FPL

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Ms. Blanca S. Bayo
Florida Public Service Commission
Director, Division of Records and Reporting
2540 Shumard Oak Blvd.
Tallahassee, Florida 32399-0850

VIA HAND DELIVERY

Dear Ms. Bayo:

In accordance with Chapter 186, Section 186.801 (Ten Year Power Plant Site Plans) of the Florida Statutes, enclosed for filing are twenty-five (25) copies of Florida Power & Light Company's Ten-Year Power Plant Site Plan.

If you have any questions, please do not hesitate to contact me at (305) 552-3643.

Sincerely,

Samuel S. Waters
Director, Regulatory Affairs

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FPSC-RECORDS/REPORTING

Ten Year Power Plant Site Plan

1999 - 2008

ORIGINAL

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FPL

Ten Year Power Plant Site Plan

1999-2008

Submitted To:

Florida Public
Service Commission

Miami, Florida
April, 1999

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Overview of The Document

Chapter 186 of the Florida Statutes requires that each electric utility in the State of Florida with a minimum existing generating capacity of 250 megawatts (MW) must annually submit a ten - year power plant site plan. This plan includes an estimate of the utility's electric power generating needs, a projection of how those needs will be met, and a disclosure of information pertaining to the utility's preferred and potential power plan sites. This information is compiled and presented in accordance with rules 25-22.070, 25-22.071, and 25-22.072 of the Florida Administrative Code (FAC).

This ten-year power plant site plan document is based on Florida Power & Light Company's (FPL) 1998 planning analyses and the forecasted information presented in this plan addresses the 1999 – 2008 time frame.

It should be recognized by all concerned that ten - year power plant site plans are long-term planning documents and should be viewed in this context. A ten - year power plant site plan submitted by an electric utility contains tentative information, especially for the latter years of the ten - year time horizon, and is subject to change at the discretion of the utility. Much of the data submitted is preliminary in nature and is presented in a general manner. Specific and detailed data will be submitted as part of the Florida site certification process, or through other proceedings and filings, which have been established for the review of such data.

This document is organized in the following manner:

Chapter I – Description of Existing Resources
This chapter provides an overview of FPL's current generating facilities. Also included is data on other FPL resources including its transmission system.

Chapter II – Forecast of Electric Power Demand
FPL's load forecasting methodology is presented in Chapter II.

Chapter III – Projection of Incremental Resource Additions
This chapter discusses FPL's integrated resource planning (IRP) process and outlines FPL's projected resource additions, especially new power plants, as determined in FPL's 1998 IRP work.

Chapter IV – Environmental and Land Use Information

This chapter discusses various environmental information as well as preferred and potential site locations for additional electric generation facilities.

Chapter V – Other Planning Assumptions and Information

This chapter addresses 12 "discussion items" which pertain to additional specific information which is to be included in a Ten Year Power Plant Site Plan filing.

FPL
List of Abbreviations
Used in FPL Forms

Reference	*Abbreviation*	*Definition*
Unit Type	IC	Internal Combustion
	NP	Nuclear Power
	ST	Steam Unit
	GT	Gas Turbine
	CT	Combustion Turbine
	CC	Combined Cycle
	BIT	Bituminous Coal
Fuel Type	UR	Uranium
	NG	Natural Gas
	FO6	#4,#5,#6 Oil (Heavy)
	FO2	#1, #2 or Kerosene Oil (Distillate)
	BIT	Bituminous Coal
	NO	None
	ORI	Orimulsion
Fuel Transportation	TK	Truck
	RR	Railroad
	PL	Pipeline
	WA	Water
	No	None
Air Pollution Control	LNB	Low No_x Burners
Cooling Method Type	OTS	Once Through - Saline
	CP	Cooling Pond
Unit/Site Status	P	Planned Unit
	A	Generation Unit Capability Increased (Rerated or Relicensed)

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Executive Summary

Florida Power & Light Company's (FPL) 1999 Ten - Year Power Plant Site Plan primarily addresses FPL's plans to increase its electric generation capability as part of its efforts to meet its projected incremental resource needs for the 1999 – 2008 time period.

FPL's total generation capability will significantly increase during the 1999-2008 time period as is shown in Table ES.1. This table also shows the resulting Summer and Winter reserve margins for FPL over the ten-year time horizon.

After first accounting for: FPL's commitment to repower existing units at its Ft. Myers and Sanford sites; FPL's proposed level of demand side management (DSM) activities filed earlier in 1999 as part of the Florida Public Service Commission's DSM Goals docket; planned changes to existing generating units (unit upgrades, overhauls, and enhancements); and scheduled changes in the delivered amounts of purchased power, FPL projects that additional resources will be needed starting in the year 2006.

As shown in Table ES.1, FPL currently plans on supplying these additional resources through the addition of two new combined cycle power plants at its existing Martin plant site in 2006 and 2007, respectively, plus an as-yet-unsited new combined cycle unit in 2008. These planned capacity additions are dependent upon securing natural gas supplies to these sites, which are both sufficient for fueling the electrical capacity involved and economically attractive.

FPL believes that these planned increases in electric generation capability will allow FPL to continue to maintain system reliability and integrity, while continuing to provide electricity at a reasonable cost.

Projected Capacity Changes and Reserve Margins for FPL [1]				
	Net Capacity Changes (MW)		***FPL Reserve Margin***	
Year	***Summer*** [2]	***Winter*** [3]	***Summer***	***Winter***
1999 Changes to existing plants	239	80	17%	21%
2000 Changes to existing plants	75	75	15%	19%
2001 Changes to existing plants	20	23	16%	18%
Changes to existing purchases	(9)	---		
Ft. Myers Repowering:Initial Phase [4]	201	182		
2002 Ft. Myers Repowering:Second Phase	725	920	20%	22%
Changes to existing plants	---	30		
Changes to existing purchases	---	(9)		
Sanford Repowering:Initial Phase [4],[5]	202	182		
2003 Sanford Repowering:Second Phase [5]	725	919	23%	25%
2004 Changes to existing purchases	(10)	(10)	21%	22%
2005 Changes to existing purchases	---	---	19%	20%
2006 Martin Combined Cycle No.5	419	448	19%	19%
Changes to existing purchases	(133)	(133)		
2007 Martin Combined Cycle No.6	419	448	19%	20%
2008 Unsited Combined Cycle	419	448	20%	20%
TOTALS=	***3,292***	***3,603***		

Note:

(1) Additional information about these capacity changes and resulting reserve margins is found in Chapter III of this document.

(2) Summer values are values for August of year shown.

(3) Winter values are values for January of year shown.

(4) The initial phase of the repowering projects consists of the introduction of combustion turbines followed by taking existing steam units out-of-service. The second phase of repowering consists of completing the integration of the combustion turbines, heat recovery steam generators, and existing steam turbines.

(5)The values shown above reflect FPL's 1998 IRP which identified that Sanford units #3 and #4 would be repowered. At the time of publication of this document, subsequent to FPL's 1998 IRP, FPL is reexamining its Sanford repowering plan. This reexamination is based on newly developed technical information which focuses on whether it would be more advantageous to repower units #4 and #5 rather than units #3 and #4. Such a change in the Sanford repowering plan would add approximately 240 MW summer capability from the Sanford site beyond what would be gained from repowering units #3 and #4. If such a change is made to the Sanford repowering plan during 1999, it will be communicated to the appropriate state agencies and reflected in FPL's 2000 Site Plan filing.

Table ES.1

CHAPTER I

Description of Existing Resources

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I. Description of Existing Resources

FPL's service area contains approximately 27,650 square miles and has a population of approximately 7 million people. FPL served an average of 3,680,470 customer accounts in thirty-five counties during 1998. These customers were served from a variety of resources including: FPL-owned fossil and nuclear generating units, non-utility-owned generation, demand side management, and interchange/purchased power.

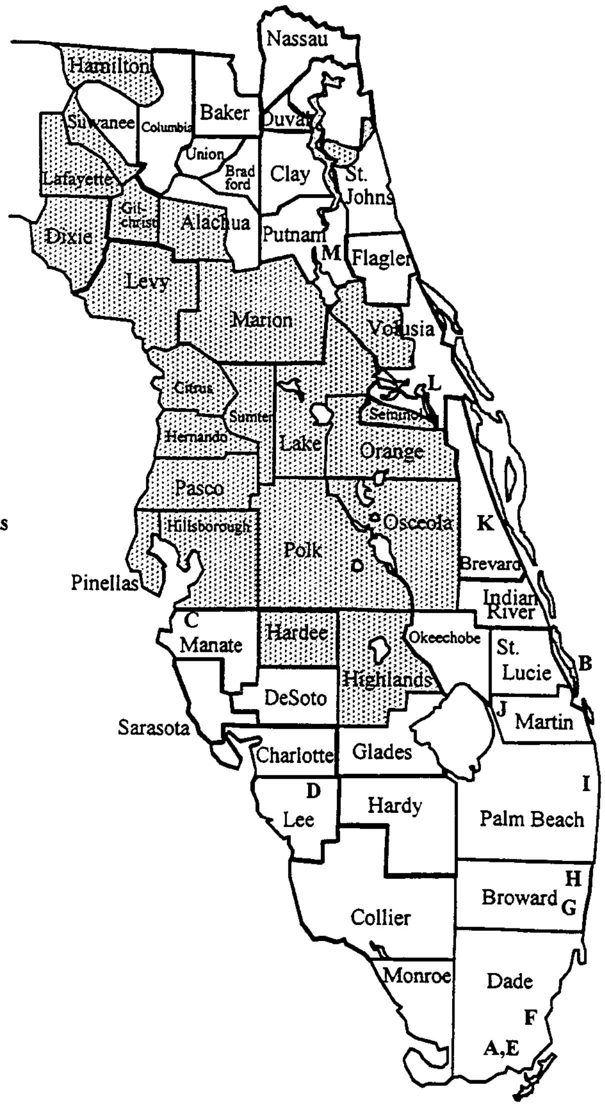
I.A. FPL-Owned Resources

The existing FPL generating resources are located at thirteen generating sites distributed geographically around its service territory and also include partial ownership of one unit location in Georgia and two units located in Jacksonville. The current generating facilities consist of four nuclear steam units, three coal units, six combined cycle units, twenty-one fossil steam units, forty-eight gas turbines, and five diesel units. The location of these units is shown on figure I.A.1.

The bulk transmission system is composed of 1,107 circuit miles of 500 KV lines (including 75 miles of 500 KV lines [two 37 ½ mile lines] between Duval Station and the Florida-Georgia state line, which are jointly owned with Jacksonville Electric Authority) and 2,510 circuit miles of 230 KV lines. The underlying network is composed of 1,593 circuit miles of 138 KV lines, 712 circuit miles of 115 KV lines, and 178 circuit miles of 69 KV transmission lines. Integration of the generation, transmission, and distribution system is achieved through FPL's 478 substations.

The existing FPL system, including generating plants, major transmission stations, and transmission lines, is shown on Figure I.A.2. In addition, Figure I.A.3. shows FPL's interconnections with other utilities.

Capacity Resources
(as of December 31, 1998)



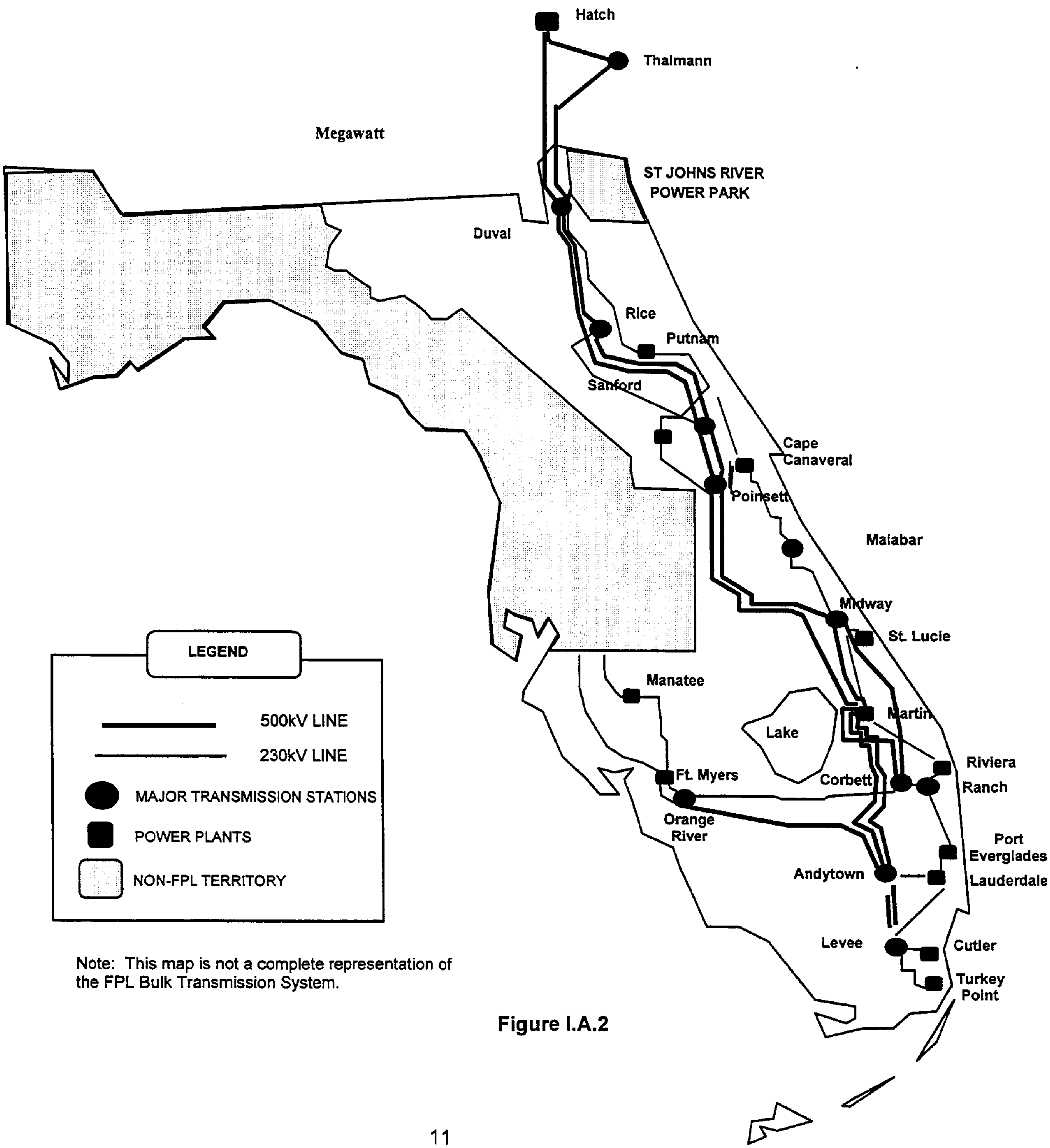
	Unit	Unit	Fuel Type	Summer Megawatts
A	Turkey Point	2	Nuclear	1,386
B.	St. Lucie *	2	Nuclear	1,553
C.	Manatee	2	Oil	1,590
D.	Ft. Myers	2	Oil	544
E.	Turkey Point	2	Oil/Gas	810
F.	Cutler	2	Gas	215
G.	Lauderdale	2	Oil/Gas	860
H.	Port Everglades	4	Oil/Gas	1,241
I.	Riviera	2	Oil/Gas	580
J.	Martin	4	Gas/Oil	2,505
K.	Cape Canaveral	2	Oil/Gas	800
L.	Sanford	3	Oil/Gas	933
M.	Putnam	2	Oil/Gas	498
N.	St. Johns River *	2	Coal	260
Scherer **		1	Coal	667
Peaking Units				1,884
FPL Generation				**16,326**

* *Represents FPL's ownership share: St. Lucie nuclear: 100% unit 1, 85% unit 2; St. Johns River: 20% of two*

** *The Scherer unit is located in Georgia and is not shown on this map.*

Figure I.A.1

FPL Substation and Transmission System Configuration



Note: This map is not a complete representation of the FPL Bulk Transmission System.

Figure I.A.2

FPL Interconnection Diagram

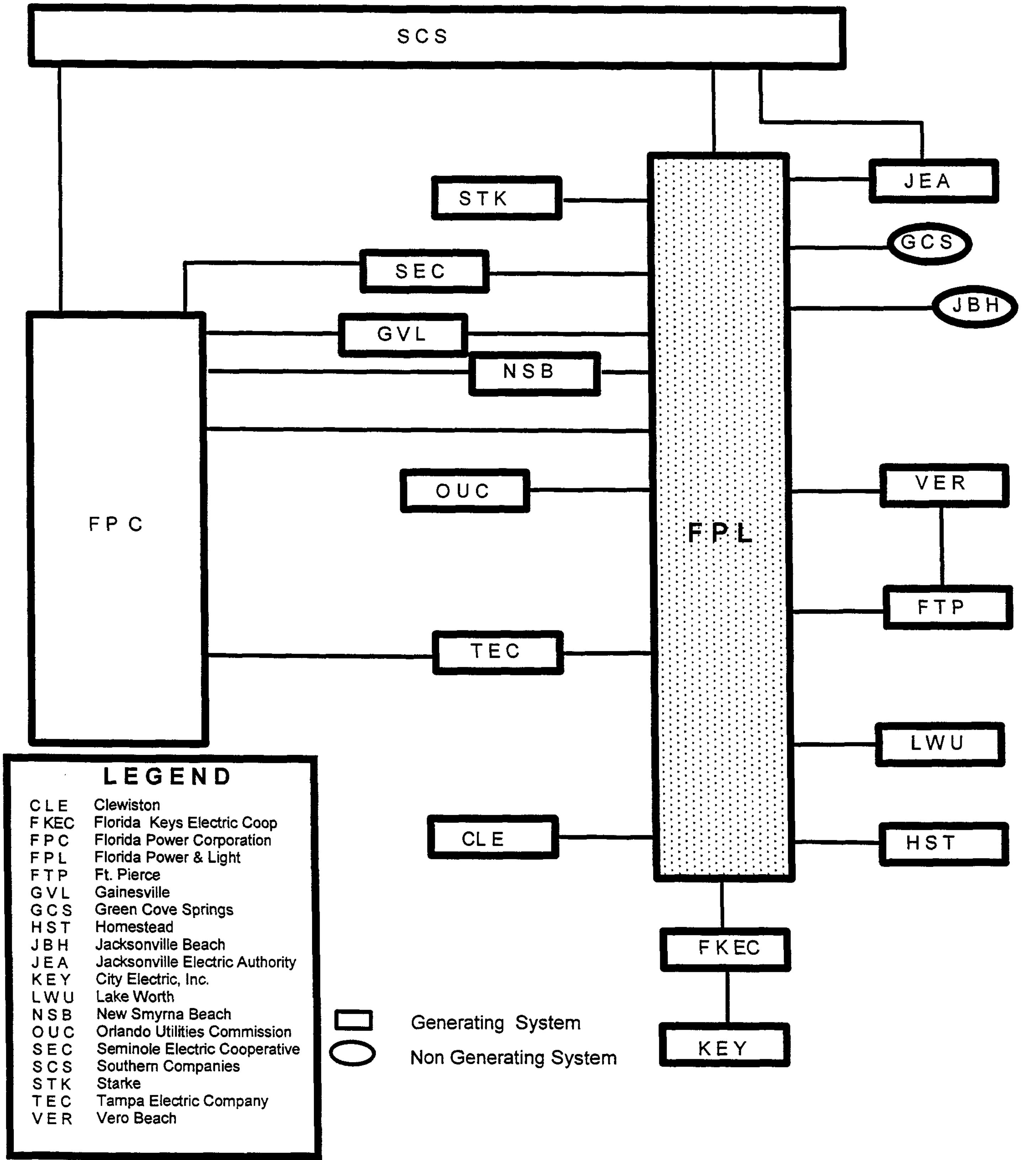


Figure I.A.3

I.B Non-Utility Generation

Non-utility generation is an important part of FPL's resource mix. FPL has contracts with ten cogeneration/small power production facilities(QF's) to purchase firm capacity and energy (two of these contracts are currently in litigation). These QF's are shown in Table I.B.1. In addition, FPL purchases as-available (non-firm) energy from several cogeneration facilities and small power production facilities, as shown in Table I.B.2.

A cogeneration facility is one which simultaneously produces electrical and thermal energy, with the thermal energy (e.g., steam) being used for industrial, commercial, or cooling and heating purposes. A small power production facility is one which does not exceed 80 MW (unless it is exempted from this size limitation by the Federal Incentives Act of 1990) and uses as its primary energy source (at least 50%) solar, wind, waste, geothermal, or other renewable resources.

Florida Power & Light Company
Firm Capacity and Energy Contracts with
Cogeneration/Small Power Production Facilities

Project	County	Fuel	MW Capacity	In-Service Date	End Date
Bio-Energy	Broward	Landfill Gas	10.0	08/01/98	01/01/05
Broward South	Broward	Solid Waste	50.6	06/01/91	08/01/09
			1.4	01/01/93	12/30/26
			1.5	01/01/95	12/30/26
			0.6	01/01/97	12/30/26
Broward North	Broward	Solid Waste	45.0	04/01/92	12/31/10
			7.0	01/01/93	12/30/26
			1.5	01/01/95	12/30/26
			2.5	01/01/97	12/30/26
Royster Mulberry	Polk	Waste Heat	8.0	04/01/92	03/31/02
			1.0	12/01/95	03/31/02
Cedar Bay Generating Co.	Duval	Coal (CBF)	250.0	01/25/94	12/31/25
Indiantown Cogen., LP	Martin	Coal (PC)	330.0	12/22/95	12/01/25
Palm Beach SWA	Palm Beach	Solid Waste	43.5	04/01/92	03/31/10
Florida Crushed Stone	Hernando	Coal (PC)	110.0	04/01/92	10/31/05
			11.0	01/01/94	10/31/05
			12.0	01/01/95	10/31/05
Osceola (1)	Palm Beach	Bagasse/Wood	55.9	(3)	(3)
Okeelanta (2)	Palm Beach	Bagasse/Wood	70.0	(3)	(3)

Notes:

(1) Off-Line since 9/14/97. Delivered 251,066 MWH to FPL in 1997 and 0 MWH in 1998.

(2) Currently selling to others and on an as-available basis to FPL.

(3) FPL has filed suit against the Okeelanta and Osceola Partnerships in Palm Beach County Circuit Court. The lawsuit seeks a declaratory judgment that the Partnerships failed to accomplish commercial operations by January 1, 1997, as required by the power purchase contracts with the Partnerships, and, as a result, FPL is relieved of all further obligations, including capacity payments, under the contracts. In addition, the amount of capacity which the Osceola Partnership has attempted to declare remains subject to dispute.

Table I.B.1

As-Available Energy Purchases
From Non-Utility Generators in 1998

Project	County	Fuel	In-Service Date	Energy (MWH) Delivered To FPL in 1998
US Sugar-Bryant	Palm Beach	Bagasse	2/80	21,982
US Sugar-Clewiston	Hendry	Bagasse	2/84	3,058
Tropicana	Manatee	Natural Gas	2/90	3,551
Lee County Resource Recovery	Lee	Solid Waste	7/94	216,118
Tomaka Farms	Volusia	Landfill Gas	7/98	11,101
Georgia Pacific	Putnam	Paper By Product	2/94	5,385

Table I.B.2

I.C. Demand Side Management (DSM)

FPL's DSM activities continue what has been FPL's practice since 1978 of encouraging cost-effective energy conservation and load management. FPL's DSM efforts through 1998 have resulted in a cumulative summer peak reduction of approximately 2,660 megawatts at the generator and an estimated cumulative annual energy saving of 4,787 gigawatt-hours at the generator.

In early 1999, FPL filed with the Florida Public Service Commission its proposal for approval of new DSM Goals for the 2000-2009 time frame. FPL's 1998 resource plan, and the schedule for new generation additions presented in this document, are based on these proposed DSM levels.

I.D. Purchased Power

Purchased power remains an important part of FPL's resource mix. FPL has a contract to purchase 921 MW of coal-fired generation from the Southern Company up to the year 2010. In addition, FPL has contracts with the Jacksonville Electric Authority (JEA) for the purchase of 383 MW of coal-fired generation from the St. John's Power Park Unit Nos. 1 and 2. Table I.D.1 presents the Summer and Winter MW resulting from these purchased power contacts.

	FPL's Purchased Power MW (1)					
	UPS		SJRPP		Total	
	Winter	Summer	Winter	Summer	Winter	Summer
1998 (2)	914	914	383	383	1297	1297
1999	921	921	383	383	1304	1304
2000	921	921	383	383	1304	1304
2001	921	921	383	383	1304	1304
2002	921	921	383	383	1304	1304
2003	921	921	383	383	1304	1304
2004	921	921	383	383	1304	1304
2005	921	921	383	383	1304	1304
2006	921	921	383	383	1304	1304
2007	921	921	383	383	1304	1304
2008	921	921	383	383	1304	1304
2009	921	921	383	383	1304	1304
2010	921	921	383	383	1304	1304

Note:

(1) Total reflects total resource entitlements resulting from agreements between FPL, Southern Companies, and JEA

(2) Values for 1998 are actual

Table I.D.1

Schedule 1
Exisitng Generating Facilties
As of December 31, 1998

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
								Alt.					
						Fuel		Fuel	Commercial	Expected	Gen.Max.	Net Capability 1/	
	Unit		Unit	Fuel		Transport.		Days	In-Service	Retirement	Nameplate	Summer	Winter
Plant Name	No.	Location	Type	Pri.	Alt.	Pri.	Alt.	Use	Month/Year	Month/Year	KW	MW	MW
Turkey Point		Dade County											
		27/57S/40E									2,338,100	2,208	2,260
	1		ST	FO6	NG	WA	PL	Unknown	Apr-67	Unknown	402,050	410	411
	2		ST	FO6	NG	WA	PL	Unknown	Apr-68	Unknown	402,050	400	403
	3		NP	UR	No	TK	No	Unknown	Nov-72	Unknown	760,000	693	717
	4		NP	UR	No	TK	No	Unknown	Jun-73	Unknown	760,000	693	717
	1-5		IC	FO2	No	TK	No	Unknown	Dec-67	Unknown	14,000	12	12
Cutler		Dade County											
		27/55S/40E									236,500	215	217
	5		ST	NG	No	PL	No	Unknown	Nov-54	Unknown	74,500	71	72
	6		ST	NG	No	PL	No	Unknown	Jul-55	Unknown	162,000	144	145
Lauderdale		Broward County											
		30/50S/42E									1,863,972	1,700	1,818
	4		CC	NG	FO2	PL	PL	Unknown	Oct-57	Unknown	521,250	430	452
	5		CC	NG	FO2	PL	PL	Unknown	Apr-58	Unknown	521,250	430	452
	1-12		GT	NG	FO2	PL	PL	Unknown	Aug-70	Unknown	410,736	420	457
	13-24		GT	NG	FO2	PL	PL	Unknown	Aug-72	Unknown	410,736	420	457
Port Everglades		City of Hollywood											
		23/50S/42E									1,665,086	1,661	1,702
	1		ST	FO6	NG	WA	PL	Unknown	Jun-60	Unknown	225,250	221	222
	2		ST	FO6	NG	WA	PL	Unknown	Apr-61	Unknown	225,000	221	222
	3		ST	FO6	NG	WA	PL	Unknown	Jul-64	Unknown	402,050	389	391
	4		ST	FO6	NG	WA	PL	Unknown	Apr-65	Unknown	402,050	410	410
	1-12		GT	NG	FO2	PL	PL	Unknown	Aug-71	Unknown	410,736	420	457

1/ These ratings are peak capability.

Schedule 1
Exisitng Generating Facilties
As of December 31, 1998

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
								Alt.					
						Fuel		Fuel	Commercial	Expected	Gen.Max.	Net Capability 1/	
	Unit		Unit	Fuel		Transport		Days	In-Service	Retirement	Nameplate	Summer	Winter
Plant Name	No.	Location	Type	Pri.	Alt.	Pri.	Alt.	Use	Month/Year	Month/Year	KW	MW	MW
Riviera		City of Riviera Beach											
		33/42S/43E									620,840	580	584
	3		ST	FO6	NG	WA	PL	Unknown	Jun-62	Unknown	310,420	290	292
	4		ST	FO6	NG	WA	PL	Unknown	Mar-63	Unknown	310,420	290	292
Martin		Martin County											
		29/29S/38E									2,950,000	2,505	2,584
	1		ST	NG	FO6	PL	PL	Unknown	Dec-80	Unknown	863,000	814	821
	2		ST	NG	FO6	PL	PL	Unknown	Jun-81	Unknown	863,000	816	833
	3		CC	NG	FO2	PL	PL	Unknown	Feb-94	Unknown	612,000	440	465
	4		CC	NG	FO2	PL	PL	Unknown	Apr-94	Unknown	612,000	435	465
St. Lucie		St. Lucie County											
		16/36S/41E									1,553,000	1,553	1,579
	1		NP	UR	No	TK	No	Unknown	May-76	Unknown	839,000	839	853
	2	2/	NP	UR	No	TK	No	Unknown	Jun-83	Unknown	714,000	714	726
Cape Canaveral		Brevard County											
		19/24S/36F									804,100	800	807
	1		ST	FO6	NG	WA	PL	Unknown	Apr-65	Unknown	402,050	395	399
	2		ST	FO6	NG	WA	PL	Unknown	May-69	Unknown	402,050	405	408
Sanford		Volusia County											
		16/19S/30E									1,022,450	933	943
	3		ST	FO6	NG	WA	PL	Unknown	May-59	Unknown	150,250	153	155
	4		ST	FO6	NG	WA	PL	Unknown	Jul-72	Unknown	436,100	390	394
	5		ST	FO6	No	WA	No	Unknown	Jul-73	Unknown	436,100	390	394

1/ These ratings are peak capability.

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

Schedule 1
Exisitng Generating Facilties
As of December 31, 1998

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Plant Name	Unit No.	Location	Unit Type	Fuel Pri.	Fuel Alt.	Fuel Transport Pri.	Fuel Transport Alt.	Alt. Fuel Days Use	Commercial In-Service Month/Year	Expected Retirement Month/Year	Gen.Max. Nameplate KW	Net Capability 1/ Summer MW	Net Capability 1/ Winter MW
Putnam		Putnam County 16/10S/27E									580,000	498	520
	1		CC	NG	FO2	PL	WA	Unknown	Apr-78	Unknown	290,000	249	260
	2		CC	NG	FO2	PL	WA	Unknown	Aug-77	Unknown	290,000	249	260
Ft. Myers		Lee County 35/43S/25E									1,302,250	1,156	1,238
	1		ST	FO6	No	WA	No	Unknown	Nov-58	Unknown	156,250	147	148
	2		ST	FO6	No	WA	No	Unknown	Jul-69	Unknown	402,000	397	400
	1-12		GT	FO2	No	WA	No	Unknown	May-74	Unknown	744,000	612	690
Manatee		Manatee County 18/33S/20E									1,726,600	1,590	1,604
	1		ST	FO6	No	WA	No	Unknown	Oct-76	Unknown	863,300	798	805
	2		ST	FO6	No	WA	No	Unknown	Dec-77	Unknown	863,300	792	799
St. Johns River Power Park 2/		Duval County 12/15/28E (RPC4)									250,000	260	260
	1		BIT	BIT	No	RR	No	Unknown	Mar-87	Unknown	125,000	130	130
	2		BIT	BIT	No	RR	No	Unknown	May-88	Unknown	125,000	130	130
Scherer3/		Monroe, GA									891,000	667	667
	4		BIT	BIT	No	RR	No	Unknown	Jul-89	Unknown	891,000	667	667
								Total System as of December 31, 1998 =				16,326	16,783

1/ These ratings are peak capability.

2/ The net capability ratings represent Florida Power & Light Company's share of St. Johns River Park Unit No 1 and No. 2, excluding Jacksonville Electric Authority (JEA) share of 80%.; SJRPP receives coal by water (WA) in addition to rail.

3/ These ratings represent Florida Power & Light Company's share of Scherer Unit No. 4, adjusted for transmission losses.

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CHAPTER II

Forecast of Electric Power Demand

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II. Forecast of Electric Power Demand

20-Year forecasts of sales, net energy for load (NEL), and peak loads are developed on an annual basis for long-term planning work at FPL. These forecasts are a key input to the models used to develop the Integrated Resource Plan. The following pages describe how these forecasts are developed for each component of the long-term forecast: sales, NEL, and peaks.

II.A. Long-Term Sales Forecasts

Long-term forecasts of electricity sales are developed for each revenue class for the forecasting period of 1998 – 2017. The results of these sales forecasts are presented on page 31. Both end-use models and econometric techniques are employed to produce the forecasts. The methodology used to develop sales forecasts for each jurisdictional revenue class is outlined below.

1. Residential Sales

The residential sales forecast is developed using the Residential End-Use Energy Planning Model (REEPS). REEPS is an integrated end-use/econometric forecasting model developed by the Electric Power research Institute (EPRI).

The Model

REEPS forecasts electricity sales in the residential sector by simulating acquisitions and energy usage of 9 major residential appliances (space heater, central air-conditioner, room air-conditioner, water heater, range, first refrigerator, second refrigerator, freezer, and dishwasher), plus residual electricity use.

Using a sample of households representative of the full residential customer population, probabilistic choice models are used to determine the stock of appliances in each dwelling based on household characteristics, prices, and other factors. Efficiency and usage equations determine energy consumptions of each appliance. Electricity consumption is aggregated across all households to produce total residential sales.

For the base year, appliance saturations and electricity sales are calibrated to actuals. REEPS then simulates the additions of new appliance stock in new homes, and changes in appliance stock in existing homes, to produce a twenty-year forecast. For each forecast year, forecasts of household characteristics, energy prices, weather, and conservation policies serve as model inputs to influence trends in appliance stock, efficiency, and utilization. These forecasts are used as explanatory variables in the choice and efficiency equations to determine the saturations and efficiencies of new housing appliance stock along with replacement and new acquisitions of appliances in existing housing. Likewise, usage equations determine energy consumption for the appliance stock in place, based on demographic and price forecasts. For each forecast period, appliance electricity consumption is aggregated across all households to produce a forecast of electricity sales.

In addition to forecasting residential electric sales, REEPS household level results are aggregated to produce other forecasts. These include:

- Total residential energy usage from all fuel sources,
- Appliance efficiencies (relative to the base year), and
- Average electricity/fuel use per appliance.

All forecasting results can be broken down by home vintage (new and existing), fuel type (electricity, natural gas, and oil/propane) and house-type (single family, small and large multi-family, and mobile home).

Model Input

For the 1998 Integrated Resource Plan, REEPS version PC 2.0 was adapted to FPL's service territory.
The following key inputs were used in FPL's implementation of REEPS:

- FPL household appliances and demographics (1995 Home Energy Survey),
- Residential customer forecast,
- Price forecasts of residential electricity, gas, and oil,
- Forecasts of household income and household size,
- Weather data for Miami, West Palm Beach, Daytona, and Ft. Myers, and
- Appliance average electricity use for the base year

Data from FPL's 1995 Home Energy Survey of Residential Customers (HES) were used to characterize FPL's existing residential customers. Results from the survey provided base-year appliance saturation's for the 9 REEPS appliances, housing information on square footage and housing type, and demographic information on household size, household income, and geographic distribution.

The 20-year residential customer forecast, discussed earlier, was separated into four housing types using ratios for single-family detached, small and large multi-family attached, and mobile homes taken from the 1995 HES. Forecasts of residential electric prices are determined using current residential electric rates with growth rates taken from FPL's official forecast of real average price of electricity. Applying the growth rates in FPL's official fuel forecast to current natural gas and oil prices creates forecasts of future residential natural gas and propane prices.

The existing household income distribution is determined from the 1995 HES. Growth in household income is determined from the residential customer forecast and WEFA, Inc.'s economic forecast of Florida real personal income. Base-year household size is determined from the 1995 HES and is forecasted using the trend from the forecast of FPL populations per residential customer.

Estimates of appliance electricity consumption are taken from a conditional demand analysis of the 1990 HES data set.

The Forecast

After REEPS is calibrated to actual 1997 residential sales, the model produces a forecast of residential electricity sales for 1998-2017.

2. Commercial Sales

The commercial end-use model, COMMEND, developed by EPRI, is used to firecast long-term commercial sales.

The Model

COMMEND forecasts commercial energy requirements by building type, end-use, and fuel type. COMMEND calculates energy requirements by determining the product of the following four factors:

- Commercial floor space by building type,
- End-use saturations and fuel shares by end-use and building type,
- Energy use index (EUI) values, which give energy use per square foot for space in each building type that is served by an end-use and fuel, and
- Utilization of equipment relative to the base year levels.

This product represents the projected energy requirements for a particular end-use and a particular building type. The total of all of the end-use values for a building type are then summed to produce a projection of total energy requirements for the building type. Adding sales across all building types produces the overall commercial sales.

In the base year (1990), the end-use data estimates are calibrated to produce estimated sales by building type. Additional calibration is required to scale these estimates up to system sales, including non-building uses. Modeling the changes in each of the four components listed below produces commercial sales forecasts:

- Forecasts of floor stock are modeled using employee-per-square foot relationships,
- Fuel shares are forecasted using multinomial logit models, based on equipment costs and equipment operating costs,
- Changes in EUI's occur as newer, more efficient buildings are constructed. Marginal EUI's are entered into the model based on economic conditions, building vintage, and a decay function, and,
- Changes in equipment utilization, relative to the base year, are modeled using short-run fuel price elasticities for all end-users and weather response elasticities for heating and cooling.

Model Input

To adapt COMMEND to the FPL service territory, estimates are needed of: The total floor stock of commercial buildings served by FPL, saturations of end-use by fuel type within those buildings, and EUI values by end-use by building type. Fourteen building types and 10 end-uses are used in COMMEND to characterize FPL's commercial sector.

Building Types	*End-Uses*
1 Large Office	1 Air-Conditioning
2 Small Office	2 Heating
3 Large Retail	3 Ventilation
4 Small Retail	4 Water Heating
5 Restaurant	5 Refrigeration
6 Grocery	6 Cooking
7 Hotel/Motel	7 Outside Lighting
8 Elementary/Secondary School	8 Inside Lighting
9 College/Vocational	9 Office Equipment
10 Hospital	10 Miscellaneous
11 Other Health	
12 Warehouse	
13 Refrigerated Warehouse	
14 Miscellaneous Commercial	

Base Year floor stock is estimated using information from the 1986 and 1990 Commercial/Industrial Customer Surveys. Forecasts of future construction are developed using the COMMEND floor stock model. The forecasting equations utilize and employee-per-square foot relationship. Employment forecasts consistent with forecasts of Florida non-agricultural employment are developed for various industries to be used in the forecast equations for each building type.

End–use saturation data comes from the 1986 and 1990 Commercial/Industrial Customer (C/I) Surveys. EUI values are also based on the subset of the C/I Survey. Marginal share and EUI values for new construction are based on the subset of the C/I Survey results that are for recently constructed buildings.

The Forecast

Base-year sales from the model were calibrated to actual FPL commercial sales. The model then produced a forecast of commercial electricity sales for 1998-2017.

3. Industrial Sales

Industrial sales were forecasted through a linear multiple regression model using Florida manufacturing employment, industrial customers, and the price of electricity as the explanatory variables. Since this revenue class consists of manufacturers, employment in this sector was an important indicator of economic activity in the sector, translating into sales for the revenue class.

4. Other Public Authority Sales

The sales for this class are developed using an econometric model with Florida manufacturing employment as an explanatory variable.

5. Street & Highway Sales and Railroad & Railways Sales

The forecast of Street & Highway sales was developed using a regression model with Florida population, and the street and highway sales of the previous period.

The forecasts for Railroads & Railways are held constant since there are no new plans for expansion.

6. Resales Sales

Resale (Wholesale) customers are composed of municipalities and/or electric cooperatives. These customers differ from jurisdictional customers in that they are not the ultimate users of the electricity they buy. Instead, they resell this electricity to their own customers.

FPL has previously had four classes of Resale customers: Partial Requirements (PR), Full Requirements (FR), Aggregate Billing Partial Requirements Service Agreement (ABPRSA), and Contracts. PR customers usually have some generating capacity and buy the balance of their energy of their energy requirements from FPL or some other utility. FR customers, on the other hand, have no generating capacity and rely fully on FPL for their generating needs.

As of January 1999, FPL no longer has customers in the PR and FR categories with the exception of an agreement with the City of Starke which expires in May 1999.

In addition, the ABPRSA class consisted of Seminole Electric Cooperative's 30 points-of-delivery who received power from Seminole's own generation and the balance of their energy requirements from FPL. This agreement terminated on December 31, 1998.

Contract Rate

There are three customers in this class: the Florida Keys Electric Cooperative, City Electric, Inc. of Key West, and Metro-Dade County. Sales to the Florida Keys are forecasted using a regression model. Sales to City Electric, Inc. of Key West are based on assumptions regarding their contact demand and expected load factor. Metro-Dade County sells 60 MW to Florida Power Corporation. Line losses are billed to Metro-Dade under a wholesale contract. The forecast is calculated based on assumptions about line losses, their capacity factor, and the number of hours in a particular month.

Total Sales

Sales forecasts by revenue class are summed to produce a total sales forecast. After an estimate of annual total sales is obtained, applying an expansion factor generates a forecast of annual Net Energy for Load (NEL).

II.B. Net Energy for Load

1. Annual NEL Forecast

An annual econometric model is developed to produce a Net Energy for Load (NEL) forecast. The key inputs to the model are price of electricity, heating & cooling degree-days, average total customers, and Florida Non-Agricultural Employment. Once an annual NEL forecast is obtained using the above-mentioned model, the results are then compared to the NEL generated using the total sales forecast for reasonability. The sales by class are then adjusted to match the NEL from the annual NEL model.

2. Monthly NEL Forecast

The monthly NEL forecast is also generated for the entire long-term forecasting period of 1998 – 2017. The following steps are used to produce the monthly NEL forecast.

a. An econometric model is developed using monthly data to capture the seasonality of monthly NEL. The model is developed using the price of electricity, heating & cooling degree-days, equipment saturation, real per capita income, and an auto-regressive (AR) term as explanatory variables.

b. This model forecasts out to five years and provides the ratios of monthly NEL to annual NEL. These ratios are then applied to annual NEL forecasted values for later years to break them down into monthly values.

The forecasted NEL values for 1999 – 2008 are presented on page 36.

II.C System Peak Forecasts

In recent years, the absolute growth in FPL system load has been associated with a larger customer base, varying weather conditions, continued economic growth, changing patterns of customer behavior (including and increasing stock of electricity consuming appliances), and more efficient heating and cooling appliances. The Peak Forecast models were developed to capture these behavioral relationships.

The forecasting methodology of Summer and Winter system peaks is discussed below. The forecasted values for these seasonal peak loads for the years 1999 - 2008 are presented in Schedules 3.1 and 3.2, as well as in Schedules 7.1 and 7.2.

1. System Summer Peak

The Summer peak forecast is developed using an econometric model. Key variables included in the model are the total number of FPL Summer customers, the price of electricity, a trend term, and a weather term. The weather term is the product of saturation of air conditioning equipment and temperature.

2. System Winter Peak

Like the system Summer peak model, this model is also an econometric model. The Winter Peak forecast is a function of the number of Winter customers, the minimum temperature on the peak day, a dummy variable to capture the effects of larger homes, and heating degree-hours for the prior day as well as for the morning of the Winter peak day.

3. Monthly Peak Forecasts

Monthly peaks for the 1998-2017 period are forecasted to provide information for the scheduling of maintenance for power plants and fuel budgeting. The forecasting process is the same as for the monthly NEL forecast.

a. Develop the historical seasonal factor for each month by using ratios of historical monthly peaks to seasonal peak (Summer=April-October, Winter=November-March).

b. Apply the monthly ratios to their respective seasonal peak forecast to derive the peak forecast by month. This process assumes that the seasonal factors remain unchanged over the forecasting period.

II.D The Hourly Load Forecast

Forecasted values for system hourly load for the period 1998-2017 are produced using a System Load Forecasting "shaper" program. This model uses sixteen years of historical FPL hourly system load data to develop load shapes for weekday, weekend, and holiday days. These daily load shapes are ranked and used with forecasted monthly peaks, NEL, and calendars in developing an hourly forecast. The model allows calibration of hourly values where the peak is maintained or where both the peak and minimum load-to-peak ratio is maintained.

Schedule 2.1
History and Forecast of Energy Consumption
And Number of Customers by Customer Class

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Rural & Residential						Commercial		
Year	Population**	Members per Household	GWH	Average*** No. of Customers	Average KWH Consumption Per Customer	GWH	Average*** No. of Customers	Average KWH Consumption Per Customer
1989	5,949,893	2.19	32,308	2,715,989	11,895	25,688	327,277	78,490
1990	6,088,140	2.17	33,488	2,801,209	11,955	26,543	337,133	78,732
1991	6,211,996	2.17	34,617	2,863,198	12,090	27,232	343,834	79,200
1992	6,314,005	2.17	34,198	2,911,807	11,745	26,991	350,269	77,058
1993	6,380,715	2.14	36,360	2,975,479	12,220	28,508	358,679	79,481
1994	6,516,879	2.15	38,716	3,037,629	12,745	29,946	366,409	81,729
1995	6,639,165	2.14	40,556	3,097,192	13,094	30,719	374,005	82,135
1996	6,754,084	2.14	41,302	3,152,625	13,101	31,211	380,860	81,949
1997	6,884,909	2.15	41,849	3,209,298	13,040	32,942	388,906	84,704
1998	7,014,152	2.15	45,482	3,266,011	13,926	34,618	396,749	87,254
1999	7,130,919	2.14	44,426	3,335,733	13,318	34,075	406,688	83,787
2000	7,248,828	2.13	45,431	3,398,802	13,367	34,897	415,490	83,990
2001	7,369,760	2.13	46,408	3,462,962	13,401	35,720	424,500	84,146
2002	7,487,812	2.12	47,393	3,525,089	13,444	36,554	433,728	84,279
2003	7,602,985	2.12	48,379	3,585,232	13,494	37,340	441,728	84,532
2004	7,715,279	2.12	49,357	3,643,479	13,547	38,132	449,946	84,748
2005	7,824,693	2.11	50,310	3,700,888	13,594	38,889	457,985	84,913
2006	7,931,163	2.11	51,266	3,757,466	13,644	39,661	465,845	85,138
2007	8,037,633	2.11	52,202	3,813,758	13,688	40,452	473,808	85,376
2008	8,145,725	2.10	53,155	3,870,300	13,734	41,255	481,829	85,622

* Forecasted values for these years reflect the Most Likely of three economic scenarios and are to be used only where singular forecast is required.
** Population represents only the area served by FPL.
*** Average No. of Customers is the annual average of the twelve month values.

Schedule 2.2
History and Forecast of Energy Consumption
And Number of Customers by Customer Class

	(10)	(11)	(12)	(13)	(14)	(15)	(16)
	Industrial						
Year	GWH	Average** No. of Customers	Average KWH Consumption Per Customer	Railroads & Railways GWH	Street & Highway Lighting GWH	Other Sales to Public Authorities GWH	Total*** Sales to Ultimate Consumers GWH
1989	4,210	17,640	238,662	80	323	692	63,301
1990	4,065	16,657	244,044	82	331	712	65,221
1991	4,090	15,348	266,493	81	345	733	67,098
1992	4,054	14,788	274,135	77	353	721	66,393
1993	3,889	14,866	261,602	79	330	665	69,830
1994	3,845	15,588	246,658	85	353	664	73,608
1995	3,883	15,140	256,481	84	358	648	76,248
1996	3,792	14,783	256,515	83	368	568	77,324
1997	3,894	14,761	263,830	85	383	702	79,855
1998	3,951	15,126	261,206	81	373	625	85,130
1999	3,884	14,992	259,072	88	385	603	83,461
2000	3,869	14,987	258,157	89	392	600	85,278
2001	3,870	15,020	257,656	90	398	599	87,085
2002	3,873	15,058	257,205	90	405	599	88,914
2003	3,855	14,978	257,377	90	411	595	90,670
2004	3,832	14,879	257,544	90	418	592	92,404
2005	3,815	14,795	257,857	90	424	589	94,093
2006	3,791	14,683	258,190	90	431	585	95,825
2007	3,792	14,667	258,540	90	437	584	97,557
2008	3,792	14,653	258,787	90	444	584	99,320

*These Forecasted values reflect the Most Likely of three economic scenarios and are to be used only where a singular forecast is required.
**Average No.of Customers is the annual average of the twelve month values.
***GWH=Column 4 + Column 7 + Column 10 + Column 13 + Column 14 + Column 15.

Schedule 2.3
History and Forecast of Energy Consumption And Number of Customers by Customer Class

Year		(17) Sales for Resale GWH	(18) Utility Use & Losses GWH	(19) Net*** Energy For Load GWH	(20) Other Customers**	(21) Total Average**** Number of Customers
1989		854	5,801	69,956	3,530	3,064,436
1990		882	4,926	71,029	3,819	3,158,817
1991		716	5,346	73,160	4,076	3,226,455
1992		702	6,002	73,097	4,374	3,281,238
1993		958	4,988	75,776	3,086	3,352,110
1994		1,400	5,367	80,376	2,560	3,422,187
1995		1,437	6,276	83,961	2,460	3,488,796
1996		1,353	5,984	84,698	2,480	3,550,748
1997		1,228	5,770	86,853	2,520	3,615,485
1998		1,326	6,205	92,663	2,584	3,680,470
1999	*	1,030	6,370	90,861	2,609	3,760,022
2000	*	1,048	6,507	92,833	2,648	3,831,927
2001	*	1,070	6,644	94,799	2,688	3,905,170
2002	*	1,092	6,783	96,789	2,220	3,976,095
2003	*	1,116	6,918	98,704	2,768	4,044,706
2004	*	1,138	7,051	100,746	2,806	4,111,110
2005	*	1,160	7,182	102,586	2,843	4,176,511
2006	*	1,182	7,311	104,473	2,881	4,240,875
2007	*	1,204	7,444	106,359	2,918	4,305,151
2008	*	1,225	7,577	108,122	2,953	4,369,735

* Forecasted values reflect the Most Likely of the three scenarios and are to be used only where a singular forecast is required.
** Average Number of Customers is the annual average of the twelve month values.
*** GWH = Column 16 + Column 17 + Column 18
**** Total = Column 5 + Column 8 + Column 11 + Column 20

Schedule 3.1
History and Forecast of Summer Peak Demand: Base Case

(1) Year	(2) Total	(3) Wholesale	(4) Retail	(5) Interruptible	(6) Res. Load Management	(7) Residential Conservation	(8) C/I Load Management	(9) C/I Conservation	(10) Net Firm Demand
1989	13,425	267	13,158	0	29	76	85	18	13,311
1990	13,754	290	13,464	0	85	110	127	30	13,542
1991	14,123	281	13,842	0	160	129	177	38	13,786
1992	14,661	223	14,438	0	234	151	248	51	14,179
1993	15,266	397	14,869	0	311	182	320	79	14,635
1994	15,179	409	14,770	0	392	220	354	125	14,433
1995	16,172	435	15,737	0	466	259	391	193	15,315
1996	16,064	364	15,700	0	531	339	414	296	15,119
1997	16,613	380	16,233	0	615	440	432	341	15,566
1998	17,897	426	17,471	0	656	480	441	359	15,961
1999	17,371	145	17,226	0	727	76	417	57	16,094
2000	17,670	148	17,523	0	775	116	433	88	16,258
2001	17,865	148	17,717	0	799	150	456	111	16,349
2002	18,129	152	17,977	0	808	191	467	129	16,534
2003	18,469	152	18,317	0	814	233	477	148	16,797
2004	18,818	152	18,666	0	820	272	487	171	17,068
2005	19,170	152	19,018	0	826	318	497	188	17,341
2006	19,532	152	19,380	0	831	364	505	208	17,624
2007	19,901	152	19,749	0	836	407	514	228	17,916
2008	20,245	152	20,093	0	841	452	522	248	18,182

Historical Values (1989 - 1998):

Cols. (2) - (4) are actual values for historical summer peaks. As such, they incorporate the effects of conservation (Cols. (7&9)), and MAY incorporate the effects of load control IF load control was operated on these peak days. Therefore, Col. (2) represents the actual Net Firm Demand.

Cols. (5) - (9) represent actual DSM capabilities starting from January 1988.

Note that the values for FPL's former Interruptible Rate are incorporated into Col. (8), which also includes CILC and GS-LC.

Col. (10) represents a HYPOTHETICAL "Net Firm Demand" if the load control values had definitely been exercised on the peak. Col. (10) is derived by the formula: (10) = (2) -(6) -(8).

Projected Values (1999 - 2008):

Cols. (2) - (4) represent FPL's forecasted peak w/o incremental conservation or cumulative load control. The effects of conservation implemented prior to 1997 are incorporated into the forecast.

Cols. (5) - (9) represent all incremental conservation and cumulative load control. These values in are projected August values and are based on projections with a 1/97 starting point.

Col. (10) represents a 'Net Firm Demand" which accounts for all of the incremental conservation and assumes all of the load control is implemented on the peak. Col. (10) is derived by using the formula: (10) = (2) - (5) - (6) - (7) - (8) - (9).

Schedule 3.2
History and Forecast of Winter Peak Demand:Base Case

(1) Year	(2) Total	(3) Firm Wholesale	(4) Retail	(5) Interruptible	(6) Res. Load Management	(7) Residential Conservation	(8) C/I Load Management	(9) C/I Conservation	(10) Net Firm Demand
1988/89	12,876	417	12,459	0	9	68	68	17	12,799
1989/90	13,988	648	13,340	0	35	101	94	29	13,859
1990/91	11,868	328	11,540	0	102	135	144	32	11,622
1991/92	13,319	105	13,214	0	174	170	193	38	12,952
1992/93	12,964	102	12,862	0	242	195	275	48	12,447
1993/94	12,594	278	12,316	0	317	231	342	67	11,935
1994/95	16,563	635	15,928	0	393	265	360	93	15,810
1995/96	18,096	698	18,096	0	459	310	406	143	17,231
1996/97	16,490	626	15,864	0	731	368	418	154	15,341
1997/98	13,060	239	12,821	0	823	403	429	168	11,236
1998/99	17,777	122	17,655	0	1,209	26	415	7	16,120
1999/00	18,191	124	18,067	0	1,293	47	432	12	16,407
2000/01	18,615	124	18,491	0	1,366	68	450	17	16,714
2001/02	19,025	127	18,899	0	1,394	90	456	25	17,060
2002/03	19,426	127	19,299	0	1,404	114	462	32	17,414
2003/04	19,816	127	19,690	0	1,415	136	468	40	17,757
2004/05	20,204	127	20,077	0	1,426	159	474	48	18,097
2005/06	20,579	127	20,452	0	1,437	181	479	58	18,424
2006/07	20,953	127	20,826	0	1,446	203	484	67	18,753
2007/08	21,328	127	21,201	0	1,455	225	489	76	19,083

Historical Values (1989 - 1998):

Cols. (2) - (4) are actual values for historical winter peaks. As such, they incorporate the effects of conservation (Cols. (7&9)), and MAY incorporate the effects of load control IF load control was operated on these peak days. Therefore, Col. (2) represents the actual Net Firm Demand.

Cols. (5) - (9) represent actual DSM capabilities starting from January 1988.

Note that the values for FPL's former Interruptible Rate are incorporated into Col. (8), which also includes CILC and GS - LC.

Col. (10) represents a HYPOTHETICAL "Net Firm Demand" if the load control values had definitely been exercised on the peak. Col. (10) is derived by the formula: (10) = (2) -(6) -(8).

Projected Values (1999-2008):

Cols. (2) - (4) represent FPL's forecasted peak w/o incremental conservation or cumulative load control. The effects of conservation implemented prior to 1997 are incorporated into the forecast.

Cols. (5) - (9) represent all incremental conservation and cumulative load control. These values in are projected August values and are based on projections with a 1/97 starting point.

Col. (10) represents a 'Net Firm Demand" which accounts for all of the incremental conservation and assumes all of the load control is implemented on the peak. Col. (10) is derived by using the formula: (10) = (2) - (5) - (6) - (7) - (8) - (9).

Schedule 3.3
History and Forecast of Annual Net Energy for Load - GWH: Base Case

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Year	Total	Residential Conservation	C/I Conservation	Retail	Wholesale	Utility Use & Losses	Net Energy For Load	Load Factor(%)
1989	70,268	217	95	69,414	854	5,801	69,956	59.5%
1990	71,510	319	162	70,628	882	4,926	71,029	59.0%
1991	73,743	397	186	73,027	716	5,346	73,160	59.1%
1992	73,778	460	221	73,076	702	6,002	73,097	56.9%
1993	76,632	553	303	75,675	957	4,988	75,776	56.7%
1994	81,493	661	456	80,093	1,400	5,367	80,376	60.4%
1995	85,415	777	677	83,978	1,437	6,276	83,961	59.3%
1996	86,708	971	1,039	85,355	1,353	5,984	84,698	60.2%
1997	89,240	1,213	1,174	88,015	1,226	5,770	86,853	59.7%
1998	95,316	1,374	1,279	93,990	1,326	6,205	92,663	66.3%
1999	90,861	46	40	89,831	1,030	6,370	90,775	64.4%
2000	92,833	135	117	91,785	1,048	6,507	92,581	65.0%
2001	94,799	222	167	93,729	1,070	6,644	94,410	65.9%
2002	96,789	315	193	95,697	1,092	6,783	96,281	66.5%
2003	98,704	411	220	97,588	1,116	6,918	98,073	66.7%
2004	100,610	509	248	99,472	1,138	7,051	99,853	66.8%
2005	102,459	609	278	101,299	1,160	7,182	101,572	66.9%
2006	104,317	712	309	103,135	1,182	7,311	103,296	66.9%
2007	106,205	817	338	105,001	1,204	7,444	105,050	66.9%
2008	108,122	924	366	106,897	1,225	7,577	106,832	67.1%

Historical Values (1989 - 1998):

Col. (2) represents derived "Total Net Energy For Load w/o DSM". The values are calculated using the formula: (2) = (8) + (3) + (4).

Cols. (3) & (4) are DSM values starting in January, 1988 through 1997 which contributed to the values in Cols. (5) - (9).

Cols. (5) & (6) are a breakdown of Net Energy For Load in Col (2) into Retail and Wholesale .

Col. (9) is calculated using Col. (8) from this page and Col. (2), "Total", from Schedule 3.1.

Projected Values (1999 - 2008):

Col. (2) represents Net Energy for Load w/o DSM values.

Cols. (3) - (4) are forecasted values of the reduction on sales from incremental conservation.

Cols. (5) & (6) are a breakdown of Net Energy For Load in Col (2) , into Wholesale and Retail .

Col. (10) represents a 'Net Firm Demand" which accounts for all of the incremental conservation and assumes all of the load control is implemented the values for Col. (8) above and the values for Col. (10) on Schedule 3.1

Schedule 4
Previous Year Actual and Two-Year Forecast of Retail Peak Demand and Net Energy for Load by Month

(1)	(2)	(3)	(4)	(5)	(6)	(7)
	1998 ACTUAL		1999 * FORECAST		2000 * FORECAST	
Month	Total Peak Demand MW	NEL GWH	Total Peak Demand MW	NEL GWH	Total Peak Demand MW	NEL GWH
JAN	11,360	6,339	17,777	6,874	18,191	7,023
FEB	11,956	5,850	15,925	6,223	16,298	6,358
MAR	11,777	6,392	13,710	6,699	14,020	6,844
APR	12,788	6,977	13,552	6,868	13,779	7,017
MAY	14,422	7,812	14,834	7,385	15,085	7,545
JUN	16,729	9,649	16,346	8,578	16,627	8,764
JUL	16,383	9,087	16,989	8,809	17,281	9,002
AUG	16,274	9,572	17,371	9,216	17,670	9,416
SEP	16,005	8,966	16,895	8,947	17,185	9,141
OCT	14,942	8,212	15,766	7,588	16,032	7,753
NOV	12,740	7,137	14,537	6,976	14,867	7,127
DEC	11,561	6,670	14,862	6,698	15,202	6,843
TOTALS		92,663		90,861		92,833

* Forecasted Peaks & NEL do not include the impacts of cumulative load management and incremental conservation.

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CHAPTER III

Projection of Incremental Resource Additions

III. Projection of Incremental Resource Additions

III.A FPL's Resource Planning:

FPL developed an integrated resource planning (IRP) process in the early 1990's and has since utilized the process in order to determine when new resources are needed, what the magnitude of the needed resources are, and what type of resources should be added. The timing and type of potential new power plants, the primary subject of this document, is determined as part of the IRP process work. This section discusses how FPL applied this process in its 1998 planning work.

Four Fundamental Steps of FPL's Resource Planning:

There are 4 basic "steps" which are fundamental to FPL's resource planning. These steps can be described as follows:

Step 1: Determine the magnitude and timing of FPL's resource needs;

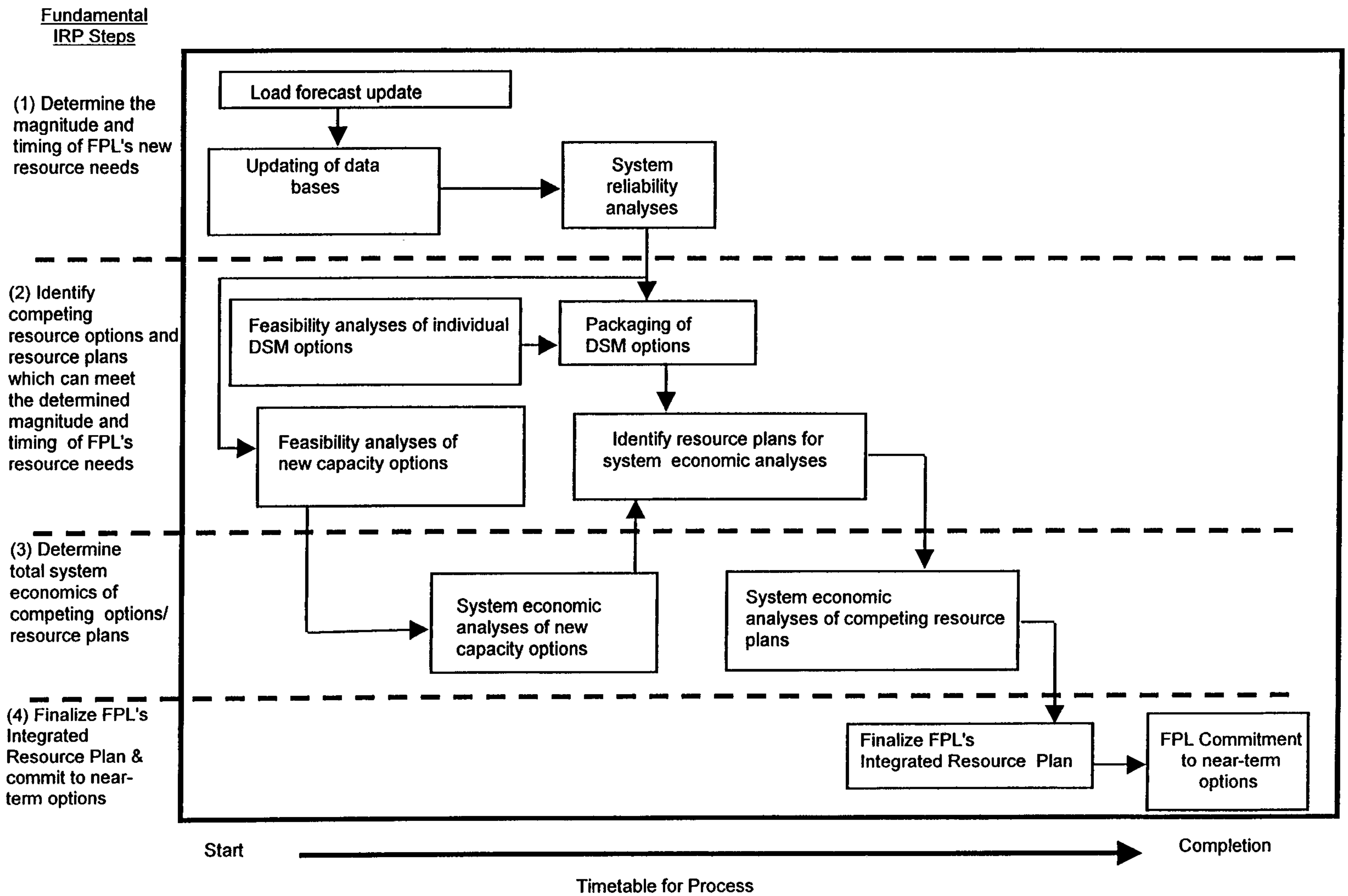
Step 2: Identify which resource options and resource plans can meet the determined magnitude and timing of FPL's resource needs (i.e. identify competing options and resource plans;

Step 3: Determine the economics for the total utility system with each of the competing options and resource plans; and,

Step 4: Select a resource plan and commit, as needed, to near-term options.

Figure III.A.1 graphically outlines the 4 steps.

Overview of FPL's IRP Process



(Normal time period: approx. 6-7 months)

Figure III.A.1

Step 1: **Determine the Magnitude and timing of FPL's Resource needs:**

The first of these four resource planning steps – determining the magnitude and timing of FPL's resource needs – is essentially a determination of how many megawatts (MW) of load reduction, new capacity, or a combination of both load reduction and new capacity options are needed. Also determined in this step is when the MW are needed to meet FPL's planning criteria. This step is often referred to as a reliability analysis for the utility system.

Step 1 starts with an updated load forecast. Several databases are also updated in this first fundamental step, not only with the new information regarding forecasted loads, but with other information as well which is used in many of the fundamental steps in resource planning. Examples of this new information include delivered fuel price projections current financial and economic assumptions, power plant capability and reliability assumptions, etc. Among the assumptions FPL made at the start of its 1998 IRP work were one involving near-term generation capacity additions and one involving DSM.

FPL committed in 1998 to repower both existing steam units at its Ft. Myers plant site and two of the three existing steam units at its Sanford plant site. These two repowering efforts will add significant capacity increases to FPL's system and will greatly increase the efficiency of the capacity now at those two sites. The repowered Ft. Myers capacity is scheduled to come in-service by January, 2002. Combustion turbines, which are components of the repowering effort, will come in-service at Ft. Myers during 2001 and will result in net capacity increases to the FPL system during portions of that year. A similar schedule is planned for Sanford with its repowered capacity coming in-service January, 2003 and combustion turbine components of the repowering work becoming operational during 2002. [1] As a result of this commitment, FPL assumed that these capacity additions resulting from the Ft. Myers and Sanford repowerings were a "given" in its 1998 resource planning work.

Since 1994, FPL's resource planning work has also used the DSM MW called for in FPL's approved DSM goals as a "given" in its analyses. However, FPL filed in 1999 for

[1] FPL's 1998 IRP identified that Sanford units #3 and #4 would be repowered. At the time of publication of this document, subsequent to FPL's 1998 IRP, FPL is reexamining its Sanford repowering plan. This reexamination is based on newly developed technical information which focuses on whether it would be more advantageous to repower units #4 and #5 rather than units #3 and #4. Such a change in the Sanford repowering plan would add approximately 240 MW Summer capability from the Sanford site beyond what would be gained from repowering units #3 and #4. If such a change is made to the Sanford repowering plan during 1999, it will be communicated to the appropriate state agencies and reflected in FPL's 2000 Site Plan filing.

new DSM goal levels. Consequently, FPL's 1998 resource planning work assumed that FPL's current DSM efforts would continue only through the year 2000 (i.e., only during the time it takes to have new goals set and to have DSM program revisions implemented in the field.) FPL assumed that no additional DSM was a "given" after 2000 in order to allow DSM to compete with new generation options for a role in the 1998 resource plan. The first place in which much of this updated information and assumptions are used is in the analyses which provide the desired result of the 1st fundamental step: the determination of the magnitude and the timing of FPL's resource needs. This determination is accomplished by system reliability analyses which are typically based on a dual planning criteria of a minimum Summer reserve margin of 15% and a maximum loss-of-load probability (LOLP) of 0.1 days/year; criteria which are commonly used throughout the utility industry. FPL also used a third reliability criterion in 1998: a minimum 15% Winter reserve margin criterion. This third criterion was used in FPL's 1998 planning work due to concern regarding reserves available during extreme Winter peak loads.

Historically, two types of methodologies, deterministic and probabilistic have been employed in system reliability analyses. The calculation of excess firm capacity at the annual system peaks (reserve margin) is the most common method and this relatively simple calculation can be performed on a spreadsheet. It provides an indication of how well a generating system can meet its native load during peak periods. However, deterministic methods do not take into account probabilistic events such as: unit reliability; unit size (i.e., two 50 MW units which can be counted on to run 90% of the time are more valuable in regard to utility system reliability than is one 100 MW unit); and the value of being part of an interconnected system.

Therefore, probabilistic methodologies have been used to provide additional information on the reliability of a generating system. There are a number of probabilistic methods that are being used to perform system reliability analyses. Of these, the most widely used is loss-of-load probability or LOLP. Simply stated, LOLP is an index of how well a generating system will be able to meet its demand (i.e., a measure of how often load will exceed available resources). In contrast to reserve margin, the calculation of LOLP looks at the daily peak demands for each year, while taking into consideration such probabilistic events as the unavailability of individual generators due to scheduled maintenance or forced outages.

LOLP is expressed in units of "number of times per year" that the system demand could not be served. The standard for LOLP accepted throughout the industry is a maximum of 0.1 day per year. This analysis requires a more complicated calculation methodology than does reserve margin analysis.

The end result of the first fundamental step of resource planning is a projection of how many MW are needed to maintain system reliability and of when the MW are needed. This information is used in the second fundamental step: identifying resource options and resource plans which can meet the determined magnitude and timing of FPL's resource needs.

Step 2: Identify Resource Options and Plans Which Can Meet the Determined Magnitude and Timing of FPL's Resource Needs:

The initial activities associated with this second fundamental step of resource planning generally proceed concurrently with the activities associated with Step 1. During Step 2, feasibility analyses of new capacity options are carried out to determine which new capacity options appear to be the most competitive on FPL's system. These analyses also establish capacity size (MW) values, projected construction / permitting schedules, and operating parameters and costs. In similar fashion, individual DSM options were evaluated to determine their potential cost-effectiveness and their achievable potential for each year after 2000.

The individual new resource options, both new generating units and DSM, are then "packaged" into different resource plans which are designed to meet the system reliability criteria. In other words, resource plans are created by combining individual resource options so that the timing and magnitude of FPL's new resource needs are met. The creation of these competing resource plans is typically carried out using dynamic programming techniques.

Therefore, at the conclusion of the second fundamental resource planning step in 1998, a number of different combinations of new resource options (i.e., resource plans) of a magnitude and timing necessary to meet FPL's resource needs were identified. These resource plans were then compared on an economic basis.

Step 3: Determining the Total System Economics:

At the completion of the fundamental Steps 1 & 2, the most viable new resource options have been identified, and these resource options have been combined into a number of resource plans. The stage is set for comparing the system economics of these resource plans. FPL combines the resource options into resource plans using linear programming techniques and the EGEAS (Electric Generation Expansion Analysis System) computer model from the Electric Power Research Institute (EPRI) and Stone & Webster Management Consultants, Inc. The EGEAS model is also used to perform the economic analyses of the resource plans.

The economic analyses of the competing resource plans focus on total system economics. The standard basis for comparing the economics of the competing resource plans is the competing resource plans' impact on FPL's electricity rate levels with the intent of minimizing FPL's levelized system average rate (i.e. a Rate Impact Measure or RIM methodology).

At the conclusion of the analyses carried out in Step 3, a determination of FPL's preferred resource plan was made.

Step 4: Finalizing FPL's 1998 Resource Plan

The results of the previous three fundamental steps' activities were evaluated by FPL management and a decision was made as to what FPL's 1998 resource plan would be. This plan is presented in the following section.

III.B Incremental Resource Additions

FPL's projected incremental generation capacity additions/changes for 1999 through 2008 are depicted in Table III.B.1. (The planned DSM additions, which affected the selection of the capacity additions, are shown separately in Table III.C.1.) These capacity additions/changes will result from a variety of actions including: upgrades to existing units (which are achieved as a result of plant component replacements during major overhauls), capacity enhancements (due to overpressurization, overfiring, and/or the addition of inlet air chillers), scheduled changes in the delivered amounts of purchased power, repowering of existing units, and projected construction of new units.

As shown in Table III.B.1, the bulk of the capacity additions are made up of the following items: the repowering of existing units at FPL's Ft. Myers site by 2002; a similar repowering at FPL's Sanford site by 2003; and the construction of two new combined cycle units at FPL's Martin site in 2006 and 2007, respectively, followed by the construction of a new combined cycle unit in 2008 at a site yet to be determined.

Projected Capacity Changes and Reserve Margins for FPL [1]		*Summer MW*	*Winter MW*
1999	Changes to existing plants [2]	239	80
2000	Changes to existing plants [2]	75	75
2001	Changes to existing plants [2]	20	23
	Changes to existing purchases [3]	(9)	---
	Ft. Myers Repowering:Initial Phase [4]	201	182
2002	Ft. Myers Repowering:Second Phase	725	920
	Changes to existing plants [2]	---	30
	Changes to existing purchases [3]	---	(9)
	Sanford Repowering:Initial Phase [4],[5]	202	182
2003	Sanford Repowering:Second Phase [5]	725	919
2004	Changes to existing purchases [3]	(10)	(10)
2005	Changes to existing purchases [3]	---	---
2006	Martin Combined Cycle No.5 [6]	419	448
	Changes to existing purchases [3]	(133)	(133)
2007	Martin Combined Cycle No.6 [6]	419	448
2008	Unsited Combined Cycle [7]	419	448
	TOTALS=	***3,292***	***3,603***

Note:

(1) Note that this table addresses only construction and purchase alternatives (I.e. it does not show planned DSM additions. These are shown in Table III.C.1).

(2) Additional capability which is expected to be achieved as a result of plant component replacements during major overhauls plus capacity enhancements (overpressurization,overfiring, addition of chillers etc.)

(3) Net of Southern Purchase Contract, QF Purchases and changes to those purchases.

(4) Projected repowering of exisiting steam units at the Ft. Myers and Sanford sites.The initial phase of the repowering projects consists of the introduction of combustion turbines followed by taking existing steam units out-of-service. The second phase of repowering consists of completing the integration of the combustion turbines, heat recovery steam generators, and existing steam turbines.

(5) The values shown above reflect FPL's 1998 IRP which identified that Sanford units #3 and #4 would be repowered. At the time of publication of this document,subsequent to FPL's 1998 IRP, FPL is reexamining its Sanford repowering plan. This reexamination is based on newly developed technical information which focuses on whether it would be more advantageous to repower units #4 and #5 rather than units #3 and #4. Such a change in the Sanford repowering plan would add approximately 240 MW summer capability from the Sanford site beyond what would be gained from repowering units #3 and #4.If such a change is made to the Sanford repowering plan during 1999, it will be communicated to the appropriate state agencies and reflected in FPL's 2000 Site Plan filing.

(6) New combined cycle unit at the Martin site.

(7) New combined cycle at a site yet to be determined.

Table III.B.1

III.C Demand Side Management (DSM)

1. FPL's Current DSM Programs

FPL's currently approved DSM programs can be summarized as follows:

Residential Conservation Service

An energy audit program designed to assist residential customers in understanding how to make their homes more energy-efficient through the installation of conservation measures/practices.

Residential Building Envelope

A program designed to encourage the installation of energy-efficient ceiling insulation in residential dwellings that utilize whole-house electric air-conditioning.

Duct System Testing and Repair

A program designed to encourage demand and energy conservation through the identification of air leaks in whole-house air conditioning duct systems and by the repair of those leaks by qualified contractors.

Residential Air Conditioning

A program designed to encourage customers to purchase higher efficiency equipment including central and window/wall units.

Residential Load Management (On Call)

A program designed to offer load control of major appliances/household equipment to residential customers.

BuildSmart

A program designed to encourage the design and construction of energy-efficient homes that cost-effectively reduce FPL's coincident peak load and energy consumption.

Business Energy Evaluation

A program designed to encourage energy efficiency in both new and existing commercial and industrial facilities by identifying DSM opportunities and providing recommendations to the customer.

Commercial/Industrial Heating, Ventilating, and Air Conditioning

A program designed to encourage the use of high-efficiency heating, ventilating, and air conditioning (HVAC) systems in commercial/industrial facilities. Includes air-and water-cooled chillers, DX units, thermal energy storage, window/wall units, and duct repair measures.

Commercial/Industrial Efficient Lighting

A program designed to encourage the installation of energy-efficient lighting measures in commercial/industrial facilities.

Off-Peak Battery Charging

A program designed to shift the demand of commercial/industrial customers' battery charging applications from on-peak to off-peak time periods.

Business Custom Incentive

A program designed to encourage commercial/industrial customers to implement unique energy conservation measures or projects not covered by other FPL programs.

Commercial/Industrial Load Control

A program designed to reduce peak demand by controlling customer loads of 200 kW or greater during periods of extreme demand or capacity shortages. (This program has been closed to new potential participants).

Commercial/Industrial Building Envelope

A program for commercial/industrial customers which is designed to encourage the installation of energy-efficient building envelope measures such as window treatments and roof/ceiling insulation.

General Service Load Management (Business On Call)

A program designed to offer load control of central air conditioning units to small non-demand-billed commercial/industrial customers.

2. Research and Development

FPL's DSM Plan contains a wide range of research and development activities. Historically, FPL has performed extensive DSM research and development, and FPL will continue such activities not only through its Conservation Research and Development program, but also through individual research projects. These efforts will examine a wide variety of technologies which build on prior FPL research where applicable and will expand the research to new and promising technologies as they emerge.

2a. Conservation Research and Development Program

FPL's Conservation Research and Development Program is designed to evaluate emerging conservation technologies to determine which are worthy of pursuing for program development and approval. FPL has researched a wide variety of technologies and from that research has been able to develop new programs such as BuildSmart, Commercial/Industrial Building Envelope, and Off-Peak Battery Charging.

The technology assessment and product development process is ongoing, and the following technologies are currently being evaluated: cooling tower enhancement, desiccant-enhanced air conditioning systems, HVAC enhancements, building envelope technologies, appliance technologies, uncontrolled air flow in commercial buildings and UV-filtration and energy management technologies.

2b. Marketing Conservation Research & Development Program

This program is designed to allow FPL the flexibility to test alternative incentive and/or marketing strategies for existing DSM programs.

2c. Research & Development Projects

Residential Thermal Energy Storage Project

This research project is intended to determine the technical feasibility of a program to encourage residential customers to cool their homes with thermal energy storage.

Cool Communities Research Project

This research project is designed to evaluate emerging conservation technologies and practices associated with residential structures to determine which are worthy of pursuing for program development and approval. The project will quantify savings from lightened roof color and tree shading of homes.

Natural Gas End-Use Technology Research & Development Projects

This research and development project is designed to determine Florida-specific operating characteristics of various natural gas end-use technologies. Three gas technologies: gas engine-driven heat pumps, gas engine-driven chillers, and gas water heating, are still being analyzed.

C/I Daylight Dimming Research Project

This research and development project is designed to assess the viability and feasibility of daylight dimming technology and to compare the demand and energy reductions and cost differentials of daylight dimming systems to conventional lighting systems. In addition, this project will attempt to discover and overcome potential barriers for the technology, quantity the cost-effectiveness of the technology, test acceptance of the technology with architectural and engineering consultants, qualitatively assess customer acceptance of the technology, and conduct market research to determine target markets and expected market penetrations.

Commercial/Industrial New Construction Research Project

The objective of this project is to identify cost-effective opportunities in the commercial/industrial new construction market which would provide energy efficiency measures beyond that required by the Florida Energy Efficiency Code.

Green Pricing Research Project

This research project is designed to test FPL customer responses to a Green Pricing initiative. In this initiative, FPL solicited voluntary contributions from customers to be used to purchase, install, maintain, and operate photovoltaic (PV) modules on FPL's system.[2]

C/I Solar Desiccant Research Project

This project is designed to evaluate the potential demand and energy savings associated with, and the cost-effectiveness of hybrid solar desiccant dehumidification systems combined with a traditional cooling system.[3]

2d. Real-Time Pricing

Although not part of FPL's approved DSM Plan, FPL continues to research new conservation/efficiency options such as Real-Time Pricing. This option is an experimental service offering for large C/I customers designed to evaluate customer load response to hourly marginal cost-based energy prices provided on a day-ahead basis.

[2],[3] Please refer to section III.F for additional information regarding FPL's efforts with renewable energy.

3. FPL's Proposed DSM MW Goals

FPL's DSM implementation plan is designed to meet currently approved DSM goals through 1999 and to meet new DSM goals starting in 2000. FPL submitted proposed DSM goals earlier this year to the Florida Public Service Commission. A decision on those goals is scheduled to be reached by the end of the year. FPL's 1999 Site Plan is based on meeting these proposed new goals for DSM. The combined total residential and commercial/industrial Summer MW reduction values from FPL's Proposed DSM Goals for 2000 – 2008 are presented in Table III.C.1. These values are incremental values above the approximately 2,660 MW of DSM which has already been implemented on FPL's system through 1998.

FPL's Proposed Summer MW Reduction Goals for DSM

Year	Cumulative Summer MW
2000	122
2001	200
2002	269
2003	339
2004	410
2005	484
2006	554
2007	625
2008	697

Table III.C.1

III.D Non-Utility Generation Additions

FPL has no incremental firm capacity purchase contracts from non-utility generating facilities which are scheduled to begin operation in the 1998-on timeframe.

Tables I.B.1 and I.B.2 present the currently contracted cogeneration/small power production facilities which are addressed in FPL's resource planning.

III.E Transmission Plan

The 1998 - 2007 transmission plan will allow for the reliable delivery of the required capacity and energy for FPL's retail and wholesale customers. The following table presents FPL's future additions of 230 KV and 500 KV proposed bulk transmission lines.

List of Proposed Power Lines
1999 – 2008

LIST OF PROPOSED POWER LINES 1998-2008					
OWNER	LINE TERMINAL (FROM)	LINE TERMINAL (TO)	NEW LINE MILES	COMMERCIAL IN-SERVICE DATE	NOMINAL OPERATING VOLTAGE
FPL	BROWARD	YAMATO	2.50	Jun-99	230
FPL/OUC	CAPE	INDIAN RIVER	2.30	Jun-99	230
FPL	GREYNOLDS	LAUDANIA	3.00	Jun-99	230
FPL	ANDYTOWN	PENNSUCO	8.50	Aug-99	230
FPL	DADE	LEVEE	3.00	Nov-99	230
FPL	COLLIER	ORANGE RIVER	36.00	Dec-99	230
FPL	BROWARD	RANCH	4.50	Jun-00	230
FPL	FLAGAMI	TURKEY POINT	1.80	Jun-00	230
FPL	FLAGAMI	TURKEY POINT	1.80	Jun-00	230
FPL	SANFORD	VOLUSIA	5.50	Jun-00	230
FPL	CALUSA	FT MYERS	1.60	Oct-00	230
FPL	FT MYERS	ORANGE RIVER	2.60	May-01	230
FPL	BROWARD	CORBETT	1.75	Jun-01	230
FPL	GREYNOLDS	LAUDANIA	6.70	Jun-01	230
FPL	POINSETT	SANFORD	45.00	Jun-02	230
FPL	POINSETT	SANFORD	45.00	Jun-02	230
FPL	BROWARD	CORBETT	10.50	Jun-03	230
FPL	YULEE	ONEIL	6.50	Jun-04	230
FPL	CONSERVATION	LEVEE	36.00	Jun-07	500

Table III.E.1

In addition, there will be transmission facilities needed to connect FPL's projected capacity additions to the system transmission grid. These "directly associated" transmission facilities for the projected capacity additions at FPL's existing Ft. Myers, Sanford, and Martin sites are described below. (Since the projected capacity addition for 2008 is as-yet unsited, no "directly associated" transmission facilities information is provided. This information will be provided in future Site Plan documents once a site is selected.)

III.E.1 Directly Associated Transmission Facilities at Ft. Myers

The work required to integrate the Ft. Myers capacity expansion (from the repowering project) with the FPL grid is as follows:

I. Substation:

1. Build two collector buses with 3 breakers each to connect 3 CT's on each one. Add another breaker to one of these collector buses to connect the start-up transformer.
2. Add the six main step-up transformers (200 MVA/each), one for each CT.
3. Add the start-up transformer.
4. Add a three breaker bay in the 230 KV substation to connect one of the collector buses and a new line to Calusa.
5. Add a three breaker bay in the 230 KV substation to connect the other collector bus and a new line at Orange River.
6. Add a two breaker bay at Orange River 230 KV substation to connect the new line from Ft. Myers.
7. Add a two breaker bay at Calusa 230 KV to connect the new line from Ft. Myers.
8. Replace breakers 3 and 36 (rated 37.6kA) on by 9N (see diagram below) with new ones rated 63 kA.
9. Add relay and other protective equipment at Ft. Myers, Orange River, and Calusa substations.

II. Transmission:

1. Build a new 230 kV line from Ft. Myers to Orange River (approximately 2.57 miles) similar to the existing circuits which are bundle 2-1431 ACSR 2580 Amps (1028 MVA) each.
2. Build a new 230 kV line from Ft. Myers to Calusa (approximately 1.58 miles) using 1431 ACSR conductor rated 1600 Amps (637 MVA).

FT. MYERS REPOWERING PROJECT

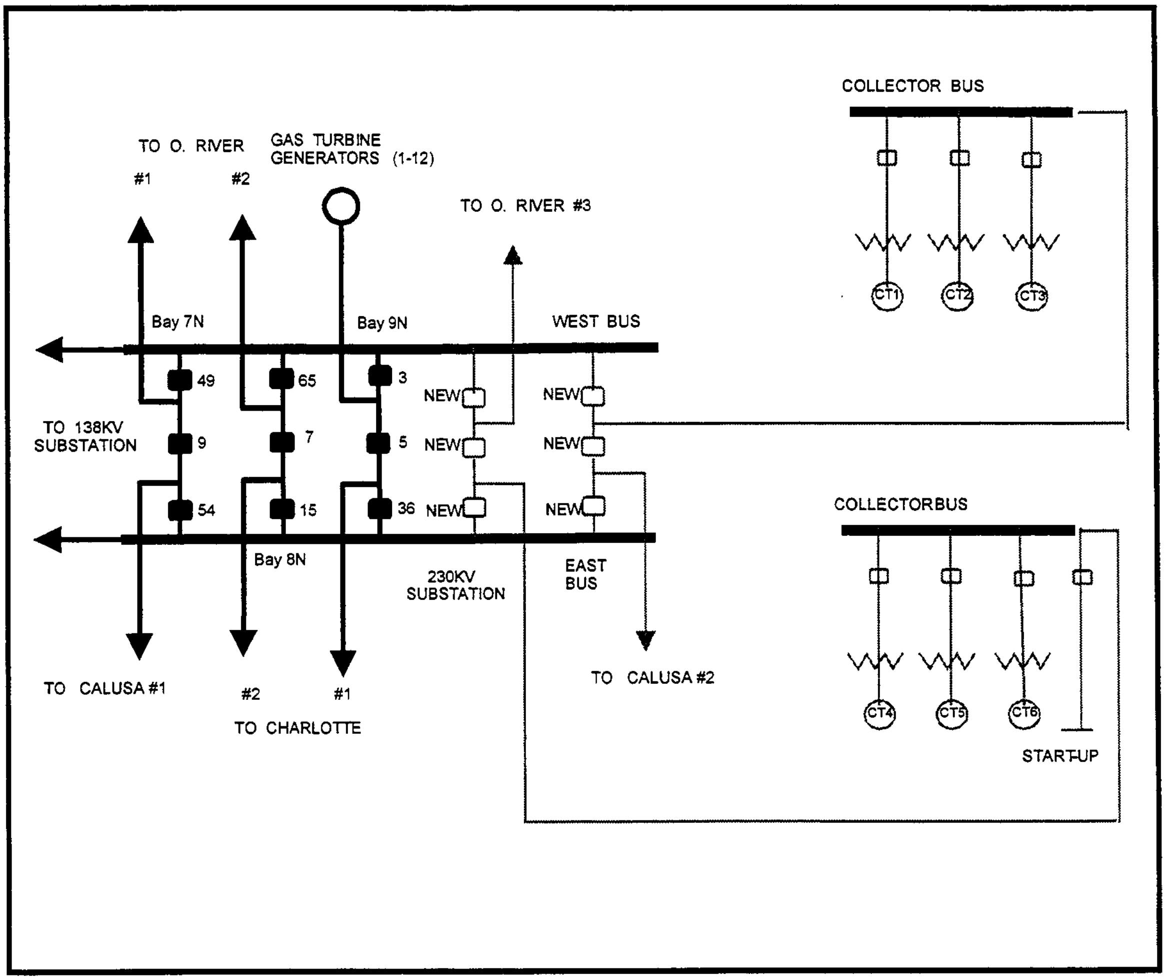


Figure III.E.1

III.E.2 Directly Associated Transmission Facilities at Sanford

The work required to integrate the Sanford capacity expansion (from the repowering project) with the FPL grid is as follows:[4]

I. Substation:

1. Build two collector buses with 3 breakers each to connect 3 CT's on each one. Add another breaker to one of these collector buses to connect the start-up transformer.
2. Add the six main step-up transformers (200 MVA/each) one for each CT.
3. Add the start-up transformer.
4. Build a new substation with 2-three breaker bays and 1-two breaker bay as shown in diagram to connect both collector buses and new transmission lines.
5. Move the Volusia #2 line terminal from the existing yard to the new 230 kV yard.
6. Add a three breaker bay at Poinsett 230 kV substation to connect the new lines from Sanford.
7. Add relay and other protective equipment at Sanford and at Poinsett substations.

II. Transmission:

1. Build two new 230 kV lines from Sanford to Poinsett (approximately 45 miles each) with conductor rated for 1600 Amps.
2. Add Protection and Control equipment for the new lines.
3. Upgrade the Cape Canaveral-Indian River 230 KV line to 1500 Amps.

---

[4] The transmission information presented here reflects FPL's 1998 IRP which identified that Sanford units #3 and #4 would be repowered. At the time of publication of this document, subsequent to FPL's 1998 IRP, FPL is reexamining its Sanford repowering plan. This reexamination is based on newly developed technical information which focuses on whether it would be more advantageous to repower units #4 and #5 rather than units #3 and #4. Such a change in the Sanford repowering plan would add approximately 240 MW Summer capability from the Sanford site beyond what would be gained from repowering units #3 and #4 and may result in modifications to this transmission information. If such a change is made to the Sanford repowering plan during 1999, it will be communicated to the appropriate state agencies and reflected in FPL's 2000 Site Plan filing.

SANFORD REPOWERING PROJECT

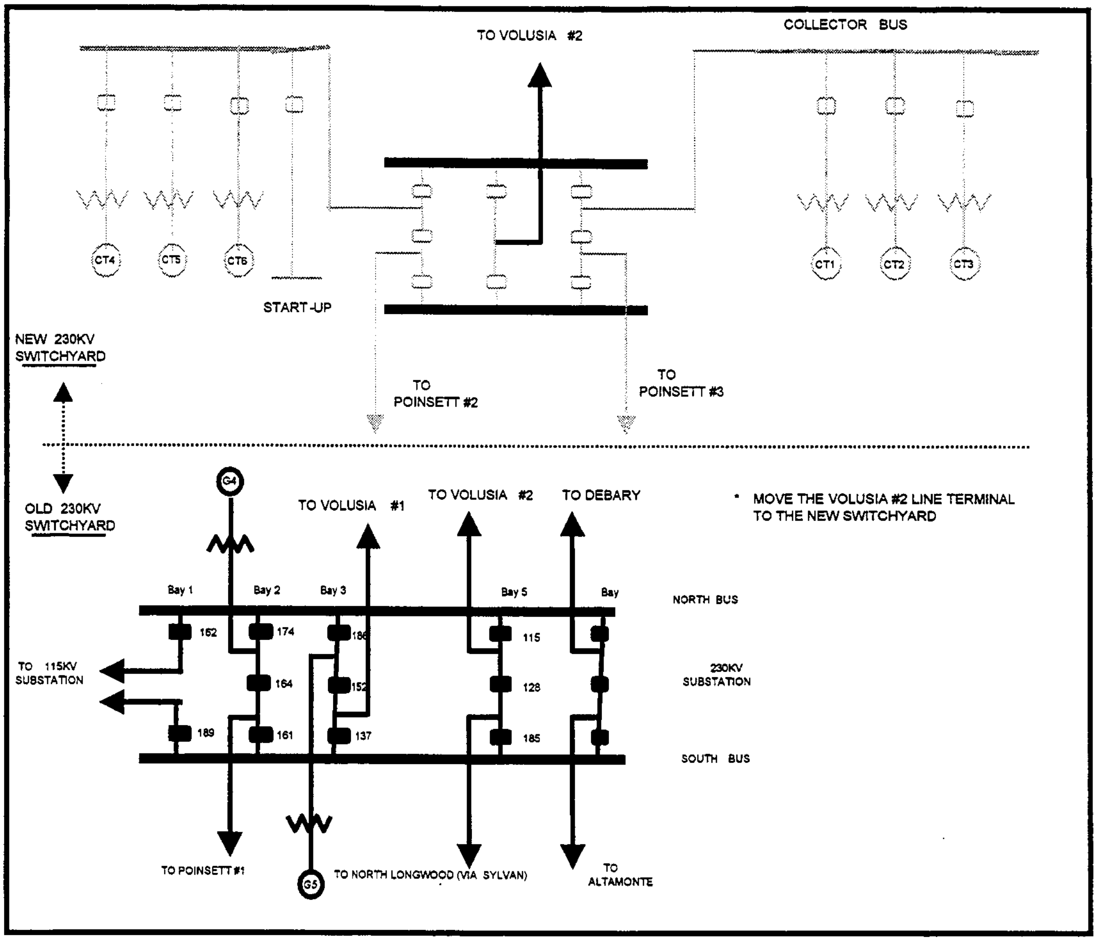


Figure III.E.2

III.E.3 Directly Associated Transmission Facilities at Martin

The work required to integrate the incremental capacity projected to be added at Martin (from new combined cycle units) with the FPL grid is as follows:

I. <u>Substation</u>

1. Build two collector buses with three single breakers each to connect the CT's, the ST units, and the start-up transformers.
2. Add the 4 main step-up transformers (2-400 MVA and 2-200 MVA) one for each CT and one for each ST unit.
3. Add the start-up transformers.
4. Add bus breaker in bay #4 to connect the Martin #5 collector bus in between this new breaker and breaker 154.
5. Add a new two-breaker bay (bay #3) to connect the Martin #6 collector bus.
6. Add relay and other protective equipment.
7. Split the 230kV bus in order to reduce fault current levels in the switchyard. This will effectively separate units 3 and 4 from the new units 5 and 6. The 500/230 kV autotransformer #1 will remain connected to the units 3 and 4 switchyard and the new autotransformer #2 will connect the units 5 and 6 switchyard to the 500 kV bus.
8. Add the second 500/230kV autotransformer and connect it to breaker 80 on the 230 kV side which is tied to the switchyard for units 5 and 6.
9. Add a single phase 230/500 kV, 500 MVA transformer to be used as a spare for either autotransformer.
10. Add relays and other protective equipment.

II. <u>Transmission</u>

1. Construct two string buses to connect the collector and main switchyards.
2. Uprate the Pratt & Whitney-Indiantown 230kV circuit from 2020 Amps to 2520 Amps.
3. Uprate the Pratt & Whitney – Ranch 230 kV circuit from 2020 Amps to 2520 Amps.

MARTIN CAPACITY ADDITIONS

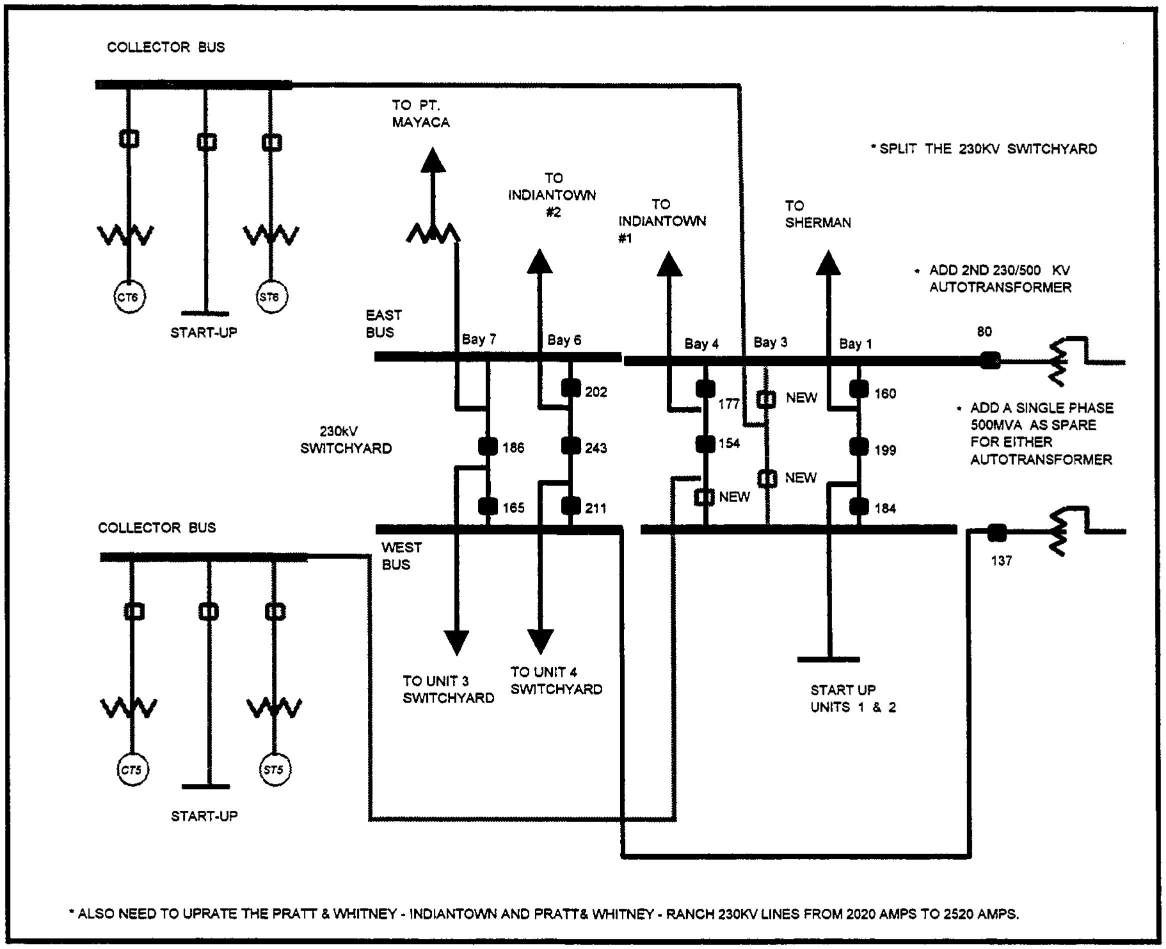


Figure III.E.3

III.F. Renewable Resources

FPL has been the leading Florida utility in examining ways to utilize renewable energy technologies to meet its customers' current and future needs. FPL has been involved since 1976 in renewable energy research and development and in facilitating the implementation of various technologies.

FPL assisted the Florida Solar Energy Center (FSEC) in the late 1970's in demonstrating the first residential solar photovoltaic (PV) system east of the Mississippi. This PV installation at FSEC's Brevard County location was in operation for over 15 years and provided valuable information about PV performance capabilities on both a daily and annual basis in Florida. FPL later installed a second PV system at the FPL Flagami substation in Miami. This 10 kilowatt (KW) system was placed into operation in 1984. The testing of this PV installation was completed, and the system was removed in 1990 to make room for substation expansion.

FPL's newest PV R&D project is a thin-film PV test facility located at the FPL Martin Plant site. The FPL PV test facility is used to test new thin-film PV technologies (and others as they become available for demonstration) and to identify design, equipment, or procedure changes necessary to accommodate direct current PV facilities into the FPL system. The site has a potential generating capacity of up to 100 KW.

In terms of utilizing renewable energy sources to meet its customers' needs, FPL initiated the first and only utility-sponsored conservation program in Florida designed to facilitate the implementation of solar technologies by its customers. FPL's Conservation Water Heating Program, first implemented in 1982, offered incentive payments to customers choosing solar water heaters. Before the program was ended (due to the fact that it was not cost-effective), FPL paid incentives to approximately 48,000 customers who installed solar water heaters.

In the mid-1980's, FPL introduced another renewable energy program. FPL's Passive Home Program was created in order to broadly disseminate information about passive solar building design techniques which are most applicable in Florida's climate. Complete designs and construction blueprints for 6 passive homes were created by 3 Florida architectural firms with the assistance of the FSEC and FPL. These designs and blueprints were available to customers at a low cost. During its existence, this program was popular and received a U.S. Department of Energy award for innovation. The program was eventually phased out due to a revision of the Florida Model Energy Building code. This revision was brought about in part by FPL's Passive Home Program. The revision incorporated into the Code one of the most significant passive design techniques highlighted in the program: radiant barrier insulation.

In early 1991, FPL received approval from the Florida Public Service Commission to conduct a research project to evaluate the feasibility of using small PV systems to directly power residential swimming pool pumps. This research project was completed with mixed results. Some of the performance problems identified in the test may be solvable, particularly when new pools are constructed. However, the high cost of PV, the significant percentage of sites with unacceptable shading, as well as customer satisfaction issues remain as significant barriers to wide acceptance and use of this particular solar application.

More recently, FPL has analyzed the feasibility of encouraging utilization of PV in another, potentially much larger way. FPL's approach did not require all of its customers to bear PV's high cost, but allowed customers who were interested in facilitating the use of renewable energy the means to do so. FPL's approach is to allow customers to make voluntary contributions into a separate fund, which FPL would then use to make PV purchases in bulk quantities. PV will be installed at one or more central sites and deliver PV-generated electricity directly into the FPL grid. Thus, when sunlight is available at this site(s), the PV-generated electricity will displace an equivalent amount of fossil fuel-generated electricity.

FPL's approach, which has been termed Green Pricing, was initially discussed with the FPSC in 1994. The concept was then formally presented to the FPSC as part of FPL's DSM Plan in January, 1995. FPL received approval from the FPSC in June, 1997, to proceed with Green Pricing. FPL initiated the project in 1998 and received approximately $84,000 in contributions which significantly exceeded the goal of $70,000. FPL will soon purchase and install the PV modules received and will further evaluate this PV concept.

Finally, FPL has also facilitated renewable energy projects (facilities which burn bagasse, waste wood, municipal waste, etc.). Firm capacity and energy, and as-available energy, have been purchased by FPL from these developers. (Please refer to Tables I.B.1 and I.B.2).

III.G FPL's Fuel Mix and Fuel Price Forecasts

1. FPL's Fuel Mix

Until the mid-1980's, FPL relied primarily on a combination of oil, natural gas, and nuclear energy to generate electricity. In 1986, coal was first added to the fuel mix, allowing FPL to meet its customers' energy needs with a more diversified mix of energy sources. Additional coal resources have been added with the acquisition (76%) of Scherer Unit #4.

2. Fuel Price Forecasts

FPL's long-term oil price forecast assumes that worldwide demand for petroleum products will grow moderately throughout the planning horizon. Non-OPEC crude oil supply is projected to increase as new and improved drilling technology and seismic information will reduce the cost of producing crude oil and increase both recovery from existing fields and new discoveries. However, the rate of increase in non-OPEC supply is projected to be slower than that of petroleum demand, resulting in an increase in OPEC's market share throughout the planning horizon. As OPEC gains market share, prices for petroleum products are projected to increase.

FPL's natural gas price forecast assumes that domestic demand for natural gas will grow moderately throughout the planning horizon, primarily due to increased requirements for electric generation. Domestic natural gas production will increase as new and improved drilling technology and seismic information will reduce the cost of finding, developing, and producing natural gas fields. The rate of increase in domestic natural gas production is assumed to be slower than that of demand, with the balance being supplied by increased Canadian and liquefied natural gas (LNG) imports. As demand for natural gas in Florida grows, it is anticipated that based on natural gas users' commitments, the Florida Gas Transmission pipeline system will be augmented/expanded and/or a new pipeline will be constructed to meet the growth in demand.

Schedule 5
Fuel Requirements 1/

	Fuel Requirements	Units	Actual 2/		Forecasted									
			1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
(1)	Nuclear	Trillion BTU	242	266	257	252	250	257	252	251	257	252	250	257
(2)	Coal	1,000 TON	767	3,241	3,575	3,870	3,598	3,531	3,792	3,511	3,498	3,708	3,332	3,490
(3)		Trillion BTU 3/	48	4/										
(4)	Residual(FO6)- TOTAL	1,000 BBL	24,876	40,586	41,423	38,179	31,777	24,982	16,207	18,494	16,718	15,512	13,286	10,240
(5)	Steam	1,000 BBL	24,876	40,586	41,423	38,179	31,777	24,982	16,207	18,494	16,718	15,512	13,286	10,240
(6)	Distillate(FO2)- TOTAL	1,000 BBL	59	380	162	178	497	38	15	38	55	48	138	26
(7)	CC	1,000 BBL	0	30	0	0	0	0	0	0	0	0	9	0
(8)	CT	1,000 BBL	44	337	162	178	497	38	15	38	55	48	129	26
(9)	Steam	1,000 BBL	15	13	0	0	0	0	0	0	0	0	0	0
(10)	Natural Gas -TOTAL	1,000 MCF	216,130	195,269	123,423	155,875	218,058	249,138	306,657	312,352	326,056	354,482	387,288	405,928
(11)	Steam	1,000 MCF	95,061	67,044	1,909	16,928	69,396	36,168	35,689	36,154	57,401	84,925	122,456	146,491
(12)	CC	1,000 MCF	118,874	119,516	117,929	135,241	138,529	209,930	269,967	274,487	266,856	267,951	262,288	258,361
(13)	CT	1,000 MCF	2,195	8,709	3,585	3,706	10,133	3,040	1,001	1,711	1,799	1,606	2,544	1,076

1/ Reflects fuel requirements for FPL only.

2/ Source: A Schedules.

3/ Scherer coal is reported in terms of BTU's only, not in tons.

4/ As per the FRCC's requirements, we must convert and report Scherer's BTU's as tons.

Schedule 6.1
Energy Sources

	Energy Sources	Units	Actual 1/ 1997	Actual 1/ 1998	Forecasted 1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
(1)	Annual Energy Interchange 2/	GWH	10,181	6,850	10,408	10,854	11,690	11,054	9,942	10,145	10,280	9,934	9,850	9,986
(2)	Nuclear	GWH	22,000	24,305	23,481	23,081	22,909	23,465	23,022	22,976	23,465	23,022	22,910	23,534
(3)	Coal	GWH	6,903	6,434	6,786	7,286	6,790	6,709	7,155	6,642	6,658	7,010	6,338	6,639
(4)	Residual(FO6) -Total	GWH	15,495	25,142	27,102	25,007	20,751	16,247	10,533	12,008	10,850	10,081	8,595	6,620
(5)	Steam	GWH	15,495	25,142	27,102	25,007	20,751	16,247	10,533	12,008	10,850	10,081	8,595	6,620
(6)	Distillate(FO2) -Total	GWH	16	149	47	52	151	12	5	12	17	15	48	8
(7)	CC	GWH	0	22	0	0	0	0	0	0	0	0	7	0
(8)	CT	GWH	16	127	47	52	151	12	5	12	17	15	41	8
(9)	Steam	GWH	0	0	0	0	0	0	0	0	0	0	0	0
(10)	Natural Gas -Total	GWH	25,492	23,778	15,828	19,268	25,082	32,319	41,518	42,129	44,451	48,578	52,810	55,823
(11)	Steam	GWH	9,382	7,032	88	1,470	6,498	3,347	3,326	3,355	6,739	10,716	15,572	19,242
(12)	CC	GWH	15,982	16,216	15,563	17,612	17,922	28,772	38,139	38,685	37,618	37,778	37,103	36,524
(13)	CT	GWH	128	530	177	186	662	200	53	89	94	84	135	57
(14)	Other 3/	GWH	6,765	6,005	7,209	7,285	7,426	6,983	6,529	6,698	6,738	5,677	5,654	5,512
	Net Energy For Load	GWH	86,852	92,663	90,861	92,833	94,799	96,789	98,704	100,610	102,459	104,317	106,205	108,122

1/ Source: A Schedules.

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

3/ Represents a forecast of energy expected to be purchased from Qualifying Facilities, Independent Power Producers, etc.

4/ Represents a forecast of energy expected to be produced upon conversion of the Manatee Power Plant to burn Orimulsion.

Schedule 6.2

Energy % by Fuel Type

Energy Source	Units	Actual 1/		Forecasted									
		1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Annual Energy Interchange 2/	%	11.7	7.4	11.5	11.7	12.3	11.4	10.1	10.1	10.0	9.5	9.3	9.2
Nuclear	%	25.3	26.2	25.8	24.9	24.2	24.2	23.3	22.8	22.9	22.1	21.6	21.8
Coal	%	7.9	6.9	7.5	7.8	7.2	6.9	7.2	6.6	6.5	6.7	6.0	6.1
Residual(FO6) -Total	%	17.9	27.3	29.9	27.0	22.0	16.8	10.7	11.9	10.6	9.7	8.1	6.1
Steam	%	17.8	27.1	29.8	26.9	21.9	16.8	10.7	11.9	10.6	9.7	8.1	6.1
Distillate(FO2) -Total	%	0.0	0.2	0.1	0.1	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CC	%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CT	%	0.0	0.1	0.1	0.1	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Natural Gas -Total	%	29.4	25.7	17.4	20.8	26.5	33.4	42.1	41.9	43.4	46.6	49.7	51.6
Steam	%	10.8	7.6	0.1	1.6	6.9	3.5	3.4	3.3	6.6	10.3	14.7	17.8
CC	%	18.4	17.5	17.1	19.0	18.9	29.7	38.6	38.5	36.7	36.2	34.9	33.8
CT	%	0.1	0.6	0.2	0.2	0.7	0.2	0.1	0.1	0.1	0.1	0.1	0.1
Other 3/	%	7.8	6.5	7.9	7.8	7.8	7.2	6.6	6.7	6.6	5.4	5.3	5.1
		100	100	100	100	100	100	100	100	100	100	100	100

1/ Source: A Schedules.

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

3/ Represents a forecast of energy expected to be purchased from Qualifying Facilities, Independent Power Producers, etc.

Schedule 7.1
Forecast of Capacity, Demand, and Scheduled
Maintenance At Time Of Summer Peak

(1) Year	(2) Total Installed 1/ Capacity MW	(3) Firm Capacity Import MW	(4) Firm Capacity Export MW	(5) Firm QF MW	(6) Total Capacity Available 2/ MW	(7) Total Peak 3/ Demand MW	(8) DSM 4/ MW	(9) Firm Summer Peak Demand MW	(10) Reserve Margin Before Maintenance 5/ MW	(11) Reserve Margin Before Maintenance 5/ % of Peak	(12) Scheduled Maintenance MW	(13) Reserve Margin After Maintenance 6/ MW	(14) Reserve Margin After Maintenance 6/ % of Peak
1999	16,528	1,346	0	886	18,760	17,371	1,277	16,094	2,666	16.6	0	2,666	16.6
2000	16,569	1,302	0	886	18,757	17,670	1,412	16,258	2,499	15.4	0	2,499	15.4
2001	16,790	1,302	0	886	18,978	17,865	1,516	16,349	2,629	16.1	0	2,629	16.1
2002	17,717	1,302	0	877	19,896	18,129	1,595	16,534	3,362	20.3	0	3,362	20.3
2003	18,442	1,302	0	877	20,621	18,469	1,672	16,797	3,824	22.8	0	3,824	22.8
2004	18,442	1,302	0	877	20,621	18,818	1,750	17,068	3,553	20.8	0	3,553	20.8
2005	18,442	1,302	0	867	20,611	19,170	1,829	17,341	3,270	18.9	0	3,270	18.9
2006	18,861	1,302	0	734	20,897	19,532	1,908	17,624	3,273	18.6	0	3,273	18.6
2007	19,280	1,302	0	734	21,316	19,901	1,985	17,916	3,400	19.0	0	3,400	19.0
2008	19,699	1,302	0	734	21,735	20,245	2,063	18,182	3,553	19.5	0	3,553	19.5

1/ Capacity additions and changes projected to be in-service by June 1st are considered to be available to meet Summer peak loads which are forecasted to occur during August of the year indicated. All values are Summer net MW.

2/ Total Capacity Available=Col.(2)+Col.(3)-Col.(4)+Col.(5).

3/ These forecasted values reflect the Most Likely forecast without DSM.

4/ The MW shown represent cumulative load management capability plus incremental conservation from 1/97 - on. They are not included in total additional resources but reduce the peak load upon which Reserve Margin calculations are based.

5/ Margin (%) Before Maintenance = Col.(8)/Col.(7)

6/ Margin (%) After Maintenance =Col.(11) /Col.(7)

Schedule 7.2
Forecast of Capacity , Demand, and Scheduled
Maintenance At Time of Winter Peak

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
	Total Installed 1/ Capability	Firm Capacity Import	Firm Capacity Export	Firm QF	Total Capacity Available 2/	Total Peak 3/ Demand	DSM 4/	Firm Winter Peak	Reserve Margin Before Maintenance 5/		Scheduled Maintenance	Reserve Margin After Maintenance 6/	
Year	MW	MW	MW	MW	MW	MW	MW	MW	MW	% of Peak	MW	MW	% of Peak
1998/99	17,241	1,346	0	886	19,473	17,777	1,657	16,120	3,353	20.8	0	3,353	20.8
1999/00	17,282	1,302	0	886	19,470	18,191	1,784	16,407	3,063	18.7	0	3,063	18.7
2000/01	17,487	1,302	0	886	19,675	18,615	1,901	16,714	2,961	17.7	0	2,961	17.7
2001/02	18,589	1,302	0	886	20,777	19,025	1,965	17,060	3,717	21.8	0	3,717	21.8
2002/03	19,508	1,302	0	877	21,687	19,426	2,012	17,414	4,273	24.5	0	4,273	24.5
2003/04	19,508	1,302	0	877	21,687	19,816	2,059	17,757	3,930	22.1	0	3,930	22.1
2004/05	19,508	1,302	0	867	21,677	20,204	2,107	18,097	3,580	19.8	0	3,580	19.8
2005/06	19,956	1,302	0	734	21,992	20,579	2,155	18,424	3,568	19.4	0	3,568	19.4
2006/07	20,404	1,302	0	734	22,440	20,953	2,200	18,753	3,687	19.7	0	3,687	19.7
2007/08	20,852	1,302	0	734	22,888	21,328	2,245	19,083	3,805	19.9	0	3,805	19.9

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

2/ Total Capacity Available = Col.(2)+ Col.(3) - Col.(4)+Col.(5).

3/ These forecasted values reflect the Most Likely forecast without DSM.

4/ The MW shown represent cumulative load management capability plus incremental conservation. They are not included in total additional

5/ Margin (%) Before Maintenance = Col.(8)/Col.(7)

6/ Margin (%) After Maintenance = Col.(11) /Col.(7)

Schedule 8
Planned And Prospective Generating Facility Additions And Changes

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
				Fuel		Fuel Transport		Const.	Commercial	Expected	Gen. Max.	Net Capability		
	Unit		Unit					Start	In-Service	Retirement	Nameplate	Summer	Winter	
Plant Name	No.	Location	Type	Pri.	Alt.	Pri.	Alt.	Mo./Yr.	Mo./Yr.	Mo./Yr.	KW	MW	MW	Status
ADDITIONS														
Martin Combined Cycle Unit	5	Martin County 29/29S/38E	CC	NG	FO2	PL	PL	Jun-05	Jan-06	Unknown	500,000	419	448	P
Martin Combined Cycle Unit	6	Martin County 29/29S/38E	CC	NG	FO2	PL	PL	Jun-06	Jan-07	Unknown	500,000	419	448	P
Unsited Combined Cycle Unit	6	Unknown	CC	NG	FO2	PL	PL	Jun-07	Jan-08	Unknown	500,000	419	448	P

Schedule 8
Planned And Prospective Generating Facility Additions And Changes (Cont.)

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
				Fuel		Fuel Transport		Const.	Commercial	Expected	Gen. Max.	Net Capability		
	Unit		Unit					Start	In-Service	Retirement	Nameplate	Summer	Winter	
Plant Name	No.	Location	Type	Pri.	Alt.	Pri.	Alt	Mo./Yr.	Mo./Yr.	Mo./Yr.	KW	MW	MW	Status
CHANGES/UPGRADES 1/														
Port Everglades		City of Hollywood 23/50S/42E												
	2		ST	FO5	NG	WA	PL	Nov-98	Jan-99	Unknown	402,000	+1	+1	A
	3		ST	FO6	NG	WA	PL	Feb-99	May-99	Unknown	402,000	+0	+15	A
	4		ST	FO6	NG	WA	PL	Feb-99	Jun-99	Unknown	402,000	-2	+1	A
Port Everglades GT	1-12		GT	NG	FO2	PL	PL	Nov-98	Jan-99	Unknown	410,736	+18	+ 7	A
Martin		Martin County 29/29S/38E												
	3		CC	NG	FO2	PL	PL	Aug-99	Nov-99	Unknown	615,000	+40	-5	A
	4		CC	NG	FO2	PL	PL	Aug-99	Nov-99	Unknown	615,000	+32	-5	A
	3		CC	NG	FO2	PL	PL	Sep-00	Nov-00	Unknown	615,000	+10	+30	A
	4		CC	NG	FO2	PL	PL	Sep-00	Nov-00	Unknown	615,000	+23	+30	A
Cape Canaveral		Brevard County 19/24S/36F												
	1		ST	FO6	NG	WA	PL	Dec-98	Jan-99	Unknown	402,050	+10	+9	A
	2		ST	FO6	NG	WA	PL	Dec-98	Jan-99	Unknown	402,050	+3	+0	A
	2		ST	FO6	NG	WA	PL	Dec-98	Jan-99	Unknown	402,051	+0	+3	A
Lauderdale		Broward County 30/50S/42E												
	4		CC	NG	FO2	PL	PL	Oct-00	Jun-01	Unknown	521,250	+10	+10	A
	5		CC	NG	FO2	PL	PL	Oct-00	Jun-01	Unknown	521,250	+10	+10	A
	1-12		GT	NG	FO2	PL	PL	Oct-99	Dec-99	Unknown	410,736	+18	+7	A
	13-24		GT	NG	FO2	PL	PL	Oct-99	Dec-99	Unknown	410,736	+18	+7	A

1/ The ratings shown for all units represent the incremental changes in capacity. Some capacity enhancements/re-ratings require the installation of additional equipment (e.g., foggers). Other enhancements are the result of changes to operating practices only.

2/ The dates provided in this column are estimates.

Schedule 8
Planned And Prospective Generating Facility Additions And Changes (Cont.)

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
				Fuel		Fuel Transport		Const.	Commercial	Expected	Gen. Max.	Net Capability		
	Unit		Unit					Start	In-Service	Retirement	Nameplate	Summer	Winter	
Plant Name	No.	Location	Type	Pri.	Alt.	Pri.	Alt.	Mo./Yr.	Mo./Yr.	Mo./Yr.	KW	MW	MW	Status
CHANGES/UPGRADES 1/								3/						
Ft. Myers		Lee County 35/43S/25E												
Repowering 2/				NG	No	PL	No	Dec-99	Jan-02	Unknown	960,000	+926	+1102	P
Ft. Myers GT	1-12		GT	FO2	No	WA	No	Apr-99	Jun-99	Unknown	744,000	+14	+10	A
Enhancements			GT	FO2	No	WA	No	Nov-98	Jan-99	Unknown	744,000	+39	+ 0	A
Manatee		Manatee County 18/33S/20E												
	1		ST	FO6	No	WA	WA	Nov-98	Jan-99	Unknown	863,000	+21	+21	P
	2		ST	FO6	No	WA	WA	Nov-98	Jan-99	Unknown	863,000	+27	+27	P
Putnam		Putnam County 16/10S/27E												
	1		CC	NG	FO2	PL	WA	Apr-98	May-99	Unknown	290,000	+14	+0	A
	2		CC	NG	FO2	PL	WA	Apr-98	May-99	Unknown	290,000	+14	+0	A
Sanford		Volusia County 16/19S/30E												
	4		ST	FO6	NG	WA	PL	Feb-98	Apr-98	Unknown	426000	-7	-7	A
Repowering 2/				NG	No	PL	No	Jun-01	Jan-04	Unknown	960,000	+927	+1101	P

1/ The ratings shown for all units represent the incremental changes in capacity. Some capacity enhancements/re-ratings require the installation of additional equipment (e.g., foggers). Other enhancements are the result of changes to operating practices only.

2/ Represents incremental capacity resulting from the conversion to combined cycle through expansion & repowering.

3/ The dates provided in this column are estimates.

Schedule 9
Status Report and Specifications of Proposed Generating Facilities

(1)	**Plant Name and Unit Number:**	Ft. Myers Repowering	
(2)	**Capacity**		
	a. Summer	926	MW Incremental (1470 MW Total After Expansion)
	b. Winter	1,102	MW Incremental (1625 MW Total After Expansion)
(3)	**Technology Type:**	Combined Cycle	
(4)	**Anticipated Construction Timing**		
	a. Field construction start-date:	1999	
	b. Commercial In-service date:	2002	
(5)	**Fuel**		
	a. Primary Fuel	Natural Gas	
	b. Alternate Fuel	None	
(6)	**Air Pollution and Control Strategy:**	LNB	(Low Nox Burners)
(7)	**Cooling Method:**	OTS	(Once Through - Saline)
(8)	**Total Site Area:**	466	Acres
(9)	**Construction Status:**	P	(Planned)
(10)	**Certification Status:**	P	(Planned)
(11)	**Status with Federal Agencies:**	P	(Planned)
(12)	**Projected Unit Performmace Data:**		
	Planned Outage Factor (POF):	3%	
	Forced Outage Factor (FOF):	1%	
	Equivalent Availability Factor (EAF):	96%	
	Resulting Capacity Factor (%):	96%	(First Year)
	Average Net Operating Heat Rate (ANHOR):	6,795	Btu/kWh
(13)	**Projected Unit Financial Data, ***		
	Book Life (Years):	30	years
	Total Installed Cost (In-Service Year $/kW):	367	
	Direct Construction Cost ($/kW):	285	
	AFUDC Amount ($/kW):	70	
	Escalation ($/kW):	13	
	Fixed O&M (000$.):	16.88	(2002$)
	Variable O&M ($/MWH):	**	
	K Factor:	1.6828	

* Note that cost values shown do not reflect the FPL system benefits which result from efficiency improvements to the existing steam capacity at the site.
** Variable O&M and capital replacement are included with Fixed O&M dollars.

Schedule 9

Status Report and Specifications of Proposed Generating Facilities

(1)	**Plant Name and Unit Number:**	Sanford Repowering [6]	
(2)	**Capacity**		
	a. Summer	927	MW Incremental (1470 MW Total After Expansion)
	b. Winter	1,101	MW Incremental (1650 MW Total After Expansion)
(3)	**Technology Type:**	Combined Cycle	
(4)	**Anticipated Construction Timing**		
	a. Field construction start-date:	2000	
	b. Commercial In-service date:	2003	
(5)	**Fuel**		
	a. Primary Fuel	Natural Gas	
	b. Alternate Fuel	None	
(6)	**Air Pollution and Control Strategy:**	LNB	(Low Nox Burners)
(7)	**Cooling Method:**	CP	(Cooling Pond)
(8)	**Total Site Area:**	1,889	Acres
(9)	**Construction Status:**	P	(Planned)
(10)	**Certification Status:**	P	(Planned)
(11)	**Status with Federal Agencies:**	P	(Planned)
(12)	**Projected Unit Performmnace Data:**		
	Planned Outage Factor (POF):	3%	
	Forced Outage Factor (FOF):	1%	
	Equivalent Availability Factor (EAF):	96%	
	Resulting Capacity Factor (%):	96%	(First Year)
	Average Net Operating Heat Rate (ANHOR):	6,795	Btu/kWh
(13)	**Projected Unit Financial Data *,****		
	Book Life (Years):	30	years
	Total Installed Cost (In-Service Year $/kW):	392	
	Direct Construction Cost ($/kW):	300	
	AFUDC Amount ($/kW):	75	
	Escalation ($/kW):	17	
	Fixed O&M ($/kW -Yr.):	9.71	(1998$)
	Variable O&M ($/MWH):	0.37	(1998$)
	K Factor:	1.6828	

• Note that cost values shown do not reflect the FPL system benefits which result from efficiency improvements to the existing steam capacity at the site.

** Fixed O&M cost includes capital replacement.

[6] The transmission information presented here reflects FPL's 1998 IRP which identified that Sanford units #3 and #4 would be repowered. At the time of publication of this document, subsequent to FPL's 1998 IRP, FPL is reexamining its Sanford repowering plan. This reexamination is based on newly developed technical information which focuses on whether it would be more advantageous to repower units #4 and #5 rather than units #3 ad #4. Such a change in the Sanford repowering plan would add approximately 240 MW Summer capability from the Sanford site beyond what would be gained from repowering units #3 and #4 and may result in modifications to this transmission information. If such a change is made to the Sanford repowering plan during 1999, it will be communicated to the appropriate state agencies and reflected in FPL's 2000 Site Plan filing.

Schedule 9

Status Report and Specifications of Proposed Generating Facilities

(1) **Plant Name and Unit Number:** Martin 5

(2) **Capacity**
a. Summer 419 MW
b. Winter 448 MW

(3) **Technology Type:** Combined Cycle

(4) **Anticipated Construction Timing**
a. Field construction start-date: 2002
b. Commercial In-service date: 2006

(5) **Fuel**
a. Primary Fuel Natural Gas
b. Alternate Fuel Distillate

(6) **Air Pollution and Control Strategy:** LNB (Low Nox Burners)

(7) **Cooling Method:** CP (Cooling Pond)

(8) **Total Site Area:** 11,179 Acres

(9) **Construction Status:** P (Planned)

(10) **Certification Status:** P (Planned)

(11) **Status with Federal Agencies:** P (Planned)

(12) **Projected Unit Performnace Data:**
Planned Outage Factor (POF): 3%
Forced Outage Factor (FOF): 1%
Equivalent Availability Factor (EAF): 96%
Resulting Capacity Factor (%): 96% (First Year)
Average Net Operating Heat Rate (ANHOR): 6,081 Btu/kWh

(13) **Projected Unit Financial Data ***
Book Life (Years): 30 years
Total Installed Cost (In-Service Year $/kW): 590
Direct Construction Cost ($/kW): 464
AFUDC Amount ($/kW): 54
Escalation ($/kW): 72
Fixed O&M ($/kW -Yr.): 12.02 (1998$)
Variable O&M ($/MWH): 0.67 (1998$)
K Factor: 1.6480

* Fixed O&M cost includes capital replacement.

Schedule 9
Status Report and Specifications of Proposed Generating Facilities

(1)	**Plant Name and Unit Number:** Martin 6		
(2)	**Capacity**		
	a. Summer	419 MW	
	b. Winter	448 MW	
(3)	**Technology Type:** Combined Cycle		
(4)	**Anticipated Construction Timing**		
	a. Field construction start-date:	2003	
	b. Commercial In-service date:	2007	
(5)	**Fuel**		
	a. Primary Fuel	Natural Gas	
	b. Alternate Fuel	Distillate	
(6)	**Air Pollution and Control Strategy:**	LNB	(Low Nox Burners)
(7)	**Cooling Method:**	CP	(Cooling Pond)
(8)	**Total Site Area:**	11,179	Acres
(9)	**Construction Status:**	P	(Planned)
(10)	**Certification Status:**	P	(Planned)
(11)	**Status with Federal Agencies:**	P	(Planned)
(12)	**Projected Unit Performnace Data:**		
	Planned Outage Factor (POF):	3%	
	Forced Outage Factor (FOF):	1%	
	Equivalent Availability Factor (EAF):	96%	
	Resulting Capacity Factor (%):	96%	(First Year)
	Average Net Operating Heat Rate (ANHOR):	6,081	Btu/kWh
(13)	**Projected Unit Financial Data** *		
	Book Life (Years):	30	years
	Total Installed Cost (In-Service Year $/kW):	604	
	Direct Construction Cost ($/kW):	464	
	AFUDC Amount ($/kW):	55	
	Escalation ($/kW):	84	
	Fixed O&M ($/kW -Yr.):	12.02	(1998$)
	Variable O&M ($/MWH):	0.67	(1998$)
	K Factor:	1.6480	

* Fixed O&M cost includes capital replacement.

Schedule 9

Status Report and Specifications of Proposed Generating Facilities

(1)	**Plant Name and Unit Number:** Unsited Combined Cycle		
(2)	**Capacity**		
	a. Summer	419 MW	
	b. Winter	448 MW	
(3)	**Technology Type:** Combined Cycle		
(4)	**Anticipated Construction Timing**		
	a. Field construction start-date:	2003	
	b. Commercial In-service date:	2008	
(5)	**Fuel**		
	a. Primary Fuel	Natural Gas	
	b. Alternate Fuel	Distillate	
(6)	**Air Pollution and Control Strategy:**	LNB	(Low Nox Burners)
(7)	**Cooling Method:**	CP	(Cooling Pond)
(8)	**Total Site Area:**	N/A	Acres
(9)	**Construction Status:**	P	(Planned)
(10)	**Certification Status:**	P	(Planned)
(11)	**Status with Federal Agencies:**	P	(Planned)
(12)	**Projected Unit Performnace Data:**		
	Planned Outage Factor (POF):	3%	
	Forced Outage Factor (FOF):	1%	
	Equivalent Availability Factor (EAF):	96%	
	Resulting Capacity Factor (%):	96%	(First Year)
	Average Net Operating Heat Rate (ANHOR):	6,081	Btu/kWh
(13)	**Projected Unit Financial Data ***		
	Book Life (Years):	30	years
	Total Installed Cost (In-Service Year $/kW):	698	
	Direct Construction Cost ($/kW):	519	
	AFUDC Amount ($/kW):	71	
	Escalation ($/kW):	107	
	Fixed O&M ($/kW -Yr.):	13.74	(1997$)
	Variable O&M ($/MWH):	0.67	(1997$)
	K Factor:	1.6516	

Schedule 10
Status Report and Specifications of Proposed Directly Associated Transmission Lines

Ft. Myers Repowering

(1)	**Point of Origin and Termination:**	From Ft. Myers - To Calusa
(2)	**Number of Lines:**	1
(3)	**Right-of-way:**	FPL Owned
(4)	**Line Length:**	1.58 miles
(5)	**Voltage:**	230 kV
(6)	**Anticipated Construction Timing:**	Start date: May 1, 2000 End Date: October 1, 2000
(7)	**Anticipated Capital Investment:**	$354,000
(8)	**Substations:**	Ft. Myers and Calusa
(9)	**Participation with Other Utilities:**	None

(1)	**Point of Origin and Termination:**	From Ft. Myers - To Orange River
(2)	**Number of Lines:**	1
(3)	**Right-of-way:**	FPL Owned
(4)	**Line Length:**	2.57 miles
(5)	**Voltage:**	230 kV
(6)	**Anticipated Construction Timing:**	Start date: October 1, 2000 End Date: March 31, 2001
(7)	**Anticipated Capital Investment:**	$706,750
(8)	**Substations:**	Ft. Myers and Orange River
(9)	**Participation with Other Utilities:**	None

Note: The Anticipated Capital Investment for this project is included in the Direct Construction Cost value for the Ft. Myers Repowering on Schedule 9, page 1 of 4.

Schedule 10
Status Report and Specifications of Proposed Directly Associated Transmission Lines

Sanford Repowering [6]

(1)	**Point of Origin and Termination:**	From Sanford - To Poinsett
(2)	**Number of Lines:**	2
(3)	**Right-of-way:**	FPL Owned
(4)	**Line Length:**	45 miles
(5)	**Voltage:**	230 kV
(6)	**Anticipated Construction Timing:**	Start Date: January 1, 2001 End Date: December 1, 2001
(7)	**Anticipated Capital Investment:**	$20,360,000
(8)	**Substations:**	Sanford and Poinsett
(9)	**Participation with Other Utilities:**	None

Note: The Anticipated Capital Investment for this project is included in the Direct Construction Cost value for the Sanford Repowering on Schedule 9, page 2 of 4.

[6]. The transmission information presented here reflects FPL's 1998 IRP which identified that Sanford units #3 and #4 would be repowered. At the time of publication of this document, subsequent to FPL's 1998 IRP, FPL is reexamining its Sanford repowering plan. This reexamination is based on newly developed technical information which focuses on whether it would be more advantageous to repower units #4 and #5 rather than units #3 and #4. Such a change in the Sanford repowering plan would add approximately 240 MW Summer capability from the Sanford site beyond what would be gained from repowering units #3 and #4 and may result in modifications to this transmission information. If such a change is made to the Sanford repowering plan during 1999,it will be communicated to the appropriate state agencies and reflected in FPL's 2000 Site Plan filing.

Schedule 10

Status Report and Specifications of Proposed Directly Associated Transmission Lines

Martin 5 & 6

(1)	**Point of Origin and Termination:**	a. Pratt & Whitney to Indiantown b. Pratt & Whitney to Ranch
(2)	**Number of Lines:**	2
(3)	**Right-of-way:**	FPL Owned
(4)	**Line Length:**	a. 8.45 b. 20.74
(5)	**Voltage:**	230 kV
(6)	**Anticipated construction Timing:**	Start Date: May 1, 2005 End Date: December 1, 2005
(7)	**Anticipated Capital Investment:**	$775,000
(8)	**Substations:**	Pratt & Whitney, Ranch, and Indiantown
(9)	**Participation with Other Utilities:**	None

Note: There are no new directly associated transmission lines required with these units. The existing lines will be upgraded to a higher current rating.

The Anticipated Capital Investment for this project is included in the Direct Construction Cost value for the Martin 5 and 6 units, on Schedule 9, pages 3 of 4 and 4 of 4, respectively.

CHAPTER IV

Environmental and Land Use Information

IV. Environmental and Land Use Information

I.V.A Protection of the Environment

FPL operates in a sensitive, temperate/sub-tropical environment containing a number of distinct ecosystems with many endangered plant and animal species. Population growth in our service area is continuing, which heightens competition for air, land, and water resources which are necessary to meet the increased demand for generation, transmission, and distribution of electricity. At the same time, residents and tourists want unspoiled natural amenities, and the general public has an expectation that large corporations such as FPL will conduct their business in an environmentally responsible manner.

Over the years FPL has gained national recognition for its commitment to meeting its customers' energy needs in harmony with the environment. For example, in 1983, FPL won the U.S. Department of the Interior Conservation Service Award and received the Florida Audubon Society Corporate Service Award in 1986. In 1998, FPL won the prestigious U.S. Cost Guard's William M. Benkert Award for demonstrating "tremendous vision and dedication to excellence in marine environmental protection." FPL's environmental protection philosophy is an integral part of how it conducts business and formal corporate policies have been established to protect the environment.

I.V.B FPL's Environmental Statement

To reaffirm its commitment to conduct business in an environmentally responsible manner, FPL developed an environmental statement in 1992 to clearly define the Company's position. This statement reflects how FPL incorporates environmental values into all aspects of the Company's activities and serves as a framework for new environmental initiatives throughout the Company. The FPL environmental statement further establishes a long-term direction of environmental responsibility for the Company. FPL's environmental statement is:

It is the Company's intent to continue to conduct its business in an environmentally responsible manner. Accordingly, Florida Power & Light Company will:

- Comply with the spirit and intent, as well as the letter of, environmental laws, regulations, and standards.
- Incorporate environmental protection and stewardship as an integral part of the design, construction, operation, and maintenance of our facilities.
- Encourage the wise use of energy to minimize the impact on the environment.

- Communicate effectively on environmental issues.
- Conduct periodic self-evaluations, report performance, and take appropriate actions.

I.V.C Environmental Management

In order to implement the Environmental Statement, FPL established an environmental management system to direct and control the fulfillment of the organization's environmental responsibilities. A key component of the system is an Environmental Assurance Program which is discussed below. Other components include: written environmental policies and procedures, delineation of organizational responsibilities and individual accountabilities, allocation of appropriate resources for environmental compliance management (which includes reporting and corrective action when non-compliance occurs), environmental incident/emergency response, environmental risk assessment/management, environmental regulatory development and tracking, and environmental management information systems.

I.V.D Environmental Assurance Program

FPL's Environmental Assurance Program consists of activities which are designed to: evaluate environmental performance, verify compliance with Company policy as well as with legal and regulatory requirements, and communicate results to corporate management. The principal mechanism for pursuing environmental assurance is the environmental audit. An environmental audit may be defined as a management tool comprising a systematic, documented, periodic, and objective evaluation of the performance of the organization and of the specific management systems and equipment designed to protect the environment. The environmental audit's primary objectives are to: 1) facilitate management control of environmental practices; and, 2) assess compliance with existing environmental regulatory requirement and Company policies.

IV.E Environmental Communication and Facilitation

FPL is involved in many efforts to enhance environmental protection through the facilitation of environmental awareness and public education. Some of FPL's 1998 environmental outreach activities are noted in Table IV.E.1.

1998 FPL Environmental Outreach Activities

Site	Activity	# of Participants
St. Lucie Plant	Turtle Beach Nature Trail Visitation	3,300
Riviera Plant	Manatee Awareness Activities	40,000
St. Lucie Plant	Turtle Walk Participation	1,300
St. Lucie Plant	FPL Energy Encounter	42,000
Not applicable	Inquiries - 800 enviromental information line and e-mails	3,000
Martin Plant	Barley Barber Swamp Visitation	4,000

Table IV.E.1

IV.F Preferred And Potential Sites

Based upon its projection of future resource needs, FPL has identified preferred and potential sites for future generation additions. These preferred and potential sites are discussed in separate sections below.

IV.F.1 Preferred Sites

FPL has identified three preferred sites: the existing Ft. Myers plant site, the existing Sanford plant site, and the existing Martin plant site. These three sites are currently the expected known locations for the capacity additions which FPL projects to make during the 1999 – 2008 period. (The last capacity addition to be made within this time period is projected to be made in 2008. The selection of a site for this capacity addition has not yet been made. Please see Table III.B.1). These three sites are discussed below in the order in which they are currently projected to be utilized during the next 10 years. FPL has committed to repower existing units at both its Ft. Myers and Sanford sites. No such commitment has yet been made for the Martin preferred site.

Preferred Site #1: Ft. Myers Plant, Lee County

The site is located on the 460-acre Ft. Myers property. Current facilities on the site include two steam electric generating units (nominally 150 MW and 400 MW, respectively) and a bank of 12 simple-cycle combustion turbine peaking units. The site has direct access to a four-lane highway, State Road (SR) 80, and barge access is available. The nearest town is Tice which is approximately 4 miles west of the site. The City of Ft. Myers is approximately 8 miles west of the site. The Ft. Myers site has been listed as a potential or preferred site in previous FPL Ten Year Power Plant Site Plans.

FPL is planning to add new capacity by replacing the existing oil-fired Units #1 and #2 with 6 advanced natural gas-fired combustion turbines and 6 heat recovery steam generator (HRSGs).

This type of steam generation replacement is commonly called "repowering". Repowering the existing two units in this manner will produce approximately 926 additional MW during Summer conditions, and approximately 1,102 additional MW during Winter conditions, beyond what is currently projected for the existing units. The output capability of the existing bank of 12 combustion turbines at the site will be unaffected by the repowering project. FPL began its project permitting in 1998. Site construction is expected to begin by mid-1999.

a. and b. U.S. geological Survey (USGS) May and Proposed Facilities Layout Map

A USGS map of the Ft. Myers plant site, plus a map of the general layout of the proposed generating facilities at the site, are found on pages 109.

c. Map of Site and Adjacent Areas

An overview map of the site and adjacent areas is also found on page 107. It is pertinent to note that several designations on the current South Florida Water Management District Florida Land Use, Cover, and Forms Classification System (FLUCCS) appear to be in error, or to require some clarification. For example, the freshwater marsh identified toward the western boundary of the site is actually FPL's 33-acre evaporation/percolation pond. Similarly, while there are scattered mangroves along the shore, the central mangrove area shown is not mangrove but is the FPL switchyard for that site. The improved pasture shown towards the east of the site is currently the location of a tree nursery.

d. Existing Land Uses of Site and Adjacent Areas

The land on the site is primarily dedicated to industrial use with surrounding grassy and landscaped areas. There is the previously mentioned 33-acre evaporation/percolation pond on the site. A portion of the site is leased to a landscape nursery.

Lee County operates Manatee Park (approximately 5 acres) with a manatee viewing area on FPL property to the east side of the discharge canal where it adjoins the Orange River south of SR 80. This manatee viewing area provides public viewing and education about the species. FPL leases the property to the county for a nominal amount.

The adjacent land uses are light commercial and retail to the south of the property and some residential areas located toward the west. Mixed scrub with some hardwoods and wetlands, plus agriculture land, can be found to the east and further to the south. The Caloosahatchee National Wildlife Refuge is located across the Caloosahatchee River, northwest of the power plant.

e. General Environmental Features On and In the Site Vicinity

1. Natural Environment

The site is adjacent to the south bank of the Caloosahatchee River near the confluence of the Orange River and the Caloosahatchee. Much of the site is no longer in its original natural condition. However, a scattering of mangroves can be found along the river shoreline. Some mixed scrub with some hardwoods and wetlands can be found to the east and further to the south. Other than the occasional congregation of manatees noted below, FPL is not aware of any significant environmental features on the site or in the vicinity.

2. Listed Species

Construction and operation of the repowered facility at the site are not expected to affect any rare, endangered, or threatened species. The only known listed species associated with the site are the West Indian Manatees (Trichechus manatus: Federal and State listed as Endangered) which are attracted to the warmed waters in the vicinity of the site discharge and can be found congregating in the area during cool weather.

The Florida Natural Areas Inventory (FNAI) reports the presence of the Eastern Indigo Snake (Drymarchons corais couperi: Federal and State listed as Threatened) and Tricolored Heron (Egretta tricolor: State listed as a Species of Special Concern) within a two-mile radius of the site.

3. Natural Resources of Regional Significance Status

No Natural Resource of Regional Significance is identified on the plant site in the Southwest Florida Regional Strategic Policy Plan.

4. Other Significant Features

FPL is not aware of any other significant features of the site.

f. Design Features and Mitigation Options

The preferred design option for the Ft. Myers site is the repowering of the two existing oil-fired boilers with natural gas-fired combustion turbines and heat recovery steam generators (HRSGs). Advanced combustion turbines can be installed on the existing facility property and make effective use of existing transmission facilities and infrastructure. Steam developed in the new HRSGs will be directed to the existing steam turbines.

The repowering of the existing Ft. Myers units is dependent upon securing a firm natural gas supply to the site which is both sufficient for fueling the electrical capacity involved and economically attractive. FPL has contracted with Florida Gas Transmission (FGT) for this fuel supply.

Mitigation options being planned in the repowering of the existing Ft. Myers facility include: the capture and reuse of plant process water, the use of combustion technology that is inherently low in air pollutant emissions, the cessation of heavy oil barge traffic on the Caloosahatchee River, plumbing the sanition system to Lee County's system and closing the on-site septic tanks, and closing the on-site ash basins.

g. Local Government Future Land Use Designations

The Local Government Future Land Use Plan designates the major portion of the site as Public Facilities and a small area as Resource Protection. Since there are no significant environmental resources on the site, and the Resource Protection designated area appears to be the location of a current tree nursery, FPL believes that this designation is in error.

h. Site Selection Criteria and Process

For the past several years, many of FPL's existing power plant sites have been considered potentially suitable sites for new, expanded, or repowered generation. The Ft. Myers plant has been selected as a preferred site due to a combination of electrical transmission and system load factors, plus economic considerations. Environmental issues were not a deciding factor in FPL's site evaluation since none of the existing preferred and potential sites exhibit significant environmental sensitivity or other environmental issues. All of these sites are considered permittable.

i. Water Resources

The available surface water source is the Caloosahatchee River and the available groundwater source is the shallow aquifer.

j. Geological Features of Site and Adjacent Areas

The geology underlying the Ft. Myers Plant consists of Quaternary Holocene and Pleistocene undifferentiated materials. The upper part of these undifferentiated materials consists of fine-to-medium-grained quartz sand with varying percentages of shell and clay. Hardpan frequently occurs at the base of the quartz sands. The lower section consists of shell beds with interbedded limestones. Underlying the undifferentiated materials are the Pliocene

Tamiami formations, the Miocene Hawthorn formation, Oligocene Suwanee Limestone, the Eocene Crystal River and Williston formations, the Avon Park Limestone, and the Lake City Limestone.

Several stratigraphic units can be differentiated based upon shallow borings drilled on the plant property. Sand with some heterogeneous fill material related to past site construction activity covers most of the surface. It is underlain by layers of clayey sand and clay to a depth of approximately 23 feet. These units mantle a thicker clay unit with numerous shell fragments that occurs from 15 feet to about 55 feet below the surface. A silty sand with a trace of clay was encountered at 55 feet near the termination depth of one deep boring on the site.

The water table at the site occurs at levels from just under the surface to about 5 feet below grade. Locally, the Surficial aquifier and surface water will generally flow toward the Caloosahatchee River. However, at the site, the intake and discharge canal will affect groundwater near the power block area. A drainage canal that borders the plant property on the west will affect groundwater flow along the western portion of the waste treatment area.

k. Projected Water Quantities For Various Uses

It is estimated that 150 gallons per minute (gpm) will be needed for industrial processing water for uses such as boiler makeup, service water, and inlet fogger makeup. For industrial cooling (once-through cooling water), no significant increase is projected in the current 451,000 gpm usage rate. Other facility water uses may include irrigation, potable use, etc. The total volume of these uses is estimated to be about 5 gpm.

l. Water Supply Sources By Type

For industrial processing, FPL anticipates that groundwater will be available. For cooling water, FPL plans to continue to use its existing allocation from the Caloosahatchee River.

m. Water Conservation Strategies Under Consideration

A plan to treat and recycle equipment wash water, boiler blowdown, and equipment area runoff for use as service water would reduce ground water consumption. FPL would anticipate this site being designed and classified as a wastewater zero-discharge site following a repowering conversion.

n. Water Discharges and Pollution Control

Heated water discharge will be dissipated using both the existing once-through cooling water system and a multi-cell cooling tower. Non-point source discharges are not anticipated to be an issue because surface water runoff is planned to be collected and used to recharge the surficial aquifer. Treating and recycling equipment wash water, boiler blowdown, and equipment area runoff will minimize industrial discharges.

o. Fuel Delivery, Storage, Waste Disposal, and Pollution Control

A combustion turbine-based repowering project at the Ft. Myers site would require a natural gas pipeline to be installed. Florida Gas Transmission has initiated permitting to install and operate such a facility. Virtually no waste is associated with natural gas firing.

p. Air Emissions and Control Systems

A natural gas-fired facility would generally have air pollutant emissions which are substantially lower than emissions from the current oil-fired boilers. While several technologies are available for nitrogen oxide (NOx) emissions control, FPL is planning to use a dry-low-NOx combustion turbine design. In these devices, combustion is staged in order to reduce the formation of combustion-derived oxides of nitrogen. FPL has proposed NOx emission limits for this facility that will be the lowest in the state once the facility is constructed. Sulfur dioxide and particulate emissions are intrinsically low due to the lack of sulfur and solids in natural gas fuel. Carbon monoxide and volatile organic compound emissions can each be controlled via the use of efficient combustion rather than through the use of add-on control devices. Carbon dioxide emission rates associated with burning natural gas are well below those of other liquid or solid fuels. While the Ft. Myers plant site is located within 100 kilometers of a Class I area (Everglades National Park), the reduction in emissions associated with repowering is expected to improve the air quality in the area as compared to current levels. Combined cycle/combustion turbine facilities have been permitted at several locations throughout the state of Florida including near Class I areas. Dry-low-NOx combustor systems have been repeatedly demonstrated to be the Best Available Control Technology (BACT) for the control of NOx emissions for this technology pursuant to the requirements of the Clean Air Act.

q. Noise Emissions and Control systems

Lee County has a noise ordinance which limits noise at the receiving property line to 75 decibels. Noise emissions from the Ft. Myers project are not anticipated to approach this level based upon demonstrated noise control at a similar natural gas-fired facility (the Lauderdale plant) in Broward County.

r. Status of Applications

FPL has applied for and received an air construction permit from the Florida Department of Environmental Protection (FDEP). Other permits are pending with FDEP, Florida Department of Transportation (FDOT), the Army Corps of Engineers, and Lee County. FPL anticipates having all permits required to begin construction by mid-1999.

Preferred Site #2: Sanford Plant, Volusia County

The site is located on the 1,718–acre FPL Sanford property just west of Lake Monroe on the north bank of St. Johns River in Volusia County. Current facilities on the site include three steam electric generating units (one with a nominal rating of 150 MW and two with nominal ratings of 400 MW). The site is within the city limits of Debary and the community of Debary is located approximately 2 miles to the northwest. The town of Deland is approximately 4 miles west of the site. The site has direct access to a four-lane highway, SR 17-92, and barge access is available. The Sanford site has been listed as a potential or preferred site in previous Ten Year Power Plant Site Plans.

FPL plans to add new capacity at the Sanford site by replacing existing oil-and gas-fired units with advanced natural gas-fired combustion turbines and heat recovery steam generators (HRSGs). This type of steam generation replacement is commonly called "repowering". FPL's 1998 IRP, the basis for this document, identified that repowering the existing Sanford units #3 and #4 would be an attractive alternative. This result is reflected through this document (in reserve margin tables, etc.) which show the projected incremental capacity which will result from the Sanford repowering. The repowering of units #3 and #4 will produce approximately 927 additional MW during Summer conditions, and approximately 1,101 additional MW of generation during Winter conditions, beyond the current capabilities of these units. The existing 390 MW unit #5 at Sanford would be unaffected by the repowering of units #3 and #4.

At the time of publication of this document, subsequent to FPL's 1998 IRP, FPL is reexamining its Sanford repowering plan. This reexamination is based on newly developed technical information which focuses on whether it would be more advantageous to repower units #4 and #5 rather that units #3 and #4. Such a change in the Sanford repowering plan would add approximately 240 MW Summer capability from the Sanford site beyond what would be gained from repowering units #3 and #4. If such a change is made to the Sanford repowering plan during 1999, it will be communicated to the appropriate state agencies and reflected in FPL's 2000 Site Plan filing.

a. and b. U.S. Geological Survey (USGS) May and Proposed Facilities Layout Map

A USGS map of the Sanford plant site, plus a map of the general layout of the proposed generating facilities at the site, are found on page 114.

c. Map of Site and Adjacent Areas

An overview map of the site and adjacent areas is also found on page 113.

d. Existing Land Uses of Site and Adjacent Areas

A large part of the property is covered by the 1,100-acre closed-cycle-cooling pond which occupies almost all of the northern portion of the site. The remainder of the site is primarily rangeland and the power plant facilities.

The surrounding land use is largely cropland and pasture. To the east of the plant there is a small residential area and some commercial/industrial land use. There are some residential areas mixed in with the agricultural areas located between the site and the St. John's River to the west. To the south is the St. Johns River and residential homes and commercial/industrial businesses are located along the south side of the river.

e. General Environmental Features On and In the Site Vicinity

1. Natural Environment

Small, scattered wooded areas can be found on the site. There are two small areas of wetland marsh on the site and a few acres of wetland forest along the riverbank. There are some wooded areas on the site, primarily upland coniferous forest. Forested and non-forested wetlands can be found to the west, adjacent to the river. Rover and wetland areas towards the northwest are designated as part of the Wekiva River Aquatic Preserve and Wekiva River State Preserve.

2. Listed Species

One inactive bald eagle (Haliaeetus leucocephalus: Federal and State listed as Threatened) nest has been found on the site. Bald eagles have also nested in the Lake Monroe area. There are a number of other eagle nests in the vicinity of the site, primarily along the river. The Florida Natural Areas Inventory (FNAI) reports several Scrub Jay populations (Aphelocoma coerulescens: Federal and State listed as Threatened) located in scrub vegetation to the northwest of the site. West Indian

Manatees (Trichechus manatus: Federal and State listed as Endangered) have also been found in this area.

3. Natural Resources of Regional Significance Status

   The Wekiva River Aquatic Preserve extends along the St. John's River in the vicinity of the plant.

4. Other Significant Features

   FPL is not aware of any other significant features of the site.

f. Design Features and Mitigation Options

The preferred design option for the Sanford site is the repowering of two existing oil-and gas-fired boilers with natural gas-fired combustion turbines and heat recovery steam generators (HRSGs). Advanced combustion turbines can be installed on the existing facility property to make effective use of existing transmission facilities and infrastructure. Steam produced in the new HRSGs will be directed to two of the existing steam turbines. It is recognized that the natural gas supply that currently exists is too small to handle the volumes of gas that would be required for a repowering of the facility. Therefore, a larger gas supply line will be necessary. Natural gas-fired facilities represent one of the cleanest, most efficient technologies currently available for capacity additions to FPL's system.

Mitigation options being considered in the repowering project at Sanford include the capture and reuse of plant process water, the use of combustion technology that is inherently low in air pollutant emissions, and the significant reduction of oil barge traffic on the St. Johns River.

g. Local Governmental Future Land Use Designations

The site is designated as Industrial Utilities in the Local Government land use plan. The city is currently updating its Land Use Plan. It is expected that the name, but not the expected use designation, may change. Land use designation of the surrounding area is primarily agricultural. There is an area of Public Institution around Lake Monroe to the southeast and a small area of mixed use to the west along Barwick Road.

h. Site Selection Criteria and Process

The Sanford plant has been selected as a preferred site due to a combination of system load and economic factors. Environmental issues were not a deciding factor in FPL's site evaluation since none of the existing preferred and potential sites exhibit significant environmental sensitivity or other environmental issues. All are considered permittable.

Additionally, there are unique circumstances with the plant's existing equipment which made them particularly amenable to replacement with upgraded units – specifically, the side-by-side presence of a 400 MW steam turbine generating unit and a 150 MW steam turbine generating unit. The proximity of these two units to each other affords the opportunity to install six combustion turbine units and six HRSGs, and to cascade the steam produced in the HRSGs first to the 400 MW unit, then to the 150 MW unit.

i. Water Resources

For surface water supply, the available water resource is the St. John's River and / or the on-site cooling pond, which is periodically refilled from the St.John's River. For groundwater supply, the available resource is the shallow aquifer.

j. Geological Features of Site and Adjacent Areas

The near-surface geology of Volusia County, like that of most of north central Florida, is represented by late Tertiary and Quaternary geologic units. Soils in the vicinity of the plant include unconsolidated Pleistocene to Recent sands, with intervening beds of shells and clay. These deposits form the reservoir for the Surficial aquifer in the county. Deposits of Pliocene or Miocene clay with some sand underlie the aquifer. These low-permeability units serve to confine groundwater under pressure in the underlying porous limestone formations of Eocene age. These formations are part of the principal hydrologic unit referred to as the Floridian aquifer. This aquifer, the top of which generally occurs through the region at or below 100 feet, is the major source of potable groundwater in Volusia County. Two faults, one trending north-to-south, the other trending east-to west, intersect two miles north of the site. Downward displacement of the fault is hypothesized as being approximately 60 to 100 feet.

k. Projected Water Quantities for Various Uses

FPL has estimated that 150 gallons per minute (gpm) would be required for industrial processing purposes (boiler makeup, service water, inlet foggers, etc.). Note that Unit #3 currently takes its cooling water directly from the St. John's River, while Unit #4 currently takes its cooling water directly from the on-site FPL cooling pond. The additional cooling water needs for the proposed repowering scenario are expected to be negligible over what is currently used.

FPL would also evaluate alternative sources of water to meet the expected needs of the site. It is anticipated that the existing off-site wells and the existing once-through cooling water system and cooling pond would continue to be used after the repowering project is completed.

l. Water Supply Sources by Type

The available surface water supply source is the St. Johns River. The shallow aquifer is an available groundwater source for service water and boiler water.

m. Water Conservation Strategies Under Consideration

A plan to treat and recycle equipment wash water, boiler blowdown, and equipment area runoff for use as service water would reduce groundwater consumption. FPL would anticipate this site being designed and classified as a wastewater zero-discharge site following a repowering conversion.

n. Water Discharges and Pollution Control

Heated water discharge will be dissipated using the existing once-through cooling water system and, possibly, a small cooling tower. Non-point source discharges are not anticipated to be an issue because surface water runoff is planned to be collected and reused. Industrial discharges will be minimized by treating and recycling equipment wash water, boiler blowdown, and equipment area runoff.

o. Fuel Delivery, Storage, Waste Disposal, and Pollution Control

The repowering project at the Sanford site would require a larger natural gas pipeline to be installed. An independent gas transmission company would permit, install, and operate such a facility. Virtually no waste is associated with natural gas firing.

p. Air Emissions and Control Systems

A natural gas-fired facility would generally have air pollutant emissions which are substantially lower that emissions from the current oil-fired boilers. While several technologies are available for nitrogen oxide (NOx) emissions control, the most appropriate candidate for the Sanford site would be a dry-low-NOx combustion turbine design type. In these types of devices, combustion is staged in order to reduce the formation of combustion-derived oxides of nitrogen. Sulfur dioxide and particulate emissions are intrinsically low, due to the lack of sulfur and solids in natural gas fuel. Carbon monoxide and volatile organic compound emissions can each be controlled via the use of efficient combustion, rather that through the use of add-on control devices. Combustion turbine/combined cycle facilities have been permitted at several locations throughout the state of Florida. Dry-low-NOx combustor systems have been repeatedly demonstrated to be the Best Available Control Technology (BACT) for the control of NOx emissions for this technology pursuant to the requirements of the Clean Air Act.

q. Noise Emissions and Control Systems

Noise emissions from the project are not anticipated to be significantly different from current levels at the existing plant. FPL will install appropriate sound attenuation devices such as insulation on high-energy piping systems in order to ensure that sound levels do not exceed allowable levels. Similar natural gas-fired facilities (the Lauderdale plant in Broward County and the Martin plant in Martin County) have been constructed and operated without exceeding allowable noise levels.

r. Status of Applications

FPL and its consultants have begun to prepare permit applications for this repowering project. Filing of applications with various federal, state and local regulatory agencies will occur during the next 6 months. All permits needed to commence construction are anticipated to be in place by October 1, 1999.

Preferred Site #3: Martin Plant, Martin County

The Martin site is located approximately 40 miles northwest of West Palm Beach, 5 miles east of Lake Okeechobee, and 7 miles northwest of Indiantown in Martin County, Florida. The site is bounded on the west by the Florida East Coast Railway (FEC) and the adjacent South Florida Water Management District (SFWMD) L-65 Canal, on the south by the St. Lucie Canal (C-44 or Okeechobee Waterway), and on the northeast by SR 710 and the adjacent CSX Railroad.

The Martin site was identified in 1987 as a preferred location for development of coal gasification/combined cycle electric generation facilities and subsequent Ten Year Power Plant Site Plans have continued to identify this site as a preferred site.

The existing 2,490 MW of generating capacity at FPL's Martin plant occupies a portion of the approximately 11,300-acre Martin site which is wholly owned by FPL. The site includes a 6,800-acre cooling pond (6,500 acres of water surface and 300 acres of dike area) and approximately 300 acres for the existing power plant units and related facilities.

Two additional combined cycle units, Units #5 and #6, are currently projected as being potential additions to the site. These units would be natural gas-fired. Unit #5 is currently projected to begin operation in 2006 with Unit #6 operation beginning in 2007. Each new unit would add 419 MW additional Summer MW and 448 additional Winter MW.[7]

a) and b) U.S. Geological Survey (USGS) Map and Proposed Facilities Layout Map

A USGS map of the Martin plant site, plus a map of the general layout of the proposed generating facilities at the site, are found on page 121.

c) Map of Site and Adjacent Areas

An overview map of the site and adjacent areas is also found on page 119.

d) Existing Land Uses of Site and Adjacent Areas

A major portion of the site consists of a 6,800-acre cooling pond. The existing power plant facilities are located on approximately 300 acres. To the east of the power plant there is an area of mixed pine flatwood with a scattering of small wetlands. To the north of the reservoir there is a 1,200-acre area which has been set aside as a mitigation area. There is peninsula of wetland forest on the west side of the reservoir, the Barley Barber Swamp, which encompasses 400 acres and is preserved as a natural area. There is also a 10-kilowatt (KW) photovoltaic energy facility at the south end of this site.

e) General Environment Features On and In Site Vicinity

1) Natural Environment

As noted above, the Barley Barber Swamp is located on the site. There is also a 1,200-acre mitigation area in the northern area of the site where wetlands and uplands have been restored. Along the south and west sides of the cooling pond is an area where the vegetation has been allowed to return to its natural state in order to serve as a wildlife corridor. FPL has preserved a Florida Panther corridor along the west side of the cooling pond. There are pine flatwoods and small scattered wetlands to the east of the plant.

2) Listed Species

Construction and operation of new units at the site are not expected to affect any rare, endangered, or threatened species. There are two active Bald Eagle (Haliaeetus

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[7] Ultimately, coal gasification facilities may be constructed and operated to supply coal-derived gas to Units #3 and #4 and/or Units #5 and #6, if economically justified. The retrofit to coal gasification / combined cycle will not produce additional megawatts, so it is not discussed further in this document. Up to 1,300 acres could potentially be used for Units #5 and #6 to accommodate the associated coal handling, coal storage, by-product handling, and storage facilities which would be constructed if coal gasification is implemented. In such a case, natural gas and/or distillate fuel coil could serve as backup files.

leucocephalus: Federal and State listed as Threatened) nests that have been on the site for many years. The FNAI database notes a record of Eastern Indigo Snakes (Drymachon coralis coupert. Federal and state listed as Threatened) in the Barley Barber Swamp. A number of other Bald Eagle nests and sightings of Eastern Indigo Snakes are reported by the FNAI database within a two-mile radius of the site. Infrequent sightings of Florida Panther have been made in the site area.

3) Natural Resources of Regional Significance Status

The Treasure Coast Regional Planning Council lists the "FPL Preserve", including the Barley Barber Swamp, as a Significant Regional Facility. Natural communities such as uplands and wetlands are also generically listed as Resources of Regional Significance.

4) Other significant features

FPL is not aware of any other significant features of the site.

f) Design Features and Mitigation Options

The Martin site presents several opportunities to add additional generating capability. The projected option is to add four additional combustion turbines and four-heat recovery steam generators (HRSGs) which will comprise the Martin #5 and #6 units. Natural gas delivered via pipeline is envisioned as the fuel type. Natural gas-fired facilities represent one of the cleanest, most efficient technologies currently available.

Mitigation options being considered in the addition of this capacity at the existing Martin site include the capture and reuse of plant process water and rainwater. The facility already encompasses several preserved areas where wildlife is abundant.

g) Local Government Future Land Use Designations

Local government future land use designation for the site is Public Utilities. Designations for the surrounding area are primarily Agricultural. There are also limited areas of Agricultural Ranchette, Industrial, and a small Commercial area designation. To the southeast of the property, fronting on the St. Lucie Canal, there is an area designated for Public Conservation.

h) Site Selection Criteria and Process

For the past several years, a number of FPL's existing power plant sites have been considered as potentially suitable sites for new or repowered generation. The Martin plant has been selected as a preferred site due to a combination of site, location, and economic factors.

One of the primary factors considered in power plant siting has been the availability of existing transmission and infrastructure. The availability of land, water, transmission facilities, and existing infrastructure all contribute to the selection of this site as "preferred" from a practical and an economic perspective. In addition, the site has already been determined by the Governor and Cabinet, serving as the Siting Board, to have an "ultimate site capacity" to accommodate up to 1,600 MW of combined cycle units fueled by natural gas, fuel oil, or coal-derived gas produced at the site. Units #5 and #6 would be included in this "ultimate site capacity".

i) Water Resources

Surface water resources currently used at the Martin facility include the cooling pond which takes its water from the St. Lucie canal. The available groundwater resource is the shallow aquifer which is used as a source of potable water and for service water for Units #1 and #2. Both of these sources are projected to be available for future site expansion.

j) Geological Features of Site and Adjacent Areas

FPL's Martin site is underlain by approximately 13,000 feet of sedimentary rock strata. The basement complex in this area consists of Paleozoic igneous and metamorphic rocks about which little is known due to their great depth.

Overlying the basement complex to the ground surface are sedimentary rocks and deposits that are primarily marine in origin. Below a depth of about 400 feet these rocks are predominantly limestone and dolomite. Above 400 feet the deposits are largely composed of sand, silt, or clay. The deepest formation in Martin County on which significant published data are available is the Eocene Age Avon Park. Limited information is available from wells penetrating the underlying Lake City formation. The published information on the sediments comprising the formations below the Avon Park Limestone in western Martin County is based on projections from deep wells in Okeechobee, St. Lucie, and Palm Beach counties.

k) Projected Water Quantities for Various Uses

The estimated additional quantity of water required for industrial processing is 130 gallons per minute (gpm) for uses such as boiler water, service water, and inlet fogger supply. FPL operates on-site water treatment systems for each of these uses. Industrial cooling water will be supplied from the on-site 6,700-acre cooling pond. Makeup water for the pond is taken from the St. Lucie canal. The current makeup water quantity to the cooling pond (approximately 4,800 gpm) is expected to be adequate for the proposed expansion. Water quantities needed for other uses such as irrigation and potable water are estimated to be approximately 5 gpm.

l) Water Supply Sources by Type

Potential future phases of the project will utilize the existing on-site cooling pond as the source of cooling water and as a heat sink for the dissipation of cooling water heat. The cooling pond operates as a "closed cycle" system in which heated water from the generating units loses its heat as it is circulated within the pond and back around to the plant intake. Makeup water to the pond is withdrawn from the St. Lucie Canal as needed to replace net evaporation and seepage losses from the pond. Such needs will comply with the existing agreement between FPL and the South Florida Water Management District (SFWMD) regarding allocation of cooling water to the pond and with SFWMD's regulations for consumptive water use.

To avoid impacts to the surficial aquifer, FPL and SFWMD have agreed that the process water for Units #3 and #4 will be obtained initially from the cooling pond. Upon completion of Units #5 and #6, process water for all units will be obtained solely from the Floridan aquifer via approximately 1,500-foot deep wells.

m) Water Conservation Strategies Under Consideration

A plan to treat the boiler blowdown and other equipment wash water, then recycle it for use as service water, will reduce both the ground and surface water consumption.

n) Water Discharges and Pollution Control

Heated water discharges will be dissipated in the cooling pond. Non-point source discharges are not an issue since there are none at this facility. Industrial discharges will be minimized by treating and recycling equipment wash water, boiler blowdown water, and equipment area runoff.

o) Fuel Delivery, Storage, Waste Disposal, and Pollution Control

The site is already serviced by multiple fuel delivery facilities. However, the addition of future natural gas-fired combined cycle units would require an enlargement of the existing pipeline(s), the installation of a new pipeline, or the addition of another natural gas pipeline compressor station. There are currently two natural gas supply lines into the facility, as well as an oil pipeline, which serve the existing steam boilers and combined cycle generating units.

p) Air Emissions and Control Systems

FPL's plan for up to 1,600 MW of combined cycle/coal gasification combined cycle development (Units #3 - #6) were subject to "New Source Review" under Federal and state Prevention of Significant Deterioration (PSD) regulations. This review required these units to meet New Source Performance Standards (NSPS) and that Best Available Control Technology (BACT) be selected to control emissions of those pollutants emitted in excess of applicable PSD significant emission rates. The primary purpose of BACT analysis is to minimize the allowable increases in air pollutants and thereby increase the potential for future economic growth without significantly degrading air quality.

Air emission rates will be limited to levels far below NSPS requirements. In addition, BACT determination was established for the following pollutants: sulfur dioxide (SO_2) , sulfuric acid mist (H_2SO_4), nitrogen oxides (NO_x), particulates (PM_{10} and TSP), carbon monoxide (CO), volatile organic compounds (VOC), lead, beryllium, mercury, and inorganic arsenic. By stipulation, the Department of Environmental Protection (DEP) has determined final BACT for Units #3 and #4 firing natural gas and distillate oil. Emission limitations and conditions concerning development of subsequent units at the site reflect a preliminary BACT determination for those phases to support certification of ultimate site capacity and shall be determined finally upon review of supplemental applications.

For sulfur dioxide, carbon monoxide, volatile organic compounds, fluorides, lead, beryllium, mercury, and arsenic emissions from the combined cycle Units #3 and #4, BACT has been determined to be of efficient design and operation of the fuel combustor in the combustion turbine and the use of low sulfur fuels, either natural gas or low sulfur oil (0.5 percent sulfur, maximum; 0.3 percent, annual average). The most effective control strategy (BACT) for particulates and sulfuric acid mist is inlet air filtering, low sulfur fuels, clean combustion, and steam injection.

For nitrogen oxide emissions, BACT for Units #3 and #4 has been determined to be the use of dry-low-NO_x combustors capable of achieving emissions of 25 parts-per-million (PPM) when burning natural gas and 65 PPM when burning oil, limiting oil-firing to an annual aggregate of 2,000 hours for the four combustion turbines comprising Units #3 and #4, and limiting allowable NO_x emissions from Units #3 and #4 to a total of 3,108 tons per year.

For proposed new Martin Units #5 and #6, FPL projects that lower emission levels to those listed above for Units #3 and #4 will be required.

q) Noise Emissions and Control Systems

A field survey and impact assessment of noise expected to be caused by unit construction at the site indicated that construction noise will be below current noise levels at the residents nearest the site.

r) Status of Applications

A Site Certification application was filed in December, 1989, for the construction and operation of the 1,600 MW Martin Coal Gasification/Combined Cycle project under the Florida Electrical Power Plant Siting Act.

On June 15, 1990, the Public Service Commission issued a Determination of Need Order for proposed Martin Units #3 and #4. This determination of need applies only to the first phase of the Project, or 832 MW of combined cycle generation. The Siting Board issued a Land Use Order on June 27, 1990. The Certification Hearing was held on November 5-7, 1990. As mentioned earlier, on February 12, 1991, the Governor and Cabinet, serving as the Siting Board, approved the construction and operation of natural gas-fired combined cycle Units #3 and #4 and determined that the Martin Site has ultimate site capacity to accommodate up to 1,600 MW of combined cycle units fueled by natural gas, fuel oil, or coal-derived gas produced at the site. No further certification action has taken place regarding the additional units proposed for the site.

IV.F.2. Potential Sites

Three FPL-owned sites are identified as the most likely potential sites for future generation after the three preferred sites just discussed. These three sites are considered the next most likely potential sites due to considerations of space, infrastructure, and accessibility to fuel and transmission facilities. These sites are located in Brevard, Palm Beach, and Broward Counties. These sites are suitable for different capacity levels and technologies, and they will remain as potential sites pending future decisions on how best to meet the timing and magnitude of FPL's future capacity needs.[8]

Each of these potential sites offers advantages and disadvatanges relative to engineering considerations and/or costs associated with the construction and operation of feasible technologies. In addition, each potential site has different characteristics, which could require further definition

[8] As has been described in former Ten-Year Power Plant Site Plans, FPL also considers a number of other sites as possible sites for future generation additions. These include the remainder of FPL's existing generation sites as well as non-FPL-owned sites located in Hardee, Highlands, Glades, and Hendry Counties.

and attention. For purposes of estimating water usage amounts, it is assumed that a natural gas-fired combined cycle unit would be the technology of choice for any capacity additions at the sites.

Permits are presently considered to be obtainable for all three sites, assuming measures can be taken to mitigate any particular site-specific environmental concerns. None of the sites exhibit any significant environmental constraints. The potential sites are briefly discussed below. (Note: The order in which the sites are discussed below does not reflect a relative ranking of these sites in regard to how likely it is for FPL to add capacity at the site.)

Potential Site #1: Cape Canaveral Plant, Brevard County

The site is located on the FPL Cape Canaveral property in unincorporated Brevard County. The city of Port St. Johns is located less than a mile away. The site has direct access to a four-lane highway, US 1, and barge access is available. A rail line is located near the plant. The existing facility consists of two 400 MW (nominal) steam boiler type generating units.

a) U.S. Geological Survey (USGS) Map

A USGS map of the Cape Canaveral plant site is found on page 125.

b) and c) Land Uses and Environmental Features

This site is located on the Indian River. The land is primarily dedicated to industrial use with surrounding grassy areas and a few acres of remnant pine forest. The land adjacent to the site is dedicated to light commercial and residential use. There are no significant environmental features on the site.

d) and e) Water Quantities and Supply Sources

FPL projects that an increase of up to 260 gallons per minute (gpm) would be required for industrial processing use (boiler makeup, service water, etc.) It is expected that industrial cooling water needs could be met using the current 550,000 gpm once-through cooling water quantity. For industrial processing, FPL would use existing on-site wells. For industrial cooling, the Indian River would continue to be utilized.

Potential Site #2: Riviera Plant, Palm Beach County

This site is located on the FPL Riviera Plant property in Riviera Beach, Palm Beach County. The site has direct access to a four-lane highway, US 1, and barge access is available. A rail line is located near the plant. The facility currently houses two operational 300 MW (nominal) steam boiler generating units and one retired 50 MW generating unit.

a) U.S. Geological Survey (USGS) Map

A USGS map of the Riviera plant site is found on page 126.

b) and c) Land Uses and Environmental Features

The land on the site is primarily covered by the existing generation facilities with some open maintained grass areas. There is a small manatee viewing area on the site which is operated seasonally by FPL. Adjacent land uses include port facilities and associated industrial activities, as well as light commercial and residential development. The site is located on the Intracoastal Waterway near the Lake Worth Inlet.

d) and e) Water Quantities and Supply Sources

Additional industrial processing water needs are estimated to be up to 40 gallons per minute (gpm). Industrial cooling water needs are estimated to be up to 54,000 gpm using the existing once-through cooling water system. The existing municipal water supply would be used for industrial processing water if additional generating capacity is placed at Riviera. For once-through cooling water, FPL would continue to use Lake Worth as a source of water.

Potential Site #3: Port Everglades Plant, Broward County

This site is located on the 94-acre FPL Port Everglades plant site in Port Everglades, Broward County. The site has convenient access to SR 84 and Interstate 595. Currently, direct barge access is not available. A rail line is located near the plant. The existing plant consists of four steam boiler generating units: two 200 MW (nominal) and two 400 MW (nominal) sized units.

a) U.S. Geological Survey (USGS) Map

A USGS map of the Port Everglades plant site is found on page 127.

b) and c) Land Uses and Environmental Features

The land on the site is primarily industrial. The adjacent land uses are port facilities and associated industrial activities, oil storage, cruise ships, and light commercial.

d) and e) Water Quantities and Supply Sources

FPL estimates that up to 130 gallons per minute (gpm) of industrial processing water would be required for uses such as boiler makeup, fogger usage, and service water. FPL would expect to use the existing municipal water supply for industrial process water. For cooling water, FPL would anticipate that the existing 320,000 gpm once-through cooling seawater source would continue to be used.

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IV. Environmental and Land Use Information: Supplemental Information

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IV. Environmental and Land Use Information:Supplemental Information

Preferred Site: Ft. Myers Plant

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Ft. Myers Plant

Land Use Data Source
1995 SFWMD Data level 3

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Figure IV.F. 1
Ft.Myers Plant
Level 3 Land Usage

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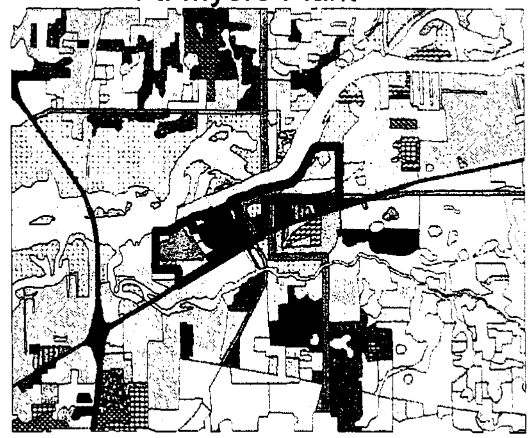
Ft. Myers Plant



Land Usage Legend
Level 3

Ft Myers Plant Boundary

Surrounding Land Usage

- Mobile Homes
- Fixed Single Family Units
- Fixed Single Family Units 2-5 du/ac
- Fixed & Mobile Units
- Fixed Single Family Units
- Multiple Dwelling Units Low Rise
- Multiple Dwelling Units High Rise
- Retail Sales & Service
- Shopping Centers
- Wholesale Sales & Service
- Junkyards
- Professional Services
- Tourists Services
- Oil & Gas Storage
- Mixed Commercial & Services
- Cemeteries
- Food Processing
- Other Light Industrial
- Other Heavy Industrial
- Strip Mines
- Sand & Gravel Pits
- Rock Quarries
- Educational Facilities
- Religious
- Medical & Health Care
- Governmental
- Correctional
- Other Institutional
- Commercial Child Care
- Swimming Beach
- Golf Courses
- Marinas & Fish Camps
- Parks & Zoos
- Community Recreatioal Facilities
- Historical Sites
- Other Recreational
- Undeveloped Land Within Urban Areas
- Inactive Land W/Street Pattern
- Urban Land In Transaction
- Other Open Land
- Improved Pastures
- Unimproved Pastures
- Woodland Pastures
- Row Crops
- Field Crops
- Sugar Cane Fields
- Citrus Groves
- Tree Nurseries
- Sod Farms
- Ornamentals
- Floriculture
- Horse Farms
- Dairies
- Aquaculture
- Fallow Crop Land
- Herbaceous Rangeland
- Palametto Praries
- Coastal Scrub
- Other Scrubs & Brush
- Mixed Rangeland
- Pine Flatwoods
- Melaleuca Infested
- Longleaf Pine - Xeric Oak
- Sand Pine
- Pine - Mesic Oak

Continued Legend

- Xeric Oak
- Brazilian Pepper
- Melaleuca
- Temperate Hardwood
- Tropical Hardwoodw
- Live Oak
- Cabbage Palm
- Sand Live Oak
- Hardwood Conifer Mixed
- Austrailian Pine
- Mixed Hardwoods
- Streams & Waterways
- Lakes > or = to 500 Acres
- Lakes > or = to 10 Acres - < or = to 500 Acres
- Lakes < or = to 10 Acres
- Reservoirs > or = to 500 Acres
- Reservoirs > or = to 100 Acres - < or = to 500 Acres
- Reservoirs > or = to 10 Acres - < or = to 100 Acres
- Reservoirs < or = to 10 Acres
- Embayments Opening
- Bay Swamps
- Mangrove Swamps
- Stream & Lake Swamps
- Inland Ponds & Sloughs
- Mixed Wetland Hardwoods
- Willows
- Mixed Shrubs
- Cypress
- Cypress - w/Wet Praries
- Cypress - Pine - Cabbage - Pine
- Wetland Forested Mixed
- Freshwater Marshes
- Freshwater Sawgrass Marshes
- Freshwater Cattail Marshes
- Saltwater Marshes
- Wet Praries
- Wet Praries - with Pine
- Emergent Aquatic Vegetation
- Submergent Aquatic Vegetation
- Sand Other Than Beaches
- Rural Land In Transition
- Borrow Areas
- Spoil Areas
- Fill Areas Highways & Railways
- Airports
- Roads & Highways
- Canals & Locks
- Auto Parking Facilities
- Transmission Towers
- Communication faciiities
- Electrical Power Facilities
- Electrical Power Transmission
- Water Supply Plants
- Sewage Treatment

Land Use Data Source
1995 SFWMD Data Level 3

FPL

Figure IV.F. 1

Ft. Myers Plant

Land Usage Legend

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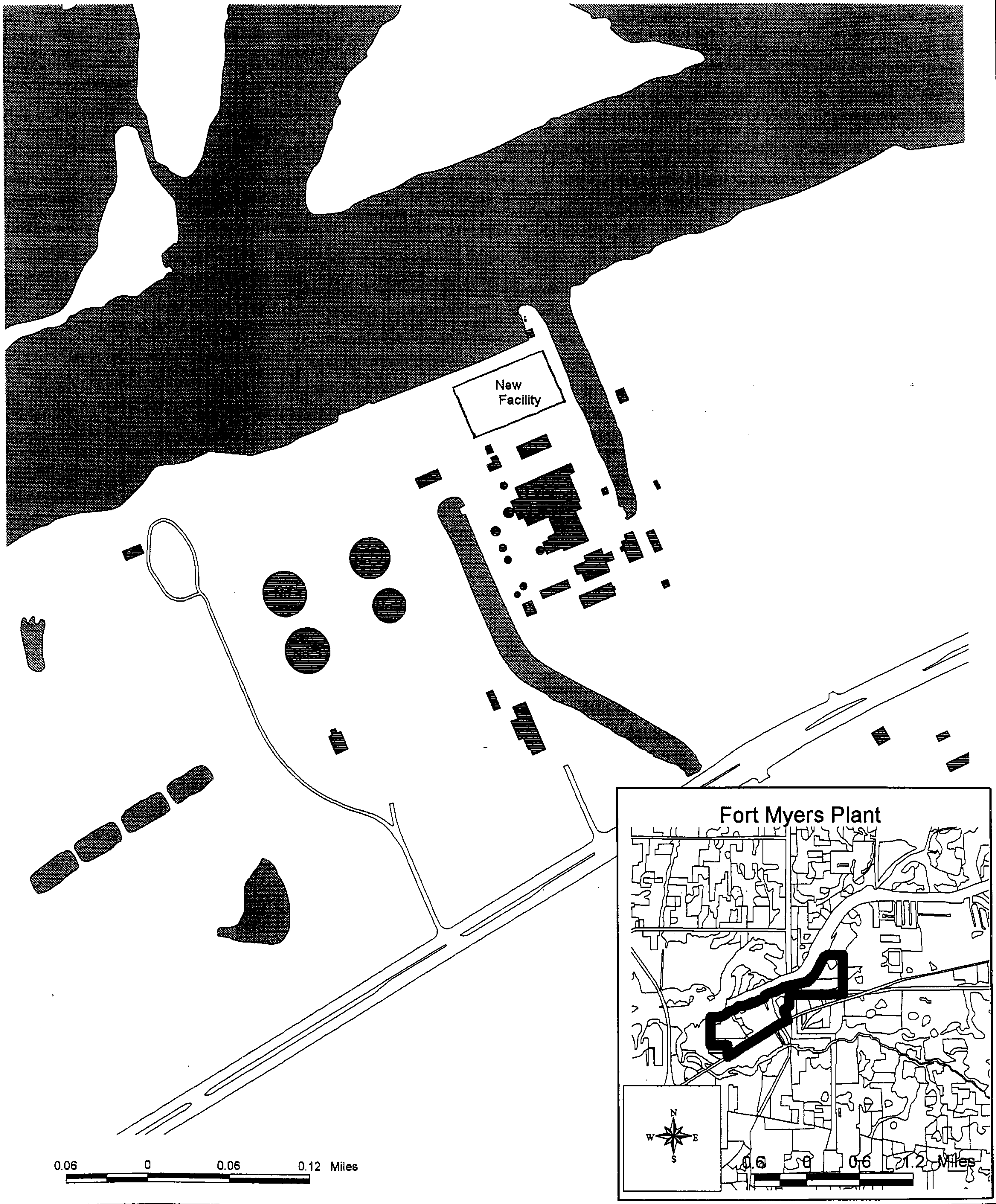

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Figure IV.F. 2

Ft. Myers Plant Site Plan
Showing Location Of New Facility

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Ft Myers Plant Site

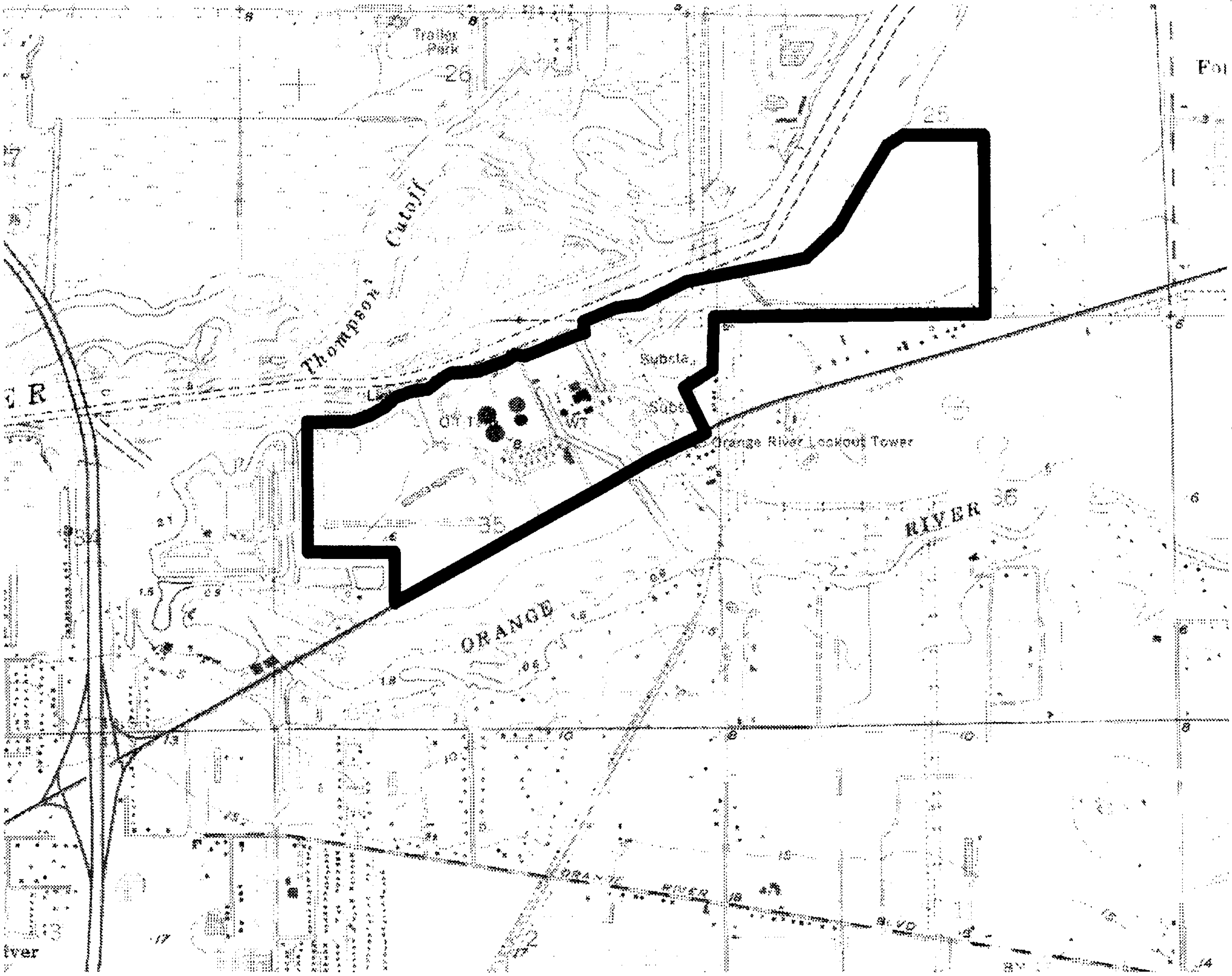

Figure IV.F. 3

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IV. Environmental and Land Use Information: Supplemental Information

Preferred Site: Sanford Plant

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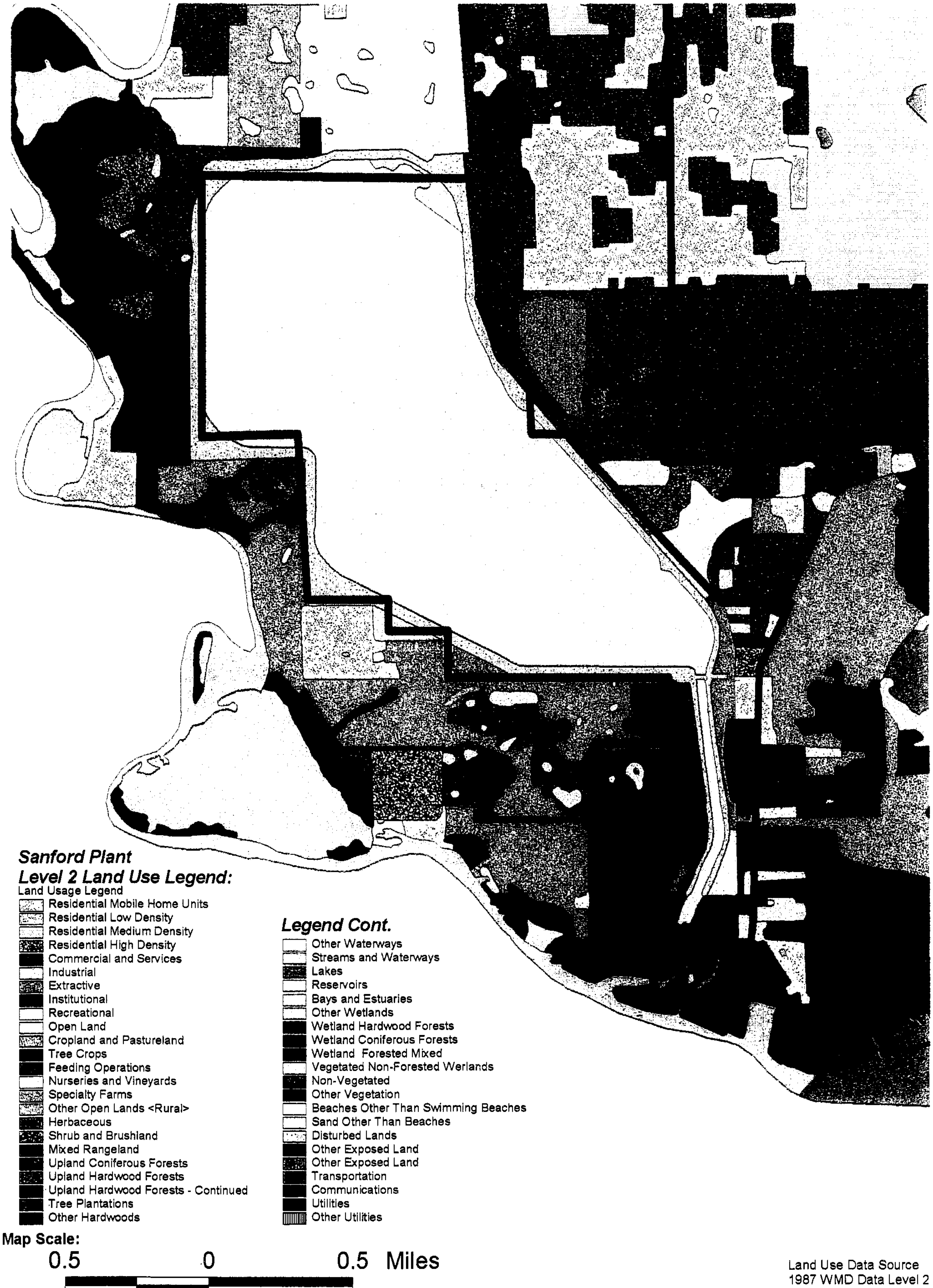

Figure IV.F. 4

Sanford Plant Land Use

Level 2 Land Use

Last Rervised 2/4/98

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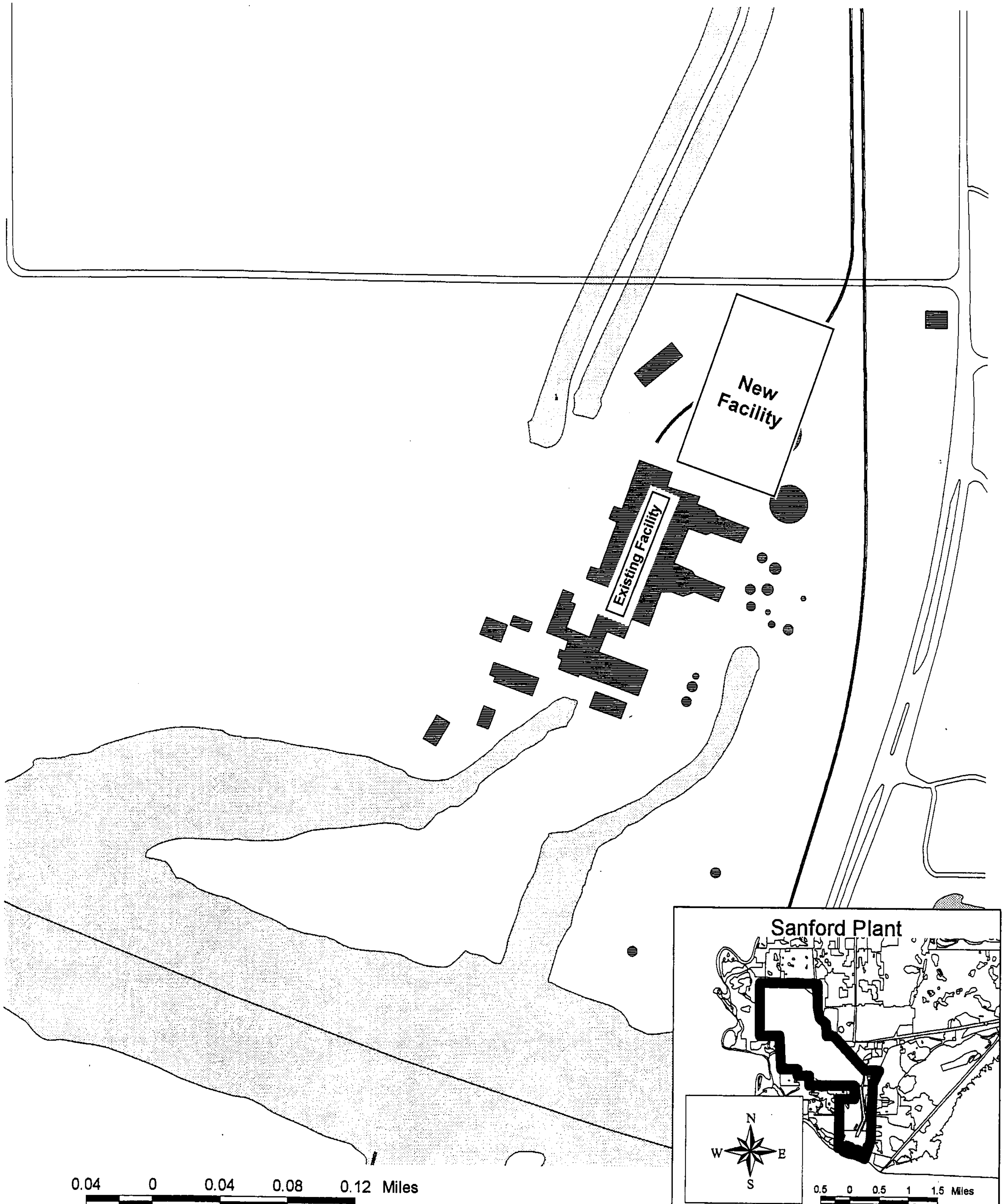

Figure IV.F. 5

Sanford Site Plan Showing Location Of New facility

GIS

FPL Sanford Plant Site

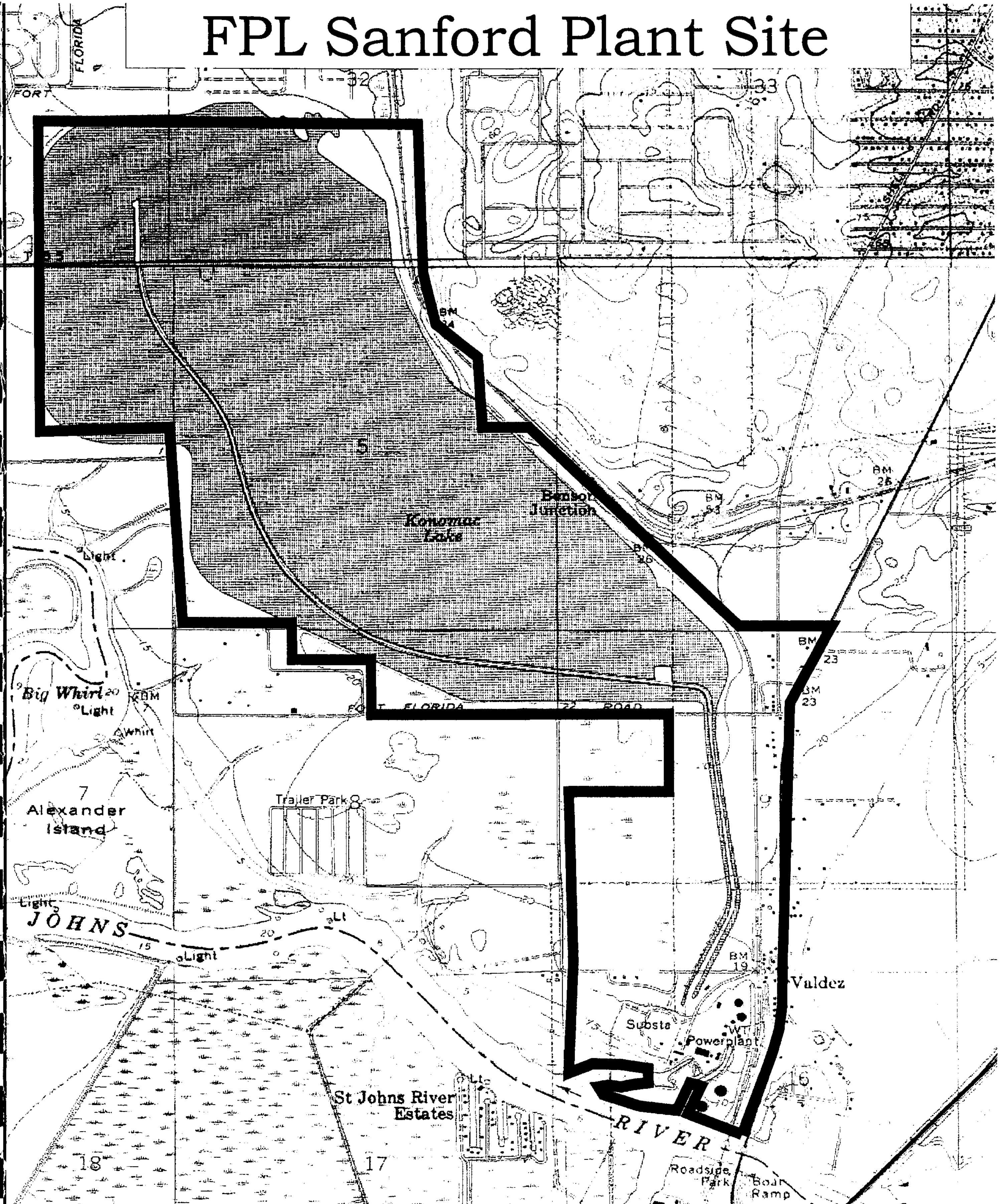

Figure IV.F. 6

N S W E

900 0 900 1800 Feet

GIS

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IV. Environmental and Land Use Information: Supplemental Information

Preferred Site: Martin Plant

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Map Scale:
1 0 1 Miles

Land Use Data Source
1995 SFWMD Data Level 3

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Figure IV.F. 7

Martin Plant Land Use

Level 3 Land Use

Last Revised 2/4/98

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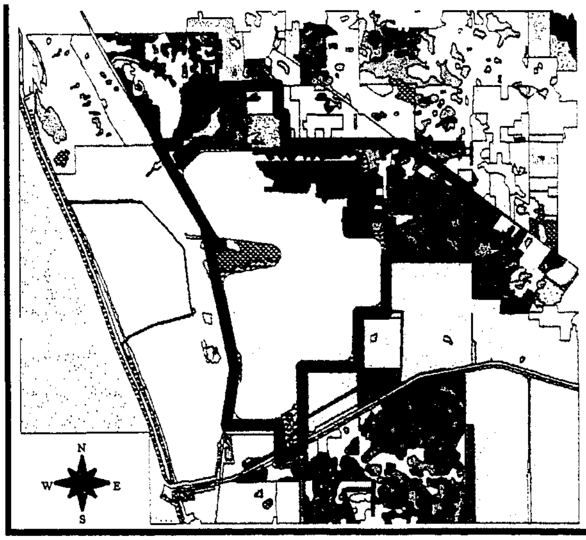

Martin Plant
Level 3 Land Use Legend:

Land Usage Legend

- Mobile Homes
- Fixed Single Family Units
- Fixed Single Family Units 2-5 du/ac
- Fixed & Mobile Units
- Fixed Single Family Units
- Multiple Dwelling Units Low Rise
- Multiple Dwelling Units High Rise
- Retail Sales & Service
- Shopping Centers
- Wholesale Sales & Service
- Junkyards
- Professional Services
- Tourists Services
- Oil & Gas Storage
- Mixed Commercial & Services
- Cemeteries
- Food Processing
- Other Light Industrial
- Other Heavy Industrial
- Strip Mines
- Sand & Gravel Pits
- Rock Quarries
- Educational Facilities
- Religious
- Medical & Health Care
- Governmental
- Correctional
- Other Institutional
- Commercial Child Care
- Swimming Beach
- Golf Courses
- Marinas & Fish Camps
- Parks & Zoos
- Community Recreational Facilities
- Historical Sites
- Other Recreational
- Undeveloped Land Within Urban Areas
- Inactive Land with Street Pattern
- Urban Land In Transaction
- Other Open Land
- Improved Pastures
- Unimproved Pastures
- Woodland Pastures
- Row Crops
- Field Crops
- Sugar Cane Fields
- Citrus Groves
- Tree Nurseries
- Sod Farms
- Ornamentals
- Floriculture
- Horse Farms
- Dairies
- Aquaculture
- Fallow Crop Land
- Herbaceous Rangeland
- Palmetto Prairies
- Coastal Scrub
- Other Scrubs & Brush
- Mixed Rangeland
- Pine Flatwoods
- Melaleuca Infested
- Longleaf Pine - Xeric Oak
- Sand Pine
- Pine - Mesic Oak
- Xeric Oak
- Brazilian Pepper
- Melaleuca
- Temperate Hardwood

Legend Cont.

- Tropical Hardwood
- Live Oak
- Cabbage Palm
- Sand Live Oak
- Hardwood Conifer Mixed
- Austrailian Pine
- Mixed Hardwoods
- Streams & Waterways
- Lakes > or = to 500 Acres
- Lakes > or ■ to 10 Acres - < or = to 500 Acres
- Lakes < or = to 10 Acres
- Reservoirs > or = to 500 Acres
- Reservoirs > or = to 100 Acres - < or = to 500 Acres
- Reservoirs > or ■ to 10 Acres - < or = to 100 Acres
- Reservoirs < or ■ to 10 Acres
- Embayments Opening
- Bay Swamps
- Mangrove Swamps
- Stream & Lake Swamps
- Inland Ponds & Sloughs
- Mixed Wetland Hardwoods
- Willows
- Mixed Shrubs
- Cypress
- Cypress - with Wet Prairies
- Cypress - Pine - Cabbage - Pine
- Wetland Forested Mixed
- Freshwater Marshes
- Freshwater Sawgrass Marshes
- Freshwater Cattail Marshes
- Saltwater Marshes
- Wet Prairies
- Wet Prairies - with Pine
- Emergent Aquatic Vegetation
- Submergent Aquatic Vegetation
- Sand Other Than Beaches
- Rural Land In Transition
- Borrow Areas
- Spoil Areas
- Fill Areas Highways & Railways
- Airports
- Roads & Highways
- Canals & Locks
- Auto Parking Facilities
- Transmission Towers
- Communication Facilities
- Electrical Power Facilities
- Electrical Power Transmission
- Water Supply Plants
- Sewage Treatment

Land Use Data Source
1995 SFWMD Data Level 3

Figure IV.F. 7

Martin Plant Land Use

Level 3 Land Use Legend

Last Revised 2/4/98

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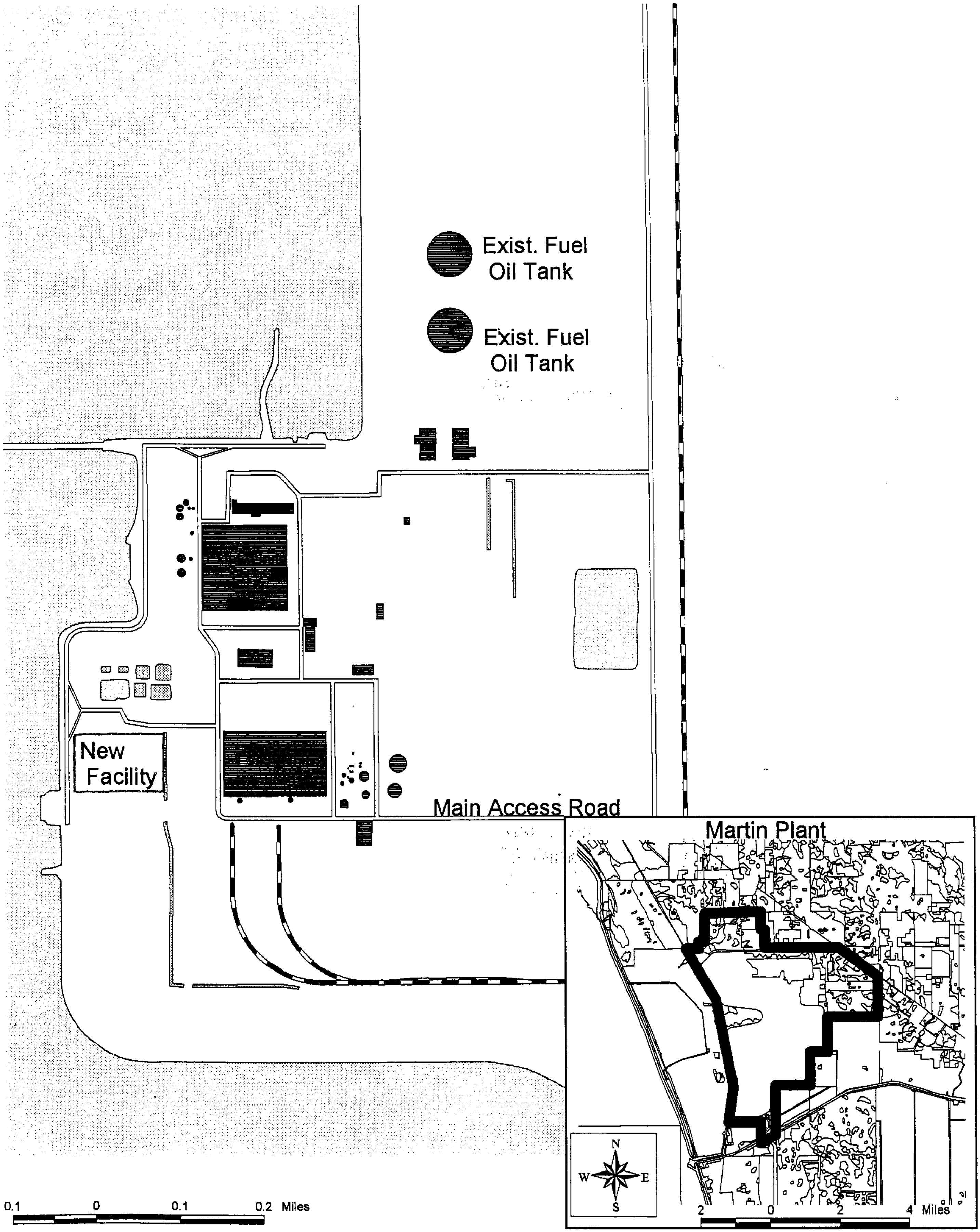

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Figure IV.F. 8

Martin Plant Site Plan Showing Location Of New facility

G I S

FPL Martin Plant Site

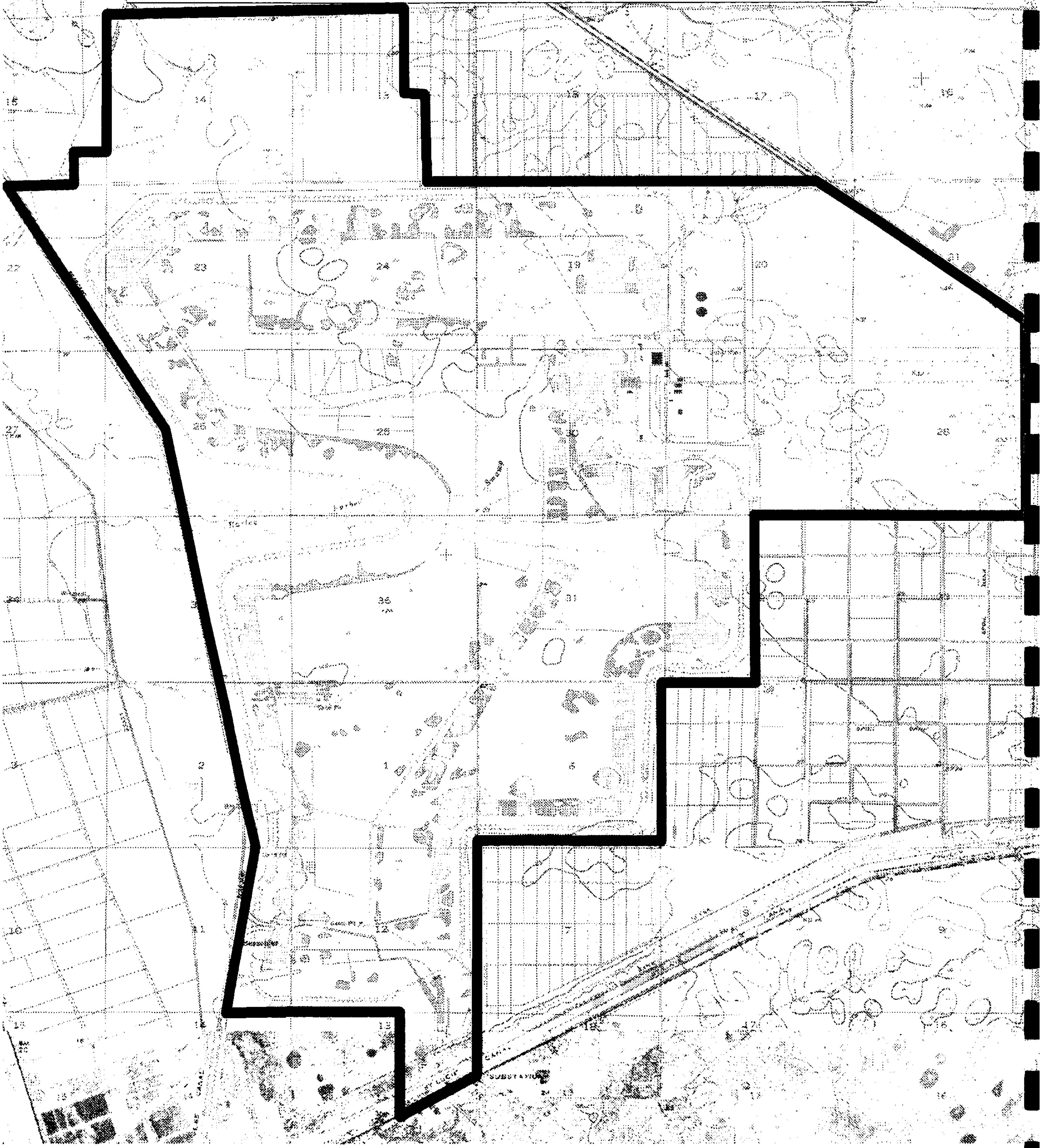

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Figure IV.F. 9

3000 0 3000 6000 Feet

G I S

IV. Environmental and Land Use Information: Supplemental Information

Potential Sites

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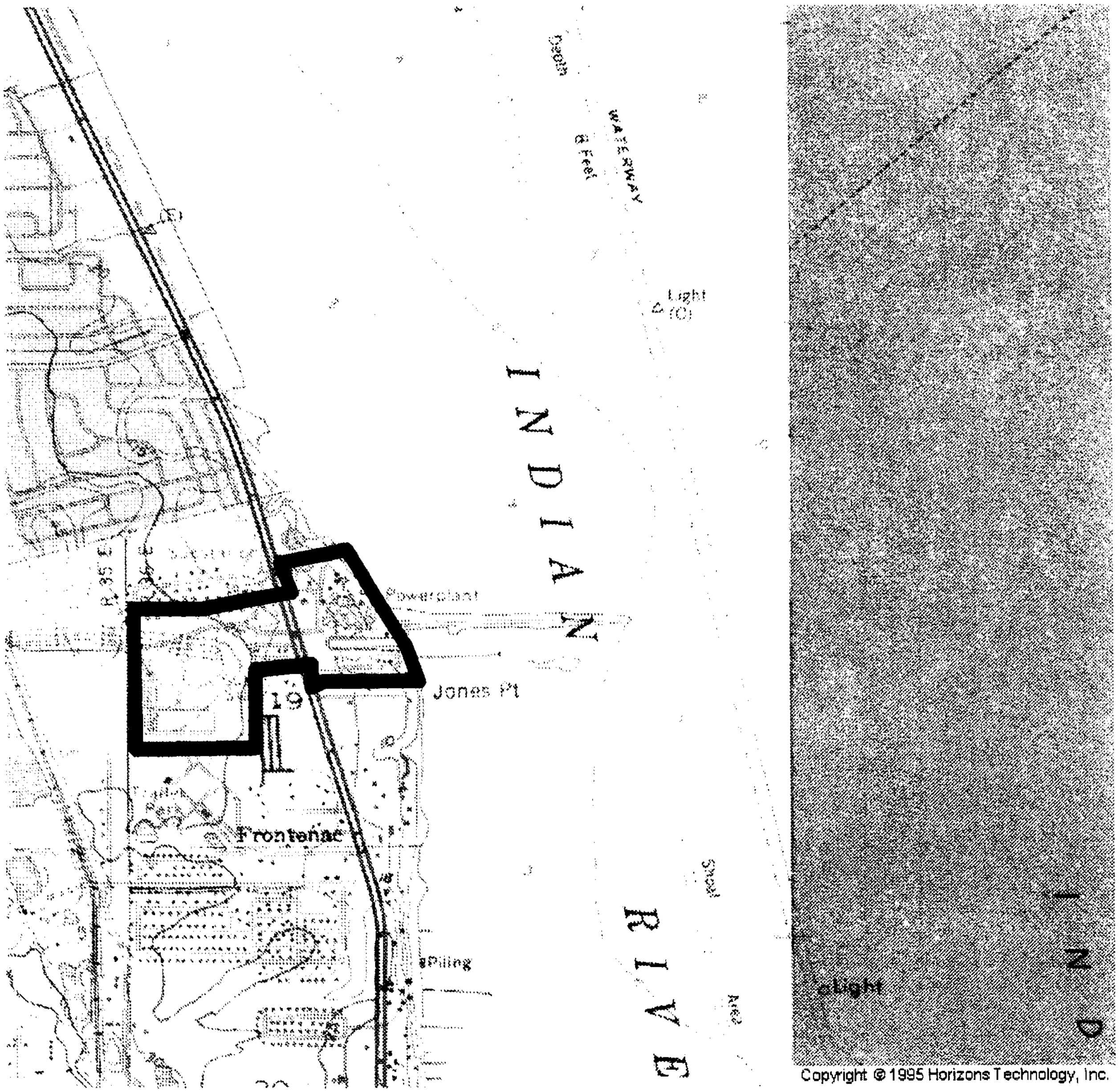
FPL Canaveral Plant Site



N
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Figure IV.F.11

2000 0 2000 Feet

FPL Riviera Plant Site

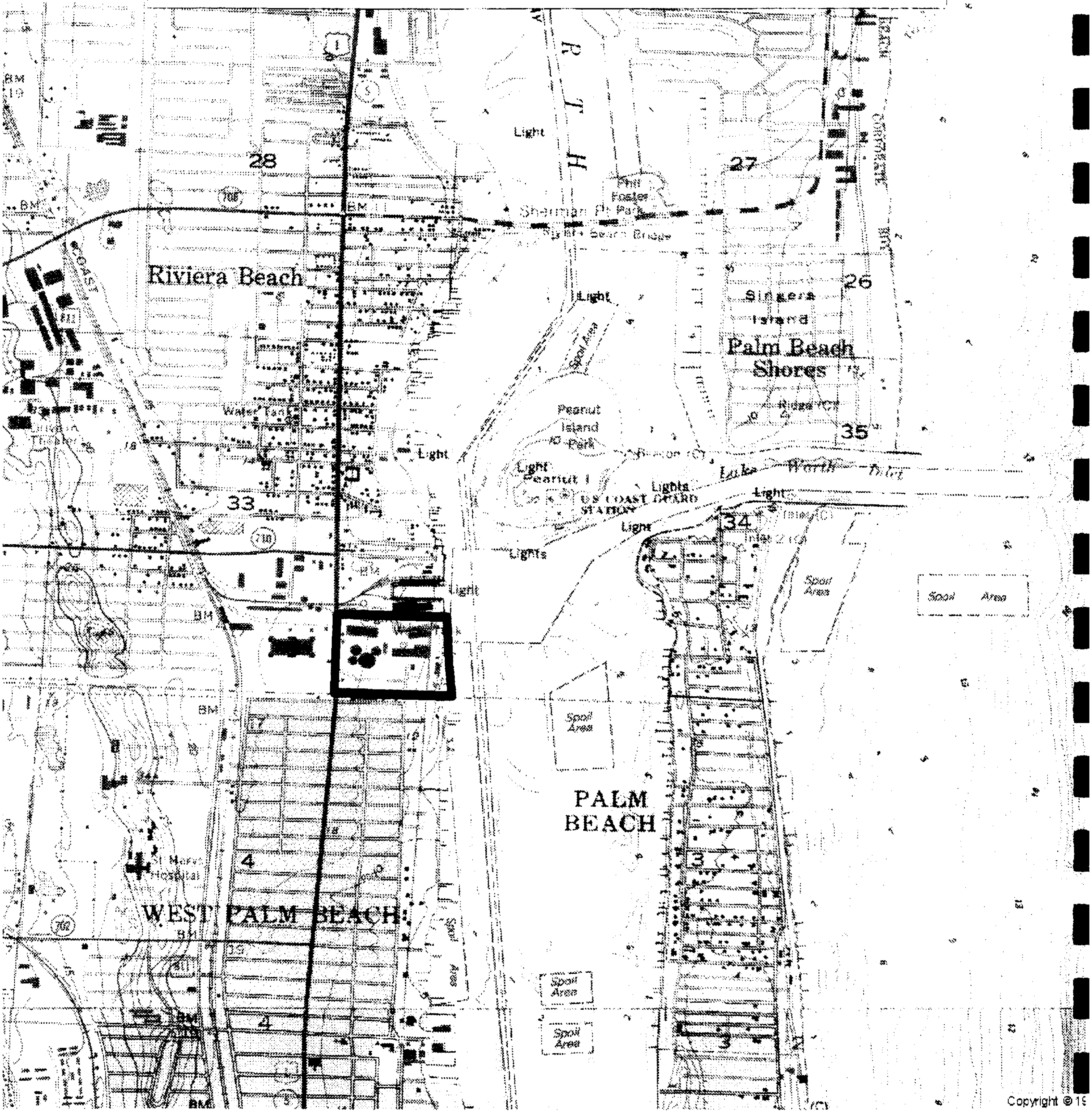

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Figure IV.F.12

2000 0 2000 Feet

G I S

FPL Port Everglades Plant Site

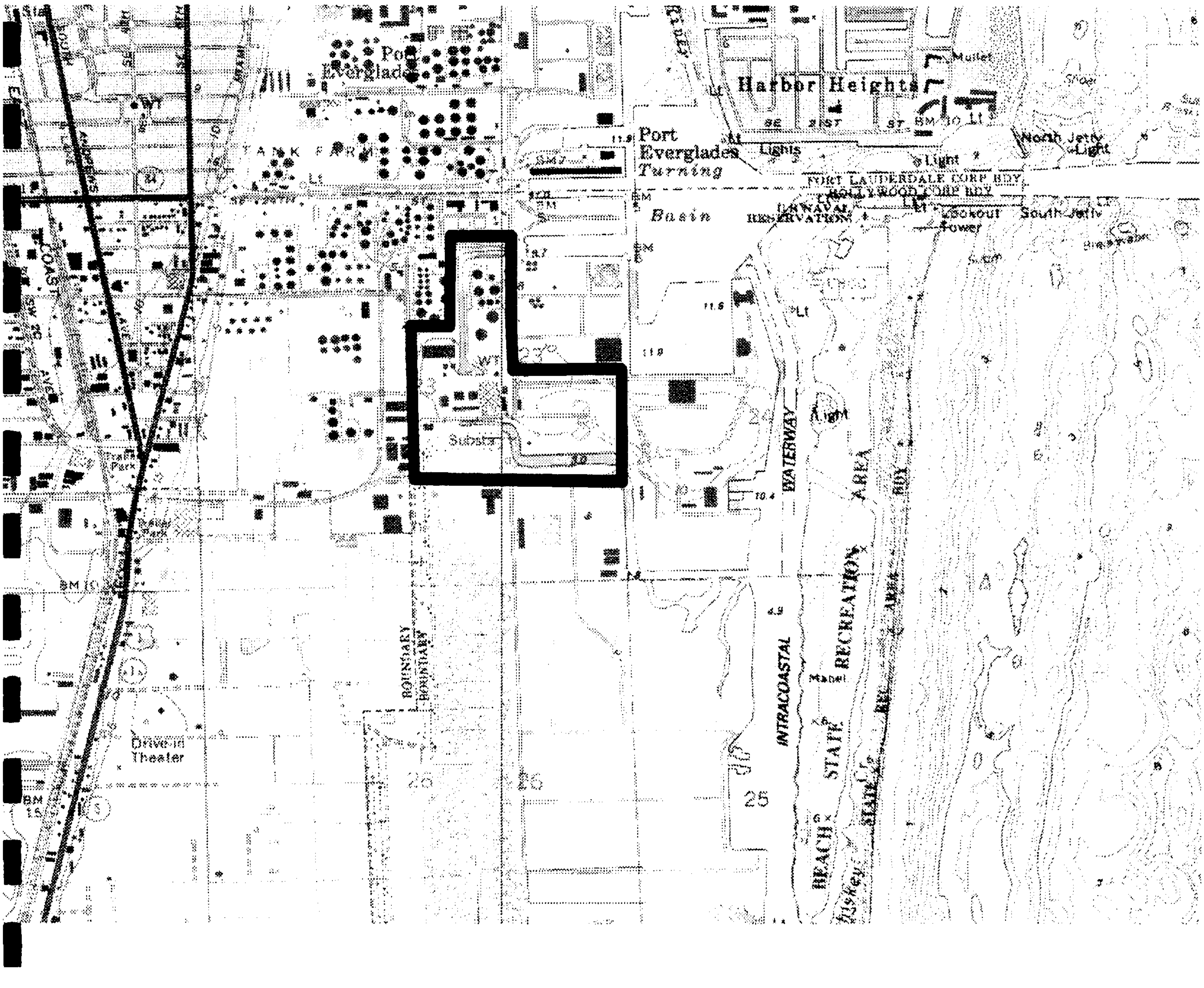
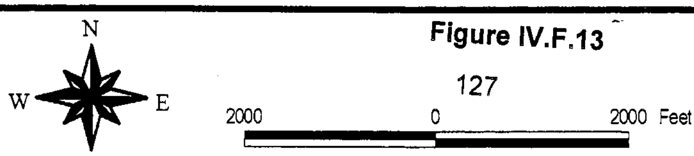


Figure IV.F.13



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CHAPTER V

Other Planning Assumptions & Information

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Introduction

The Florida Public Service Commission (FPSC), in Docket No. 960111-EU, specified certain information that was to be included in an electric utility's Ten Year Power Plant Site Plan filing. Among this specified information was a group of 12 items listed under a heading entitled "Other Planning Assumptions and Information". These 12 items basically concern specific aspects of a utility's resource planning work. The FPSC requested a discussion or a description of each of these items.

These 12 items are addressed individually below as separate "Discussion Items".

Discussion Item # 1: Describe how any transmission constraints were modeled and explain the impacts on the plan. Discuss any plans for alleviating any transmission constraints.

FPL's resource planning consider two type of transmission constraints. External constraints deal with FPL's ties to its neighboring systems. Internal constraints deal with the flow of electricity with in the FPL system.

The external constraints are important since they affect the development of assumptions for the amount of external assistance which is available and the amount and price of economy energy purchases. Therefore, these external constraints are incorporated both in the reliability analysis and economic analysis aspects of resource planning. The amount of external assistance which is assumed to be available is based on the transfer capability as well as historical levels of available assistance. FPL models this amount of external assistance as an additional generator which provides capacity in all but the peak load months. The assumed amount and price of economy energy are based on historical values and projections from production costing models.

Internal transmission constraints or limitations are addressed in developing the costs for siting new units at different locations. Site-specific transmission costs are developed for each different unit/unit location option.

Discussion Item # 2: Discuss the extent to which the overall economics of the plan were analyzed. Discuss how the plan is determined to be cost-effective. Discuss any changes in the generation expansion plan as a result of sensitivity tests to the base case load forecast.

As discussed on page 45 of FPL's Site Plan document, FPL performs economic analyses of competing resource plans using the EGEAS (Electric Generation Expansion Analysis System) computer model from the Electric Power research Institute (EPRI) and Stone and Webster Management Consultants, Inc. The resource plan reflected in FPL's Site Plan document emerged as the resource plan with the least impact on FPL's levelized system average electric rates (i.e., a Rate Impact Measure or RIM approach).

FPL performed two sensitivity analyses in its 1998 resource planning work. One of these analyses used a load forecast which differed from FPL's base case or "Most Likely" load forecast. (The second sensitivity analysis is discussed in Discussion Item #4.)

The first sensitivity analysis examined a case in which a "High Load" forecast was combined with a "Low Price" fuel forecast. In this case, FPL's need for incremental resources moved forward in time to 1999. This accelerated need, if assumed to be met solely through the construction of new units (as is the primary focus of the Site Plan filing), could only be addressed by combustion turbines in the early years. Subsequent years would be addressed by a combination of new combined cycle units and repowering/expansion of existing units.

In its 1998 resource planning work, FPL did not conduct a sensitivity case involving a "Low Load" forecast. Since the system reliability analysis which utilized the "Most Likely" load forecast showed that new units were not needed until 2006, it was clear that a "Low Load" case would not have shown a power plant decision needed prior to 2006. Therefore, FPL saw no value in analyzing such a "Low Load" case in its 1998 planning work.

The construction options selected in the resource plans for FPL's "Most Likely" case, and for the two sensitivity cases discussed above, are presented on the following page in Table V.1.

Table V.1

Selected Power Plant Construction Options For Base and Sensitivity Cases

Year	"Most Likely" Load and "Most Likely" Fuel Price Case	"High" Load and "Low" Fuel Price Case
1999	----	CT
2000	-----	CT
2001	-----	CT
2002	Ft. Myers Repowering	Ft. Myers Repowering
2003	Sanford Repowering	Sanford Repowering
2004	-----	-----
2005	-----	-----
2006	Martin 5 CC	Martin 5 CC
2007	Martin 6 CC	Martin 6 CC
2008	Unsited CC	Unsited CC

Key: CT = combustion turbine
CC = combined cycle unit (at undetermined site unless otherwise noted)

Discussion Item # 3: Explain and discuss the assumptions used to derive the base case fuel forecast. Explain the extent to which the utility tested the sensitivity of the base case plan to high and low fuel price scenarios. If high and low fuel price sensitivities were performed, explain the changes made to the base case fuel price forecast to generate the sensitivities. If high and low fuel price scenarios were performed as part of the planning process, discuss the resulting changes, if any, in the generation expansion plan under the high and low fuel price scenario. If high and low fuel price sensitivities were not evaluated, describe how the base case plan is tested for sensitivity to varying fuel prices.

The basic assumptions FPL used in deriving its base case or "Most Likely" fuel price forecast are discussed on page 62 of FPL's Site Plan document.

The "High Price" and "Low Price" fuel forecasts are developed based on a review of major supply and demand assumptions for oil and natural gas. The "High Price" forecast assumes that the worldwide demand for petroleum products will grow somewhat rapidly throughout the planning horizon. Non-OPEC crude oil supply will remain unchanged as improved drilling technology permits only the replacement of depleting fields. As a result, OPEC's market share will grow more rapidly than in the base case which would result in higher oil prices. In addition, this forecast assumes that domestic natural gas demand will grow somewhat rapidly, primarily due to significant increases in the construction of combined cycle generation. Domestic natural gas production will increase slowly as improved drilling technology permits only the replacement of depleting fields. This will result in higher natural gas imports, including Liquified Natural Gas (LNG), than in the base case which, in turn, results in higher natural gas prices.

The "Low Price" fuel forecast assumes that worldwide demand for petroleum products will grow slowly over the forecast horizon. It also assumes that non-OPEC crude oil supply will grow rapidly due to significant improvement in drilling technology and that OPEC's market share will only make small gains relative to the base case. In regard to natural gas, the "Low Price" forecast assumes that domestic demand for natural gas will grow slowly over the forecast horizon and that domestic production will increase faster than in the base case. These assumptions result in lower oil and gas price forecasts.

FPL did test the sensitivity of its resource plan to a "Low Price" fuel forecasts in conjunction with a "High Load" forecast. The results of these analyses are presented above in FPL's response to Discussion Item # 2. FPL did not test the sensitivity of its resource plan to a "High Price" fuel forecast in its 1998 IRP work. Although FPL typically performs a sensitivity analysis on a combined "Low Load"/ "High Price" fuel forecast, such an analysis would not have shown a need for new power plants before 2006 (as discussed in Discussion Item #2.) Consequently, this analysis was not performed in FPL's IRP98 work.

Discussion Item # 4: Describe how the sensitivity of the plan was tested with respect to holding the differential between oil/gas and coal constant over the planning horizon.

In addition to the sensitivity analyses discussed above which examined the impact of "High Load" and "Low Price" fuel forecasts, FPL also performed a sensitivity analysis in which the differentials between oil prices, gas prices, and coal prices were kept constant over the planning horizon. FPL performed this analysis solely due to the fact that it was included in the FPSC's list of specified information for the Site Plan filing. FPL believes that the likelihood of a constant differential between fuel prices occurring over the planning horizon is very small. In order to perform this "acid test" analysis, FPL used the initial year price forecast for each fuel and kept those prices constant throughout the planning horizon

The results of this analysis showed that three new combined cycle units which come in-service in 2006, 2007, and 2008 respectively would be the most economical options to add (following the already committed to repowering of existing units at Ft. Myers and Sanford) with this "acid test" fuel forecast assumption. Thus, the same types of construction options, repowering and expansion of existing units, followed by new combined cycle plants, are the best choices under both the "Most Likely" and "acid test" fuel price forecasts.

Discussion Item # 5: Describe how generating unit performance was modeled in the planning process.

The performance of existing generating units on FPL's system was modeled using current projections for scheduled outages, unplanned outages, and capacity output ratings and heat rate information. Schedules 1 and 8 present the capacity output ratings of FPL's existing units. The values used for outages and heat rates are consistent with the values FPL has used in planning studies in recent years.

In regard to new unit performance, FPL utilized current projections for the capital costs, fixed and variable operating & maintenance costs, capital replacement costs, construction schedules, heat rates, and capacity ratings for all construction options which were considered in the resource planning work. A summary of this information for the new capacity options FPL projects to add over the planing horizon is presented on Schedule 9. Please refer to that schedule.

Discussion Item # 6: Describe and discuss the financial assumptions used in the planning process. Discuss how the sensitivity of the plan was tested with respect to varying financial assumptions.

The key financial assumptions used in FPL's 1998 resource planning work were 45% debt and 55% equity FPL capital structure;projected debt cost of 7.6%; and an equity return of 12.5%. These assumptions resulted in a weighted average cost of capital of 10.30% and an after-tax discount rate of 8.98%. These assumptions were used in FPL's base case or "Most Likely" forecast case analysis, and in its sensitivity analyses of alternate load and/or fuel price forecasts.

In order to test the sensitivity of the resource plan to a different set of financial assumptions, FPL performed an analysis in which the capital financing structure was changed to one which might be more typical of a case involving third-party financing of a new power plant. This alternate financing structure was assumed to be one made of 80% debt and 20% equity. The returns on debt and equity were assumed to be the same as for FPL's "Most Likely" case 7.6% and 12.5% respectively. These assumptions result in a weighted average cost of capital of 8.6% and an after-tax discount rate of 6.23%.

The results of this "alternate financial case" sensitivity analysis were the same as for FPL's "Most Likely" case analysis. The Martin 5 and 6 combined cycle units were selected for 2006 and 2007, respectively, followed by an unsited combined cycle unit in 2008. These plant additions followed the already committed-to repowering of existing units at Ft. Myers and Sanford.

Discussion Item # 7: Describe in detail the electric utility's Integrated Resource Planning process. Discuss whether the optimization was based on revenue requirements, rates, or total resource cost.

FPL's integrated resource planning (IRP) process is described on pages 36 through 45 of FPL's Site Plan document.

The standard basis for comparing the economics of competing resource plans in FPL's basic IRP process is the impact of the plans on FPL's electricity rate levels with the intent of minimizing FPL's levelized system average rate (i.e., a Rate Impact Measure or RIM approach). This RIM basis was again used in FPL's 1998 resource planning work.

Discussion Item # 8: Define and discuss the electric utility's generation and transmission reliability criteria.

FPL traditionally uses two generation reliability criteria in its resource planning work. These are a minimum 15% Summer reserve margin and a maximum of 0.1 days per year loss-of-load-probability (LOLP). However, in its 1997 planning work, FPL also used a third criterion: a minimum 15% Winter reserve margin due to concern regarding reserves available during Winter peak loads. (FPL will continue to monitor this particular concern and make appropriate adjustments as needed to provide reliable service.) These reliability criteria are discussed on pages 42 and 43of FPL's Site Plan document. Please refer to those pages.

In its 1998 planning work, FPL utilized transmission planning criteria which are consistent with the Principles and Guides for Planning Reliable Bulk Electric Systems published by the Florida Reliability Coordinating Council in September, 1996 and in the process of complying with the Planning Standards approved by NERC September, 1997. A copy of that document follows this page.

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Principles and Guides for Planning Reliable Bulk Electric Systems

FLORIDA RELIABILITY COORDINATING COUNCIL

September - 1996

Criteria For Reliability In System Planning

Introduction

The purpose of is to augment the reliability of bulk power supply in the areas served by the member systems. This can be best accomplished by promoting maximum coordination of planning, construction and utilization of generation and transmission facilities involved in interconnected operations.

To assist in achieving these objectives, the member organizations of FRCC recognize the need for regional criteria to be used in the planning of their systems for adequate and reliable bulk power supply.

It is recognized that the reliability of power supply in local areas is the responsibility of the individual FRCC members and that each system has internal criteria relating to load forecasting, resource planning, and transmission planning. The criteria outlined in this document are a resource to be used in conjunction with local area criteria.

Forecasts

◆ Principle

Electricity demand and energy forecasts must project far enough into the future to allow timely development, design, and implementation of electric system plans needed to reliably supply customer requirements.

◆ Guides

1. Forecasts should generally include such factors as economic, demographic, and customer trends; conservation, improvements in the efficiency of electrical energy use, and other changes in the end uses of electricity; and weather effects.

2. Assumptions, methodologies, and forecast uncertainties should be documented.

3. Forecasts should clearly document how the effects of utility-sponsored demand-side management programs (e.g., conservation, interruptible demand, direct control load management) are treated.

4. Load forecasts based upon the hourly integrated net peak demand for normal weather conditions shall be used for FRCC reports. However, other forecasts may be used for purposes other than FRCC reporting.

5. Forecasts should state how the electricity demand and energy projections of interconnected entities that are within the boundaries of the FRCC region but not members of FRCC are addressed.

Resources

♦ Principle

Adequate resources must be planned, designed, and implemented to reliably meet projected customer electricity demand and energy requirements.

♦ Guides

A. General

1. Assessments of future resource adequacy should generally include the following:
   - Electricity demand and energy forecasts, including uncertainties
   - Existing and planned demand- and supply-side resources
   - Availability and performance of all resources
   - Limited-energy resources
   - Delays in resource in-service dates
   - Resource life cycle
   - Environmental or regulatory limitations
   - Availability of emergency assistance
2. Measurable levels of resource adequacy should be defined, and may be based on any one of several evaluation methodologies or criteria, as appropriate.
3. Adequate margins should be provided in both active (real) and reactive power resources.
4. Resources not under a system's control should be addressed in the planning process as to availability, capacity value, emergency assistance, scheduling, and deliverability.
5. A balanced relationship should be maintained among the type, size, capacity, and location of all electric system resources.

B. Demand-Side Resources

1. The characteristics of utility-sponsored demand-side resources used in assessing future resource adequacy should generally include the f following:

   - Consistent demand-side management (DSM) program ratings, including seasonal variations
   - Effect on annual system load shape
   - Availability, effectiveness, and diversity of DSM programs
   - Contractual arrangements
   - Expected program duration
   - Aggregate effects of multiple DSM programs

2. The effects of utility-sponsored DSM programs (e.g., conservation, interruptible demand, direct control load management) should be documented and should be verified.

C. Supply-Side Resources

1. Supply-side resource characteristics used in assessing future resource adequacy should generally include the following:

   - Consistent Generator Unit Ratings, Including Seasonal Variations
   - Each FRCC member shall establish Seasonal Net Capability ratings for each generating unit. The Seasonal Net Capability ratings are intended to reflect such seasonal variations as ambient temperature, condensing water temperature and availability, fuels, steam heating loads, reservoir levels and scheduled reservoir discharge.
   - Availability of utility and non-utility generator units
   - Dependability of and contractual obligations for capacity and energy purchases and sales, including assignment of system losses
   - Fuel availability, deliverability, and diversity
   - Retirement of resources

- Changes in unit capability and or availability due to major modifications required for compliance with environmental regulations.

2. Supply-side resource capability shall be tested to demonstrate and verify that the Seasonal Net Capability ratings can be achieved in the respective season. The reported capability is, therefore, a figure which should not be altered until the accumulated evidence of tests and/or analyses of operating experience indicate that a long-term change has taken place. The Seasonal Net Capability ratings shall be confirmed annually.

3. Non-utility generator facilities should be planned and integrated with the bulk electric systems in accordance with all applicable planning principles, criteria, and guides.

4. Purchasers, transmitters, and sellers of electricity should coordinate and agree with each other on the characteristics and level of dependability of their electricity transactions for reliability assessment purposes, including such factors as:

   - Contractual commitments
   - Duration of the transaction
   - Dependability of the transaction
   - Availability of dedicated generator units
   - Availability of transmission capacity
   - Effect of firm transactions on deliverability of emergency assistance

5. The system should be planned so that operating procedures can be developed for the timely restoration of supply-side resources following a system disturbance, including coordination with neighboring systems, if necessary.

Transmission

♦ Principle

Transmission systems that are part of an interconnected network must be planned, designed, and constructed to operate reliably within thermal, voltage, and stability limits.

♦ Guides

A. Adequacy

1. Transmission systems should be capable of delivering generator unit output to meet projected customer demands during normal and probable contingency conditions.

2. Transmission interconnections between electric systems should have sufficient capability to accommodate projected electricity transfers while not burdening neighboring electric systems.

3. An adequate supply of reactive power should be located throughout the electric systems to accommodate projected customer demands and electricity transfers while maintaining system voltages within acceptable limits during normal and probable contingency conditions.

4. A balanced relationship among transmission system elements should be maintained, if practical, to avoid excessive dependence on any one transmission circuit, structure, right-of-way, or substation.

5. Transmission systems should allow for maintenance of generation and transmission equipment without unacceptable loss of system reliability.

6. Transmission systems should provide flexibility in switching arrangements, voltage control, and other control measures to ensure reliable system operation.

7. The system should be planned so that operating procedures can be developed for the timely restoration of electric system elements following a system disturbance, including coordination with neighboring systems, if necessary.

8. The transmission facilities and electricity transfers of interconnected entities that are not members of FRCC should be addressed in the transmission planning process.

B. Security

1. Electric systems should be planned to withstand probable contingencies at projected customer demand levels and electricity transfers.

2. It is recognized that there are credible, less probable contingencies which may result in islanding and/or loss of firm load. These conditions are considered acceptable as long as the adverse impact is limited and rapid load restoration is possible. Credible, less probable contingencies should be evaluated for risks, consequences, and corrective actions to avoid cascading outages or voltage collapse resulting in uncontrolled interruptions to customer electric supply.

3. Each of the FRCC member systems should be planned to avoid cascading and should generally consider the following contingencies:

   - Sudden loss of entire generating capability in any one plant.
   - Sudden loss of a large load or major load center.
   - The outage of the most critical transmission line caused by a three-phase fault during the outage of any other critical transmission line.
   - Sudden loss of all lines on a common right-of-way.
   - Sudden loss of a substation (limited to a single voltage level within the substation plus transformation from that voltage level), including any generating capacity connected thereto.
   - Delayed clearing of a three-phase fault at any point on the system due to failure of a breaker to open.

C. **Coordination**

1. The planning and development of electric systems should be coordinated with other interconnected systems to preserve the reliability benefits of interconnected operations.

2. Data that is essential for electric system analysis should be shared on a timely basis. Such data generally includes:

   - System characteristics for modeling, including transmission, resources, and customer demands
   - Resource plans and facility locations
   - Electricity transactions
   - Special controls and procedures that affect transmission capability, resources, or operations

3. Coordinated system studies should be conducted as required.

D. **Protection Systems**

1. Protection systems for interconnected electric systems should be planned to isolate only the faulted electric system element(s), except in those circumstances where additional elements must be removed from service intentionally to preserve electric system integrity.

2. Protection systems should be planned to include the following general characteristics:

   - Single-contingency redundancy
   - Minimal complexity
   - Reliable communication systems, when used
   - Selectivity of operation
   - Capability of being periodically tested and maintained

3. Special protection systems (or remedial action schemes) should be planned to generally achieve the same level of operational reliability as that provided by traditional protection systems.

4. Automatic load shedding (interruption of electric supply to customers) equipment should be coordinated among electric system elements and with neighboring electric systems to preserve electric system integrity.

5. Protection system designs and their modifications should be coordinated with all applicable planning and operating principles, criteria, guides and with neighboring electric systems as necessary.

6. Protection system applications, settings, and coordination should be reviewed periodically and whenever major changes are anticipated in resources, transmission, substations, operating conditions, or customer demand.

Definitions

FRCC's Planning Principles and Guides are defined as follows:

- **Adequate/Adequacy** - The ability of a bulk electric system to supply the aggregate electrical demand (power) and energy requirements of the consumers at all times, taking into account scheduled and (reasonably expected) unscheduled outages of system components.

- **Cascading** - The uncontrolled successive loss of system elements triggered by an incident at any location. Cascading results in an uncontrolled, widespread collapse of system power which cannot be restrained from sequentially spreading beyond an area predetermined by appropriate studies.

- **Contingency** - The unexpected loss of a system element.

  - Probable Contingency - The loss of any single element (generating unit, transmission line or transformer).

  - **Credible, Less Probable Contingency** - The loss of two or more elements in a single substation, generating plant, or on a transmission right-of-way.

  - **Severe Contingency** - The loss of all elements in a single substation at one voltage level plus transformation or the entire substation, all generation at a plant, or all lines on a common transmission line right-of-way.

- **Emergency Assistance** - Power flow utilizing the interconnected transmission network resulting from a request for assistance by a utility with deficient generation.

- **Forecast Uncertainty** - The probable deviations from the expected values of factors considered in a forecast.

- **Integrated Net Peak Demand** - Peak demand calculated by dividing the energy used over a short period of time by the time period.

- **Limited Energy Resource** - Resources that are dependent on a limited fuel supply, other operating restrictions, or are dispatched to optimize either cost, reliability or other criteria.

- **Normal Weather** - Typical seasonal weather based on historical actual weather data over a reasonable time period, typically twenty years.

- **Seasonal Net Capability** - The gross capacity of a generating unit as measured at the generator terminals less the power required for the auxiliary equipment. This value can vary with ambient temperature.

- **Net Capacity** - The maximum capacity (or effective rating), modified for ambient limitations, that a generating unit, power plant, or electric system can sustain over a specified period of time, less the capacity used to supply the demand of station service or auxiliary needs (such as fan motors, pump motors, and other equipment essential to operation of the generating units).

- **Reliability** - In a bulk power system, this is the degree to which the performance of the elements of that system results in power being delivered to consumers within accepted standards and in the amount desired. The degree of reliability may be measured by the frequency, duration, and magnitude of adverse effects on consumer service.

- **Special Protective System** - A relay system designed to remove electrical elements from the network for conditions other than electrical system faults.

- **System Disturbance** - An unplanned event that causes widespread variations in system parameters on the bulk electric system.

- **Security** - The ability of the bulk (power) electric system to withstand sudden disturbances such as electric short circuits or unanticipated loss of system components (or switching operations).

Discussion Item # 9: Discuss how the electric utility verifies the durability of energy savings for its DSM programs.

FPL monitors and evaluates each of its DSM programs on an annual basis. These analyses enable FPL to verify, and update as needed, the projected demand and energy savings of its DSM programs in order to accurately reflect DSM's impact on FPL's future resource needs.

FPL utilizes statistically adjusted engineering models which are calibrated with metered data, billing data, and survey information in order to perform these evaluations. Data from program participants are used to establish usage patterns, demand impacts, and energy impacts associated with each program. Data is also collected from non-participating customers in order to estimate what the baseline efficiencies would be in the absence of a particular DSM program.

The projected useful life of each measure addressed in FPL's DSM programs is also reviewed periodically. FPL reviews this both through its own analyses as well as through a review of industry publications such as the ASHRAE handbook of HVAC Systems and Applications and manufacturers' product literature. FPL also monitors the published research of others who are studying DSM measure life.

Finally, for those DSM measures which involve the utilization of load management, FPL conducts periodic tests of the load control equipment to ensure that it is functioning correctly.

Discussion Item # 10: Discuss how strategic concerns are incorporated in the planning process.

FPL's resource planning process is designed to address various "strategic concerns" or areas of uncertainty. There are 6 areas of uncertainty that FPL seeks to address in its resource planning work: load growth, fuel price, transmission system constraints, environmental regulations, evolving technology, and competitive risk.

In regard to uncertainty about both load growth and fuel price, FPL addressed this by developing a resource plan which used a combination of a "High Load" forecast and a "Low Price" fuel forecast, as is discussed in Discussion Items # 3.(In response to the list of information specified by the FPSC for inclusion in the Site Plan filing, FPL also developed a resource plan which used an "acid test" fuel price forecast. This is discussed in Discussion Item #4.) In addition, uncertainty about fuel prices is addressed in fuel conversion efforts such as repowering projects now planned at FPL's Ft. Myers and Sanford sites and in retaining the capability to burn more than one fuel in a number of FPL generating units.

Uncertainty regarding transmission system constraints is addressed by annually updating assumptions about how much assistance may be available to FPL from outside of FPL's service territory as well as assumptions relating to transmission constraints within FPL's system. In regard to uncertainty about environmental regulations, FPL's policy has always been that it will comply with all existing environmental laws and regulations. In that regard, FPL's resource planning analyses include all reasonably known costs of complying with these laws and regulations. Furthermore, in regard to potential new environmental regulations, FPL believes that its efforts to maintain the ability to burn varying grades of oil or burning either oil or natural gas at numerous plants, and to expand the use of natural gas (through the planned repowering projects at Ft. Myers and Sanford), should allow FPL to reasonably respond to a variety of potential environmental regulations.

Uncertainty about evolving technology's potential impact on resource plans is best addressed by not committing to resource additions before it is necessary to do so. (In most cases, this approach also benefits the economics of the resource plan.) This minimizes the chance that a newly emerged technology will turn out to be a more economical choice than what the utility has already committed to. Uncertainty about evolving technology is also reduced by maintaining close contact with equipment vendors in order to better understand what the developmental status is of various generating technologies.

Finally, an increasingly important consideration in FPL's planning process is that of competitive risk. FPL's resource planning process is designed to identify the resource plan which best minimizes system average electric rates in order to keep FPL's service competitive in the evolving utility industry. Also, because of the inherent uncertainty associated with an evolving industry, long-term purchase commitments are undesirable. FPL seeks to avoid/minimize such commitments in its planning.

Discussion Item # 11: Describe the procurement process the electric utility intends to utilize to acquire the additional supply-side resources identified in the electric utility's ten-year site plan.

As has been discussed, the principal elements of FPL's capacity additions during the next 10 years are the repowering of its Ft. Myers and Sanford plants in 2002 and 2003, respectively. The incremental capacity for these two sites comes from the addition of 6 combustion turbines (CTs) and 6 heat recovery steam generators (HRSGs). FPL will acquire these CTs and HRSGs through a bid process which will combine cost and performance considerations.

The later capacity additions projected in FPL's Site Plan document, the new Martin # 5 and # 6 units, plus the new unsited combined cycle unit currently projected for 2008,will most likely be carried out following the issuance of a capacity solicitation to potential suppliers at an appropriate time, if that approach represents the best vehicle to offer the lowest cost new generating capacity.

Discussion Item # 12: Provide the transmission construction and upgrade plans for electric utility system lines that must be certified under the Transmission Line Siting Act (403.52 – 403.536, F. S.) during the planning horizon. Also, provide the rationale for any new or upgraded line.

FPL's plans do not include any new or upgraded transmission lines during the 1999 – 2008 time period which would need to be certified under the Transmission Line Siting Act (403.52 – 403.536, F.S.)