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ENVIRONMENTAL LICENSING PLAN OF STUDY

TAMPA ELECTRIC COMPANY
POLK POWER STATION
440-MW COMBINED CYCLE AND 500-MW BASELOAD
POWER PLANT PROJECT

Prepared for:

TAMPA ELECTRIC
A TECO ENERGY COMPANY

TAMPA ELECTRIC COMPANY
Tampa, Florida

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Fort Lauderdale/Gainesville/Tampa, Florida

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State of Florida
DEPARTMENT OF ENVIRONMENTAL REGULATION

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SUBJECT: Tampa Electric Company - Polk County Site Plan of Study

Attached, please find a copy of the referenced plan of study. Please have the appropriate staff persons review this document for adequacy and submit written comments to this office by May 28, 1991. There will be a meeting to discuss this plan of study at 9:30 a.m. on May 31, 1991, in room 338-D.

Thank You

SP/ah
cc: Bill Thomas
Attachment

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LIST OF ACRONYMS AND ABBREVIATIONS

AAQS	ambient air quality standards
AFBC	atmospheric fluidized bed combustion
Agrico	Agrico Chemical Company
BACT	best available control technology
BAQM	Bureau of Air Quality Management
bls	below land surface
CC	combined cycle
CFR	Code of Federal Regulations
CFRPC	Central Florida Regional Planning Council
CO	carbon monoxide
CR	county road
CT	combustion turbine
dBA	A-weighted decibels
DLES	Department of Labor and Employment Security
DO	dissolved oxygen
EA	environmental analysis
ECT	Environmental Consulting & Technology, Inc.
EIS	environmental impact statement
EMF	electric and magnetic fields
EPA	U.S. Environmental Protection Agency
ESP	electrostatic precipitator
FAA	Federal Aviation Administration
F.A.C.	Florida Administrative Code
FCREPA	Florida Committee on Rare and Endangered Plants and Animals
FDACS	Florida Department of Agriculture and Consumer Services
FDER	Florida Department of Environmental Regulation
FDHR	Florida Division of Historical Resources
FDNR	Florida Department of Natural Resources
FDOA	Florida Department of Administration
FDOS	Florida Department of State
FDOT	Florida Department of Transportation
FEMA	Federal Emergency Management Agency
FEPPSA	Florida Electrical Power Plant Siting Act
FGD	flue gas desulfurization
FGFWFC	Florida Game and Fresh Water Fish Commission
FGT	Florida Gas Transmission
FHWA	Federal Highway Administration
FIPR	Florida Institute of Phosphate Research
FLUCCS	Florida Land Use and Cover Classification System
FNAI	Florida Natural Areas Inventory
ft	feet
F.S.	Florida Statutes
FSHPO	Florida State Historic Preservation Officer
GEP	good engineering practice
HPS	Hardee Power Station
HRSG	heat recovery steam generator
IGCC	integrated gasification combined cycle

LIST OF ACRONYMS AND ABBREVIATIONS
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IMCF	IMC Fertilizer, Inc.
km	kilometer
kV	kilovolt
LOS	level-of-service
LRU	logical reclamation units
MGD	million gallons per day
MSSW	management and storage of surface water
MW	megawatt
NEPA	National Environmental Policy Act
NESHAP	National Emissions Standards for Hazardous Air Pollutants
NOAA	National Oceanic and Atmospheric Administration
NO_x	nitrogen oxide
NPDES	National Pollutant Discharge Elimination System
NSPS	new source performance standards
NSR	New Source Review
NWS	National Weather Service
O_3	ozone
Pb	lead
PC	pulverized coal
PM_{10}	particulate matter less than or equal to 10 micrometers aerodynamic diameter
POS	plan of study
PPS	Polk Power Station
PSD	prevention of significant deterioration
PVC	polyvinyl chloride
QA/QC	quality assurance/quality control
SCA	site certification application
SCS	Soil Conservation Service
SECI	Seminole Electric Cooperative, Inc.
SO_2	sulfur dioxide
SPT	standard penetration test
SR	state road
SWFWMD	Southwest Florida Water Management District
TBRPC	Tampa Bay Regional Planning Council
TEC	Tampa Electric Company
TPS	TECO Power Services
tpy	tons per year
TSP	total suspended particulate
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
VOC	volatile organic compounds

1.0 INTRODUCTION

Tampa Electric Company (TEC) is planning to construct and operate new electric power generating facilities consisting of two 220-megawatt (MW) (nominal) combined cycle (CC) units and one 500-MW (nominal) baseload, coal-fueled unit. The primary fuel for the CC units will be natural gas with No. 2 fuel oil as the back-up fuel. The planned facilities will be located in southwestern Polk County, Florida; the project is currently known as the TEC Polk Power Station (PPS) (see Figure 1.0-1). Prior to constructing the planned facilities, TEC must address and fulfill various applicable regulatory agency requirements and obtain appropriate licensing approvals. This plan of study (POS) describes the technical approach, baseline data collection and monitoring efforts, potential impact analyses, schedule, and regulatory agency coordination which will be conducted by TEC to fulfill the applicable environmental licensing requirements for the PPS.

The two most comprehensive regulatory requirements for new electric generating facilities in Florida are the Florida Electrical Power Plant Siting Act (FEPPSA) and the National Environmental Policy Act (NEPA). The FEPPSA is administered by the Florida Department of Environmental Regulation (FDER) with various other statutory or affected state, regional, and local agencies, and the public participating in the FEPPSA procedures and review and approval processes. The FEPPSA-related regulations require the preparation and filing by TEC of a site certification application (SCA) pursuant to Chapter 403.5063, Florida Statutes (F.S.); and Chapter 17-17.041(5), Florida Administrative Code (F.A.C.). These laws, regulations, and related instruction guide from FDER provide specific guidance for the types of information and analyses which must be included in the SCA as well as the agency coordination, review, public hearing, and approval procedures.

For the PPS project, the U.S. Environmental Protection Agency (EPA) will serve as the lead federal agency for fulfilling the NEPA regulatory

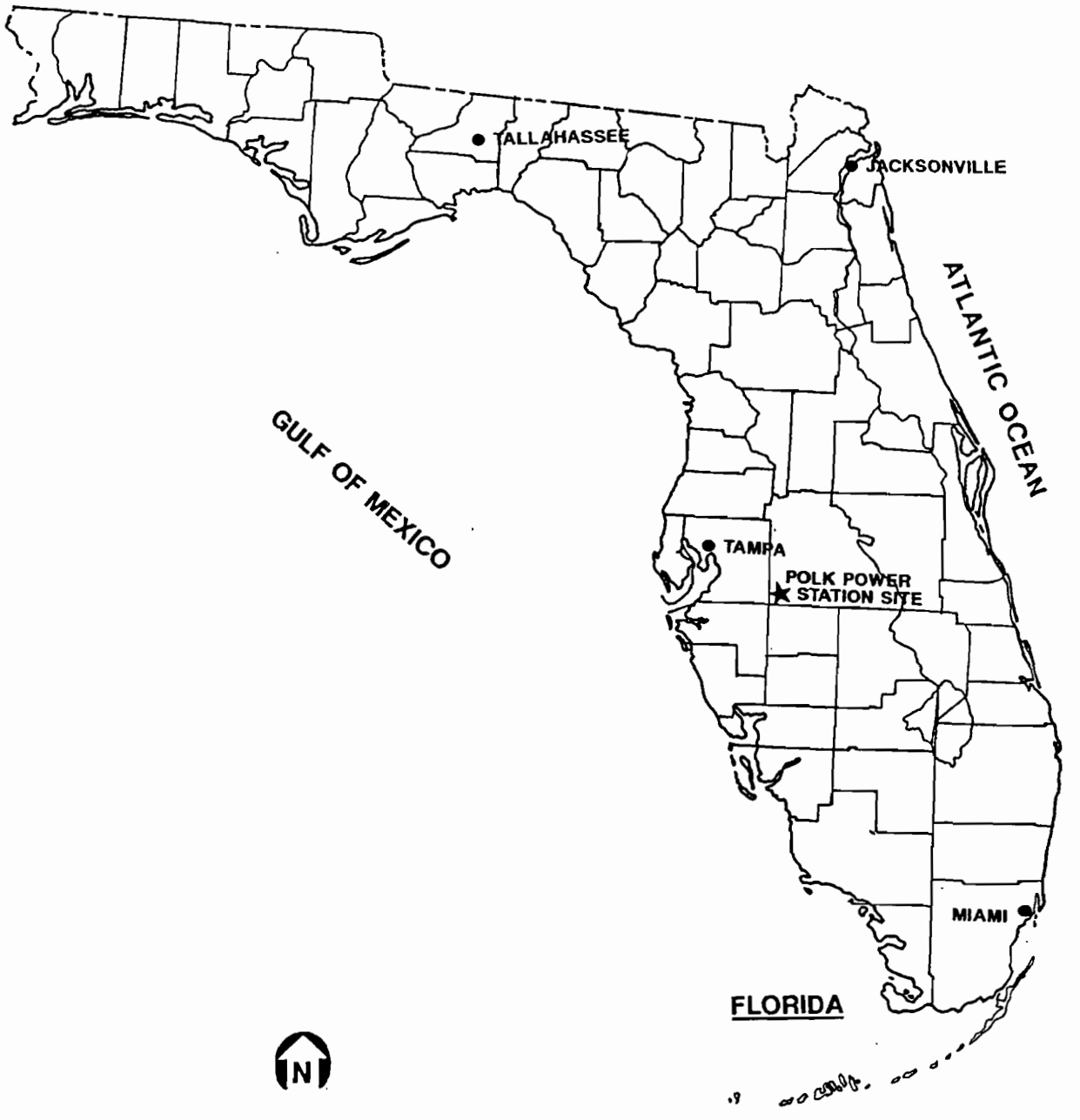

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FIGURE 1.0-1.

GENERAL LOCATION OF POLK POWER STATION

Source: ECT, 1991.

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requirements pursuant to its National Pollutant Discharge Elimination System (NPDES) and NEPA-implementing regulations [40 Code of Federal Regulations (CFR), Parts 423 and 122]. These regulations require the submission of an environmental analysis (EA) by TEC, the applicant, for review by EPA and various other affected federal and state agencies. Based on these reviews and inputs from the public, EPA will determine whether or not preparation of an environmental impact statement (EIS) is required.

Both the FEPPSA and NEPA regulations require similar, comprehensive environmental, social, and economic evaluations of the planned PPS project; its site characteristics; its potential, adverse and beneficial, impacts; and alternatives to mitigate impacts. TEC plans to submit a single SCA/EA document to FDER and EPA to fulfill their applicable regulatory requirements. This POS describes the specific baseline data collection/monitoring, impact analysis, and documentation work efforts and procedures which will be conducted by TEC in preparation of the SCA/EA. The overall goal of this POS is to provide the basis for obtaining appropriate concurrences and binding agreements from regulatory agencies that the planned technical work efforts and analyses will fulfill the informational requirements of these agencies for the SCA/EA.

1.1 GOALS AND OBJECTIVES OF THE POS

The specific goal of the POS is to provide a basis for binding agreements and concurrences between FDER and other affected agencies and TEC that define: (1) the scope, quantity, and specificity of information to be provided in the SCA/EA document; (2) the methods to be used in providing such information; and (3) the nature of the supporting documentation to be included in the SCA/EA document applicable to the PPS project.

Specific objectives of the POS are to:

1. Present the approach to comply with applicable federal and state requirements;

2. Outline procedures for multiple reviews by local, regional, state, and federal agencies, and the public; and
3. Establish methods for identifying issues and their significance, and for developing a range of actions or alternatives for the mitigation of impacts associated with these issues.

The following POS presents TEC's approach to meeting these goals and objectives, and provides the basis for the preparation of the SCA/EA document for regulatory agency and public review of the PPS project.

1.2 PROJECT BACKGROUND

TEC is an investor-owned electric utility which serves west-central Florida, primarily Hillsborough County and portions of Pasco, Pinellas, Polk, and Highlands counties (see Figure 1.2-1). Currently, TEC serves approximately 460,000 residential, commercial, industrial, and governmental Customers within its service area. TEC's system has an installed net electric generating capacity of 3,281 MW from 24 generating units located at five different sites--Big Bend, Gannon, Hookers Point, Phillips, and Dinner Lake stations.

As a public utility, TEC has a corporate obligation to provide reliable and economical electric service to its Customers, existing and future. To meet this obligation, TEC conducts ongoing, long-range generation planning and load (i.e., demand) forecasting programs to predict its future power supply needs and options to meet these needs. These programs also consider TEC's extensive efforts in conservation, load management, and cogeneration to minimize future power needs. Currently, based on the projected population and electricity demand growth within its service area, TEC has determined the need for a 440-MW CC facility in the mid-to late-1990s and a 500-MW baseload power plant early in the 2000s.

Due to the long lead time needed for planning, licensing/permitting, designing, and constructing new electric generating facilities, TEC initiated the comprehensive planning efforts required for these facilities. An integral aspect of these efforts was the identification of

suitable sites for constructing and operating the new generating facilities. In order to be in proximity to the Customers it serves, TEC preferred that the new generating facilities be located within a six-county area, shown in Figure 1.2-1, which includes its service territory and adjacent areas. This study area included all of Hillsborough, Pinellas, Pasco, Manatee, Polk, and Hardee counties. TEC conducted a Power Plant Site Selection Assessment program to identify a suitable site or sites for the needed facilities within this six-county area. This program included the participation of a Power Plant Siting Task Force which was comprised of private citizens from environmental groups, businesses, and universities. The Siting Task Force provided guidance and recommendations to TEC throughout the site selection process and TEC concurred with the final guidance and recommendations of the Siting Task Force regarding the selection of the preferred sites for the planned facilities.

1.3 SITE LOCATION

TEC is planning to construct and operate two 220-MW (nominal) CC units and one 500-MW (nominal) baseload, coal-fueled unit at a site located in southwestern Polk County approximately 20 miles south of the City of Lakeland, Florida. The PPS site, consisting of approximately 4,300 acres, is bounded by the Hillsborough County line along the western boundary; Fort Green Road [County Road (CR) 663] and the CSX Railroad on the east; CR 630 and Bethlehem and Albritton Roads along the north; and State Road (SR) 674 and phosphate clay settling ponds on the south. SR 37 bisects the property running in a southwest to northeast direction. The property to the east of SR 37 consists primarily of recently mined areas with water-filled mine cuts between over-burden spoil piles surrounding an unmined parcel of land and older mined and reclaimed and unreclaimed areas. The area to the west of SR 37 is currently being mined for phosphate matrix; these operations are scheduled to continue through 1992. Figure 1.3-1 outlines the planned site boundaries for the PPS. Except for the approximately 675-acre tract south of CR 630 (Sections 34 and 35), the

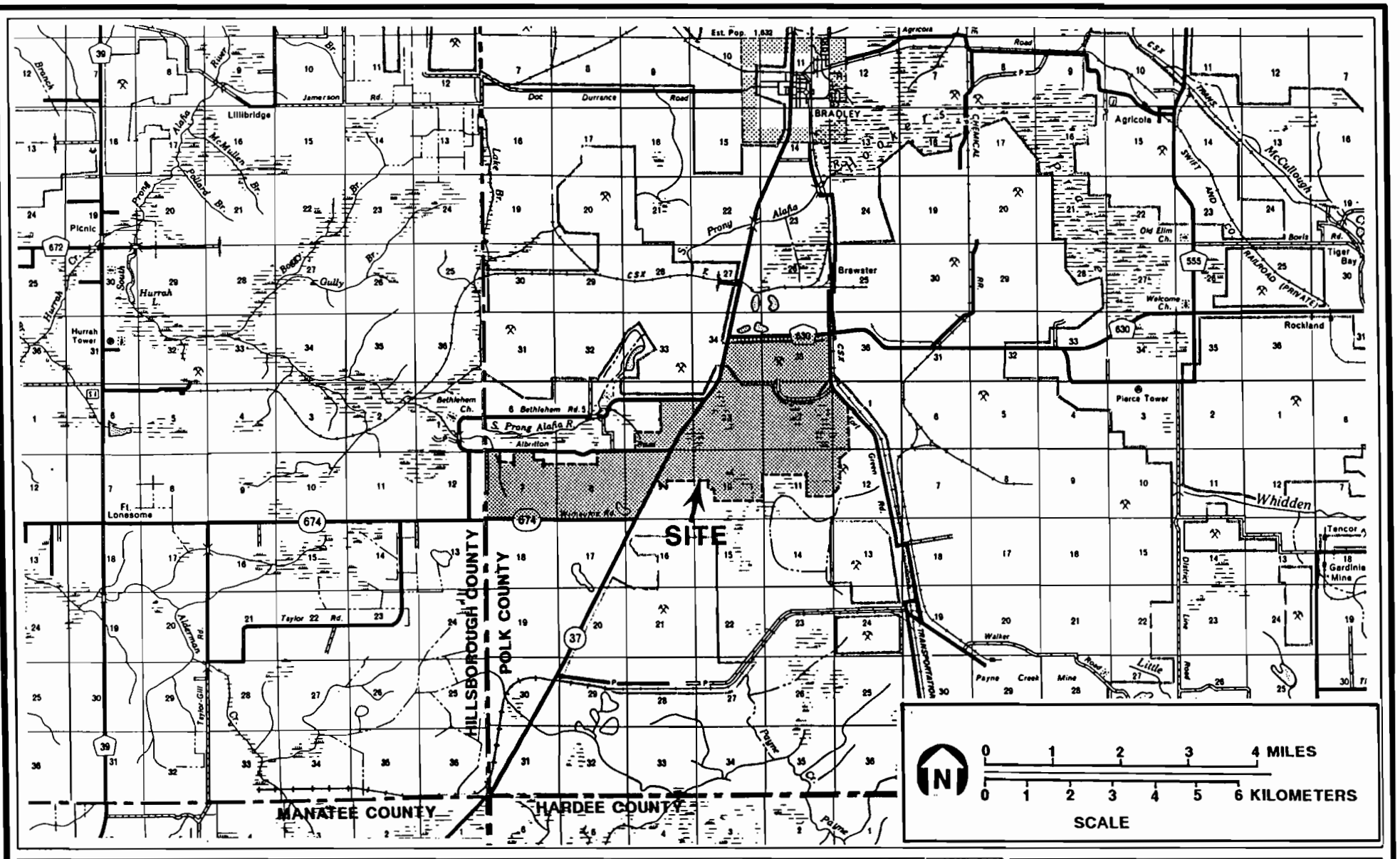

FIGURE 1.3-1.

SITE BOUNDARIES OF POLK POWER STATION

Sources: FDOT Map, FL; ECT, 1991.

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PPS site has been part of the Agrico Chemical Company (Agrico) Fort Green Mine.

1.4 PROJECT DESCRIPTION

The proposed PPS site will be permitted for an electric generating capacity of 940 MW. The two 220-MW (nominal) CC units (i.e., total nominal capacity of 440 MW) will consist of combustion turbines (CTs) with associated heat recovery steam generators (HRSGs), steam turbines, and condenser cooling system. The primary fuel will be natural gas with No. 2 fuel oil as back-up. Natural gas will be delivered to the site by pipeline from a connection to the Florida Gas Transmission (FGT) Sarasota bulk transmission lateral which runs through a portion of the PPS site. The fuel oil will be transported to the site by truck from Port Tampa or Port Manatee, or by pipeline from the currently proposed GATX fuel oil pipeline which would run adjacent to the eastern boundary of the PPS site.

A CT unit operates very similar to a jet aircraft engine. In an aircraft engine, fuel is burned to produce hot gases which are used to spin a turbine which, in turn, creates the thrust for the aircraft. For power generation, liquid or gaseous fuels are burned in a high-pressure combustion chamber to produce hot gases. The hot gases are passed directly through a turbine which then spins a generator to produce electricity. The turbine also drives the compressor that provides the high-pressure air to the combustion chamber.

The efficiency of electric generation is improved when CTs are configured with a steam turbine in what is termed a CC system. When CTs are used as stand-alone units, the hot combustion gases are released to the atmosphere after they have passed through the turbine. In a CC system, the hot exhaust gases, which are still about 1,000° F, are used to generate steam in a HRSG. Once the hot gases in the CT have already spun the turbine generator, the gases are piped into a HRSG, where the water is evaporated to produce steam. The steam is then used to spin another turbine and

generator to produce electricity. Thus, the second generator is able to produce electricity without additional fuel input.

The 500-MW (nomimal) baseload unit is scheduled to be in-service early in the 2000s. Currently, TEC is planning to use conventional pulverized coal (PC) electric generating technology to meet its baseload capacity needs. For the PC baseload power plant, coal will be delivered to the plant site by trains and placed in a storage area. When needed to generate electricity, the coal is transported to a pulverizing mill where it is ground to the consistency of face powder for efficient burning. The PC is then carried into the boiler in a stream of hot air and burned in the boiler. The heat from the burning coal is transferred to water that circulates in a closed cycle in pipes forming the boiler. The water changes to steam which is used to spin a turbine that is connected to an electric generator. Sulfur dioxide (SO_2) emissions from a PC power plant will be controlled by cleaning the SO_2 out of the combustion gases before they enter the atmosphere. Flue gas desulfurization systems (FGDs) clean the SO_2 out of the combustion gases with the use of a device more commonly known as a "scrubber." Though there are different types currently in use, they all operate on the same basic principle: passing the combustion gases through a chemical solution, a process known as "washing" the gases. During the washing process, the SO_2 gas reacts with the chemicals in the solution to form a new substance. This substance can either be filtered out of the combustion gas, in the case of a "dry" scrubber, or separated from the used chemical solution in the case of a "wet" scrubber. Flue gas particulate emissions from the PC plant will be controlled by use of an electrostatic precipitator (ESP) or a fabric filter baghouse.

The general plant layout for the PPS is shown in Figure 1.4-1. A paved access and entrance will connect the plant roadways to SR 37. A controlled access to the plant site will be provided. The primary power plant facilities will be located in unmined land and the existing mined-out land will be used primarily for a cooling reservoir.

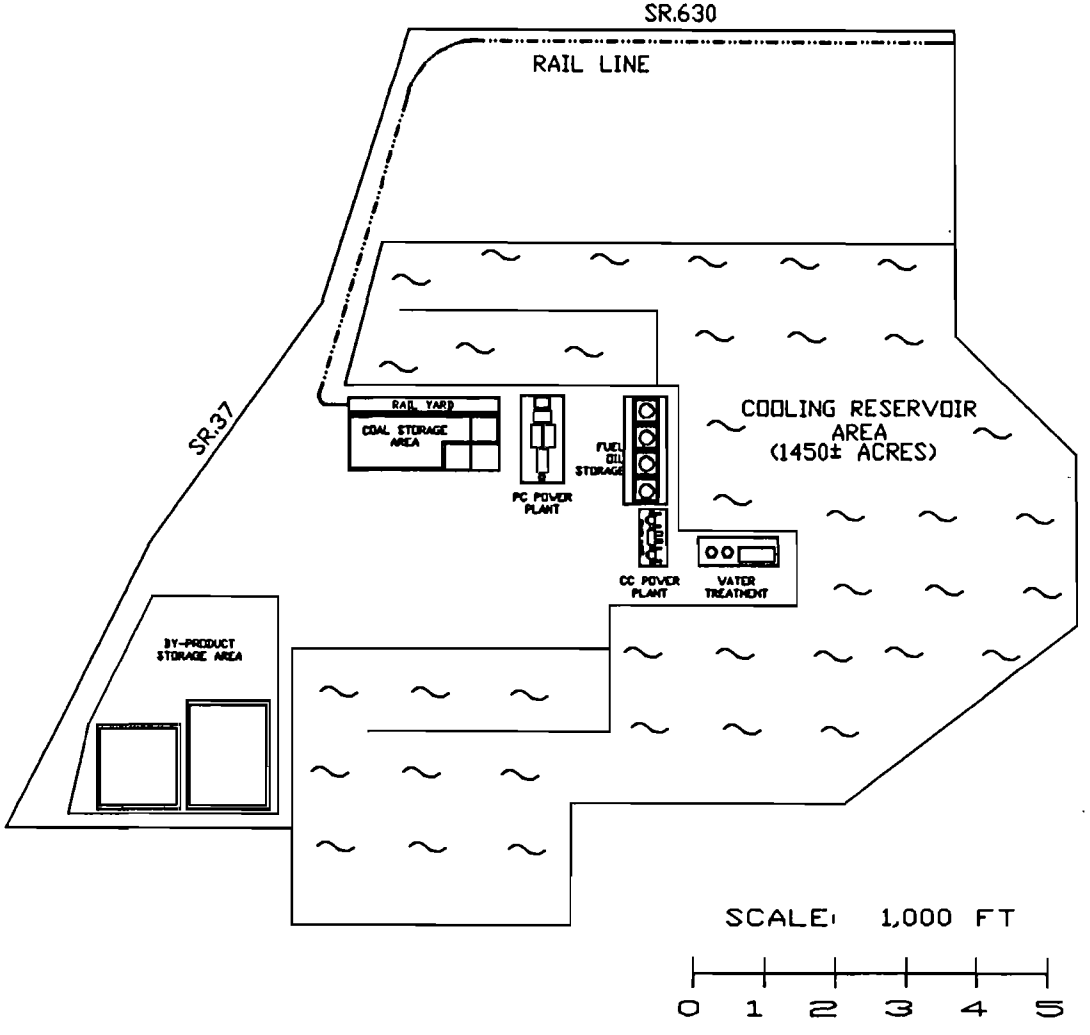

FIGURE 1.4-1.

CONCEPTUAL PLANT LAYOUT FOR POLK POWER STATION

Source: TEC, 1991.

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A well field will be developed to provide the primary supply of plant makeup water for the cooling system makeup, and other plant uses. Water will be withdrawn from the Floridan aquifer. The condenser cooling system will consist of an approximately 1,450-acre cooling reservoir. Stormwater runoff on the plant site will be collected, retained, and treated, as appropriate, in accordance with applicable regulations. Discharges from the cooling reservoir and excess stormwater from the plant site will be directed to the South Prong Alafia River system. According to TEC's current conceptual plans, any water discharges from the site would be directed through a series of reclaimed lakes and wetlands proposed as a stormwater management area for the site property to the west of SR 37. This series of lakes and wetlands will provide for significant, additional retention and natural treatment of any discharges prior to reaching the ultimate discharge point, an unnamed tributary of the South Prong Alafia River system. Further, although preliminary conceptual designs and water balances have not yet been developed, if possible, any cooling reservoir and/or stormwater discharges from the site would occur only during extreme rainfall events (e.g., the 10-year, 24-hour storm). Design of plant systems, including the cooling water reservoir, will consider criteria to maximize plant water re-use and minimize groundwater withdrawals.

A total of six new 230-kilovolt (kV) transmission circuits will be needed as associated facilities to interconnect the plant to the TEC and state transmission grid systems. Depending on the final corridors for these lines, the total length for the proposed lines will be approximately 35 to 55 miles. During the phased construction of the CC units, five of the circuits will be phased into service. The first and second circuits will be built concurrently and run from a new substation on the PPS site and loop into the Hardee/Pebbledale transmission line which will run along CR 663 adjacent to the eastern boundary of the site (see Figure 1.4-2). These lines will effectively make the Hardee/Pebbledale transmission line two distinct circuits, i.e., Hardee/PPS and PPS/Pebbledale. The third and fourth lines will run from the PPS station north to interconnect with TEC's existing 230-kV Mines/Pebbledale transmission line which runs in an

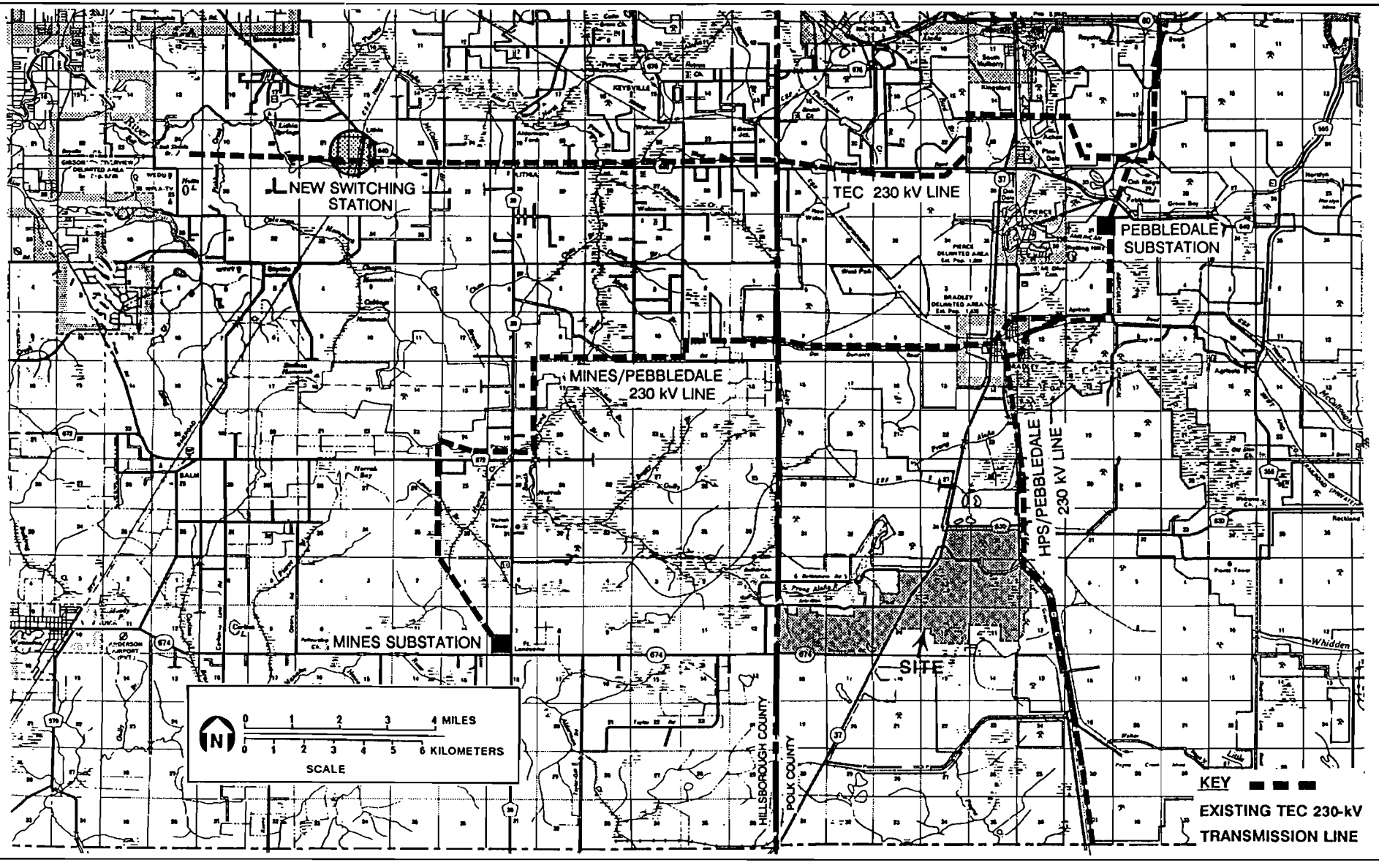

FIGURE 1.4-2.
RELATIONSHIP OF PPS SITE TO PROPOSED TRANSMISSION LINE INTERCONNECTIONS AND NEW SWITCHING STATION

Source: ECT, 1991.

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east-west direction along Doc Durrance Road in the vicinity of Bradley Junction. Again, these circuits will be built concurrently and will make the Mines/Pebbledale transmission line two distinct circuits, i.e., Mines/PPS and PPS/Pebbledale. The final corridor for these circuits will be selected and evaluated as part of the PPS licensing program. The fifth circuit will involve the construction and addition of a 230-kV circuit to the planned Hardee/Pebbledale transmission line running from the PPS site to TEC's Pebbledale Substation located approximately 9 miles to the northeast of the site. For the PC unit, an additional 230-kV circuit will be constructed from the PPS Substation to interconnect at a new switching station with other existing TEC 230-kV lines. The final corridor for this circuit will be selected and evaluated as part of the PPS licensing program. The new switching station will be located in the vicinity of the CR 640 and Boyette Road intersection in Hillsborough County.

Again, the specific corridors for these new transmission lines have not been selected at this time. Corridor selection studies will be conducted during the PPS licensing efforts to identify the proposed routes for these associated lines. To the extent possible, the transmission lines will be primarily located within/adjacent to existing TEC transmission line corridors, road and rail rights-of-way, and other linear features.

Conceptual facility design assumptions and land requirements for the planned CC and PC units are summarized in Tables 1.4-1 and 1.4-2 and provide the initial basis for the planning and development of this POS. However, it must be recognized that these assumptions are conceptual in nature and not definitive. More specific preliminary design information will be developed and included in the SCA/EA document.

Since the baseload unit is not scheduled to be in-service until early in the 2000s, TEC will continue to analyze several baseload plant technologies using coal as fuel to meet its future needs. In addition to PC, other baseload technologies include:

Table 1.4-1. Conceptual Criteria Requirements for Polk Power Station (Page 1 of 2)

Facilities/Systems	Units	CC Plants		PC Plant
A. Electrical Generation Components				
• Number required		1		1
• Generating capacity				
Net @ full load	MW	440		500
• Unit heat rate				
Net @ full load	Btu/KWH	8,150		9,850
• Unit heat input	10^6 Btu/hr	3,590		4,930
B. Fuel Delivery				
• Utilization rate				
Oil*	bbl/day	14,800		--
Natural gas*	10^6 SCF/day	86.1		--
Coal	tons/day	--		5,380
• Delivery method				
Oil*		Pipeline or truck		--
Natural gas*		Pipeline		--
Coal		--		Train
C. Fuel Characteristics				
• Distillate oil (No. 2)*				
Higher heating value	Btu/lb	19,000		--
Percent sulfur	%	0.5		--
Max. burn	gals/hr	26,000		--
Annual quantity	bbl/yr	2,711,000		--
• Natural gas*				
Higher heating value	Btu/SCF	1,035		--
Max burn	10^6 SCF/hr	3.6		--
Annual quantity	10^6 SCF/yr	15,200		--
• Coal				
Higher heating value	Btu/lb	--		11,500
Lower heating value	Btu/lb	--		10,800
Percent sulfur	%	--		3.5
Percent ash	%	--		12
Max burn	tons/hr	--		228
Annual burn rate	tons/yr	--		1,800,000
• Air emissions (maximum)				
Sulfur dioxide	lb/hr	1,902		3,191
Nitrogen oxides	lb/hr	1,168		3,008
Particulates	lb/hr	144		181
Carbon monoxide	lb/hr	88		983
Volatile organic compounds	lb/hr	51		17
• Stack parameters		CTs	HRSGs	
Number of stacks	qty	4	4	1
Stack height	ft	75	90	550
Stack diameter	ft	15	14.5	17.5
Emission velocity	ft/sec	120	70	85
Emission temperature	°F	960	280	150
D. Cooling System: Makeup Reqmts.				
• Cooling reservoir				
Average	gal/min	1,970		5,490
Maximum	gal/min	3,210		7,780

Table 1.4-1. Conceptual Criteria Requirements for Polk Power Station (Page 2 of 2)

Facilities/Systems	Units	CC Plants	PC Plant
E. Cooling System: Discharges			
• Cooling reservoir			
Average	gal/min	Cooling reservoir discharge is highly site specific. Normally expect that seepage/ percolation is adequate for any blowdown criteria. Abnormal discharge would be due to excess rainfall.	
Maximum	gal/min		
Discharge temperature	°F		
F. Process Water Reqmts.			
• Makeup			
Average	gal/min	327	840
Maximum	gal/min	430	1,150
• Discharge			
Average	gal/min	102	320
Maximum	gal/min	134	330
G. By-Product Disposal			
• By-product (gypsum)	tons/day	--	1,200
• Fly ash and bottom ash	tons/day	--	660

* Information for distillate oil and natural gas assumes that one type of fuel or the other are utilized as primary fuel for the plant.

Source: TEC, 1991.

Table 1.4-2. Conceptual Land Area Requirements for Polk Power Station (in acres)

	Both CC and PC Plants
Base plants	56
Fuel oil storage/handling	22
Coal storage/handling[1]	71
Limestone storage/handling[1]	10
Cooling reservoir	1,450
Ash/By-product handling/storage[2]	115
Water/wastewater treatment	16
Switchyard	36
Construction laydown	75
Stormwater management	1,521
Miscellaneous (roads, etc.)	45
Others (buffers, etc.)	859
Total Land Area	4,276

Note: [1] Coal/limestone storage/handling is based on 45 days onsite storage.
[2] Assumes 5 years material storage.

Source: TEC, 1991.

1. Integrated gasification combined cycle (IGCC), and
2. Atmospheric fluidized bed combustion (AFBC).

The IGCC technology involves the addition of a coal gasifier to a CC plant. Coal gasification is a method of producing a clean, synthetic gas from coal. One gasification technology, the Lurgi system, has been in commercial use for some years. There are now several other second-generation, or advanced, gasifiers at the pilot or demonstration plant stage, but they are not expected to become commercial until the late-1990s. Basically, the advanced systems differ from one another in how the coal and oxidant are brought into contact and how the physical conditions (temperature, pressure, and so on) of the reaction are controlled. Cost predictions suggest that gasified coal may be able to compete with oil and natural gas for electric generation, especially due to the potential volatility of the prices and availability of these other fuels. Further, tests show that when a gasification unit is integrated with a CC unit, the efficiency and economics of the system may improve to a point competitive with conventional coal-fired plants for providing baseload electrical power.

AFBC limits SO_2 emissions by modifying and controlling the chemical reactions that occur during coal burning itself. Undesirable gases that could escape to the atmosphere either are not formed or are converted to other compounds during combustion. The coal burns in what is known as a fluidized bed: a concentrated suspension of crushed limestone and coal particles in a flow of hot gas. As the coal burns, the limestone reacts chemically with the sulfur oxides normally created during coal combustion to form calcium sulfate. This by-product is collected in the form of a dry, granular solid. Thus, because SO_2 is captured during the actual coal burning, AFBC systems do not require extensive cleanup of stack gases, although they still produce solid by-products which must be properly stored.

2.0 REGULATORY REQUIREMENTS

2.1 LICENSING ACTIVITIES

Licensing of the PPS project will require the consideration of federal, state, regional, and local regulations. A list of regulations which may be applicable to this project is provided in Table 2.1-1. Of the potential regulations listed, the major licensing requirements identified for the project are:

1. State SCA approval under FEPPSA, as promulgated under 403.501, et. seq. F.S.; and Chapter 17-17, F.A.C.;
2. Federal approval under NPDES as promulgated in 40 CFR, Parts 423 and 122;
3. Federal approval for dredge and fill activities under the U.S. Army Corps of Engineers (USACE) promulgated under Section 404 of the Clean Water Act and 33 CFR Parts 320-330; and
4. State approval for prevention of significant deterioration (PSD) under Chapter 17-2.500, F.A.C.

The SCA process will address applicable state, regional, and local regulatory requirements, with ultimate approval granted through a Site Certification Order issued by the Governor and Cabinet acting as the Siting Board. To comply with the terms of EPA's approval of Florida's PSD program, a separate air quality permit, reviewed and issued by the FDER simultaneously with the site certification process, is also anticipated. While the FEPPSA otherwise obviates the need to obtain separate state, regional, or local permits or approvals, affected regulatory agencies participate in the site certification process and their regulatory requirements need to be addressed in the process.

At the federal level, the project will probably constitute a "new source" under EPA's NPDES regulations. Consequently, EPA's permitting action will be subject to the requirements of NEPA. The SCA will also serve as the EA to be submitted to EPA as the basis for its determination of whether or not the preparation of an EIS will be necessary.

Table 2.1-1. Major Potentially Applicable Environmental Regulations and Licensing Considerations (Page 1 of 2)

Federal

1. NEPA (CEQ 40 CFR 1500-1508; 7 CFR 1794)
2. Air: NSPS (EPA 40 CFR 60 Subparts GG and Da)
3. Air: PSD (EPA 40 CFR 52.21)
4. Water: NPDES (EPA 40 CFR 423, 122)
5. Dredge and Fill (USACE Section 404; 33 CFR 320-330)
6. Stack Height (FAA 14 CFR 77; EPA 40 CFR 51)
7. Endangered Species (50 CFR 17)

State

1. Power Plant Siting Act: (FDER 403.501-403.518, F.S.; Ch. 17-17, F.A.C.)
2. Air: NSPS (FDER Ch. 17-2.660, F.A.C.)
3. Air: PSD (FDER Ch. 17-2.500, F.A.C.)
4. Air: Nonattainment (FDER Ch. 17-2.510, F.A.C.)
5. Surface Water Discharge: (FDER Ch. 17-302, 17-4 F.A.C.)
6. Groundwater Discharge: (FDER Ch. 17-3., 17-4 F.A.C.)
7. Effluent Limitations: (FDER Ch. 17-660, F.A.C.)
8. Stormwater (FDER Ch. 17-25, F.A.C.)
9. Dredge and Fill: Wetlands (FDER Ch. 17-312, F.A.C.)
10. Land Use: FDOA Coastal Zone Areas (Ch. 380.19, Ch. 380.23, F.S.); Environmentally Endangered Land (Ch. 259, F.S.); Areas of Critical Concern (Ch. 380, F.S.); Aquatic Preserves (Ch. 258.35, F.S.); Outstanding Florida Waters (Ch. 17-302, F.A.C.) (Ch. 258, Ch. 259, F.S.); National and State Parks and Recreation Areas (Ch. 592.12, F.S.); National Forests National Wildlife Refuges and State Wildlife Management Areas (Ch. 372, F.S.); State Wilderness Areas (Ch.258.17, F.S.); Indian Reservations (Ch. 285, F.S.)
11. Archaeology/Historical: (FDOS Ch. 267, F.S.; Ch. 1A, F.A.C.)
12. Stack Height: (FDOT Ch. 14-60.09, F.A.C.)
13. Highway/Railroad: (FDOT Ch. 14, F.A.C.)
14. Solid Waste: (FDER Ch. 17-701, F.A.C.)
15. Hazardous Waste: (FDER Ch. 17-730, F.A.C.)
16. Electric and Fields (FDER Ch. 17-274, F.A.C.)
17. Phosphate Mining Reclamation (FDNR 211, 378, F.S.; Ch 16C-16, 16C-17, F.A.C.)
18. Water Quality Based Effluent Limitations: (FDER Ch. 17-650, F.A.C.)
19. Underground Injection Control: (FDER Ch. 17-700, F.A.C.)

Table 2.1-1. Major Potentially Applicable Environmental Regulations and Licensing Considerations (Page 2 of 2)

Regional

1. Consumptive Water Use: (SWFWMD Ch. 40D-2,3, F.A.C.)
2. Stormwater Discharge: (SWFWMD Ch. 40D, F.A.C.)
3. Land Use: Regional Policy Plans (CFRPC and TBRPC Ch. 186, F.S.; Ch. 27D, F.A.C.)
4. Works of District (SWFWMD Ch. 40D-6, F.A.C.)
5. Surface Water Management: (SWFWMD Ch. 40D-4, F.A.C.)

Local

1. Land Use: Local Government Comprehensive Planning Act of 1975 with Amendments (Ch. 163 F.S.); Polk County and Hillsborough County
2. Construction Permits
3. Surface Water Management (Polk Ordinance 88-04)
4. Phosphate Mining (Polk Ordinance 88-19)

Source: ECT, 1991.

2.2 SITE CERTIFICATION APPLICATION (SCA) FORMAT

The SCA/EA format will follow the FDER "Instruction Guide for Certification Applications; Electrical Power Plant Site, Associated Facilities, and Transmission Lines," FDER Form 17-1.211(1), F.A.C. Based on this form, Table 2.2-1 presents the proposed Table of Contents for the SCA/EA document.

Table 2.2-1. Site Certification Application/Environmental Analysis (SCA/EA) Outline (Page 1 of 5)

SCA/EA Section
1.0 Need for Power and the Proposed Facilities
2.0 Site and Vicinity Characterization
2.1 Site and Associated Facilities Delineation
2.2 Socio-Political Environment
2.2.1 Governmental Jurisdictions
2.2.2 Zoning and Land Use Plans
2.2.3 Demography and Ongoing Land Use
2.2.4 Easements, Title, Agency Works
2.2.5 Regional Scenic, Cultural and Natural Landmarks
2.2.6 Archaeological and Historic Sites
2.2.7 Socioeconomics and Public Services
2.3 Biophysical Environment
2.3.1 Geohydrology
2.3.2 Subsurface Hydrology
2.3.3 Site Water Budget and Area Users
2.3.4 Surficial Hydrology
2.3.5 Vegetation/Land Use
2.3.6 Ecology
2.3.7 Meteorology and Ambient Air Quality
2.3.8 Noise
2.3.9 Other Environmental Features
3.0 The Plant and Directly Associated Facilities
3.1 Background
3.2 Site Layout
3.3 Fuel
3.4 Air Emissions and Controls
3.4.1 Air Emission Types and Sources
3.4.2 Air Emission Controls
3.4.3 Best Available Control Technology
3.4.4 Design Data for Control Equipment
3.4.5 Design Philosophy
3.5 Plant Water Use
3.5.1 Heat Dissipation System
3.5.2 Domestic/Sanitary Wastewater

Table 2.2-1. Site Certification Application/Environmental Analysis (SCA/EA) Outline (Page 2 of 5)

SCA/EA Section
3.5.3 Potable Water Systems
3.5.4 Process Water Systems
3.6 Chemical and Biocide Waste
3.7 Solid and Hazardous Waste
3.7.1 Solid Waste
3.7.2 Hazardous Waste
3.8 Onsite Drainage System
3.9 Materials Handling
4.0 Effects of Site Preparation, and Plant Associated Facilities Construction
4.1 Land Impact
4.1.1 General Construction Impacts
4.1.2 Roads
4.1.3 Flood Zones
4.1.4 Topography and Soils
4.2 Impact on Surface Water Bodies and Uses
4.3 Groundwater Impacts
4.4 Ecological Impacts
4.5 Air Impacts
4.6 Impact on Human Populations
4.7 Impact on Landmarks and Sensitive Areas
4.8 Impact of Archaeological and Historic Sites
4.9 Special Features
4.10 Benefits From Construction
4.11 Variances

Table 2.2-1. Site Certification Application/Environmental Analysis (SCA/EA) Outline (Page 3 of 5)

SCA/EA Section
5.0 Effects of Plant Operation
5.1 Effects of the Operation of the Heat Dissipation System
5.1.1 Temperature Effect on Receiving Body of Water
5.1.2 Effects on Aquatic Life
5.1.3 Biological Effects of Modified Circulation
5.1.4 Effects of Offstream Cooling
5.1.5 Measurement Program
5.2 Effects of Chemical and Biocide Discharges
5.2.1 Industrial Wastewater Discharges
5.2.2 Cooling Tower Blowdown
5.2.3 Measurement Programs
5.3 Impacts on Water Supplies
5.3.1 Surface Water
5.3.2 Groundwater
5.3.3 Drinking Water
5.3.4 Leachate and Runoff
5.3.5 Measurement Programs
5.4 Solid/Hazardous Waste Disposal Impacts
5.4.1 Solid Waste
5.4.2 Hazardous Waste
5.5 Sanitary and Other Waste Discharges
5.6 Air Quality Impacts
5.7 Noise
5.8 Changes in Non-Aquatic Species Populations
5.9 Other Plant Operation Effects
5.10 Archaeological Sites
5.11 Resources Committed
5.12 Variances

Table 2.2-1. Site Certification Application/Environmental Analysis (SCA/EA) Outline (Page 4 of 5)

SCA/EA Section
6.0 Transmission Lines and Other Linear Facilities
6.1 Transmission Lines
6.1.1 Project Introduction
6.1.2 Corridor Location and Layout
6.1.3 Transmission Line and Road Design Characteristics
6.1.4 Cost Projections
6.1.5 Corridor Selection
6.1.6 Socio-Political Environment of the Corridor Area
6.1.7 Bio-Physical Environment of the Corridor Area
6.1.8 Effects of Right-of-Way Preparation and Transmission Line Construction
6.1.9 Post-Construction Impacts and Effects of Maintenance
6.1.10 Other Post-Construction Effects
6.2 Associated Linear Facilities
7.0 Economic and Social Effects of Plant Construction and Operation
7.1 Socioeconomic Benefits
7.2 Socioeconomic Costs
7.2.1 Temporary External Costs
7.2.2 Long-term External Costs
8.0 Site and Design Alternatives
8.1 Alternative Sites
8.2 Site Design Alternatives
8.2.1 Cooling System (exclusive of intake and discharge)
8.2.2 Biological Fouling Control
8.2.3 Intake System
8.2.4 Discharge System
8.2.5 Chemical Waste Treatment
8.2.6 Sanitary Waste System
8.2.7 Solid Waste Disposal System
8.2.8 Multiple Uses
9.0 Phosphate Mining Reclamation Plan Amendments
10.0 Coordination

Table 2.2-1. Site Certification Application/Environmental Analysis (SCA/EA) Outline (Page 5 of 5)

SCA/EA Section
11.0 Appendices
11.1 Permit Applications or Approvals
11.1.1 Dredge and Fill
11.1.2 NPDES Application/Permit
11.1.3 Prevention of Significant Deterioration
11.1.4 Water Use Permit
11.1.5 Reclamation Plans and Programs
11.2 Zoning Descriptions
11.3 Land Use Plan Descriptions
11.4 Existing State Permits
11.5 Monitoring Programs

Source: ECT, 1991.

2.3 PHOSPHATE MINE RECLAMATION REQUIREMENTS

A majority of the land at the PPS site has been mined to recover phosphate or disturbed due to mining related activities. Mining of those portions of the site lying west of SR 37 and north of CR 674 will continue through 1992.

Chapter 211, F.S.; and Chapter 16C-16, F.A.C., prescribe the Florida requirements to reclaim lands mined for phosphate subsequent to July 1, 1975, commonly referred to as "mandatory lands." Reclamation of lands mined prior to July 1, 1975 is not mandatory; state severance tax-based funding is available to reimburse owners of "non-mandatory" lands for some or all of the cost of voluntary reclamation activities. Non-mandatory reclamation is governed by Chapter 378, F.S.; and Chapter 16C-17, F.A.C. Both of these regulatory programs are administered by Florida Department of Natural Resources (FDNR).

This section of the POS describes the reclamation status of the site, together with the procedures to be followed and applications to be filed as part of the SCA/EA process. Since most of the site has been mined and FDNR is now a statutory party to the SCA process, it is appropriate to incorporate these regulatory requirements into the SCA/EA document for the PPS project.

2.3.1 RECLAMATION STATUS OF THE SITE

The site chosen for the PPS project consists of four separate types of land with respect to land reclamation regulations. These include: (1) lands disturbed prior to 1975, (2) lands disturbed prior to 1975 and re-mined subsequently, (3) lands mined after July 1975, and (4) lands not disturbed by phosphate mining. The terms of the land acquisition agreements TEC expects to execute in the near future may also affect the regulatory procedures in fulfilling FDNR reclamation and other requirements. To simplify this description, the site has been be subdivided into the nine parcels shown on Figure 2.3-1 and described below.

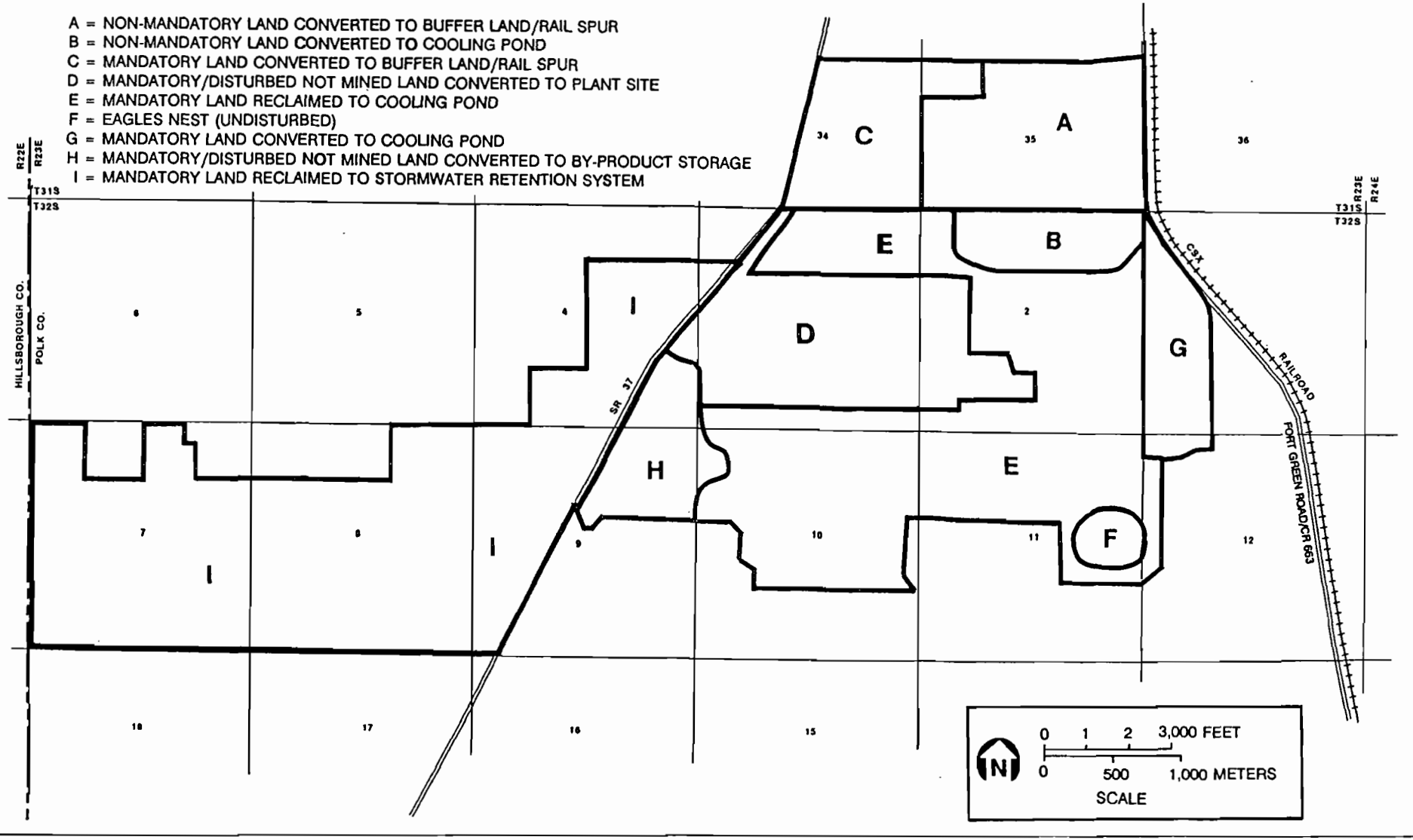

FIGURE 2.3-1.

CONCEPTUAL SITE PLAN FOR PROPOSED POLK POWER STATION

Sources: USGS, Duette NE, FL, Rev. 1972; Baird, FL, Rev. 1987; ECT, 1991.

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American Cyanamid Old Lands (Parcel A)--Parcel A consists of lands owned by the American Cyanamid Company in Section 35, Township 31 South, Range 23 East. This property, totaling approximately 400 acres, is not subject to the mining lease agreement between IMC Fertilizer, Inc. (IMCF), and American Cyanamid at the Haynsworth Mine. It was mined prior to 1940 and is eligible for reclamation funding through the FDNR Non-Mandatory Reclamation Trust Fund.

TEC proposes to use this land as a buffer to the proposed facilities and possibly to locate a rail spur and oil pipeline corridor from the existing CSX rail line and CR 663 east of the plant site. A portion of the parcel may also be used for the cooling reservoir.

There are no mandatory reclamation requirements associated with this parcel. At this time, TEC does not plan to seek Non-Mandatory Lands Trust Funds reimbursement for proposed activities on this parcel.

American Cyanamid Old Lands (Parcel B)--American Cyanamid also owns approximately 135 acres in Section 2, Township 32 South, Range 23 East, referred to as Parcel B. This property is not subject to the mining lease agreement between IMCF and American Cyanamid at the Haynsworth Mine. The property was mined prior to 1940 and is eligible for reclamation funding through the FDNR Non-Mandatory Reclamation Trust Fund. It consists of a rectangular deep lake, nearly divided into two cells.

TEC proposes to use this land as part of the cooling water reservoir for the proposed project. Thus, this property would be reclaimed as part of the reservoir construction process. At this time, TEC does not propose to seek FDNR reimbursement for cooling reservoir construction costs on this land. There are no mandatory reclamation requirements associated with this parcel.

American Cyanamid/IMCF Land (Parcel C)--Parcel C consists of land owned by the American Cyanamid Company in Sections 34 and 35, Township 31 South,

Range 23 East. This property, totalling approximately 280 acres, is subject to the mining lease agreement between IMCF and American Cyanamid. Although the land was mined prior to 1940, IMCF re-mined this property from 1987 to 1991. Mandatory reclamation plans for this area have been approved by FDNR and approximately one-third of the property has been reclaimed by grading overburden left at the site into land and lakes.

TEC proposes to use this land as a buffer to the proposed facilities and possibly to locate a rail spur, a transmission line, and/or an oil pipeline corridor from existing facilities in the vicinity of the plant site. A portion of the parcel may also be used for the cooling reservoir and to satisfy, in part, some of the requirements of Chapter 16C-16.0051, F.A.C., which cannot be satisfied elsewhere on the project site.

TEC recognizes that any changes in the approved reclamation plan for this area, either temporary or permanent, would require the review and approval of FDNR prior to implementation.

Agrico - Plant Site (Parcel D)--Parcel D consists of land owned by the Agrico in Sections 2 and 3, Township 32 South, Range 23 East. This property, totalling approximately 600 acres, contains an irregular-shaped parcel of unmined land surrounded by mined land, and mined land between the unmined land and SR 37. The lands are unreclaimed. The FDNR mandatory reclamation liability for the unmined portions of the parcel, if any, would be limited to minor grading and revegetation of areas disturbed in association with adjacent mining. The mining-related activities on this parcel were performed by Agrico after 1975 and subject to FDNR mandatory reclamation requirements. The reclamation plans developed by Agrico for this parcel have been approved by FDNR.

TEC proposes to locate the main power plant facilities on this property. Plant access road, rail yard, coal and limestone unloading and storage areas, and by-product handling area will also be located on portions of this parcel. Section 1.4 of this POS describes TEC's current conceptual

plans to the extent they have been defined at this time. New or revised reclamation plans for approval by FDNR will be required for this parcel.

Agrico Land-Cooling Reservoir (Parcel E)--Parcel E consists of land owned by the Agrico in Sections 1, 2, 3, 4, 10, 11, and 12, Township 32 South, Range 23 East. This property is an irregular shaped parcel of mined, but unreclaimed, land which surrounds the proposed plant site (Parcel D). All of this property was mined after 1975 by Agrico and is subject to the FDNR mandatory reclamation obligation. Reclamation plans developed by Agrico for this parcel have been approved by FDNR.

TEC proposes to convert this land into a cooling water reservoir, as described in Section 1.4 of the POS. Therefore, new or revised reclamation plans will be required for this parcel.

Agrico Land-Eagle's Nest (Parcel F)--Parcel F consists of land owned by the Agrico in Section 11, Township 32 South, Range 23 East. This property, totalling approximately 50 acres, is a circular shaped parcel of undisturbed land containing eagle's nest PO-40, currently inactive. Disturbance by Agrico was prohibited by U.S. Fish & Wildlife Service (USFWS) regulations. Accordingly, there is no mandatory reclamation obligation. According to current conceptual plans, TEC also will not disturb this parcel.

Agrico Land - Cooling Reservoir (Parcel G)--Parcel G consists of land owned by the Agrico in Sections 1 and 12, Township 32 South, Range 23 East. This property, totalling approximately 120 acres, is a rectangular shaped reclaimed lake and adjacent uplands. All of this land was mined by Agrico after 1975 and was reclaimed pursuant to Chapter 16C-16, F.A.C. Final release of the land from reclamation liability is expected to occur during the licensing process. However, in the event final release is not obtained, TEC will submit a conceptual plan and logical reclamation units (LRU) program amendment for any disturbance proposed for this parcel.

According to current conceptual plans, this land will be connected to the main cooling reservoir.

Agrico Land - By-Product Storage (Parcel H)--Parcel H consists of land owned by the Agrico in Sections 3, 4, 9, and 10, Township 32 South, Range 23 East. This property, totalling approximately 190 acres, is an irregular shaped parcel of disturbed, but not mined land. The FDNR mandatory reclamation liability for this parcel, if any, would be limited to minor grading and revegetation of three corridors cleared for access to other mineable areas. These mining-related activities were performed by Agrico after 1975.

According to current conceptual plans, TEC proposes to use portions of this land for by-product storage.

Agrico Land - Stormwater Management (Parcel I)--Parcel I consists of land owned by the Agrico in Sections 3, 4, 7, 8, and 9, Township 32 South, Range 23 East. This property, totalling approximately 1,521 acres, is an irregular shaped parcel bounded by CR 674 on the south and SR 37 on the east. Agrico began mining this parcel in 1989 and projects mining to continue into 1992. When completed, Agrico will have mined approximately 950 acres of this parcel. Agrico's reclamation plans for this parcel have been approved by FDNR.

TEC proposes to use this land as a stormwater management system to take advantage of the ability to reclaim this land into lakes and wetlands. New or revised reclamation plans and LRU program for this parcel will be required.

2.3.2 PROCEDURES TO AMEND APPROVED RECLAMATION PLANS AND PROGRAMS

Reclamation of the PPS site is governed by a number of approved reclamation programs for the portion of the site mined by Agrico and IMCF. The procedures to be followed in satisfying Florida land reclamation

requirements will be coordinated with the staff of the FDNR Bureau of Mine Reclamation as part of the licensing program for the proposed PPS project.

New or amended conceptual plan and LRU program submittals will be provided to FDNR in a timeframe which falls within the schedule for submittal of the SCA/EA. The exact procedures which will be used to process these plans and programs cannot be described at this time. Essentially, the proposals may be processed as amendments/modifications to Agrico's approved programs, processed as a "separate mine" and deleted from Agrico's Fort Green Mine, or as a joint Agrico/TEC application.

A principal determinant is the land acquisition contract language defining the specific liabilities of Agrico and TEC with respect to reclamation design, permitting, and performance.

Independent of the questions of ownership, identification of the applicant and procedures, and delineation of reclamation responsibilities, the SCA/EA will contain a complete set of conceptual plan and LRU reclamation program applications for the affected parcels. These applications will describe the reclamation work necessary to convert these parcels into the plant site, cooling water reservoir, by-product storage area, and stormwater management system, respectively.

The required set of reclamation applications will consist of a concurrent filing of the conceptual plan information and LRU program applications for the entire site. These applications will be filed in accordance with the requirements of Chapter 16C-16, F.A.C. The conceptual plan will be submitted on FDNR Form No. 1 (Chapter 16C-16.0095, F.A.C.), and be prepared in accordance with Chapters 16C-16.0041 and 16C-16.0051, F.A.C. According to current conceptual plans, TEC will propose that the site be divided into several LRU program applications. These program applications will be submitted on FDNR Form No. 2 (Chapter 16C-16.0095, F.A.C.) and be prepared in accordance with Chapters 16C-16.0042, 16C-16.0045, and 16C-16.0051, F.A.C.

TEC envisions that these applications will be filed with the FDNR during the second or third quarter of 1991. The applications are projected to be approved during the fourth quarter of 1991. This schedule permits resolution of reclamation issues prior to submittal of the SCA/EA. The SCA/EA will contain the final FDNR actions for the changes to the conceptual plans and the LRU program applications.

2.3.3 POLK COUNTY PHOSPHATE MINING ORDINANCE

Of the nine parcels which comprise the PPS site, several of them are regulated by the Polk County Phosphate Mining Ordinance (88-19). It is anticipated that the SCA/EA will contain an application to amend the Agrico Fort Green Mine Conceptual Plan to be consistent with the changes in FDNR approvals proposed above. Because Polk County relies upon FDNR application forms for reclamation, a duplicate set will not be published.

It will also be necessary for Agrico to amend its Polk County Mine operating permit. Because these permits are limited to a one or two year term, it is proposed that the requisite reclamation modifications be incorporated into the next operating permit.

It is proposed that these amendment requests be processed by the Polk County Commission either as part of Agrico's operating permit renewal process or as part of the SCA process.

3.0 PROJECT ORGANIZATION

3.1 PROJECT TEAM

Figure 3.1-1 outlines the overall PPS project organization for the licensing activities. TEC's Environmental Planning Department will direct the overall environmental licensing activities. TEC has retained Environmental Consulting & Technology, Inc. (ECT), as the prime environmental contractor for completing the licensing requirements and preparing the SCA/EA. Requests for information or questions regarding the PPS project should be directed to:

Mr. Gregory M. Nelson, P.E.
Consulting Engineer
Tampa Electric Company
P.O. Box 111; Tampa, FL 33601-0111
702 N. Franklin Street; Tampa, FL 33602
(813) 228-4847

3.2 PROJECT SCHEDULE

The following lists the approximate dates for key milestones in the overall licensing schedule:

- Submit Draft POS to Agencies — February 1991
- Agency Comments on Draft POS — March 1991
- Final POS Submitted to Agencies — April 1991
- Agency Binding Agreements Obtained — May 1991
- SCA Filed — February 1992
- Land Use Hearing Held — May 1992
- Certification Hearings Held — February 1993
- Siting Board Approval — July 1993
- Initiate Construction — September 1993
- Commercial Operation — January 1995

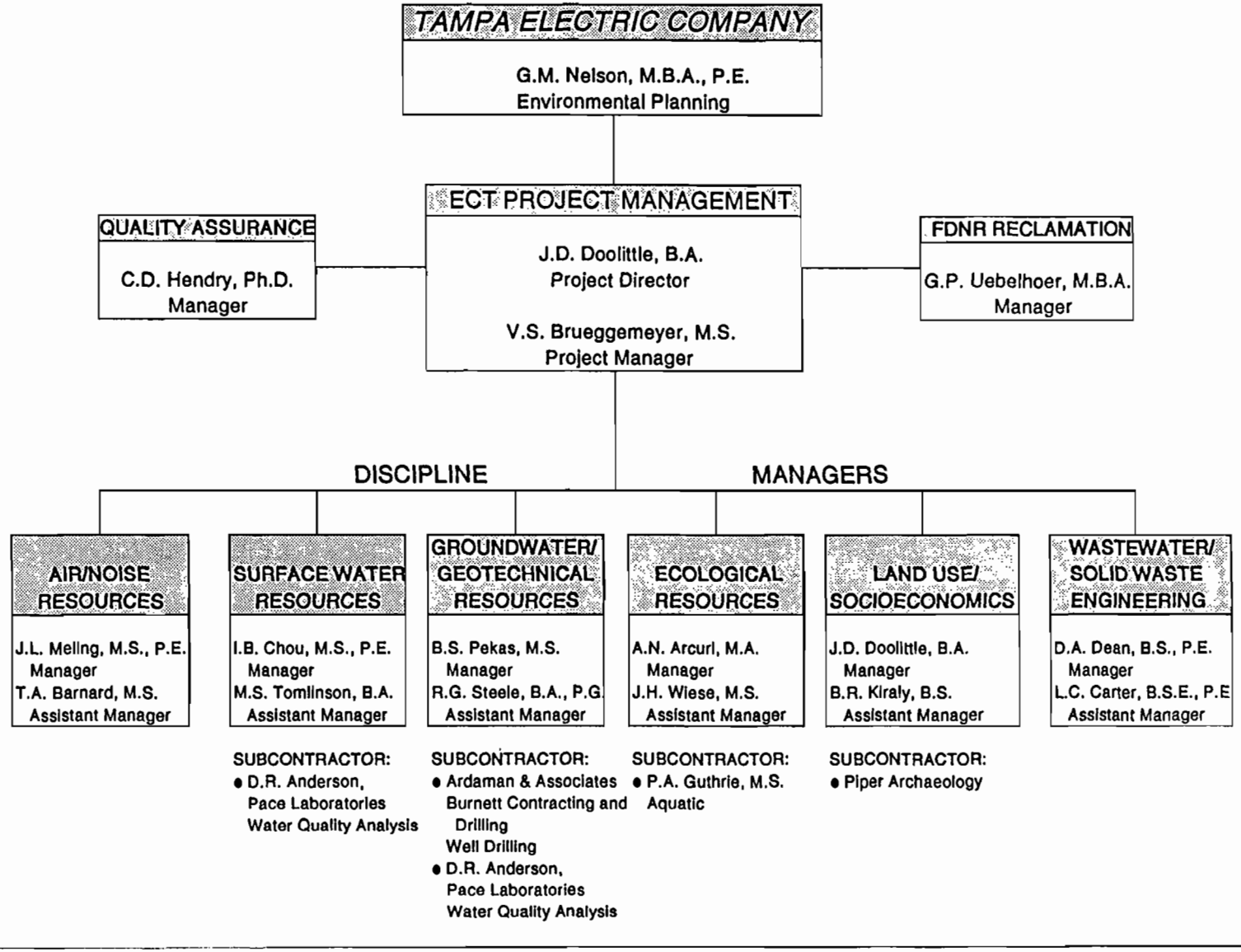

FIGURE 3.1-1.

POLK POWER STATION: ENVIRONMENTAL LICENSING PROJECT ORGANIZATION

Source: ECT, 1991.

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4.0 BASELINE MONITORING AND IMPACT ASSESSMENT

The following sections describe the proposed technical baseline data collection/monitoring efforts, data analyses, and impact assessments to support the preparation of the SCA/EA document and fulfill the applicable regulatory requirements for licensing of the planned PPS. These descriptions are organized into the following major environmental discipline areas:

- Air Quality and Meteorology,
- Geohydrology,
- Surface Water Quality and Hydrology,
- Aquatic Ecology,
- Terrestrial Ecology,
- Socioeconomics/Land Use/Aesthetics,
- Archaeology/History, and
- Noise.

4.1 AMBIENT AIR QUALITY AND METEOROLOGY

4.1.1 INTRODUCTION

4.1.1.1 Background

The PPS site is located in an area that FDER classifies as attainment for all criteria pollutants (Chapter 17-2.420, F.A.C.). This means that the area meets all state and federal ambient air quality standards (AAQS), which are given in Table 4.1-1.

Ambient air monitoring data is available with which to characterize the existing conditions in the vicinity of the site. FDER collected ambient total suspended particulate (TSP) data during 1988 and/or 1989 at several locations in the vicinity. These locations were: Bradley Junction, approximately 10 kilometers (km) north of the site; Nichols, approximately 20 km north of the site; and Bartow Municipal Airport, approximately 30 km northeast of the site. In all cases, the measured concentrations were well below TSP standards, which have now been replaced with standards for

Table 4.1-1. National and Florida AAQS ($\mu g/m^3$)

Pollutant	Averaging Time	National AAQS Primary	National AAQS Secondary	Florida AAQS
PM_{10}	Annual Arithmetic Mean	50	50	50
	24-Hour Maximum*	150	150	150
SO_2	Annual Arithmetic Mean	80	NA	60
	24-Hour Maximum*	365	NA	260
	3-Hour Maximum*	NA	1,300	1,300
NO_2	Annual Arithmetic Mean	100	100	100
CO	8-Hour Maximum*	10,000	NA	10,000
	1-Hour Maximum*	40,000	NA	40,000
Ozone	1-Hour Maximum+	235	235	235
Lead	Calendar Quarter Arithmetic Mean	1.5	1.5	1.5

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

+ The ozone standard is attained when the expected number of days per calendar year with a maximum hourly average concentration above the standard is equal to or less than one.

Sources: 40 CFR 50.
Chapter 17-2.300, F.A.C.

particulate matter less than or equal to 10 micrometers aerodynamic diameter (PM_{10}). The nearest PM_{10} data are from the Tampa metropolitan area and would not be representative of southwest Polk County. However, the TSP data for the area indicate that existing PM_{10} concentrations would also be well below AAQS.

SO_2 concentrations have been measured at Nichols. FDER data from 1988 and 1989 showed existing SO_2 concentrations at that nearby location to be well below AAQS.

Ambient data for nitrogen oxides (NO_x), carbon monoxide (CO), ozone (O_3), and lead (Pb) have been collected only in the Tampa and Sarasota metropolitan areas and would not be representative of southwest Polk County. However, given the rural nature of the site, existing concentrations of these pollutants, which are usually associated more closely with urban environments, should be well below the applicable standards.

The southwest quadrant of Polk County (and the immediately adjacent portions of Hillsborough, Manatee, and Hardee Counties) is moderately populated with existing large sources of anthropogenic emissions, as illustrated in Figure 4.1-1. Most of the sources closest to the PPS site are associated with the phosphate mining and processing industry. The planned Seminole Electric Cooperative, Inc. (SECI) and TECO Power Services (TPS) Hardee Power Station (HPS) is located to the south of the PPS site in Hardee County.

4.1.1.2 Issues and Potential Impacts

The CC and PC units will constitute a new major facility, as defined in Chapter 17-2.100(117), F.A.C. Table 4.1-2 presents preliminary estimates of criteria and noncriteria pollutant emissions from the facility. Since the emissions of at least one pollutant are estimated to be equal to or greater than 250 tons per year (tpy), the facility will be subject to PSD review requirements given in Chapter 17-2.500, F.A.C. Individual pollutants subject to review are those resulting in a significant net

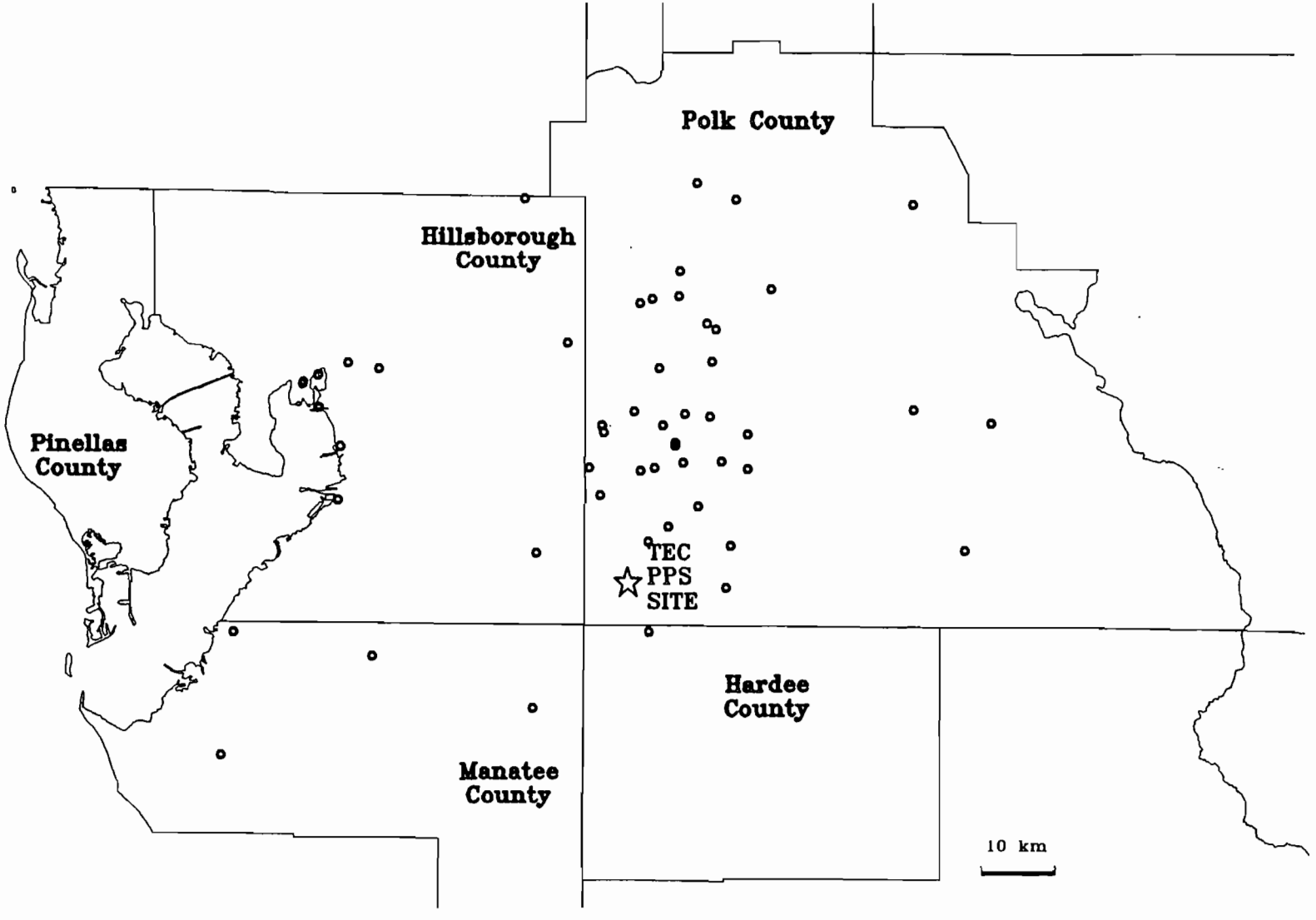

FIGURE 4.1-1.

EXISTING LARGE EMISSION SOURCES IN VICINITY OF PPS SITE

Source: ECT, 1991.

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Table 4.1-2. Emissions of Regulated Pollutants Compared to PSD Significance Rates

Pollutant	Total Estimated Annual Emissions (tpy)*	Significance Rate (tpy)	Subject to PSD Review?
Sulfur dioxide (SO_2)	22,305	40	Yes
Particulate matter (PM_{10})	1,425 +	15	Yes
Particulate matter (TSP)	1,425 +	25	Yes
Nitrogen oxides (NO_x)	18,290	40	Yes
Carbon monoxide (CO)	4,690	100	Yes
Ozone (VOC)	300 **	40	Yes
Lead (Pb)	1.1	0.6	Yes
Sulfuric acid mist	830	7	Yes
Total fluorides	70	3	Yes
Total reduced sulfur	0	10	No
Reduced sulfur compounds	0	10	No
Hydrogen sulfide	0	10	No
Asbestos	0	0.007	No
Beryllium	0.1	0.0004	Yes
Mercury	0.4	0.1	Yes
Vinyl chloride	0	1	No
Benzene	0	0	No
Radionuclides	0.1	0	Yes
Inorganic arsenic	0.9	0	Yes

* Total emissions include CC unit emissions based on fuel oil and a 100-percent annual utilization factor plus PC unit emissions based on a 100-percent annual utilization factor.
\+ Stack emissions only; fugitive emissions not included.
** VOC emissions.

Source: ECT, 1991.

emission increase. Significant is defined as any potential increase in emissions in excess of specified levels, as shown in Table 4.1-2. In this case, based on preliminary estimates, potential emissions of SO_2, PM_{10}, TSP, NO_x, CO, volatile organic compounds (VOC), Pb, sulfuric acid mist, fluorides, beryllium, mercury, radionuclides, and arsenic are greater than the applicable significance levels. Therefore, the proposed facility must undergo PSD review for these pollutants as outlined in the following paragraphs.

New major facilities subject to PSD review are required to undergo the following reviews for each pollutant emitted in significant amounts:

1. Control technology review,
2. Air quality analysis (monitoring),
3. Source impact analysis,
4. Source information, and
5. Additional impact analyses.

The control technology review includes determination of best available control technology (BACT) for each applicable pollutant. BACT emission limits cannot exceed applicable new source performance standards (NSPS) promulgated under 40 CFR Part 60. The air quality analysis (monitoring) portion of PSD review may require continuous ambient air monitoring data to be collected in the impact area of the proposed source. The source impact analysis requires demonstration of compliance with federal and state AAQS and allowable PSD increment limitations. Projected ambient impacts on designated nonattainment areas and federally promulgated PSD Class I areas must also be addressed in some cases. Source information, including process design parameters, control equipment information, and construction schedule, must be submitted to the reviewing agencies. Additional analyses of the proposed source's impact on soils, vegetation, and visibility, especially pertaining to PSD Class I areas, must be performed, if applicable, as well as analysis of impacts due to growth in the area associated with the proposed source.

4.1.1.3 Program Objectives

The objectives of the ambient air quality/meteorology baseline studies are to characterize the site meteorology and identify appropriate meteorological data to be used in air quality impact assessments and identify and/or collect ambient air quality data needed for evaluation of baseline conditions. The objectives of the impact analyses are to assess any air quality impacts potentially resulting from construction and operation of the generating units and to assess any impacts on soils, vegetation, visibility, and other air quality related values resulting from construction and operations of the units. The impact analyses will follow EPA and FDER procedures and guidelines.

4.1.1.4 Program Outputs/Products

The information developed in this task will be incorporated into the SCA/EA document to fulfill the following requirements and subsections of Form 17-1.211(1), F.A.C.:

2.0 Site and Vicinity Characterization
  2.3.7 Meteorology and Ambient Air Quality
3.0 The Plant and Directly Associated Facilities
  3.4 Air Emissions and Controls
4.0 Effects of Site Preparations, and Plant and Associated Facilities Construction
  4.5 Air Impacts
5.0 Effects of Plant Operations
  5.6 Air Quality Impacts
11.0 Appendices
  11.1 Permit Applications or Approvals
    11.1.3 Prevention of Significant Deterioration

4.1.2 BASELINE INFORMATION AND MONITORING

4.1.2.1 Meteorology

The needs for meteorological information fall into two categories. For the first, information is needed to describe and characterize the meteorology and climatic conditions of the area. For this need, surface

data from the nearest primary National Weather Service (NWS) station--in this case, Tampa International Airport--will be used. To describe wind patterns, a wind rose showing the distribution of wind directions and windspeeds will be presented. The Tampa meteorological data will be supplemented with temperature and precipitation data from other nearby recording stations, such as Bartow and Wauchula.

The second need for meteorological data is for use in air quality dispersion modeling. Consistent with EPA (1986) guidance and FDER practice, surface data from Tampa International Airport and mixing height values from Ruskin, Florida, for the years 1982 through 1986 will be used for this purpose.

Therefore, onsite monitoring of meteorological parameters to (1) describe meteorological and climatic conditions, or (2) support dispersion modeling studies is not planned. Monitoring of basic meteorological parameters as part of an ambient air quality monitoring network will, however, be performed.

4.1.2.2 Ambient Air Quality

As described in Section 4.1.1.2, the PSD review process imposes certain preconstruction monitoring requirements. EPA has provided guidance to determine the need for such monitoring (EPA, 1987). This guidance also includes procedures to design a monitoring program if one is required.

Following the EPA guidance, a separate monitoring plan for PSD ambient monitoring at the PPS site, dated March 26, 1991, has been prepared, submitted under separate cover, and approved by FDER. The analysis described in the plan determined that preconstruction monitoring is required for SO_2, PM_{10}, and O_3. For all other pollutants subject to PSD review, either (1) the impacts of the proposed facility's emissions will be less than specified *de minimis* levels, (2) impacts due to existing sources' emissions would be less than *de minimis*, or (3) no acceptable ambient measurement method is available.

Based on dispersion modeling studies presented in the monitoring plan, continuous monitoring of ambient SO_2, O_3, PM_{10}, and basic meteorological parameters will be conducted at one station (Station AQ-1). At Station AQ-2, PM_{10} data only will be collected. This station will also include a collocated PM_{10} sampler. Figure 4.1-2 shows the planned locations of the two ambient air monitoring stations. The ambient network will operate for a period of 1 year. The initial 6 months of data will be adequate for *completeness* of the PSD application. The remainder of the data will be submitted before completion of the FDER studies.

4.1.3 IMPACT ANALYSES

4.1.3.1 Control Technology Reviews

An analysis of BACT will be completed for each pollutant which is emitted in excess of the PSD significant emission rates (see Table 4.1-2). All emission units involved that emit the applicable pollutants will undergo BACT analysis. Since each applicable pollutant must be analyzed, particular emission units may undergo BACT analysis for more than one pollutant.

BACT will be defined as an emission limitation based on the maximum degree of reduction of each pollutant subject to regulation, which the administrative authority, in this case FDER, on a case-by-case basis, determines is achievable and cost-effective. The BACT determinations will take into account energy, non-air quality environmental, economic, and other costs as well as technical feasibility. BACT limitations will not exceed any applicable federal or state NSPS or National Emissions Standards for Hazardous Air Pollutants (NESHAP). BACT will be defined in terms of a numerical emissions limit. This numerical emissions limit may be based on the application of air pollution control equipment, specific production processes, methods, systems or techniques, fuel cleaning, or combustion techniques.

BACT analyses will be conducted using the "top-down" analysis approach, as outlined in a December 1, 1987, EPA memorandum on the subject of improving

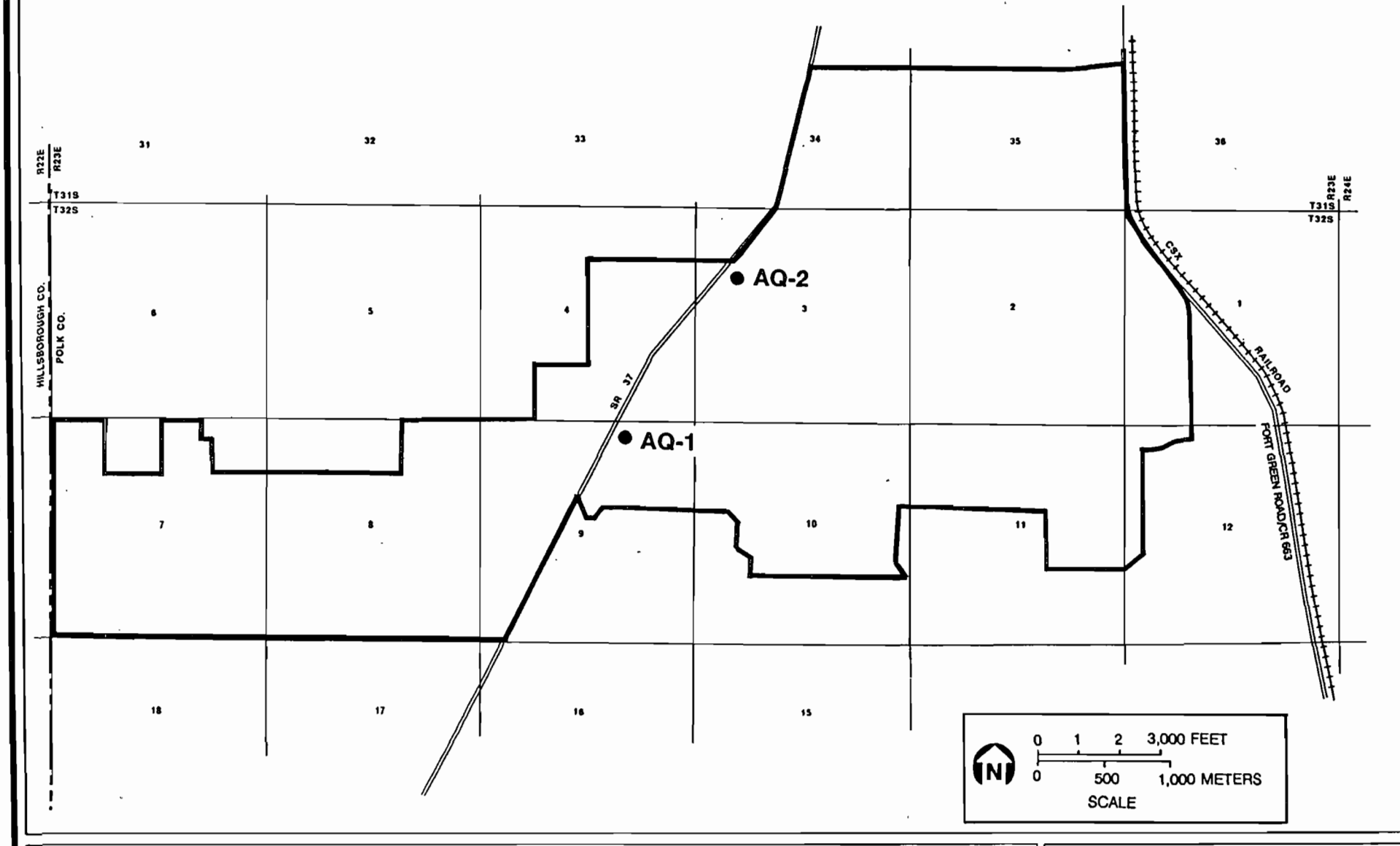

FIGURE 4.1-2.

AMBIENT AIR MONITORING STATIONS

Source: ECT, 1991.

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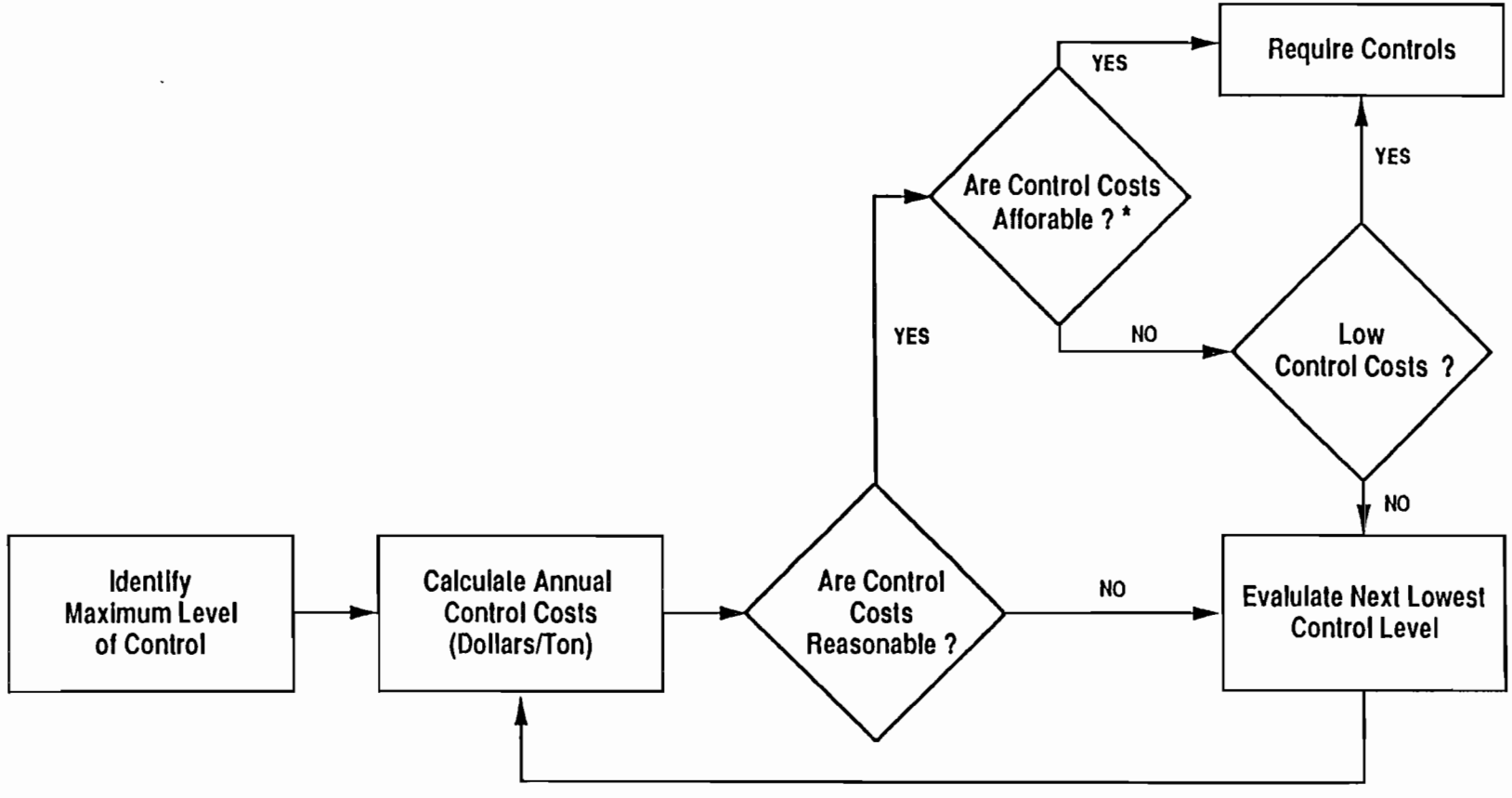
New Source Review (NSR) Implementation. Following the top-down methodology, as illustrated in Figure 4.1-3, available alternatives will be identified based on knowledge of demonstrated technologies and previous control technology permitting decisions for other identical or similar sources. These alternatives will be rank-ordered by stringency into a control technology hierarchy. The hierarchy will be evaluated starting with the "top," or most stringent alternative, to determine economic, environmental, and energy impacts and to assess the feasibility or appropriateness of each alternative as BACT based on site-specific factors. If the top control alternative is not applicable, or if it is technically or economically infeasible, it will be rejected as BACT, and the next most stringent alternative will then be considered. This evaluation process will continue until an applicable control alternative is determined to be both technologically and economically feasible, thereby defining the emission level corresponding to BACT for the pollutant in question emitted from the particular emission unit.

4.1.3.2 Source Impact Analysis

A source impact analysis will be performed for each pollutant subject to review, following the procedures contained in the modeling protocol, which is included in Appendix A. The analysis will demonstrate compliance with the federal and state AAQS and PSD Class II increments. An examination of impacts versus Class I increments will not be required since the PPS site is approximately 120 km from the nearest Class I area.

The PSD regulations specifically require the use of atmospheric dispersion models in performing the impact analysis, estimating future air quality levels, and determining compliance with AAQS and allowable PSD increments. Guidance for the use and application of dispersion models presented in the EPA publication, *Guideline on Air Quality Models* (1986) will be followed. Individual criteria pollutants may be exempt from the full source impact analysis if the net increase in impacts due to the new facility is below the appropriate significance level, as discussed in the modeling protocol.



* If controls are technically infeasible, the option is also rejected.

FIGURE 4.1-3.

"TOP-DOWN" BACT APPROACH (POTTER MEMO OF 12/01/87)

Source: Joint ADEM/EPA Air Permitting Conference (02/09/89)

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No source impact analysis will be conducted for O_3. O_3 is formed in the atmosphere as a result of complex photochemical reactions. Models for O_3 generally are applied to entire urban areas. EPA has not approved or recommended any model to address the impacts of an isolated source located outside an urban area.

As presented in the modeling protocol, the modeling analysis will use appropriate emission inventory data, receptor data, and other basic model inputs. The emission inventory will include plant emission characteristics (i.e., emission rates for various averaging times, associated stack parameters or source release characteristics, source locations, etc.) for other sources located within 50 km of the site. Large emission sources greater than 50 km away will also be included, as appropriate. Data for other sources will be obtained from a computerized data base and confirmed, as necessary, by reviewing state permits and permitting files. The inventory for other sources will be submitted to FDER Bureau of Air Quality Management (BAQM) for approval prior to use in the modeling. PSD increment-affecting sources will also be identified in order to evaluate PSD Class II increment consumption.

Receptor locations selected for the modeling analysis will be in conformance with EPA guidelines. Plant areas which are excluded from public access, according to EPA criteria, will not be considered in the modeling analysis. These areas will be defined with supporting documentation presented.

Because downwash analyses have become an integral part of the air quality analyses undergoing regulatory review, building dimensions for the proposed buildings and structures will be included in the analysis. Each stack associated with the proposed project will be compared to EPA's good engineering practice (GEP) height formula. If a stack is less than GEP, then downwash conditions will be modeled for that stack. Appropriate building dimensions (i.e., height, length, width) will be incorporated in

the modeling for each stack, when applicable, based on the location and orientation of the stack with respect to nearby buildings and structures.

All methods, databases, and assumptions used in the air impact analysis will be documented and incorporated into the PSD application, including results demonstrating compliance with all AAQS.

4.1.3.3 Additional Impact Analyses

Additional impact analyses for three areas will be conducted: (1) associated growth, (2) soils and vegetation impact, and (3) human health effects. The growth analysis will include: (1) a projection of the associated industrial, commercial, and residential growth that may occur in the area as a result of the project; (2) an estimate of the air pollution emissions generated by the permanent associated growth; and (3) an air quality analysis based on the associated growth emission estimates and the emissions expected to be generated directly by the new facility.

The soils and vegetation analysis will be conducted by comparing projected ambient concentrations for the pollutants of concern with applicable susceptibility data from the air pollution literature. For most types of soils and vegetation, ambient air concentrations of criteria pollutants below the national AAQS will not result in harmful effects. Sensitive vegetation and emissions of toxic air pollutants could necessitate a more extensive assessment of potential adverse effects on soils and vegetation, depending on the level of impact.

The CC and PC units will emit small amounts of noncriteria or toxic air pollutants (see Table 4.1-2). A human health effects analysis of the potential impacts of these emissions will be conducted, focusing on constituents known to be carcinogenic; this includes arsenic, beryllium, cadmium, and hexavalent chromium. Unit risk factors established by EPA will provide the basis for evaluation. In addition, all air toxics will be evaluated with respect to the FDER No Threat Levels.

The PSD regulations also require consideration of potential impacts on visibility. The visibility impairment analysis pertains particularly to impacts on Class I areas and other areas where good visibility is of special concern. However, since the site is not proximate to any such areas, an analysis of possible visibility impairment is not warranted.

4.2 GEOHYDROLOGY

4.2.1 INTRODUCTION

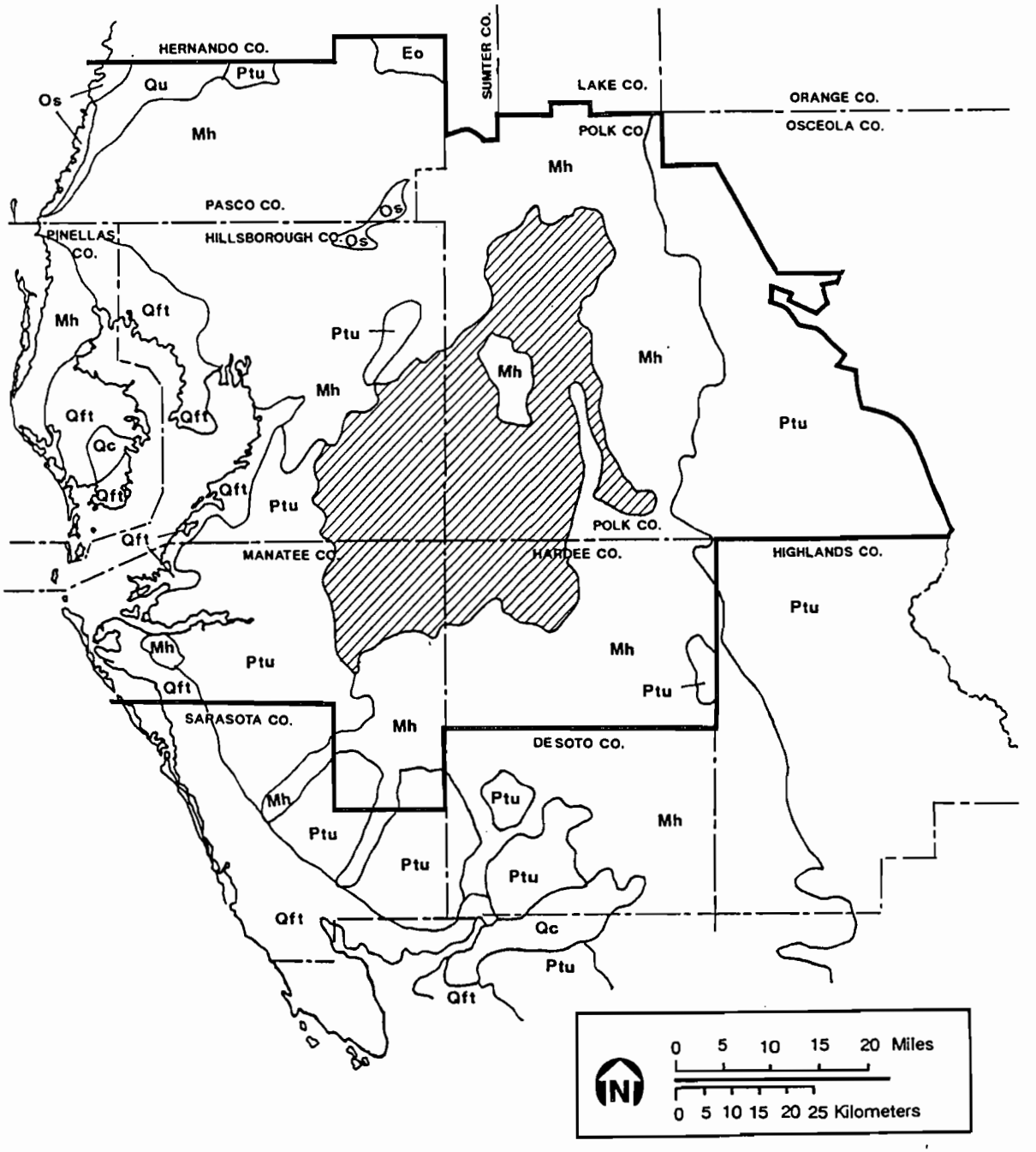
4.2.1.1 Background

A majority of the land at the PPS site has been mined to recover phosphate or is disturbed due to mining activities. The mining activities are associated with mining the phosphate matrix from the Bone Valley Member of the Peace River Formation within the Hawthorn Group. The Bone Valley Member is the primary unit exposed in western and south western Polk County (Figure 4.2-1).

According to TEC's current conceptual plans, groundwater from the Floridan aquifer will be used for plant process water and for cooling makeup water. In addition, present plans call for the use of a cooling reservoir to provide condenser cooling for the units. Surface water discharges are currently anticipated from the site from the cooling reservoir and stormwater management areas only during major storm events. Groundwater seepage discharges may occur from the cooling reservoir. Consequently, potential impacts on the groundwater resources must be evaluated for water use due to groundwater withdrawals and potential surface water and seepage discharges. In addition, potential construction-related impacts to the geohydrological conditions of the site must be considered.

Cooling reservoir makeup and process water is proposed to be obtained from onsite, Floridan aquifer production wells. The production wells will be completed into the top two producing zones of the Floridan aquifer. As shown in Table 1.4-1, makeup water requirements are estimated to be an average of 12.4 million gallons per day (MGD), of which 1.7 MGD is for plant process water and 10.7 MGD is for cooling water.

To support the impact assessment for groundwater withdrawal, potential surface water discharges, and groundwater seepage, detailed baseline information on the soils, geology, groundwater, and surface water resources will be evaluated. Preliminary evaluations of these parameters



EXPLANATION

- **Qu - UNDIFFERENTIATED SAND, SHELL, CLAY, MARL, AND PEAT**
- **Qft - FORT THOMPSON FORMATION**
- **Qc - CALOOSAHATCHEE FORMATION**
- **Ptu - TAMIAMI FORMATION AND UNDIFFERENTIATED DEPOSITS**
- **Mh - HAWTHORN GROUP**
  - **PEACE RIVER FORMATION – BONE VALLEY MEMBER**
- **Os - SUWANNEE LIMESTONE**
- **Eo - OCALA LIMESTONE**

FIGURE 4.2-1.
SURFICIAL GEOLOGY OF WEST CENTRAL FLORIDA

Sources: Modified from Brooks, 1981; ECT, 1991.

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indicate the site is suitable to support the project. A general description of the site characteristics is given below.

Stratigraphy--The PPS project site and surrounding region contain surficial layers of unconsolidated sand and clay underlain by a thick sequence of sedimentary rocks. A summary of the hydrogeologic framework is presented in Table 4.2-1. The surficial layer is predominately fine sand, interbedded clay, marl, shell, and phosphorite. The primary stratigraphic units of the surficial layer include undifferentiated sands and clays, the Fort Thompson Formation, and the Caloosahatchee Formation. This surficial layer varies in depth; however, it is approximately 50 feet (ft) deep in the vicinity of the project site. Locations of geologic cross-sections, completed from well log information recorded by the U.S. Geological Survey (USGS) or by the Southwest Florida Water Management District (SWFWMD), are illustrated in Figure 4.2-2. The geologic cross-sections depicted in Figures 4.2-3 and 4.2-4 were constructed by USGS geologists from the available well logs in the general region.

Underlying the surficial layer is the Tamiami Formation (See Table 4.2-1) consisting of clayey sand, limestone, pebbly sand, shell, and phosphatic material. Underlying the Tamiami Formation is the Hawthorn Group. In Polk County, the Hawthorn Group consists of the Arcadia Formation and the Peace River Formation, in ascending order. The Arcadia Formation contains, in ascending order, the Nocatee and Tampa Members plus an unnamed member. The Arcadia Formation consists of dolomite, sand, clay, and silty, phosphatic limestone. The Peace River Formation contains, in ascending order, an undifferentiated member and the Bone Valley Member (phosphate matrix) (Scott, 1986).

The Tamiami Formation and Hawthorn Group together extend from approximately 50 ft below land surface (bls) to approximately 325 to 350 ft bls, in the region of the project site (Duerr et.al., 1988). Beginning within the

Table 4.2-1. Hydrogeological Framework West Central Florida

System	Series	Stratigraphic Unit		General Lithology	Major Lithologic Unit	Hydrogeological Unit
Quaternary	Holocene and Pliestocene	Undifferentiated Surficial Deposits		Predominantly fine quartz sand; shell interbedded clay, marl, peat, dolostone, sandstone, and phosphorite.	Sand	Surficial Aquifer System
		Fort Thompson Formation		Shelly quartz sand, unfossiliferous quartz sand, and thin limestone beds.		
		Caloosahatchee Formation		Shelly quartz sand. Thin, shelly limestone beds, and marl.		
Tertiary	Pliocene	Tamiami Formation		Sandy limestone, clayey and pebbly sand; clay, marl, shell, phosphatic.	Clastic	Confining Unit
	Miocene	HAWTHORN GROUP	Peace River Formation[1]	Clayey, phosphatic, sandy beds; silty and sandy phosphatic clay beds, and clayey phosphatic quartz sand.	Carbonate and Clastic	Aquifer
			Arcadia Formation[2]	Dolomite and, clay, and limestone, silty, phosphatic.		Confining Unit
	Oligocene	Suwannee Limestone		Limestone, sandy limestone, fossiliferous	Carbonate	Floridan Aquifer System
	Eocene	Ocala Limestone		Limestone, chalky, foraminiferal, dolomitic, near bottom.		
		Avon Park Formation		Limestone and hard brown dolomite; intergranular evaporite in lower part in some areas.		Upper Floridan Aquifer
		Oldsmar Formation		Dolomite and limestone, with intergranular gypsum in most areas.		Middle Confining Unit / Lower Floridan Aquifer
	Paleocene	Cedar Keys Formation		Dolomite and limestone with beds of anhydrite.	Carbonate with evaporites	Sub-Floridan Confining Unit

INTERMEDIATE AQUIFER SYSTEM

1 Peace River Formation includes Bone Valley Member and undifferentiated deposits.
2 Arcadia Formation includes undifferentiated deposits, Tampa Member, and Nocatee Member.

Sources: Modified from Ryder, 1985 (Table 1) and Johnson, 1989.

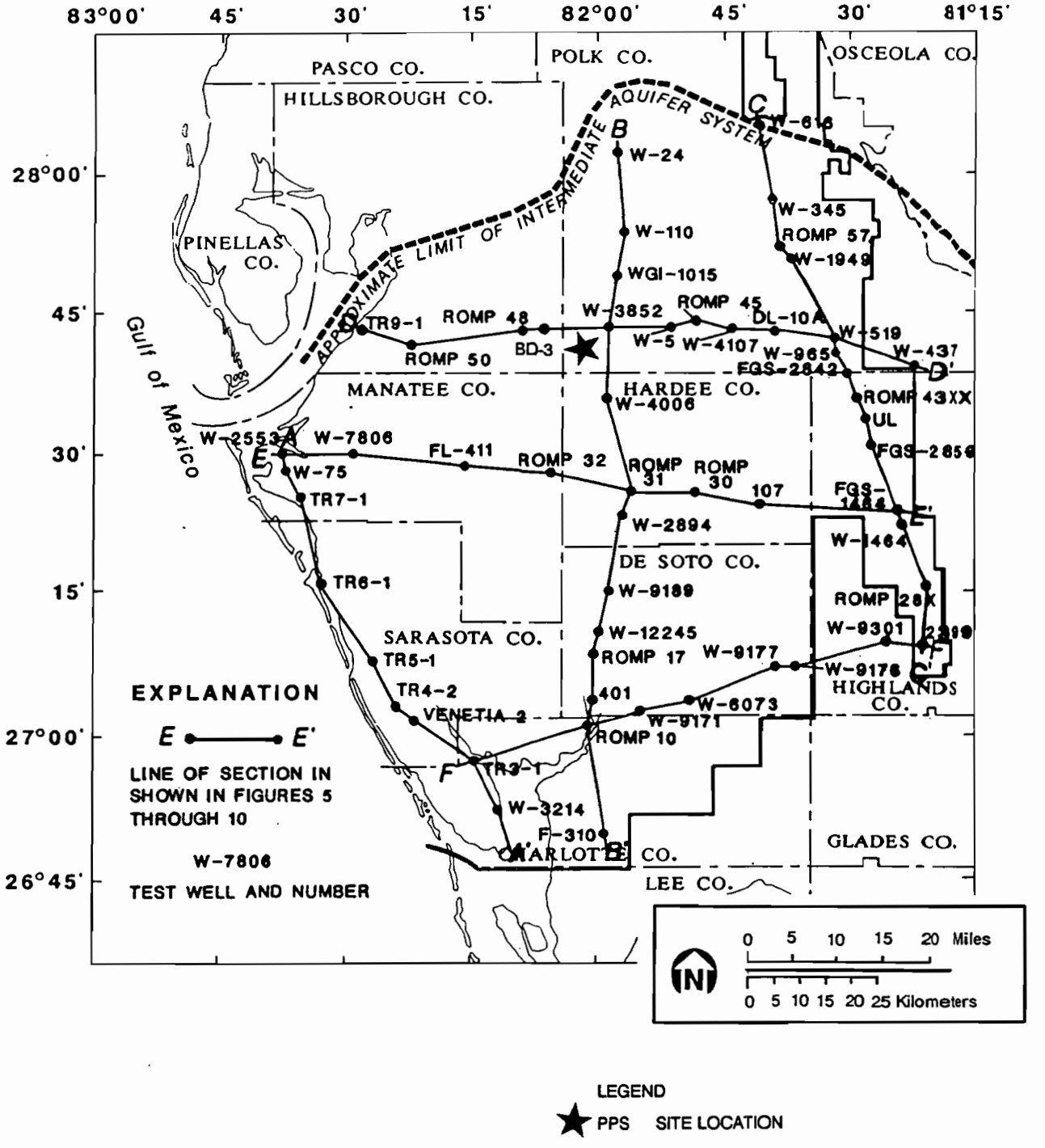

FIGURE 4.2-2.
LOCATIONS OF HYDROGEOLOGICAL CROSS SECTIONS

Sources: Modified from Duerr, 1988 (Fig. 4); ECT, 1991.

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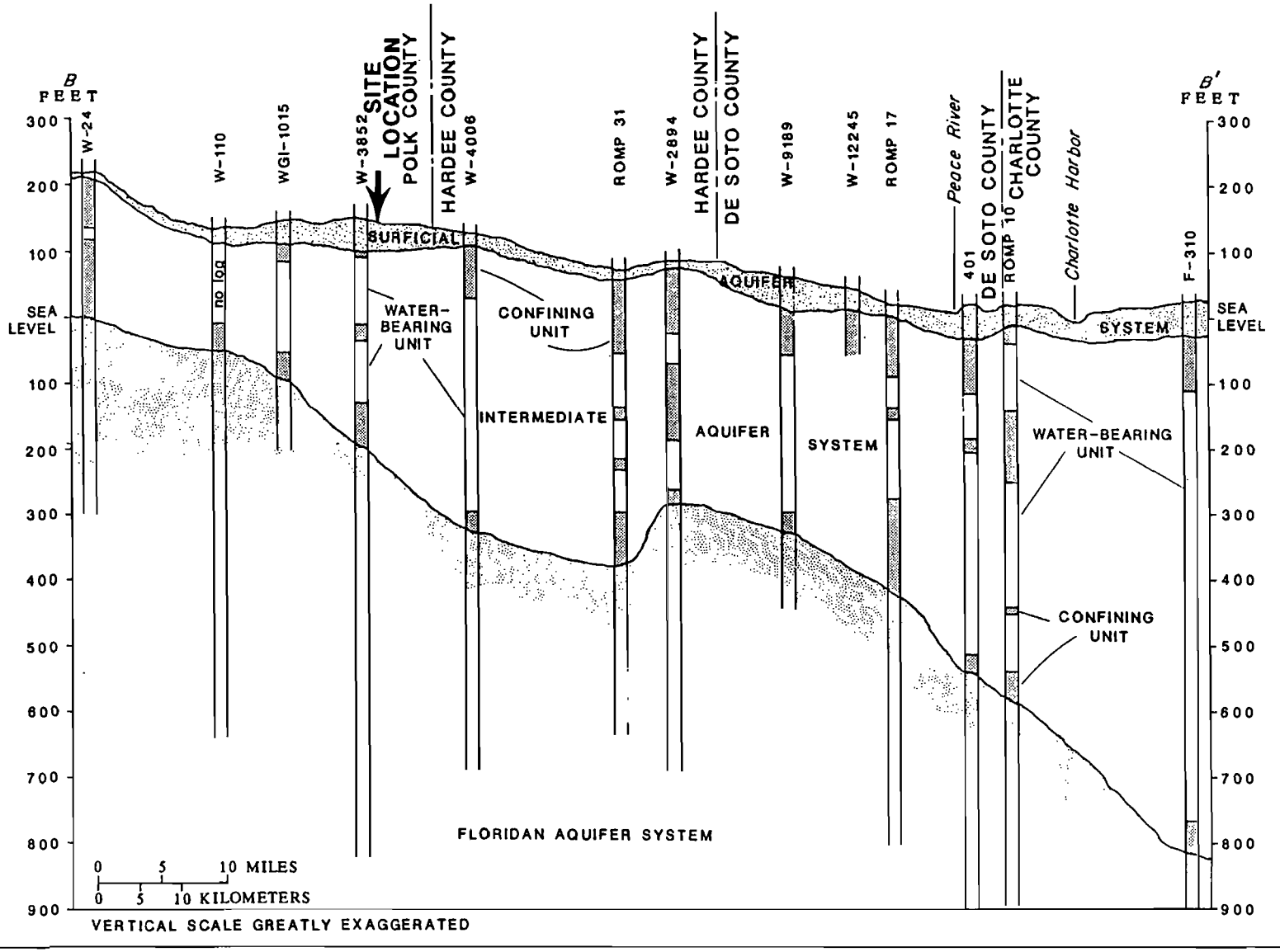

FIGURE 4.2-3.

GENERALIZED HYDROGEOLOGIC CROSS SECTION B - B'

Sources: Modified from Duerr, 1988 (Fig. 6); ECT, 1991.

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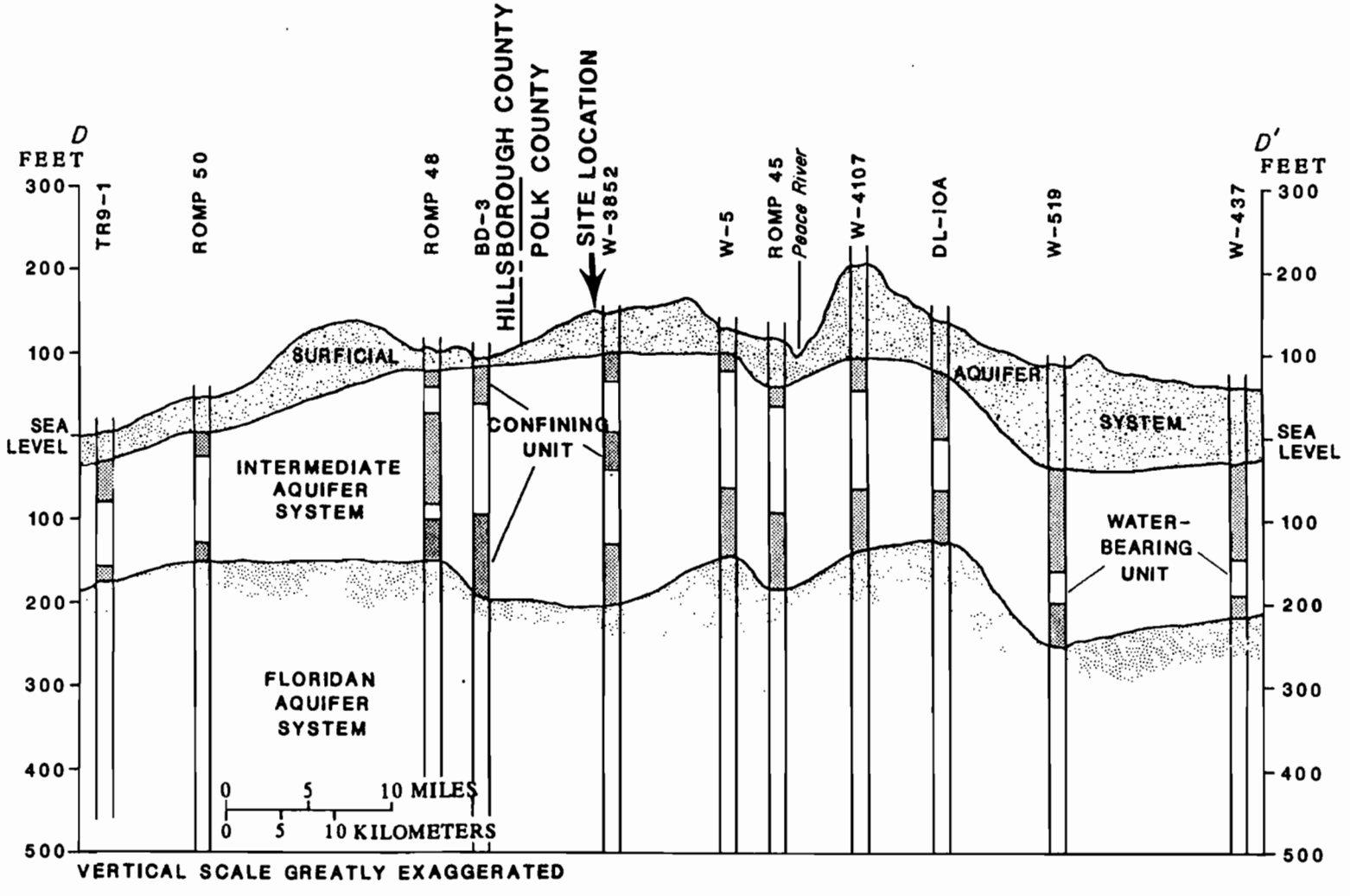

FIGURE 4.2-4.

GENERALIZED HYDROGEOLOGIC CROSS SECTION D - D'

Sources: Modified from Duerr, 1988 (Figure 4-5); ECT, 1991.

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Hawthorn Group, a sequence of limestone dominated strata starting with the Tampa Member of the Arcadia Formation extends in the site vicinity from approximately 350 ft bls to depths in excess of 1,000 ft.

Aquifers--The sequence of strata described above controls the occurrence and movement of groundwater. In Polk County, the principal water-bearing strata consist of the surficial aquifer, the intermediate aquifer, and the Floridan aquifer (see Table 4.2-1). The surficial aquifer may approach 50 ft in thickness or more, and is not considered a major source of water within the site area.

The intermediate aquifer consists of a series of water-bearing layers of sand and limestone, and water-confining layers of sandy clay, clay, and marl. The water-confining layers retard vertical movement of groundwater between the water-bearing layers and the overlying surficial aquifer and underlying Floridan aquifer. The top of the intermediate aquifer system consists of a sandy clay, clay, and marl unit which hydraulically separates the water-bearing strata in the intermediate aquifer from the overlying surficial aquifer. The generalized cross-sections in Figures 4.2-3 and 4.2-4 indicate that the total thickness of all the water-confining layers is approximately 100 to 150 ft thick in the immediate area of the site. Figures 4.2-3 and 4.2-4 also suggest that the total thickness of the intermediate aquifer system in the region can range between 250 to 300 ft.

The Floridan aquifer underlies the lower confining unit of the intermediate aquifer and in the region of the site is located from approximately 325 ft bls to more than 900 ft bls (see Figures 4.2-3 and 4.2-4). The Floridan aquifer is the major source of fresh groundwater for most of Central Florida. The Floridan aquifer has a layer called the middle confining unit which is located (in the area) in excess of 1,000 ft bls. It contains rocks with low permeability. These include limestone, dolomite, and beds of gypsum and anhydrite, which tend to act as sealants.

Below the confining unit the water is too mineralized to be considered potable. Even though the Floridan aquifer lies far beneath the land surface and is isolated by a thick overburden, cover-collapse type sinkholes are known to exist. The potential for and investigation of potential sinkholes in the site area will be evaluated through research and field activities.

Soils--Eight types of soil were identified from a 1927 Bureau of Chemistry and Soils map for the vicinity of the site and are shown in Figure 4.2-5. The soils listed below were present prior to mining activities in the region.

1. Blanton fine sand (Bf),
2. Fort Meade fine sand (Ff),
3. Bladen fine sand (BS),
4. Leon fine sand (Ls),
5. Portsmouth fine sand (Ps),
6. Portsmouth fine sand - Swamp phase (Pss),
7. St. Johns fine sand (Ss), and
8. Peaty muck (Pm).

4.2.1.2 Issues and Potential Impacts

Geotechnical Impacts--Potential impacts on geotechnical conditions (i.e., topography and soils) at the site may result from the construction and operation of the plant. The majority of the site has been or will be disturbed by phosphate mining and related activities. Thus, the impacts from construction and operation of the proposed power plant must be compared to the current mining and planned reclamation conditions. Several remaining geotechnical issues resulting from construction and operation of the power plant which will require consideration include impacts on runoff, percolation rates, subsidence, sink hole formation, soil bearing strength, and soil stability.

Groundwater Impacts--Potential impacts on groundwater aquifers at the proposed site may result from water withdrawal, construction and subsequent operation of the plants. The potential issues and impacts on

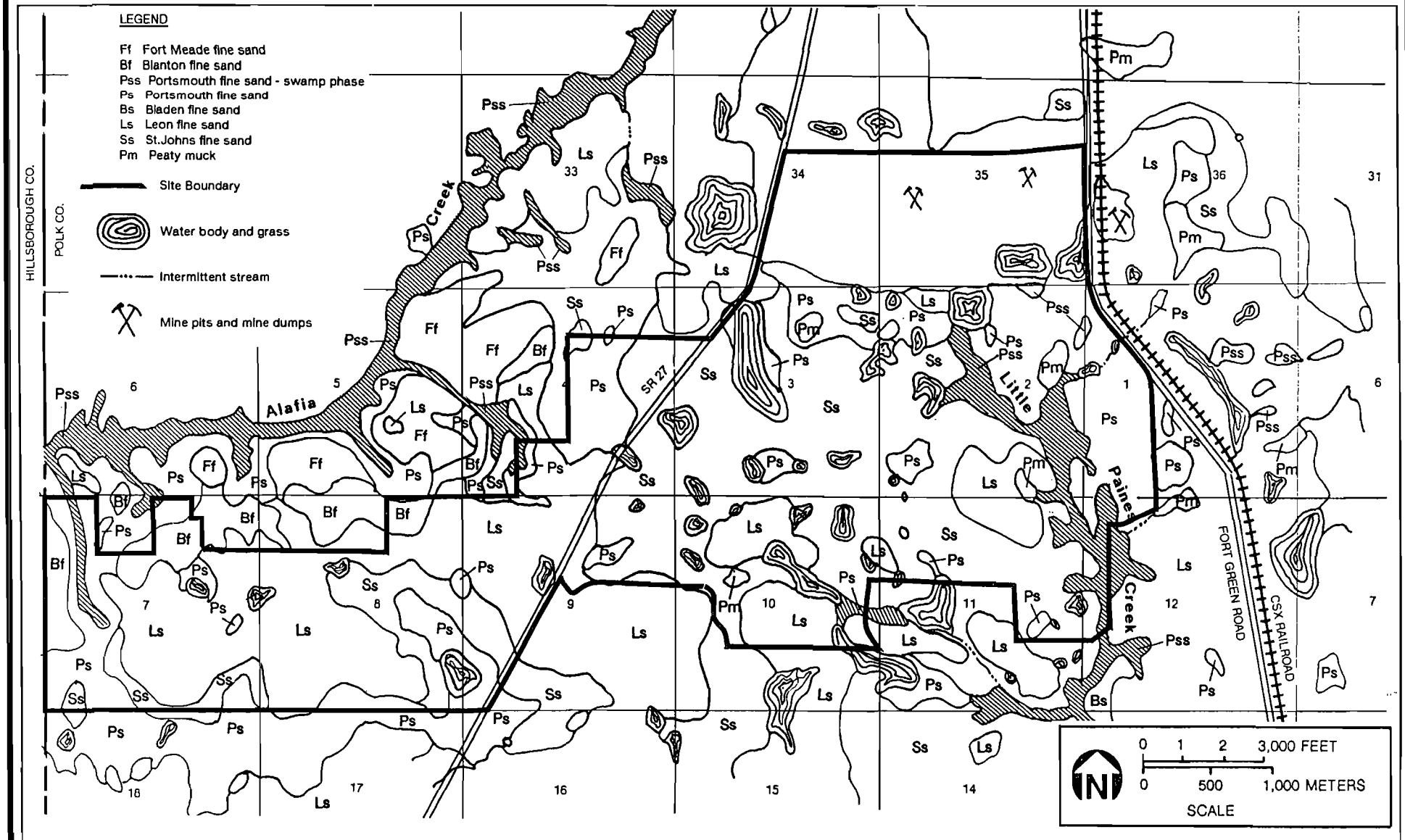

FIGURE 4.2-5

SOIL IDENTIFICATION MAP

Sources: Bureau of Chemistry and Soils; Soil Survey of Polk Co., Fla. 1927; ECT, 1991

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the surficial, intermediate, and Floridan aquifers resulting from construction of the plants are:

1. Potential effects of plant operational activities on existing aquifer users adjacent to the proposed plant site resulting from groundwater withdrawal required from plant cooling system make-up and the long-term impacts of the quantity of water withdrawn and consumed, i.e., consumptive use;

2. Potential temporary effects on existing groundwater quality of the surficial aquifer due to increased suspended and/or dissolved solids loading as a result of earth-moving activities at the site due to site preparation and construction;

3. Potential temporary effects of dewatering of part of the surficial aquifer within the plant site area to allow for excavation of the plant foundations and the construction of the cooling reservoir;

4. Potential effects of construction activities on present aquifer users adjacent to the proposed plant site;

5. Potential effects on groundwater quality from stormwater runoff and leachate from plant facilities, and coal and by-product storage areas; and

6. Potential hydrological changes due to plant water use and groundwater diversion interception, release or recharge.

4.2.1.3 Program Objectives

Geotechnical Program--The objectives of this task will be to characterize baseline topographic and soil conditions from the literature (including mining and reclamation plans) and an onsite data collection program. The baseline information will be used to assess potential impacts from construction and subsequent operation of the proposed power plant. Specific goals of the geotechnical task that will be developed to meet the objectives of the program include:

1. Comparing the topographic conditions of the site prior to recent mining activities, planned reclamation activities, and construction and operation of the power plant;

2. Evaluating soil bearing strength and stability in the central unmined portion of the site for suitability for construction

and operation of the main power plant structures and buildings; and

3. Investigating several closed topographic depressions as part of a potential for sink hole presence and sink hole formation evaluation as related to the construction and operation of the proposed power plant.

Groundwater Program--The objectives of this task will be to characterize baseline geologic and hydrologic conditions from the literature and develop an onsite monitoring program. The baseline information will be used to assess potential impacts of groundwater withdrawal, potential cooling reservoir recharge, potential surface water discharge, plant construction, and plant operation. Specific goals of the hydrogeology task that will be developed to meet the objectives of the program include:

1. Determining the availability of groundwater from the Floridan aquifer, which is the proposed source for cooling water and process water for the plants;

2. Providing a summary of the hydrologic units, defining aquifer and confining bed characteristics, and defining boundary conditions;

3. Researching the properties of the first two producing zones of the Floridan aquifer;

4. Documenting long- and short-term water level trends;

5. Identifying groundwater users and estimating present and projected groundwater use in the general site area;

6. Providing baseline groundwater quality data;

7. Estimating drawdown from the proposed water use; and

8. Evaluating potential impacts of cooling reservoir recharge/seepage on the surficial aquifer and on surface water, using a contaminant transport model.

4.2.1.4 Program Outputs/Products

The information developed above will be incorporated into the SCA document to fulfill the following requirements and subsections:

- 2.0 Site and Vicinity Characterization
  - 2.3.1 Geohydrology
  - 2.3.2 Subsurface Hydrology
  - 2.3.3 Site Water Budget and Area Uses
- 4.0 Effects of Site Preparation, and Plant and Associated Facilities Construction
  - 4.1 Land Impact
  - 4.3 Groundwater Impacts
- 5.0 Effects of Plant Operation
  - 5.2 Effects of Chemical and Biocide Discharge
  - 5.3 Impacts on Water Supplies
    - 5.3.1 Surface Water
    - 5.3.2 Groundwater
    - 5.3.3 Drinking Water
    - 5.3.5 Measurement Programs
  - 5.4 Solid/Hazardous Waste Disposal Impacts
- 9.0 Phosphate Mining Reclamation Plan Amendments
- 11.0 Appendices
  - 11.4 Existing State Permits: Water Use Permit

4.2.2 BASELINE INFORMATION AND MONITORING

4.2.2.1 Literature Review

A literature search is proposed as the initial task in the program to develop an accurate understanding of the hydrogeologic conditions at and adjacent to the proposed site.

This review will describe the major geological aspects of the region containing the site and the physical, chemical, and hydrological characteristics of the affected groundwater. It will also define the existing consumptive uses within the area.

Available literature and records will be reviewed with regard to regional and site-specific aquifer characteristics, groundwater quality, regional water use, and general characteristics of aquifers in karst terrains. A well inventory will be assembled as part of this task. Literature and records which will be reviewed and synthesized into the baseline description are expected to be limited to the following sources:

1. USGS;
2. Florida Bureau of Geology;
3. SWFWMD;
4. FDNR
5. USACE;
6. Florida Department of Transportation (FDOT);
7. Florida Institute of Phosphate Research (FIPR);
8. Florida Sinkhole Research Institute; and
9. Miscellaneous reports from professional societies, universities, and government agencies.

4.2.2.2 Data Collection and Analysis

Geotechnical Investigation--Most of the required information on the regional soil conditions near the site will be obtained from available literature as described above. However, additional site-specific information will be needed for impact assessment on the topography and soils at the site.

The proposed site-specific geotechnical investigations will include:

1. Five to ten standard penetration test (SPT) borings to evaluate soil strength, soil classifications, lithology, and sink hole potential;

2. Two to five pieziocone soundings to evaluate soil strength and soil bearing capacity;

3. Two closed depressions will be investigated by SPT borings to evaluate sink hole presence and formation potential; and

4. Selected lithological units/samples collected from the borings and monitor wells will be analyzed for vertical hydraulic conductivities, porosity, Atterberg limits, cation exchange potential, and grain size analysis.

The information obtained from the above sources will be compiled, analyzed, and the soil properties and required design parameters will be summarized. This information will be used for soil suitability and stability analysis and to assess the impacts of both construction and operation of the proposed power plants on the soil conditions.

Groundwater Aquifer Systems--Most of the required information on the regional hydrogeology near the site will be obtained from available literature as described above. However, additional site-specific information will be needed for impact assessment on the aquifer system beneath the site.

Surficial Aquifer--Two piezometer and three monitor wells will be installed in the surficial aquifer during February 1991 (Figure 4.2-6). The surficial aquifer wells and piezometers will be installed to approximately 35 to 45 ft deep. The groundwater level in the piezometer and monitor wells will be measured in March, May, July, and September, 1991 to determine the water-table elevations and hydraulic gradients of the surficial aquifer. The monitor wells will be sampled once each to determine the baseline groundwater quality. These samples will be analyzed for the chemical parameters as identified in Table 4.2-2 and for priority pollutants. The parameters include the primary and secondary drinking water standards (Chapter 17-550, F.A.C.) and several additional cations and anions. The permeability of the surficial layer will be estimated by conducting falling head borehole permeability testing (slug tests) at each monitor well. The testing and sampling program at the surficial aquifer locations and surface water monitoring locations will establish adequate baseline data to evaluate the background water quality, availability, and the hydrogeologic relationships between the surface water and the surficial aquifer. The evaluation and utilization of the researched data and the field investigation results will allow for reliable impact assessment of construction, dewatering, and subsequent plant operation on the surficial aquifer.

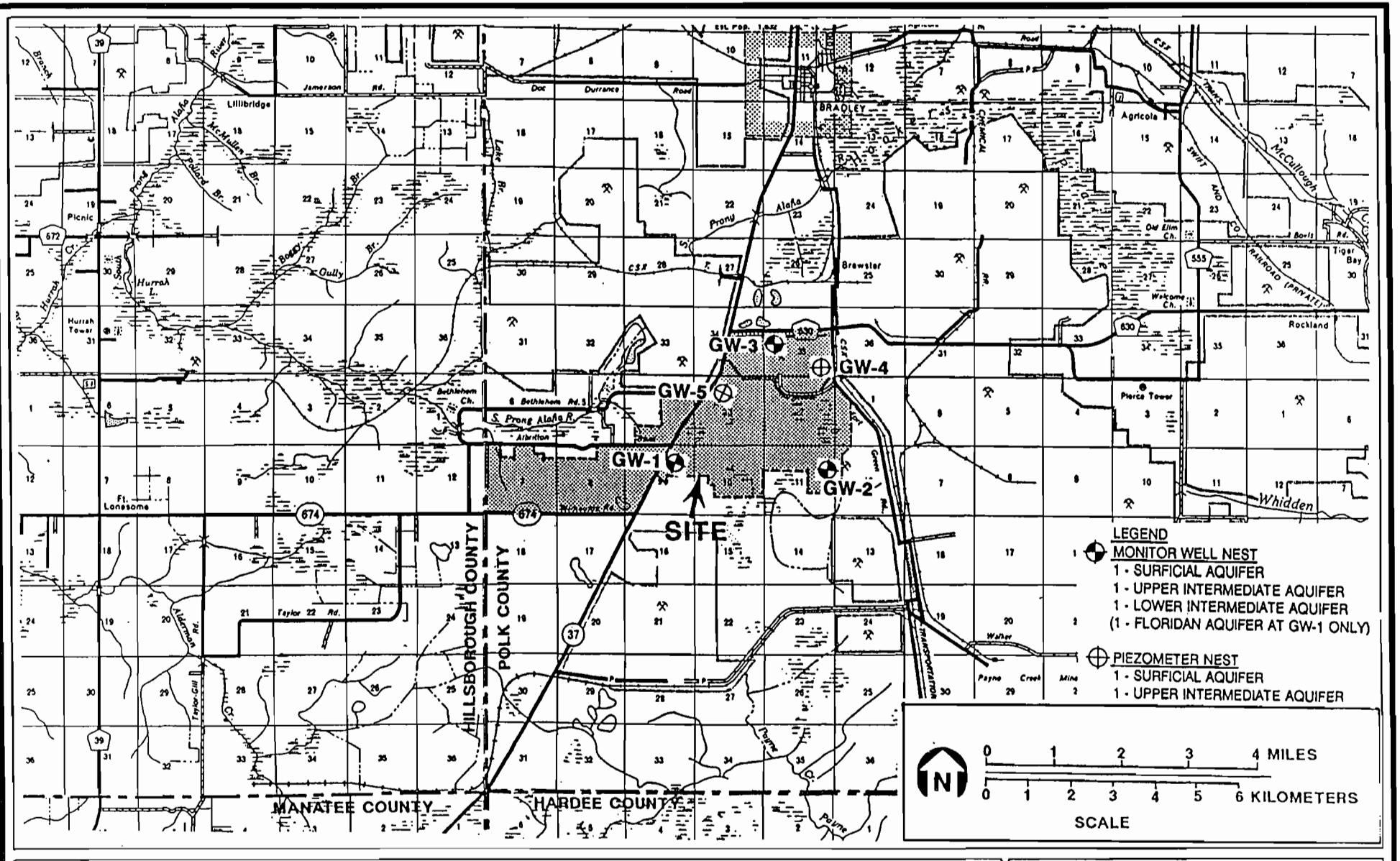

FIGURE 4.2-6.

MONITOR WELL/PIEZOMETER LOCATION MAP

Sources: USGS, Duette NE, FL, Rev. 1972; Biard, FL, Rev. 1987; ECT, 1991.

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Table 4.2-2. Water Quality Parameters for TEC Groundwater Monitoring and Drinking Water Standards (Rules 17-550.310* and 17-550.320*) (Page 1 of 2)

Water Quality Parameter	Drinking Water Standards
<u>In Situ Measurements</u>	
Water level	
Specific conductance	
Hydrogen ion activity (pH)	6.5 - 8.5+
Oxidation-reduction potential	
<u>Classical</u>	
Alkalinity (as $CaCO_3$)	
Acidity	
Bicarbonate	
Carbonate	
Hardness (as $CaCO_3$)	
Color	≤ 15 color units+
Total dissolved solids	≤ 500 mg/L+
Total suspended solids	
Turbidity	complex rule**
Selenium	≤ 0.01 mg/L*
Chloride	≤ 250 mg/L+
Fluoride	≤ 2.0 mg/L+
Sulfate	≤ 250 mg/L+
Sodium	≤ 160 mg/L*
Calcium	
Magnesium	
Arsenic	≤ 0.05 mg/L*
Selenium	≤ 0.01 mg/L*
Total anions (calculated)	
Total cations (calculated)	
Nitrate	≤ 10 mg/L*
Foaming agents	≤ 0.5 mg/L+
<u>Other Metals</u>	
Barium	≤ 1.0 mg/L*
Beryllium	
Cadmium	≤ 0.010 mg/L*
Chromium (total)	≤ 0.05 mg/L*
Chromium (hexavalent)	
Copper	≤ 1.0 mg/L+
Iron	≤ 0.3 mg/L+

Table 4.2-2. Water Quality Parameters for TEC Groundwater Monitoring and Drinking Water Standards (Rules 17-550.310* and 17-550.320*) (Page 2 of 2)

Water Quality Parameter	Drinking Water Standards
Lead	≤ 0.05 mg/L*
Manganese	≤ 0.05 mg/L+
Mercury	≤ 0.002 mg/L*
Silver	≤ 0.05 mg/L*
Zinc	≤ 5.0 mg/L+
Radioactive Substances	
Radium 226 and 228	≤ 5 pCi/L*
Gross alpha	≤ 15 pCi/L*
Organics	
Endrin	≤ 0.0002 mg/L*
Lindane	≤ 0.004 mg/L*
Methoxychlor	≤ 0.1 mg/L*
Toxaphene	≤ 0.005 mg/L*
2,4-D	≤ 0.1 mg/L*
2,4,5-TP, silvex	≤ 0.01 mg/L*
Total trihalomethanes	≤ 0.10 mg/L*
Trichloroethene	≤ 0.003 mg/L*
Tetrachloroethene	≤ 0.003 mg/L*
Carbon tetrachloride	≤ 0.003 mg/L*
Vinyl chloride	≤ 0.001 mg/L*
1,1,1-Trichloroethane	≤ 0.2 mg/L*
1,2-Dichloroethane	≤ 0.003 mg/L*
Benzene	≤ 0.001 mg/L*
Ethylene dibromide	≤ 0.00002 mg/L*
p-Dichlorobenzene	≤ 0.075 mg/L*
1,1-Dichloroethene	≤ 0.007 mg/L*

* Primary drinking water standards.
\+ Secondary drinking water standards.
** Complex, refer to Chapter 17-550.310, F.A.C.

Units
mg/L = milligrams per liter
NTU = nephelometric turbidity unit
pCi/L = picocuries per liter

Source: Chapters 17-3 and 17-550, F.A.C.; ECT, 1991.

Intermediate Aquifer System--To provide site-specific information on the two zones (upper and lower) of the intermediate aquifer, the following monitoring network is proposed to be installed in February 1991 (Figure 4.2-6):

1. Upper Zone: two piezometers and three monitor wells; and
2. Lower Zone: three monitor wells.

The upper intermediate wells and piezometers will be installed to a maximum depth of 100 ft, and the lower intermediate wells will be installed to a maximum depth of 225 ft. The water levels of the intermediate aquifer system will be monitored in March, May, July, and September 1991, to determine the potentiometric elevations, hydraulic gradients, and direction of flow. In addition, each intermediate aquifer monitor well will be sampled once and the groundwater will be analyzed for the same parameters as the surficial aquifer. Permeability testing will also be conducted on the monitor wells to assure sufficient information is available on the aquifer for impact assessment. Since groundwater will not be withdrawn from this aquifer, no pump tests will be performed. The testing and sampling program of the intermediate aquifer system will establish adequate baseline data to evaluate the background water quality, availability, and hydrogeologic relationships between the existing aquifers. The evaluation and use of the researched data and the field investigation results will allow for reliable impact assessment of construction and subsequent plant operation on the intermediate aquifer system.

Floridan Aquifer--One monitor well will be installed in the Floridan aquifer at Station GW-1 during February 1991 (Figure 4.2-6). The Floridan aquifer monitor well will be installed to a maximum depth of 400 ft. The groundwater level in the monitor well will be measured in March, May, July, and September, 1991, to determine the potentiometric elevation for the Floridan aquifer. The monitor well will be sampled once to determine the baseline groundwater quality. For the Floridan aquifer, it is not anticipated that pumping tests will be conducted at the proposed site.

Substantial information concerning the Floridan aquifer system and its characteristics in Polk County is available in the literature. The aquifer's characteristics and design parameters will be compiled from existing full scale aquifer testing previously conducted by SWFWMD, FIPR, mining companies, and others. The primary source of makeup water will be the Floridan aquifer. A preliminary literature review indicates numerous sources of information available to characterize the water quantity and quality available in this aquifer. The available information and the onsite monitoring and sampling program of the Floridan aquifer system will establish adequate baseline data to evaluate the background water quality, availability, and hydrogeologic relationships between the existing aquifers. The evaluation and utilization of the researched data and the field investigation results will allow for reliable impact assessment of construction and subsequent plant operation on the Floridan aquifer system.

The information obtained from the above sources will be compiled, analyzed, and aquifer properties and required design parameters will be summarized. This information will be used for wellfield design and to assess the impacts of both construction and operation of the proposed power plants on the entire aquifer system.

4.2.3 IMPACT ANALYSES

4.2.3.1 Consumptive Use Impacts

Floridan aquifer characteristics available from pump tests performed in the general site area will be incorporated into a groundwater flow model and used to predict the impact of pumping on current groundwater users. The groundwater quality will be summarized from data obtained from the monitoring program and existing data obtained from wells previously drilled in the vicinity of the proposed PPS.

The plant water demand data will be developed and the consumptive use volume will be determined, which must be demonstrated to be in conformance with SWFWMD requirements.

Drawdown impacts on streamflows and well fields will be evaluated using the three-dimensional, finite-difference, USGS MODFLOW model which incorporates the following assumptions:

1. The aquifer systems have a three-dimensional flow,
2. The groundwater acts as an incompressible fluid,
3. The principles of Darcy's law are valid,
4. The surficial aquifer is under unconfined conditions,
5. The intermediate aquifer system is under semi-confined conditions, and
6. The Floridan aquifer is under confined conditions.

Hydrogeologic data required for the groundwater flow model will be obtained from the monitoring program, literature review, and other available data sources.

4.2.3.2 Construction Impacts

Available information and the results of the monitoring program will be used to assess potential construction impacts. Potential construction impacts could include degradation of existing groundwater quality in the surficial aquifer by increased suspended and/or dissolved solids loading as a result of earthmoving operations. Additionally, dewatering projects in support of foundation setting at the plant site potentially could impact the quality and quantity of the surficial aquifer in areas adjacent to the plant site.

Baseline data including the surficial aquifer's hydrogeological properties, groundwater quality, and hydro-chemical characterization will be analyzed, along with the construction plans. Baseline data will provide detailed site-specific geologic and hydrogeologic information which will indicate the potential for a wide range of impacts. Impacts to the surficial aquifer system drawdown and quality will be assessed as a result of site preparation, construction of support piers or grouting, dewatering

operations, and construction of the cooling reservoir. The Floridan aquifer system is not expected to be impacted as a result of construction operations.

4.2.3.3 Operational Impacts

The primary impact to the groundwater from operations is the potential drawdown from water use as discussed in Section 4.2.3.1. Other impacts include potential effects on groundwater quality in the surficial aquifer from ongoing operation of the cooling reservoir and the potential impacts of percolation from stormwater management areas. In addition, the potential for long-term effects of consumptive use on the surficial and intermediate aquifer will be assessed with a three-dimensional groundwater flow model. The long-term effects on groundwater quality from the operation of the cooling water reservoir and stormwater management areas will be evaluated with a contaminant transport model. Groundwater diversion, interception, and/or addition from plant operations will also be evaluated.

4.3 SURFACE WATER QUALITY AND HYDROLOGY

4.3.1 INTRODUCTION

4.3.1.1 Background

The proposed facility will use a cooling water reservoir for condenser cooling for both the CC and PC units. Precipitation and groundwater seepage into the reservoir from the surficial aquifer will provide a portion of the cooling water makeup needs to the reservoir. Wellfields also will be used to provide makeup water from the Floridan aquifer.

Cooling water will be reused by recirculating through the cooling reservoir in order to conserve the water resources and to minimize potential hydrologic and water quality impacts. Under normal conditions, discharges from the cooling water reservoir to offsite areas or streams are not expected. Based on TEC's current conceptual plans, the cooling water reservoir will be designed so that discharge, or blowdown, from the reservoir will occur only during extreme storm events.

Cooling water reservoir discharges will be directed to a stormwater management area which consists of a series of reclaimed lakes and wetlands to the west of SR 37 prior to ultimately discharging to an unnamed tributary of the South Prong Alafia River. Other discharge scenarios to be evaluated include discharging to the Little Payne Creek and Payne Creek.

Other potential water effluents from the proposed power plants include: treated plant process wastewaters, treated sanitary wastewater, and stormwater runoff from storage areas. These waters will be directed to the cooling water reservoir for re-use and/or to the reclaimed lake and wetland system to the west of SR 37.

4.3.1.2 Issues and Potential Impacts

The following potential surface water licensing issues and impacts will be addressed in the SCA/EA document:

1. Potential changes in surface water drainage patterns.

2. Potential changes in average stream flows and storm hydrographs.
3. Potential thermal and chemical water quality impacts due to cooling water reservoir blowdown and wastewater discharges. The quantity and quality of the blowdown will be determined.
4. Surface water consumption due to cooling water reservoir evaporation and discharge to the surficial aquifer.
5. Management and storage of surface water (MSSW).
6. Hydrologic impacts to the receiving water.
7. Potential water quality impacts to the receiving water.
8. Solid by-product and wastewater disposal during plant construction.
9. Erosion control during the construction and operational phases of the project.
10. Compliance of phosphate mine reclamation plans with the provisions of Chapter 16C-16.051, F.A.C.

4.3.1.3 Program Objectives

The objectives of the surface water quality and hydrology study are to:

1. Characterize the existing surface water conditions;
2. Identify and locate surface water users in the area;
3. Assess potential impacts of the proposed project;
4. Develop a stormwater management plan and other mitigative measures to reduce the hydrologic impacts;
5. Complete the SCA/EA document; and
6. Provide supporting information and analyses to obtain state approval and federal permits relevant to surface water resources, including:
   a. Federal NPDES permit,
   b. Dredge-and-fill permit,
   c. MSSW permit,
   d. Surface water use permit, if appropriate, and
   e. Phosphate mine reclamation plans.

4.3.1.4 Program Outputs/Products

Information will be presented in the SCA/EA document to fulfill the following requirements of FDER Form 17-1.211(1), F.A.C.:

- 2.0 Site and Vicinity Characterization
  - 2.3.3 Site Water Budget and Area Users
  - 2.3.4 Surficial Hydrology
- 4.0 Effects of Site Preparation, and Plant and Associated Facilities Construction
  - 4.1 Land Impact
    - 4.1.3 Flood Zones
  - 4.2 Impact on Surface Water Bodies and Uses
- 5.0 Effects of Plant Operation
  - 5.1 Effects of the Operation of the Heat Dissipation System
    - 5.1.1 Temperature Effect on Receiving Body of Water
    - 5.1.2 Effects on Aquatic Life
    - 5.1.3 Biological Effects of Modified Circulation
    - 5.1.4 Effects of Offstream Cooling
    - 5.1.5 Measurement Program
  - 5.2 Effects of Chemical and Biocide Discharges
    - 5.2.1 Industrial Wastewater Discharges
    - 5.2.2 Cooling Tower Blowdown (not applicable)
    - 5.2.3 Measurement Programs
  - 5.3 Impacts on Water Supplies
    - 5.3.1 Surface Water
    - 5.3.2 Groundwater
    - 5.3.3 Drinking Water
    - 5.3.4 Leachate and Runoff
    - 5.3.5 Measurement Programs
  - 5.4 Solid/Hazardous Waste Disposal Impacts
    - 5.4.1 Solid Waste
    - 5.4.2 Hazardous Waste
  - 5.5 Sanitary and Other Waste Discharges
- 9.0 Phosphate Mining Reclamation Plan Amendments

11.0 Appendices
11.1 Federal Permit Applications
11.1.2 NPDES Application/Permit

4.3.2 BASELINE INFORMATION AND MONITORING

A baseline description of surface waters and their uses is an essential part of the SCA/EA. This baseline description will be based on existing information in the form of publications, reports to agencies, and unpublished data, and on data collected in the field as part of the monitoring program. In addition to baseline surface water information, relevant information regarding the impacts associated with the construction and operation of similar power plants will be identified and acquired. The methods by which information will be obtained are described in the following sections.

4.3.2.1 Literature Review

A comprehensive literature review will be conducted to locate the most relevant surface water and potential impacts information. Particularly useful documents that have already been identified include:

1. Fort Green Mine conceptual reclamation plan submitted to FDNR by Agrico and modifications to the mine reclamation plan;
2. Hydrology study and amendment for the Fort Green Mine prepared by Ardaman & Associates, Inc.;
3. *Water Resources Data, Florida, Water Year 1989, Volume 3A: Southwest Florida Surface Water* (USGS, 1990); and
4. *Low-Flow Frequency Analyses for Streams in West-Central Florida* (USGS, 1985).

The USGS water resources book described above, has identified two surface water stations maintained by USGS (see Figure 4.3-1). Although neither of these stations lies closer than 10 km from the site boundary, both do provide a long-term record of stream discharge. Station #02301300, located on the South Prong Alafia River near Lithia has been operating for 26 years, and according to USGS, the records are considered "good". In

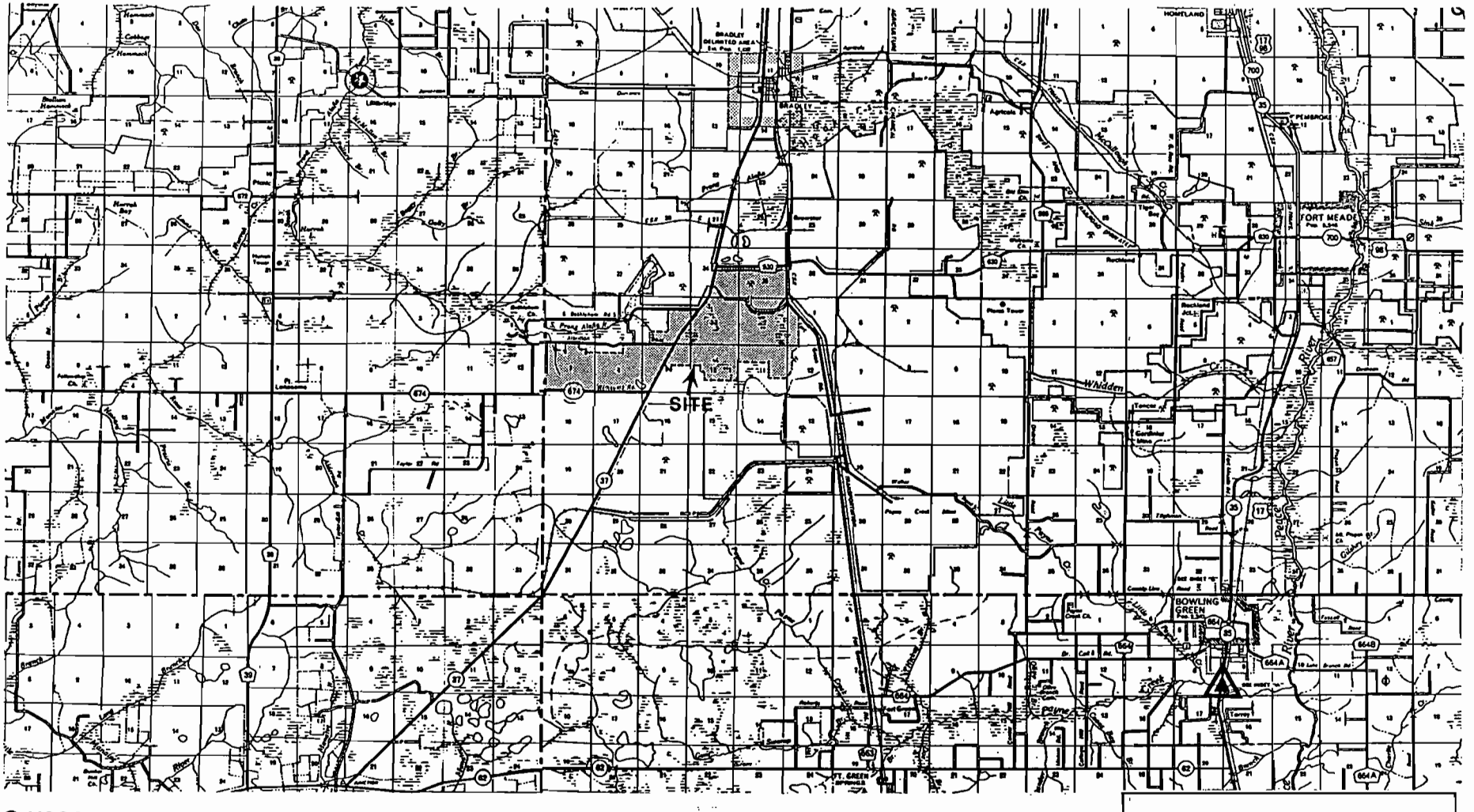

FIGURE 4.3-1.

LOCATION OF USGS SURFACE WATER STATIONS

Source: USGS, 1990.

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addition to stream discharge, water quality data have been collected at this station for the same 26 years. USGS Station #02295420 is located 16 km from the site on Payne Creek near Bowling Green. Stream discharge data at this station are available for 15 years. Again, USGS classifies the records as "good". USGS has also published low-flow statistics for both of these stations. These USGS stations will provide long-term data essential for the characterization of surface waters and impact assessments.

To augment these identified publications, an online literature search will be conducted of the following databases to identify other relevant published data:

1. Water Resources Abstracts,
2. Aquatic Sciences and Fisheries Abstracts,
3. Chemical Engineering Abstracts,
4. Meteorological and Geoastrophysical Abstracts,
5. Electric Power Database,
6. Electric Power Industry Abstracts,
7. Dissertation Abstracts Online,
8. Federal Research in Progress,
9. National Technical Information Service, and
10. Scisearch.

It is recognized that much of the information specific to southwest Polk County surface water resources will not be published, or if published, would not appear in these databases. Therefore, the following entities will be contacted to identify other reports and data relevant to this project:

1. USGS,
2. EPA STORET system,
3. Soil Conservation Service (SCS),
4. National Oceanic and Atmospheric Administration (NOAA),
5. Federal Emergency Management Agency (FEMA),
6. FDER,

7. FDNR,
8. SWFWMD,
9. Central Florida Regional Planning Council (CFRPC),
10. Polk County Environmental Services Department,
11. Polk County Water Resources Department,
12. FIPR,
13. Florida Sinkhole Institute,
14. Florida University System libraries, and
15. ECT Library.

These sources will be searched not only for baseline surface water hydrology and quality data and possible construction and operational impacts, but also for existing water uses in the area. SWFWMD, in particular, will be a valuable source for the existing uses as well as other types of surface water information.

The existing information collected using the methods described above will be used to prepare the baseline descriptions and impact assessments required in the SCA/EA and other permitting documents.

4.3.2.2 Data Collection and Analysis

Although historical data usually provide more long-term information, in most cases, these data are not sufficiently site-specific to meet all of the requirements of the SCA/EA document. Therefore, these data are augmented with site-specific data collected expressly to address the requirements of the SCA/EA. The field monitoring plan designed for the PPS surface water investigations is described below.

Seven surface water stations have been identified for field monitoring. These stations, shown in Figure 4.3-2, have been located to ensure that the maximum amount of representative data are collected from the streams and other water bodies that may be affected by plant construction and operation. Station SW-1, is located on an unnamed tributary to the South Prong Alafia River. This tributary is the proposed receiving water for

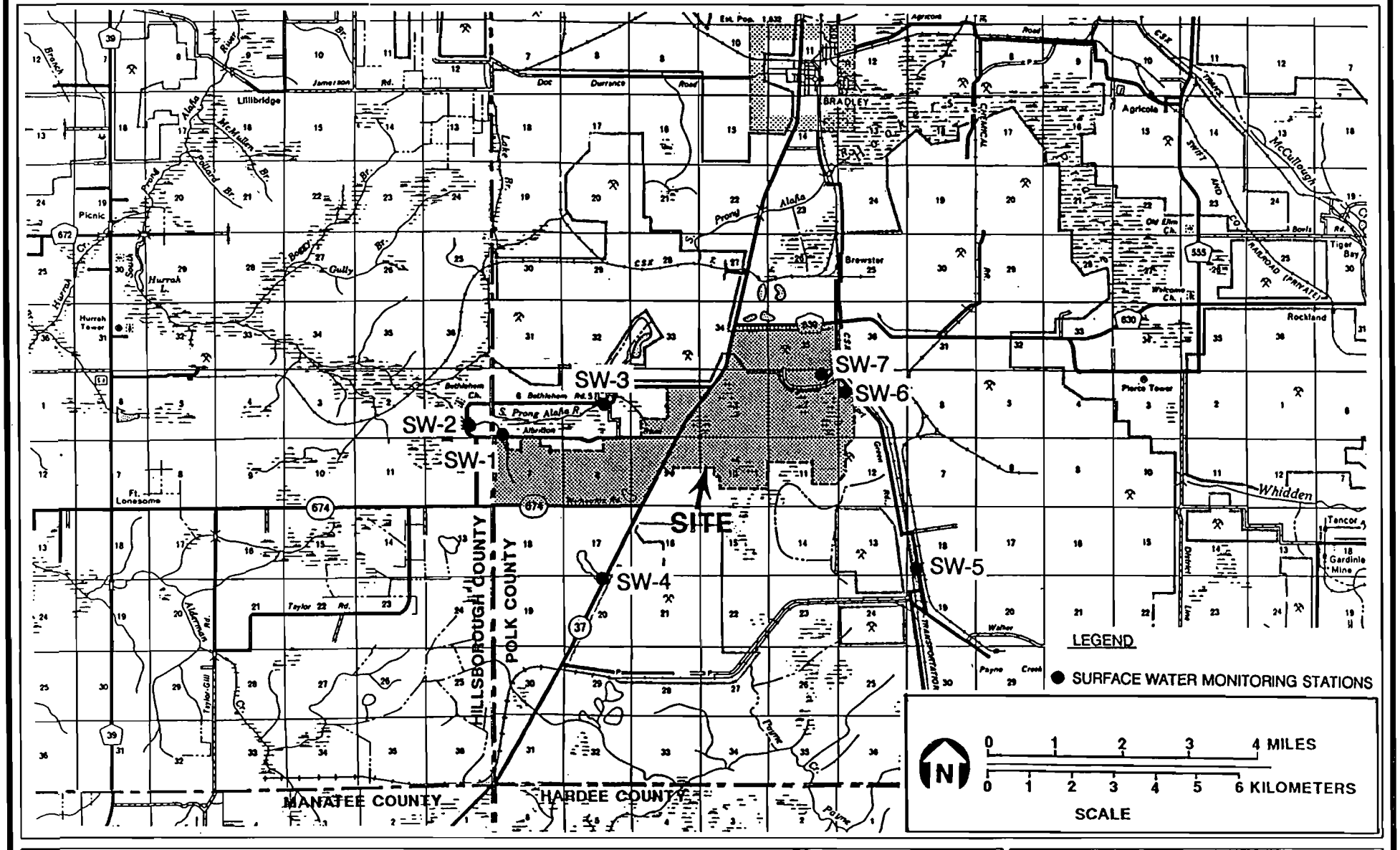

FIGURE 4.3-2.

SURFACE WATER MONITORING STATIONS

Sources: FDOT, 1976, 1977; ECT, 1991.

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potential overflow from the cooling reservoir and excess stormwater, via the reclaimed lake/wetland stormwater management area, during significant storm events. Hydrologic and water quality data from this station will be used to characterize baseline conditions in this stream and to assess the potential impacts associated with intermittent flows from the reclaimed stormwater management area. Stations SW-2 and SW-3 were located to characterize the South Prong Alafia River both downstream and upstream, respectively, of this unnamed stream. Data obtained from SW-3 will be used to characterize the South Prong Alafia River prior to the proposed discharge. SW-3 has been located so that it is downstream of IMCF Brewster's discharge but upstream of any runoff associated with Agrico's mining activities. Data from Station SW-2, located downstream of the proposed discharge will be used to characterize the stream as it exists today and assess the potential impacts of the proposed discharge.

Other surface water bodies that may potentially be affected either by construction or operation of the proposed plant include Little Payne Creek and Payne Creek. Both of these streams have been substantially modified as a result of mining activities. In order to characterize regional baseline surface water conditions and provide the necessary information to assess potential impacts associated with the proposed plant discharge location, surface water stations will be located along these water bodies. Station SW-4 will be located near the headwaters of Payne Creek at the point where SR 37 crosses Payne Creek. Station SW-5 is located where CR 663 crosses the drainage canal that now replaces the headwaters of Little Payne Creek.

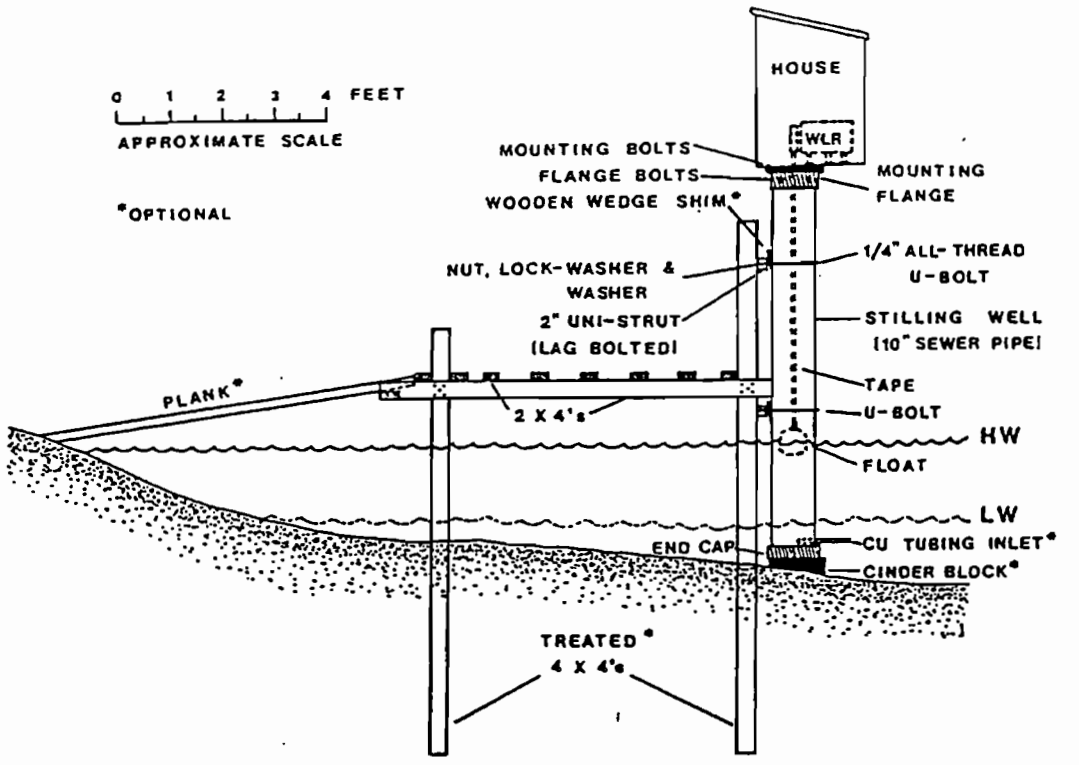
In addition to the streams that surround the TEC site, mine cuts and a reclaimed lake are located on the site. Surface water stations will be located in both the recently reclaimed lake and the old unreclaimed mine cut. These stations, designated SW-6 and SW-7, respectively, will characterize water quality in these two distinct types of water bodies. Furthermore, because TEC plans to convert the old mine cut and reclaimed lake to a cooling reservoir, the data from these stations will be used for

assessing the potential impact of this construction. If, as a result of the cooling reservoir final conceptual design, these water bodies are incorporated without bathymetric changes appropriate sounding measurements will be performed.

As discussed in Section 4.4, the aquatic ecology monitoring stations will be collocated with these surface water stations. The surface water hydrology and quality data will aid in the interpretation of the aquatic ecology data.

Continuous stage recorders will be installed at Stations SW-2, SW-5, and SW-6 for 6 months beginning near the end of February and continuing through August 1991. This period encompasses central Florida's dry and wet periods. Station SW-2, located on the South Prong Alafia River, is located downstream of the proposed point of discharge from the lake/wetland reclaimed stormwater management area. A continuous stage recorder will be installed at SW-5 to characterize current flow conditions downstream of the TEC and other Agrico properties and to assess the impacts associated with the diversion of some of this water to the South Prong Alafia River. A continuous stage recorder will also be installed on the reclaimed lake located on the TEC site. Data from this recorder will be used to characterize the type of water level fluctuations in a reclaimed lake. Furthermore, because the stage recorder will located near a free-flowing culvert that directs water from the lake across CR 663, the occurrence and quantity of outflow from this lake will be determined over the 6-month monitoring period.

Continuous stage will be recorded using Leupold & Stevens Type A or equivalent water level recorders. These recorders will be housed in weatherproof shelters which will be mounted on polyvinyl chloride (PVC) stilling wells. A typical installation is shown in Figure 4.3-3. The bottoms of the stilling wells are closed and a small hole is drilled near the bottom to permit water to enter and leave the well. This small hole



SIDE VIEW

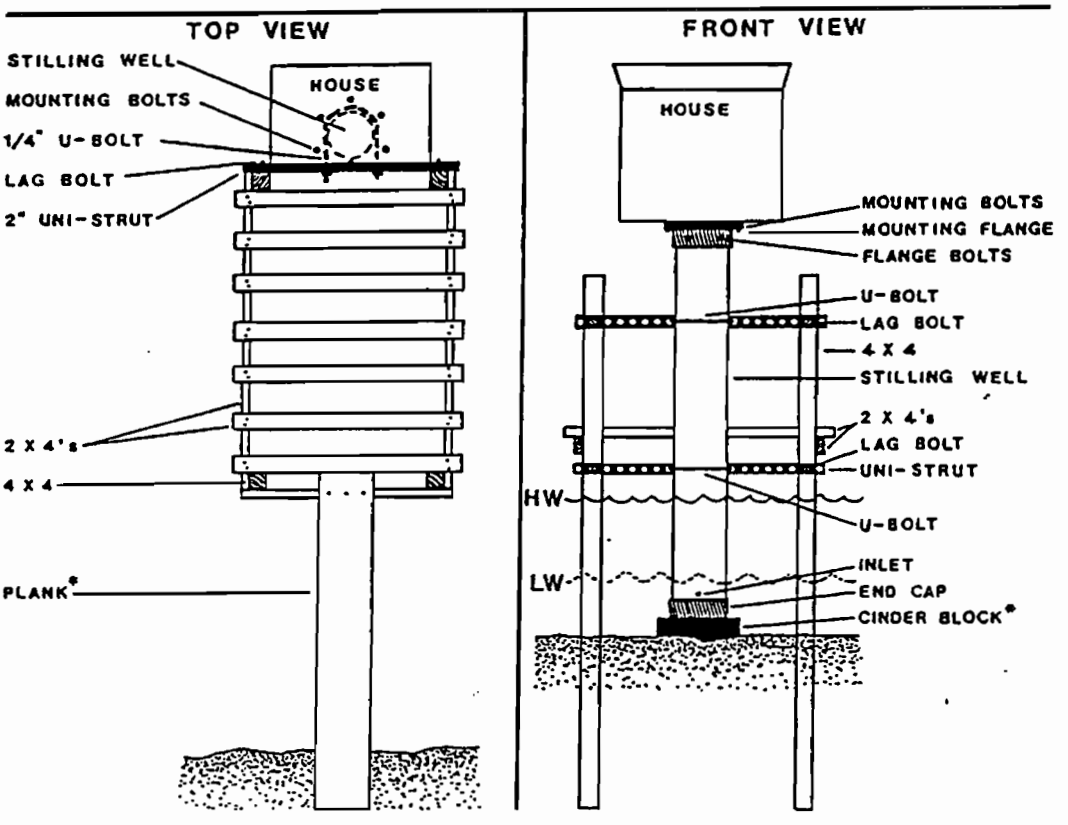


FIGURE 4.3-3.
TYPICAL CONTINUOUS STAGE RECORDER INSTALLATION

Source: ECT, 1991.

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filters out rapid disturbances of the water surface such as ripples and waves thereby producing a "cleaner" record of water level changes.

These water level recorders will be serviced monthly. Servicing includes rewinding the clocks or changing the batteries on the clocks, depending on which model is used; checking the stilling well for obstructions to the outlet hole; removal of pests such as mud daubers which can interfere with the operation of the recorder; and annotation and removal of the paper chart from the water level recorder.

A staff gauge will be attached to the stilling well of each recorder. This will provide an independent check of water level that can be compared to the actual chart record. During the monthly servicing of the water level recorders, a record of the water levels indicated by the recorder and the staff gauge will be documented. This check is essential for detecting problems such as plugged outlet holes and slipped float cables.

To convert stage to discharge, instantaneous flow at Stations SW-2, SW-5, and SW-6 will be measured using a Teledyne-Gurley pygmy or Price current meter and standard USGS techniques. Instantaneous flow measurements will be made across the stream, if flowing water is present, at the location of the continuous stage recorder on a monthly basis over the 6-month monitoring period. The stage, as indicated by the recorder and the staff gauge, will be measured prior to, and immediately following, the instantaneous flow measurement. Instantaneous flow determinations will be made by measuring water current speed at one or two depths at equally spaced distances across the stream. Depending on the total water depth, either the USGS 6/10ths or 2/10ths-8/10ths method will be used. The current speed data will be recorded on streamflow logs. The reduced flow data will then be plotted against the stage data from the water level recorder to produce a stage-discharge curve. Using this curve, continuous discharge from the continuous stage data will be determined.

In addition, monthly instantaneous flow will be measured at Stations SW-1, SW-3, and SW-4. Flow measurements are not applicable at Station SW-7 since the unreclaimed mine cut is not a flowing system. These measurements will be made during the servicing of the water level recorders and water quality sampling efforts, whenever there is water flowing through these smaller streams. From the instantaneous flow data, streamflow at these locations for a variety of conditions will be estimated.

All discharge data will be plotted as time-series and flow statistics will be calculated. Discharge data collected will be correlated with the long-term USGS data available for the South Prong Alafia River and Payne Creek. The correlation function that results from this analysis will be used in conjunction with the USGS long-term data to estimate long-term high- and low-flow statistics for these stations.

Concurrent with discharge data collection, water quality samples will be collected monthly at the seven surface water monitoring stations. These samples will be analyzed for the parameters listed in Table 4.3-1. This list is based on the Class III standards presented in Chapters 17-302.510 and 17-302.560, F.A.C. The Class III standards also have been included in this table. Additional analytes have been included in this list because they are either essential for describing an aquatic system or for interpreting water quality data. The parameters in this table have been grouped into in situ measurements, classical analytes, other metals, radioactive substances, pesticides, and organics. The latter two categories will be sampled only twice during the field monitoring: once during the dry period and once during the wet period. All other parameters will be measured during each of the six water quality sampling trips. At Station SW-2, two complete priority pollutant scans will be conducted; once during the dry season and a second time during the wet season. These scans will identify any such pollutants that may exist in the South Prong Alafia River. Dissolved oxygen (DO) concentrations will be measured during a period that extends from about 1 hour before sunrise to 2 hours after sunrise. It is during this period that DO concentrations

Table 4.3-1. Water Quality Parameters for TEC Surface Water Monitoring and Class III Water Quality Standards (Rules 17-302.510 and 17-302.560) (Page 1 of 3)

Water Quality Parameters	Class III Standards	No. of Samples per Station
<u>In Situ Measurements</u>		
Temperature	Complex rule*	6
Specific conductance		6
Hydrogen ion activity (pH)	Complex rule*	6
Dissolved oxygen (DO)	Complex rule*	6
DO saturation (calculated)		6
Oxidation-reduction potential		6
Transparency (Secchi/calc.)	Complex rule*	6
<u>Classical</u>		
Alkalinity (as $CaCO_3$)	≥ 20 mg/L	6
Acidity		6
Bicarbonate		4
Carbonate		4
Hardness (as $CaCO_3$)		6
Color		6
Total solids		6
Total dissolved solids		6
Total suspended solids		6
Turbidity	≤ 29 NTU above ambient	6
Chloride	< 10% above ambient	6
Fluoride	≤ 10 mg/L	6
Sulfate		6
Cyanide	≤ 5.0 µg/L	6
Sodium		6
Calcium		6
Magnesium		6
Arsenic	≤ 0.05 mg/L	6
Selenium	≤ 0.025 mg/L	6
Total anions (calculated)		6
Total cations (calculated)		6
Ammonia (un-ionized)	≤ 0.02 mg/L	6
Nitrate		6
Nitrite		6
Total organic nitrogen		6
Orthophosphate		6
Total phosphate		6

Table 4.3-1. Water Quality Parameters for TEC Surface Water Monitoring and Class III Water Quality Standards (Rules 17-302.510 and 17-302.560) (Continued, Page 2 of 3)

Water Quality Parameters	Class III Standards	No. of Samples per Station
Oil and grease	≤ 5 mg/L	6
Detergents	≤ 0.5 mg/L	6
Phenolic compounds	Complex rule*	6
Phenol	Complex rule*	6
Biochemical oxygen demand (BOD)	Complex rule*	6
Chemical oxygen demand (COD)		6
<u>Other Metals</u>		
Barium		6
Beryllium	Complex rule*	6
Cadmium	Complex rule*	6
Chromium (total)	Complex rule*	6
Chromium (hexavalent)	Complex rule*	4
Copper	≤ 0.03 mg/L	6
Iron	≤ 1.0 mg/L	6
Lead	≤ 0.03 mg/L	6
Manganese		6
Mercury	≤ 0.2 µg/L	6
Nickel	≤ 0.1 mg/L	6
Silver	≤ 0.07 µg/L	6
Zinc	≤ 0.03 mg/L	6
<u>Radioactive Substances</u>		
Radium 226 and 228	≤ 5 pCi/L	6
Gross alpha	≤ 15 pCi/L	6
<u>Pesticides</u>		
Aldrin + Dieldrin	≤ 0.003 µg/L	2
Chlordane	≤ 0.01 µg/L	2
DDT	≤ 0.001 µg/L	2
Demeton	≤ 0.1 µg/L	2
Endosulfan	≤ 0.003 µg/L	2
Endrin	≤ 0.004 µg/L	2
Guthion	≤ 0.01 µg/L	2

Table 4.3-1. Water Quality Parameters for TEC Surface Water Monitoring and Class III Water Quality Standards (Rules 17-302.510 and 17-302.560) (Continued, Page 3 of 3)

Water Quality Parameters	Class III Standards	No. of Samples per Station
Heptachlor	≤ 0.001 µg/L	2
Lindane	≤ 0.01 µg/L	2
Malathion	≤ 0.1 µg/L	2
Methoxychlor	≤ 0.03 µg/L	2
Mirex	≤ 0.001 µg/L	2
Parathion	≤ 0.04 µg/L	2
Toxaphene	≤ 0.005 µg/L	2
Organics		
Phthalate esters	≤ 3.0 µg/L	2
Polychlorinated biphenyls	≤ 0.001 µg/L	2

Note: mg/L = milligrams per liter.
µg/L = micrograms per liter.
NTU = nephelometric turbidity unit.
pCi/L = picocuries per liter.

* Complex, refer to Chapters 17-302.510 and 17-302.560, F.A.C.

Sources: Chapter 17-302, F.A.C.
ECT, 1991.

are most likely to be minimal due to potential respiration. Furthermore, DO will be measured shortly before sunset during days that early morning sampling will be conducted. These concentrations should represent maximum concentrations due to potential photosynthesis. Temperature will be measured concurrently with DO in order to obtain DO saturation. The morning-afternoon sampling will be conducted twice during the 8-month sampling period.

The water quality data will be entered into a project database for additional analysis, tabulation, and plotting. Field data, as well as historical data, will be analyzed in order to accurately characterize the surface water bodies on and in the vicinity of the site.

In addition, sediment and soil samples will be collected and analyzed at the seven monitoring stations. The purpose for collecting these samples is two-fold. First, in order to explain potential differences in benthic infauna populations and diversity, sediment grain size distribution must be characterized. Many differences in benthic infauna distributions are a function not only of stress, but often simply differences in substrate. The sediment samples will be collected at all surface water/aquatic ecology stations twice; once during the dry season and again during the wet season. The dry-wet season approach is used in order to characterize seasonal changes in sediment grain size distribution resulting from different flow conditions. In addition to grain size distribution, these sediment samples will be analyzed for total organic carbon and water content.

Additional soil and sediment cores will be obtained from the bottom of the reclaimed lake, the bottom of the recent mine cuts, and the ridges of overburden in these cuts. The cores will be tested for hydraulic conductivity, grain size distribution, and clay composition. These data will provide inputs to the modeling of seepage into and out of the cooling reservoir, a critical factor in determining the reservoir water budget. Ten randomly selected samples will be collected and analyzed; three from

the reclaimed lake and seven from the recent mine cuts and ridges. This sampling will be conducted once during the 8-month sampling period.

The products and statistics that result from the analysis of discharge and water quality data will provide inputs to the hydrologic and water quality modeling efforts that will be conducted to evaluate the potential impacts associated with the construction and operation of the proposed power plants. In addition, the surface water data and modeling results will provide inputs to the modeling efforts of the potential impacts to groundwater resources.

4.3.3 IMPACT ANALYSES

4.3.3.1 Construction Impacts

The potential hydrologic and water quality impacts resulting from plant construction will be assessed. Based on the results of the initial construction impacts analysis, management practices to alleviate any significant adverse impacts will be implemented by TEC, using best engineering practices and construction technology. The construction impacts assessments will include the following:

1. Solid By-Product and Wastewater Impacts--The environmental impacts of solid by-product and wastewater (i.e., dewatering activities) generated during plant construction will be assessed. The assessment will be based on the baseline data, plant design, and construction plans. The best construction management alternatives will be identified for the by-product handling, transport, disposal, and treatment of wastewater.
2. Erosion Control--The short-term hydrologic impacts caused by plant construction will be evaluated. The assessments include drainage patterns, flow diversion, peak flows, water quality, and soil erosion potential. A hydrologic model will be implemented to calculate the hydrograph and peak flow changes resulting from the construction plans.
3. Stormwater Management--A stormwater management plan will be developed to minimize the hydrologic impacts, water quality

impacts, and to prevent soil erosion in accordance with state and federal regulatory requirements.

4. Hydrologic Water Quality Impact Assessment of the Receiving Water--The potential hydrologic and water quality impacts on receiving waters during plant construction will be evaluated.

4.3.3.2 Operational Impacts

To assess the potential impacts on surface water resources caused by the plant operation, the following analyses will be conducted:

1. Rainfall Analysis--The available long-term rainfall data will be obtained from the NOAA weather stations near the project area including Bartow and Wauchula. The statistical parameters of the monthly and annual rainfall data will be analyzed. Drought and wet conditions will be defined to be used as the scenarios for hydrologic and water budget analyses.
2. Meteorological Data Analysis--Evaporation data at the Lake Alfred Experiment Station and the air temperature and wind data for project vicinity will be obtained from NOAA weather stations for analyses. The meteorological data will be used for water budget and heat budget analysis.
3. Runoff and Stream Flow Data Analyses--Monthly and annual statistical analyses of the flow data will be conducted. Extreme high-flow and low-flow analysis will also be conducted using the log-Pearson Type III distribution to determine the extreme conditions (i.e., 7-day, 10-year low flow).
4. Thermal Budget--A thermal budget analysis will be conducted for the cooling reservoir area. The meteorological data (shortwave solar radiation, longwave atmospheric radiation, equilibrium water temperature, etc.) and plant thermal loading will be used for the inputs to the modeling analysis.
5. Cooling Reservoir Water Budget Analysis and Makeup Requirements--A water budget model will be developed to determine the cooling reservoir makeup requirements. Using the hydrologic data, meteorological data, groundwater data, and plant water usage, the

model will determine the water balance. The model will consider the water storage and all mass flux components, such as rainfall, evaporation, groundwater makeup, surface runoff, plant water uses, groundwater seepage and recharge, and plant discharges. The water budget model will be used as a tool to assist in the design of the cooling reservoir.

Using the results of the rainfall, runoff, meteorological, thermal budget, and water budget analyses, the following impact assessments will be conducted:

1. Reclamation Plan Evaluation--The proposed reclamation plans discussed in Section 2.3 of this POS will be reviewed and evaluated as to their compliance with the provisions of Chapter 16C-16.051, F.A.C.
2. Thermal Impact Analysis--A thermal model for the cooling water reservoir will be conducted to determine the thermal distribution in the reservoir. A thermal transport model evolved from EPA's RECEIV-II model will be used to simulate the heat transfer, mass transport, and intake/outlet recirculation. This model and/or other appropriate thermal dispersion model will be used for thermal analysis, depending on the site conditions. The quantity and temperature of the cooling water reservoir discharge will be determined by the model.
3. Hydrologic Impact Assessment and Stormwater Management--A hydrologic model (e.g., HEC-1, TR-20, or other pertinent models) will be performed to calculate the watershed runoff, reservoir hydraulics, and cooling reservoir discharge quantity for various design storms. The model simulations will be used to assist in the reservoir discharge and discharge location scenario design which would minimize the peak flow quantity and prevent flood levels. The hydrologic impacts on the receiving water will also be assessed. This analysis will support the requirements of Chapter 40D-4, F.A.C.

4. Consumptive Use Impacts--The cooling reservoir may induce surface water consumption due to reservoir evaporation and groundwater discharge/recharge. The water budget analysis will address the potential surface water consumptive use impacts.
5. Water Quality Impact Assessment--A water quality and recirculation model will be used to simulate the water quality in the cooling reservoir. The degree of pollutant accumulation via recirculation will be quantified. The model will determine the water quality of potential reservoir discharges and will assess the dilution/retention/treatment effects of the series of reclaimed lakes and wetlands prior to reaching the receiving water.
6. Solid By-Product and Wastewater Impacts--The potential impacts of, and leachate runoff from, the coal and by-product storage areas and wastewater generated by plant operation will be evaluated. Plant operation and waste management plans will be reviewed relative to applicable regulatory requirements.

Further, the analyses for the SCA/EA will examine the proposed Agrico/TEC reclamation plans with respect to those landform characteristics which may affect surface water quality and hydrology. This analysis will be prepared by describing how, and to what extent, the reclaimed site will comply with the reclamation standards of Chapter 16C-16.051, F.A.C.

4.4 AQUATIC ECOLOGY

4.4.1 INTRODUCTION

4.4.1.1 Background

The PPS site is located within three drainage basins: South Prong Alafia River, Payne Creek, and Little Payne Creek. The portion of the site to the east of SR 37, which is planned for the plant facilities and cooling reservoir, lies primarily within the Little Payne Creek drainage basin. This basin has been extensively impacted by previous and ongoing phosphate mining activities. The portion of the site to the west of SR 37 lies primarily within the South Prong Alafia River drainage basin with a small portion in the Payne Creek basin.

According to TEC's current conceptual plans, excess stormwater and cooling reservoir water would only be discharged from the site during extreme storm events. Also, according to current plans, any such discharges from the cooling reservoir and plant site runoff would be directed to the site property to the west of SR 37 into a series of reclaimed lakes and wetlands to provide for further retention. Ultimately, the discharged water would enter an unnamed tributary of the South Prong Alafia River which flows in a northerly direction near the Hillsborough-Polk County line. Therefore, any surface water discharges from the PPS site may potentially impact only the South Prong Alafia River and its associated aquatic ecology systems. However, since the site also lies within the drainage basins of Payne Creek and Little Payne Creek, and final design information has not been developed at this time, these basins may also be potentially affected by the PPS project construction and operation.

Therefore, the aquatic ecology baseline studies are designed to provide data on important species, populations, and habitats that are needed for ecological impact assessments in all three site drainage basins. The impact analysis will provide a description of the potential construction and operational impacts of the project on the aquatic systems of the water bodies in the site area.

4.4.1.2 Issues and Potential Impacts

Typically, the two primary concerns related to power plant effluent discharges are the potential thermal shock and degradation of water quality effects on aquatic organisms. Since it is anticipated that the cooling reservoir will only discharge during major storm events, the major issue regarding the aquatic environment is the potential impacts to biota due to periodic stormwater/wastewater/effluent discharges, mostly during high rainfall events.

As discussed above, TEC's current conceptual plans call for the intermittent discharge of water from the cooling reservoir into a stormwater management system to be located just west of SR 37 which would ultimately discharge into an unnamed tributary of the South Prong Alafia River. Other potential issues associated with construction and operation of the power plant facilities and cooling reservoir may result from surface runoff, groundwater seepage, dewatering, and alternate discharge scenarios involving the drainages of Payne Creek and Little Payne Creek.

4.4.1.3 Program Objectives

The baseline aquatic ecology monitoring program is designed to characterize the aquatic resources in the surface waters which could be potentially impacted by the proposed plant. The baseline studies are also designed to collect the aquatic data required to describe the major components of the aquatic systems. These data will define baseline conditions and will be used to predict the potential effects of the proposed plant facilities on the aquatic environment.

4.4.1.4 Program Outputs/Products

Information will be presented in the SCA/EA document to fulfill the following requirements of FDER Form 17-1.211(1), F.A.C.:

2.0 Site and Vicinity Characterization

2.3.6 Ecology

2.3.6.1 Species-Environmental Relationships

2.3.6.2 Pre-existing Stresses

2.3.6.3 Measurement Program

4.0 Effects of Site Preparation, and Plant and Associated Facilities Construction

4.2 Impact on Surface Water Bodies and Uses

4.4 Ecological Impacts

5.0 Effects of Plant Operation

5.1.2 Effects on Aquatic Life

5.1.5 Measurement Program

5.2 Effects of Chemical and Biocide Discharges

5.3.5 Measurement Program

4.4.2 BASELINE INFORMATION AND MONITORING

4.4.2.1 Literature Review

A review of available literature pertaining to the aquatic ecology of the region and the site will be conducted. The literature review will emphasize the following:

1. Status of ecologically and commercially important species;
2. Aquatic community structure and diversity;
3. Species composition, abundance, and biomass;
4. Distribution and seasonality; and
5. Chemical responses to stress.

Relevant studies on aquatic resources of the study area, including DRIs, mine reclamation plans, and FIPR-sponsored studies will be reviewed for information on the aquatic resources of the immediate region. Computerized literature searches and other data bases will be used to supplement the information gathering process, as necessary.

Species life history data/habitat descriptions which will be collected and refined under this task to aid in impact assessment include, but are not limited to:

1. Temporal and spatial distribution;
2. Commercial and recreational importance;
3. Habitat preference;

4. Potential sources of impact (thermal effluents, biocides);
5. Threatened/endangered status;
6. Reproductive and spawning/nursery requirements;
7. Growth and mortality/survivability; and
8. Functional importance to the ecosystem.

The result of this task will be the identification and utilization of key literature for the region and from similar stream systems. This information will then be used as needed in developing the baseline descriptions and in the impact analysis.

4.4.2.2 Data Collection and Analysis

The proposed aquatic ecology monitoring program will focus on providing the baseline information needed to assess the potential impacts associated with the cooling reservoir, stormwater, and other wastewater discharges on the receiving water body.

The proposed monitoring program is designed to provide site-specific baseline information on the unnamed tributary to the South Prong Alafia River, the South Prong Alafia River (upstream and downstream of the tributary confluence), Little Payne Creek, Payne Creek, a reclaimed lake, and an unreclaimed mine cut. These data will be correlated with water quality data collected at the same sampling station locations (see Section 4.3). The field data collection efforts are designed to provide baseline information in the following areas: (1) important species, (2) existing habitat, (3) seasonal variability, (4) community structure, and (5) pre-existing stresses. The monitoring program will focus on collecting and analyzing macroinvertebrate and fish samples to describe existing biological communities.

The field studies proposed to define the biological communities in the receiving waters will include two macroinvertebrate and fisheries field efforts: one scheduled in late-February to early-March and one in late-July to early-August 1991. These efforts will be conducted at the seven aquatic ecology monitoring stations shown in Figure 4.4-1.

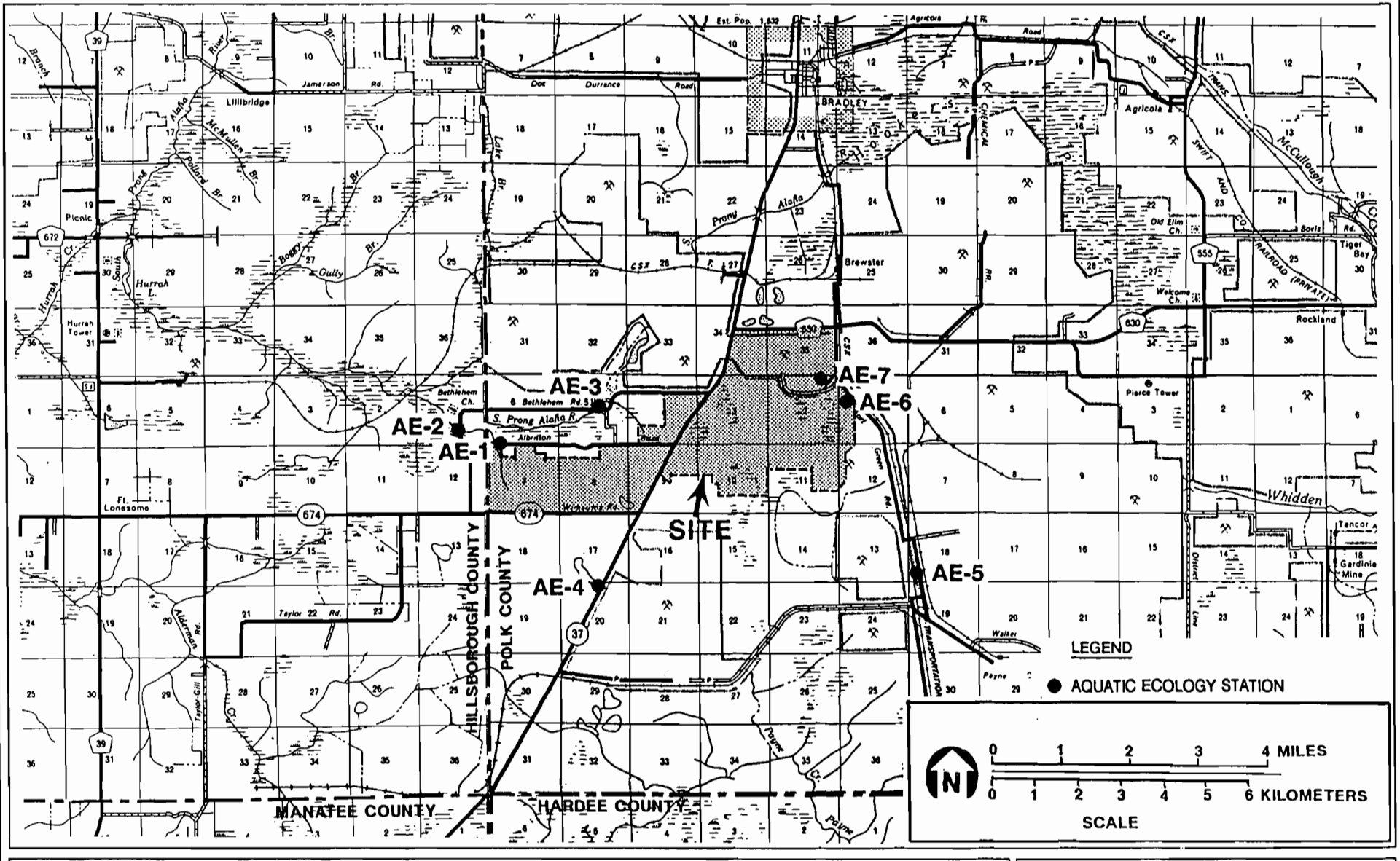

FIGURE 4.4-1.

AQUATIC ECOLOGY MONITORING STATIONS

Sources: FDOT Map, FL; ECT, 1991.

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Macroinvertebrate Sampling--Macroinvertebrate sampling will emphasize benthic infaunal communities and epifaunal communities. Benthic infaunal organisms are normally considered indicators of the relative health of a system. In addition to the important role benthic communities play at the base of the aquatic food web as primary, secondary, and detrital consumers, benthic invertebrates are thought to reflect changes and/or fluctuations in environmental quality. Benthic organisms are good indicators because they generally have limited mobility and cannot escape from deteriorating environmental conditions.

Adequate description of the structure and function of any benthic community must consider spatial and temporal variables using both quantitative and qualitative methods. The use of techniques designed to measure spatial changes in communities will be especially important at this site since large fluctuations in community composition may be expected within the various water bodies. Seasonal measurements will allow the assessment of naturally occurring changes in macroinvertebrate assemblages associated with seasonal differences in environmental conditions. Two sampling events (wet and dry) are planned.

The macroinvertebrate studies will consist of sediment grab sampling of the infaunal benthic community using a petite ponar and of artificial substrate sampling (Hester-Dendy) of the epifaunal communities. Seven stations will be sampled (see Figure 4.4-1). The tributary to the South Prong Alafia River will be sampled at the Albriton Road crossing along the northern property boundary (Station AE-1). Two other aquatic sampling sites along the South Prong Alafia River include both a downstream (Bethlehem Road, Hillsborough County, Section 1) and an upstream (Bethlehem Road, Polk County, Section 5) location, Stations AE-2 and AE-3, respectively.

Station AE-4 will be located near the headwaters of Payne Creek at the point where SR 37 crosses Payne Creek. Station AE-5 will be located at

the intersection of CR 663 and the drainage canal that now replaces the headwaters of Little Payne Creek. Both the reclaimed lake and an old mine cut located on the TEC site will be sampled, designated as Stations AE-6 and AE-7, respectively. The aquatic ecology sampling stations will be collocated with surface water hydrology and quality data collection stations to aid in the interpretation of baseline information.

At each station, five sediment grab samples will be collected using a petite ponar. The samples will be sieved and preserved to provide representative samples of the infaunal community. Four of these samples from each station will then be sorted to identify the animals and characterize the benthic community (one sample will be held in reserve).

Four Hester-Dendy artificial substrate samplers will be installed and incubated for approximately 28 days at each station. Following the collection of all samples, three of the four samples will be sieved through a 500-micron mesh, sorted, and the animals identified to complete the description of the macroinvertebrate community at each site.

Fisheries Sampling--The fisheries studies will follow the same sampling schedule as the macroinvertebrates program. The ichthyofaunal communities will be sampled during spring and fall at the same seven stations as the macroinvertebrates using dipnets, 10-ft seine, 30-ft seine, and 50-ft seine. Voucher specimen will be collected and preserved in formalin. Since the size and hydrology of each station varies, a combination of seining, dip netting, and electroshocking will be used to sample the resident fish communities. The objectives of the surveys are to inventory the local fish fauna, develop representative species lists for the various water bodies, and characterize the diversity of resident populations.

The aquatic ecology studies proposed above will be sufficient to define the aquatic communities to allow for meaningful potential impact assessments. Since literature on regional aquatic communities is readily

available and because of its limited application in impact assessments, phytoplankton, zooplankton, and ichthyoplankton sampling are not proposed.

4.4.3 IMPACT ANALYSES

4.4.3.1 Construction Impacts

Potential impacts of project construction on the aquatic ecological resources of the unnamed tributary to the South Prong Alafia River, the South Prong Alafia River, Payne Creek, and Little Payne Creek are expected to be minimal. Surface water quality in these waters may potentially be impacted by construction stormwater runoff or dewatering activities. However, the potential for such impacts is low since appropriate construction safeguards will be employed.

4.4.3.2 Operational Impacts

Aquatic biological systems may be affected by incremental increases in flow or chemical discharges. These potential impacts are associated with the effects of chemical components of discharge on organisms in the receiving body of water.

Impact analyses will include data from baseline studies and existing literature on the biotic communities. The aquatic ecology program data used in the impact assessment will include:

1. Spatial and temporal population distribution;
2. Species composition and abundance;
3. Species richness and diversity;
4. Seasonality; and
5. Migration, spawning, or nursery characteristics within the receiving water body.

Resultant effects on aquatic community distribution, abundance, density, richness or diversity, and similarity will be estimated by examining community response parameters.

4.5 TERRESTRIAL ECOLOGY

4.5.1 INTRODUCTION

4.5.1.1 Background

TEC's proposed facilities will be developed on two tracts of land, including the plant facilities and cooling reservoir located east of SR 37 and a stormwater management area located west of SR 37.

The eastern tract is bounded by SR 37 on the west; and by CR 663, citrus groves, and mined lands on the east. The tract consists primarily of recently mined areas with water-filled mine cuts between overburden spoil piles surrounding a central, unmined parcel of land. The primary power plant facilities will be located on this unmined parcel. Two smaller, unmined tracts are located on the southeastern and southwestern portions of the plant site. The southwestern tract of approximately 180 acres will serve as the future by-product storage area disposal site, while the 50-acre southeastern tract will remain undisturbed.

In addition, the eastern tract includes a previously mined and unreclaimed parcel which provides some stabilized terrestrial habitat. The western portion of this parcel is currently being re-mined and will be reclaimed to a land-and-lake system. According to TEC's current conceptual plans, this parcel will be relatively undisturbed by the PPS operations and will primarily serve as a buffer area.

Most of the western tract of the PPS site has recently been or is currently being disturbed by mining operations. According to TEC's conceptual plans, the mined area will be reclaimed to a series of lakes and wetlands and used as a stormwater management area for the PPS. An approximately 175-acre northwestern portion which lies west of an existing FGT pipeline, and includes the unnamed tributary to the South Prong Alafia River, is not scheduled for mining.

As a result of past and ongoing mining activities on most of the site, the site provides only limited areas of undisturbed terrestrial, wetland, and

aquatic habitats. The following sections describe the issues, monitoring studies, and impact assessments which will be conducted to obtain the required information and describe the baseline conditions and potential impacts.

4.5.1.2 Issues and Potential Impacts

The principal issues, from a terrestrial ecology perspective, will be the assessment of impacts associated with the construction and operation of PPS on the biological and ecological resources of the site and surrounding areas. The impact assessment will address specific resources such as bald eagle nest sites, wading bird colonies, and important species of plants and animals listed by USFWS, Florida Game and Fresh Water Fish Commission (FGFWFC), and the Florida Committee on Rare and Endangered Plants and Animals (FCREPA). An inactive bald eagle nest is located on the southeastern portion of the plant site, and an active bald eagle nest is located within 0.5-mile of the site's eastern boundary. A representative list of important species occurring, or expected to occur, in Polk County is shown in Table 4.5-1.

In addition to protected species and their habitats, particular attention will be paid to potential onsite and offsite wetlands and aquatic habitats. Such wetlands include relatively undisturbed marshes, shrub/mixed swamps, narrow floodplain forest, reclaimed wetlands, and altered wetlands associated with mined areas. In contrast, no scrub or sandhill upland habitats are known to occur on the project site.

A unique issue to the proposed site is the development of mine reclamation plans as discussed in Section 2.3 of this POS. Such plans will need to address the provisions of FDNR's rules in Chapter 16C-16.051(4), (5), (9), and (10), F.A.C., for the re-establishment of herbaceous and forested wetlands, upland forests, and wildlife habitats.

Table 4.5-1. Protected Flora and Fauna Potentially Inhabiting the Project Site (Page 1 of 2)

Common Name	Scientific Name	Designated Status* FGFWFC[1]	FDACS[2]	USFWS[3]
PLANTS				
Water sundew	Drosera intermedia	--	R	--
Florida hartwrightia	Hartwrightia floridana	--	T	UR2
Spoon-flower	Peltandra sagittifolia	--	R	--
Needle palm	Rhapidophyllum hystrix	--	C	UR5
AMPHIBIANS AND REPTILES				
American alligator	Alligator mississippiensis	SSC	--	T(S/A)
Eastern indigo snake	Drymarchon corais couperi	T	--	T
Gopher tortoise	Gopherus polyphemus	SSC	--	UR2
Florida pine snake	Pituophis melanoleucus mugitus	SSC	--	UR2
Gopher frog	Rana aerolata	SSC	T	UR2
BIRDS				
Wood stork	Mycteria americana	E	--	E
Tricolored heron	Egretta tricolor	SSC	--	--
Peregrine falcon	Falco peregrinus	E	--	T
Red-cockaded woodpecker	Picoides borealis	T	--	E
Southeastern American kestrel	Falco sparverius paulus	T	--	UR2
Florida sandhill crane	Grus canadensis pratensis	T	--	--
Audubon's crested caracara	Polyborus plancus audubonii	T	--	T
Snowy egret	Egretta thula	SSC	--	--
Limpkin	Aramus guarauna	SSC	--	--
Florida burrowing owl	Athena cunicularia floridana	SSC	--	--
Southern bald eagle	Haliaeetus leucocephalus leucocephalus	T	--	E
MAMMALS				
Sherman's fox squirrel	Sciurus niger shermani	SSC	--	UR2
Florida long-tailed weasel	Mustela frenata peninsulae	--	--	UR2
Round-tailed muskrat	Neofiber alleni	--	--	UR2
Florida panther	Felis concolor coryi	E	--	E

Note:
E = Endangered
T = Threatened
SSC = Species of special concern

Table 4.5-1. Protected Flora and Fauna Potentially Inhabiting the Project Site
(Page 2 of 2)

R = Rare
C = Commercially exploited
UR2 = Under review for listing, but substantial evidence of biological vulnerability and/or threat is lacking.
UR5 = Still formally under review for listing, but no longer considered for listing because recent information indicates species is more widespread or abundant than previously believed.
T(S/A) = Threatened due to similarity of appearance.
1. FGFWFC (list published in Chapter 39-27.03-05, F.A.C.).
2. FDACS (list published in Preservation of Native Flora of Florida Act, Subsection 581.185-187, F.S.).
3. USFWS (list published in Endangered and Threatened Wildlife and Plants, 50 CFR 17.11-12).

Sources: FGFWFC, 1989.
ECT, 1990.

4.5.1.3 Program Objectives

The terrestrial ecology program is designed to obtain the baseline information necessary to characterize the site in accordance with specific regulatory requirements. As such, the terrestrial studies will result in a description of the composition, structure, and ecology of the site's biota under existing conditions, i.e., prior to plant construction. This information will serve as a basis for projecting impacts of the proposed facility to ecosystem structure and function, as well as to the species composition and diversity. This will allow a comprehensive assessment of expected and potential impacts on these resources resulting from site clearing and development, facility construction, and facility operation. The overall goal of the studies will be to provide the necessary information for the SCA/EA document.

The objectives of the baseline field studies are to provide a description of the flora and fauna of the site as required by regulations and to obtain information needed for the impact assessments. The required information includes: (1) identification of important flora and fauna on site, including state and federally listed species; (2) their habitats, abundance, and distribution; (3) the relationship between species; and (4) delineation of vegetation communities. The objectives of the vegetation studies are as follows:

1. Identify and delineate the plant communities on the site and important flora within 5 miles of the site that may reasonably be expected to be affected by the proposed facility;
2. Determine species composition, diversity, and distribution of plant communities on the site;
3. Determine the species-environmental relationships and successional status of these plant communities; and
4. Compliance of phosphate mine reclamation plans with the provisions of Chapter 16C-16.051(4), (5), (9), and (10), F.A.C.

4.5.1.4 Program Outputs/Products

Information for the following sections of Form 17-1.211(1), F.A.C., will be obtained as a result of the terrestrial ecology program:

- 2.0 Site and Vicinity Characterization
  - 2.3.5 Vegetation/Land Use
  - 2.3.6 Ecology
    - 2.3.6.1 Species/Environmental Relationship
    - 2.3.6.2 Pre-existing Stresses
    - 2.3.6.3 Measurement Programs
- 4.0 Effects of Site Preparation, and Plant and Associated Facilities Construction
  - 4.4 Ecological Impacts
- 5.0 Effects of Plant Operation
  - 5.6 Air Quality Impacts
  - 5.8 Changes in Non-Aquatic Species Populations
- 6.0 Transmission Lines and Other Linear Facilities
- 9.0 Phosphate Mine Reclamation Plan Amendments

Sufficient information will also be incorporated into the SCA/EA to address relevant portions of the following regulations:

1. U.S. Water Resources Council Principles and Standards for Water and Related Land Resources Planning--Level C, Final Rule;
2. Florida Endangered and Threatened Species Act of 1977 (Section 372.083, F.S.);
3. Section 404 of the Clean Water Act;
4. Executive Order 11988: Floodplain Management;
5. Executive Order 11990: Protection of Wetlands;
6. Federal PSD Permit Application: Information on effects of air emissions on vegetation, wildlife, and soils;
7. Endangered Species Act of 1973; and
8. Phosphate Mining (Chapter 16C-16.051, F.A.C.).

4.5.2 BASELINE INFORMATION AND MONITORING

4.5.2.1 Literature Review

A literature review will be conducted as part of the initial tasks. Specifically, this initial literature search will review maps and aerial photographs, and current listings of endangered and threatened species prepared by USFWS (listing plant and animal species), FGFWFC (listing animal species only), Florida Department of Agriculture and Consumer Services (FDACS) (listing plant species only), and FCREPA (listing both). Important plant and animal lists available from the CFRPC and the Florida Natural Areas Inventory (FNAI) will also be reviewed.

The literature search will include published material dealing with the area and studies in progress relating to:

1. Nature of regional biota,
2. Pre-existing environmental stresses,
3. Effect of existing land uses on site biota,
4. Potential occurrences of threatened and endangered species, and
5. Effects of the construction and operation of power plant on biota.

When applicable, computerized literature searches will be conducted. Contact will be made with FDER, FDNR, FGFWFC, SWFWMD, USACE, USFWS, SCS, University of South Florida, Florida State Museum, FIPR, and other appropriate sources. Relevant studies in progress will be sought.

4.5.2.2 Site Reconnaissance and Field Studies

The terrestrial ecology studies are described in the following sections. The effort consists of five tasks, including a preliminary site reconnaissance, literature review, agency consultation, and two terrestrial site surveys during dry and wet seasons.

Terrestrial ecology efforts will concentrate on: (1) the onsite, local, and regional status of important species; (2) species-environmental relationships; and (3) pre-existing stresses which may impact either the

onsite ecological conditions or species abundance and diversity. Special attention will be given to the occurrence of endangered species, to wetlands, and to other ecologically unique or sensitive features.

In February 1991, a preliminary site reconnaissance will be conducted as the initial field task. The purpose of this effort is to verify previously collected information and familiarize the principal ecologists and plant taxonomists with the major upland, wetland, and aquatic habitats of the site; locate potentially sensitive or unique areas; classify on-site and local vegetation communities; and identify land uses and existing stresses and impacts. The results of these field observations will be used to finalize the subsequent site-specific sampling and monitoring program, and provide relevant information necessary for the literature survey.

The initial onsite activities will include a preliminary designation of size and type of major vegetation communities, the number and locations of wetlands, and the locations of appropriate areas for intensive threatened and endangered species surveys. The following information will be marked on reproductions of aerial photographs (scale at least 1:400) of the site:

1. Preliminary designations of vegetation communities ($\geq$ 5 acres) and determination of the number and locations of sampling transects in each as determined by the diversity and size of each community. The Florida Land Use and Cover Classification System (FLUCCS) (Level III) will be used to designate vegetation types.
2. The number and locations of major wetlands to be evaluated.
3. The locations of appropriate areas for seasonal threatened and endangered species surveys.

After the initial site visit, detailed vegetation and wildlife surveys will be scheduled for a dry and wet season sampling effort. The following describes these efforts.

Vegetation Survey--All vegetation communities and associations on the proposed plant site will be identified and characterized by species composition and habitat structure. Quantitative sampling will be performed in the major plant communities that comprise the most unaltered sections of the plant site. Emphasis will be placed on five specific areas of the property: (1) the power plant facility area, (2) the by-product storage area, (3) the 50-acre inactive eagle's nest site, (4) the northern buffer area, and (5) the undisturbed area in the northwestern corner of the property. The power plant facility contains disturbed pine flatwoods, a few freshwater marshes, and a remnant portion of the historic headwaters of Little Payne Creek. The proposed by-product storage area also contains remnant flatwoods and marshes. The inactive eagle's nest site supports disturbed flatwoods. The northern buffer area supports primarily old field vegetation and some ponds, while the unmined area to be left intact contains a narrow floodplain along an unnamed tributary to the South Prong Alafia River, as well as some forested uplands and pastureland.

Quantitative sampling provides information on the abundance and relative importance of the more common plant species in each community. Comparisons of species composition among tree canopy, shrub, and ground cover as well as the comparisons between communities yield information valuable to understanding the relationships between species, successional status of communities, and species-environmental relationships. Understanding these relationships also provides a basis for determining the impacts of plant construction and operation on the regional biota. Tree canopy, shrub, and ground cover will be quantitatively sampled. Determination of the plant species composition, diversity, abundance, and structure within each major onsite vegetation community (i.e., vegetation communities covering more than 10 percent of the site's acreage) will be quantitatively sampled using standard sampling methodologies such as quadrats for canopy, shrub understory, and herbaceous ground cover strata; and transects for plant association determinations. The quality or condition of each plant community will be assessed.

Wildlife Surveys--This section describes the methodologies to be used in collecting wildlife data, including information about endangered and threatened species and species of special concern. Objectives and frequency of sampling are described for each group of species. Methodologies will be consolidated to include as many species as possible by using each method. A majority of the information needed for endangered and threatened species will be obtained while conducting studies on animal communities. Special studies will be conducted for certain species (see endangered and threatened species discussions in Section 4.5.2.4).

Sampling will be conducted seasonally (wet and dry season) to determine variations in abundance and distribution of resident species and utilization of the site by migrant species. Each major seasonal survey will be scheduled at a time when conditions are generally typical of that particular season. If required, additional field trips may be scheduled to monitor the currently inactive eagle's nest situated onsite. Factors which will determine the timing of such trips will be related primarily to hydrological aspects. However, potential nesting periods, particularly for wading birds and eagles, will also be included in this determination.

Birds, mammals, reptiles, and amphibians will be surveyed by the appropriate qualitative and quantitative techniques described below. Each observation will be recorded in a field notebook by date and habitat type.

Mammals of the site will be sampled during the spring and fall surveys. A series of small mammal trap lines will be set in the principal terrestrial and wetland habitats of the site. These traps will be set along flagged transects located in mixed oak-pine forest, marsh, and ruderal grasslands of the proposed by-product disposal area; and in mixed oak-pine forest and ruderal grasslands of the proposed power plant area. Each transect will contain 20 stations composed of a large and small Sherman live trap per station. These traps will be baited each afternoon, and checked each morning for a total of five consecutive nights for a total of 500 trap-nights.

Captured mammals will be identified to species by an experienced wildlife biologist, and released onsite.

Birds of the site will be censused in spring and fall during early morning and evening surveys along pre-established transects on different areas of the project site. Birds will be identified by direct sightings or calls during timed surveys in each of the principal onsite habitats by an experienced ornithologist. Surveys will be conducted during three consecutive days. Due to the generally open character of the site and predominance of aquatic species, no breeding bird transect counts are required.

Amphibians and reptiles of the site will be identified during searches of suitable terrestrial and aquatic habitats. Such searches of suitable habitat (e.g., dead falls, burrows) will be incidental to other field efforts, but will also include two nights of road surveys conducted during rain events. These nighttime road surveys will be conducted along Old Fort Green Road and SR 37. Voucher specimen of frogs and salamanders will be collected and preserved in formalin.

The outputs of the vegetation and wildlife surveys will be:

1. A vegetation map and list of dominant species,
2. A wildlife habitat map and list of species occurring onsite, and
3. Descriptions of site vegetation communities and wildlife habitat and populations.

4.5.2.3 Wetland Evaluation

A detailed analysis of the type, structure, extent, and functional status of onsite freshwater wetlands will be conducted. This will include evaluations of wetlands with regard to their vegetation composition, hydrology, and functions such as wildlife habitat, water storage, maintenance of water quality, and erosion control.

The purpose of the wetland evaluation is to identify and describe the wetlands associated with the site, to evaluate the functional quality of these wetlands, and to determine potential effects to offsite wetlands, which are adjacent or connected to onsite wetlands or are affected by withdrawal of groundwater. Information necessary to evaluate site wetlands includes wetland size, successional status, vegetation cover and composition, depth and duration of flooding, and degree of connection with other wetlands.

Wetlands onsite will be evaluated with regard to the functions provided such as water storage, erosion control, maintenance of water quality, and wildlife habitat. The evaluation will be based on wetland size and productivity as determined by percent vegetation cover, hydroperiod, species richness, degree of connection with other wetlands, and soil characteristics. The size and degree of connection of the wetlands will be estimated with the aid of aerial photographs; the area will then be ground-truthed to determine the location of the boundaries of wetland vegetation. The landward extent of wetlands will be determined primarily using plant indicator species as utilized by federal, state, and regional agencies in establishing their respective jurisdictional authorities. These limits will be flagged in the field with surveyors tape, field reviewed by the regulatory agencies for accuracy, and then surveyed. Acreages of potential impact will then be determined and appropriate measures to mitigate potential impacts will be evaluated. Offsite wetlands will be evaluated qualitatively. Observations in the field will be recorded in a bound field notebook and used to support evaluations and impact assessments along with appropriate references from technical literature. The outputs will include the wetland evaluation and mapping.

4.5.2.4 Threatened and Endangered Species Analysis

A detailed species-environmental analysis for "important" species including species listed as endangered and threatened will be provided. These analyses will include descriptions of area and habitat use, key life history aspects, and relevant inter-specific and abiotic relationships.

In the unlikely event that a federally-listed species resides within the boundaries of the project site, a biological assessment using the USFWS format will be prepared.

This analysis is necessary to reveal the presence or likelihood of occurrence of any threatened or endangered species or species proposed for such classification and critical habitat. "Rare, endangered, threatened, or protected species" are species officially designated as such by USFWS or Florida state agencies such as FGFWFC and FDACS. Information to be obtained includes USFWS and state lists, information in FNAI files, potential for occurrence of the species onsite, and whether the species is observed onsite. If a threatened or endangered species occurs, information necessary to plan mitigative measures will be obtained.

In order to record the potential seasonal occurrence of threatened and endangered species, plant and animal species surveys will be conducted during each quarter; the time expended will vary depending on species characteristics and the probability of endangered species occurrence. Both the inactive and active eagles' nests described earlier will also be monitored at quarterly events. Any change in nest status and eagle activity will be documented.

4.5.2.5 Pre-existing Stress Survey

Pre-existing stress surveys will be conducted to identify existing natural or man-made stresses which do, or have the potential to, adversely impact the ecological conditions, or alter the diversity, abundance, or distribution of plants and animals on the site and surrounding area. This stress survey will be conducted during the late summer to coincide with a period of maximum plant emergence and wildlife abundance. The purpose of such a survey is to document existing impacts prior to site clearing activities for the proposed facilities. Photographs will be taken to document onsite examples of existing stresses to foliage, plant growth, habitat structure, wetland drainage or recharge, and land use alterations.

The pre-existing stress survey will identify currently existing environmental stresses from sources such as pollutants or natural stresses. Information about historic stresses, if any, in the area will be reviewed.

4.5.3 IMPACT ANALYSES

4.5.3.1 Construction Impacts

Impact analysis will be based on a detailed review of the clearing, site preparation and construction practices for the proposed facilities. This will include a description of potential and/or expected changes, including favorable environmental effects, adverse environmental effects which cannot be avoided, and the expected short- and long-term adjustments in species composition, habitat usage, and community structure. Information from baseline terrestrial studies, site conceptual layout and development plans, other discipline studies, and technical literature will be synthesized to determine the impacts.

Localized indirect impacts would include noise pollution, air pollution, human activity in the area, and potential degradation of water quality. Since the site and adjacent properties have been previously altered through mining practices, it cannot be considered natural or undisturbed in its existing condition. This condition will be considered throughout the impact analysis.

The specific impact assessment tasks will consist of describing the expected effect of site preparation on terrestrial ecosystems, and construction and operation of the plant and associated facilities. Changes in land cover due to clearing, construction, and other activities will be described. Acreage of affected vegetation communities will be determined by planimetry. The overlay technique will also be used to assess impacts on sensitive areas, populations of endangered or rare species, and wildlife corridors and habitat associations. These overlays may be used for determining the most suitable plant location. In addition, mitigating measures for expected impacts will be proposed.

4.5.3.2 Operational Impacts

Potential unavoidable and irreversible environmental effects associated with plant operation will be described and measures for mitigating any adverse impacts will be discussed. Potential operational effects may include degradation of adjacent habitats and displacement of species due to hydrological alterations, stack emissions, and increases in noises. The potential impacts will also be compared against the environmental conditions of the site as can reasonably be expected to occur with reclamation.

Potential impacts of the proposed well field and cooling water reservoir on biological elements, such as adjacent wetlands, will also be evaluated and discussed. This analysis will be based on data developed in the hydrological tasks. Air emission effects on soils, vegetation, and wildlife due to possible gaseous and trace element emissions from the proposed plant will be assessed. Particular emphasis will be placed on commercially important vegetation, endangered and threatened species, other important wildlife, and sensitive natural areas. Predicted impacts of the proposed plant will be obtained from the air quality dispersion modeling analysis. The values obtained will be compared to literature values and the stress survey results for threshold of injury levels or other indirect effects. Increases in noise levels and potential effects to the wildlife in the project area will also be assessed. However, due to historic, current, and future mining activities within the region, it is not expected that the proposed project will have any significant additional adverse impacts to wildlife populations in the vicinity due to increased noise levels.

4.6 SOCIOECONOMICS/LAND USE/AESTHETICS

4.6.1 INTRODUCTION

4.6.1.1 Background

The PPS site is located in southwest Polk County. The project site is bordered on the south by Wimauma Road/SR 674, to the north by CR 630 to the east by CR 663, and is bisected by SR 37 in a northeast/southwest direction. CSX Transportation Railroad line is adjacent to the east of CR 663.

The majority of the site is currently developed by Agrico as a phosphate mine. Because of current and proposed future mining activities, the site will be in a disturbed condition at the commencement of the development of the proposed power plant at this site. However, plans have been developed to reclaim the disturbed lands resulting from phosphate mining activities as discussed in Section 2.3 of this POS.

The nearest area of residential development is the unincorporated community of Bradley Junction, approximately 4 miles to the north. As shown in Figure 4.6-1, the nearest incorporated communities are Mulberry, approximately 12 miles to the north, and Fort Meade, approximately 12 miles to the east of the PPS site. Larger incorporated communities lying within a 45-minute commuting distance include Bartow, approximately 12 miles northeast; Lakeland, approximately 20 miles north; Winter Haven, approximately 26 miles to the northeast; Plant City, approximately 20 miles to the northwest; and the Tampa urban area including Brandon, whose outer fringe is located approximately 25 miles west-northwest of the PPS site.

4.6.1.2 Issues and Potential Impacts

The potential issues and impacts associated with the proposed PPS include economics, transportation, land use compatibility, aesthetics, and scenic and natural landmarks. The potential issues and impacts, however, are likely to be focused on economic impacts (i.e., benefits derived from increased employment and enlarged tax base), and those impacts associated

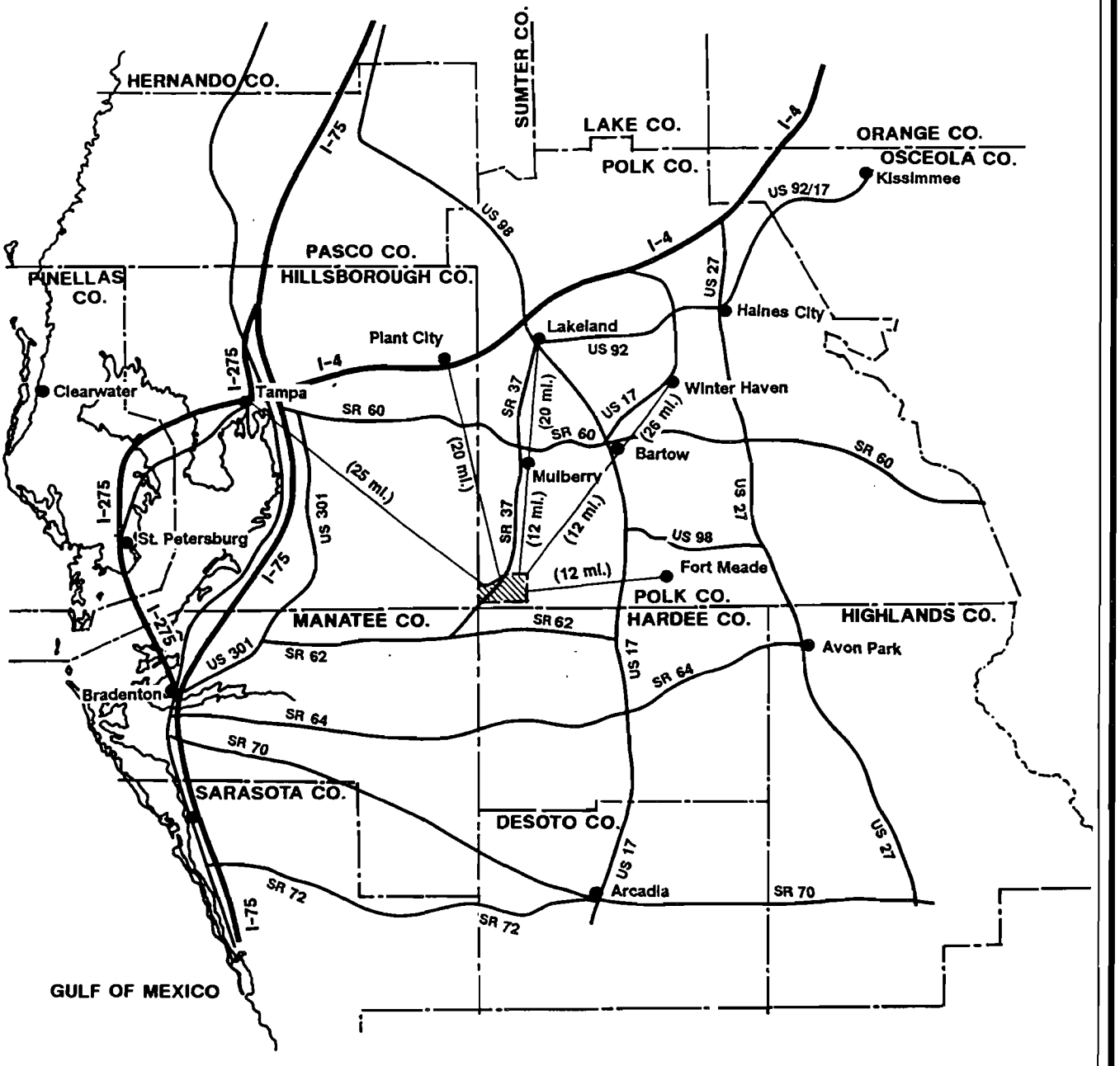

FIGURE 4.6-1.
COMMUNITY LOCATION WITHIN THE REGIONAL STUDY AREA OF THE STATION SITE

Source: ECT, 1991.

TAMPA ELECTRIC
A TECO ENERGY COMPANY

with the transportation of workers and supplies to and from the site. The size of the workforce is not anticipated to be large enough to create excessive demands on services and facilities in surrounding communities. Site access, traffic volumes, and safety issues associated with increased traffic will be carefully considered. Approximately 60 homes are near the portion of the project site west of SR 37, and adjacent to Bethlehem and Albritton Roads. However, as previously described, the areas west of SR 37 are currently being mined and are designated for stormwater management. Due to the natural character of this type of development, negative visual impacts are not expected to residences in this area. One residence is located near the project site east of SR 37, adjacent to CR 663. Due to the sparse residential population and disturbed character of lands in this area, aesthetic impacts are also not expected to be significant for areas east of SR 37.

4.6.1.3 Program Objectives

The program objectives of the socioeconomic/land use portions of the study are to identify and evaluate both the positive and negative impacts which are projected due to the construction and operation of the PPS. This evaluation will be based on an analysis of existing baseline conditions to which projected impacts will be compared. The evaluation of these positive and negative impacts will be presented in a benefit/cost analysis. Where appropriate, steps to mitigate the projected negative impacts will be identified.

4.6.1.4 Program Outputs/Products

As a result of the socioeconomic/land use program, information for the following sections of the SCA/EA, as required by FDER Form 17-1.211(1), F.A.C., will be provided:

2.0 Site and Vicinity Characterization
- 2.2 Socio-Political Environment
  - 2.2.1 Governmental Jurisdictions
  - 2.2.2 Zoning and Land Use Plans
  - 2.2.3 Demography and Ongoing Land Use

2.2.4 Easements, Title, Agency Works
2.2.5 Regional Scenic, Cultural and Natural Landmarks
2.2.7 Socioeconomics and Public Services

4.0 Effects of Site Preparation, and Plant and Associated Facilities Construction
4.1 Land Impact
4.1.1 General Construction Impacts
4.1.2 Roads
4.6 Impact on Human Populations
4.7 Impact on Landmarks and Sensitive Areas
4.9 Special Features
4.10 Benefits From Construction
4.11 Variances

6.0 Transmission Lines and Other Linear Facilities
6.1.6 Socio-Political Environment of the Corridor Area
6.1.8 Effects of Right-of-Way Preparation and Transmission Line Construction
6.1.9 Post-Construction Impacts and Effects of Maintenance

7.0 Economic and Social Effects of Plant Construction and Operation
7.1 Socio-Economic Benefits
7.2 Socio-Economic Costs
7.2.1 Temporary External Costs
7.2.2 Long-term External Costs

11.0 Appendices
11.2 Zoning Descriptions
11.3 Land Use Plan Descriptions

4.6.2 BASELINE INFORMATION AND MONITORING

4.6.2.1 Literature Review

Social, economic, and land use characteristics will be developed in relation to the PPS project over three different geographic scales of influence. These scales of analysis will include the following: (1) the

project site itself; (2) a local study area determined by a 5-mile radius drawn from the proposed location of the stack; and (3) on a regional basis, Polk and Hillsborough Counties. The relevant data sources will include:

1. Local
    a. City of Lakeland Community Development Department
    b. City of Winter Haven Planning Department
    c. Polk County Planning Division
    d. Polk County Zoning Division
    e. Polk County Engineering Division
    f. Polk County Property Appraiser
    g. Polk County Board of Education
    h. Polk County Chamber of Commerce
    i. Polk County Sheriff's Department
    j. Polk County Fire Department
    k. Polk County Public Works Department
    l. Polk Count Utilities Department
    m. Hillsborough County City-County Planning Commission
    n. Hillsborough County Planning and Zoning Department
    o. Hillsborough County Engineering Department
    p. Hillsborough County Property Appraiser
    q. Hillsborough County Board of Education
    r. Hillsborough Count Chamber of Commerce
    s. Hillsborough County Sheriff's Department
    t. Hillsborough County Fire Department
    u. Hillsborough County Public Works Department
    v. Hillsborough County Utilities Department
2. Regional
    a. CFRPC
    b. TBRPC
    c. SWFWMD
3. State
    a. Florida Department of Community Affairs
    b. FDNR

c. FDOT, District One - Bartow
d. FDOT, District Seven -Tampa
e. Florida Department of Banking and Finance
f. Florida Department of Commerce
g. Florida Department of Education
h. Florida Department of Labor and Employment Security (FDLES)
i. Florida Department of Health and Rehabilitation Service
j. Florida Department of Revenue
k. Florida Department of State, Division of Historical Resources (FDHR)
l. University of Florida, Bureau of Economic and Business Research

4. Federal
   a. SCS
   b. USGS
   c. United States Department of Commerce, Bureau of the Census

The validity and reliability of this data will be verified by these agencies, and where available, compared against comparable data obtained from independent sources.

4.6.2.2 Site-Specific Investigation and Data Analysis

Field investigations will be performed in addition to agency contacts and literature review, in order to update and expand published data for land use, housing, development patterns, transportation, aesthetics, etc. During field evaluations, photographs will be taken to document the investigations, supplement field notes, and provide assurances to accurate field interpretations.

The data analysis will be based on literature review, verification, and field evaluation of socioeconomic, land use, and transportation characteristics. These characteristics will establish the existing baseline socioeconomic environment, and will form the basis for the impact

evaluation. The following elements will be included in the baseline analysis:

1. Demography and housing
   a. Human settlements
   b. Population characteristics
   c. Housing characteristics
2. Land use and zoning
   a. Existing land use development patterns
   b. Zoning classifications, ordinances, and land development regulations
   c. Future land use designations, and supplemental data from comprehensive plans
   d. Prime and unique farmland
   e. Sensitive areas
   f. Aesthetics
3. Community services and facilities
   a. Potable water
   b. Wastewater treatment
   c. Solid waste disposal
   d. Energy
   e. Police protection
   f. Fire protection
   g. Health services
   h. Education
   i. Recreation
4. Transportation systems
   a. Major roadway corridors including functional classification and level-of-service (LOS) rating
   b. Airport facilities
   c. Programmed transportation improvements (roadway and airport)
   d. Railroads
   e. Mass transit
5. Economy
   a. Labor force

b. Employment
c. Income
d. Government revenues

Baseline characteristics will be identified and mapped within the site boundaries, a local area defined by a 5-mile radius surrounding the site, and as necessary, the region.

The PPS site boundaries and adjacent area abutting uses will be identified and mapped at a graphic scale of 1 inch equals 2,000 ft (1:24,000 proportional scale) on USGS 7.5 minute topographic quadrangle maps. This map will also identify areas within the site which are within the 100-year flood zone, and also include site data regarding total acreage, and existing and proposed uses.

Boundaries of towns and cities located within the 5-mile study area will be identified and mapped at a graphic scale of 1 inch equals 2 miles (1:126,720 proportional scale) on FDOT County General Highway maps. Sensitive environmental areas classified as preserves, parks, and special management areas according to local, regional, state, or federal designations located within the 5-mile study areas will also be identified and mapped also at a graphic scale of 1 inch equals 2 miles on FDOT General Highway maps. If environmentally protected or preserved areas are found within 1 mile of the PPS site boundaries, they will be identified and mapped at a graphic scale of 1 inch equals 2,000 ft on USGS 7.5 minute quadrangle maps.

Future land use designations according to county comprehensive plans and zoning classifications according to county zoning ordinances and land development regulations within the 5-mile study area will be determined and mapped at a graphic scale of 1 inch equals 2 miles on FDOT General Highway maps. The characteristics of existing land use development patterns within the 5-mile study area will be described, and mapped according to the FLUCCS to Level II detail at a graphic scale of 1 inch

equals 1 mile (1:63,360 proportional scale) on photo-reduced versions of USGS 7.5 minute quadrangle maps. Residences within the 5-mile study area will also be identified and mapped at a scale of 1 inch equals 2,000 ft.

The presence of any regional scenic, cultural, and/or natural landmarks within the 5-mile study area will also be determined and mapped at a graphic scale of 1 inch equals 2 miles on FDOT General Highway Maps. Any easements, titles, or agency works normally required by governmental agencies for the development of land within the site boundaries will also be described.

4.6.3 IMPACT ANALYSES

4.6.3.1 Construction Impacts

The projected social, economic, land use, and transportation effects resulting from the construction of the proposed power station will be evaluated onsite, within the 5-mile study area, and on a regional basis using information obtained as previously described. The analysis will include an investigation of the effects of site preparation, and will identify primary and secondary effects, resource commitments, alternatives, and mitigation measures, as required.

Socioeconomic costs and benefits anticipated to result from the construction of the proposed project will also be identified. The external costs and benefits will be identified in terms of extent and duration.

Methodologies to be used in estimating impacts include the following:

1. Inventories and economic studies for agricultural impacts as appropriate,
2. Supply/demand analysis of housing and community facility impacts, and
3. Capacity/demand analysis of traffic impacts.

Characteristics of the construction work force will be reviewed and analyzed based on existing literature and input from TEC. Impacts will be

addressed, particularly during peak construction, to determine worse-case impacts. Construction impacts will emphasize the short-term, temporary nature of construction activities.

The following discussion summarizes the major socioeconomic/land use issues to be examined relating to potential construction-related impacts.

Population--Changes in population with and without the proposed project will be analyzed for the construction period. Population anticipated as a result of the project will be based on employment information supplied by TEC, and the indirect/induced workers and dependents will be estimated. An evaluation will be made of the changes in demographic characteristics and how these changes will affect the local communities.

Land Use--The effects of the proposed project on the site and within the 5-mile study area will be assessed. Emphasis will be placed on potential changes in and the compatibility with existing land use development patterns, future land use designations based on county comprehensive plans, and zoning classifications according to zoning ordinances and land development regulations. This compatibility analysis will include a discussion of potential construction-related impacts on residential areas and other sensitive receptors. Potential conflicts between the proposed project and these land development characteristics, and the probable residential locations of the construction workforce will be evaluated.

Community and Transportation Facilities and Services--The projected impacts upon existing and planned community and transportation facilities, services, and infrastructure due to site construction within a regional impact area will be determined and evaluated.

The transporation analysis will be conducted on the primary modes of transportation (i.e., highways, rail, and air). Major roads and highways in the local area will be identified according to their functional classification and LOS rating. Additional traffic generated by construc-

tion of the proposed project at times of peak construction activity will be estimated and used to estimate the worst-case scenario traffic volumes and level of service impacts on local roads.

The need for, and availability of, housing for the peak construction workforce will be estimated using baseline housing characteristics such as housing mix, vacancy rates, and availability of accommodations for transients.

Economics--Economic impact forecasts will be generated for the construction period. The proposed economic impact methodology involves the estimation of construction-related impacts based on regional economic multipliers, construction expenditures, and direct construction labor and indirect support and income projections. The fiscal impact analysis will cover public costs and revenues that are directly created by the proposed project.

Income projections will be based on specific, county wage data obtained from the FDLES, Bureau of Labor Market Information.

4.6.3.2 Operational Impacts

Operation impacts on socioeconomic/land use/aesthetic resources will be determined in a manner similar to the impact methodologies identified for construction impacts. Emphasis will be placed on long-term impacts for the duration of plant operations instead of short-term, temporary impacts. Average operational characteristics will be determined with assistance from TEC to determine the project effects in relation to population, land use, community and transportation facilities, and economics.

Identification and evaluation of impacts during the operation of the proposed project will be addressed by projecting plant operating characteristics (tax revenues, payrolls, workforce, etc.) onto baseline conditions. The projected future baseline conditions will be based on available data projections (i.e., population and housing projections,

future land use plans) where available. In the absence of suitable and available data regarding projected future conditions, current available data will be extrapolated into forecasted baseline conditions based on observed trends.

The following discussion briefly summarizes the analysis of socioeconomic/land use impacts projected to result from the operation of the PPS. The discussion is divided into major issues consisting of population, land use, community and transportation facilities and services, and economics.

Population--Changes in population with and without the operation of the proposed project will be analyzed. Population anticipated as a result of the operation of the project will be based on information provided by TEC, and the indirect/induced workers and dependents will be estimated. An evaluation will be made concerning changes in demographic characteristics, and the impact of these potential changes on the local communities.

Land Use--The analysis of potential land use impacts resulting from the operation of the proposed project will focus on compatibility of the site with adjacent land uses. This analysis will include an evaluation of the projects proximity to residential areas and other sensitive receptors. As future land use development patterns will be in all probability determined by the county comprehensive plans, future land use maps will serve as the basis for this compatibility analysis. Other land use related issues such as specific goals, objectives, and policies found in county comprehensive plans and regional planning council regional policy plans will also be reviewed for potential consistency or conflict.

Community and Transportation Facilities and Services--The potential impacts upon community services, transportation facilities, and infrastructure that will directly result from the projected project's operational-related population growth will be estimated. Because the operational workforce is expected to be relatively small compared to the size of the workforce in the region, impacts upon these facilities,

services, and infrastructure are expected to be minimal. These potential impacts will also be largely determined by the pattern of distribution of these operational workers within the region. The analysis will include an estimation of the distribution of residential settlement patterns of the operational workforce, as influenced by the sparsely populated surrounding area, and as based on an accepted one-way average commuting distance of 45 minutes (EPRI, 1982).

Characteristics of the operational workforces and their families will be projected from the review and analysis of existing literature. The additional long-term demand upon public services including police, fire, medical, education, and recreation facilities resulting from the incoming operational workforce will be estimated. Impacts on these facilities, services will be addressed, and the cost of providing additional services to offset increased demand will be estimated. The availability of housing within the regional area will be estimated using forecasted baseline housing characteristics found in pertinent information (i.e., housing elements of county comprehensive plans). Additional demand upon this forecasted future housing stock resulting from the population growth associated with the operational workforce will also be estimated.

Transportation impacts resulting from the operation of the proposed project will focus on additional traffic volumes created by those workers ingressing and egressing the site. There traffic volumes will be added to forecasted background traffic to determine impacts on the functional capacities and LOS ratings of major roadways within the 5-mile study area.

Economics--Economic impact forecasts will be generated for the operational period. The proposed economic impact methodology involves the estimation of operational-related impacts based on regional economic multipliers, projected plant facility capital investments and payroll. Income information for the operational workforce will be provided by TEC, and will be referenced against specific county wage data obtained from the FDLES, Bureau of Labor Market Information. The fiscal impact analysis

include those estimated public costs and revenues that are directly created by the operation of the proposed project.

4.7 ARCHAEOLOGY/HISTORY

4.7.1 INTRODUCTION

4.7.1.1 Background

As mentioned in previous sections, portions of the proposed plant site have been mined and other portions have been approved for mining. According to the FDHR, a single prehistoric, lithic artifact of unknown origin is listed in the Master Site File within Section 7, Township 32 South, Range 23 East (see Appendix B).

This artifact is not eligible for listing on the National Register of Historic Places, nor is it considered significant at a district scale or on a local level. Therefore, damage to or destruction of this archaeological site does not constitute an adverse impact to regionally significant cultural resources.

DHR has stated that significant archaeological and/or historic resources may be contained in portions of the site not previously subject to mining activities especially in Section 4 of Township 32 South, Range 23 East (see Appendix C). A cultural resource assessment will be conducted. All other portions of the site, however, can be developed without further interaction with the DHR.

4.7.1.2 Issues and Potential Impacts

Power plant construction activities have the potential to alter or destroy unknown significant archaeological and historical resources.

4.7.1.3 Program Objectives

The objectives of the archaeological and historical analyses will be to verify the archaeological/historical conditions of the site and to identify any significant archaeological and historical resources on site that may be effected by construction activities and to develop mitigation plans to preserve such resources.

4.7.1.4 Program Outputs/Products

Based on the archaeological and historic resource investigations, information will be provided for the following sections of the SCA/EA in accordance with the FDER Form 17-1.211(1), F.A.C.:

2.0 Site and Vicinity Characterization
2.2.6 Archaeological and Historic Sites

4.0 Effects of Site Preparation, and Plant and Associated Facilities Construction
4.8 Impact on Archaeological and Historic Sites

5.0 Effects of Plant Operation
5.10 Archaeological Sites

4.7.2 BASELINE INFORMATION AND MONITORING

4.7.2.1 Literature Review

The task will involve a literature search and review of existing archaeological and historical information on the site including relevant mining DRIs, contact with applicable historical organizations, libraries, local information sources, and review of state and national historic registers. Information obtained through research efforts will be used to develop hypotheses concerning the potential for archaeological and historic findings occurring on the proposed project site. The Florida State Historic Preservation Officer (FSHPO) will be contacted to review the project site location and findings of the literature review, and to determine if future exploration and/or preservation will be required.

4.7.2.2 Site-Specific Investigation

If no archaeological survey has been conducted for the site and/or the potential for significant resources to occur on the site is identified by the FSHPO, a detailed walkover survey of the site and associated facilities will be conducted. The survey will include excavation of subsurface test pits using standard archaeological methodology. If resources are found they will be evaluated for their significance in terms of cultural value, quality, and uniqueness. Recommendations will be made and, if applicable, preservation techniques will be investigated.

A detailed methodology describing the activities undertaken for the cultural resource survey will be prepared by the contract archaeologist and reviewed by the FSHPO prior to initiation.

Literature search methodology and site survey and excavation processes, including the criteria to be used to determine the locations of test pits, will be identified in the contract archaeologist's plan of study.

4.7.3 IMPACT ANALYSES

The impact analysis will be based on spatial arrangement of any cultural resources identified (if any) in relation to ground clearing, construction and operational activities. The impact of the proposed project on all archaeological and historical sites will be analyzed. Alternatives and mitigative measures will be included as necessary.

4.8 NOISE

4.8.1 INTRODUCTION

4.8.1.1 Background

The proposed facility will be located primarily in an area of agricultural and mining land uses with sparse residential development. Noise-sensitive receptors in this area include residences and a church. A residence located to the east of the site along CR 663, and residences and the church located west of SR 37 are the closest sensitive receptors in the site vicinity. Plant construction and operation, the use of service vehicles, and increased traffic on the roadways may cause indirect impacts of elevated noise levels at the noise-sensitive receptors.

Existing noise levels in the area are influenced by phosphate mining activities, agricultural activities, occasional airplanes, car and truck traffic on SR 37, and the CSX Railroad.

4.8.1.2 Issues and Potential Impacts

The construction and operation of the facility will generate localized noise. Noise from construction will originate from heavy equipment during site development and from activities associated with the physical construction of the major plant components. The major operational noise sources will be the power blocks, coal handling activities, and the by-product storage area. Increased traffic will also elevate noise levels.

The SCA/EA submission requires addressing potential noise impacts to the surrounding communities. FDER has not promulgated noise regulations; however, EPA (1973, 1974) has promulgated public health and welfare criteria for noise which will be used to assess the significance of noise generated by the project.

4.8.1.3 Program Objectives

The objectives of the noise studies are to develop baseline information on the site and assess the potential noise impacts of the project.

4.8.1.4 Program Outputs/Products

The information developed in this task will be incorporated into the SCA/EA document to fulfill the following requirements of Form 17-1.211(1), F.A.C.:

2.0 Site and Vicinity Characterization
  2.3.8 Noise
4.0 Effects of Site Preparation, and Plant and Associated Facilities Construction
  4.6 Impact on Human Populations
5.0 Effects of Plant Operation
  5.7 Noise

4.8.2 BASELINE INFORMATION AND MONITORING

Baseline noise data are required to assess the existing noise levels at the proposed site. A survey of the site area has identified noise-sensitive receptors. Figure 4.8-1 shows residential areas closest to the site. The proposed locations of the noise monitors are also shown in Figure 4.8-1. The monitors will be placed in residential areas next to the property line. Monitoring will also be conducted at the Agrico Fort Green Mine south of the site, and at draglines currently mining near the residences to develop a thorough description of noise levels in the area.

Monitoring at each location will be made during each of two 24-hour periods. Noise levels will be measured by a Type I (precision) sound-level meter with an octave band filter, and reported as A-weighted decibels.

A literature review will be conducted to locate pertinent and relevant information on noise levels for construction and operation sources. A useful document to be reviewed is *Noise from Construction Equipment and Operations, Building Equipment, and Home Appliances* (EPA, 1971).

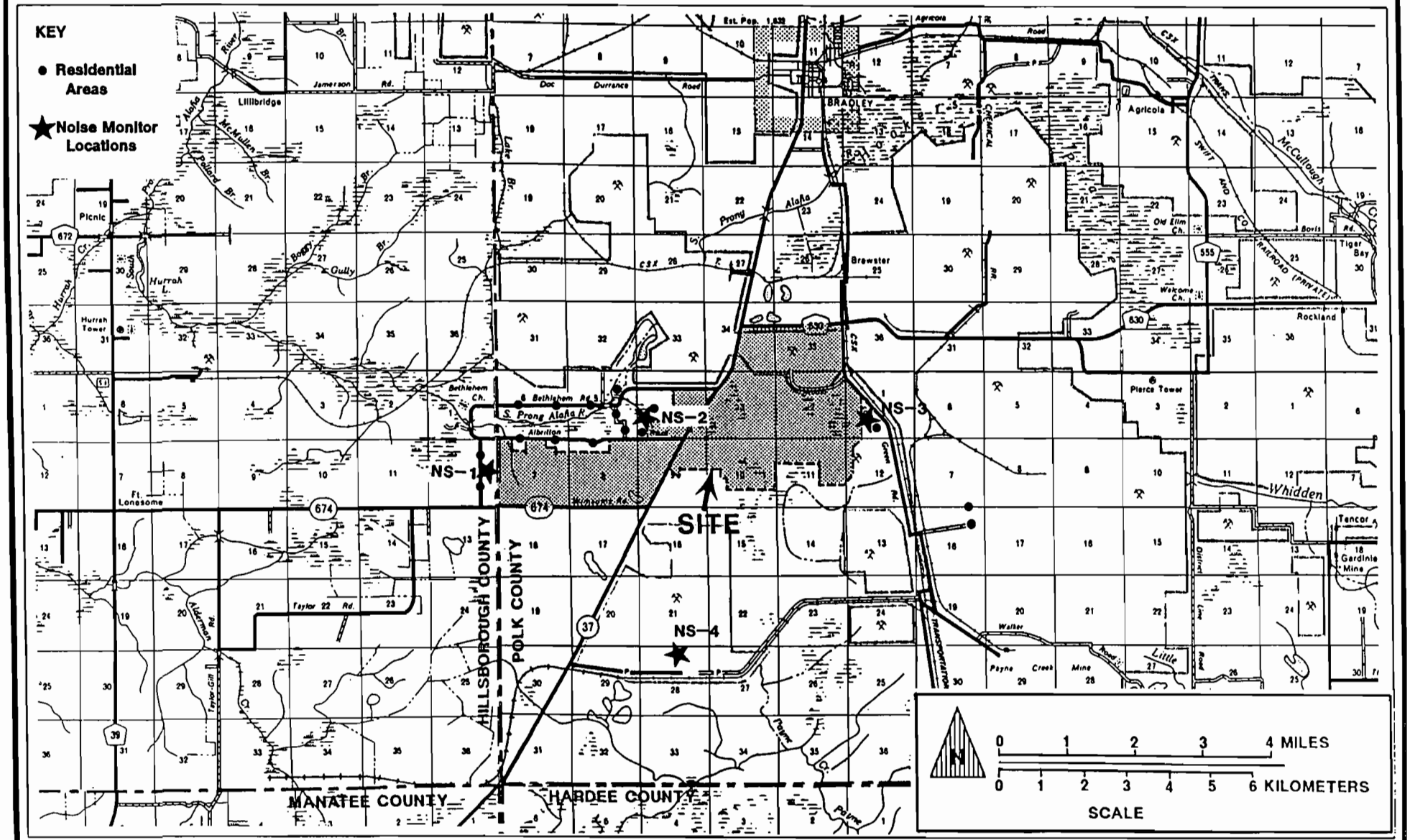

FIGURE 4.8-1.

LOCATIONS OF RESIDENTIAL AREAS AND PROPOSED NOISE MONITORS

Source: ECT, 1991.

TAMPA ELECTRIC

A TECO ENERGY COMPANY

4.8.3 IMPACT ANALYSES

Noise levels for construction and operation sources will be developed based on the design of the facility. Noise sources will be categorized by plant equipment and location layout as well as noise characteristics (frequency). These data will be used to determine their geometric-acoustical relationship to each other and surrounding sensitive receptors. Noise levels in the surrounding area will be projected from equipment emission levels by taking into account the attenuation of sound pressure levels with distance, and, as appropriate, vegetative, atmospheric, and building attenuation. Baseline noise levels shall be integrated with the projected noise levels from the proposed facility, using the NOISECALC model (1985), to obtain total noise levels projected during construction and operation. Impacts will be evaluated on the basis of comparison with EPA, Federal Highway Administration (FHWA), and the U.S. Department of Housing and Urban Development noise guidelines. A general EPA guideline for noise levels at the edge of the property line is 55 A-weighted decibels (dBA). FHWA guidelines include absolute levels at the edge of the property of 67 dBA for residential sites, and 72 dBA for commercial sites.

5.0 ENGINEERING ALTERNATIVES AND ASSESSMENT

The FEPPSA and NEPA require a discussion of plant facility alternatives. Alternative design concepts for plant facilities will be developed and incorporated into the SCA/EA document. Design alternatives will include air pollution control technologies, water supply systems, cooling water systems, discharge structures and their location, wastewater treatment systems, fuel delivery, by-product storage, and others.

Practical alternative sites have been addressed in TEC's 1991 Ten-Year Site Plan (TEC, 1991) and the Power Plant Site Selection Assessment (TEC, 1990) referred to in Section 1.0 of this POS. Both of these documents will be referenced in Chapter 8 of the SCA/EA document as part of the alternative sites discussion.

Alternative energy sources have been addressed in TEC's 1991 Ten-Year Site Plan (TEC, 1991) and will be addressed as part of TEC's Petition for Determination of Need to the Public Service Commission, which will be incorporated as part of Chapter 1.0 of the SCA/EA.

6.0 ASSOCIATED FACILITIES

6.1 TRANSMISSION LINE CORRIDORS

6.1.1 BACKGROUND AND PROGRAM OBJECTIVES

As discussed in Section 1.4, the PPS will be connected to the TEC and peninsular Florida electrical power grid by a number of new 230-kV transmission line interconnections. The general location of the proposed transmission interconnection points and corridor study areas were depicted in Figure 1.4-2.

Major issues in the transmission line corridor study areas include: (1) wetlands, (2) threatened and endangered species, (3) proximity to residential areas, (4) rivers and streams, and (5) phosphate mines.

For the transmission lines to be either looping to or located within the Hardee/Pebbledale transmission line corridor, corridor studies will focus on the impacts the additional circuits will have on the existing corridor. For the other transmission lines, corridor studies will focus on corridor selection and environmental impacts analysis. The objective of the corridor selection studies is the selection of the most favorable corridor (i.e., up to 1 mile in width) on the basis of socioeconomic, environmental, and engineering considerations.

The objective of the corridor impacts studies is primarily the fulfillment of the following requirements of Form 17-1.211(1), F.A.C.:

6.0 Transmission Lines and Other Linear Facilities
- 6.1 Transmission Lines
  - 6.1.1 Project Introduction
  - 6.1.2 Corridor Location and Layout
  - 6.1.3 Transmission Line and Road Design Characteristics
  - 6.1.4 Cost Projections
  - 6.1.5 Corridor Selection
  - 6.1.6 Socio-Political Environment of the Corridor Area

6.1.7 Bio-Physical Environment of the Corridor Area
6.1.8 Effects of Right-of-Way Preparation and Transmission Line Construction
6.1.9 Post-Construction Impacts and Effects of Maintenance

6.1.2 CORRIDOR SELECTION

The corridor selection studies consist of three major tasks: (1) regional resources screening and mapping, (2) identification of candidate corridors, and (3) selection of the preferred corridors.

The first task involves the compilation of accurate mapping and rating of socioeconomic and environmental resources within the study area. This task will identify land areas which restrict siting of the corridor. Examples of such possible restrictions include developed residential areas, known critical habitats, and wetlands. Relevant information will be mapped.

The second task involves the identification of candidate corridors up to 1 mile wide. Criteria to be considered include but are not limited to:

1. The most direct route between end-points,
2. Other linear facilities rights-of-way,
3. Phosphate mines, and
4. Critical habitats.

Once candidate corridors are selected, a more detailed analysis of the candidate corridors will be performed. This analysis will focus on the socioeconomic, environmental, and engineering problems that the location of the actual transmission line right-of-way within a candidate corridor may pose. Existing data, supported by helicopter flyovers and targeted groundtruthing, will be used to identify siting constraints within the candidate corridors. General cost comparison of the corridors will be performed. These costs will reflect general construction and operation costs. The costs will be for relative comparison only to indicate the

probable cost of transmission lines in one corridor over another. The selected corridor will be that which provides the best balance of all criteria considered.

6.1.3 IMPACT ANALYSES

The preferred corridor will be evaluated in detail for impacts to the following:

1. Socioeconomics/land use,
2. Ecology,
3. Water resources, and
4. Electric and magnetic fields (EMF).

The impacts analysis will incorporate methodology already outlined in Chapter 4.0 of this POS for socioeconomic/land use, ecology, and water resources. TEC will perform the required EMF analysis to determine the impacts associated with the proposed lines.

6.2 NATURAL GAS AND FUEL OIL PIPELINES

The proposed 440-MW CC facilities will be primarily fired by natural gas with No. 2 fuel oil as backup. The FGT Sarasota lateral natural gas pipeline crosses the western tract of the PPS site and then along SR 37 between the western and eastern tracts. Since TEC is proposing to connect to that pipeline, no corridor selection study will be necessary. Impact studies will focus on the best location to interconnect with the pipeline.

Fuel oil will be delivered to the site by truck from either Port Tampa or Port Manatee, or by pipeline connection to the proposed GATX pipeline which would run along CR 663 adjacent to the eastern boundary of the PPS site. Again, since this proposed pipeline is adjacent to the site, no corridor selection study will be necessary and potential impacts will be minimal.

6.3 COOLING WATER DISCHARGE SYSTEM

6.3.1 BACKGROUND

TEC is proposing the construction of a cooling water reservoir which will be designed to require discharge only under extreme storm conditions. The intermittent discharges from the cooling water reservoir will be directed through an approximately 1,521-acre stormwater management system west of SR 37 which ultimately discharges to an unnamed tributary of the South Prong Alafia River.

6.3.2 IMPACT ANALYSES

Baseline information and monitoring requirements as well as the methodology to be used to evaluate the potential impacts associated with the discharge from the cooling reservoir have already been outlined in detail in Chapter 4.0 of this POS.

7.0 QUALITY ASSURANCE/QUALITY CONTROL PROGRAM

7.1 PROGRAM OBJECTIVES AND ORGANIZATION

A site-specific quality assurance/quality control (QA/QC) plan has been prepared and submitted under separate cover in conformance with the provisions of Chapter 17-160, F.A.C. An established QA philosophy and program are essential for any organization to consistently produce valid field, laboratory, and engineering data. Furthermore, valid data must be interpreted by capable personnel who are trained in appropriate scientific and engineering disciplines, who maintain a current knowledge of their fields, and who are knowledgeable in the application for which the data will be used.

A major requirement of that program is the implementation of a QA project plan. The major objectives of such a plan are:

1. Monitoring and control of data to document accuracy and validity;
2. Documentation of precision, accuracy, and sensitivity of sampling and analytical systems;
3. Documentation of representativeness and limits of all data used or developed; and
4. Implementation of mechanisms for the early recognition of deficiencies and corrective actions.

The QA function is managed by the QA Manager. The QA Manager may enlist the assistance of other technical personnel at ECT to serve as QA auditors. In their role as QA auditors, these personnel are directly responsible to the QA Manager.

7.2 QA PLAN IMPLEMENTATION

Specific authorities and responsibilities of the QA Manager include:

1. Developing and revising the corporate QA program, as required;
2. Coordinating development and enforcement of safety standards and operating procedures, with the Corporate Safety Officer;
3. Supervising the QA staff;
4. Coordinating the auditing the technical and peer review of all deliverables, as required;
5. Issuing recommendations and orders as required for corrective action for all aspects of work which does not meet standards;
6. Interacting with agency and client QA personnel about certification of laboratories and coordinating QA and technical staff compliance with requirements as required;
7. Informing staff and management about new techniques and programs for QA and safety; and
8. Coordinating development of project QA plans as required.

The Project Manager will be responsible for effective day-to-day management of the total project staff as well as direct communication and liaison with TEC. Her responsibility specific to QA will be to oversee and coordinate all project procedures and QA/QC procedures to be used in the conduct of the project with the Project QA Manager.

It is the policy of ECT that all project deliverables (with the exception of certain short letters, reports, and proposals) be reviewed by a qualified individual prior to release to a client. The regional office managers will be responsible for enforcement of the peer review process in their regional offices subject to periodic audit by the QA Manager.

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APPENDIX A

AIR QUALITY MODELING PROTOCOL

APPENDIX A
AIR QUALITY MODELING PROTOCOL

INTRODUCTION

Prior to the start of any modeling study, EPA recommends that a protocol should be established between the preparing and reviewing parties, in this case ECT (representing TEC) and FDER, respectively. The purposes of the protocol are to:

1. Define the overall procedures to be followed,
2. Agree upon the data to be collected and the model(s) to be used, and
3. Define the approaches used to analyze source impacts and background concentration data.

This modeling protocol is submitted for review and comment to FDER in fulfillment of these purposes.

All modeling will be conducted in a manner consistent with EPA and FDER guidance and standard practices. For the ISCST and ISCLT models, this will include the use of regulatory default options.

MODEL SELECTION AND USE

The region surrounding the PPS site would, for modeling purposes, be classified as rural and as having simple terrain. For applying dispersion models to this type of situation, EPA has identified several recommended alternatives. First, for screening purposes, the SCREEN model is recommended. SCREEN is a simple model that calculates 1-hour average concentrations over a range of meteorological conditions. It is appropriate for use in situations where building wake downwash is or is not a concern. Then, as a refined model, the Industrial Source Complex (ISC) model (EPA, 1987) is recommended. ISC is a steady-state Gaussian plume model that can be used to assess air quality impacts from a wide variety of sources. It is capable of calculating concentrations for averaging times ranging from 1-hour to annual. The ISC model consists of

a short-term version (ISCST) and a long-term version (ISCLT). Both versions are listed by EPA as refined models.

For this study, air quality models will be applied at two levels. At the first, or screening, level, models will be used to provide conservative estimates of impacts from a specific source. The purposes of screening modeling will be to: (1) eliminate the need for more sophisticated analysis in situations where predicted impacts are very low and not a threat to any standard, and (2) provide information that can be used to guide the more rigorous refined analysis. The second, or refined, level will consist of techniques that provide more detailed treatment of atmospheric processes. Refined modeling will require more detailed and precise input data, but (presumably) will provide more accurate estimates of source impacts.

SELECTION AND PROCESSING OF METEOROLOGICAL DATA

Detailed meteorological data are needed for modeling with the ISCST and ISCLT models. ISCST requires a pre-processed data file compiled from hourly surface observations and concurrent twice-daily rawinsonde soundings. ISCLT requires a statistical tabulation of the joint frequency of occurrence of wind speed, wind direction, and atmospheric stability category. These frequency distributions are commonly referred to as STAR data, short for STability ARray.

For this effort, meteorological data for input to the ISC models have been selected to be consistent with EPA guidance and FDER practice. For southwest Polk County, surface data from Tampa and mixing height data from Ruskin are appropriate. As recommended by EPA (1986), for full-year refined ISCST runs, 5 years of the Tampa/Ruskin meteorological data were obtained from FDER in pre-processed form. The 5 years of data covered the years 1982 through 1986 as required by FDER.

For input to ISCLT, ECT obtained the Tampa surface data files from FDER. These data have been processed into STAR data sets using EPA's PCSTAR program. Values of ambient air temperatures and mixing heights specified by stability class have been derived as recommended in the ISC User's Guide (EPA, 1987). Average ambient air temperatures for Bartow have been obtained (Gale Research, 1985), along with the mean afternoon mixing height (Holzworth, 1972), from which the specific ISCLT model input values have been calculated.

DETERMINATION OF AREA CLASSIFICATION

The determination of whether to use rural or urban dispersion coefficients and mixing heights is outlined in the revised Guideline on Air Quality Models (EPA, 1986). Land use is classified within a 3-km radius of the source based on the scheme proposed by Auer (1978). If the land use type is classified as urban for 50 percent or more of the land use within the 3-km radius, urban dispersion coefficients and mixing heights should be invoked; otherwise, rural values are appropriate.

Through the use of USGS topographic maps for the area, recent aerial photographs, and a field visit to the site, the land use types have been identified within a 3-km radius of the plant site. Based on this analysis, clearly less than 50 percent of the land use surrounding the plant is urban. Therefore, rural dispersion coefficients and mixing heights will be used.

GEP/DOWNWASH CONSIDERATIONS

The 1977 CAA Amendments require that the degree of emission limitation required for control of any pollutant not be affected by a stack height that exceeds GEP or any other dispersion technique. On July 8, 1985, EPA promulgated final stack height regulations (40 CFR 51), in which GEP stack height is defined as the highest of:

1. 65 m, or

2. A height established by applying the formula:

$$Hg = H + 1.5L$$

where: Hg = GEP stack height,
H = Height of the structure or nearby structure, and
L = Lesser dimension (height or projected width) of the nearby structure.

"Nearby" is defined as a distance up to five times the lesser of the height or width dimension of a structure or terrain feature, but not greater than 800 m. While GEP stack height regulations require that stack height used in modeling for determining compliance with AAQS and PSD increments not exceed the GEP stack height, the actual stack height may be greater.

The guidelines published by EPA (1985) for application of the stack height regulations were followed in determining the GEP stack height for the main combined cycle and coal-fired plant stacks. For the combined cycle plant, the tallest nearby structure will be approximately 50 ft tall. Its maximum projected width is approximately 215 ft. [NOTE: The combined cycle stacks are not expected to be within the area of influence of the PC boiler building.] Therefore:

$$Hg = 50 + 1.5\ (50) = 125\ ft$$

Thus, the main stacks, at 90 ft tall, are not GEP and will be subject to downwash influences. But since their heights are greater than 1.5 times the height of the nearby structure, only the Huber-Snyder downwash will apply, rather than the direction-specific Schulman-Scire.

Similarly, for the PC unit the adjacent boiler building will be approximately 250 ft tall with a maximum projected width of 275 ft. Therefore:

$$Hg = 250 + 1.5\ (250) = 625\ ft$$

Again, Huber-Snyder downwash will apply, since the stack height will be 550 ft.

For other small point sources of particulate matter, potential downwash influences will be assessed at a later time when more detailed information on site layout and structural dimensions is available.

For all emission points potentially subject to downwash, plot plans showing the locations of the emission points and all nearby buildings or structures will be provided. The plot plans will show the area of influence for each building or structure. If applicable, directional downwash building influences will also be illustrated.

CONSIDERATION OF PLANT OPERATING LOADS

Operating load can affect plume dispersion, and therefore ground-level impacts, since exit temperature and velocity change. For the PC unit, three operating load cases will be analyzed at the screening level. These loads will be selected to cover the range of normal plant operations. The PC load case shown in the screening analysis to cause the highest impacts for each source will be used in the refined analyses. The CC unit is not expected to operate at less than full load under normal plant conditions. Therefore, it will be modeled at full load, and other scenarios will not be examined.

CONSIDERATION OF OTHER SOURCES

For those pollutants for which the PPS will have significant impacts, it will be necessary to factor other emission sources into the air quality impact analyses. The inventory of other sources will be assembled from

FDER information and other recent air quality modeling studies in the area. Maximum allowable emission rates will be used, as required by FDER. A listing of sources in the inventory will be submitted to FDER for review and comment prior to the initiation of detailed modeling efforts.

RECEPTOR LOCATIONS

Receptors will be placed at locations considered to be "ambient air," which EPA has defined as "that portion of the atmosphere, external to buildings, to which the general public has access" [40 CFR 50.1(e)]. Most of the PPS site will not be ambient air since access will be restricted. Therefore, the closest receptors will be on the site property lines. SR 37, which bisects the site, will also be considered ambient air. A plot plan showing the plant boundary and areas where public access is precluded will be provided, as will a description of the measures taken to prohibit public access (e.g., fences).

To determine the significant impacts areas (SIAs) for the proposed facilities, a radial receptor grid will be used. The grid will be centered on the plant site and will extend to distances necessary to define the SIA for each subject pollutant, but will not extend beyond 50 km. The SIAs will be defined per the EPA and FDER modeling significance levels, using the highest annual and short-term impacts. For short-term averaging times, the SIAs will also be defined by time. That is, a particular location will only be included in the SIA during those periods when the PPS has a significant impact.

Modeling used to determine maximum impacts relative to AAQS and PSD increments will also employ a polar grid system. Locations of existing sources will be converted from UTM coordinates to their location relative to grid center. Initially, grid radials will be spaced 10 degrees apart. To determine maximum impacts, 2-degree radial spacing will be used, along with 100-m spacing of receptor rings.

DETERMINATION OF BACKGROUND CONCENTRATIONS

To analyze impacts relative to AAQS, estimates of background pollutant concentrations will be needed. Background concentrations include contributions from sources not included in the modeling analyses, and may include contributions from natural sources, anthropogenic sources too distant to be included in the modeling inventory, small area sources, and/or other unidentified sources.

EPA (1986) has provided some guidance regarding the determination of background concentrations. The data collected as part of the preconstruction monitoring program will be interpreted following this guidance. For annual average concentrations, background values will be calculated by averaging the hourly concentrations when the monitor is not downwind of sources which will be included in the modeling analyses. The monitor will be considered not downwind of an existing source if it is not inside a 90-degree sector downwind of the source, i.e., wind vector $\pm$ 45 degrees. For shorter-term averaging times, meteorological conditions will be examined more closely, and representative maximum background values for each averaging time will be determined.

REFERENCES

Auer, A.H., Jr. 1978. Correlation of Land Use and Cover with Meteorological Anomalies. Journal of Applied Meteorology, 17:636-643.

Gale Research Company. 1985. Climates of the United States. Third Edition. Detroit, MI.

Holzworth, G.C. 1972. Mixing Heights, Wind Speeds, and Potential for Urban Air Pollution Throughout the Contiguous United States. AP-101. U.S. Environmental Protection Agency. Research Triangle Park, NC.

U.S. Environmental Protection Agency (EPA). 1985. Guidelines for Determination of Good Engineering Practice Stack Height [Technical Support Document for the Stack Height Regulations (Revised)]. EPA-450/4-80-023R. Research Triangle Park, NC.

U.S. Environmental Protection Agency (EPA). 1986. Guidelines on Air Quality Models (Revised). EPA-450/2-78-027R. Research Triangle Park, NC.

U.S. Environmental Protection Agency (EPA). 1987. Industrial Source Complex (ISC) Dispersion Model User's Guide, Second Edition (Revised). EPA-450/4-88-002. Research Triangle Park, NC.

APPENDIX B

FLORIDA MASTER SITE FILE FORMS

X original
___ update

ARCHAEOLOGICAL SITE FORM
FLORIDA MASTER SITE FILE

Version 1.1: 11/88

Site #8 Pol508
Recorder # 2010
Field Date 7-25-89

SITE NAME(S) Agrico #6
PROJECT NAME Agrico COE Permits DHR# 2010
OWNERSHIP X private-profit _priv-nonprof _priv-indiv _priv-unsp _city _county _state _federal
USGS MAP NAME Duette NE CITY
UTM: ZONE 16 / 17 EASTING /3/9/6/4/6/0/ NORTHING /3/0/6/5/4/2/0/
COUNTY Polk TWP 32E RANGE 23E SECTION 7 ¼ SW ¼-¼ NE ¼-¼-¼ NW
(Optional) LATITUDE d ___ m ___ s ___ LONGITUDE d ___ m ___ s ___
ADDRESS/VICINITY OF/ROUTE TO

TYPE OF SITE (All that apply) Xprehist unspecified _hist aboriginal _hist nonaboriginal _hist unspecified

SETTING	STRUCTURES OR FEATURES			FUNCTION	DENSITY
Xland site	_aboriginal boat	_fort	_road segment	Xnone specified	_unknown
_____	_agric/farm bldg	_midden	_shell midden	_campsite	Xsingle artifact
_wetland fresh	_burial mound	_mill unspecified	_shell mound	_extractive site	_diffuse scatter
_wetland salt/tidal	_building remains	_mission	_shipwreck	_habitatn/homestead	_dense scatter>2/m²
_____	_cemetery/grave	_mound unspecif	_subsurface features	_farmstead	_variable density
_underwater	_dump/refuse	_plantation	_well	_village/town	_____
_____	_earthworks	_platform mound	_wharf/dock	_quarry	_____

OTHER

HISTORIC CONTEXTS (All that apply) X unknown culture _aboriginal unspecif _hist unspecified

ABORIGINAL:	_Early Archaic	_Glades IIb	_Manasota	_St. Johns unspecif	_Swift Creek
_Alachua	_Early Swft Creek	_Glades IIc	_Middle Archaic	_St. Johns I	_Transitional
_Archaic unspec.	_Englewood	_Glades III	_Mount Taylor	_St. Johns Ia	_Weeden Island
_Belle Glade	_Fort Walton	_Glades IIIa	_Norwood	_St. Johns Ib	_Weeden Island I
_Belle Glade I	_Glades unspecif	_Glades IIIb	_Orange	_St. Johns II	_Weeden Island II
_Belle Glade II	_Glades I	_Glades IIIc	_Paleo-Indian	_St. Johns IIa	_____
_Belle Glade III	_Glades Ia	_Hickory Pond	_Pensacola	_St. Johns IIb	_____
_Belle Glade IV	_Glades Ib	_Late Archaic	_Perico Island	_St. Johns IIc	_____
_Cades Pond	_Glades II	_Late Swift Creek	_Safety Harbor	_Santa Rosa	_prehistc-aceramic
_Deptford	_Glades IIa	_Leon-Jefferson	_St. Augustine	_Seminole	_prehistc-ceramic
NONABORIGINAL:	_1st Spn 1700-63	_Amer Terr 1821-44	_Postreen 1880-97	_Depress 1930-40	_American 1821-
_1st Spanish unsp	_Brit 1763-1783	_Statehood 1845-60	_SpWar 1898-1916	_WW II 1941-49	_American 1821-99
_1st Spn 1513-99	_2dSpn 1783-1821	_Civil War 1861-65	_WW I 1917-1920	_Modern 1950-	_American 1900-
_1st Spn 1600-99	_____	_Reconstr 1866-79	_Boom 1921-1929	_____	_Afro-American

OTHER

RECORDER'S EVALUATION OF SITE

Eligible for National Register?	_yes	Xno	_likely, need information	_insufficient information
Significant as part of district?	_yes	Xno	_likely, need information	_insufficient information
Significant at the local level?	_yes	Xno	_likely, need information	_insufficient information

SIGNIFICANCE STATEMENT FOR COMPUTER FILES (Limit to 3 lines here; attach full justification)

DHR USE ONLY ---------- *DHR USE ONLY*

DATE LISTED ON NAT REG. ___/___/___

KEEPER DETERMINATION OF ELIGIBILITY: Yes _ No _ Date_____
SHPO EVALUATION OF ELIGIBILITY: Yes _ No _ Date_____
LOCAL DETERMINATION OF ELIGIBILITY: Yes _ No _ Date_____
Local Office_____

ARCHAEOLOGICAL SITE FORM

Division of Historical Resources, Florida Department of State

Site #8 PO1508

METHODS FOR SITE DETECTION

_no field check _exposed ground X screened shovel
_literature search _posthole digger _____
_informant report _auger--size: ____ _____
_remote sensing _unscreend shovel _____
Other/Remarks (#, size, depth, pattern of units; screen size) 50 cm dia test pits, 1/4" screen

METHODS FOR SITE BOUNDARIES

_bounds unknown _remote sensing _unscreened shovel
_none by recorder _insp exposed ground xscreened shovel
_literature search _posthole digger _block excavns
_informant report _auger--size: ____ _guess

COLLECTION STRATEGY

_unknown _unselective (all artifacts)
_selective (some artifacts)
_uncollected Xgeneral (not by subarea)
_controlled (by subarea)
Other (Strategy, Categories)

ARTIFACT CATEGORIES

_unknown _daub _nonlocal-exotic _bone-unspec
Xlithics _brick/bldg matl _metal _unworked shell
_ceramic-aborig _glass _bone-human _worked shell
_ceramic-nonabo _prec metal/coin _bone-animal _subsurf feats

SITE EXTENT Size (m^2) _____ Depth/Stratigraphy of Cultural Deposit Depth = 45cm

Perpendicular Dimensions ____ m _____ direction by ____ m _____ direction

SPACE COLLECTED Surface: #units___, total area ____m^2. Excavation: #units___, total vol ____m^3
TOTAL ARTIFACTS Count or Estimate? Surface # 0 Subsurface # 1.

DIAGNOSTICS (TYPE OR MODE & FREQUENCY)

1 Flake N= 1
2 _____ N= ___
3 _____ N= ___
4 _____ N= ___
5 _____ N= ___
6 _____ N= ___
7 _____ N= ___
Remarks

TEMPORAL INTERPRETATION Components: _single _prob single _prob multiple _multiple X uncertain
Describe each occupation spatially. For each, estimate begin, end dates BP; basis; if absolute dates, give method, lab, id, date, range, etc.

ENVIRONMENT Nearest Fresh Water South Prong Alafia River Distance (m) ca. 30 m
Natural Community
Local Vegetation improved pasture
Topographic Setting
Present Land Use pasture
SCS Soil Series _____ Soil Association

SITE INTEGRITY Overall Disturbance: _none seen X minor _substantial _major _redeposited
Nature of Disturbances/Threats planned for phosphate mining

INFORMANT(S) Contact Information
REPOSITORY Field Notes, Artifacts Agrico Chemical Company Mulberry, FL
Photographs (negative nos)
MANUSCRIPTS OR PUBLICATIONS ON THE SITE

RECORDER(S): Name Bill Johnson Date of Form 7-25-89
Affiliation/Address/Phone Piper Archaeology, St. Petersburg, FL 813-821-7600

RECOMMENDATIONS FOR SITE No further work recommended

NARRATIVE DESCRIPTION: Attach information on site discovery, history, current integrity, apparent threats, environment, and your temporal and functional interpretations.
DISCUSSION OF SIGNIFICANCE: Attach justification for recorder's evaluation (Page 1).

REQUIRED: USGS MAP OR COPY WITH SITE LOCATION MARKED

APPENDIX C
CULTURAL RESOURCE ASSESSMENT REQUEST

FLORIDA DEPARTMENT OF STATE
Jim Smith
Secretary of State
DIVISION OF HISTORICAL RESOURCES
R.A. Gray Building
500 South Bronough
Tallahassee, Florida 32399-0250
Director's Office (904) 488-1480
Telecopier Number (FAX) (904) 488-3353

January 10, 1991

Brian Kiraly
Environmental Consulting &
Technology, Inc.
P. O. Box 20866
Tampa, Florida 33622-0866

In Reply Refer To:
Susan M. Herring
Historic Sites Specialist
(904) 487-2333
Project File No. 910020

RE: Cultural Resource Assessment Request
Proposed 1500 Acre Coal Fired Power Plant
Polk County, Florida

Dear Mr. Kiraly:

In accordance with the procedures contained in 36 C.F.R., Part 800 ("Protection of Historic Properties"), we have reviewed the above referenced project(s) for possible impact to archaeological and historical sites or properties listed, or eligible for listing, in the National Register of Historic Places. The authority for this procedure is the National Historic Preservation Act of 1966 (Public Law 89-665), as amended.

A review of the Florida Master Site File indicates that a portion of the proposed project area has already been surveyed to locate and evaluate any cultural resources present. One archaeological site, 8PO1508, was identified within the project area, but this site was determined not to be significant. In addition, the U.S.G.S. topographic maps indicate that several sections within the proposed project area have already been disturbed by phosphate mining activities. However, it is the opinion of this agency that significant archaeological and historic sites may be present within a portion of the project area which, according to our records, has not been subjected to mining practices nor has it been assessed for cultural resources.

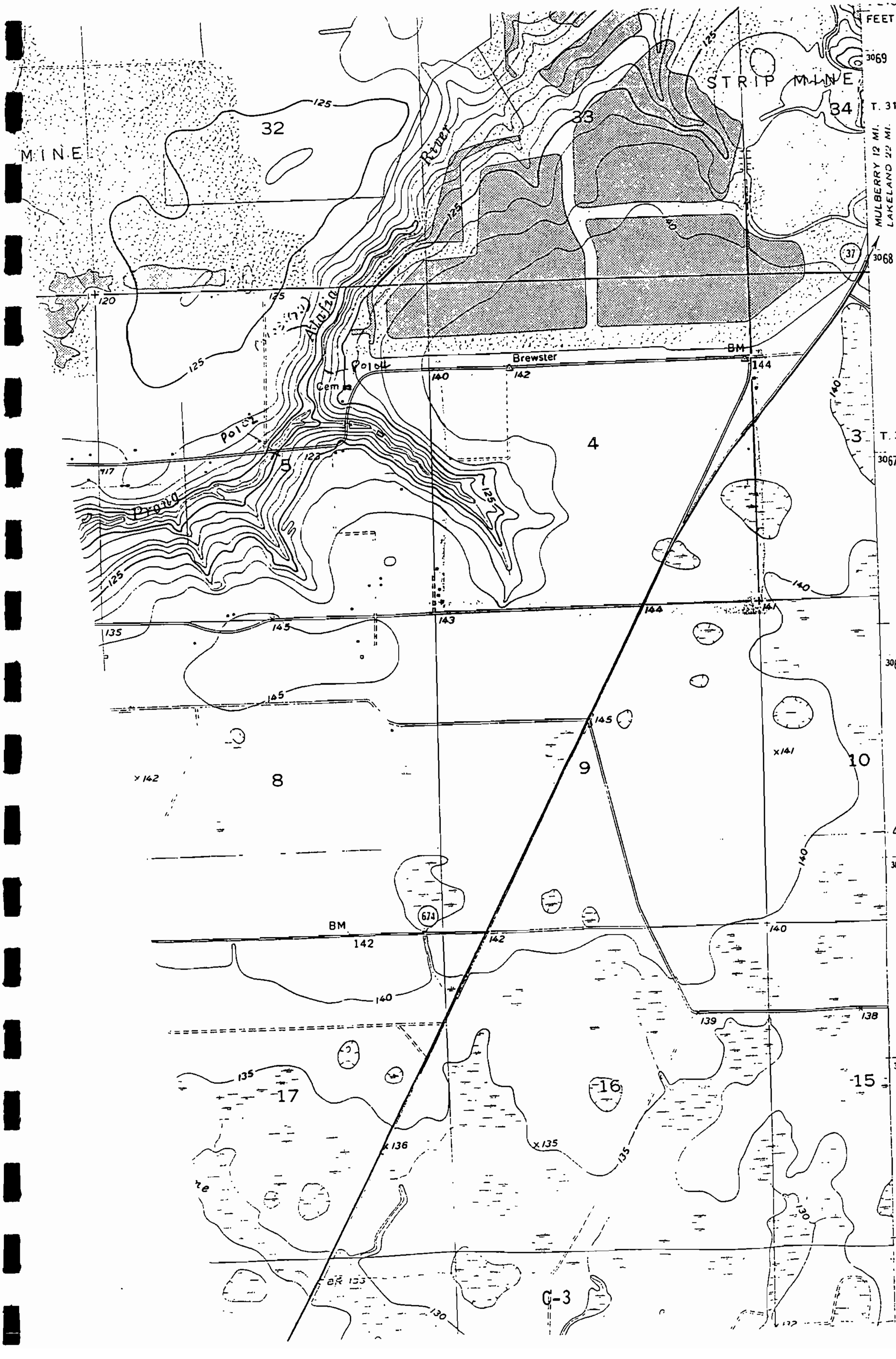
Since potentially significant archaeological and historic sites may be present, it is our recommendation that, prior to initiating any project related land clearing or ground disturbing activities within Section 4, Township 32S-Range 23E, this portion of the proposed project area should be subjected to a systematic, professional archaeological and historical survey (see attachment). The purpose of this survey will be to locate and assess the significance of cultural resources present. The resultant survey report must be forwarded to this agency in order to complete the process of reviewing the impact of this project on significant archaeological and historic resources. However, project activities in all other sections may proceed without further involvement with this agency.

If you have any questions concerning our comments, please do not hesitate to contact us. Your interest in protecting Florida's archaeological and historic resources is appreciated.

Sincerely,

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

GWP/smh
Enclosure (1)



C-3

APPENDIX D

AERIAL PHOTOGRAPH OF POLK POWER STATION SITE


T.31 S.
R.22 E.
R.23 E.
HILLSBOROUGH COUNTY
POLK
PROPER
SCALE
NORTH
AGRICO
HILLSBOROUGH
POLK
STATE ROUTE
T. 32 S.
T.33 S.
TAMPA ELECTRIC COMPANY
POLK POWER STATION
FEBRUARY 1991