

**HARDEE
POWER
STATION**

**SITE
CERTIFICATION
APPLICATION/
ENVIRONMENTAL
ASSESSMENT**

VOLUME 1

CHAPTERS 1-10

SUBMITTED BY:

TECO POWER SERVICES

TAMPA ELECTRIC COMPANY

**SEMINOLE ELECTRIC
COOPERATIVE, INC.**

**HARDEE
POWER
STATION**

**SITE
CERTIFICATION
APPLICATION/
ENVIRONMENTAL
ASSESSMENT**

VOLUME 1

CHAPTERS 1-10

SUBMITTED BY:

**TECO POWER SERVICES
TAMPA ELECTRIC COMPANY
SEMINOLE ELECTRIC
COOPERATIVE, INC.**

Application # 1

**HARDEE
POWER
STATION**

**SITE
CERTIFICATION
APPLICATION/
ENVIRONMENTAL
ASSESSMENT**

VOLUME 1

CHAPTERS 1-10

SUBMITTED BY:

TECO POWER SERVICES

TAMPA ELECTRIC COMPANY

**SEMINOLE ELECTRIC
COOPERATIVE, INC.**

APPLICANT INFORMATION
FOR THE
HARDEE POWER STATION PROJECT

1. Applicant's Official Name: TECO Power Services Corporation
2. Address: 702 N. Franklin Street, Tampa, FL 33602
3. Address of Official Headquarters: 702 N. Franklin Street, Tampa, FL 33602
4. Business Entity (corporation, partnership, co-operative): Corporation
5. Names, owners, etc.: The owners of the Hardee Power Station and associated facilities will be:
 - 1) TECO Power Services Corporation, 702 N. Franklin Street, Tampa, FL 33602
 - 2) Tampa Electric Company, P. O. Box 111, Tampa, FL 33601-0111
 - 3) Seminole Electric Cooperative Inc., P. O. Box 272000, Tampa, FL 3688-2000Refer to Chapter 1, Need for Power and the Proposed Hardee Power Station Project.
6. Name and Title of Chief Executive Officer: Richard E. Ludwig, President, TECO Power Services Corporation
7. Name, Address, and Phone Number of Official Representative responsible for obtaining certification: Jerry L. Williams, Director Environmental, Tampa Electric Company, P. O. Box 111, Tampa, FL 33601-0111, (813) 228-4111
8. Site Location (counties): Hardee/Polk
9. Nearest Incorporated Cities: Bowling Green (7.5 miles), Wauchula (10 miles), Ft. Meade (9 miles).
10. Latitude and Longitude: 22°38'02" N; 81°57'46" E
11. UTM's Northerly: 3,057,000 meters
Easterly: 405,000 meters (Zone 17)
12. Section, Township, Range: Sections 35 and 36, T32S, R23E; Sections 1 and 2, T33S, R23E
13. Location of any directly associated transmission facilities (counties): Polk, Hardee, DeSoto, Charlotte, and Lee
14. Name Plate Generating Capacity: 295 MW (Nominal Net)
15. Capacity of Proposed Additions and Ultimate Site Capacity (where applicable):

Phase 1A:	295 MW (Nominal Net)
Phase 1B:	145 MW (Nominal Net)
Phase 2 :	220 MW (Nominal Net)
Total :	660 MW (Nominal Net)

Remarks: (Additional information that will help identify the applicant): See Chapter 1, Need for Power and the Proposed Hardee Power Station Project, for a discussion of the Project.

Professional Engineer sponsoring application:

Date: 6/28/89

Signature: Kennard F. Kosky

Kennard F. Kosky
FL PE No. 14996
P.O. Box 14288
Gainesville, FL 32604
(904) 375-8000

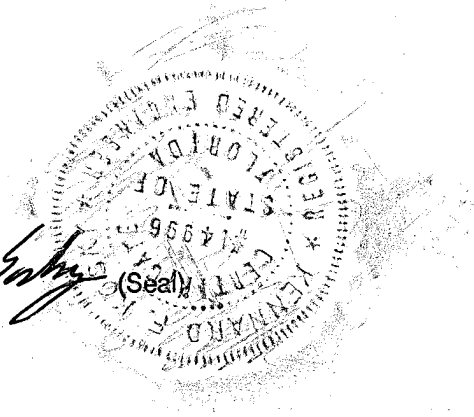


TABLE OF CONTENTS

SECTION		PAGE
1.0	<u>NEED FOR POWER AND THE PROPOSED FACILITIES</u>	1-1
1.1	INTRODUCTION	1-1
1.1.1	<u>Purpose of Site Certification</u> <u>Application/Environmental Analysis</u>	1-1
1.1.2	<u>The Applicants</u>	1-2
1.2	NEED FOR THE PROJECT	1-4
1.3	OVERVIEW OF HARDEE POWER STATION PROJECT	1-5
1.3.1	<u>Introduction</u>	1-5
1.3.2	<u>General Site Location and Description</u>	1-6
1.3.3	<u>Project Description</u>	1-6
1.4	BENEFITS OF THE PROJECT	1-15
1.4.1	<u>External Benefits</u>	1-15
1.4.2	<u>Internal Benefits</u>	1-15
2.0	<u>SITE AND VICINITY CHARACTERIZATION</u>	2-1
2.1	SITE AND ASSOCIATED FACILITIES DELINEATION	2-1
2.2	SOCIO-POLITICAL ENVIRONMENT	2-1
2.2.1	<u>Governmental Jurisdiction</u>	2-1
2.2.2	<u>Zoning and Land Use Plans</u>	2-5
2.2.3	<u>Demography and Ongoing Land Use</u>	2-9
2.2.3.1	Demography	2-9
2.2.3.2	Ongoing Land Use	2-11
2.2.4	<u>Easements, Title, Agency Works</u>	2-12
2.2.5	<u>Regional Scenic Cultural and Natural Landmarks</u>	2-12
2.2.6	<u>Archaeological and Historic Sites</u>	2-12
2.2.7	<u>Socioeconomics and Public Services</u>	2-14
2.2.7.1	Social and Economic Characteristics	2-14
2.2.7.2	Area Public Service and Utilities	2-22
2.3	BIOPHYSICAL ENVIRONMENT	2-33

TABLE OF CONTENTS

SECTION	PAGE
2.3.1 <u>Geohydrology</u>	2-33
2.3.1.1 Geologic Description of the Site-Area	2-33
2.3.1.2 Detailed Site Lithologic Description	2-38
2.3.1.3 Geologic Maps	2-46
2.3.1.4 Bearing Strength	2-47
2.3.2 <u>Subsurface Hydrology</u>	2-49
2.3.2.1 Subsurface Hydrologic Data for the Site	2-49
2.3.2.2 Karst Hydrogeology	2-62
2.3.3 <u>Site Water Budget and Area Users</u>	2-63
2.3.3.1 Site Water Budget	2-63
2.3.3.2 Area Users	2-65
2.3.4 <u>Surficial Hydrology</u>	2-67
2.3.4.1 Hydrologic Characterization	2-67
2.3.4.2 Measurement Programs	2-90
2.3.5 <u>Vegetation/Land Use</u>	2-94
2.3.6 <u>Ecology</u>	2-94
2.3.6.1 Species-Environmental Relationships	2-94
2.3.6.2 Pre-existing Stresses	2-135
2.3.6.3 Measurement Programs	2-136
2.3.7 <u>Meteorology and Ambient Air Quality</u>	2-140
2.3.7.1 Meteorology	2-140
2.3.7.2 Ambient Air Quality	2-150
2.3.7.3 Measurement Programs	2-161
2.3.8 <u>Noise</u>	2-162
2.3.8.1 Background	2-162
2.3.8.2 Noise Measurement Procedures	2-162
2.3.8.3 Existing Ambient Sound Pressure Level Conditions	2-167
2.3.9 <u>Other Environmental Features</u>	2-167

TABLE OF CONTENTS

SECTION	PAGE
3.0 <u>THE PLANT AND DIRECTLY ASSOCIATED FACILITIES</u>	3-1
3.1 BACKGROUND	3-1
3.2 SITE LAYOUT	3-4
3.3 FUEL	3-8
3.4 AIR EMISSIONS AND CONTROLS	3-11
3.4.1 <u>Air Emissions Types and Sources</u>	3-11
3.4.2 <u>Air Emission Controls</u>	3-14
3.4.3 <u>Best Available Control Technology</u>	3-14
3.4.3.1 Nitrogen Oxides	3-14
3.4.3.2 Carbon Monoxide and Volatile Organic Compounds	3-18
3.4.3.3 Sulfur Dioxide and Sulfuric Acid Mist	3-19
3.4.3.4 Particulate Emissions and other Regulated Pollutants	3-19
3.4.4 <u>Design Data for Control Equipment</u>	3-19
3.4.5 <u>Design Philosophy</u>	3-20
3.5 PLANT WATER USE	3-20
3.5.1 <u>Cooling Reservoir and Heat Dissipation Systems</u>	3-24
3.5.1.1 System Design	3-24
3.5.1.2 Sources of Cooling Reservoir Water Makeup	3-31
3.5.1.3 Cooling Reservoir Water Discharges	3-31
3.5.2 <u>Domestic/Sanitary Wastewater</u>	3-34
3.5.3 <u>Potable Water</u>	3-34
3.5.4 <u>Process Water</u>	3-34
3.5.4.1 Demineralized Water	3-34
3.5.4.2 General Service Water	3-35
3.5.4.3 Plant Drains	3-35
3.5.5 <u>Water Use Variations</u>	3-35

TABLE OF CONTENTS

SECTION	PAGE
3.6 CHEMICAL AND BIOCIDES WASTE	3-36
3.6.1 <u>Cooling Reservoir Circulating Water Treatment</u>	3-37
3.6.2 <u>Steam Cycle Water Treatment</u>	3-37
3.6.3 <u>Sanitary Wastewater Treatment</u>	3-37
3.6.4 <u>Makeup Water Demineralization</u>	3-38
3.6.5 <u>Chemical Cleaning</u>	3-38
3.6.6 <u>Miscellaneous Chemical Drains</u>	3-39
3.6.7 <u>Neutralization Basin</u>	3-39
3.6.8 <u>Miscellaneous Plant Drains</u>	3-40
3.7 SOLID AND HAZARDOUS WASTE	3-40
3.7.1 <u>Solid Waste</u>	3-40
3.7.2 <u>Hazardous Waste</u>	3-40
3.8 ONSITE DRAINAGE SYSTEM	3-43
3.8.1 <u>Stormwater Detention Pond</u>	3-43
3.8.2 <u>Stormwater Runoff Control During Construction</u>	3-44
3.8.3 <u>Site Drainage</u>	3-44
3.8.4 <u>Flood Elevations</u>	3-45
3.9 MATERIALS HANDLING	3-45
3.9.1 <u>Construction Materials and Equipment</u>	3-45
3.9.2 <u>Roads</u>	3-45
3.9.3 <u>Railroad</u>	3-46
4.0 <u>EFFECTS OF SITE PREPARATION AND PLANT AND ASSOCIATED FACILITIES CONSTRUCTION</u>	4-1
4.1 LAND IMPACT	4-1
4.1.1 <u>General Construction Impacts</u>	4-1
4.1.2 <u>Roads</u>	4-2
4.1.3 <u>Flood Zones</u>	4-2
4.1.4 <u>Topography and Soils</u>	4-2
4.2 IMPACT ON SURFACE WATER BODIES AND USES	4-4
4.2.1 <u>Impact Assessment</u>	4-4
4.2.1.1 Surface Hydrology - Physical and Chemical	4-4
4.2.1.2 Ecological Systems	4-5
4.2.2 <u>Measuring and Monitoring Programs</u>	4-6

TABLE OF CONTENTS

SECTION	PAGE
4.3 GROUNDWATER IMPACTS	4-6
4.3.1 <u>Physical and Chemical Effects of Dewatering</u>	4-6
4.3.2 <u>Measuring and Monitoring Program</u>	4-8
4.4 ECOLOGICAL IMPACTS	4-8
4.4.1 <u>Impact Assessment</u>	4-8
4.4.1.1 Aquatic Systems	4-8
4.4.1.2 Terrestrial Ecology	4-8
4.4.2 <u>Measuring and Monitoring Programs</u>	4-10
4.5 AIR IMPACT	4-11
4.5.1 <u>Estimated Emissions</u>	4-11
4.5.2 <u>Control Measures</u>	4-11
4.5.3 <u>Potential Impacts</u>	4-12
4.6 IMPACT ON HUMAN POPULATIONS	4-12
4.6.1 <u>Noise Impacts</u>	4-12
4.6.2 <u>Transportation Impacts</u>	4-13
4.6.3 <u>Housing Impacts</u>	4-15
4.7 IMPACT ON LANDMARKS AND SENSITIVE AREAS	4-17
4.8 IMPACT ON ARCHAEOLOGICAL AND HISTORIC SITES	4-17
4.9 SPECIAL FEATURES	4-18
4.10 BENEFITS FROM CONSTRUCTION	4-18
4.11 VARIANCES	4-18
5.0 <u>EFFECTS OF PLANT OPERATION</u>	5-1
5.1 EFFECTS OF OPERATION OF THE HEAT DISSIPATION SYSTEM	5-1
5.1.1 <u>Temperature Effects on Receiving Body of Water</u>	5-1
5.1.2 <u>Effects on Aquatic Life</u>	5-24

TABLE OF CONTENTS

SECTION	PAGE
5.1.2.1 Thermal Impacts	5-24
5.1.2.2 Impingement and Entrainment	5-25
5.1.2.3 Thermal Shock	5-25
5.1.3 <u>Biological Effects of Modified Circulation</u>	5-26
5.1.4 <u>Effects of Offstream Cooling</u>	5-26
5.1.4.1 Groundwater/Surface Water Interchange	5-26
5.1.4.2 Fogging	5-27
5.1.5 <u>Measurement Programs</u>	5-27
5.1.5.1 Groundwater Monitoring and Assessment Methodology	5-27
5.1.5.2 Surface Water Monitoring	5-29
5.1.5.3 Biological Monitoring	5-29
5.2 EFFECTS OF CHEMICAL AND BIOCIDES DISCHARGES	5-29
5.2.1 <u>Industrial Wastewater Discharges</u>	5-29
5.2.1.1 Surface Water Discharges	5-29
5.2.1.2 Groundwater Discharges	5-36
5.2.1.3 Biological Impacts	5-42
5.2.1.4 Biological Monitoring	5-42
5.2.2 <u>Cooling Tower Blowdown</u>	5-43
5.2.3 <u>Measurement Programs</u>	5-43
5.2.3.1 Assessment Methodology - Surface Water	5-43
5.2.3.2 Physical Chemical Monitoring	5-43
5.3 IMPACTS ON WATER SUPPLIES	5-43
5.3.1 <u>Surface Water</u>	5-43
5.3.2 <u>Groundwater</u>	5-44
5.3.2.1 Consumptive Use Impacts	5-44
5.3.2.2 Recharge of Water Table Aquifer	5-45
5.3.3 <u>Drinking Water</u>	5-45
5.3.4 <u>Leachate and Runoff</u>	5-48
5.3.5 <u>Measurement Programs</u>	5-48
5.3.5.1 Assessment Methodology - Surface Water	5-48
5.3.5.2 Physical Chemical Monitoring	5-48

TABLE OF CONTENTS

SECTION	PAGE
5.4 SOLID/HAZARDOUS WASTE DISPOSAL IMPACTS	5-48
5.4.1 <u>Solid Waste</u>	5-48
5.4.2 <u>Hazardous Wastes</u>	5-49
5.5 SANITARY AND OTHER WASTE DISCHARGES	5-49
5.6 AIR QUALITY IMPACTS	5-50
5.6.1 <u>Impact Assessment</u>	5-50
5.6.1.1 Analysis Approach and Assumptions	5-50
5.6.1.2 Model Results	5-61
5.6.1.3 Additional Impact Analysis	5-68
5.7 NOISE IMPACTS	5-73
5.7.1 <u>Impacts to Adjacent Properties</u>	5-73
5.7.2 <u>Impact to Biota</u>	5-75
5.8 CHANGES TO NON-AQUATIC SPECIES POPULATION	5-79
5.8.1 <u>Flora</u>	5-79
5.8.2 <u>Fauna</u>	5-82
5.9 TRANSPORTATION IMPACTS AND OTHER PLANT OPERATION EFFECTS	5-82
5.10 ARCHAEOLOGICAL SITES	5-82
5.11 RESOURCES COMMITTED	5-82
5.12 VARIANCES	5-83
6.0 <u>TRANSMISSION LINES AND OTHER LINEAR FACILITIES</u>	6-1
6.1 TRANSMISSION LINES	6-1
6.1.1 <u>Project Introduction</u>	6-1
6.1.2 <u>Corridor Location and Layout</u>	6-3
6.1.3 <u>Transmission Line and Road Design Characteristics</u>	6-3
6.1.4 <u>Cost Projections</u>	6-5
6.1.5 <u>Corridor Selection</u>	6-5
6.1.6 <u>Hardee Power Station to Pebbledale Substation Transmission Line</u>	6-13

TABLE OF CONTENTS

SECTION	PAGE
6.1.6.1 Description of Preferred and Alternative Corridors	6-13
6.1.6.2 Socio-Political Environment of the Pebbledale Substation Corridor Area	6-16
6.1.6.3 Bio-Physical Environment of the Corridor Area	6-18
6.1.6.4 Effects of Right-of-Way Preparation and Transmission Line Construction	6-32
6.1.6.5 Post-Construction Impacts and Effects of Maintenance	6-39
6.1.7 <u>Hardee Power Station to Vandolah and Lee Substations Transmission Line</u>	6-42
6.1.7.1 Description of Preferred and Alternative Corridors	6-42
6.1.7.2 Socio-Political Environment of the Vandolah and Lee Substations Corridor Area	6-45
6.1.7.3 Bio-Physical Environment of the Corridor Area	6-54
6.1.7.4 Effects of Right-of-Way Preparation and Transmission Line Construction	6-72
6.1.7.5 Post-Construction Impacts and Effects of Maintenance	6-80
6.2 ASSOCIATED NATURAL GAS PIPELINE	6-83
6.2.1 <u>Project Description</u>	6-83
6.2.2 <u>Corridor Location and Layout</u>	6-85
6.2.3 <u>Gas Pipeline Design Characteristics</u>	6-90
6.2.4 <u>Cost Projections</u>	6-90
6.2.5 <u>Corridor Selection</u>	6-90
6.2.6 <u>Socio-Political Environment of the Corridor Area</u>	6-94
6.2.6.1 Governmental Jurisdiction	6-94
6.2.6.2 Zoning and Land Use Plans	6-94
6.2.6.3 Easements, Title, Agency Works	6-98
6.2.6.4 Vicinity Scenic, Cultural and Natural Landmarks	6-99
6.2.6.5 Archaeological and Historic Sites	6-99
6.2.7 <u>Bio-Physical Environment of the Corridor Areas</u>	6-99

TABLE OF CONTENTS

SECTION		PAGE
	6.2.7.1 Land Use/Vegetation	6-99
	6.2.7.2 Affected Waters and Wetlands	6-99
	6.2.7.3 Ecology	6-103
	6.2.7.4 Other Environmental Features	6-110
6.2.8	<u>Effects of Right-of-Way Preparation and Construction</u>	6-110
	6.2.8.1 Construction Techniques	6-110
	6.2.8.2 Impact on Water Bodies and Uses	6-110
	6.2.8.3 Solid Wastes	6-111
	6.2.8.4 Changes to Vegetation, Wildlife and Aquatic Life	6-111
	6.2.8.5 Impact on Human Population	6-111
	6.2.8.6 Impact on Regional Scenic, Cultural, and Natural Landmarks	6-113
	6.2.8.7 Impact on Archaeological and Historic Sites	6-113
6.2.9	<u>Post-Construction Impacts and Effects of Maintenance</u>	6-113
	6.2.9.1 Maintenance Techniques	6-113
	6.2.9.2 Multiple Uses	6-114
	6.2.9.3 Changes In Species Population	6-114
	6.2.9.4 Effects of Public Access	6-114
6.2.10	<u>Other Post-Construction Effects</u>	6-114
	6.2.10.1 Pipeline Safety	6-114
	6.2.10.2 Impact on Public Safety	6-114c
7.0	<u>ECONOMIC AND SOCIAL EFFECT OF PLANT CONSTRUCTION AND OPERATION</u>	7-1
7.1	SOCIOECONOMIC BENEFITS	7-1
7.2	SOCIOECONOMIC COSTS	7-4
	7.2.1 <u>Temporary External Costs</u>	7-4
	7.2.2 <u>Long-term External Costs</u>	7-5
8.0	<u>SITE AND DESIGN ALTERNATIVES</u>	8-1
8.1	ALTERNATIVE SITES	8-1

TABLE OF CONTENTS

SECTION	PAGE
6.3.6 <u>Socio-Political Environment of the Corridor Area</u>	6-126
6.3.6.1 Governmental Jurisdiction	6-126
6.3.6.2 Zoning and Land Use Plans	6-126
6.3.6.3 Easements, Title, Agency Works	6-131
6.3.6.4 Vicinity Scenic, Cultural, and Natural Landmarks	6-131
6.3.6.5 Archaeological and Historic Sites	6-134
6.3.7 <u>Bio-Physical Environment of the Corridor Area</u>	6-134
6.3.7.1 Land Use/Vegetation	6-134
6.3.7.2 Affected Waters and Wetlands	6-140
6.3.7.3 Ecology	6-146
6.3.7.4 Other Environmental Features	6-161
6.3.8 <u>Effects of Right-of-Way Preparation and Construction</u>	6-161
6.3.8.1 Construction Techniques	6-161
6.3.8.2 Impacts to Water Bodies and Uses	6-163
6.3.8.3 Solid Wastes	6-164
6.3.8.4 Changes to Vegetation, Wildlife, and Aquatic Life	6-165
6.3.8.5 Impact on Human Populations	6-169
6.3.8.6 Impact on Regional Scenic, Cultural, and Natural Landmarks	6-170
6.3.8.7 Impact on Archaeological and Historic Sites	6-170
6.3.9 <u>Post Construction Impacts and Effects of Maintenance</u>	6-171
6.3.9.1 Maintenance Techniques	6-171
6.3.9.2 Multiple Uses	6-171
6.3.9.3 Changes in Species Populations	6-171
6.3.9.4 Effects of Public Access	6-173
6.3.10 <u>Other Post Construction Effects</u>	6-173
6.3.10.1 Pipeline Safety	6-173
6.3.10.2 Impacts on Public Safety	6-175

TABLE OF CONTENTS

SECTION		PAGE
7.0	<u>ECONOMIC AND SOCIAL EFFECT OF PLANT CONSTRUCTION AND OPERATION</u>	7-1
7.1	SOCIOECONOMIC BENEFITS	7-1
7.2	SOCIOECONOMIC COSTS	7-4
7.2.1	<u>Temporary External Costs</u>	7-4
7.2.2	<u>Long-term External Costs</u>	7-5
8.0	<u>SITE AND DESIGN ALTERNATIVES</u>	8-1
8.1	ALTERNATIVE SITES	8-1
8.1.1	<u>Introduction</u>	8-1
8.1.2	<u>Siting Study Objectives</u>	8-1
8.1.3	<u>Siting Study Approach</u>	8-3
8.1.4	<u>Phase I--Regional Screening</u>	8-6
8.1.5	<u>Phase II--Intermediate Screening</u>	8-6
8.1.6	<u>Phase III--Detailed Candidate Study Area Analysis</u>	8-8
8.1.7	<u>Preferred and Alternative Study Areas</u>	8-12
8.2	PROPOSED SITE DESIGN ALTERNATIVES	8-12
8.2.1	<u>Alternative Heat Rejection System</u>	8-12
8.2.1.1	System Criteria	8-13
8.2.1.2	Alternative System Designs	8-13
8.2.1.3	Alternative Systems Environmental Evaluation	8-16
8.2.1.4	Preferred Heat Rejection System Alternative	8-18
8.2.2	<u>Biological Fouling Control Alternatives</u>	8-18
8.2.3	<u>Water Supply/Intake Alternatives</u>	8-19
8.2.4	<u>Chemical Waste and Wastewater Treatment Alternatives</u>	8-20
8.2.4.1	Steam Cycle	8-20
8.2.4.2	Makeup Water Demineralization	8-20
8.2.4.3	Plant Drains	8-21

TABLE OF CONTENTS

SECTION		PAGE
8.2.5	<u>Plant and Sanitary Wastewater Discharge Alternatives</u>	8-21
8.2.6	<u>Solid Waste Disposal</u>	8-21
8.2.7	<u>Multiple Uses of the Plant</u>	8-22
8.3	ALTERNATIVE FUELS	8-22
8.3.1	<u>Gasification Overview</u>	8-22
8.3.1.1	General Statement	8-22
8.3.1.2	Types of Gasifiers	8-23
8.3.1.3	Process Description--Entrained Flow	8-25
8.3.2	<u>Design and Environmental Characteristics</u>	8-28
8.3.2.1	Design Basis	8-28
8.3.2.2	Air Emissions	8-31
8.3.2.3	Wastewater	8-31
8.3.2.4	By-products	8-33
8.3.3	<u>Potential Environmental Impacts</u>	8-33
8.3.3.1	Air Emissions Impacts	8-35
8.3.3.2	Cooling Reservoir Performance with Gasifier Thermal Loading	8-35
8.3.3.3	Wastewater Treatment	8-38
8.3.3.4	By-products	8-40
8.3.4	<u>Assessment of Technology</u>	8-40
9.0	<u>COORDINATION</u>	9-1
10.0	<u>HARDEE POWER STATION PROJECT AND SITE RECLAMATION REQUIREMENTS</u>	10-1
10.1	BACKGROUND OF SITE RECLAMATION REQUIREMENTS AND PLANS	10-1
10.1.1	<u>Past and Present Reclamation Plans</u>	10-1
10.1.2	<u>Applicable FDNR Reclamation Rules</u>	10-2

TABLE OF CONTENTS

SECTION	PAGE
10.2 RELATIONSHIP OF PROPOSED PLANT AND ASSOCIATED FACILITIES TO RECLAMATION PLANS	10-5
10.2.1 <u>Plant and Associated Facilities Location</u>	10-5
10.2.2 <u>Plant and Associated Facilities Operational Aspects</u>	10-6
10.2.3 <u>Release Procedures</u>	10-8
10.2.4 <u>Financial Responsibilities</u>	10-8
10.3 AMENDMENTS AND VARIANCES	10-9

LIST OF TABLES

TABLE		PAGE
1.3.1-1	Hardee Power Station Project Terminology	1-8
2.2.3-1	Historic and Projected Population for Selected Communities in Hardee and Polk Counties	2-10
2.2.7-1	Employment Distribution by Industry for Service Delivery Area 18	2-16
2.2.7-2	Employment and Wages of Hardee and Polk County Workers Covered by the Florida Unemployment Compensation Law 1985	2-17
2.2.7-3	Income Characteristics for Hardee and Polk Counties By Industry	2-19
2.2.7-4	Hardee and Polk County Personal Income Private Nonfarm Earnings on Place-of-Work Basis	2-20
2.2.7-5	Firefighting Equipment for Towns within Approximately 10 Miles of the Hardee Power Station Site	2-28
2.2.7-6	1989 Public Water Supply Usage and Capacity for Selected Towns in Hardee and Polk Counties	2-30
2.2.7-7	1989 Municipal Sewage Systems Use & Capacity for Selected Towns in Hardee and Polk Counties	2-32
2.3.2-1	Results of Permeability Testing of Shallow Water Table Observation Wells at the Hardee Power Station Site	2-52
2.3.2-2	Water Quality Characteristic of the Shallow Aquifer at the Hardee Power Station Site	2-53
2.3.2-3	Results of Permeability Testing of Intermediate Aquifer Observation Wells at the Hardee Power Station Site	2-56
2.3.2-4	Water Characteristics (Inorganics) at the Hardee Power Station Site for Intermediate Aquifer	2-58
2.3.3-1	Monthly and Annual Precipitation Averages and Extremes at Wauchula, Florida	2-64
2.3.3-2	Estimated Climatic Conditions at the Hardee Power Station Site	2-66

LIST OF TABLES

TABLE		PAGE
2.3.3-3	Well Construction Permits Within One Mile of the Hardee Power Station	2-68
2.3.4-1	Summary of Historical Flows on Payne Creek at Bowling Green and Estimated Flows at the Hardee Power Station	2-72
2.3.4-2	Estimated Low Flows on Payne Creek Near the Hardee Power Station	2-73
2.3.4-3	Estimated Flood Flows on Payne Creek at the Hardee Power Station	2-75
2.3.4-4	Stage and Flow Data for Payne Creek Near the Hardee Power Station	2-78
2.3.4-5	Summary of Historic Payne Creek Surface Water Quality in Vicinity of the Hardee Power Station	2-80
2.3.4-6	In Situ Water Quality Parameters for Payne Creek	2-86
2.3.4-7	Summary of Water Quality Conditions in Payne Creek	2-87
2.3.4-8	Hardee Power Station Water Quality Monitoring Parameters	2-93
2.3.5-1	Species Observed on the Hardee Power Station Site	2-97
2.3.6-1	Fishes Collected at Three Stations in Upper Payne Creek, 6 October 1988, with Characterizations of Ecological Assemblages	2-101
2.3.6-2	Fishes Collected at Three Stations in Upper Payne Creek, 14 February 1989, with Characterizations of Ecological Assemblages	2-104
2.3.6-3	Density, Diversity, and Number of Taxa of Macroinvertebrates Collected from Payne Creek Using Artificial Substrates During October/November 1988 and February/March 1989	2-105

LIST OF TABLES

TABLE		PAGE
2.3.6-4	Density, Diversity, and Number of Taxa of Macroinvertebrates Collected from Payne Creek by Ponar Crab and Multiplate Samples in October, 1988 and March, 1989	2-108
2.3.6-5	Macroinvertebrates Collected in Qualitative Dip Net Samples from Payne Creek October 1988 and February 1989	2-109
2.3.6-6	Plant Species Abundance in Improved Pasture at Hardee Power Station Site	2-113
2.3.6-7	Plant Species Abundance in Forested Wetland at Hardee Power Station Site	2-115
2.3.6-8	Plant Species Abundance in Payne Creek Floodplain at Hardee Power Station Site	2-117
2.3.6-9	Mammal Species Observed (O) or Which Potentially Occur (P) on the Agrico Site	2-123
2.3.6-10	Birds Observed (O) or Which Potentially Occur (P) on the Hardee Power Station Site	2-124
2.3.6-11	Terrestrial Reptiles and Amphibians Observed (O) or Which Potentially Occur (P) on the Hardee Power Station Site	2-126
2.3.6-12	Threatened and Endangered Plant Species that Could Potentially Occur on or Near Hardee Power Station Site	2-129
2.3.6-13	Threatened and Endangered Faunal Species that Occur or Could Potentially Occur on or Near Hardee Power Station Site	2-132
2.3.7-1	Temperature Means and Extremes (°F) Measured at Tampa International Airport, Tampa, Florida	2-141
2.3.7-2	Precipitation and Diurnal Relative Humidity Measured at Tampa International Airport, Tampa, Florida	2-143
2.3.7-3	Wind Direction and Speed Measured at Tampa International Airport	2-146
2.3.7-4	Occurrences of Atmospheric Stability Classes Determined at Tampa International Airport, Tampa, Florida	2-148

LIST OF TABLES

TABLE		PAGE
2.3.7-5	Morning and Afternoon Mixing Heights Determined at Tampa International Airport, Tampa, Florida	2-149
2.3.7-6	Federal and State of Florida Ambient Air Quality Standards (AAQS)	2-151
2.3.7-7	Federal and State of Florida PSD Allowable Increments	2-153
2.3.7-8	Ambient Air Concentrations of Sulfur Dioxide (SO ₂) and Total Suspended Particulate Matter (TSP) for Stations Located in Polk County	2-156
2.3.7-9	SO ₂ Sources (>100 TPY) Within 50 km of Proposed Hardee Power Plant	2-158
2.3.7-10	NO ₂ Sources (>100 TPY) Within 50 km of Proposed Hardee Power Plant	2-159
2.3.7-11	PM Sources (>100 TPY) Within 50 km of Proposed Hardee Power Plant	2-160
2.3.8-1	Ambient Sound Pressure Level Data for the Hardee Power Station Site	2-166
3.2-1	Approximate Elevations and Dimensions of Major Plant Facilities for the Hardee Power Station	3-7
3.3-1	Typical Natural Gas Specification	3-9
3.3-2	Typical Distillate Fuel Oil Specification	3-10
3.4.1-1	Maximum Estimated Air Pollutant Emissions	3-12
3.5-1	Design Water Characteristics for the Hardee Power Station	3-25
3.5.1-1	Estimated Cooling Reservoir Water Quality for the Hardee Power Station	3-32
3.6.7-1	Estimated Characteristics of the Neutralization Basin Effluent for the Hardee Power Station	3-41
4.6.2-1	Existing and Projected Peak Hour Traffic Conditions on Site Access Roads in Polk and Hardee Counties	4-16

LIST OF TABLES

TABLE		PAGE
5.1.1-1	Estimation of Evaporation from the Proposed Hardee Power Station Cooling Reservoir at 43% Average Annual Load Factor	5-3
5.1.1-2	Estimation of Evaporation from the Proposed Hardee Power Station Cooling Reservoir at Worst Case Load Conditions	5-5
5.1.1-3	Analysis of Predicted Cooling Reservoir Discharges from the Hardee Power Station and Corresponding Payne River Flows and Dilutions, Based on Monthly Water Balance Analysis	5-12
5.1.1-4	Hardee Power Station Cooling Reservoir Water Discharge and Payne Creek Dispersion Modeling Maximum Temperature Conditions	5-21
5.1.1-5	Payne Creek Hardee Power Station Cooling Water Discharge and Dispersion Modeling - October Temperature Conditions	5-23
5.2.1-1	Summary of Estimated Cooling Reservoir and Intake Water Quality Conditions, and Reservoir Effluent Quality	5-33
5.2.1-2	Summary of Estimated Cooling Reservoir Discharge Water Quality Mixing Zones Necessary to Meet Class III Water Quality Criteria	5-37
5.3.2-1	Average Preliminary Deep Well Aquifer Parameters	5-46
5.6.1-1	Major Features of the ISCST Model	5-52
5.6.1-2	Summary of Modeled SO ₂ Emissions Used for Screening and Refined Analyses	5-55
5.6.1-3	Summary of Modeled NO ₂ Emissions Used for Screening and Refined Analyses	5-56
5.6.1-4	Summary of Modeled PM Emissions Used for Screening and Refined Analyses	5-57
5.6.1-5	Structure Dimensions and GEP Stack Height Calculations	5-60

LIST OF TABLES

TABLE		PAGE
5.6.1-6	Maximum concentrations for the Combined Cycle Plant (660 MW) for Four Operating Designs in the Screening Modeling Analysis	5-62
5.6.1-7	Maximum Predicted SO ₂ , PM, and NO ₂ Concentrations from the Hardee Power Station for Comparison to PSD Class II Increments	5-64
5.6.1-8	Maximum Predicted SO ₂ , PM and NO ₂ Concentrations from the Hardee Power Station for Comparison to AAQS	5-66
5.6.1-9	SO ₂ and NO ₂ Doses Reported to Affect Plant Species Similar to Vegetation in the Region of the Hardee Power Plant	5-70
5.6.1-10	Examples of Lowest Observed Effect Levels of Air Pollutants	5-71
5.7.1-1	USEPA Recommended Noise Criteria	5-74
5.7.1-2	Sound Power Levels of Dominant Sources for Each Combined Cycle Unit	5-76
5.7.1-3	Impact Results Using Average Leq Background Values	5-77
5.7.1.4	Impact Results Using Average Minimum Background Values	5-78
6.1.4-1	Cost Projections for the Preferred and Alternative Corridors for the Hardee Power Station in 1988 Dollars	6-8
6.1.5-1	Phase I Screening Criteria for Transmission Line Corridors for the Hardee Power Station	6-11
6.1.5-2	Candidate Corridor Ranking Criteria	6-14
6.1.6-1	Easements, Title, Crossing Approvals Normally Required for Transmission Line Construction in the Preferred and Alternative Corridors Between the Hardee Power Station and Pebbledale Substation	6-19
6.1.6-2	Water Bodies Within Preferred and Alternative Corridors Between the Hardee Power Station and the Pebbledale Substation	6-23

LIST OF TABLES

TABLE		PAGE
6.1.6-3	Protected Rare Plant Species Potentially Present Within Five Miles of Proposed Transmission Line Corridor Between the Hardee Power Station and the Pebbledale Substation	6-25
6.1.6-4	Protected Rare Animal Species Potentially Present Within Five Miles of Proposed Transmission Line Corridor Between the Hardee Power Station and the Pebbledale Substation	6-26
6.1.7-1	Easements, Title, Crossing Approvals Normally Required for Transmission Line Construction in the Preferred and Alternative Corridors Between the Hardee Power Station and the Vandolah and Lee Substations	6-50
6.1.7-2	Archaeological and Historic Sites Within the Preferred Transmission Line Corridor Between the Hardee Power Station and the Vandolah and Lee Substations	6-53
6.1.7-3	Water Bodies Within Preferred and Alternative Corridors Between the Hardee Power Station and the Vandolah and Lee Substations	6-59
6.1.7-4	Protected Rare Plant Species Potentially Present Within Five Miles of Proposed Transmission Line Corridor Between the Hardee Power Station and the Vandolah and Lee Substations	6-62
6.1.7-5	Protected Rare Animal Species Potentially Present Within Five Miles of Proposed Transmission Line Corridor Between the Hardee Power Station and the Vandolah and Lee Substations	6-63
6.2.6-1	Easements, Title, Crossing Approvals Normally Required for Gas Pipeline Construction from Interconnect Point to Hardee Power Station	6-99
6.2.7-1	Water Bodies Crossed by Proposed Gas Pipeline Corridor for the Hardee Power Station	6-102
6.2.7-2	Threatened and Endangered Species that Could Potentially Occur along the Gas Pipeline Corridor	6-104
6.3.4-1	Preliminary Cost Analysis for the Hardee Power Station Liquid Fuel Pipeline	6-122

LIST OF TABLES

TABLE		PAGE
6.3.6-1	Easements, Title, Crossing Approvals Normally Required for Liquid Fuel Pipeline Construction in the Preferred (P) and Alternative (A) Corridors	6-132
6.3.7-1	Waterbodies Within the Preferred (P) and Alternative (A) Liquid Fuel Pipeline Corridor	6-142
6.3.7-2	Listed Animal Species Potentially Occuring Within 1,500 Feet of the Proposed Pipeline Corridor	6-148
6.3.7-3	Common (Nonlisted) Fish Expected to Occur in the Waters of the Corridor Study Area	6-150
7.1-1	Projected Taxes on Hardee Power Station and Transmission Facilities Over Life of the Plant	7-2
8.3.2-1	Typical Design Data for Gasification Plant Potentially Constructed at the Hardee Power Station	8-29
8.3.2-2	Summary of Raw Wastewater Characteristics CWCGP	8-34
8.3.3-1	Estimation of Evaporation from the Proposed SECI Cooling Reservoir based on Maximum Annual Load Factor and Coal Gasifier Cooling Requirements	8-36
9.0-1	Hardee Power Station Agency and Public Organization Contacts	9-2
10.1.2-1	FDNR Reclamation Requirements (Chapter 16C-16 F.A.C.) Applicable to the Hardee Power Station Project (Cooling Reservoir)	10-3

LIST OF FIGURES

FIGURE	PAGE
1.3.1-1 Hardee Power Plant Station Project Composition	1-7
1.3.2-1 General Location of Hardee Power Station	1-10
1.3.2-2 Hardee Power Station Site Location	1-11
1.3.3-1 Hardee Power Station Site	1-13
1.3.3-1a Hardee Power Station Site Boundaries	1-13a
1.3.3-2 Location of Hardee Power Station, Associated Transmission Line Substations, and Interconnect Points for Pipelines	1-14
2.1-1 Locations of Site Boundary (Perimeters) and Adjacent Properties	2-2
2.2.1-1 Site Location and Boundaries of Cities and Towns Within a 5 Mile Radius	2-3
2.2.1-2 Areas Within a One Mile Radius of Hardee Power Station Plant Facilities	2-4
2.2.3-1 Existing and Projected Land Use for the HPS Project Area	2-13
2.2.7-1 Major Access Routes in the Vicinity of Hardee Power Station	2-23
2.3.1-1 Generalized Stratigraphic Column of the Site Vicinity	2-35
2.3.1-2 Definition of Soil Types Underlying the Hardee Power Station Site	2-40
2.3.1-3 Generalized East-West Stratigraphic Cross-Section of the Hardee Power Station Site	2-41
2.3.1-4 Generalized North-South Stratigraphic Cross-Section of the Hardee Power Station Site	2-42
2.3.1-5 Boring Location Plan with Cross-Section Lines	2-43
2.3.1-6 Geologic Map of Hardpan	2-48
2.3.2-1 Potentiometric Surface of the Water Table Aquifer	2-50
2.3.2-2 Potentiometric Surface of the Intermediate Aquifer	2-55
2.3.2-3 Potentiometric Surface - Floridan Aquifer	2-60

LIST OF FIGURES

FIGURE		PAGE
2.3.2-4	Water Level Fluctuations in the Floridan Aquifer from Wells in the Vicinity of the Hardee Power Station	2-61
2.3.4-1	Typical Cross-Section of Payne Creek and Flood Plain Near the Hardee Power Station (Looking Upstream)	2-69
2.3.4-2	Topography of the Hardee Power Station	2-70
2.3.4-3	Discharge Hydrograph for Payne Creek Near the Hardee Power Station	2-76
2.3.4-4	Surface Water Levels and Streamflow Monitoring Locations	2-77
2.3.4-5	Surface Historic Water Quality Monitoring Locations for Agrico and Dames & Moore Studies (1975-1986)	2-85
2.3.4-6	Surface Water Quality Monitoring Locations (October 1988-March 1989)	2-91
2.3.5-1	Land Use and Vegetation of Plant Site and Associated Facilities	2-95
2.3.6-1	Aquatic Ecology Sampling Station Locations	2-99
2.3.6-2	Generalized Relationship of Plant Species to Payne Creek Floodplain Configurations	2-119
2.3.7-1	Annual Average Wind Frequency Distribution (1982-1986) Measured at the National Weather Service Station in Tampa, Florida	2-144
2.3.7-2	Seasonal Average Wind Frequency Distribution (1982-1986) Measured at the National Weather Service Station in Tampa, Florida	2-145
2.3.8-1	Noise Monitoring Locations	2-164
3.1-1	Simplified Flow Diagram of the Hardee Power Station	3-2
3.2-1	Proposed Hardee Power Station Site Layout for Phase I-A	3-5
3.2-2	Conceptual Profile of Hardee Power Station	3-6
3.5-1	Water Mass Balance: Maximum Daily Makeup	3-21

LIST OF FIGURES

FIGURE		PAGE
3.5-2	Water Mass Balance: Maximum Daily Discharge	3-22
3.5-3	Water Mass Balance: Annual Average Makeup	3-23
3.5.1-1	Plant Location of Cooling Reservoir Edge Cross-Sections	3-28
3.5.1-2	Cross-Section A - Typical Below Grade Edge of Reservoir	3-29
3.5.1-3	Cross-Section B - Typical Above Grade Edge of Reservoir	3-30
5.1.1-1	Predicted Cooling Reservoir Elevations (51 yrs)	5-9
5.1.1-2	Predicted Cooling Reservoir Discharges	5-10
5.1.1-3	Payne Creek Runoff Hydrograph (10 Year, 24 hour)	5-14
5.1.1-4	Payne Creek Runoff Hydrograph (25 Year, 24 Hour)	5-16
5.1.1-5	Predicted Cooling Reservoir Discharge (25 Year, 24 Hour)	5-17
5.1.1-6	Ratio of Reservoir Discharge to Payne Creek Flow	5-19
5.1.5-1	Operational Monitoring Temperature and Water Quality Station Locations	5-30
5.2.1-1	Predicted Groundwater Discharge for 660 MW	5-39
5.2.1-2	Predicted Solute Transport From the Cooling Reservoir	5-41
5.3.2-1	Predicted Groundwater Drawdown	5-47
6.1.2-1	See Appendix 11.10	**
6.1.2-2	See Appendix 11.10	**
6.1.2-3	See Appendix 11.10	**
6.1.2-4	See Appendix 11.10	**
6.1.2-5	See Appendix 11.10	**
6.1.2-6	See Appendix 11.10	**

LIST OF FIGURES

FIGURE		PAGE
6.1.3-1	Hardee Power Station Transmission Structures	6-4
6.1.3-2	Profile for H-Frame Construction	6-6
6.1.3-3	Profile for Single Pole Construction	6-7
6.1.5-1	Transmission Corridor Selection Study Area	6-9
6.1.5-2	See Appendix 11.10	**
6.1.6-1	See Appendix 11.10	**
6.1.6-2	See Appendix 11.10	**
6.1.6-3	See Appendix 11.10	**
6.1.6-4	Hardee Power Station to Pebbledale Substation Typical Access Road Plan and Cross-Section	6-34
6.1.7-1	See Appendix 11.10	**
6.1.7-2	See Appendix 11.10	**
6.1.7-3	See Appendix 11.10	**
6.1.7-4	Hardee Power Station to Pebbledale Substation Access Road Plan and Cross-Section	6-64
6.2.1-1	Natural Gas Pipeline Study Area and Interconnect Points	6-84
6.2.1-2	Proposed Gas Pipeline Corridor: Sarasota Lateral Loop to SR 540; Hardee Power Station Interconnect South Towards Plant Site	6-86
6.2.1-3	Proposed Gas Pipeline Corridor: Hardee Power Station Interconnect South to Plant Site	6-87
6.2.1-4	Proposed Gas Pipeline Corridor: Hardee Power Station Lateral South to Plant Site	6-88
6.2.1-5	Proposed Gas Pipeline Corridor: Hardee Power Station Lateral South to Plant Site	6-89
6.2.1-6	Land Use/Vegetation in Potential New Access Areas Along the Proposed Natural Gas Pipeline Corridor (Braddock Road to Highway 92)	6-91

LIST OF FIGURES

FIGURE		PAGE
6.2.1-7	Land Use/Vegetation in Potential New Access Areas Along the Proposed Natural Gas Pipeline Corridor (Old Eagle Lake to Gordonville)	6-92
6.2.3-1	Proposed Right-of-Way (ROW) Schematic Designs	6-93
6.2.6-1	Future Land Use Map--Auburndale	6-95
6.2.6-1	Future Land Use Map--Polk City	6-96
6.3.2-1	Proposed Liquid Fuel Pipeline Corridor	6-117
6.3.2-2	See Appendix 11.10	**
6.3.3-1	Proposed Right-of-Way (ROW) Schematic Designs	6-121
6.3.5-1	Liquid Fuel Pipeline Corridor Selection Study Area	6-124
6.3.6-1	Governmental Jurisdictions Liquid Fuel Pipeline Corridor	6-127
6.3.6-2	See Appendix 11.10	**
6.3.7-1	See Appendix 11.10	**
8.1.1-1	Power Plant Siting Study Area	8-2
8.1.3-1	Siting Study Phases	8-4
8.1.4-1	General Location Map of Preliminary Study Areas- Phase I Regional Screening	8-7
8.1.5-1	General Location Map of Potential Study Areas	8-9
8.1.5-2	General Location Map of Candidate Study Areas	8-10
8.3.1-1	Block Diagram of Entrained Flow Coal Gasification Plant and Combined Cycle Power Plant	8-26
8.3.2-1	Conceptual Layout of a Coal Gasification Facility at the Site	8-32

LIST OF ACRONYMS

AAQS	Ambient Air Quality Standards
ACSR	Aluminum Conductor Steel Reinforced
ADT	Average Daily Traffic
Agrico	Agrico Chemical Company
ANSI	American National Standard Institute
BACT	Best Available Control Alternative
BB4	Tampa Electric's Big Bend Unit Four
CAA	Clean Air Act
CC	Combined Cycle
CCP	Combined Cycle Project
CEQ	Council on Environmental Quality
CFCRPP	Central Florida Comprehensive Regional Policy Plan
CFI	CF Industries, Inc.
CFR	Code of Federal Regulations
CFRPC	Central Florida Regional Planning Council
CO	Carbon Monoxide
COE	U.S. Army Corps of Engineers
CR	County Road
CSX	CSX Transportation
CT	Combustion Turbine
CWCGP	Cool Water Coal Gasification Program
dB	decibel
dBA	A weighted decibels
dbh	Diameter at Breast Height
DCA	Department of Community Affairs
DHR	Division of Historical Resources
DOT	Florida Department of Transportation
DRI	Development of Regional Impact
EA	Environmental Assessment
EDC	Economic Development Council
EIA	Environmental Impact Assessment
EIS	Environmental Impact Statement
EMF	Electromagnetic Field
EPRI	Electric Power Research Institute
FAC	Florida Administrative Code
FCREPA	Florida Committee on Rare and Endangered Plants and Animals
FDA	Florida Department of Agriculture
FDACS	Florida Department of Agriculture and Consumer Services
FDCA	Florida Department of Community Affairs
FDER	Florida Department of Environmental Regulation
FDLES	Florida Department of Labor and Employment Security
FDNR	Florida Department of Natural Resources
FDOC	Florida Department of Commerce
FDOT	Florida Department of Transportation
FEPPSA	Florida Electric Power Plant Siting Act
FGFWFC	Florida Game and Fresh Water Fish Commission

LIST OF ACRONYMS

(Continued)

FGT	Florida Gas Transmission
FHWA	Federal Highway Administration
FLUCCS	Florida Land Use Cover and Classification System
FNAI	Florida Natural Areas Inventory
FPC	Florida Power Corporation
FPL	Florida Power & Light
FPSC	Florida Public Service Commission
GCC	Gasification Combined Cycle
GIS	Geographic Information System
HA	Hectare
HCPP	Hardee County Comprehensive Plan
HRSG	Heat Recovery Steam Generator
ISCST	Industrial Source Complex Short-Term
KBN	KBN Engineering and Applied Sciences, Inc.
LAER	Lowest Achievable Emission Rate
MCR	Maximum Current Rating
MSL	Mean Sea Level
MVA	Megavolt/Amperes
MW	Megawatts
NEPA	National Environmental Policy Act
NO ₂	Nitrogen Dioxide
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollution Discharge Elimination System
NRHP	National Register of Historic Places
NSPS	New Source Performance Standard
NWS	National Weather Service
O ₃	Ozone
PCCP	Polk County Comprehensive Plan
PM	Particulate Matter
POD	Point of Discharge
POS	Plan of Study
PSC	Florida Public Service Commission
PSD	Prevention of Significant Deterioration
RC	Rural Conservation
RCRA	Resource Conservation Recovery Act
REA	United States Department of Agriculture's Rural Electrification Administration
ROMP	Regional Observation Monitoring Program
ROW	Right-of-Way
RV	Recreational Vehicle
SCA	Site Certification Application
SCOT	Shell-Claus Offgas Treatment
SECI	Seminole Electric Cooperative, Inc.
SELS	Severe Local Storms
SO ₂	Sulfur Dioxide
SPL	Sound Pressure Level
SR	State Road
SWFWMD	Southwest Florida Water Management District

LIST OF ACRONYMS
(Continued)

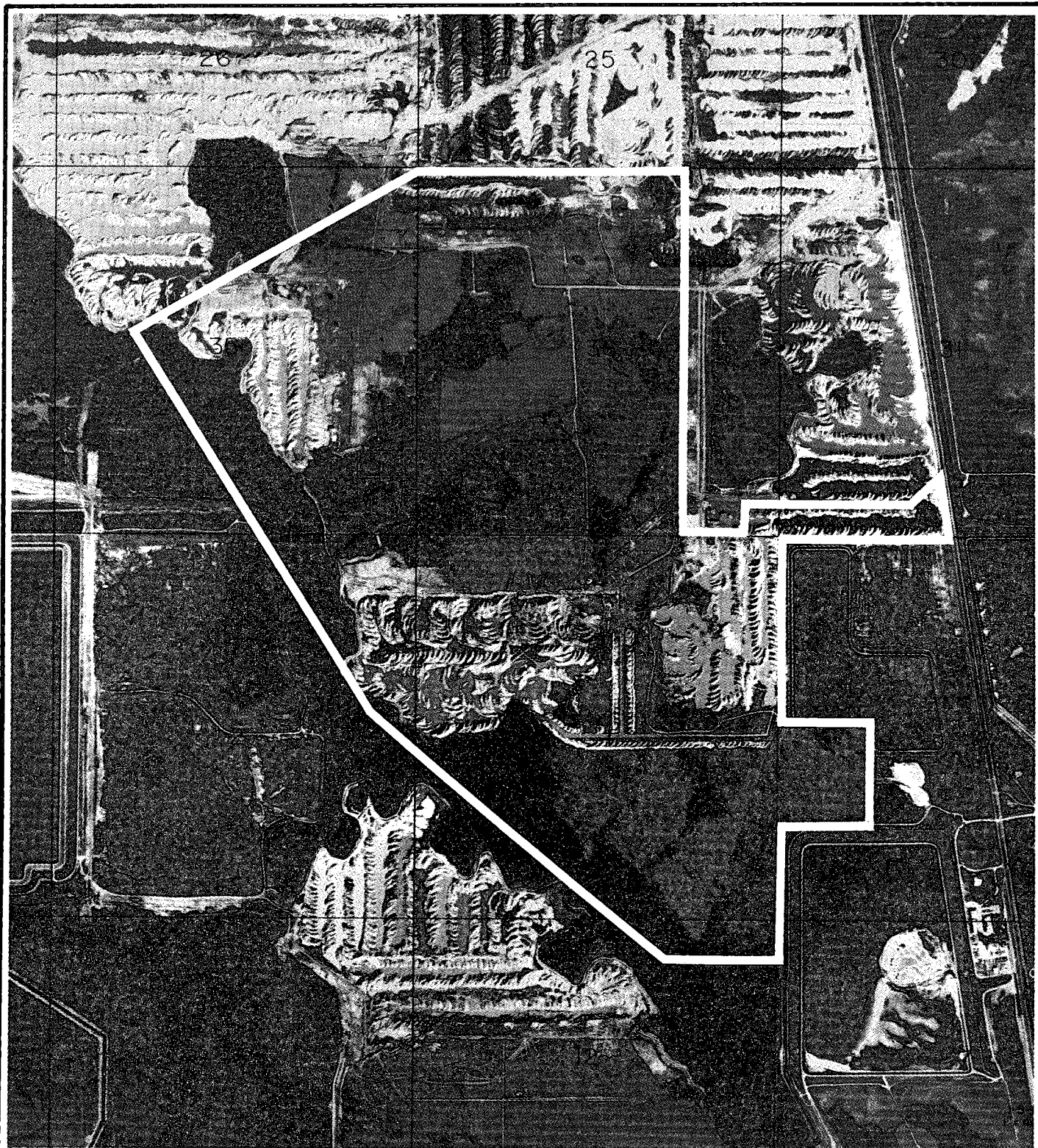
Tampa Electric	Tampa Electric Company, Inc.
TPY	Tons per year
TSP	Total Suspended Particulate
UNAMAP	User's Network for Applied Modeling of Air Pollution
USDA	U.S. Department of Agriculture
USDL	U.S. Department of Labor
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USGS	United States Geological Survey
USSAC	United States Steel Agri-Chemicals

HARDEE
POWER
STATION

**SITE
CERTIFICATION
APPLICATION/
ENVIRONMENTAL
ASSESSMENT**

CHAPTER 1

**NEED FOR POWER
AND THE PROPOSED
HARDEE POWER STATION
PROJECT**



0 1/2 1 Miles
0 1/2 1 Kilometers

1/5/89

Figure 1.3.3-1 HARDEE POWER STATION SITE

**Hardee
Power Station**

TABLE OF CONTENTS

SECTION		PAGE
1.0	<u>NEED FOR POWER AND THE PROPOSED FACILITIES</u>	1-1
1.1	INTRODUCTION	1-1
1.1.1	<u>Purpose of Site Certification</u> <u>Application/Environmental Analysis</u>	1-1
1.1.2	<u>The Applicants</u>	1-2
1.2	NEED FOR THE PROJECT	1-4
1.3	OVERVIEW OF HARDEE POWER STATION PROJECT	1-5
1.3.1	<u>Introduction</u>	1-5
1.3.2	<u>General Site Location and Description</u>	1-6
1.3.3	<u>Project Description</u>	1-6
1.4	BENEFITS OF THE PROJECT	1-15
1.4.1	<u>External Benefits</u>	1-15
1.4.2	<u>Internal Benefits</u>	1-15

1.0 NEED FOR POWER AND THE PROPOSED FACILITIES

1.1 INTRODUCTION

1.1.1 Purpose of Site Certification Application/Environmental Analysis

The applicant is proposing to license, construct, and operate a new combined cycle power plant and associated transmission line, gas pipeline, and liquid fuel pipeline facilities known as the Hardee Power Station. The licensing of power plant and associated facilities in Florida requires compliance with federal, state, and local laws, regulations, and ordinances. The two primary laws governing the licensing of this project are the Florida Electric Power Plant Siting Act [FEPPSA, 403.501-403.517 Florida Statutes (F.S.)] and the National Environmental Policy Act (NEPA).

FEPPSA establishes the state's policy toward balancing the needs for increased electrical power generation with the effects on human health, the environment and ecology of the lands and waters within the state. In the site certification process, the Florida Public Service Commission (PSC) is the exclusive forum for the determination of need, and the Florida Department of Environmental Regulation (FDER) acts as the central coordinator. Certification proceeds with the submittal of a Site Certification Application (SCA) to FDER by the applicant and culminates with approval by the Governor and Cabinet. Implementation procedures of FEPPSA are presented in FDER's Chapter 17-17, Florida Administrative Code (F.A.C.) Electrical Power Plant Siting.

NEPA is the national charter for the protection of the environment. It establishes policy, sets goals, and provides means for carrying out the policy. The Council on Environmental Quality (CEQ) promulgates regulations (40 CFR 1500) to guide federal agencies in complying with the procedures and achieving the goals of NEPA. In meeting its responsibilities under NEPA and CEQ regulations, the United States Department of Agriculture's Rural Electrification Administration (REA) has determined that its loan guarantee commitments for bulk power generation and transmission facilities are major federal actions significantly affecting the quality of the human environment. Therefore, these commitments are subject to NEPA and CEQ

regulations. REA typically requires a borrower to prepare an Environmental Assessment (EA) document prior to preparing its own Environmental Impact Statement (EIS). REA's environmental policies and procedures are presented in 7 CFR 1794.

A single environmental application, a SCA/EA has been prepared and submitted to FDER and the REA describing the Hardee Power Station Project and the environmental conditions and impacts associated with the project. This SCA/EA has been prepared to meet the requirements of the two primary laws, i.e., FEPPSA and NEPA, which govern this project. This SCA/EA followed the scope, quantity and specificity of information described in the "Seminole Electric Cooperative, Inc. SECI Combined Cycle Environmental Licensing Plan of Study" [KBN Engineering and Applied Sciences, Inc. (KBN), et al., 1988]. Approvals and binding agreements were obtained for this Plan of Study pursuant to Section 403.5063, F.S. and Chapter 17-17.041(6) F.A.C.

Agency and public comments regarding the project have been obtained through numerous meetings, discussions and presentations. State and federal interagency meetings and public scoping meetings regarding the Hardee Power Station Project were held in September and December 1988. Public workshops regarding this proposed transmission line were held in February 1989 (see Chapter 9).

1.1.2 The Applicants

The applicants for the SCA for the Hardee Power Station are TECO Power Services (Power Services), Tampa Electric Company (Tampa Electric), and Seminole Electric Cooperative, Inc. (SECI).

Power Services, a wholly-owned subsidiary of TECO Energy, will supply power to both Tampa Electric and SECI as an independent power producer. Power Services will enter into power supply agreements to sell capacity and energy to SECI to meet its backup requirements and to Tampa Electric for a portion of its capacity and energy needs.

Tampa Electric, headquartered in Tampa, Florida, a wholly-owned subsidiary of TECO Energy, is an investor-owned electric utility. Tampa Electric's service territory comprises an area of about 2,000 square miles on the west coast of Florida, including substantially all of Hillsborough County and parts of Polk, Pasco, and Pinellas counties. This territory has an estimated population of about 950,000 and is served by Tampa Electric's three electrical generating plants in or near Tampa. Over 99% of Tampa Electric's electric generation for the years 1987 and 1988 was from its coal-fired units.

SECI, headquartered in Tampa, Florida, is an electric generation and transmission cooperative which provides wholesale electric service to its 11 member distribution rural electric cooperatives serving more than 500,000 customers in Florida. SECI has approximately 1,214 megawatts (MW) of generating capacity consisting of two 600 MW coal-fired generating plants and a 14 MW portion of the Crystal River Unit 3 nuclear plant.

SECI has a demonstrated need for 440 MW of back-up capacity to be available in 1993 to supply power during those periods when one of its coal generating units is taken out of service for maintenance. These maintenance periods usually occur in the spring and fall of each year. Tampa Electric has a need for peak load capacity normally during the summer and winter months. Power Services is contracting with Tampa Electric to supply peak load capacity and with Seminole for back-up capacity. To meet these needs, Power Services will provide 440 MW of capacity by combining 145 MW from Tampa Electric's Big Bend Unit Four (BB4) with 295 MW of new capacity located at the Hardee Power Station. Power Services will contract with Tampa Electric to own certain rights to BB4's capacity. After 10 years, the BB4 capacity will revert fully to Tampa Electric. Power Services will then add 145 MW of new capacity at the Hardee Power Station to continue its commitment to provide Seminole with 440 MW of back-up capacity.

1.2 NEED FOR THE PROJECT

On February 23, 1988, SECI filed a petition to determine need for two 220 MW combined cycle facilities, having an in-service date of January 1, 1993, with the PSC, pursuant to Section 403.519 F.S. SECI also submitted a comprehensive Need Determination Study and Need Determination Study Appendices to the PSC in support of that petition. Those documents, which are incorporated herein by reference, contained the information required by the PSC's rule (Chapter 25-22.081, F.A.C.) in order for it to make a determination of need for the facilities pursuant to the FEPPSA. Copies of those documents are available for inspection at the Florida Public Service Commission, Division of Records and Reporting, 101 East Gaines Street, Tallahassee, Florida.

Concurrently with filing the need determination petition, SECI issued a request for proposals (RFP) for capacity from qualifying facilities, independent power producers and others to determine if there was a viable and cost-effective purchased power alternative to SECI's construction of the proposed combined cycle facilities.

The PSC held public hearings on SECI's petition on December 7-8, 1988. At the time of the hearings, the RFP process had resulted in the identification of two short list bidders with whom negotiations were proceeding for a potential capacity alternative. Power Services was one of those bidders.

The PSC issued its "Initial Order on Need Determination" (Order No. 20930, Docket No. 88309-EC) on March 23, 1989. (A copy of that order is reproduced in Appendix 11.9.) In that order, the PSC determined that: (1) SECI had proven a need for 450 MW of capacity in 1993; and (2) of the alternatives fully developed in the record, SECI's need would be best and most economically met by the two 220 MW combined cycle facilities proposed for the Hardee Power Station site. The PSC deferred issuance of a final need determination order pending presentation of the results of SECI's RFP process at a subsequently noticed public hearing.

The RFP process is concluding a series of contracts among SECI, Power Services, and Tampa Electric, which will provide 440 MW of electric capacity to meet SECI's capacity needs through a combination of capacity from Tampa Electric's BB4 and capacity from the phased construction of the two 220 MW combined cycle facilities comprising Phases I-A and I-B of the Hardee Power Station.

Concurrently with filing this application, SECI, Power Services and Tampa Electric are filing with the PSC a "Joint Motion to Add Coapplicants and to Supplement Need Determination Petition," together with supporting testimony and exhibits. That filing contains the additional information required by the PSC in order to make a final determination of need for the facilities comprising the Hardee Power Station. A final hearing before the PSC on the supplemented need determination petition is scheduled for September 20, 1989.

1.3 OVERVIEW OF HARDEE POWER STATION PROJECT

1.3.1 Introduction

The project is composed of four major types of facilities:

1. The Hardee Power Station facilities within Hardee and Polk counties,
2. Associated transmission facilities extending from the power plant facilities to existing transmission facilities in central and south Florida,
3. Associated gas pipeline facilities within Polk and Hardee counties, and
4. Associated liquid fuels pipeline extending from Port Manatee to the power plant facility.

This document addresses the environmental aspects of the Hardee Power Station project as a whole and each of the three major types of facilities in more detail: Hardee Power Station facilities are described in Chapter 3 and associated transmission line, gas pipeline, and liquid fuel pipeline facilities are described in Chapter 6. Each of the major types of

facilities is further divided into major components. As an overview, Figure 1.3.1-1 illustrates the Hardee Power Station project's composition. Terminology used through this SCA/EA document is presented in Table 1.3.1-1.

1.3.2 General Site Location and Description

The proposed site for the Hardee Power Station project is located in Hardee and Polk Counties about 14 km (9 miles) northwest of Wauchula, 26 km (16 miles) south-southwest of Bartow and 64 km (40 miles) east of Tampa Bay (Figures 1.3.2-1 and 1.3.2-2). The project site is bordered on the east by County Road (CR) 663, CSX Transportation (CSX) railroad line, and CF Industries, Inc. (CFI), Hardee Phosphate Complex. Agrico Chemical Company, a division of Freeport McMoand Resource Partners, a Delaware Limited Partnership (Agrico) properties surround the remaining portions of the site. Payne Creek flows along the site's western border. Mining is the primary land use of the project site and adjoining areas. The site will utilize lands that have been approved for phosphate mining by Florida Department of Natural Resources (FDNR) and FDER.

1.3.3 Project Description

The Hardee Power Station project consists of constructing and operating combined cycle electric generating facilities with an ultimate capacity of 660 MW constructed in two phases. In Phase 1-A, Power Services will place 295 MW of capacity into commercial operation in January 1993. This capacity will consist of a stand alone 75 MW combustion turbine (CT) and a 220 MW combined cycle facility comprised of two 75 MW CT's connected to a 70 MW heat recovery steam generator system (HRSG). In Phase 1-B, Power Services will add 145 MW to replace the BB4 capacity. This new capacity will add one 75 MW CT and a 70 MW HRSG system to the stand alone CT. Phase 1-A and 1-B will result in two 220 MW combined cycle facilities. Phase 2 is the addition of a third 220 MW combined cycle facility at an unspecified future date.

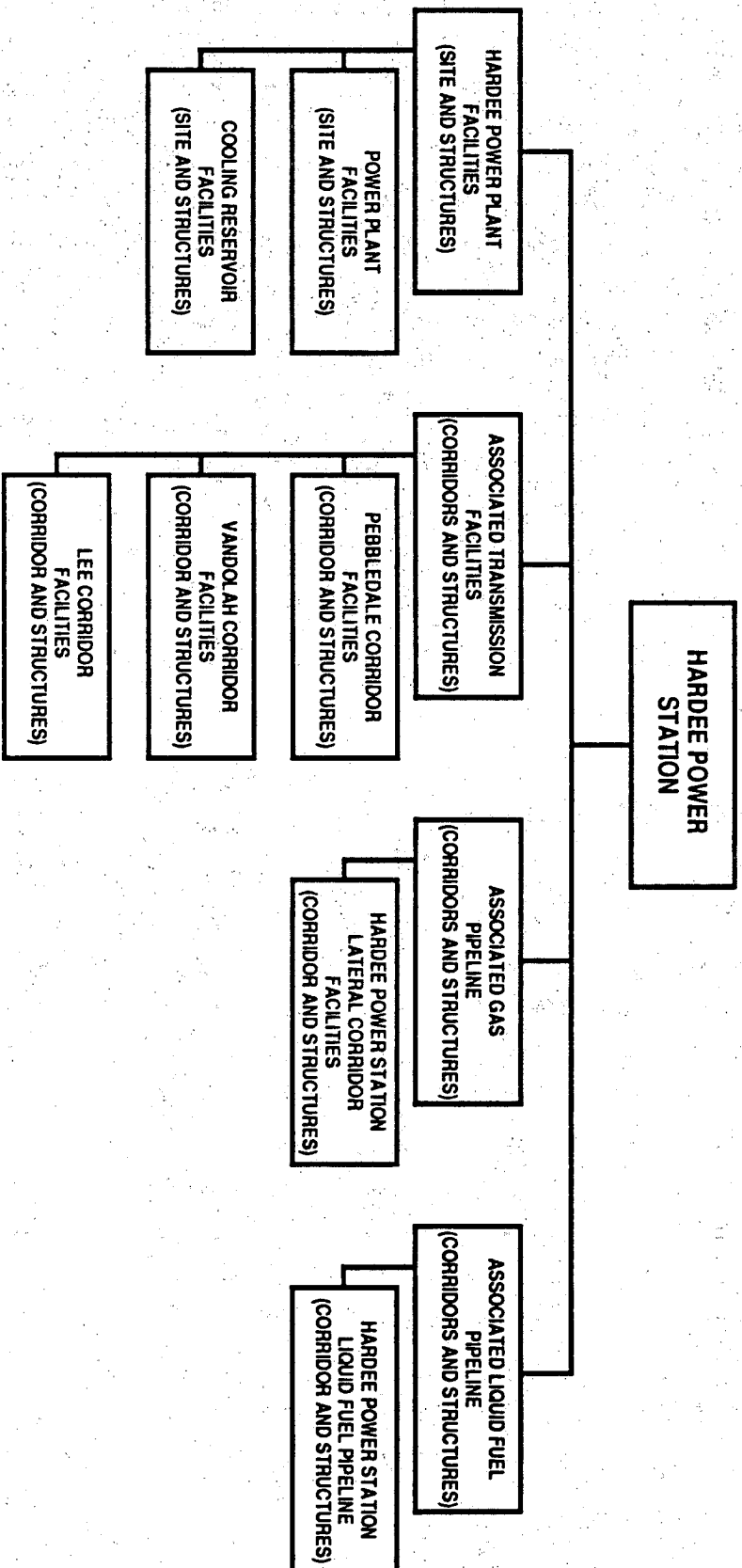


Figure 1.3.1-1 HARDEE POWER PLANT STATION
PROJECT COMPOSITION

**Hardee
Power Station**

Table 1.3.1-1. Hardee Power Station Project Terminology (Page 1 of 2)

Hardee Power Station Project	The overall project: Hardee Power Station plant facilities plus the associated transmission facilities plus the associated fuel delivery facilities.
Hardee Power Station plant facilities (site plus structures)	The area encompassing the power plant site, the railroad spur corridors, and the cooling reservoir and the structures to be constructed within that area.
power plant facilities (site plus structures)	The 20-hectare (50-acre) area and the structures to be constructed within that area.
cooling reservoir facilities (site plus structures)	The 231-hectare (570-acre) area encompassing the cooling reservoir site and the discharge structures to be constructed within that area.
access road facilities (corridors plus structures)	The area traversed by the access road connecting to CR 663 and the structures to be constructed within that area.
associated transmission facilities (corridor structures)	The area traversed by the preferred transmission corridor and the structures to be constructed within that area.
Pebbledale corridor facilities (corridor plus structures)	The area traversed by the preferred transmission corridor from the power plant facilities to the existing Pebbledale Substation and the structures to be constructed within that Pebbledale area.
Vandolah corridor facilities (corridor plus structures)	The area traversed by the preferred transmission corridor from the power plant facilities to the existing Vandolah Substation and the structures to be constructed within that area.
Lee corridor facilities (corridor plus structures)	The area traversed by the preferred transmission corridor from the power plant facilities to the existing Lee Substation and the structures to be constructed within that area.
Hardee Power Station Lateral facilities (corridor plus structures)	The area traversed by the gas pipeline corridor from the existing gas pipeline west of Polk City and the structures to be constructed within that area.

Table 1.3.1-1. Hardee Power Station Project Terminology (Page 2 of 2)

Hardee Power Station Liquid Fuel Pipeline facilities (corridor plus structures)	The area traversed by the liquid fuel pipeline corridor from Port Manatee to the plant site and the structures to be constructed within that area)
--	---

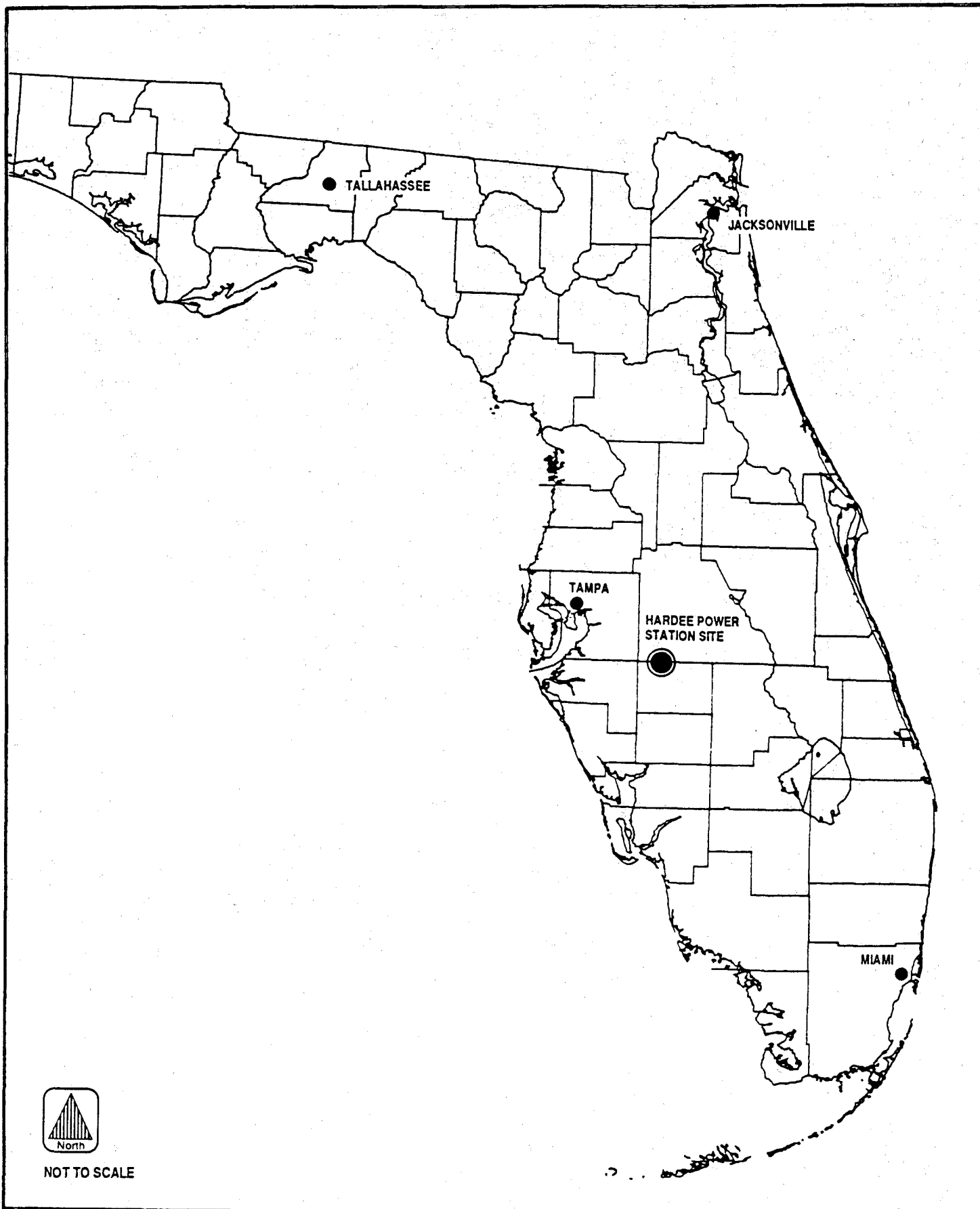


Figure 1.3.2-1 GENERAL LOCATION OF
HARDEE POWER STATION

Hardee Power Station

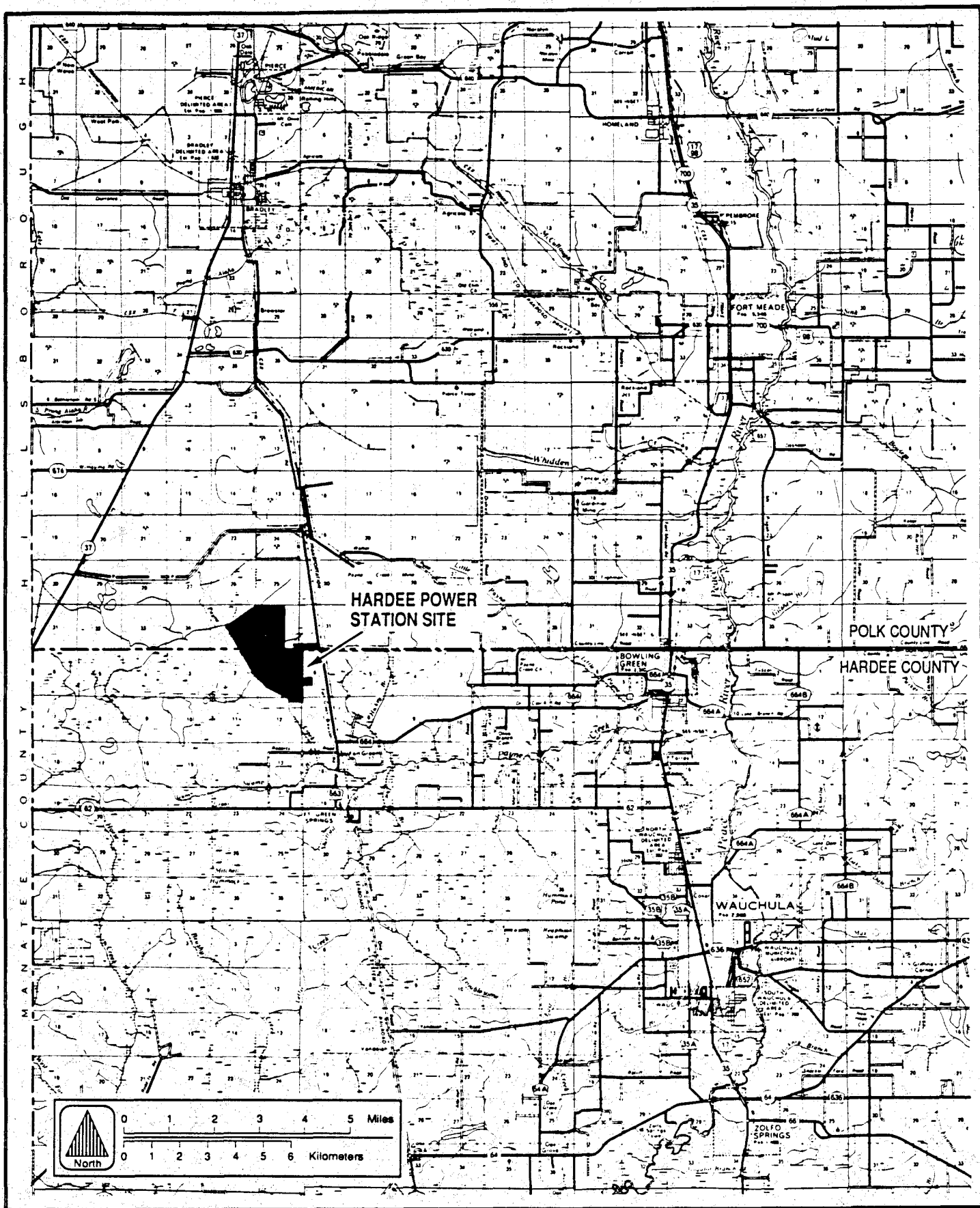


Figure 1.3.2-2 HARDEE POWER STATION SITE LOCATION

**Hardee
Power Station**

The new capacity will use natural gas or distillate oil as a fuel source, but will be constructed so as not to preclude the use of coal gas should that fuel prove more economical.

The project provides for building the new generating facilities on a 526 hectare (ha) (1300 acre) site (Figure 1.3.3-1) selected by SECI in northwest Hardee County and southwest Polk County. The Hardee Power Station site will be owned by SECI with a portion of this land being leased to Power Services for the duration of the project. Power Services will own and operate the power generating facilities associated with Phases 1-A and 1-B.

Steam cycle cooling for the entire 660 MW facility will be achieved through the use of an on-site 231 ha (570 acre) cooling reservoir constructed specifically for the Hardee Power Station. This reservoir will be constructed by Agrico, who is currently mining the area where it will be located. The construction of the reservoir will be part of Agrico's reclamation plan required by the FDNR to restore the area to a functional use once mining activities are complete. Once the reservoir is constructed it will be owned by SECI.

Groundwater from on-site well fields will provide the primary supply of plant makeup water. Cooling water will be infrequently discharged to Payne Creek.

SECI will build, own, operate, and maintain two 230 KV transmission lines originating at the Hardee Power Station (Figure 1.3.3-2). The first line will connect to Lee Substation located in Lee County, south of the plant site. The second line will connect to Florida Power Corporation's Vandolah Substation located in Hardee County, also south of the plant site.

Tampa Electric will build, own, operate, and maintain one 230 KV transmission line connecting the Hardee Power Station with Tampa Electric's Pebbledale Substation located in Polk County, north of the plant site (Figure 1.3.3-2).

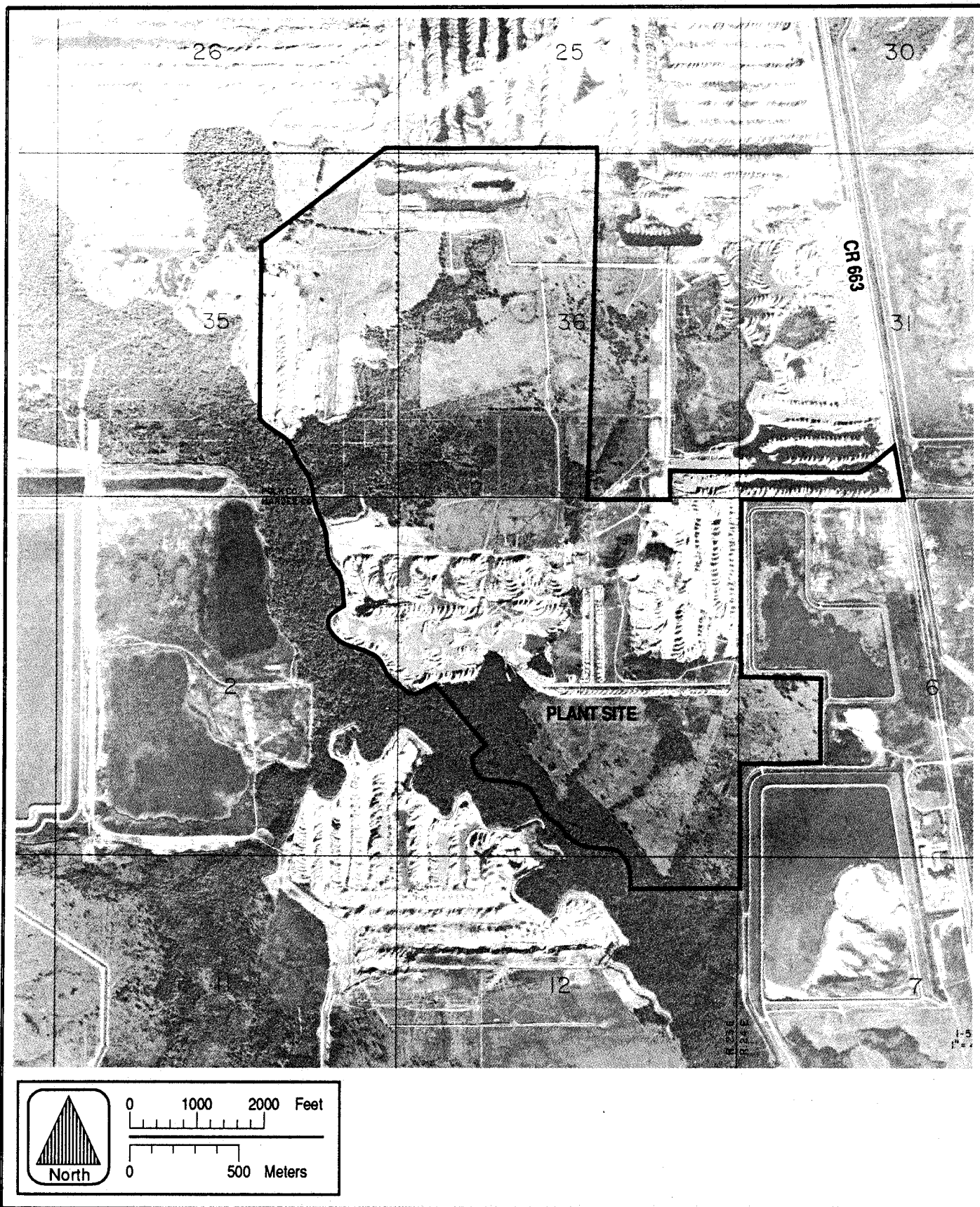


Figure 1.3.3-1a HARDEE POWER STATION SITE BOUNDARY

**Hardee
Power Station**

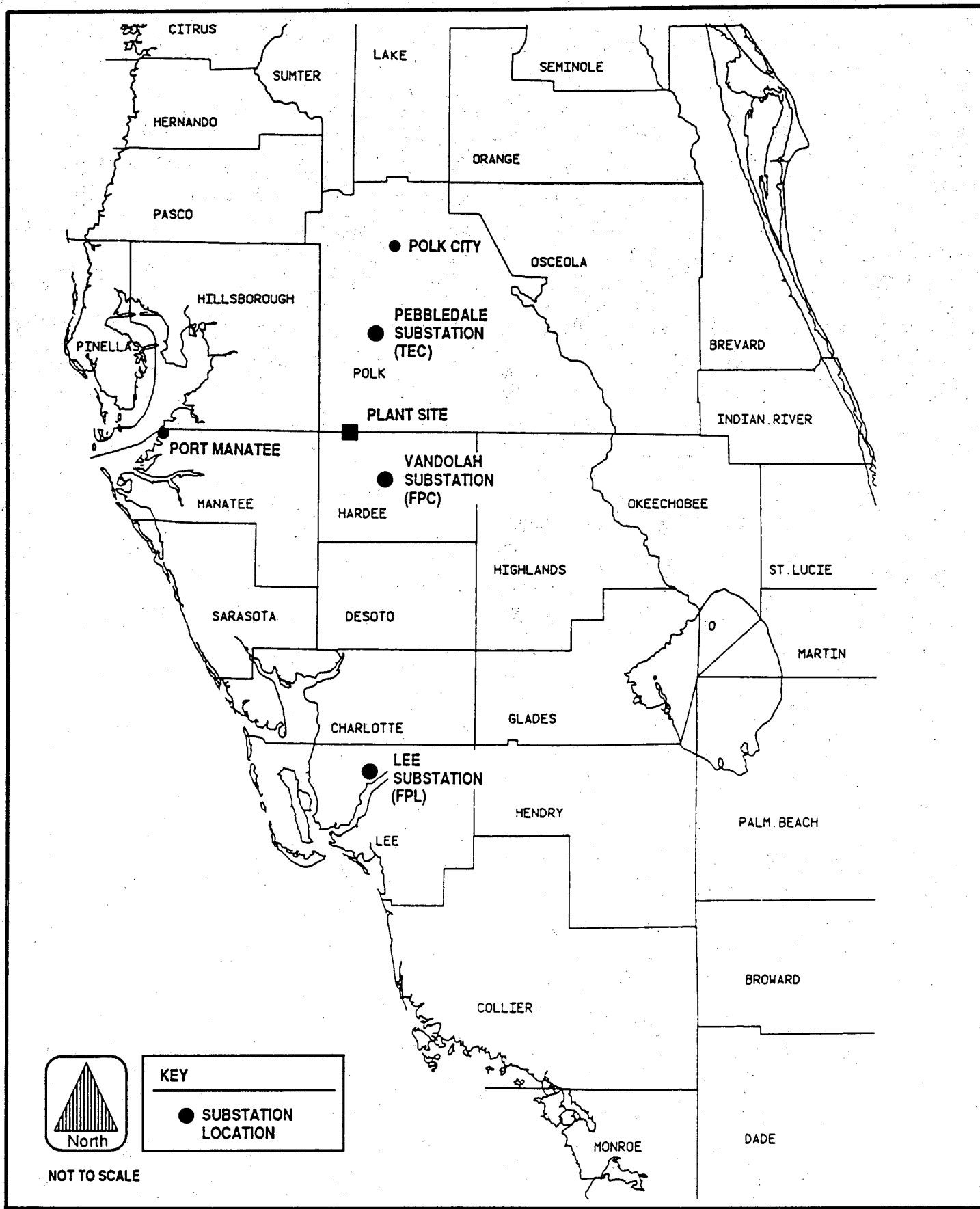


Figure 1.3.3-2 LOCATION OF HARDEE POWER STATION, ASSOCIATED TRANSMISSION LINE SUBSTATIONS AND INTERCONNECT POINTS FOR PIPELINES

**Hardee
Power Station**

Power Services and/or Florida Gas Transmission (FGT) and/or a qualified third party will build, own, operate, and maintain a 48 centimeter (cm) (18-inch) natural gas pipeline to the Hardee Power Station connecting into FGT's existing pipeline system at a point north of Polk City (Figure 1.3.3-2).

Fuel oil will be delivered to the Hardee Power Station by truck or via an 20.3 cm (8-inch) liquid fuels pipeline. This liquid fuels pipeline will be built, owned, operated, and maintained by Power Services and/or a qualified third party and, when constructed, will run from Port Manatee to the Hardee Power Station (Figure 1.3.3-2).

1.4 BENEFITS OF THE PROJECT

1.4.1 External Benefits

The primary benefit of this project to Hardee and Polk Counties, the region and the state of Florida is the provision of a new, clean and reliable energy source. In addition to the provision of energy, the Hardee Power Station project will provide employment and tax revenues. The Hardee Power Station project makes beneficial use of mined lands in Hardee and Polk Counties and is compatible with proposed reclamation plans.

Because of the previously altered environment in the project area and the relatively clean nature of the project, no significant adverse impacts will result from the project.

1.4.2 Internal Benefits

This project is beneficial to the customers of SECI and Tampa Electric due to the diversity of SECI's need for backup capacity and Tampa Electric's need for peaking capacity. The project provides optimum utilization of the power resources and minimizes the total generating capacity required on an individual basis. SECI's primary need is in their spring and fall maintenance periods, whereas Tampa Electric has greater need during its summer and winter peak load periods. In accordance with statewide planning objectives, the proposed mix of intermediate and peaking resources, along

with existing baseload coal-fired resources, make efficient use of all these resources within the state of Florida. Improved utilization of existing coal-fired capacity and deferral of construction of new capacity results in both SECI's and Tampa Electric's ratepayers realizing significant savings.

REFERENCES - Chapter 1

KBN Engineering and Applied Sciences, Inc., Applied Technology and Management, Inc., and Stone & Webster Engineering Corporation. 1988. Seminole Electric Cooperative Incorporated SECI Combined Cycle Project Environmental Licensing Plan of Study. Prepared for: Seminole Electric Cooperative, Inc.