MW of generation. An alternate connection with the proposed Sunshine Pipeline is under consideration.

Number two (distillate) fuel oil will be used as a back-up fuel. The facility will have the equivalent of a seven day burn at a 100% capacity factor fuel oil storage tank with a truck off-loading facility capable of supporting prolonged operation on the backup fuel. Fuel oil will be transported to the site by truck.

Since HPS #3 is being constructed on an existing site, it will interconnect with three existing 230 KV transmission lines. The first line, owned by Seminole, extends from the HPS facility to a Lee County Cooperative substation located in Fort Myers. The second line, also owned by Seminole, leaves the HPS facility and interconnects with FPC's Vandolah substation. The third line is owned by Tampa Electric Company, leaves the HPS facility and interconnects with the TECO Pebbledale substation. The two Seminole-owned transmission lines have sufficient capability for the 440 of capacity represented by HPS #3 in addition to the output of HPS #1 and #2.

HPS #3 will be designed and operated to comply with all applicable state and federal environmental requirements. The expected costs of environmental compliance have been included in the capital and operating cost figures used in Seminole's economic analysis of the project.

Therefore, we believe that Seminole has provided sufficient information on the technical aspects of HPS #3 to evaluate the proposal.

I LOAD FORECAST

Seminole's load forecast includes annual projections from 1993 through 2012 of each of the following:

A. Residential Consumers
B. Commercial Consumers
C. Residential Sales, based on Avg. Residential Usage (kWh)
D. Commercial Sales, based on Avg. Commercial Usage (kWh)
E. Total Purchases by members at the delivery point (GWH)
F. Winter Peak Demand (MW)
G. Summer Peak Demand (MW)

Seminole's load forecast is produced through a joint effort by Seminole, its distribution members, and the Rural Electrification Administration (REA). The total purchases forecast for Seminole is the summation of results of modelling residential and commercial sales, plus trended sales to other classes (street lighting, etc). Residential and commercial forecasted sales is the product of forecasted consumers times forecasted customer usage. The summation of the individual members' sales across customer classes, adjusted for energy losses and the impact of conservation and load management, yields the total purchases forecasted for Seminole.

Projections are developed for each of Seminole's member cooperatives separately. Econometric and end-use models are used to derive each forecast. Seminole's forecasts are simply the summation of the individual members' forecasts.

Since Seminole's power supply arrangements include the purchase of peak requirements from other utilities, the Company's peak demand does not appreciably impact its need for power generation.

All of the annual projections referenced above appear in the Company's 1992 Power Requirements Study (PRS). This study is conducted by Seminole every two years for planning purposes. Likewise, the results of this study are reflected in the Seminole's 1993 Ten Year Site Plan. The energy forecast presented in the Company's filing is identical to that which appears in the 1992 Power Requirements Study. The energy forecast in the 1992 Power Requirements Study is consistent with the energy forecast in the 1993 Ten Year Site Plan.

According to Seminole forecast results, the average growth rates in residential consumers and residential energy usage per customer are expected to decline dramatically in the years 1993 through 2012 compared to the 1982 through 1992 time period. Average annual residential consumer growth is expected to slow from 4.6% per year to 2.7% per year. Likewise, average annual residential usage growth is expected to slow from 1.9% per year to .5% per year.

Similarly, the average growth rates in commercial consumers is expected to decline significantly, from 6.0% per year to 2.7% per year. However, the average annual growth rate in commercial energy usage is expected to remain the same at 0.8% per year.

According to Seminole, these historical and forecasted energy usage growth rates are higher than similar growth rates throughout the rest of the state, but Seminole's average energy usage per residential and commercial consumer is lower than the average energy usage in the rest of the state. This would indicate that the Seminole service territory is lagging in energy usage, but gradually gaining on the rest of the state as the territory increasingly takes on more urban characteristics.

We find that the load forecast used by Seminole is reasonable for planning purposes.

II EFFECTS OF CONSERVATION AND DEMAND SIDE MANAGEMENT

We find that the effects of conservation and demand side management are appropriately reflected in Seminole's load forecast.

The Company states that the conservation programs used by its members, combined with the lack of Seminole resources to measure the impact of all such programs, motivated Seminole to use statewide conservation savings data to determine the impact of conservation programs on it load forecast. The statewide savings data used by Seminole appears in the 1989 Planning Hearing Document, prepared by the Florida Electricity Coordinating Group (FCG). This statewide data is the percentage of net energy for load which is expected to be avoided through the impact of conservation programs, based on the expected implementation of energy conservation programs projected at the time of the publication of the document. The assumed conservation savings ratio level for the forecast period is 1.6% of purchases.

Seminole states that the impact of load management programs on the energy forecast is minimal - less than 3 gigawatt hours (GWH) in any year. While 100 percent of the expected load management reduction is applied to the coincident peak, it is assumed that 50 percent of the displaced energy would be recovered during the hours following the peak. We agree that the impact of load management programs would have a minimal impact on energy requirements.

We reviewed the data in the 1989 Planning Hearing Document used to calculate the energy savings related to conservation and load management. The annual percentage savings ratios appearing in the document are consistent with the savings data forecasted by Seminole. We believe it is likely that the Company's use of statewide data has the effect of making the energy forecast lower than it would be if direct measurement had been used. Since Seminole members' consumers use less electricity than average Floridians, they probably have even less potential to conserve than the average Floridian, so statewide data would reflect greater savings than would be expected for Seminole members' consumers.

For the purposes of determination of need, it is not unreasonable to substitute the use of statewide data for direct measurements of conservation savings, since a more conservative load forecast would be expected using statewide data rather than direct measurement of conservation effects.

III NEED FOR ADDITIONAL CAPACITY

We find that Seminole, as a utility interconnected with the statewide grid, has a need for 440 MW of additional capacity in 1999.

Seminole has demonstrated by evidence of record, that based on the estimated economic benefits to Seminole, 440 megawatts of additional capacity is needed in 1999. Typically, new resources are needed when a utility's reliability criteria are projected to be violated at a point in the future. This is usually caused by a combination of factors including but not limited to customer growth, and consumption per customer growth.

Seminole states that HPS #3 is being added for economic reasons, to displace higher cost partial requirements service, and not to meet a need for additional reliability. This decision was based primarily on the economic analyses performed by Seminole that showed cost savings to Seminole, its member cooperatives, and their customers by building this unit, rather than continuing to purchase the same level of partial requirements power.

We find that the proposed combined cycle unit is needed in the 1999 time frame to contribute to the reliability and integrity of the electric system of Seminole and the State of Florida.

According to Seminole's witness Walbridge, FPL has since documented that Seminole's intent to remove this load from FPL's system, along with other factors, has contributed to the deferral of FPL's need to build capacity in the 1998-1999 time frame. HPS #3 can be viewed as a substitute for a portion of the capacity that FPL had been planning to construct in the 1998-1999 time frame, and is equally consistent with the projected statewide needs.

According to Seminole witness Huis, HPS #3 improves the reliability of Seminole's system on an EUE basis. The 1993 Ten-Year Plan for the State of Florida shows Peninsular-wide reserve margin in 1999 of approximately 20% summer and 13% winter. These reserve margin calculations assume that HPS #3 is placed into service as proposed on January 1, 1999.

In addition to enabling Seminole to meet the obligation it assumed to serve an additional 440 MW of capacity, HPS #3 will improve the reliability of Seminole's system, defer the need for additional combustion turbine capacity, and satisfy a portion of the state's need for additional capacity in this time frame.

Therefore, the evidence tends to demonstrate that the proposed combined cycle unit is needed in the 1999 time frame to contribute to the reliability and integrity of the electric system of Seminole and the State of Florida.

We find that the timing of Seminole's petition to determine need for its proposed combined cycle unit is appropriate.

We have reviewed the HPS #3 project schedule and believe it to be a reasonable timetable. Actual construction of the advanced combined cycle unit is scheduled to take approximately two years. All environmental permitting is expected to take an additional two years. Another factor influencing the project schedule is the loan application process at the Rural Electrification Administration (REA). Seminole plans to submit its loan application in June 1994 with loan approval anticipated in September 1995.

Therefore, the timing of Seminole's petition for determination of need is appropriate, given the reasonable project schedule submitted.

We find that if HPS #3 is not completed in the time frame requested, Seminole, its member cooperatives, and their customers face the risk of potentially more costly replacement power.

Given that Seminole notified FPL that it would increase its capacity commitment under the partial requirements contract by 440 MW beginning in 1999, Seminole is responsible for providing that amount of capacity at that time. Seminole has investigated other alternatives in the event HPS #3 is delayed or denied. Those alternatives include the construction of combustion turbine units which do not require Commission approval, short term purchases from other utilities, utilizing outdated bids from potential suppliers who participated in Seminoles RFP process, or potential renegotiation with FPL. Seminole estimates that alternatives to HPS #3 would result in higher cost to Seminole's member consumers. We agree that, based upon record evidence, Seminole and its ratepayers face the risk of higher cost electricity if HPS #3 is not completed in the time frame requested.

We find that Seminole's fuel price forecasts for heavy oil, distillate oil, natural gas and coal are reasonable and adequate for planning purposes.

Seminole's base case delivered fuel price forecasts for each fuel type are neither the highest nor the lowest compared to forecasts made by other utilities. Of the forecasts compared Seminole's fuel price forecasts are similar to FCG's. The FCG price forecast is the lowest fuel price forecast for high sulfur coal, residual oil and natural gas while FPC's is the lowest price forecast for distillate oil. The Seminole distillate oil forecast shows a lower price than FCG's but higher than FPC's distillate oil price forecasts. Seminole's base case delivered fuel price forecast indicates that coal is expected to be the lowest priced fuel, then natural gas, residual oil and distillate respectively over the study period.

The fuel price forecasts prepared by Seminole, FPL, FPC, Florida Electric Coordinating Group (FCG), Tampa Electric Company (TECO) and Orlando Utilities Commission (OUC) each show a continual increase in the price of all fuels over time. We do not believe that future fuel prices will be as high as these trends indicate because of the actual market price trends which are monitored by the Commission. However, Seminole's fuel price forecasts are reasonably adequate for assessing the relative risks of long term commitments between fuel types for planning purposes. These relative risks include weighing the uncertainty of future fuel prices against the capital costs associated with the technologies of using each of the different fuels. In this docket, the target costs to avoid are the Partial Requirements which principally follow the price of distillate fuel oil, heavy oil and natural gas.

Therefore, selecting either natural gas or coal would be more economic than the higher priced residual oil and distillate oil based on just fuel prices alone. Coal units are more expensive to build than combined cycle units which can be later converted to use gasified coal. Deferring the additional capital requirements to burn coal to some future date provides for economic flexibility to respond to fuel prices if and when necessary.

Because of the pricing of Partial Requirements and selection of a lower cost fuel and selection of a low capital cost technology which can be adapted to alternate fuels, the fuel-capital cost flexibility risk is not at issue in this case.

We find that Seminole's proposed natural gas fired combined cycle unit (HPS #3) will contribute to fuel diversity for Seminole's system and for Peninsular Florida by adding natural gas to its fuel mix. In addition to cost savings, the construction of HPS #3 will provide Seminole with greater fuel diversity, which reduces Seminole's risk associated with unexpected fuel supply or price changes. Seminole's existing generation consists almost exclusively of 1276 MW of coal-fired capacity from Seminole units No. 1 and No. 2.

Assuming that HPS #3 is placed into service as proposed on January 1, 1999 HPS #3 will represent 15% of Seminole's generating capacity and 5% of its energy output. Peninsular Florida will be proportionately affected.

We find that adequate assurances have been provided regarding available primary and secondary fuel to serve the proposed combined cycle unit on a long and short term basis at reasonable cost.

Natural gas will be the primary fuel for HPS #3, and it will provide approximately 95 percent of the unit's fuel requirements. Florida Gas Transmission (FGT) already serves HPS #1 and 2, although some upstream improvements to the FGT system would be required to transport the full quantity of gas required by the project. FGT has advised Seminole that the volume of gas needed to serve HPS #3 is sufficient to support an expansion of the FGT system solely to serve HPS #3 without forcing Seminole to wait for future expansions. Natural gas supplies are abundantly available at the wellhead and Seminole is in the fortunate position of choosing from two pipeline companies for transportation of such wellhead gas.

The alternate fuel, distillate oil, will be delivered to the proposed unit by tanker truck from terminals near Tampa Bay in a similar manner which is used to deliver distillate oil to the existing Hardee Power Station Units 1 and 2. Seminole is planning to install a 4.4 million gallon distillate oil storage tank on site as well as tanker truck off-loading facilities to provide for extended operation should natural gas deliveries experience a sustained interruption. Not including any additional deliveries, the standby distillate storage tank provide for 7 days continuous burn at a 100% capacity level. We believe that there are adequate and sufficient distillate oil supplies to serve the projected requirements based on the expected life of the proposed unit.

We find that Seminole has provided adequate assurances that sufficient natural gas pipeline capacity will be available to transport natural gas to the proposed combined cycle unit.

Florida Gas Transmission (FGT) already serves the Hardee site. The additional 16 inch pipe that will create an alternative route for FGT to supply gas to the Hardee Power Station (HPS) will be sufficient to transport the total quantity of gas needed to the HPS including that of HPS #3.

We find that the reasonably anticipated costs to Seminole of environmental compliance of the proposed unit been properly considered by Semi..ole.

Capital costs to comply with known environmental requirements were part of Seminole's cost effectiveness evaluation and contract price for the proposed unit. If new environmental requirements come into effect which are not specified in the contract, Seminole is responsible for those costs.

Additional evaluations and negotiations are in progress to determine the possibilities of sharing existing cooling pond and waste water facilities at Hardee Power Station. However, whether these facilities are shared or not have no significant impact on the cost-effectiveness of the proposed unit.

Coal gasification was a criteria for selecting the Hardee Power Station site. In the eventuality that natural gas becomes less economic than coal gasification, the adjacent 40 acre site appears convenient to the generation station and coal transportation. Pursuant to the Clean Air Act of 1990, Seminole anticipates annual allocations of 36,700 SO_2 allowances. Seminole projects that approximately 27,000 allowances will be used at existing coal fired units with a surplus of 9,700 SO_2 allowances annually. These surplus allowances may be used at the proposed unit.

Seminole states that the projected water use by the proposed unit will be essentially within the expected environmental impacts and conditions of certification adopted in 1990 for Hardee Power Station No. 1 and No. 2a in the 660-megawatt site buildout scenario.

Therefore, we believe that Seminole has made a fair and reasonable effort to assess environmental compliance costs.

We find that Seminole has adequately explored and evaluated alternative Seminole-owned supply side sources of capacity.

In the 1989 Power Supply Study, Seminole determined that partial requirements purchases could be economically displaced.

The results of this plan identified combined cycle units as the appropriate technology. Seminole issued its Request for Proposals (RFP) in July 1990 based on the results of the 1989 Power Supply Study. The RFP contained requests for purchased power proposals and Seminole-owned turnkey projects.

A turnkey project transfers the risk of such items as project schedule delays, equipment performance, and initial environmental compliance to the turnkey contractor while allowing the utility to own and operate the completed facility. Seminole also requested bids for turnkey projects in order to enhance competition for resources based on concerns expressed by the Federal Energy Regulatory Commission regarding Seminole's 1988 solicitation. We believe Seminole's decision to request proposals for turnkey projects was appropriate.

Seminole's RFP was advertised in industry trade journals, and inquiry letters were mailed to over 300 companies taken from Seminole's listing from the 1988 bid solicitation. Seminole mailed 47 RFP documents to prospective bidders and eventually received ten formal proposals from eight different bidders. In 1991 Seminole updated its planning assumptions and ultimately revised its plan to 75 MW needed January 1996 for reserves and 440 MW needed in 1999 for partial requirements displacement in the FPL area. As a result of the new plan, Seminole in January 1992 notified the RFP respondents and requested modifications to the bids to match the new plan.

A four phase evaluation process was utilized which analyzed the technical aspects and economic parameters of each proposal. Staff believes that Seminole's bid solicitation and evaluation of the turnkey proposals which culminated in the selection of the Black & Veatch/Westinghouse project was adequate.

We find that Seminole has adequately explored and evaluated the availability of purchased power to serve its load in lieu of constructing HPS#3.

Seminole first evaluated the purchased power proposals against Seminole's self-build alternative in late 1990. After the updated solicitation in early 1992, the purchased power proposals were evaluated as part of the four phase process discussed below.

After Seminole notified FPL in December 1991 that Seminole would increase its capacity commitment by 440 MW beginning in 1999, FPL offered alternative arrangements for providing purchased power.

Seminole evaluated the proposals from FPL and found them not to be competitive with responses to the RFP.

We find that the evaluation process used by Seminole in the selection of the 440 MW combined cycle unit project was appropriate.

After receiving the responses to the updated solicitation early 1992, Seminole evaluated those responses using a four phase evaluation process. Ten proposals, consisting of four turnkey projects and six purchased power proposals, were evaluated in this process. Phase one of the process reviewed each proposal for completeness.

In phase two, each proposal was evaluated on technical grounds including technical viability, environmental compliance, and reasonableness of stated performance data. An economic analysis was also performed and each proposal was analyzed using Seminole's planning models. The 30-year present worth revenue requirements of Seminole's system including each proposal separately was calculated. Each analysis performed compared Seminole's system cost with the particular proposal to the base case cost which assumed continuing to purchase partial requirements from FPL. The top four bids, two turnkey and two purchased power bids, were retained for further evaluation.

In phase three of the evaluation process, a more detailed economic analysis was conducted which included costs for transmission and gas pipeline construction. While no bid was excluded from further consideration, the ranking of the bids changed.

Phase four of the evaluation process consisted of negotiations with each bidder to acquire additional information. A detailed economic analysis utilizing the additional data was performed, and a risk analysis was conducted by Stone & Webster. This analysis considered the risk of completing the project as proposed, and the operational risk of plant performance. Based on the results of this analysis, Seminole selected the Black & Veatch/Westinghouse project and subsequently began contract negotiations.

We believe the evaluation process employed by Seminole to analyze the responses to its updated solicitation was reasonable.

We find that the evidence in the record does not indicate that additional conservation measures are available to Seminole to avoid or significantly defer its need for capacity in 1999. However, we are concerned about the lack of energy saving programs available to member cooperative customers. We will examine this issue in the upcoming conservation goals dockets for the five FEECA cooperatives.

Utility conservation programs primarily are aimed at reducing and/or shifting the system peaks, and also at reducing the level of the load curve in a cost effective manner. Seminole supplies base load power to its member cooperatives with predominately its coal-fired Seminole units 1 and 2.

Intermediate and peaking power is provided primarily through the partial requirements contracts Seminole has with FPL and FPC. These contracts require FPC and FPL to not only meet the peak the demand of Seminole, but meet the growth in peak demand over the term of each contract. Conservation programs which result in the lowering of Seminole's system peak, result in lower partial requirements power costs to Seminole. As the entity responsible for providing power to its member cooperatives, Seminole has responded to this situation by initiating the Coordinated Load Management Program.

Seminole states that other conservation programs are the province of the individual member cooperatives. We are concerned regarding the type and diversity of conservation programs offered by member cooperatives. While it appears the member coops perform audits and provide information on conservation options, there is a lack of incentive based equipment retrofit programs. Seminole was asked to perform a cost effectiveness analysis for a residential ceiling insulation program from the perspective of an individual member coop. This analysis showed that with the given assumptions such a program would be cost-effective. In response, Seminole stated that such a program is best left to the individual member systems to pursue. We are concerned that potential cost-effective conservation programs are not being pursued by member cooperatives. We intend to pursue this issue for the five FEECA cooperatives during the upcoming goals dockets. These five cooperatives make up 85 percent of Seminole's load.

The energy and capacity from HPS #3 will increase, from the bottom up, Seminole's capacity commitment in the FPL area. Because conservation programs reduce the load curve from the top down, there are not sufficient conservation resources available to cost-effectively defer HPS #3. Seminole performed several sensitivities to analyze the cost-effectiveness of HPS #3. One sensitivity increased the saturation of load management from 40 percent to 60 percent of controllable appliances. This analysis showed a decline in savings compared to the base plan which assumed a 40 percent load management saturation. Another sensitivity restricted load growth to 50 percent of the predicted level. This sensitivity mimics the effect of conservation in that it lowers the load to be served by Seminole. This sensitivity resulted in an estimated $59 million less in savings than the base plan.

We believe, that given the type of load to be served by HPS #3, there is not sufficient conservation available which could cost-effectively defer all or part of HPS #3 by 1999.

We find that Seminole's proposed combined cycle unit will contribute to the provision of adequate electricity to Seminole and the State of Florida at a reasonable cost.

The decision by Seminole to increase its capacity commitment under its partial requirements contract with FPL in part allowed FPL to defer its capacity need.

The total installed cost of HPS #3 is estimated to be $313 million or approximately $711 per kW. This amount was confirmed as a reasonable cost by staff witness Waters of FPL. He agreed that $800 per kW would be "in the ballpark" for a natural gas fired combined cycle unit.

Thus, the evidence suggests that HPS #3 will provide reasonable cost electricity.

We find that the project does not require the need to construct additional transmission lines or other off-site associated facilities. There will be a need to construct additional on site facilities including fuel off loading, storage, metering and pumping facilities.

HPS #3 is being constructed on an existing site and will interconnect with three existing 230 kV transmission lines. Seminole currently owns two of the 230 kV lines. The power currently being transmitted over the lines include 295 MW of capacity being generated by HPS #1 and HPS #2. According to Seminole's witness Zimmerman, the three 230 kV transmission lines are adequate to handle the output of the existing facilities, the plan build-out of HPS #2 and the 440 MW of HPS #3.

In addition to facilities that will be shared on the site by the proposed project, HPS #3 will require a switch yard extension, this will enable the generator to interconnect with the existing transmission lines, a water treatment facility, fuel oil off-loading and storage facilities. The fuel oil facilities will have storage to accommodate seven days of full load operation. The off-loading facilities will be designed to support prolonged operation on fuel oil should the primary fuel, natural gas, become unavailable.

Seminole has also requested that Black & Veatch include mechanical draft cooling towers in its base proposal. Seminole's reason for that was at the time of the contract, the studies to determine if the existing cooling pond could handle the additional capacity of the 440 MW plant had not been completed. At the time of hearing, Seminole had not made a final decision on the use of the existing cooling pond or to construct mechanical draft cooling towers. If the existing cooling pond is utilized for HPS #3, the overall cost of the project will be less.

We find that, based on record evidence, HPS #3 appears to be the most cost-effective alternative to Seminole and peninsular Florida.

Seminole purchases partial requirements power (PR) from FPC and FPL. Under the PR contract with FPC, Seminole is charged for the intermediate and peaking generation on their system used to provide power to Seminole. This is know as a stratified methodology.

Pursuant to the PR contract with FPL, Seminole's charges are based on an average system cost methodology. Because of these different methodologies, Seminole pays lower fixed costs under its PR contract with FPC than with FPL.

The record demonstrates that the different methodologies result in higher cost power from FPL than FPC. Seminole pursued a change in PR rate methodologies with FPL at the FERC but was unsuccessful.

After Seminole issued its RFP in 1990, the 1991 Base Case Update was performed, the results of which showed a change in the amount and timing of Seminole's displacement of PR purchases. This plan resulted in the greatest savings by displacing 440 MW of PR purchases from FPL in 1999, and 220 MW of PR purchases from FPC. Seminole negotiated a shorter notice provision with FPC allowing Seminole to postpone a decision on whether to displace 220 MW of PR purchases from FPC. Seminole notified previous bidders of the change in its base plan which is described in issues 14-16.

Seminole compared each of the bid respondents to continuing to purchase PR from FPL. HPS #3 ultimately was shown to be the most cost-effective among the proposals received. Seminole performed its need study to analyze the cost effectiveness of HPS #3. The primary source of savings derived from HPS #3 over continuing to purchase PR from FPL is the difference in the fixed cost of HPS #3 and the fixed cost component of FPL's PR rate. Because FPL's rate is based on an average system cost, the fixed component includes FPL's high capital cost baseload units, as well as its intermediate and peaking units.

A number of sensitivities to Seminole's base plan of HPS #3 were performed to test the cost-effectiveness of the unit. These sensitivities include a reduction in load growth which mimics conservation, and, is estimated to provide less savings than the base plan. The other sensitivities, with the exception of HPS #3 running exclusively on distillate oil, show estimated savings to Seminole by owning and operating HPS #3.

Based on the resolution of the previous factual and legal issues, we find that Seminole's petition for determination of need for the proposed combined cycle unit should be granted.

Seminole's petition for determination of need meets the statutory requirements of Chapter 403.519, Florida Statutes. These statutory requirements include:

1. The need for electric system reliability and integrity

   - The addition of 440 MW in 1999 will allow Seminole to meet the need created when Seminole notified FPL that Seminole would increase its capacity commitment under its PR contract with FPL due to evidence that displacing PR would provide an economic benefit to Seminole.

   - The capacity from HPS #3 in part allows FPL to defer its need for capacity to later years. HPS #3 also will provide a portion of the additional generating capacity needed in 1999 to maintain an adequate level of reliability.

2. The need for adequate electricity at a reasonable cost

   - The capacity from HPS #3 is projected to adequately provide the electricity FPL would have provided Seminole under its PR contract.

   - The estimated cost to construct and operate HPS #3 is reasonable level compared to the comparable combined cycle units.

3. Whether the proposed plant is the most cost-effective alternative available

   - HPS #3 appears to be the most cost-effective alternative compared to continuing to purchase PR from FPL, given the assumptions contained in Seminole's analysis.

   - Compared to other turnkey and purchased power bids acquired pursuant to Seminole's bid solicitation, HPS # 3 appears to be the most cost-effective alternative.

4. Conservation measures taken by or reasonably available to mitigate the need for the proposed plant

   - As discussed in this Order we are concerned about the relative lack of incentive based energy saving programs offered by the member cooperatives. This issue will be examined in the five FEECA member cooperatives conservation goals dockets.

   - However, it appears that additional conservation measures, given the type of load HPS #3 will serve, cannot cost-effectively mitigate the need for HPS #3 prior to 1999.

In consideration of the foregoing, it is

ORDERED by the Florida Public Service Commission that the findings set forth in the body of this Order are hereby approved. It is further

ORDERED that the Petition for Determination of Need for Proposed Electrical Power Plant to be located in Hardee and Polk counties by Seminole Electric Cooperative, Incorporated is hereby granted. It is further

ORDERED that this docket shall be closed.

By ORDER of the Florida Public Service Commission, this 21st day of June, 1994.

BLANCA S. BAYÓ, Director
Division of Records and Reporting

by: Kay Flynn
Chief, Bureau of Records

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NOTICE OF FURTHER PROCEEDINGS OR JUDICIAL REVIEW

The Florida Public Service Commission is required by Section 120.59(4), Florida Statutes, to notify parties of any administrative hearing or judicial review of Commission orders that is available under Sections 120.57 or 120.68, Florida Statutes, as well as the procedures and time limits that apply. This notice should not be construed to mean all requests for an administrative hearing or judicial review will be granted or result in the relief sought.

Any party adversely affected by the Commission's final action in this matter may request: 1) reconsideration of the decision by filing a motion for reconsideration with the Director, Division of Records and Reporting within fifteen (15) days of the issuance of this order in the form prescribed by Rule 25-22.060, Florida Administrative Code; or 2) judicial review by the Florida Supreme Court in the case of an electric, gas or telephone utility or the First District Court of Appeal in the case of a water or sewer utility by filing a notice of appeal with the Director, Division of Records and Reporting and filing a copy of the notice of appeal and the filing fee with the appropriate court. This filing must be completed within thirty (30) days after the issuance of this order, pursuant to Rule 9.110, Florida Rules of Civil Procedure. The notice of appeal must be in the form specified in Rule 9.900 (a), Florida Rules of Appellate Procedure.