P.O. BOX 529100 MIAMI, FL 33152

FPL
FLORIDA POWER & LIGHT COMPANY

Office of Nuclear Reactor Regulation
Attention: Mr. Darrell G. Eisenhut, Director
Division of Licensing
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Dear Mr. Eisenhut:

Re: St. Lucie Unit 1
Docket No. 50-335
Proposed Amendment to
Facility Operating License DPR-67

In accordance with 10 CFR 50.30, Florida Power & Light Company submits herewith three (3) signed originals and forty (40) copies of a request to amend Facility Operating License DPR-67 by upgrading rated power from 2560 Mwt to 2700 Mwt.

The proposed changes are shown on the accompanying Operating License and Technical Specification pages bearing the date of this letter in the lower right hand corner. The Operating License change is Attachment 1, the Technical Specification changes are Attachment 2, the supporting analysis is Attachment 3, and the Stretch Power Environmental Report is Attachment 4.

The proposed amendment has been reviewed by the St. Lucie Facility Review Group and the Florida Power & Light Company Nuclear Review Board. They have concluded that it does not involve an unreviewed safety question.

FPL has determined that this is a Class IV Amendment in accordance with 10 CFR 170.22. A check in the amount of $12,300 is enclosed.

Very truly yours,

Robert E. Uhrig

Robert E. Uhrig
Vice President
Advanced Systems & Technology

REU/MAS/ah

Attachments (4)

cc: J. P. O'Reilly, Region II
Harold F. Reis, Esquire

Docket # 50-335
Control # 8011200255
Date 11-14-80 of Document:
REGULATORY DOCKET FILE

STATE OF FLORIDA)
) ss.
COUNTY OF DADE)

Robert E. Uhrig, being first duly sworn, deposes and says:

That he is a Vice President of Florida Power & Light Company, the Licensee herein;

That he has executed the foregoing document; that the statements made in this said document are true and correct to the best of his knowledge, information, and belief, and that he is authorized to execute the document on behalf of said Licensee.

Robert E Uhrig
Robert E. Uhrig

Subscribed and sworn to before me this

14 day of November, 1980

Cheryl L. Fredrick
NOTARY PUBLIC, in and for the county of Dade, State of Florida

My commission expires: Notary Public, State of Florida at Large
My Commission Expires October 30, 1983
Bonded thru Maynard Bonding Agency

C. This license shall be deemed to contain and is subject to the conditions specified in the following Commission regulations in 10 CFR Chapter I: Part 20, Sections 30.34 of Part 30, Section 40.41 of Part 40, Section 50.54 and 50.59 of Part 50, and Section 70.32 of Part 70; and is subject to all applicable provisions of the Act and to the rules, regulations, and orders of the Commission now or hereafter in effect; and is subject to the additional conditions specified or incorporated below;

(1) Maximum Power Level

The licensee is authorized to operate the facility at steady state reactor core power levels not in excess of 2700 megawatts (thermal), provided that the construction items, preoperational tests, startup tests, and other items identified in Enclosure 1 to this license have been completed as specified in Enclosure 1. Enclosure 1 is an integral part of, and is hereby incorporated in this license.

(2) Technical Specifications

The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 35 are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications.

(3) Fire Protection

The licensee may proceed with and is required to provide a schedule for and to complete the modifications and evaluations identified in Paragraphs 3.1 through 3.15 of the NRC's Fire Protection Safety Evaluation, dated August 17, 1979 for the facility. If any modifications or evaluation cannot be completed on schedule the licensee shall submit a report explaining the circumstances together with a revised schedule.

The licensee is required to implement the administrative controls identified in Section 6 of the Safety Evaluation. The administrative controls shallbe in effect within 90 days from the date of issuance of this amendment.

D. The licensee shall maintain in effect and fully implement all provisions of the Commission-approved physical security plan, including amendments and changes made pursuant to the authority of 10 CFR 50.54(p). The approved security plan consists of documents withheld from public disclosure pursuant to 10 CFR 2.790(d), referred to as the St. Lucie Unit 1 Security Plan dated October 18, 1978, with Revision No. 1 dated February 20, 1979.

ATTACHMENT 2

Re: St. Lucie Unit 1
Docket No. 50-335
Stretch Power

TECHNICAL SPECIFICATION CHANGES

8011200 258

FLORIDA POWER & LIGHT COMPANY
ST. LUCIE UNIT 1
STRETCH POWER APPLICATION
AND
ENVIRONMENTAL REPORT

ATTACHMENT 1

Re: St. Lucie Unit 1
Docket No. 50-335
Stretch Power

Paragraph 2.C.(1) of Operating License DPR-67 is revised as shown on the next page.

TABLE 1

St. Lucie Unit 1 - Stretch Power
Technical Specification and Bases Changes

Page	Specification	Change	Remarks
1-1	1.3	Change rated thermal power from 2560 Mwt to 2700 Mwt.	
2-2	Figure 2.1-1	Replace this figure with a revised figure.	The Thermal Limit Lines have been changed to reflect 2700 Mwt full power operation.
2-4	Table 2.2-1	Change the "steam generator pressure-low" setpoint from ≥500 psia to ≥600 psia.	The "steam generator pressure-low" setpoint is being increased to minimize the consequences of a Steam Line Break event.
2-5	Table 2.2-1	Add a "steam generator pressure difference-high" setpoint.	A trip for Asymmetric Steam Generator pressure has been added to minimize the consequences of the Loss of Load to One Steam Generator event.
2-5	Table 2.2-1	Change the "steam generator pressure-low" trip bypass from 585 psig to 685 psia.	The "steam generator pressure-low" trip bypass has been increased to be consistent with the new trip value.
2-7	Figure 2.2-2	Replace this figure with a revised figure.	The LPD LSSS is being changed to reflect operation at 2700 Mwt with higher radial peaking factors. These limits were generated using a fuel centerline melt limit of 21.7 kw/ft.
2-8	Figure 2.2-3	Replace this figure with a revised figure.	The TM/LP LSSS is being changed to reflect operation at 2700 Mwt with higher radial peaking factors.

TABLE 1 (continued)

Page	Specification	Change	Remarks
2-9	Figure 2.2-4	Replace this figure with a revised figure.	The TM/LP LSSS is being changed to reflect operation at 2700 Mwt with higher radial peaking factors.
B2-1,B2-3 B2-5,B2-7	B2.1,B2.2	Change the "W-3 DNB correlation" to "CE-1 DNB correlation", and change the minimum DNBR value from 1.30 to 1.23.	The DNB correlation used in the Cycle 4 analysis is the CE-1 correlation and the minimum DNBR has been reduced to 1.23.
B2-4	B2.2.1	Editorial change for clarification.	
B2-5	B2.2.1	Change "steam generator pressure-low" setpoint from 500 psia to 600 psia.	The basis of the "steam generator pressure-low" trip setpoint has been changed to be consistent with Table 2.2-1.
B2-7,B2-8	B2.2.1	Add a function description for the asymmetric steam generator transient protective trip.	
B2-7	B2.2.1	Revise the TM/LP Trip description.	The TM/LP Trip description has been revised to reflect the change in methodology from COSMO/W-3 to statistical TORC/CE-1 and the CEAW recategorization.
3/4 1-1	3/4.1.1.1	Change the Shutdown Margin for T-avg >200 F from 3.3%Δk/k to 4.3%Δk/k.	The shutdown margin has been increased to yield acceptable consequences from a Steam Line Break event due to the more negative MTC allowed in Cycle 4.

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TABLE 1 (continued)

Page	Specification	Change	Remarks
3/4 1-3	3/4.1.1.2	Change the Shutdown Margin for T-avg below 200 F from 1.0%Δk/k to 2.0%Δk/k.	The shutdown margin has been increased to lengthen the operator action time required in a boron dilution event.
3/4 1-5	3.1.1.4	Change the MTC limit to "less negative than $-2.5\text{X}10^{-4}$ Δk/k/°F."	The most negative MTC permitted for Cycle 4 has been made more negative for longer cycle lengths.
3/4 1-10	3.1.2.2	Change the Shtudown Margin equivalent at 200 F to at least 2%Δk/k.	The required shutdown margin has been increased to be consistent with Specification 3/4.1.1.2.
3/4 1-18	3.1.2.8	Change the Shutdown Margin equivalent to at least 2%Δk/k at 200 F.	The required shutdown margin has been increased to be consistent with Specification 3/4.1.1.2.
3/4 1-30	Figure 3.1-2	Replace this figure with a revised figure.	The PDIL is being changed to be consistent with the new LPD and TM/LP LSSS.
3/4 2-3	Figure 3.2-1	Change the allowable peak linear heat rate from 14.68 kw/ft to 15.0 kw/ft.	Increase the allowable peak linear heat rate to 15.0 kw/ft to be consistent with the ECCS analysis value.

TABLE 1 (continued)

Page	Specification	Change	Remarks
3/4 2-4	Figure 3.2-2	Replace this figure with a revised figure.	The kw/ft LCO is changed to reflect the new LOCA limit of 15.0 kw/ft and the higher radial peaking factors.
3/4 2-5	Figure 4.2-1	Replace this figure with a revised figure.	The incore monitoring system augmentation factors have been increased due to the higher enrichment fuel and uncertainty in the power distributions of future cycles.
3/4 2-6	3.2.2	Change the maximum calculated Fxy^T from 1.627 to 1.70.	The curves of Fr^T and Fxy^T vs. power are being changed to reflect operation at 2700 Mwt with higher radial peaking factors, new LPD LSSS, new TM/LP LSSS, new DNB LCO, and new LHR LCO.
3/4 2-8	Figure 3.2-3	Replace this figure with a revised figure.	Same remarks as for the preceding entry.
3/4 2-9	3.2.3	Change the maximum calculated Fr^T from 1.64 to 1.70.	Same remarks as for the preceding entry.
3/4 2-14	Table 3.2-1	Change maximum cold leg temperature to 549 F.	The cold leg temperature has been increased for Cycle 4 stretch power operation.
3/4 2-15	Figure 3.2-4	Replace this figure with a revised figure.	The DNB LCO is being changed to reflect operation at 2700 Mwt with a 549 F inlet temperature and higher radial peaking factors.
3/4 3-2	Table 3.3-1	Add "steam generator pressure difference-high" description to Table.	The asymmetric steam generator pressure trip has been added to the Table.

TABLE 1 (continued)

Page	Specification	Change	Remarks
3/4 3-4	Table 3.3-1	Change the "steam generator pressure-low" trip bypass from 585 psig to 685 psia.	The "steam generator pressure-low" trip bypass has been increased to be consistent with the new trip value.
3/4 3-6	Table 3.3-2	Add "steam generator pressure difference-high" response time.	The asymmetric steam generator pressure trip has been added to the Table.
3/4 3-7	Table 4.3-1	Add "steam generator pressure difference-high" surveillance.	The asymmetric steam generator pressure trip has been added to the Table.
3/4 3-12	Table 3.3-3	Change the "steam generator pressure-low" trip bypass for the Main Steam Line Isolation function from 585 psig to 685 psia.	The trip bypass has been increased to be consistent with the new trip value.
3/4 3-14	Table 3.3-4	Change the "steam generator pressure-low" setpoint for the Main Steam Line Isolation function to 600 psia.	The ESF setpoint has been increased to be consistent with the reactor trip setpoint.
3/4 4-1	3.4.1	Replace the entire page.	The shutdown margin requirement has been increased to yield acceptable consequences for a Steam Line Break event during one-loop operation due to the more negative MTC permitted during Cycle 4. Modes 4 and 5 shutdown margin has been increased to 4.3%Δk/k.

TABLE 1 (continued)

Page	Specification	Change	Remarks
B3/4 1-1	B3/4.1.1.1 B3/4.1.1.2	Change minimum Shutdown Margin from 3.3%Δk/k to 4.3%Δk/k, and from 1.0%Δk/k to 2.0%Δk/k.	The shutdown margins in the Bases have been increased to be consistent with Specifications 3.1.1.1 and 3.1.1.2.
B3/4 1-1	B3/4.1.1.4	Change MTC to -2.5×10^{-4} Δk/k/°F.	The most negative MTC permitted has been changed in the Bases to be consistent the Specification 3.1.1.4.
B3/4 1-2	B3/4.1.1.4	Change shutdown margin to 2.0%Δk/k after xenon decay and cooldown to 200 F.	The shutdown margin has been increased in the Bases to be consistent with Specification 3.1.1.2.
B3/4 2-2	B3/4.2.5	Change minimum DNBR to 1.23.	The minimum DNBR has been decreased to be consistent with Specification B2.1.
B3/4 4-1	B3/4.4.1	Change minimum DNBR to 1.23.	Same remarks as for preceding entry.
B3/4 7-1 B3/4 7-2	B3/4.7.1.1	Steam flows are revised to reflect 2700 Mwt.	

1.0 DEFINITIONS

DEFINED TERMS

1.1 The DEFINED TERMS of this section appear in capitalized type and are applicable throughout these Technical Specifications.

THERMAL POWER

1.2 THERMAL POWER shall be the total reactor core heat transfer rate to the reactor coolant.

RATED TERMAL POWER

1.3 RATED THERMAL POWER shall be a total reactor core heat transfer rate to the reactor coolant of 2700 MWt.

OPERATIONAL MODE

1.4 An OPERATIONAL MODE shall correspond to any one inclusive combination of core reactivity condition, power level and average reactor coolant temperature specified in Table 1.1.

ACTION

1.5 ACTION shall be those additional requirements specified as corollary statements to each principle specification and shall be part of the specifications.

OPERABLE - OPERABILITY

1.6 A system, subsystem, train, component or device shall be OPERABLE or have OPERABILITY when it is capable of performing its specified function(s). Implicit in this definition shall be the assumption that all necessary attendant instrumentation, controls, electric power, cooling or seal water, lubrication or other auxiliary equipment that are required for the system, subsystem, train, component or device to perform its function(s) are also capable of performing their related support function(s).

REPORTABLE OCCURRENCE

1.7 A REPORTABLE OCCURRENCE shall be any of those conditions specified in Specifications 6.9.1.8 and 6.9.1.9.

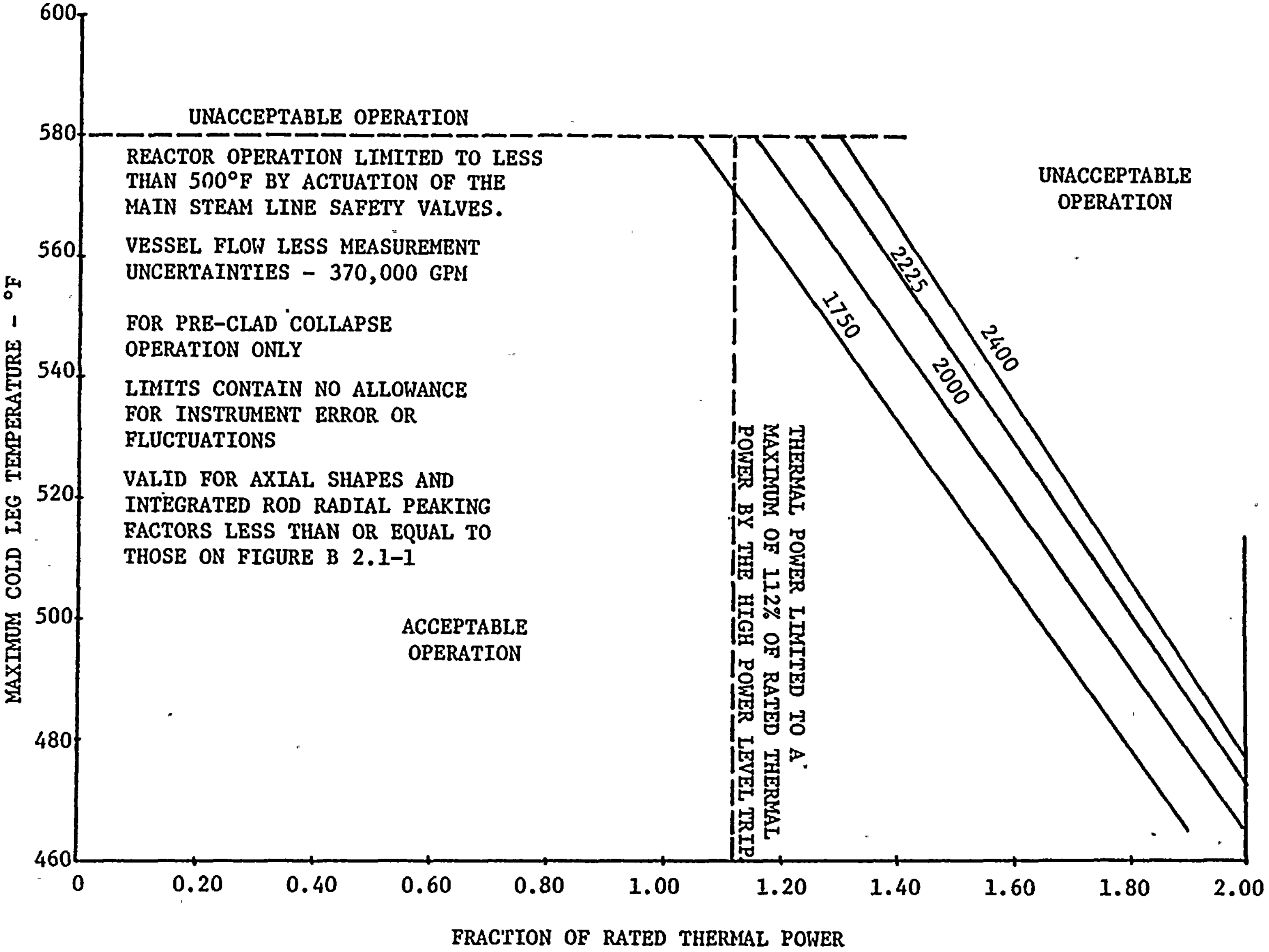

Figure 2.1-1 REACTOR CORE THERMAL MARGIN SAFETY LIMIT - FOUR REACTOR COOLING PUMPS OPERATING

TABLE 2.2-1
REACTOR PROTECTIVE INSTRUMENTATION TRIP SET POINT LIMITS

FUNCTIONAL UNIT	TRIP SET POINT	ALLOWABLE VALUES
1. Manual Reactor Trip	Not Applicable	Not Applicable
2. Power Level - High (1)		
Four Reactor Coolant Pumps Operating	$\leq$ 9.61% above THERMAL POWER, with a minimum set-point of 15% of RATED THERMAL POWER, and a maximum of $\leq$ 107.0% of RATED THERMAL POWER.	$\leq$ 9.61% above THERMAL POWER, and a minimum setpoint of 15% of RATED THERMAL POWER and a maximum of $\leq$ 107.0% of RATED THERMAL POWER
3. Reactor Coolant Flow - Low (1)		
Four Reactor Coolant Pumps Operating	$\geq$ 95% of design reactor coolant flow with 4 pumps operating*	$\geq$ 95% of design reactor coolant flow with 4 pumps operating*
4. Pressurizer Pressure-High	$\leq$ 2400 psia	$\leq$ 2400 psia
5. Containment Pressure-High	$\leq$ 3.3 psig	$\leq$ 3.3 psig
6. Steam Generator Pressure - Low (2)	$\geq$ 600 psia	$\geq$ 600 psia
7. Steam Generator Water Level-Low	$\geq$ 37.0% Water Level - each steam generator	$\geq$ 37.0% Water Level - each steam generator
8. Local Power Density - High (3)	Trip setpoint adjusted to not exceed the limit lines of Figures 2.2-1 and 2.2-2	Trip setpoint adjusted to not exceed the limit lines of Figures 2.2-1 and 2.2-2.

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* Design reactor coolant flow with 4 pumps operating is 370,000 gpm.

TABLE 2.2-1 (CONTINUED)
REACTOR PROTECTIVE INSTRUMENTATION TRIP SETPOINT LIMITS

FUNCTIONAL UNIT	TRIP SETPOINT	ALLOWABLE VALUES
9. Thermal Margin/Low Pressure (1)		
Four Reactor Coolant Pumps Operating	Trip setpoint adjusted to not exceed the limit lines of Figures 2.2-3 and 2.2-4.	Trip setpoint adjusted to not exceed the limit lines of Figures 2.2-3 and 2.2-4.
9a. Steam Generator Pressure Difference-High (1) (Logic in TM/LP)	$\leq$ 135 psid	$\leq$ 135 psid
10. Loss of Turbine--Hydraulic Fluid Pressure - Low (3)	$\geq$ 800 psig	$\geq$ 800 psig
11. Rate of Change of Power - High (4)	$\leq$ 2.49 decades per minutes	$\leq$ 2.49 decades per minuts

TABLE NOTATION

(1) Trip may be bypassed below 1% of RATED THERMAL POWER; bypass shall be automatically removed when THERMAL POWER is $\geq$ 1% of RATED THERMAL POWER.

(2) Trip may be manually bypassed below 685 psia; bypass shall be automatically removed at or above 685 psia.

(3) Trip may be bypassed below 15% of RATED THERMAL POWER; bypass shall be automatically removed when THERMAL POWER is $\geq$ 15% of RATED THERMAL POWER.

(4) Trip may be bypassed below 10^{-4}% and above 15% of RATED THERMAL POWER.

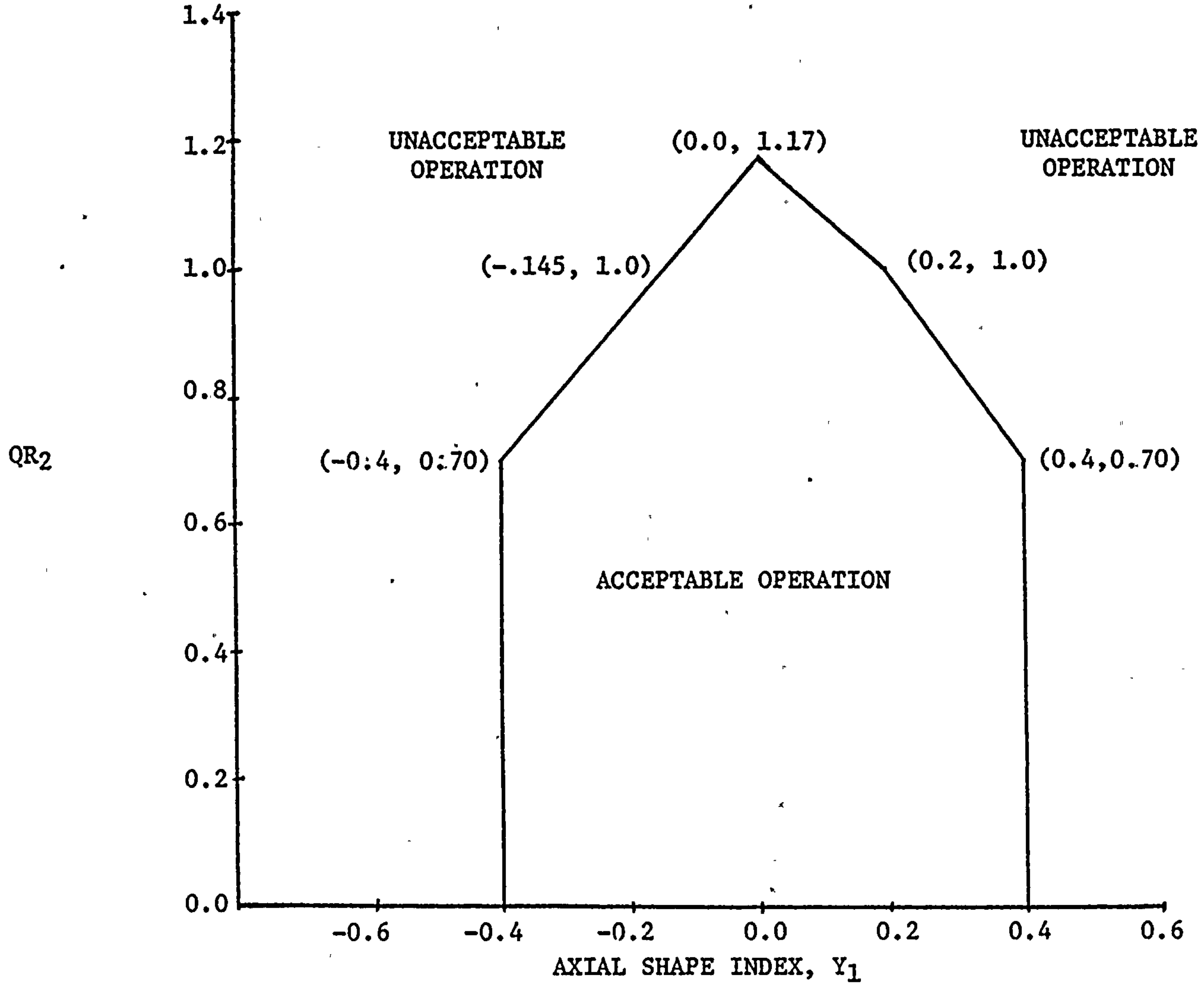

FIGURE 2.2-2

Local Power Density-High Trip Setpoint Part 2(QR_2 Versus Y_1)

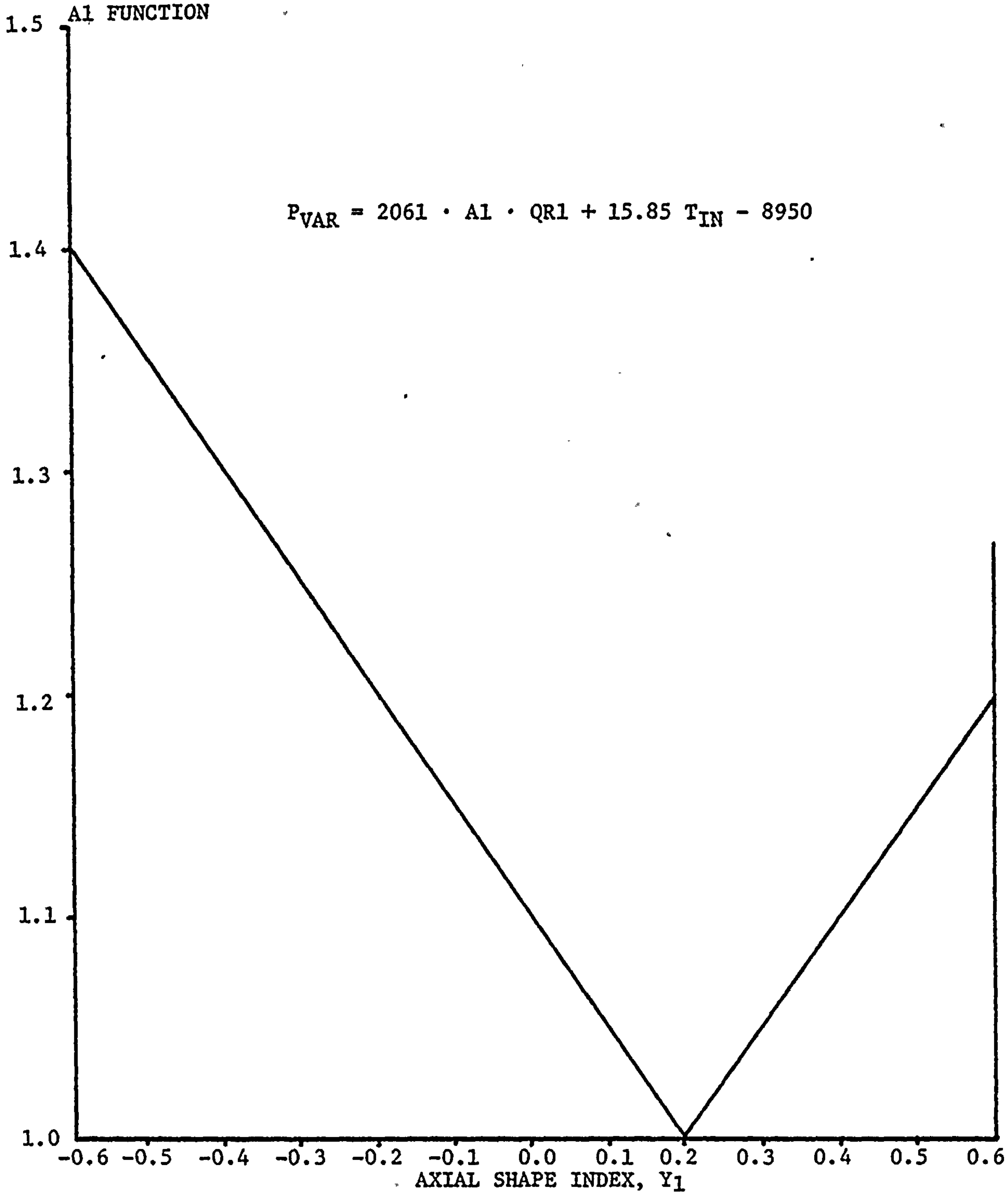

FIGURE 2.2-3

Thermal Margin/Low Pressure Trip Setpoint

$P_{VAR} = 2061 \cdot A1 \cdot QR1 + 15.85\ T_{IN} - 8950$

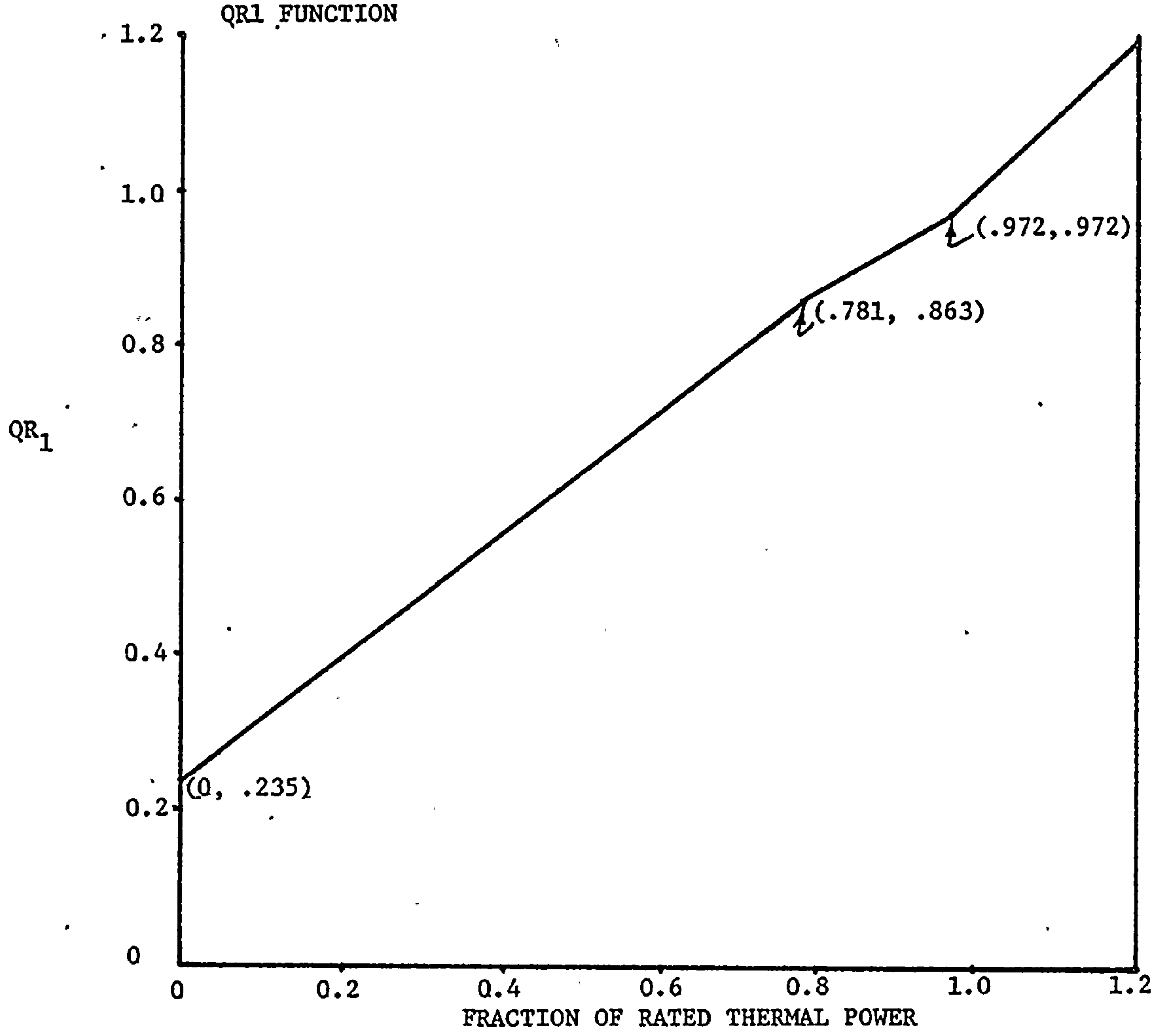

FIGURE 2.2-4

Thermal Margin/Low Pressure Trip Setpoint
Part 2 (Fraction of RATED THERMAL POWER Versus QR_1)

2.1.1 REACTOR CORE

The restrictions of this safety limit prevent overheating of the fuel cladding and possible cladding perforation which would result in the release of fission products to the reactor coolant. Overheating of the fuel is prevented by maintaining the steady state peak linear heat rate below the level at which centerline fuel melting will occur. Overheating of the fuel cladding is prevented by restricting fuel operation to within the nucleate boiling regime where the heat transfer coefficient is large and the cladding surface temperature is slightly above the coolant saturation temperature.

Operation above the upper boundary of the nucleate boiling regime could result in excessive cladding temperatures because of the onset of departure from nucleate boiling (DNB) and the resultant sharp reduction in heat transfer coefficient. DNB is not a directly measurable parameter during operation and therefore THERMAL POWER and Reactor Coolant Temperature and Pressure have been related to DNB through the CE-1 correlation. The CE-1 DNB correlation has been developed to predict the DNB flux and the location of DNB for axially uniform and non-uniform heat flux distributions. The local DNB heat flux ratio, DNBR, defined as the ratio of the heat flux that would cause DNB at a particular core location to the local heat flux, is indicative of the margin to DNB.

The minumum value of the DNBR during steady state operation, normal operational transients, and anticipated transients is limited to 1.23. This value corresponds to a 95 percent probability at a 95 percent confidence level that DNB will not occur and is chosen as an appropriate margin to DNB for all operating conditions.

The curves of Figure 2.1-1 show the loci of points of THERMAL POWER, Reactor Coolant System pressure and maximum cold leg temperature with four Reactor Coolant Pumps operating for which the minimum DNBR is no less than 1.23 for the family of axial shapes and corresponding radial peaks shown in Figure B 2.1-1. The limits in Figure 2.1-1 were calculated for reactor coolant inlet temperatures less than or equal to 580°F. The dashed line at 580°F coolant inlet temperature is not a safety limit; however, operation above 580°F is not possible because of the actuation of the main steam line safety valves which limit the maximum value of reactor inlet temperature. Reactor operation at THERMAL POWER levels higher than 112% of RATED THERMAL POWER is prohibited by the high power level trip setpoint specified in Table 2.1-1. The area of safe operation is below and to the left of these lines.

The conditions for the Thermal Margin Safety Limit curves in Figure 2.1-1 to be valid are shown on the figure.

The reactor protective system in combination with the Limiting Conditions for Operation, is designed to prevent any anticipated combination of transient conditions for reactor coolant system temperature, pressure, and thermal power level that would result in a DNBR of less than 1.23 and preclude the existence of flow instabilities.

2.1.2 REACTOR COOLANT SYSTEM PRESSURE

The restriction of this Safety Limit protects the integrity of the Reactor Coolant System from overpressurization and thereby prevents the release of radionuclides contained in the reactor coolant from reaching the containment atmosphere.

The reactor pressure vessel and pressurizer are designed to Section III of the ASME Code for Nuclear Power Plant components which permits a maximum transient pressure of 110% (2750 psia) of design pressure. The Reactor Coolant System piping, valves and fittings, are designed to ANSI B 31.7, Class I which permits a maximum transient pressure of 110% (2750 psia) of component design pressure. The Safety Limit of 2750 psia is therefore consistent with the design criteria and associated code requirements.

The entire Reactor Coolant System is hydrotested at 3125 psia to demonstrate integrity prior to initial operation.

2.2 LIMITING SAFETY SYSTEM SETTINGS

2.2.1 REACTOR TRIP SETPOINTS

The Reactor Trip Setpoints specified in Table 2.2-1 are the values at which the Reactor Trips are set for each parameter. The Trip Values have been selected to ensure that the reactor core and reactor coolant system are prevented from exceeding their safety limits. Operation with a trip set less conservative than its Trip Setpoint but within its specified Allowable Value is acceptable on the basis that the difference between each Trip Setpoint and the Allowable Value is equal to or less than the drift allowance assumed for each trip in the safety analyses.

Manual Reactor Trip

The Manual Reactor Trip is a redundant channel to the automatic protective instrumentation channels and provides manual reactor trip capability.

Power Level-High

The Power Level-High trip provides reactor core protection against reactivity excursions which are too rapid to be protected by a Pressurizer Pressure-High or Thermal Margin/Low Pressure Trip.

The Power Level-High trip setpoint is operator adjustable and can be set no higher than 9.61% above the indicated THERMAL POWER level. Operator action is required to increase the trip setpoint as THERMAL POWER is increased. The trip setpoint is automatically decreased as THERMAL POWER decreases. The trip setpoint has a maximum value of 107.0% of RATED THERMAL POWER and a minimum setpoint of 15% of RATED THERMAL POWER. Adding to this maximum value the possible variation in trip point due to calibration and instrument errors, the maximum actual THERMAL POWER level at which a trip would be actuated is 112% of RATED THERMAL POWER, which is consistent with the value used in the safety analysis.

Reactor Coolant Flow-Low

The Reactor Coolant Flow-Low trip provides core protection to prevent DNB in the event of a sudden significant decrease in reactor coolant flow. Provisions have been made in the reactor protective system to permit operation of the reactor at reduced power if one or two

Reactor Coolant Flow-Low (continued)

reactor coolant pumps are taken out of service. The low-flow trip setpoints and Allowable Values for the various reactor coolant pump combinations have been derived in consideration of instrument errors and response times of equipment involved to maintain the DNBR above 1.23 under normal operation and expected transients. For reactor operation with only two or three reactor coolant pumps operating, the Reactor Coolant Flow-Low trip setpoints, the Power Level-High trip setpoints, and the Thermal Margin/Low Pressure trip setpoints are automatically changed when the pump condition selector switch is manually set to the desired two- or three-pump position. Changing thse trip setpoints during two and three pump operation prevents the minimum value of DNBR from going below 1.23 during normal operational transients and anticipated transients when only two or three reactor coolant pumps are operating.

Pressurizer Pressure- High

The Pressurizer Pressure-High trip, backed up by the pressurizer code safety valves and main stream line safety valves, provides reactor coolant system protection against overpressurization in the event of loss of load without reactor trip. This trip's setpoint is 100 psi below the nominal lift setting (2500 psia) of the pressurizer code safety valves and its concurrent operation with the power-operated relief valves avoids the undesirable operation of the pressurizer code safety valves.

Containment Pressure- High

The Containment Pressure-High trip provides assurance that a reactor trip in initiated concurrently with a safety injection.

Steam Generator Pressure - Low

The Steam Generator Pressure-Low trip provides protection against an excessive rate of heat extraction from the steam generators and subsequent cooldown of the reactor coolant. The setting of 600 psia is sufficiently below the full-load operating point of 800 psig so as not

Thermal Margin/Low Pressure

The Thermal Margin/Low Pressure trip is provided to prevent operation when the DNBR is less than 1.23.

The trip is initiated whenever the reactor coolant system pressure signal drops below either 1887 psia or a computed value as described below, whichever is higher. The computed value is a function of the higher of ΔT power or neutron power, reactor inlet temperature, the number of reactor coolant pumps operating and the AXIAL SHAPE INDEX. The minimum value of reactor coolant flow rate, the maximum AZIMUTHAL POWER TILT and the maximum CEA deviation permitted for continuous operation are assumed in the generation of this trip function. In addition, CEA group sequencing in accordance with Specifications 3.1.3.5 and 3.1.3.6 is assumed. Finally, the maximum insertion of CEA banks which can occur during any anticipated operational occurrence prior to a Power Level-High trip is assumed.

The Thermal Margin/Low Pressure trip setpoints include appropriate allowances for equipment response time, calculational and measurement uncertainties, and processing error. A further allowance of 30 psia is included to compensate for the time delay associated with providing effective termination of the occurrence that exhibits the most rapid decrease in margin to the DNBR limit.

Asymmetric Steam Generator Transient Protective Trip Function (ASGTPTF)

The ASGTPTF consists of steam generator pressure inputs to the TM/LP calculator, which causes a reactor trip when the difference in pressure between the two steam generators exceeds the trip setpoint. The ASGTPTF is designed to provide a reactor trip for those events associated with the secondary system which result in asymmetric primary loop coolant temperatures. The most limiting event is the loss of load to one steam generator caused by a single main steam isolation valve closure.

The equipment trip setpoint and allowable values are calculated to account for instrument uncertainties, and will ensure a trip at or before reaching the analysis setpoint.

Loss of Turbine

A Loss of Turbine trip causes a direct reactor trip when operating above 15% of RATED THERMAL POWER. This trip provides turbine protection, reduces the severity of the ensuing transient and helps avoid the lifting of the main steam line safety valves during the ensuing transient, thus extending the service life of these valves. No credit was taken in the accident analyses for operation of this trip. Its functional capability at the specified trip setting is required to enhance the overall reliability of the Reactor Protection System.

Rate of Change of Power-High

The Rate of Change of Power-High trip is provided to protect the core during startup operations and its use serves as a backup to the administratively enforced startup rate limit. Its trip setpoint does not correspond to a Safety Limit and no credit was taken in the accident analyses for operation of this trip. Its functional capability at the specified trip setting is required to enhance the overall reliability of the Reactor Protection System.

3/4.1 REACTIVITY CONTROL SYSTEMS

3/4.1.1 BORATION CONTROL

SHUTDOWN MARGIN - T_{AVG} >200°F

LIMITING CONDITION FOR OPERATION

3.1.1.1 The SHUTDOWN MARGIN shall be $\geq$ 4.3% $\Delta k/k$.

APPLICABLITY: MODES 1, 2, 3, and 4.

ACTION:

With the SHUTDOWN MARGIN < 4.3% $\Delta k/k$, immediately initiate and continue boration at $\geq$ 40 gpm of 1720 ppm boron or equivalent until the required SHUTDOWN MARGIN is restored.

SURVEILLANCE REQUIREMENTS

4.1.1.1.1 The SHUTDOWN MARGIN shall be determined to be $\geq$ 4.3% $\Delta k/k$:

a. Within one hour after detection of an inoperable CEA(s) and at least once per 12 hours thereafter while the CEA(s) is inoperable. If the inoperable CEA is immovable or untrippable, the above required SHUTDOWN MARGIN shall be increased by an amount at least equal to the withdrawn worth of the immovable or untrippable CEA(s).

b. When in MODES 1 or 2#, at least once per 12 hours by verifying that CEA group withdrawal is within the Power Dependent Insertion Limits of Specification 3.1.3.6.

c. When in MODE 2##, at last once during CEA withdrawal and at least once per hour thereafter until the reactor is critical.

d. Prior to initial operation above 5% RATED THERMAL POWER after each fuel loading, by consideration of the factors of e below, with the CEA groups at the Power Dependent Insertion Limits of Specification 3.1.3.6.

---

* See Special Test Exception 3.10.1.

\# With $K_{eff} \geq 1.0$.

\## With $K_{eff} < 1.0$

SHUTDOWN MARGIN - $T_{avg} \leq 2.0\%$ $\Delta k/k$.

LIMITING CONDITION FOR OPERATION

3.1.1.2 The SHUTDOWN MARGIN shall be $\geq 2.0\%$ $\Delta k/k$.

APPLICABILITY: MODE 5.

With the SHUTDOWN MARGIN $< 2.0\%$ $\Delta k/k$, immediately initiate and continue boration at ≥ 40 gpm of 1720 ppm boron or equivalent until the required SHUTDOWN MARGIN is restored.

SURVEILLANCE REQUIREMENTS

4.1.1.2 The SHUTDOWN MARGIN shall be determined to be $\geq 2.0\%$ $\Delta k/k$:

a. Within one hour afer detection of an inoperable CEA(s) and at least once per 12 hours thereafter while the CEA(s) is inoperable. If the inoperable CEA is immovable or untrippable, the above required SHUTDOWN MARGIN shall be increased by an amount at least equal to the withdrawn worth of the immovable or untrippable CEA(s).

b. At least once per 24 hours by consideration of the following factors:

1. Reactor coolant system boron concentration,
2. CEA position,
3. Reactor coolant system average temperature,
4. Fuel burnup based on gross thermal energy generation,
5. Xenon concentration, and
6. Samarium concentration.

MODERATOR TEMPERATURE COEFFICIENT

LIMITING CONDITION FOR OPERATION

3.1.1.4 The moderator temperature coefficient (MTC) shall be:

a. Less positive than 0.5×10^{-4} $\Delta k/k/°F$ whenever THERMAL POWER is $\leq$ 70% of RATED THERMAL POWER,

b. Less positive than 0.2×10^{-4} $\Delta k/k/°F$ whenever THERMAL POWER is > 70% of RATED THERMAL POWER, and

c. Less negative than -2.5×10^{-4} $\Delta k/k/°F$ at RATED THERMAL POWER.

APPLICABILITY: MODES 1 and 2*#

ACTION:

With the moderator temperature coefficient outside any one of the above limits, be in HOT STANDBY within 6 hours.

SURVEILLANCE REQUIREMENTS

4.1.1.4.1 The MTC shall be determined to be within its limits by confirmatory measurements. MTC measured values shall be extrapolated and/or compensated to permit direct comparison with the above limits.

---

*With $K_{eff} \geq 1.0$.

#See Special Test Exception 3.10.2

FLOW PATHS - OPERATING

LIMITING CONDITION FOR OPERATION

3.1.2.2 At least two of the following three boron injection flow paths and one associated heat tracing circuit shall be OPERABLE:

a. Two flow paths from the boric acid makeup tanks via either a boric acid pump or a gravity feed connection and a charging pump to the Reactor Coolant System, and

b. The flow path from the refueling water tank via a charging pump to the Reactor Coolant System.

APPLICABILITY: MODES 1, 2, 3 and 4.

ACTION:

With only one of the above required boron injection flow paths to the Reactor Coolant System OPERABLE, restore at least two boron injection flow paths to the Reactor Coolant System to OPERABLE status within 72 hours or make the reactor subcritical within the next 2 hours and borate to a SHUTDOWN MARGIN equivalent to at least 2% Δk/k/ at 200°F; restore at least two flow paths to OPERABLE status within the next 7 days or be in COLD SHUTDOWN within the next 30 hours.

SURVEILLANCE REQUIREMENTS

4.1.2.2 At least two of the above required flow paths shall be demonstrated OPERABLE:

a. At least once per 7 days by:

1. Cycling each testable power operated or automatic valve in the flow path through at least one complete cycle of full travel.

BORATED WATER SOURCES - OPERATING

LIMITING CONDITION FOR OPERATION

3.1.2.8 At least two of the following three borated water sources shall be OPERABLE,

a. Two boric acid makeup tanks and one associated heat tracing circuit with the contents of the tanks in accordance with Figure 3.1-1, and

b. The refueling water tank with:

1- A minimum contained volume of 401,800 gallons of water,
2- A minimum boron concentration of 1720 ppm,
3- A minimum solution temperature of 100°F,
4- A minimum solution temperature of 55°F when in MODES 1 and 2, and
5- A minimum solution temperature of 40°F when in MODES 3 and 4.

APPLICABILITY: MODES 1, 2, 3 and 4.

ACTION:

With only one borated water source OPERABLE, restore at least two borated water sources to OPERABLE status within 72 hours or make the reactor subcritical within the next 2 hours and borate to a SHUTDOWN MARGIN equivalent to at least 2% Δk/k at 200°F; restore at least two borated water sources to OPERABLE status wihin the next 7 days or be in COLD SHUTDOWN within the next 30 hours.

SURVEILLANCE REQUIERMENTS

4.1.2.8 At least two borated water sources shall be demonstrated OPERABLE:

a. At least once per 7 days by:

1. Verifying the boron concentration in each water source.

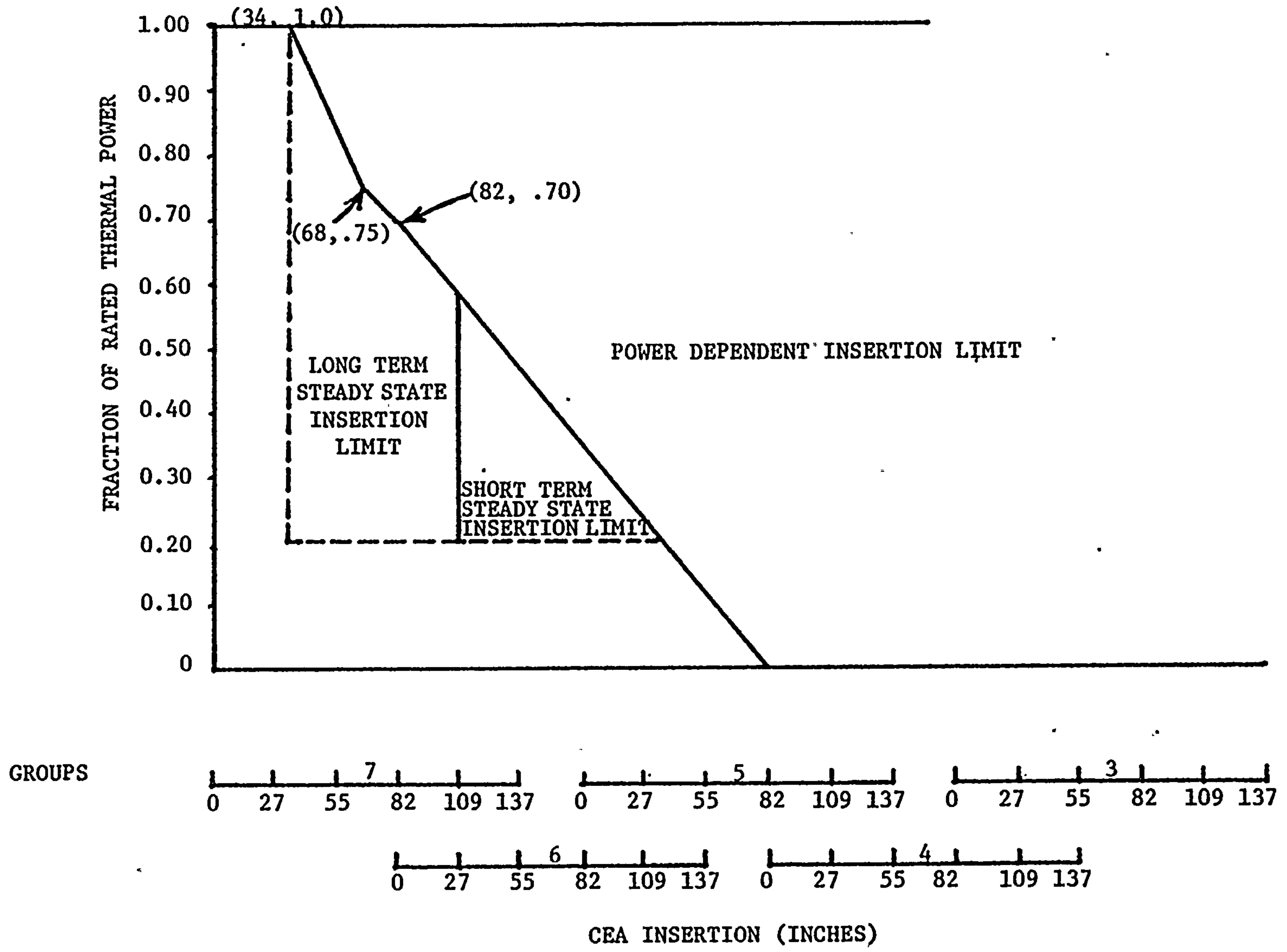

Figure 3.1-2 CEA Insertion Limits vs THERMAL POWER with 4 Reactor Coolant Pumps Operating

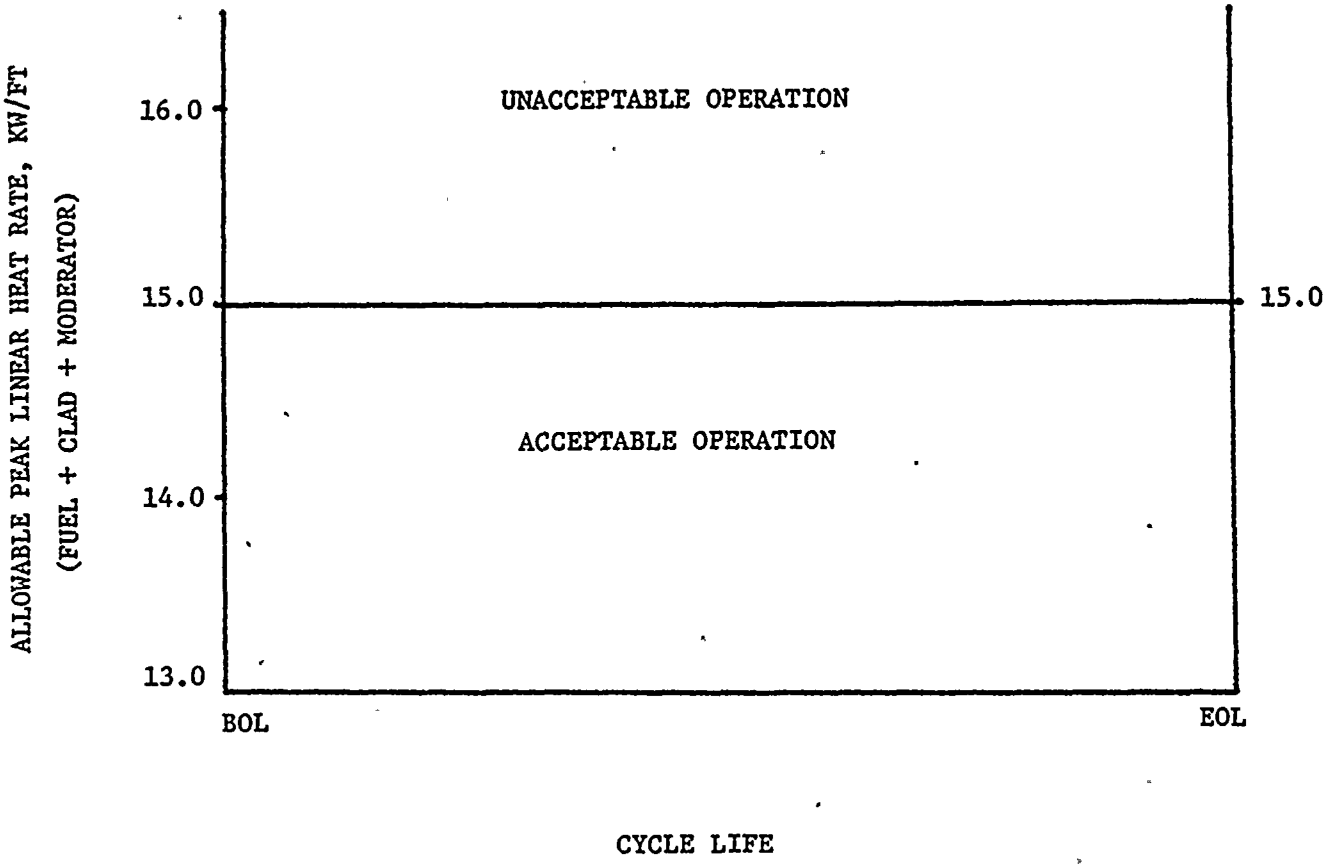

FIGURE 3.2-1 Allowable Peak Linear Heat Rate vs Burnup

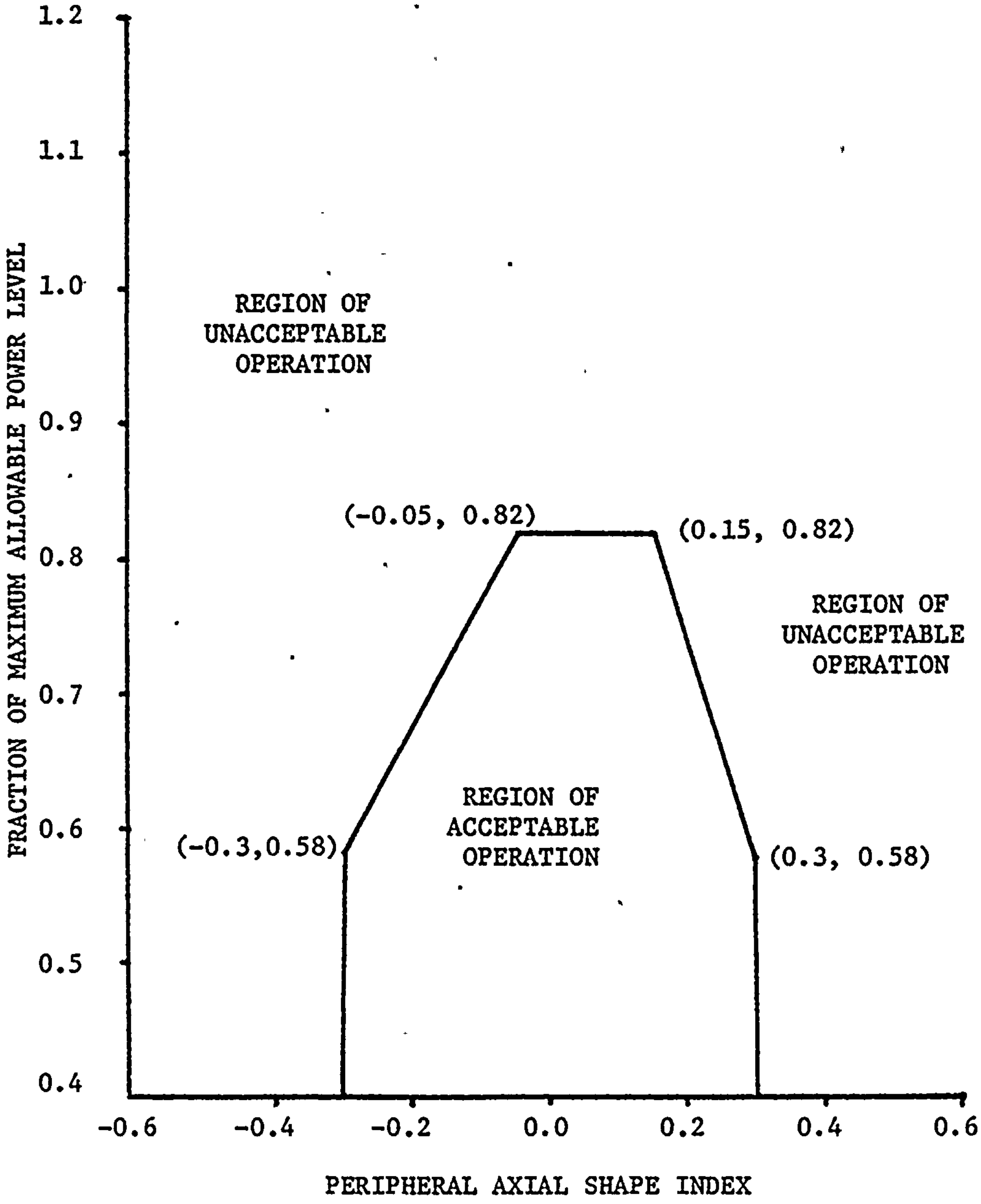

FIGURE 3.2-2

AXIAL SHAPE INDEX vs. Fraction of Maximum Allowable Power Level Per Specification 4.2.1.3

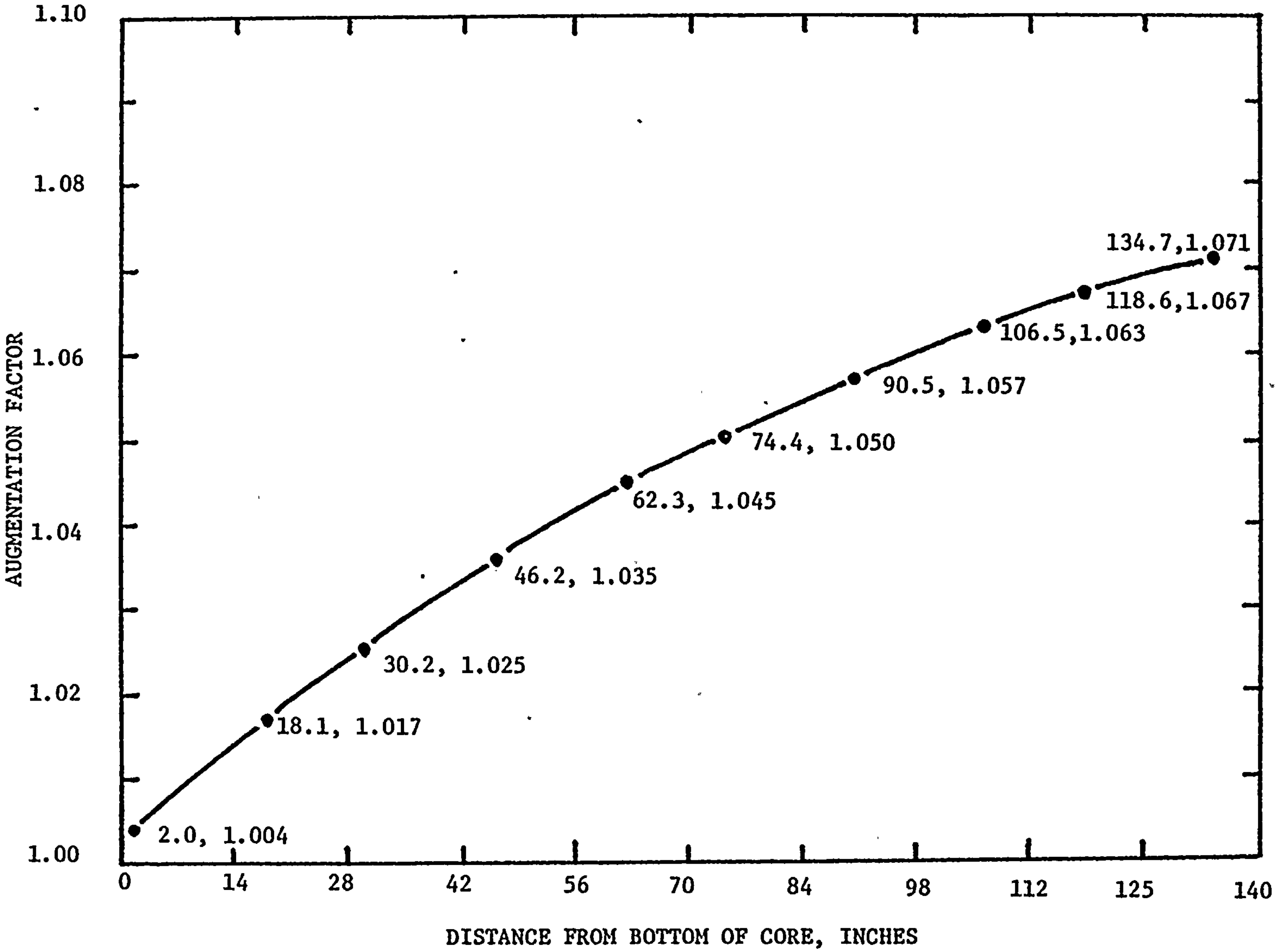

FIGURE 4.2-1

AUGMENTATION FACTORS vs DISTANCE FROM BOTTOM OF CORE

TOTAL PLANAR RADIAL PEAKING FACTOR - F^T_{xy}

LIMITING CONDITION FOR OPERATION

3.2.2 The calculated value F^T_{xy} defined as $F^T_{xy} = F_{xy}(1+T_q)$, shall be limited to ≤ 1.70.

APPLICABILITY: MODE 1*.

ACTION:

With $F^T_{xy} > 1.70$, within 6 hours either:

a. Reduce THERMAL POWER to bring the combination of THERMAL POWER and F^T_{xy} to within the limits of Figure 3.2-3 and withdraw the full length CEAs to or beyond the Long Term Steady State Insertion Limits of Specification 3.1.3.6; or

b. Be in HOT STANDBY.

SURVEILLANCE REQUIREMENTS

4.2.2.1 The provisions of Specifications 4.0.4 are not applicable.

4.2.2.2 F^T_{xy} shall be calculated by the expression $F^T_{xy} = F_{xy} (1+T_q)$ when in non-LOAD FOLLOW OPERATION and by the expression $F^T_{xy} = 1.03 F_{xy} (1+T_q)$ when in LOAD FOLLOW OPERATION. F^T_{xy} shall be determined to be within its limit at the following intervals:

a. Prior to operation above 70 percent of RATED THERMAL POWER after each fuel loading,

b. At least once per 31 days of accumulated operation in MODE 1, and

c. Within four hours if the AZIMUTHAL POWER TILT (T_q) is > 0.03.

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* See Special Test Exception 3.10.2.

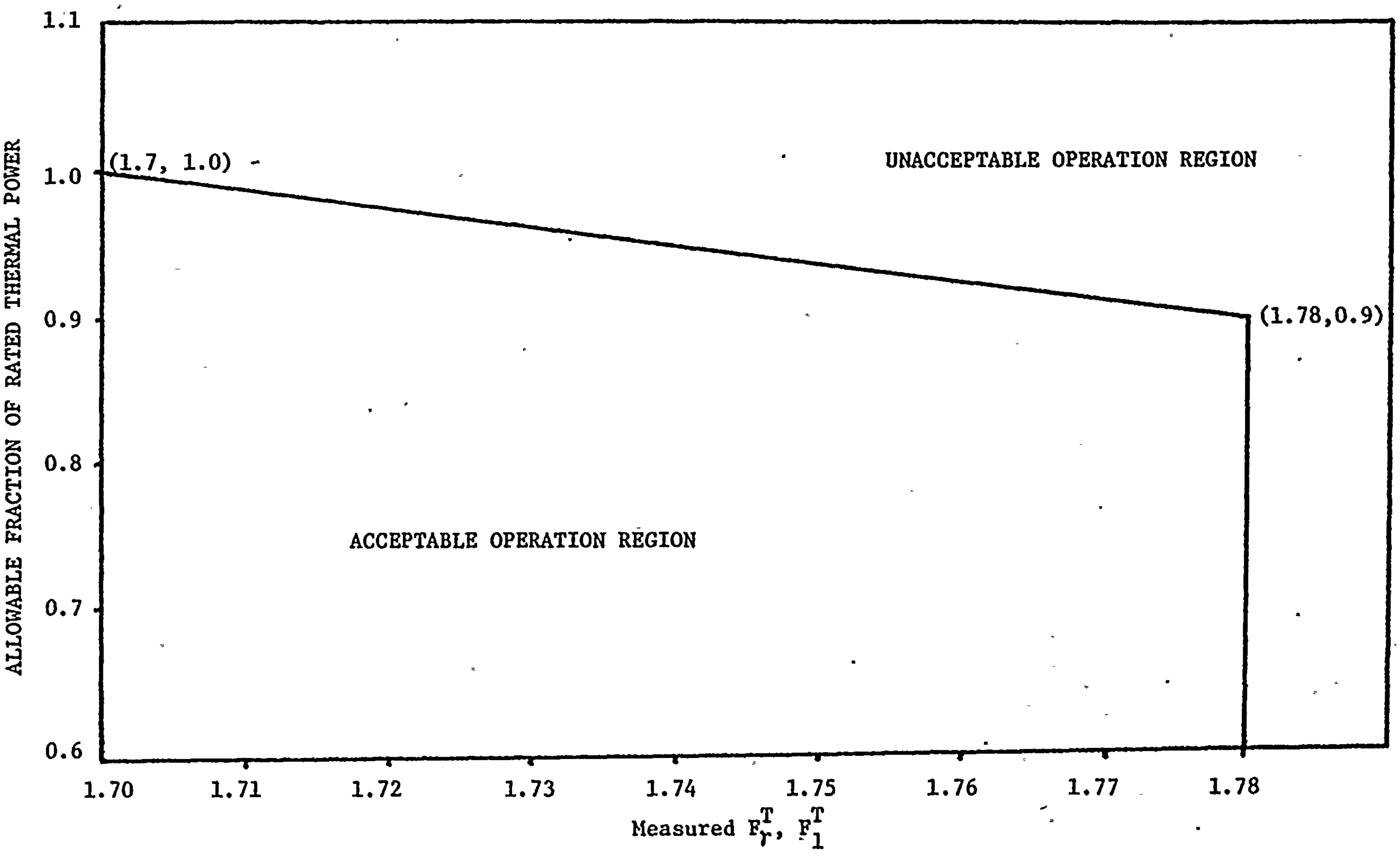

FIGURE 3.2-8
Allowable Combinations Of Thermal Power And F_r^T, F_{xy}^T

TOTAL INTEGRATED RADIAL PEAKING FACTOR - F_r^T

LIMITING CONDITION FOR OPERATION

3.2.3 The calculated value of F_r^T, defined as $F_r^T = F_r \ (1+T_q)$, shall be limited to ≤ 1.70.

APPLICABILITY: MODE 1*.

ACTION:

With $F_r^T > 1.70$, within 6 hours either:

a. Be in at least HOT STANDBY, or

b. Reduce THERMAL POWER to bring the combination of THERMAL POWER and F_r^T to within the limits of Figure 3.2-3 and withdraw the full length CEAs to or beyond the Long Term Steady State Insertion Limits of Specification 3.1.3.6. The THERMAL POWER limit determined from Figure 3.2-3 shall then be used to establish a revised upper THERMAL POWER level limit on Figure 3.2-4 (truncate Figure 3.2-4 at the allowable fraction of RATED THERMAL POWER determined by Figure 3.2-3) and subsequent operation shall be maintained within the reduced accceptable operation of Figure 3.2-4.

SURVEILLANCE REQUIREMENTS

4.2.3.1 The provisions of Specification 4.0.4 are not applicable.

4.2.3.2 F_r^T shall be calculated by the expression $F_r^T = F_r(1+T_q)$ when in non-LOAD FOLLOW OPERATION and by the expression $F_r^T = 1.02 \ F_r(1+T_q)$ when in LOAD FOLLOW OPERATION. F_r^T shall be determined to be within its limit at the following intervals.

a. Prior to operation above 70 percent of RATED THERMAL POWER after each fuel loading.

b. At least once per 31 days of accumulated operation in MODE 1, and

c. Within four hours if the AZIMUTHAL POWER TILT (T_q) is > 0.03.

---

*See Special Test Exception 3.10.2.

TABLE 3.2-1

DNB MARGIN

LIMITS

Parameter	Four Reactor Coolant Pumps Operating
Cold Leg Temperature	≤ 549°F
Pressurizer Pressure	≥ 2225 psia*
Reactor Coolant Flow Rate	≥ 370,000 gpm
AXIAL SHAPE INDEX	Figure 3.2-4

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* Limit not applicable during either a THERMAL POWER ramp increase in excess of 5% of RATED THERMAL POWER or a THERMAL POWER step increase of greater than 10% of RATED THERMAL POWER.

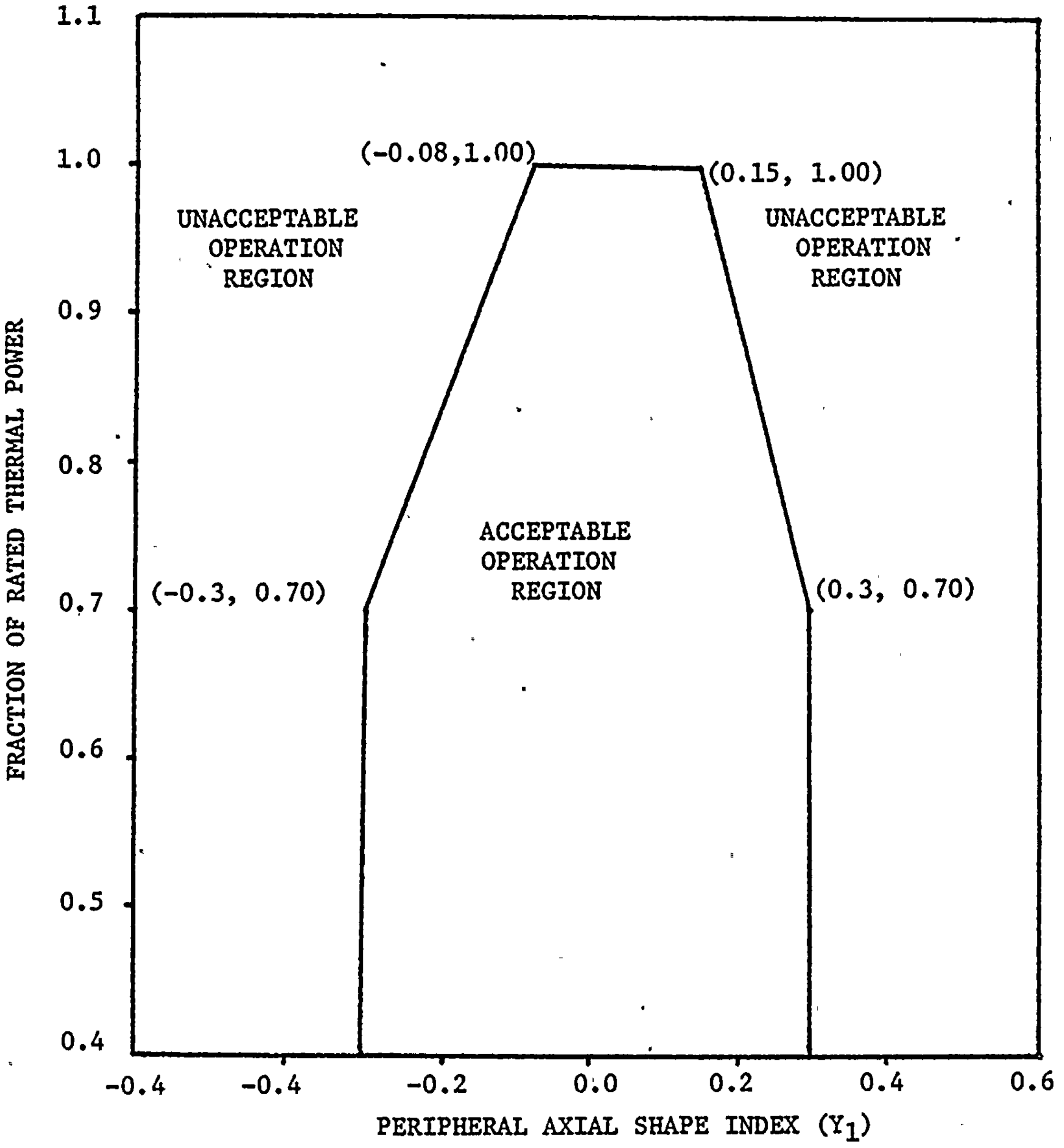

FIGURE 3.2-4
AXIAL SHAPE INDEX Operating Limits With 4 Reactor Coolant Pumps Operating

TABLE 3.3-1

REACTOR PROTECTIVE INSTRUMENTATION

FUNCTIONAL UNIT	TOTAL NO. OF CHANNELS	CHANNELS TO TRIP	MINIMUM CHANNELS OPERABLE	APPLICABLE MODES	ACTION
1. Manual Reactor Trip	2	1	2	1, 2 and *	1
2. Power Level - High	4	2(a)	3(f)	1, 2	2#
3. Reactor Coolant Flow - Low	4/SG	2(a)/SG	3/SG	1, 2 (e)	2#
4. Pressurizer Pressure - High	4	2	3	1, 2	2#
5. Containment Pressure - High	4	2	3	1, 2	2#
6. Steam Generator Pressure - Low	4/SG	2(b)/SG	3/SG	1, 2	2#
7. Steam Generator Water Level - Low	4/SG	2/SG	3/SG	1, 2	2#
8. Local Power Density - High	4	2(c)	3	1	2#
9. Thermal Margin/Low Pressure	4	2(a)	3	1, 2 (e)	2#
9a. Steam Generator Pressure Difference -High	4	2(a)	3	1, 2 (e)	2#
10. Loss of Turbine- -Hydraulic Fluid Pressure - Low	4	2(c)	3	1	2#

TABLE 3.3-1 (CONTINUED)

TABLE NOTATION

* With the protective system trip breakers in the closed position and the CEA drive system capable of CEA withdrawal.

\# The provisions of Specificatin 3.0.4 are not applicable.

(a) Trip may be bypassed below 1% of RATED THERMAL POWER; bypass shall be automatically removed when THERMAL POWER is $\geq$ 1% of RATED THERMAL POWER.

(b) Trip may be mannually bypassed below 685 psia; bypass shall be automatically removed at or above 685 psia.

(c) Trip may be bypassed below 15% of RATED THERMAL POWER; bypass shall be automatically removed when THERMAL POWER IS $\geq$ 15% of RATED THERMAL POWER.

(d) Trip may be bypassed below 10^{-4}% and above 15% of RATED THERMAL POWER; bypass shall be automatically removed when THERMAL power is $\geq 10^{-4}$% or $\leq$ 15% of RATED THERMAL POWER.

(e) Trip may be bypassed during testing pursuant to Special Test Exception 3.10.3.

(f) There shall be at last two decades of overlap between the Wide Range Logarithmic Neutron Flux Monitoring Channels and the Power Range Neutron Flux Monitoring Channels.

ACTION STATEMENTS

ACTION 1 - With the number of channels OPERABLE one less than required by the Minimum Channels OPERABLE requirement, restore the inoperable channel to OPERABLE status wihin 48 hours or be in HOT STANDBY within the next 6 hours and/or open the protective system trip breakers.

ACTION 2 - With the number of OPERABLE channels one less than the Total Number of Channels, STARTUP and/or POWER OPERATION may proceed provided the following conditions are satisfied:

a. The inoperable channel is placed in either the bypassed or tripped condition within 1 hour. For the purposes of testing and maintenance, the inoperable channel may be bypassed for up to 48 hours from time of initial loss of OPERABILITY; however, the inoperable channel shall then be either restored to OPERABLE status or placed in the tripped condition.

TABLE 3.3-2

REACTOR PROTECTIVE INSTRUMENTATION RESPONSE TIMES

FUNCTIONAL UNIT	RESPONSE TIME
1. Manual Reactor Trip	Not Applicable
2. Power Level - High	$\leq$ 0.40 seconds*# and $\leq$ 8.0 seconds##
3. Reactor Coolant Flow - Low	$\leq$ 0.65 seconds
4. Pressurizer Pressure - High	$\leq$ 0.90 seconds
5. Containment Pressure - High	$\leq$ 1.40 seconds
6. Steam Generator Pressure - Low	$\leq$ 0.90 seconds
7. Steam Generator Water Level - Low	$\leq$ 0.90 seconds
8. Local Power Density - High	$\leq$ 0.40 seconds*# and $\leq$ 8.0 seconds##
9. Thermal Margin/Low Pressure	$\leq$ 0.90 seconds*# and $\leq$ 8.0 seconds##
9a. Steam Generator Pressure Difference - High	$\leq$ 0.90 seconds
10. Loss of Turbine- -Hydraulic Fluid Pressure - Low	Not Applicable
11. Wide Range Logarithmic Neutron Flux Monitor	Not Applicable

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* Neutron detectors are exempt from response time testing. Response time shall be measured from detector output or input of first electronic component in channel.

\# Response time does not include contribution of RTDs.

\## RTD response time only. This value is equivalent to the time interval required for the RTDs output to achieve 63.2% of its total change when subjected to a step change in RTD temperature.

TABLE 4.3-1

REACTOR PROTECTIVE INSTRUMENTATION SURVEILLANCE REQUIREMENTS

	FUNCTIONAL UNIT	CHANNEL CHECK	CHANNEL CALIBRATION	CHANNEL FUNCTIONAL TEST	MODES IN WHICH SURVEILLANCE REQUIRED
1.	Manual Reactor Trip	N.A.	N.A.	S/U(1)	N.A.
2.	Power Level - High				
	a. Nuclear Power	S	D(2), M(3),Q(5)	M	1, 2
	B. ΔT Power	S	D(4), Q	M	1
3.	Reactor Coolant Flow - Low	S	R	M	1, 2
4.	Pressurizer Pressure - High	S	R	M	1, 2
5.	Containment Pressure - High	S	R	M	1, 2
6.	Steam Generator Pressure - Low	S	R	M	1, 2
7.	Steam Generator Water Level - Low	S	R	M	1, 2
8.	Local Power Density - High	S	R	M	1
9.	Thermal Margin/Low Pressure	S	R	M	1, 2
9a.	Steam Generator Pressure Difference - High	S	R	M	1, 2
10.	Loss of Turbine--Hydraulic Fluid Pressure - Low	N.A .	N.A.	S/U(1)	N.A.
11.	Wide Range Logarithmic Neutron Flux Monitor	S	N.A.	S/U(1)	1, 2, 3, 4, 5 and *
12.	Reactor Protection System Logic	N.A.	N.A.	M and S/U(1)	1, 2 and *
13.	Reactor Trip Breakers	N.A.	N.A.	M	1, 2 and *

TABLE 3.3.-3 (CONTINUED)

TABLE NOTATION

(a) Trip function may be bypassed in this MODE when pressurizer pressure is <1725 psia; bypass shall be automatically removed when pressurizer pressure is ≥ 1725 psia.

(b) An SIAS signal is first necessary to enable CSAS logic.

(c) Trip function may be bypassed in this MODE below 685 psia; bypass shall be automatically removed at or above 685 psia.

The provisions of Specification 3.0.4 are not applicable.

ACTION STATEMENTS

ACTION 8 - With the number of OPERABLE channels one less than the Total Number of Channels, restore the inoperable channel to OPERABLE status within 48 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

ACTION 9 - With the number of OPERABLE channels one less than the Total Number of Channels, operation may proceed provided the following conditions are satisfied:

a. The inoperable channel is placed in either the bypassed or tripped condition within 1 hour. For the purposes of testing and maintenance, the inoperable channel may be bypassed for up to 48 hours from time of initial loss of OPERABILITY, however, the inoperable channel shall then be either restored to OPERABLE status or placed in the tripped condition.

b. Within one hour, all functional units receiving an input from the inoperable channel are also placed in the same condition (either bypassed or tripped, as applicable) as that required by a. above for the inoperable channel.

c. The Minimum Channels OPERABLE requirement is met; however, one additional channel may be bypassed for up to 48 hours while performing tests and maintenance on that channel provided the other inoperable channel is placed in the tripped condition.

TABLE 3.3-4

ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION TRIP VALUES

FUNCTIONAL UNIT	TRIP SETPOINT	ALLOWABLE VALUES
1. SAFETY INJECTION (SIAS)		
a. Manual (Trip Buttons)	Not Applicable	Not Applicable
b. Containment Pressure - High	≤ 5 psig	≤ 5 psig
c. Pressurizer Pressure - Low	≥ 1600 psia	≥ 1600 psia
2. CONTAINMENT SPRAY (CSAS)		
a. Manual (Trip Buttons)	Not Applicable	Not Applicable
b. Containment Pressure -- High - High	≤ 10 psig	≤ 10 psig
3. CONTAINMENT ISOLATION (CIS)		
a. Manual (Trip Buttons)	Not Applicable	Not Applicable
b. Containment Pressure - High	≤ 5 psig	≤ 5 psig
c. Containment Radiation - High	≤ 10 R/hr	≤ 10 R/hr
4. MAIN STEAM LINE ISOLATION (MSIS)		
a. Manual (Trip Buttons)	Not Applicable	Not Applicable
b. Steam Generator Pressure - Low	≥ 600 psia	≥ 600 psia
5. CONTAINMENT SUMP RECIRCULATION (RAS)		
a. Manual RAS (Trip Buttons)	Not Applicable	Not Applicable
b. Refueling Water Tank - Low	48 inches above tank bottom	48 inches above tank bottom

REACTOR COOLANT LOOPS

LIMITING CONDITION FOR OPERATION

3.4.1 Four reactor coolant pumps shall be in operation.

APPLICABILITY: As noted below, but excluding MODE 6.

ACTION:

MODES 1 and 2:

With less than four reactor coolant pumps in operation, be in at least HOT STANDBY within 6 hours.

MODE 3

Operation may proceed provided

a) Two reactor coolant loops are in operation with either both or just one reactor coolant pump(s) in each loop or

b) At least one reactor coolant loop is in operation with an associated reactor coolant pump and the Shutdown Margin requirement of Specification 3.1.1.1. is increased to and maintained at $\geq$ 5.1% Δ k/k.

The provisions of Specifications 3.0.3 and 3.0.4 are not applicable.

MODES 4 and 5:

Operation may proceed provided at least one reactor coolant loop is in operation with an associated reactor coolant pump or shutdown cooling pump. The provisions of Specifications 3.0.3 and 3.0.4 are not applicable.

SURVIELLANCE REQUIREMENTS

4.4.1 The Flow Dependent Selector Switch shall be determined to be in the 4 pump position within 15 minutes prior to making the reactor critical and at last once per 12 hours thereafter.

\# All reactor coolant pumps and shutdown cooling pumps may be de-energized for up to 1 hour, provided no operations are permitted which could cause dilution of the reactor coolant system boron concentration.

3/4.1.1 BORATION CONTROL

3/4.1.1.1 and 3/4 1.1.2 SHUTDOWN MARGIN

A sufficient SHUTDOWN MARGIN ensures that 1) the reactor can be made subcritical from all operating conditions, 2) the reactivity transients associated with postulated accident conditions are controllable within acceptable limits, and 3) the reactor will be maintained sufficiently subcritical to preclude inadvertent criticality in the shutdown condition.

SHUTDOWN MARGIN requirements vary throughout core life as a function of fuel depletion, RCS boron concentration, and RCS T_{avg}. The most restrictive condition occurs at EOL, with T_{avg} at no load operating temperature, and is associated with a postulated steam line break accident and resulting uncontrolled RCS cooldown. In the analysis of this accident, a minimum SHUTDOWN MARGIN of 4.3% $\Delta k/k$ is required to control the reactivity transient. Accordingly, the SHUTDOWN MARGIN required by Specification 3.1.1.1 is based upon this limiting condition and is consistent with FSAR accident and analysis assumptions. For earlier periods during the fuel cycle, this value is conservative. With $T_{avg} \leq 200°F$, the reactivity transients resulting from any postulated accident are minimal and a 2% $\Delta k/k$ shutdown margin provides adequate protection.

3/4.1.1.3 BORON DILUTION AND ADDITION

A minimum flow rate of at least 3000 GPM provides adequate mixing, prevents stratification and ensures that reactivity changes will be gradual during boron concentration changes in the Reactor Coolant System. A flow rate of at least 3000 GPM will circulate an equivalent Reactor Coolant System volume of 11,400 cubic feet in approximately 26 minutes. The reactivity change rate associated with boron concentration changes will be within the capability for operator recognition and control.

3/4.1.1.4 MODERATOR TEMPERATURE COEFFICIENT (MTC)

The limiting values assumed for the MTC used in the accident and transient analyses were $+0.5 \times 10^{-4}$ $\Delta k/k/°F$ for THERMAL POWER levels $\leq 70\%$ of RATED THERMAL POWER, $+0.2 \times 10^{-4}$ $\Delta k/k/°F$ for THERMAL POWER levels $> 70\%$ of RATED THERMAL POWER and -2.5×10^{-4} $\Delta k/k/°F$ at RATED THERMAL POWER. Therefore, these limiting values are included in this specification. Determination of MTC at the specified conditions ensures that the maximum positive and/or negative values of the MTC will not exceed the limiting values.

3/4.1.1.5 MINIMUM TEMPERATURE FOR CRITICALITY

The MTC is expected to be slightly negative at operating conditions. However, at the beginning of the fuel cycle, the MTC may be slightly positive at operating conditions and since it will become more positive at lower temperatures, this specification is provided to restrict reactor operation when T_{avg} is significantly below the normal operating temperature.

3/4 1. 2 BORATION SYSTEMS

The boron injection system ensures that negative reactivity control is available during each mode of facility operation. The components required to perform this function include 1) borated water sources, 2) charging pumps, 3) separate flow paths, 4) boric acid pumps, 5) associated heat tracing systems, and 6) an emergency power supply from OPERABLE diesel generators.

With the RCS average temperature above 200°F, a minimum of two separate and redundant boron injection systems are provided to ensure single functional capability in the event an assumed failure renders one of the systems inoperable. Allowable out-of-service periods ensure that minor component repair or corrective action may be completed without undue risk to overall facility safety from injection system failures during the repair period.

The boration capability of either system is sufficient to provide a SHUTDOWN MARGIN from all operating conditions of 2.0% $\Delta k/k$ after xenon decay and cooldown to 200°F. The maximum boration capability requirement occurs at EOL from full power equilibrium xenon conditions and requires 7,925 gallons of 8.0% boric acid solution from the boric acid tanks or 13,700 gallons of 1720 ppm borated water from the refueling water tank.

The requirements for a minimum contained volume of 401,800 gallons of borated water in the refueling water tank ensures the capability for borating the RCS to the desired level. The specified quantity of borated water is consistent with the ECCS requirements of Specification 3.5.4. Therefore, the larger volume of borated water is specified here too.

With the RCS temperature below 200°F, one injection system is acceptable without single failure consideration on the basis of the stable reactivity condition of the reactor and the additional restrictions prohibiting CORE ALTERATIONS and positive reactivity change in the event the single injection system becomes inoperable.

used in the analysis establishing the DNB Margin LCO, and Thermal Margin/Low Pressure LSSS setpoints remain valid during operation at the various allowable CEA group insertion limits. If F^T_{xy}, F^T_r or T_q exceed their basic limitations, operation may continue under the additional restrictions imposed by the ACTION statements since these additional restrictions provide adequate provisions to assure that the assumptions used in establishing the Linear Heat Rate, Thermal Margin/Low Pressure and Local Power Density - High LCOs and LSSS setpoints remain valid. An AZIMUTHAL POWER TILT > 0.10 is not expected and if it should occur, subsequent operation would be restricted to only those operations required to identify the cause of this unexpected tilt.

The value of T_q that must be used in the equation $F^T_{xy} = F_{xy} (1 + T_q)$ and $F^T_r = F_r (1+T_q)$ is the measured tilt.

The surveillance requirements for verifying that F^T_{xy}, F^T_r and T_q are within their limits provide assurance that the actual values of F^T_{xy}, F^T_r and T_q do not exceed the assumed values. Verifying F^T_{xy} and F^T_r after each fuel loading prior to exceeding 75% of RATED THERMAL POWER provides additional assurance that the core was properly loaded.

3/4.2.5 DNB PARAMETERS

The limits on the DNB related parameters assure that each of these parameters are maintained within the normal steady state envelope of operation assumed in the transient and accident analyses. The limits are consistent with the safety analyses assumptions and have been analytically demonstrated adequate to maintain a minimum DNBR of 1.23 throughout each analyzed transient.

The 12 hour periodic surveillance of these parameters through instrument readout is sufficient to ensure that the parameters are restored within their limits following load changes and other expected transient operatin. The 18 month periodic measurement of the RCS total flow rate is adequate to detect flow degradation and ensure correlation of the flow indication channels with measured flow such that the indicated percent flow will provide sufficient verification of flow rate on a 12 hour basis.

3/4.4.1 REACTOR COOLANT LOOPS

The plant is designed to operate with both reactor coolant loops and associated reactor coolant pumps in operation, and maintain DNBR above 1.23 during all normal operations and anticipated transients. STARTUP and POWER OPERATION may be initiated and may proceed with one or two reactor coolant pumps not in operation after the setpoints for the Power Level-High, Reactor Coolant Flow-Low and Thermal Margin/Low Pressure trips have been reduced to their specified values. Reducing these trip setpoints ensures that the DNBR will be maintained above 1.23 during three pump operation and that during two pump operation the core void fraction will be limited to ensure parallel channel flow stability within the core and thereby prevent premature DNB.

A single reactor coolant loop with its steam generator filled above the low level trip setpoint provides sufficient heat removal capacity for core cooling while in MODES 2 and 3; however, single failure considerations require plant cooldown if component repairs and/or corrective actions cannot be made within the allowable out-of-service time.

3/4.4.2 and 3/4.4.3 SAFETY VALVES

The pressurizer code safety valves operate to prevent the RCS from being pressurized above its Safety Limit of 2750 psia. Each safety valve is designed to relieve 2 x 10^5 lbs per hour of saturated steam at the valve setpoint. The relief capacity of a single safety valve is adequate to relieve any overpressure condition which could occur during shutdown. In the event that no safety valves are OPERABLE, an operating shutdown cooling loop, connected to the RCS, provides overpressure relief capability and will prevent RCS overpressurization.

During operation, all pressurizer code safety valves must be OPERABLE to prevent the RCS from being pressurized above its safety limit of 2750 psia. The combined relief capacity of these valves is sufficient to limit the Reactor Coolant System pressure to within its Safety Limit of 2750 psia following a complete loss of turbine generator load while operating at RATED THERMAL POWER and assuming no reactor trip until the first Reactor Protective System trip setpoint (Pressurizer Pressure-High) is reached (i.e. no credit is taken for a direct reactor trip on the loss of turbine) and also assuming no operation of the pressurizer power operated relief valve or steam dump valves.

3/4.7.1 TURBINE CYCLE

3/4.7.1.1 SAFETY VALVES

The OPERABILITY of the main steam line code safety valves ensures that the secondary system pressure will be limited to within 110% of its design pressure during the most severe anticipated system operational transient. The maximum relieving capacity is associated with a turbine trip from 100% RATED THERMAL POWER coincident with an assumed loss of condenser heat sink (i.e. no steam bypass to the condenser).

The specified valve lift settings and relieving capacities are in accordance with the requirements of Section III of the ASME Boiler and Pressure Code, 1971 Edition and ASME Code for Pumps and Valves, Class II. The total relieving capacity for all valves on all of the steam lines is 12.38 x 10^6 lbs/hr which is 102.8 percent the total secondary steam flow of 12.04 x 10^6 lbs/hr at 100% RATED THERMAL POWER. A minimum of 2 OPERABLE safety valves per steam generator ensures that sufficient relieving capacity is available for removing decay heat.

STARTUP and/or POWER OPERATION is allowable with safety valves inoperable within the limitations of the ACTION requirements on the basis of the reduction in secondary system steam flow and THERMAL POWER required by the reduced reactor trip settings of the Power Level-High channels. The reactor trip setpoint reductions are derived on the following basis:

For two loop operation

$$SP = \frac{(X) - (Y)(V)}{X} \times (106.5)$$

where:

SP = reduced reactor trip setpoint in percent of RATED THERMAL POWER

V = maximum number of inoperable safety valves per steam line

106.5 = Power Level - High Trip Setpoint for two loop operation

X = Total relieving capacity of all safety valves per steam line in lbs/hour (6.192×10^6 lbs/hr.)

Y = Maximum relieving capacity of any one safety valve in lbs/hour (7.740×10^5 lbs/hr.)

3/4.7.1.2 AUXILIARY FEEDWATER PUMPS

The OPERABILITY of the auxiliary feedwater pumps ensures that the Reactor Coolant System can be cooled down to less than 325°F from normal operating conditions in the event of a total loss of off-site power.

Any two of the three auxiliary feedwater pumps have the required capacity to provide sufficient feedwater flow to remove reactor decay heat and reduce the RCS temperature to 325°F where the shutdown cooling system may be placed into operation for continued cooldown.

3/4.7.1.3 CONDENSATE STORAGE TANK

The OPERABILITY of the condensate storage tank with the minimum water volume ensures that sufficient water is available for cooldown of the Reactor Coolant System to less than 325°F in the event of a total loss of off-site power. The minimum water volume is sufficient to maintain the RCS at HOT STANDBY conditions for 9 hours with steam discharge to atmosphere.

3/4.7.1.4 ACTIVITY

The limitations on secondary system specific activity ensure that the resultant off-site radiation dose will be limited to a small fraction of 10 CFR Part 100 limits in the event of a steam line rupture. The dose calculations for an assumed steam line rupture include the effects of a coincident 1.0 GPM primary to secondary tube leak in the steam generator of the affected steam line and a concurrent loss of offsite electrical power. These values are consistent with the assumptions used in the accident analyses.

ATTACHMENT 3

Re: St. Lucie Unit 1
Docket No. 50-335
Stretch Power

SAFETY EVALUATION

Design and Safety Report
for
St. Lucie Unit 1 Cycle 4
at 2700 MWt

Table of Contents

1. INTRODUCTION AND SUMMARY

This report provides an evaluation of the design and performance for the operation of St. Lucie-1 during its fourth fuel cycle at a full power, stretch rating of 2700 MWt; Cycles 1, 2 and 3 were at a full power rating of 2560 MWt. Other changes evaluated are an increase in the full power inlet temperature to 549°F and the addition of an asymmetric steam generator trip function. The core will consist of presently operating Batch C, D and E assemblies together with fresh Batch F assemblies.

System requirements have created a need for flexibility in the Cycle 3 burnup length ranging from 7250 to 8250 MWD/T. The Cycle 4 loading pattern described in this report has been designed to accommodate this range of shutdown points. In performing analyses of postulated accidents, determining limiting safety system settings and establishing limiting conditions for operations, values of key parameters were chosen to assure that expected conditions are enveloped within the above Cycle 3 burnup range.

The sleeving of CEA guide tubes caused by wear of the CEA fingers follows the same procedure as reported in Reference 1. For Cycle 4 operation, only sleeved assemblies will be placed under CEAs and all 88 Batch F assemblies will be sleeved.

The evaluations of the reload core characteristics have been examined with respect to the safety analyses describing Cycle 3 (Reference 2) hereafter referred to as the reference cycle. In all cases, it has been concluded that the revised analyses at 2700 MWt presented in this report continue to show acceptable results.

Where dictated by variations from the reference cycle, proposed modifications to the plant Technical Specifications are provided and are justified by the analyses reported herein.

2.0 OPERATING HISTORY OF THE REFERENCE CYCLE

Cycle 3 is the designated reference cycle for this report. St. Lucie Unit 1 operated during its third fuel cycle utilizing Batch B, C, D, and E fuel assemblies at or near a licensed core power level of 2560 MWt. Cycle 3 terminated on March 15, 1980 at 8:42 pm with a burnup of 6050.91 EFPH or 7730 MWD/T. The termination was within the range of burnups between 7250 and 8250 MWD/T anticipated for Cycle 3.

3. GENERAL DESCRIPTION

The Cycle 4 core will consist of the numbers and types of assemblies from the various fuel batches as described in Table 3-1. The primary change to the core for Cycle 4 is the removal of the remaining 21 Batch B assemblies and 67 of the 68 Batch C assemblies. These assemblies will be replaced by 40 Batch F (3.65 w/o enrichment) and 48 Batch F* (3.03 w/o enrichment) assemblies. The 48 low enrichment Batch F* assemblies contain burnable poison pins with 12 pins per assembly. The location of poison pins within the lattice is the same as that for poison pin assemblies present in the reference cycle. The fuel management pattern developed for Cycle 4 allows for flexibility in Cycle 3 burnup length between 7250 and 8250 MWD/T. The loading pattern is shown in Figure 3-1.

The Cycle 4 core loading pattern is 90 degrees rotationally symmetric. That is, if one quadrant of the core were rotated 90 degrees into its neighboring quadrant, each assembly would overlay a similar assembly. This similarity includes batch type, number of fuel rods, initial enrichment and beginning of cycle burnup distribution.

Figure 3-2 shows the beginning of Cycle 4 assembly burnup distribution for a Cycle 3 burnup length of 7750 MWD/T. The initial enrichment of each assembly is also shown.

Table 3-1

St. Lucie Unit 1

Cycle 4 Core Loading

Assembly Designation	Number of Assemblies	Initial Enrichment w/o U-235	Beginning of Cycle 4 Batch Average Burnup MWD/MTU (EOC 3 = 7750 MWD/T)	Number of Shims	Initial Shim Loading w/o B_4C	Total Shims	Total Fuel Rods
C	1	2.82	24,800	0	---	0	176
D	40	3.03	15,700	0	---	0	7,040
D*	20	2.73	17,700	0	---	0	3,520
E	40	3.03	6300	0	---	0	7,040
E*	28	2.73	9100	0	---	0	4,928
F	40	3.65	0	0	---	0	7,040
F*	48	3.03	0	12	3.03	576	7,872
	217					576	37,616

							F	F
				F	F	F*	E*	D
			F	E	E*	E	E	F*
		F	F*	D*	F*	D	F*	D*
	F	E	D*	E	D	E	D*	E*
	F	E*	F*	D	F*	D	F*	D
	F*	E	D	E	D	E	D	E*
F	E*	E	F*	D*	F*	D	F*	E*
F	D	F*	D*	E*	D	E*	E*	C

St. Lucie
Nuclear Power Station
Unit No. 1

CYCLE - 4 LOADING PATTERN

Figure
3-1

XXXX Y.YY	BOC 4 BURNUP (MWD/T) INITIAL ENRICHMENT, WT % U-235

							0.0 3.65	0.0 3.65
				0.0 3.65	0.0 3.65	0.0 3.03	8,700 2.73	15,800 3.03
			0.0 3.65	5,500 3.03	8,500 2.73	7,100 3.03	7,300 3.03	0.0 3.03
		0.0 3.65	0.0 3.03	18,000 2.73	0.0 3.03	17,400 3.03	0.0 3.03	18,300 2.73
	0.0 3.65	5,500 3.03	18,000 2.73	6,200 3.03	14,600 3.03	5,600 3.03	17,100 2.73	9,700 2.73
	0.0 3.65	8,600 2.73	0.0 3.03	14,900 3.03	0.0 3.03	14,500 3.03	0.0 3.03	16,000 3.03
	0.0 3.03	7,100 3.03	17,400 3.03	5,600 3.03	14,600 3.03	6,200 3.03	15,800 3.03	9,800 2.73
0.0 3.65	8,700 2.73	7,300 3.03	0.0 3.03	17,100 2.73	0.0 3.03	15,900 3.03	0.0 3.03	9,800 2.73
0.0 3.65	15,900 3.03	0.0 3.03	18,300 2.73	9,800 2.73	15,800 3.03	9,700 2.73	9,800 2.73	24,800 2.82

St. Lucie Nuclear Power Station Unit No. 1	CYCLE 4 - ASSEMBLY AVERAGE BURNUP AND INITIAL ENRICHMENT DISTRIBUTION	Figure 3-2

4.0 FUEL DESIGN

4.1 Mechanical Design

The fuel assembly complement for Cycle 4 is given in Table 3-1. The mechanical design of the reload fuel assemblies, Batch F, is identical to St. Lucie-1 Batch E fuel.

C-E has performed analytical predictions of cladding creep collapse time for all St. Lucie-1 fuel batches that will be irradiated during Cycle 4 and has concluded that the collapse resistance of all fuel rods is sufficient to preclude collapse during their design lifetime. This lifetime will not be exceeded by the Cycle 4 duration. Predicted times to cladding collapse for the fuel batches that will be irradiated during Cycle 4 are given in Table 4-1.

The analyses utilized the CEPAN computer code (Reference 3) and included as input conservative values of internal pressure, cladding dimensions, cladding temperature and neutron flux.

Table 4-1
Cladding Collapse Information

Batch	Calculated End of Cycle 4 Operation (EFPH)	Predicted Time to Collapse (EFPH)
C	33,608	>40,000
D	24;002	32,600
E	17,628	27,800
F	11,193	>27,000

4.2 Hardware Modifications to Mitigate Guide Tube Wear

All Batch C, E, and F fuel assemblies installed in CEA locations for Cycle 4 have stainless steel sleeves installed in the guide tubes in order to mitigate tube wear.

A detailed discussion of the design of the sleeves and its effects on reactor operation is contained in Reference 4.

4.3 Thermal Design

Using the FATES model (Reference 5), the thermal performance of the various types of fuel assemblies has been evaluated with respect to their Cycles 1, 2, and 3 burnups, proposed burnups during Cycle 4, their respective fuel geometries, and expected flux levels during Cycle 4. The Batch E fuel has been determined to be the limiting fuel batch with respect to stored energy. Burnup dependent fuel performance calculations were used in ECCS fuel performance calculations performed in Section 8, ECCS Analysis.

4.4 Chemical Design

The metallurgical requirements of the fuel cladding and the fuel assembly structural members for the Batch F fuel have not been changed from the original Cycles 1, 2, and 3 designs. Therefore, the chemical or metallurgical performance of the Batch F fuel will be unchanged from that of the original core fuel and discussions in the FSAR, Reference 6, are still valid.

4.5 Operating Experience

Fuel assemblies incorporating the same design features as the St. Lucie Unit 1, Batch F fuel assemblies have had operating experiences at Calvert Cliffs 1 and 2, Fort Calhoun 1, Millstone II and previous reload cycles for St. Lucie-1. The operating experience has been successful with the implementation of stainless steel sleeves to mitigate the CEA guide tube wear problem as discussed in Section 4.2.

5.0 NUCLEAR DESIGN

5.1 Physics Characteristics

5.1.1 Fuel Management

The Cycle 4 fuel management employs a mixed central region as described in Section 3, Figure 3-1. The fresh Batch F is comprised of two sets of assemblies, each having a unique enrichment in order to minimize radial power peaking. There are 40 assemblies with an enrichment of 3.65 wt% U-235 and 48 assemblies with an enrichment of 3.03 wt% U-235 and 12 poison shims per assembly. With this loading, the Cycle 4 burnup capacity for full power operation is expected to be between 14,300 MWD/T and 14,900 MWD/T, depending on the final Cycle 3 termination point. The Cycle 4 core characteristics have been examined for Cycle 3 terminations between 7250 and 8250 MWD/T and limiting values established for the safety analyses. The loading pattern (see Section 3) is applicable to any Cycle 3 termination point between the stated extremes.

Physics characteristics including reactivity coefficients for Cycle 4 are listed in Table 5-1 along with the corresponding values from the reference cycle. Please note that the values of parameters actually employed in safety analyses are different than those displayed in Table 5-1 and are typically chosen to conservatively bound predicted values with accommodation for appropriate uncertainties and allowances. Table 5-2 presents a summary of CEA shutdown worths and reactivity allowances for Cycle 4 with a comparison to reference cycle data. Table 5-2 generally characterizes the changes in reactivity that occur during a trip from full power with a corresponding change in core parameters to the zero power state. It is not intended to represent any particular limiting AOO or accident, although the quantity shown as "Required Shutdown Margin" represents the numerical value of the worth which is applied to the hot zero power steam line break accident. For the analysis of any specific accident or AOO, conservative or "most limiting" values are used. The power dependent insertion limit (PDIL) curve for Cycle 4 is shown in Figure 5-1 The CEA group identification remains the same as in the reference cycle. Table 5-3 shows the reactivity worths of various CEA groups calculated at full power conditions for Cycle 4 and the reference cycle.

5.1.2 Power Distribution

Figures 5-2 through 5-4 illustrate the all rods out (ARO) planar radial power distributions at BOC 4, MOC 4 and EOC 4 that are characteristic of the high burnup end of the Cycle 3 shutdown window. These planar radial power peaks are characteristic of the major portion of the active core length between about 20 and 80 percent of the fuel height. The higher burnup end of the Cycle 3 shutdown window tends to increase the power peaking in this central region of the core.

Figure 5-5 illustrates the planar radial power distribution within the upper 15 to 20 percent of the core produced with the insertion of the first CEA regulating group, Bank 7. This power distribution, calculated at 500 MWD/T ,is based upon the low burnup end of the Cycle 3 shutdown window, providing an illustration of maximum power peaking expected for this configuration. Higher burnup Cycle 3 shutdown points tend to reduce power peaking in this upper region of the core with Bank 7 inserted. It is a characteristic of both ARO and Bank 7 inserted conditions that the Cycle 4 peaks are highest near BOC.

The radial power distributions described in this section are calculated data without uncertainties or other allowances. However, single rod power peaking values do include the increased peaking that is characteristic of fuel rods adjoining the water holes in the fuel assembly lattice. For both DNB and kw/ft safety and setpoint analyses in either rodded or unrodded configurations, the power peaking values actually used are higher than those expected to occur at any time during Cycle 4. These conservative values, which are used in Section 7 of this document, establish the allowable limits for power peaking to be observed during operation.

The range of allowable axial peaking is defined by the limiting conditions for operation of the axial shape index (ASI). Within these ASI limits, the necessary DNBR and kw/ft margins are maintained for a wide range of possible axial shapes. The maximum three-dimensional or total peaking factor anticipated in Cycle 4 during normal base load, all rods out operation at full power is 1.85, not including uncertainty allowances and augmentation factors.

5.1.3 Safety Related Data

5.1.3.1 Ejected CEA

The maximum reactivity worths and planar radial power peaks associated with an ejected CEA event are shown in Table 5-4 for Cycle 4 and the reference cycle. The Cycle 4 values encompass the worst conditions anticipated during Cycle 4 and are safety analysis values, which are conservative with respect to the actual calculated values.

5.1.3.2 Dropped CEA

The limiting parameters of dropped CEA reactivity worth and maximum increase in radial peaking factor are shown in Table 5-5 for Cycle 4 and the reference cycle. The values shown for Cycle 4 are the safety analysis values, which are conservative with respect to the actual calculated values.

5.1.3.3 Scram Reactivity

Scram reactivities are calculated using the space-time kinetics code FIESTA described in Reference 13.

5.1.4 Augmentation Factors

Augmentation factors have been calculated for the Cycle 4 core using the calculational model described in Reference 5. The input information required for the calculation of augmentation factors that is specific to the core under consideration includes the fuel densification characteristics, the radial pin power distribution and the single gap peaking factors. Augmentation factors for the Cycle 4 core have been conservatively calculated by combining for input the largest single gap peaking factors with the most conservative (flattest) radial pin power distribution. The calculations yield non-collapsed clad augmentation factors showing a maximum value of 1.048 at the top of the core. The calculated values were increased to create conservative augmentation factors to be used in the in-core monitoring system. The augmentation factors used for Cycle 4 are compared to those of the reference cycle in Table 5-6.

5.2 PHYSICS ANALYSIS METHODS

5.2.1 Uncertainties in Measured Power Distributions

The power distribution measurement uncertainties which are applied to Cycle 4 are:

F_q = 7.0 percent

where $F_q = F_{xy} \times F_z$, local power density

F_r = 6.0 percent

These values are to be used for monitoring power distribution parameters during operation.

5.2.2 Nuclear Design Methodology

The analyses have been performed in the same manner and with the same methodologies used for the reference cycle analyses except for the use of FIESTA (Reference 13).

TABLE 5-1

St. Lucie Unit 1 Cycle 4 Physics Characteristics

	Units	Reference Cycle	Cycle 4
Dissolved Boron			
Dissolved Boron Content for Criticality, CEAs Withdrawn			
Hot full power, equilibrium xenon, BOC	PPM	850	1077
Boron Worth			
Hot Full Power BOC	PPM/%$\Delta\rho$	90	104
Hot Full Power EOC	PPM/%$\Delta\rho$	80	83
Reactivity Coefficients (CEAs Withdrawn)			
Moderator Temperature Coefficients, Hot Full Power			
Beginning of Cycle (Equilibrium Xe)	10^{-4} $\Delta\rho/^\circ F$	-0.2	0.0
End of Cycle	10^{-4} $\Delta\rho/^\circ F$	-1.8	-2.06
Doppler Coefficient			
Hot BOC Zero Power	10^{-5} $\Delta\rho/^\circ F$	-1.44	-1.64
Hot BOC Full Power	10^{-5} $\Delta\rho/^\circ F$	-1.13	-1.26
Hot EOC Full Power	10^{-5} $\Delta\rho/^\circ F$	-1.22	-1.39
Total Delayed Neutron Fraction, β_{eff}			
Beginning of Cycle		.0060	.0063
End of Cycle		.0051	.0051
Neutron Generation Time, ℓ^*			
BOC	10^{-6} sec	28	24
EOC	10^{-6} sec	33	29

TABLE 5-2

St. Lucie Unit 1
Limiting Values of Cycle 4 CEA
REACTIVITY WORTHS AND ALLOWANCES, %Δρ

	BOC		EOC	
	Reference Cycle	Reload Cycle	Reference Cycle	Reload Cycle
Worth Available*				
Worth of all CEAs inserted	10.5	9.4	11.4	10.6
Stuck CEA allowance	2.7	2.4	3.1	2.9
Worth of all CEAs less highest worth CEA stuck out	7.8	7.0	8.3	7.7
Worth Required (Allowances)				
Power defect, HFP to HZP (Doppler, Tavg, redistribution)	1.7	1.9	2.2	2.4
Moderator voids	0.0	0.0	0.1	0.1
CEA bite, boron deadband and maneuvering band	0.6	0.5	0.6	0.6
Required shutdown margin (%Δρ)	3.3	4.3	3.3	4.3
Total reactivity required	5.6	6.7	6.2	7.4
Available Worth Less Allowances				
Margin available	2.2	0.3	2.1	0.3

*For every accident or AOO considered in the safety analysis, a calculational uncertainty of 10% is deducted from the worth available.

TABLE 5-3

ST. LUCIE UNIT I
CYCLE 4 REACTIVITY WORTH
OF CEA REGULATING GROUPS
AT HOT FULL POWER,
%$\Delta\rho$

Regulating CEAs	Beginning of Cycle		End of Cycle	
	Reference Cycle	Cycle 4	Reference Cycle	Cycle 4
Group 7	0.78	0.57	0.84	0.80
Group 6	0.52	0.51	0.56	0.60
Group 5	0.39	0.32	0.46	0.44

Note

Values shown assume sequential group insertion.

TABLE 5-4

ST. LUCIE UNIT I CYCLE 4 CEA EJECTION DATA

	Limiting Value	
	Reference Cycle Safety Analysis Value	Cycle 4 Safety Analysis Value
Maximum Radial Power Peak		
Full power with Bank 7 inserted; worst CEA ejected	3.60	3.60
Zero power with Banks 7+6+5 inserted; worst CEA ejected	8.34	9.40
Maximum Ejected CEA Worth (%Δρ)		
Full power with Bank 7 inserted; worst CEA ejected	.29	.28
Zero power with Banks 7+6+5 inserted; worst CEA ejected	.65	.63

Notes: 1) Uncertainties and allowances are included in the above data.
2) The Cycle 4 safety analysis values are conservative with respect to the actual Cycle 4 calculated values.

TABLE 5-5

St. Lucie-1 Cycle 4 Full Length CEA Drop Data

	Limiting Values	
	Reference Cycle	Cycle 4
Minimum Worth $\%\Delta\rho$	.04	.04
Maximum Percent Increase in Radial Peaking Factor	17	16

Notes:

(1) CEAs are either fully withdrawn or fully inserted for radial calculations.

(2) These are Cycle 4 safety analysis values which are conservative with respect to Cycle 4 calculated values.

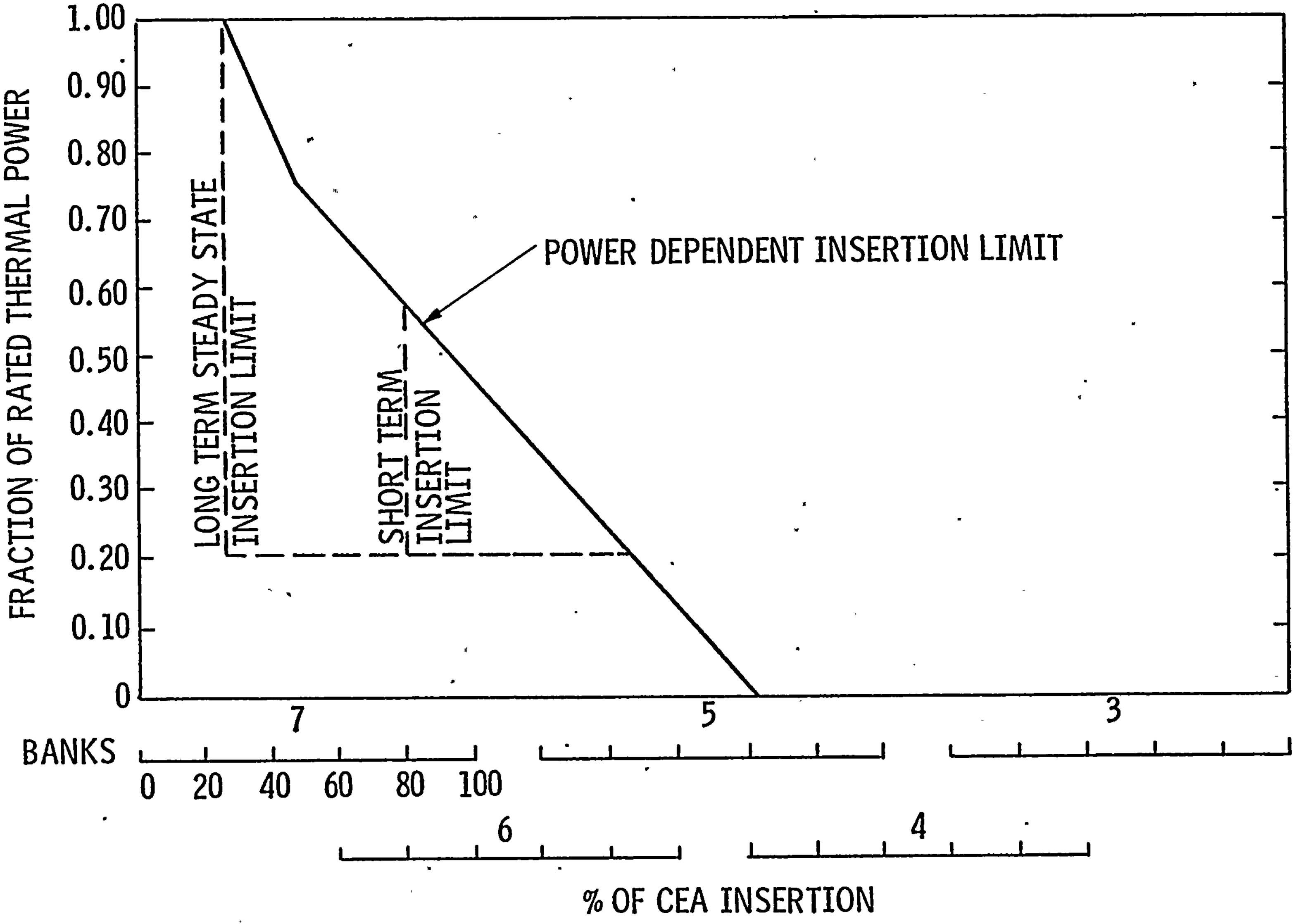
TABLE 5-6

St. Lucie Unit 1 Augmentation Factors and Gap Sizes for Cycle 4 and Reference Cycle

		Reference Cycle		Cycle 4	
Core Height (Percent)	Core Height (Inches)	Noncollapsed Clad Augmentation Factor	Gap Size (Inches)	Noncollapsed Clad Augmentation Factor	Gap Size (Inches)
98.5	134.7	1.058	2.04	1.071	1.74
86.8	118.6	1.053	1.80	1.067	1.54
77.9	106.5	1.050	1.62	1.063	1.38
66.2	90.5	1.044	1.38	1.057	1.18
54.4	74.4	1.038	1.14	1.050	0.97
45.6	62.3	1.033	0.96	1.045	0.82
33.8	46.2	1.026	0.72	1.035	0.62
22.1	30.2	1.018	0.48	1.025	0.41
13.2	18.1	1.013	0.30	1.017	0.26
1.5	2.0	1.003	0.06	1.004	0.05

Notes:
1) Values are based on approved model described in Reference 5.
2) The Cycle 4 in-core monitoring system values are conservative with respect to the actual Cycle 4 calculated values.

St. Lucie
Nuclear Power Station
Unit No. 1



POWER DEPENDENT INSERTION LIMIT

Figure 5-1

						0.75	1.03 X	
				0.75	1.02	0.98	1.06	1.03
			0.73	1.02	1.09	1.22	1.21	1.18
		0.73	0.90	0.85	1.17	1.03	1.13	0.85
	0.75	1.01	0.85	1.14	1.06	1.19	0.87	0.91
	1.01	1.08	1.16	1.05	1.18	1.04	1.05	0.88
0.75	0.98	1.22	1.02	1.19	1.03	1.14	0.90	0.89
1.03	1.05	1.21	1.13	0.86	1.05	0.90	0.98	0.85
	1.03	1.18	0.85	0.91	0.88	0.89	0.85	0.65

NOTE: X = MAXIMUM 1 - PIN PEAK = 1.48

St. Lucie Nuclear Power Station Unit No. 1	CYCLE 4 - ASSEMBLY RELATIVE POWER DENSITY BOC, EQUILIBRIUM XENON	Figure 5-2

							0.68	0.87
				0.68	0.91	0.97	0.95	0.93
			0.72	0.93	1.00	1.12	1.15	1.25
		0.72	0.96	0.84	1.22	1.00	1.24	0.92
	0.68	0.93	0.84	1.10	1.04	1.17	0.92	0.98
	0.91	1.00	1.22	1.04	1.29 X	1.06	1.22	0.97
	0.97	1.12	1.00	1.17	1.06	1.17	1.00	1.00
0.68	0.95	1.15	1.24	0.92	1.22	1.00	1.21	0.99
0.87	0.93	1.25	0.92	0.98	0.97	1.00	0.99	0.80

NOTE: X = MAXIMUM   1 - PIN PEAK = 1.46

St. Lucie Nuclear Power Station Unit No. 1	CYCLE 4 - ASSEMBLY RELATIVE POWER DENSITY MOC, EQUILIBRIUM XENON	Figure 5-3

						0.70	0.85	
				0.70	0.91	1.02	0.94	0.92
			0.78	0.95	0.98	1.08	1.11	1.27
		0.78	1.07	0.88	1.24	0.98	1.26	0.94
	0.70	0.95	0.88	1.08	1.01	1.11	0.92	0.98
	0.91	0.98	1.24	1.01	1.26	1.02	1.24	0.97
0.70	1.02	1.08	0.98	1.11	1.02	1.11	0.99	0.99
0.85	0.94	1.11	1.26	0.92	1.24	0.99	1.24	1.00
	0.92	1.27 X	0.94	0.98	0.97	0.99	1.00	0.84

NOTE: X = MAXIMUM 1 - PIN PEAK = 1.43

St. Lucie Nuclear Power Station Unit No. 1	CYCLE 4 - ASSEMBLY RELATIVE POWER DENSITY EOC, EQUILIBRIUM XENON	Figure 5-4

▨ BANK 7 CEA INSERTIONS

						0.63	0.84	
				0.65	0.91	0.90	0.93	0.85
			0.53	0.89	1.06	1.19	1.08	▨ 0.74
		0.53	▨ 0.51	0.78	1.19	1.10	1.14	0.83
	0.65	0.89	0.78	1.15	1.19	1.35	1.02	1.05
	0.91	1.05	1.18	1.17	1.37	1.25	1.27	1.09
0.63	0.89	1.19	1.10	1.35	1.25	1.39 X	1.13	1.11
0.83	0.92	1.08	1.13	1.01	1.27	1.13	1.15	0.96
	0.85	▨ 0.74	0.83	1.05	1.09	1.11	0.96	▨ 0.50

NOTE: X = MAXIMUM 1 - PIN PEAK = 1.64

St. Lucie **Nuclear Power Station** **Unit No. 1**	CYCLE 4 ASSEMBLY RELATIVE POWER DENSITY WITH CEA BANK 7 INSERTED AT HFP BOC	Figure 5-5

6. THERMAL-HYDRAULIC DESIGN

6.1 DNBR Analyses

Steady state DNBR analyses of Cycle 4 at the rated power level of 2700 Mwt have been performed using the TORC computer code (Ref. 10) and the CE-1 critical heat flux correlation (Ref. 11).

Table 6-1 contains a list of pertinent thermal-hydraulic design parameters used for both safety analyses and for generating reactor protective system setpoint information. Also note, that the calculational factors (engineering heat flux factor, engineering factor on hot channel heat input and rod pitch, bowing and clad diameter factor) listed in Table 6-1 have been combined statistically with other uncertainty factors at a 95/95 confidence/probability level (Ref. 12) to define a new design limit on CE-1 minimum DNBR (1.23) when iterating on power as discussed in Ref. 12.

Investigations have been made to ascertain the effect of the CEA guide tube wear problem and the sleeving repair on DNBR margins as established by this type of analysis. The findings were reported to the NRC in Reference 4 which concluded that the wear problem and the sleeving repair do not adversely affect DNBR margin.

6.2 Effects of Fuel Rod Bowing on DNBR Margin

Effects of fuel rod bowing on DNBR margin have been incorporated in the safety and setpoint analyses in the same manner as discussed in Reference 8. This reference contains penalties on minimum DNBR due to fuel rod bowing as a function of burnup generated using NRC guidelines contained in Reference 9.

Table 6-1

St. Lucie Unit 1

Thermal-Hydraulic Parameters at Full Power

General Characteristics	Unit	Reference Cycle 3	Cycle 4
Total Heat Output (core only)	MWt	2560	2700
	10^6 BTU/hr	8737	9215
Fraction of Heat Generated in Fuel Rod		.975	.975
Primary System Pressure			
Nominal	psia	2250	2250
Minimum in steady state	psia	2200	2200
Maximum in steady state	psia	2300	2300
Design Inlet Temperature	°F	544	549
Total Reactor Coolant Flow	gpm	370,000	370,000
(minimum steady state)	10^6 lb/hr	140.2*	139.3*
Coolant Flow Through Core	10^6 lb/hr	135.0*	134.10*
Hydraulic Diameter (nominal channel)	ft	0.044	0.044
Average Mass Velocity	10^6 lb/hr-ft^2	2.53*	2.51*
Pressure Drop Across Core (minimum steady state flow irreversible Δp over entire fuel assembly)	psi	10.3	10.4 psi
Total Pressure Drop Across Vessel (based on nominal dimensions and minimum steady state flow)	psi	33.5	33.6 psi
Core Average Heat Flux (accounts for above fraction of heat generated in fuel rod and axial densification factor)	BTU/hr-ft^2	174,400	183,843
Total Heat Transfer Area (accounts for axial densification factor)	ft^2	48,860	48,872
Film Coefficient at Average Conditions	BTU/hr-ft^2 °F	5820	5820
Maximum Clad Surface Temperature	°F	657	657
Average Film Temperature Difference	°F	31	33
Average Linear Heat Rate of Undensified Fuel Rod (accounts for above fraction of heat generated in fuel rod)	kw/ft	5.83	6.14
Average Core Enthalpy Rise	BTU/lb	65*	68.7*

*Calculated at design inlet temperature, nominal primary system pressure.

Table 6-1 (cont.)

Calculational Factors	Reference Cycle 3	Cycle 4
Engineering Heat Flux Factor **	1.03	1.03
Engineering Factor on Hot Channel Heat Input **	1.03	1.02*
Inlet Plenum Nonuniform Distribution	1.05	Not applicable
Rod Pitch, Bowing and Clad Diameter**	1.065	1.065
Fuel Densification Factor (axial)	1.01	1.002
Fuel Rod Bowing Augmentation Factor on Fr	1.018	1.018

*Based on "Asbuilt" information.

**For cycle 4 these factors have been combined statistically with our uncertainty factors that 95/95 confidence/probability level (Ref. 12) to define a new design limit on CE-1 minimum DNBR when iterating on power as discussed in Reference 12.

REFERENCES (Sections 1 through 6)

1. CEN-79-P, "Reactor Operation with Guide Tube Wear", February 3, 1978

2. Letter, Robert E. Uhrig (FP&L) to Victor Stello (NRC), dated February 22, 1979, "St. Lucie Unit 1 Docket No. 50-335 Proposed Amendment to Facility Operating License DPR-67"

3. CENPD-187, "CEPAN Method of Analyzing Creep Collapse of Oval Cladding", June, 1975.

4. CEN-80(M)-P, "Millstone Unit 2 Reactor Operation with Modified CEA Guide Tubes", February 8, 1978

5. CENPD-139, "C-E Fuel Evaluation Model Topical Report", July 1, 1974

6. St. Lucie Nuclear Power Plant (Formerly Hutchinson Island) Unit One, Final Safety Analysis Report, in support of Docket No. 50-335

7. (There is no Reference 7)

8. Supplement 3-P (Proprietary) to CENPD 225P, "Fuel and Poison Rod Bowing", June 1979

9. Letter from D. B. Vassallo (NRC) to A. E. Scherer (C-E) dated June 12, 1978

10. CENPD-161-P, "TORC Code, A Computer Code for Determining the Thermal Margin of a Reactor Core", July 1975

11. Critical Heat Flux Correlation for C-E Fuel Assemblies with Standard Spacer Grids Part 1, Uniform Axial Power Distribution, CENPD-162-P-A (Proprietary) and CENPD-162-A (Non-Proprietary), April, 1975

12. CEN-124 (B)-P, "Statistical Combination of Uncertainties, Part 2", January, 1980

13. CEN-122(F), "FIESTA", November, 1979.

7.0 TRANSIENT ANALYSIS

The purpose of this section is to present the results of Florida Power and Light St. Lucie Unit 1, Cycle 4 Non-LOCA safety analysis at 2700 MWt.

The Design Bases Events (DBEs) considered in the stretch power safety analyses are listed in Table 7-1. These events can be categorized in the following groups:

1. Anticipated Operational Occurrences for which the intervention of Reactor Protective System (RPS) is necessary to prevent exceeding Acceptable Limits.
2. Anticipated Operational Occurrences for which the intervention of the RPS trips and/or initial steady state thermal margin, maintained by Limiting Conditions of Operation (LCO), are necessary to prevent exceeding Acceptable Limits.
3. Postulated Accidents.

For all DBEs so indicated in Table 7-1, an explicit analysis was performed to determine the consequences of these events during stretch power operation. A few events were not reanalyzed (See Table 7-1). These events are eliminated by Technical Specification restrictions.

TABLE 7-1

ST. LUCIE UNIT 1 CYCLE 4
DESIGN BASIS EVENTS CONSIDERED IN STRETCH POWER SAFETY ANALYSIS

		Analysis Status
7.1	Anticipated Operational Occurrences for which intervention of the RPS is necessary to prevent exceeding acceptable limits:	
7.1.1	Boron Dilution	Reanalyzed
7.1.2	Startup of an Inactive Reactor Coolant Pump	Not Reanalyzed
7.1.3	Excess Load	Reanalyzed
7.1.4	Loss of Load	Reanalyzed
7.1.5	Loss of Feedwater Flow	Reanalyzed
7.1.6	Excess Heat Removal due to Feedwater Malfunction	Reanalyzed
7.1.7	Reactor Coolant System Depressurization	Reanalyzed
7.1.8	Control Element Assembly Withdrawal[1]	Reanalyzed
7.1.9	Loss of Coolant Flow[2]	Reanalyzed
7.1.10	Loss of AC Power[2]	Reanalyzed
7.1.11	Transients Resulting from the Malfunction of One Steam Generator[3]	Reanalyzed
7.2	Anticipated Operational Occurrences for which RPS trips and/or sufficient initial steady state thermal margin, maintained by the LCOs, are necessary to prevent exceeding the acceptable limits:	
7.2.1	Control Element Assembly Withdrawal	Reanalyzed
7.2.2	Loss of Coolant Flow	Reanalyzed
7.2.3	Loss of AC Power	Reanalyzed
7.2.4	Full Length CEA Drop	Reanalyzed
7.2.5	Part Length CEA Drop	Not Reanalyzed
7.2.6	Part Length CEA Malpositioning	Not Reanalyzed
7.2.7	Transients Resulting from the Malfunction of One Steam Generator	Reanalyzed
7.3	Postulated Accidents:	
7.3.1	CEA Ejection	Reanalyzed
7.3.2	Steam Line Rupture	Reanalyzed
7.3.3	Steam Generator Tube Rupture	Reanalyzed
7.3.4	Seized Rotor	Reanalyzed

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[1] Requires High Power and Variable High Power trip; event is discussed in Section 7.2.

[2] Requires Low Flow trip; event is discussed in Section 7.2.

[3] Requires ΔP across the Steam Generator Trip; event is discussed in Section 7.2.

7.1 ANTICIPATED OPERATIONAL OCCURRENCES FOR WHICH THE RPS ASSURES NO VIOLATION OF LIMITS

The events in this category were analyzed for stretch power operation of Florida Power and Light St. Lucie Unit 1, Cycle 4 to determine that Acceptable Limits on DNBR, CTM, Reactor Coolant System (RCS) upset pressure, and 10CFR100 site boundary dose rate guidelines will not be exceeded. Each of the event writeups in the section identifies which criterion the event in question addresses. Protection against violating these limits will continue to be assured by the Reactor Protection System (RPS) Limiting Safety System Settings (LSSS) setpoints. The setpoints will be modified (as necessary) to include changes necessitated by the results of the stretch power analyses of these events. The methodology used to generate the Limiting Safety System Settings (LSSS) for the TM/LP and ASI RPS trips is discussed in CEN-123 (F)-P, (Reference 14).

For those events in this section where DNBR or CTM values were calculated and quoted, the calculations were performed using the nominal values of key NSSS parameters listed in Table 7.2. Uncertainties were accounted for in determining the values of DNBR or CTM by applying appropriate values of aggregate uncertainties identified in CEN-123 (F)-P to the limiting rod power. For those events analyzed to determine that the RCS upset pressure limit or 10CFR100 dose limits are not exceeded, the methods used are the same as previously reported in the FSAR or subsequent reload licensing submittals. Effects of NSSS parameter uncertainties on these limits are not assessed statistically. Instead, applicable uncertainties are assumed to occur simultaneously in the most adverse direction. When values of the NSSS parameter used in evaluation of the RCS pressure and dose limits differ from those given in Table 7.2, they will be specifically noted.

The results of the analyses are provided in the following sections.

7.1.1 BORON DILUTION EVENT

The Boron Dilution event was reanalyzed for Cycle 4 to determine if sufficient time is available for an operator to identify the cause and to terminate an approach to criticality for all subcritical modes of operation. It is also analyzed to establish corresponding shutdown margin requirements for modes 3 through 5 as they are defined by the Technical Specifications.

An inadvertent boron dilution adds positive reactivity, produces power and temperature increases, and during operation at power (for mode 1 and 2) can cause an approach to both the DNBR and CTM limits. Since the TM/LP trip system monitors the transient behavior of core power level and core inlet temperature at power, the TM/LP trip will intervene, if necessary, to prevent the DNBR limit from being exceeded for power increases within the setting of the Variable High Power Level trip. For more rapid power excursions the Variable High Power Level trip initiates a reactor trip. The approach to the CTM limit is terminated by either the Local Power Density trip, Variable High Power Level trip, or the DNBR related trip discussed above. The trip which is actuated depends on the rate of reactivity resulting from the dilution event. For a boron dilution initiated from hot zero power, critical, the power transient resulting from the slow reactivity insertion rate is terminated by the Variable High Power Level trip prior to approaching the limits.

Table 7.1.1-1 compares the values of the key transient parameters assumed in each mode of operation for Cycle 4 and the reference cycle. The conservative input data chosen consists of high critical boron concentrations and low inverse boron worths. These choices produce the most adverse effects by reducing the calculated time to criticality. The time to criticality was determined by using the following expression:

$$\Delta t_{crit} = \tau_{BD} \ln \frac{C_{Initial}}{C_{crit}}$$

where Δt_{crit} = Time interval to dilute to critical

τ_{BD} = Time constant

C_{crit} = Critical boron concentration (ppm)

$C_{Initial}$ = Initial boron concentration (ppm)

Table 7.1.1-2 compares the results of the analysis for Cycle 4 with those for Cycle 2. The key results are the minimum times required to lose prescribed negative reactivity in each operational mode. As seen from Table 7.1.1-2, sufficient time exists for the operator to initiate appropriate action to mitigate the consequences of this event.

TABLE 7.1.1-1

KEY PARAMETERS ASSUMED IN THE BORON DILUTION ANALYSIS

Parameter	Reference Cycle*	Cycle 4
Critical Boron Concentration, PPM (All Rods Out, Zero Xenon)		
Power Operation (Mode 1)	1200	1330
Startup (Mode 2)	1300	1420
Hot Standby (Mode 3)	1300	1420
Hot Shutdown (Mode 4)	1300	1420
Cold Shutdown (Mode 5)	1300	1420
Refueling (Mode 6)	1200	1280
Inverse Boron Worth, PPM/%Δρ		
Power Operation	70	95
Startup	65	90
Hot Standby	55	70
Hot Shutdown	55	70
Cold Shutdown	55	70
Refueling	55	70
Minimum Shutdown Margin Assumed, %Δρ		
Power Operation	--	--
Startup	-3.3	-4.3
Hot Standby	-3.3	-4.3
Hot Shutdown	-3.3	-4.3
Cold Shutdown	-1.0	-2.0
Refueling	-9.45	-6.28

* Cycle 2 - last detailed analysis presented

TABLE 7.1.1-2

RESULTS OF THE BORON DILUTION EVENT

Mode	Time to Lose Prescribed Shutdown Margin (Min)		Criterion For Minimum Time to Lose Prescribed Shutdown Margin (Min)
	Cycle 2	Cycle 4	
Startup	95.1	128.9	15
Hot Standby	69.3	102.8	15
Hot Shutdown	69.3	102.8	15
Cold Shutdown	22.6	25.0	15
Refueling	56.8	46.5	30

7.1.2 STARTUP OF AN INACTIVE REACTOR COOLANT PUMP EVENT

The Startup of an Inactive Reactor Coolant Pump event was not analyzed for Cycle 4, stretch power operation because the Technical Specifications do not permit operation at power (modes 1 and 2) with less than 4 Reactor Coolant pumps operating.

7.1.3 EXCESS LOAD EVENT

The Excess Load Event was reanalyzed to determine that the DNBR and CTM design limit are not exceeded during Cycle 4.

The high power level and Thermal Margin/Low Pressure (TM/LP) trips provide primary protection to prevent exceeding the DNBR limit during this event. Additional protection is provided by other trip signals including high rate of change of power, low steam generator water level, and low steam generator pressure. In this analysis, credit is taken only for the action of the high power trip in the determination of the minimum transient DNBR, since this delays the reactor trip and allows the greatest change in DNBR. The approach to the CTM limit is terminated by either the Local Power Density trip, Variable High Power Level trip or the DNB related trip discussed above.

As presented in the FSAR, the most limiting load increase events at full power and at hot standby are due to the complete opening of the steam dump and bypass valves. Of these two events only the full power case is analyzed since it is the more limiting (i.e., approaches closer to the acceptable DNBR limit) case.

The Excess Load event at full power was initiated at the conditions given in Table 7.2. A Moderator Temperature Coefficient of $-2.5X10^{-4}\Delta\rho/F$ was assumed in this analysis. This MTC, in conjunction with the decreasing coolant inlet temperature, enhances the rate of increase of heat flux at the time of reactor trip. A Fuel Temperature Coefficient (FTC) corresponding to beginning of cycle conditions with an uncertainty of 15% was used in the analysis since this FTC causes the least amount of negative reactivity change for mitigating the transient increase in core heat flux. The pressurizer pressure control system was assumed to be inoperable because this minimizes the RCS pressure during the event and therefore reduces the calculated DNBR. All other control systems were assumed to be in the manual mode of operation and have no impact on the results of this event.

The Full Power Excess Load event results in a high power trip at 7.8 seconds. The minimum DNBR calculated for the event at the conditions specified is 1.54 compared to the design limit of 1.23. The maximum local linear heat generation rate for the event is 18.3 KW/ft compared to the design CTM limit of 21.7 KW/ft (steady state linear heat rate to fuel centerline melt). Table 7.1.3-1 presents the sequence of events for this transient. Figures 7.1.3-1 to 7.1.3-5 show the NSSS parameters for power, heat flux, RCS temperatures, RCS pressure, and steam generator pressure.

For the complete opening of the steam dump and bypass valves at hot standby conditions the minimum transient DNBR would be greater than 2.0.

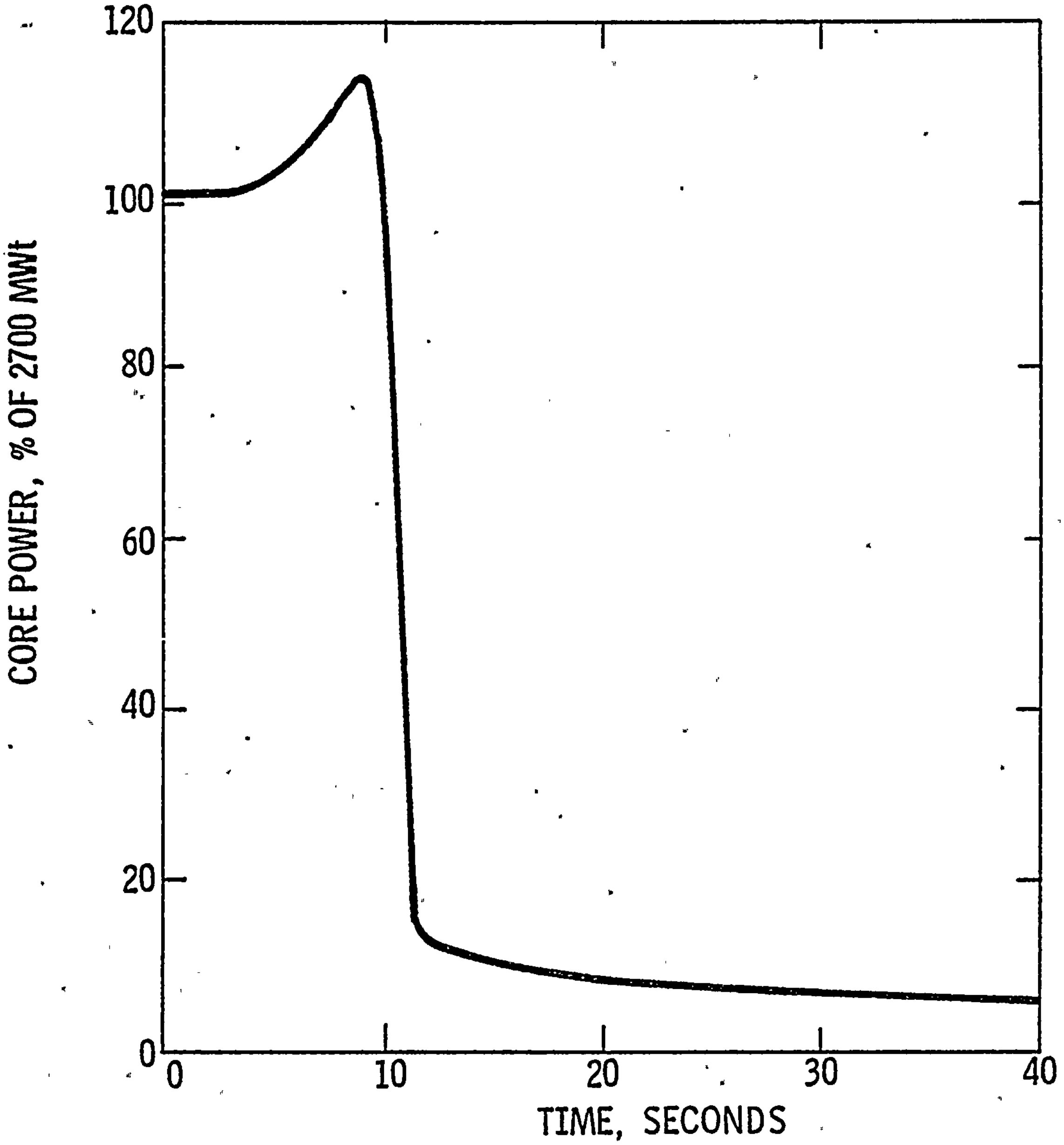
The results of the Excess Load event demonstrate that with intervention of the RPS trips, the acceptable DNBR and CTM limits will not be violated.

TABLE 7.1.3-1

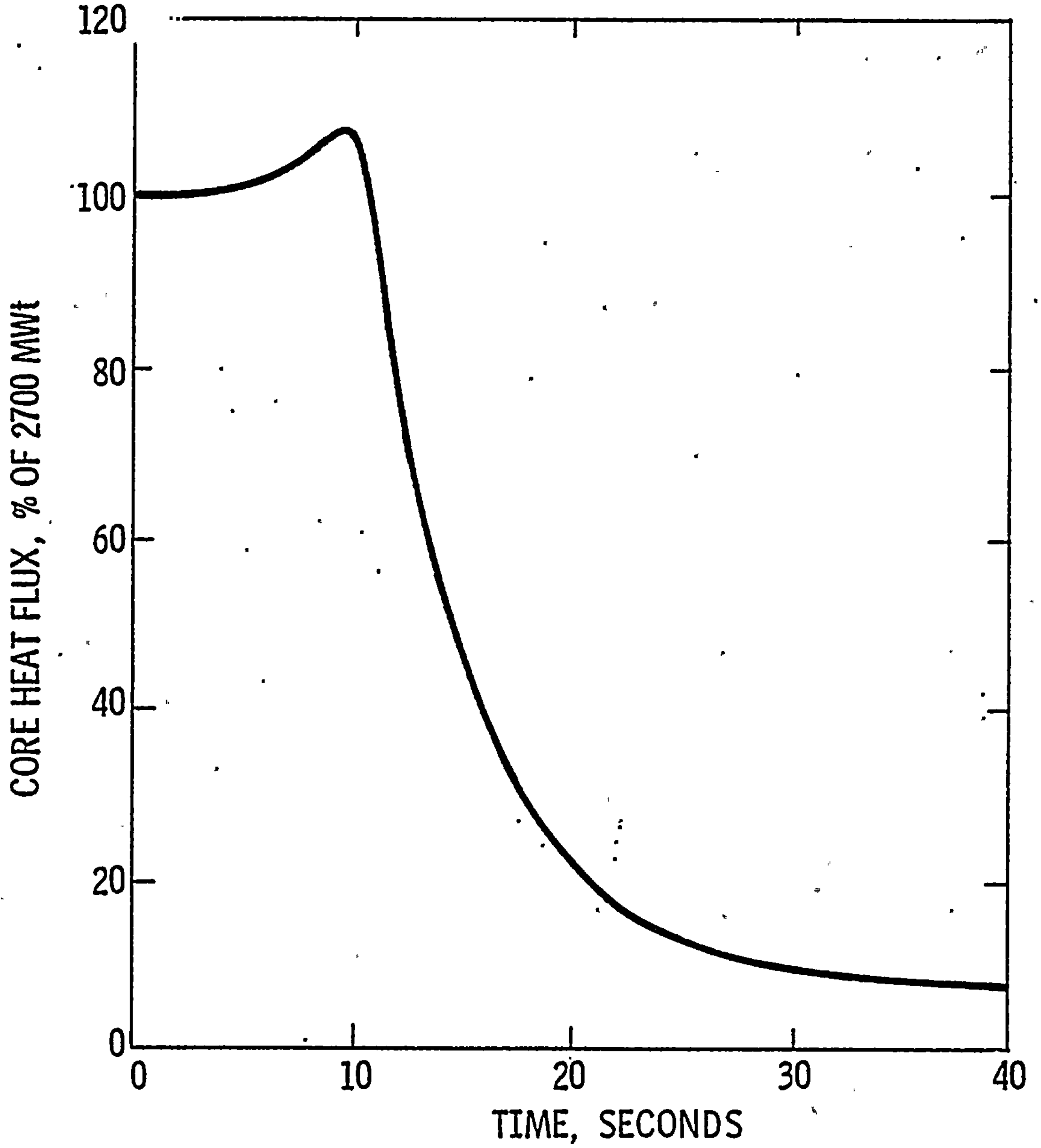
SEQUENCE OF EVENTS FOR THE EXCESS LOAD EVENT AT FULL POWER TO CALCULATE MINIMUM DNBR

Time (Sec)	Event	Setpoint or Value
0.0	Complete Opening of Steam Dump and Bypass Valves at Full Power	- - -
7.8	High Power Trip Signal Generated	110% of full power
8.2	Trip Signal Reaches CEA Holding Coil	- - -
8.7	CEA's Begin to Drop Into Core	- - -
9.1	Maximum Power	113.6
9.1	Maximum Local Linear Heat Rate Occurs, KW/ft	18.3
9.6	Minimum DNBR Occurs	1.54

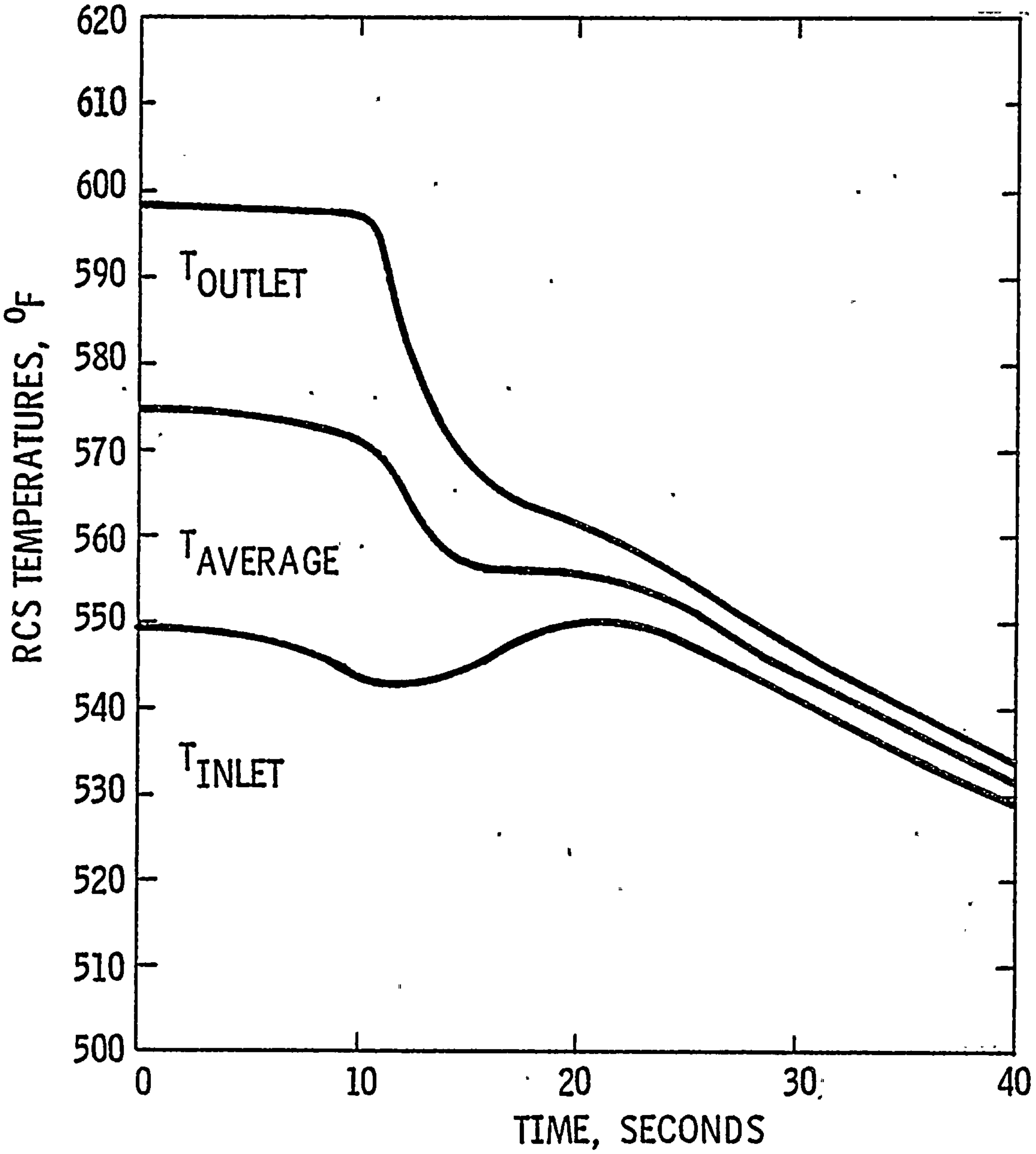
Note: The Reference Cycle for this event is the FSAR.



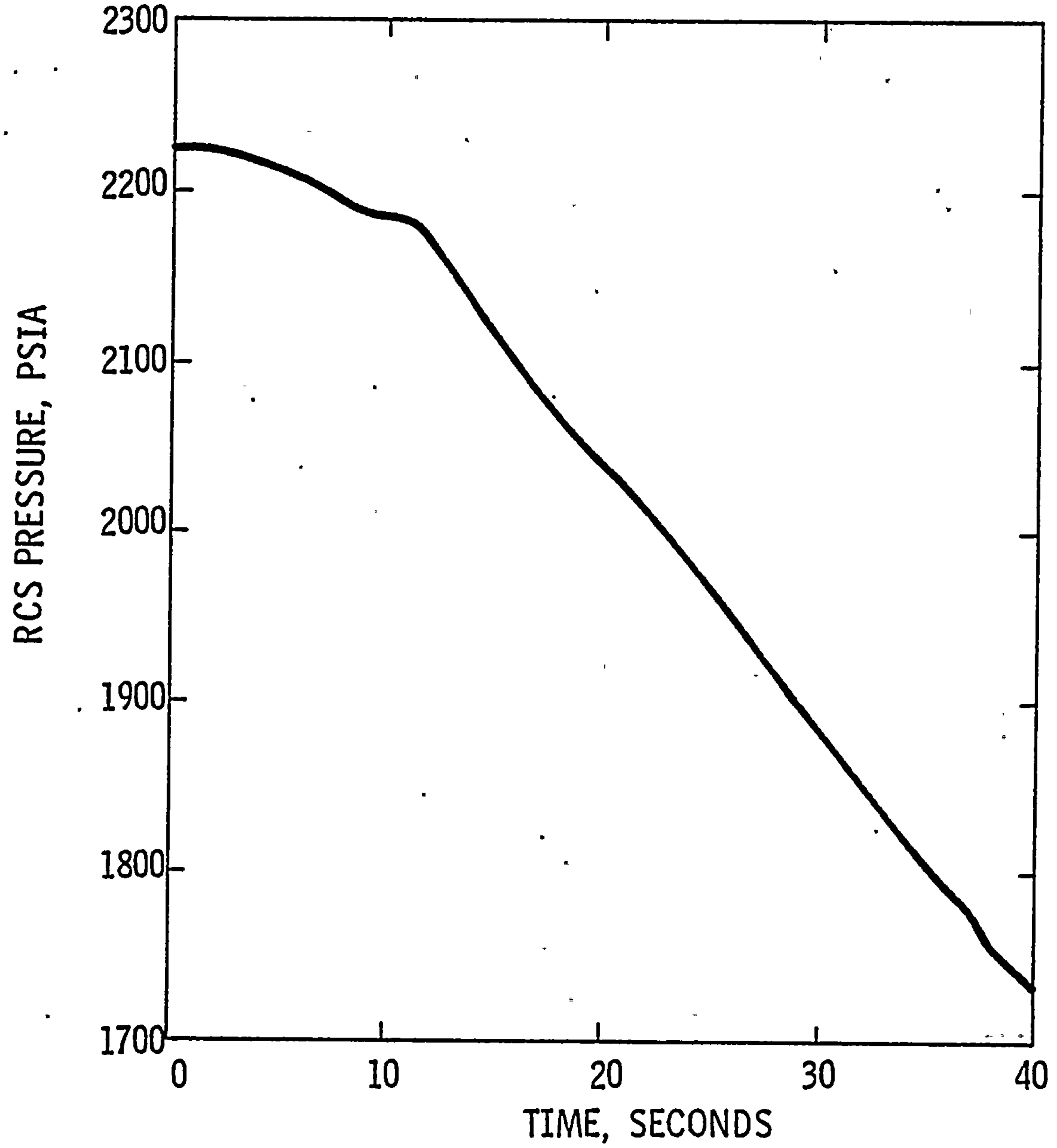
FLORIDA POWER & LIGHT CO. St. Lucie Plant Unit 1	EXCESS LOAD EVENT CORE POWER vs TIME	Figure 7.1.3-1



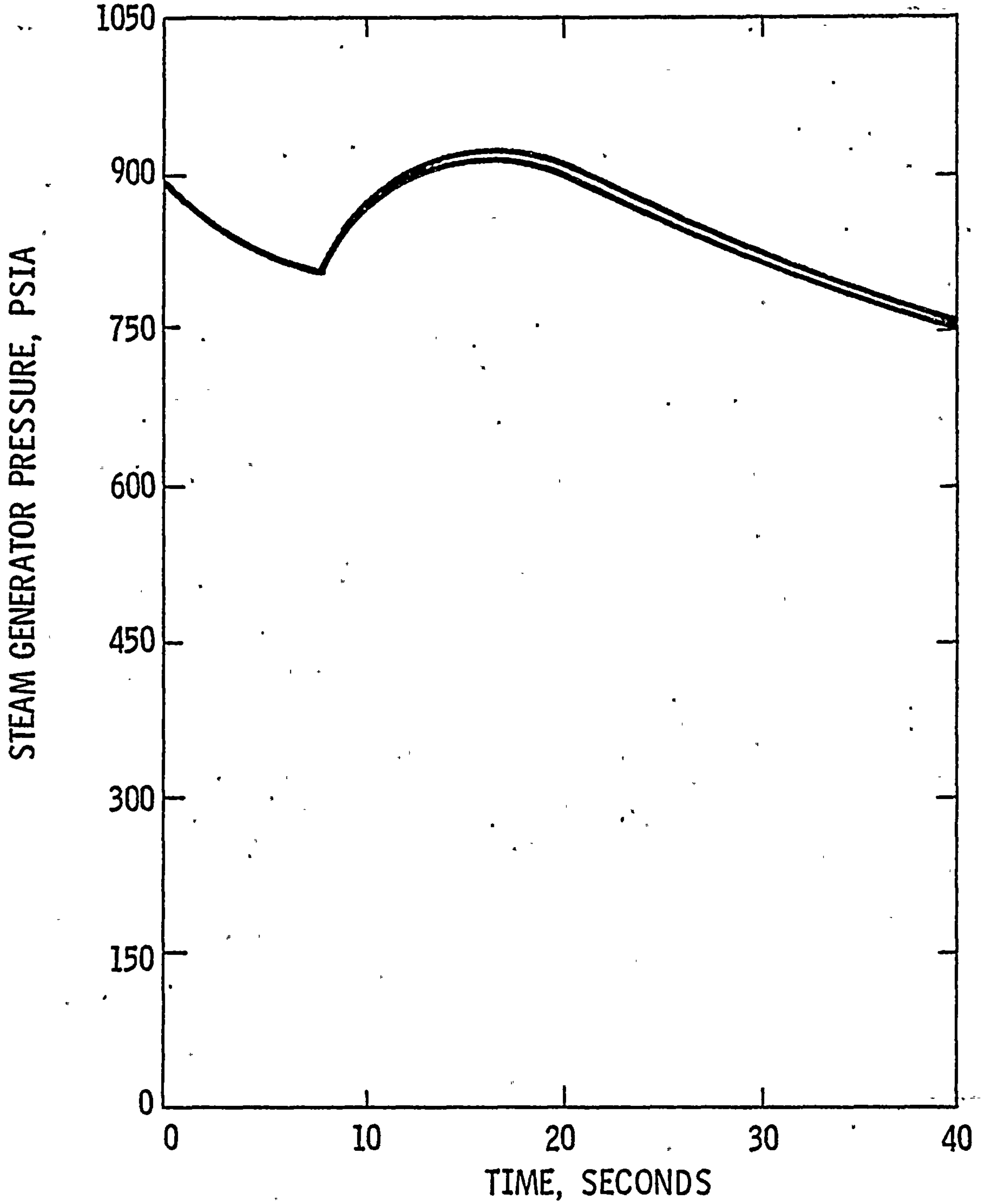
FLORIDA POWER & LIGHT CO. St. Lucie Plant Unit 1	EXCESS LOAD EVENT CORE AVERAGE HEAT FLUX vs TIME	Figure 7.1.3-2



FLORIDA POWER & LIGHT CO. St. Lucie Plant Unit 1	EXCESS LOAD EVENT RCS TEMPERATURES vs TIME	Figure 7.1.3-3



FLORIDA POWER & LIGHT CO. St. Lucie Plant Unit 1	EXCESS LOAD EVENT RCS PRESSURE vs TIME	Figure 7.1.3-4



FLORIDA POWER & LIGHT CO. St. Lucie Plant Unit 1	EXCESS LOAD EVENT STEAM GENERATOR PRESSURE vs TIME	Figure 7.1.3-5

7.1.4 LOSS OF LOAD EVENT

The Loss of Load event was reanalyzed to determine that the DNBR limit and the RCS pressure upset limit of 2750 psia are not exceeded during Cycle 4.

The assumptions used to maximize RCS pressure during the transient are:

a) The event is assumed to result from the sudden closure of the turbine stop valves without a simultaneous reactor trip. This assumption causes the greatest reduction in the rate of heat removal from the reactor coolant system and thus results in the most rapid increase in primary pressure and the closest approach to the RCS pressure upset limit.

b) The steam dump and bypass system, the pressurizer spray system, and the power operated pressurizer relief valves are assumed not to be operable. This too maximizes the primary pressure reached during the transient.

The Loss of Load event was initiated at the conditions shown in Table 7.1.4-1. The combination of parameters shown in Table 7.1.4-1 maximizes the calculated peak RCS pressure. As can be inferred from the table, the key parameters for this event are the initial primary and secondary pressures, the moderator and fuel temperature coefficients of reactivity. The methods used to analyze this event are identical to those described in the FSAR except TORC/CE-1, rather than COSMO/W-3, was used to calculate DNBR's.

The initial core average axial power distribution for this analysis was assumed to be a bottom peaked shape. This distribution is assumed because it minimizes the negative reactivity inserted during the initial portion of the scram following a reactor trip and maximizes the time required to mitigate the pressure and heat flux increases. The Moderator Temperature Coefficient (MTC) of $+.5\text{X}10^{-4}\Delta\rho/^{\circ}\text{F}$ was assumed in this analysis. This MTC in conjunction with the increasing coolant temperatures, enhances the rate of change of heat flux and the pressure at the time of reactor trip. A Fuel Temperature Coefficient (FTC) corresponding to beginning of cycle conditions was used in the analysis. This FTC causes the least amount of negative reactivity feedback to mitigate the transient increases in both the core heat flux and the pressure. The uncertainty on the FTC used in the analyses is shown in Table 7.1.4-1. The lower limit on initial RCS pressure is used to maximize the rate of change of pressure, and thus peak pressure, following trip.

The Loss of Load event, initiated from the conditions given in Table 7.1.4-1, results in a high pressurizer pressure trip signal at 7.7 seconds. At 11.0 seconds, the primary pressure reaches its maximum value of 2572 psia. This compares to an FSAR value of 2513 psia. The increase in secondary pressure is limited by the opening of the main steam safety valves, which open at 5.1 seconds. The secondary pressure reaches its maximum value of 1057 psia at 11.2 seconds after initiation of the event.

The event was also analyzed with the initial conditions listed in Table 7.2 to demonstrate that the acceptable DNBR limit is not violated. The minimum transient DNBR calculated for the event is 1.48 as compared to the design limit of 1.23.

Table 7.1.4-2 presents the sequence of events for this event. Figures 7.1.4-1 to 7.1.4-5 show the transient behavior of power, heat flux, RCS coolant temperatures, the RCS pressure, and the steam generator pressure.

The results of this analysis demonstrate that the Loss of Load event will not produce DNBR's or peak RCS pressures which exceed the DNBR limit or the upset pressure limit.

TABLE 7.1.4-1

KEY PARAMETERS ASSUMED IN THE LOSS OF LOAD ANALYSIS TO MAXIMIZE CALCULATED RCS PEAK PRESSURE

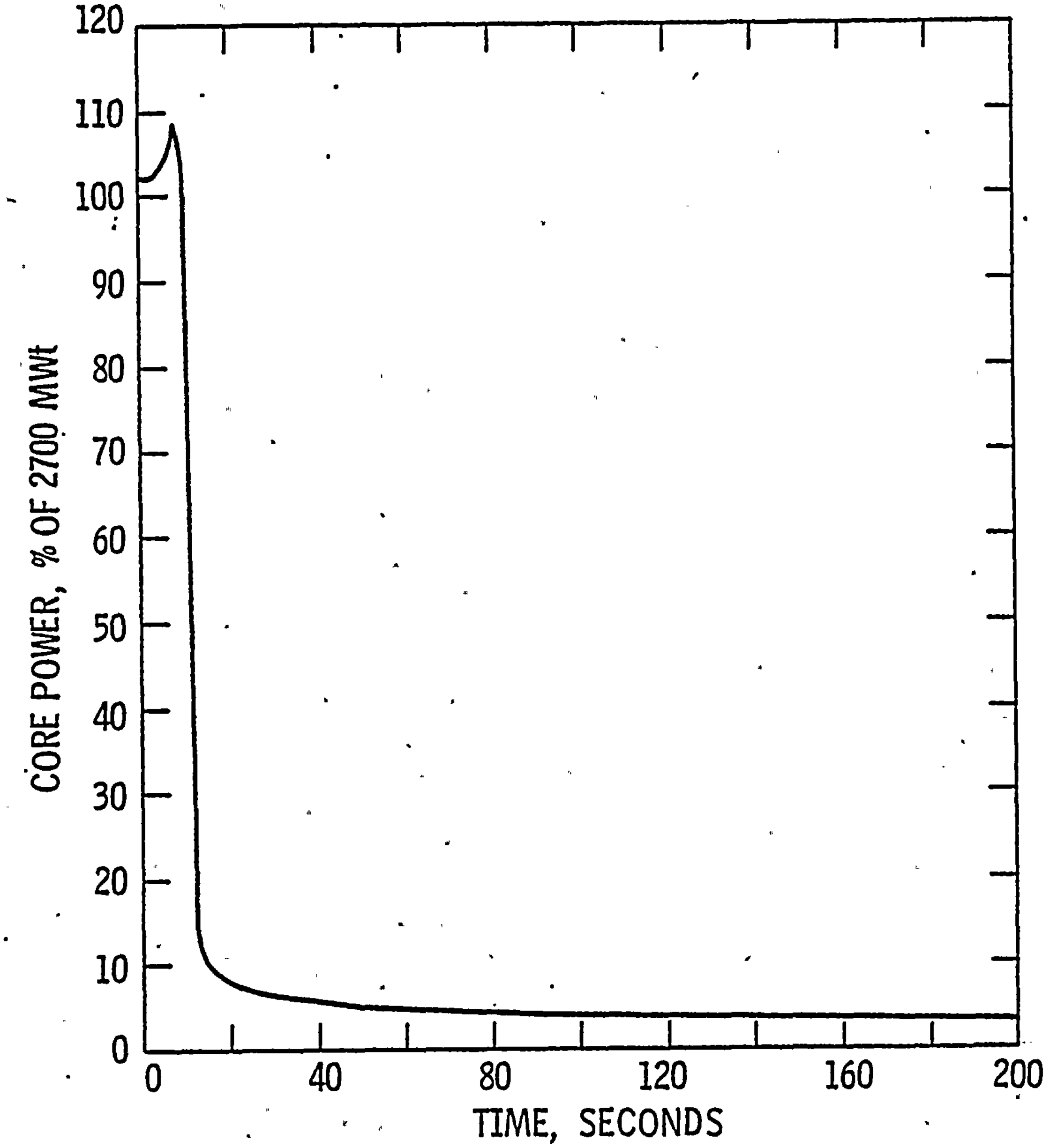
Parameter	Units	Reference* Cycle	Cycle 4
Initial Core Power Level	MWt	2611	2754
Initial Core Inlet Coolant Temperature	°F	544	551
Core Coolant Flow	$X10^6$ lbm/hr	134.9	138.3
Initial Reactor Coolant System Pressure	psia	2250	2200
Initial Steam Generator Pressure	psia	848	820
Moderator Temperature Coefficient	$X10^{-4} \Delta\rho/°F$	+.5	+.5
Doppler Coefficient Multiplier		.85	.85
CEA Worth at Trip	%Δρ	-2.4	-4.7
Time to 90% Insertion of Scram Rods	sec	3.0	3.1
Reactor Regulating System	Operating Mode	Manual	Manual
Steam Dump and Bypass System	Operating Mode	Inoperative	Inoperative

* FSAR

TABLE 7.1.4-2

SEQUENCE OF EVENTS FOR THE LOSS OF LOAD EVENT TO MAXIMIZE CALCULATED RCS PEAK PRESSURE

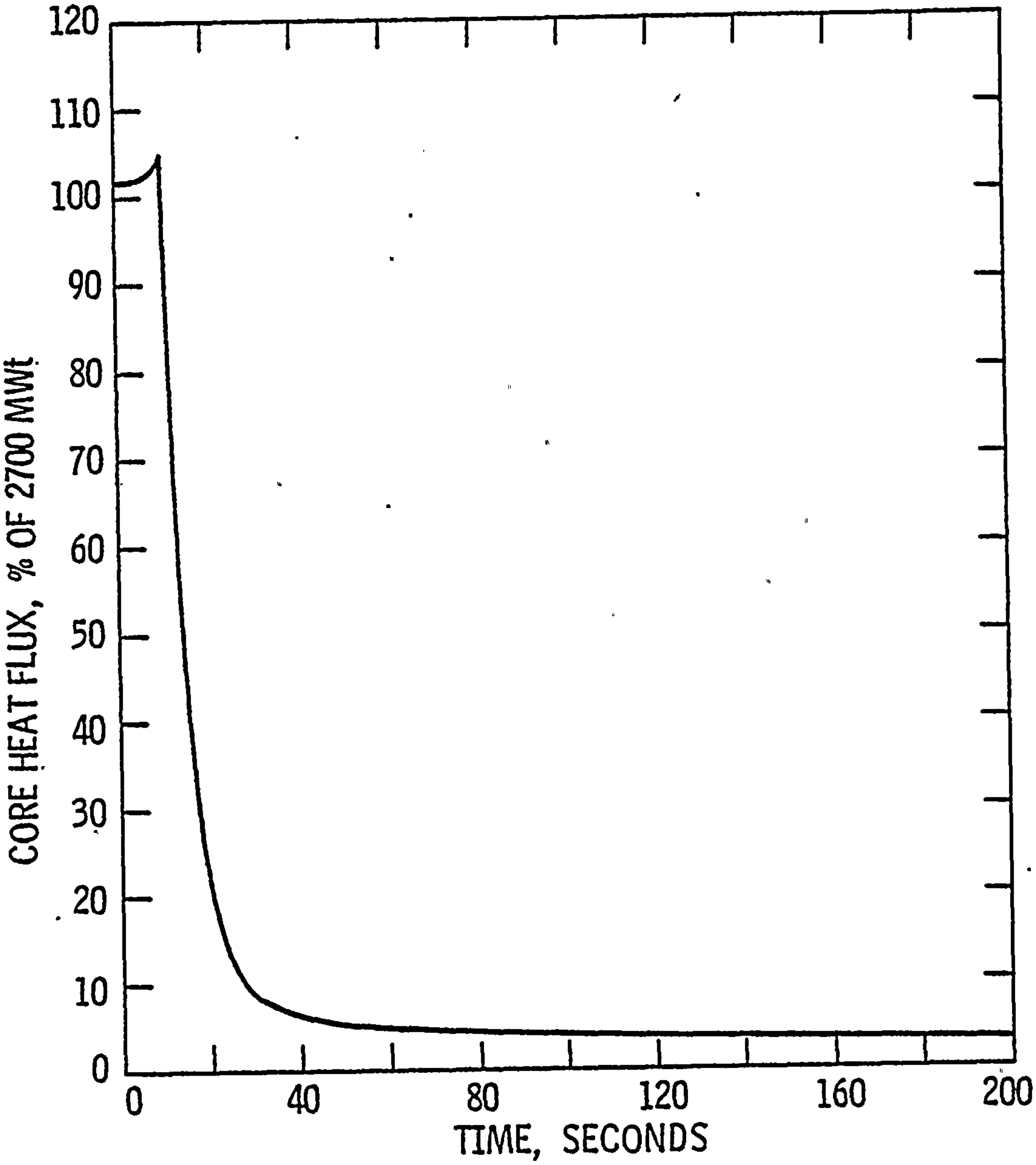
Time (sec)	Event	Setpoint or Value
0.0	Loss of Secondary Load	- - -
5.1	Steam Generator Safety Valves Open	1010 psia
7.8	High Pressurizer Pressure Trip Signal Generated	2422 psia
9.0	Pressurizer Safety Valves Open	2500 psia
9.2	CEAs Begin to Drop Into Core	- - -
11.0	Maximum RCS Pressure	2572 psia
11.2	Maximum Steam Generator Pressure	1057 psia
13.5	Pressurizer Safety Valves are Fully Closed	2500 psia



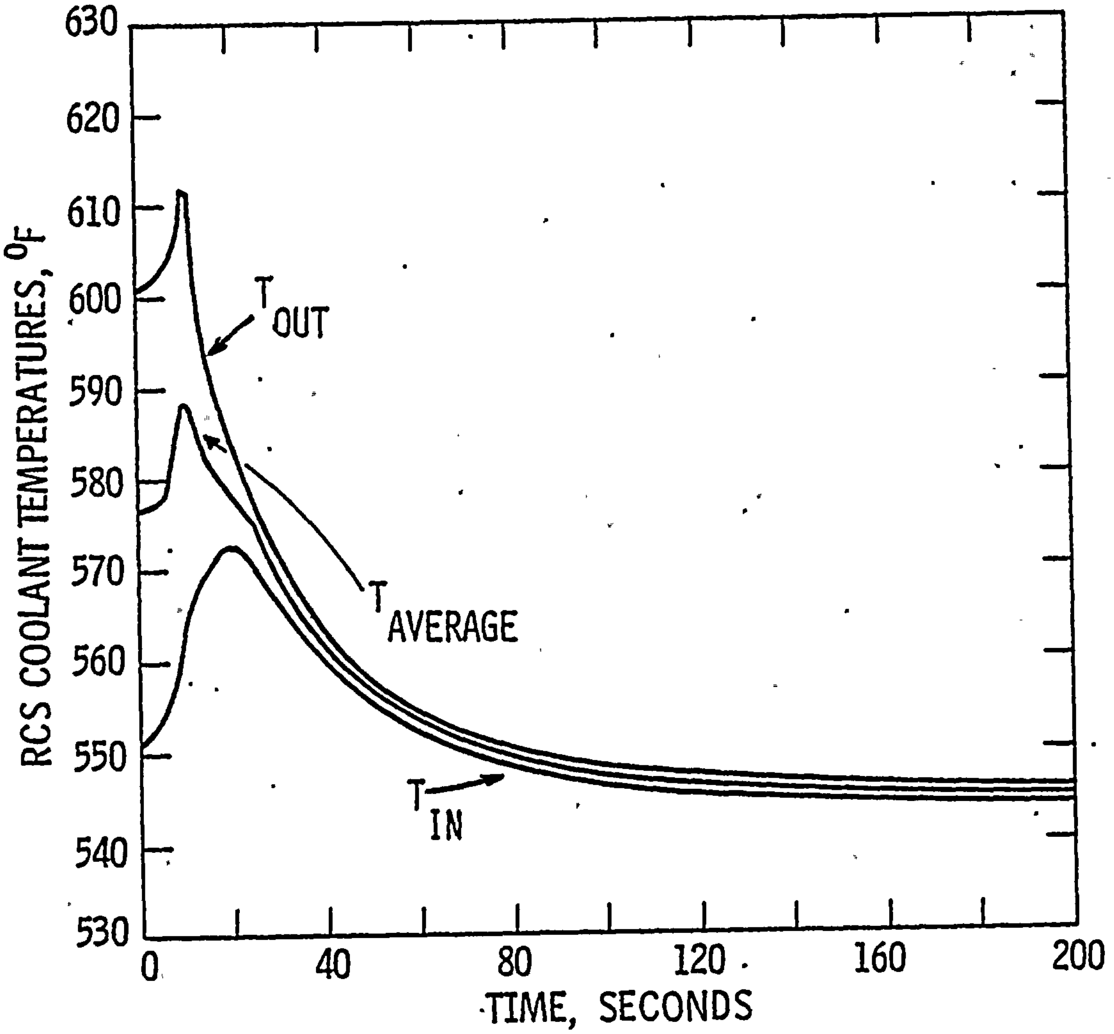
FLORIDA
POWER & LIGHT CO.
St. Lucie Plant

LOSS OF LOAD EVENT
CORE POWER vs TIME

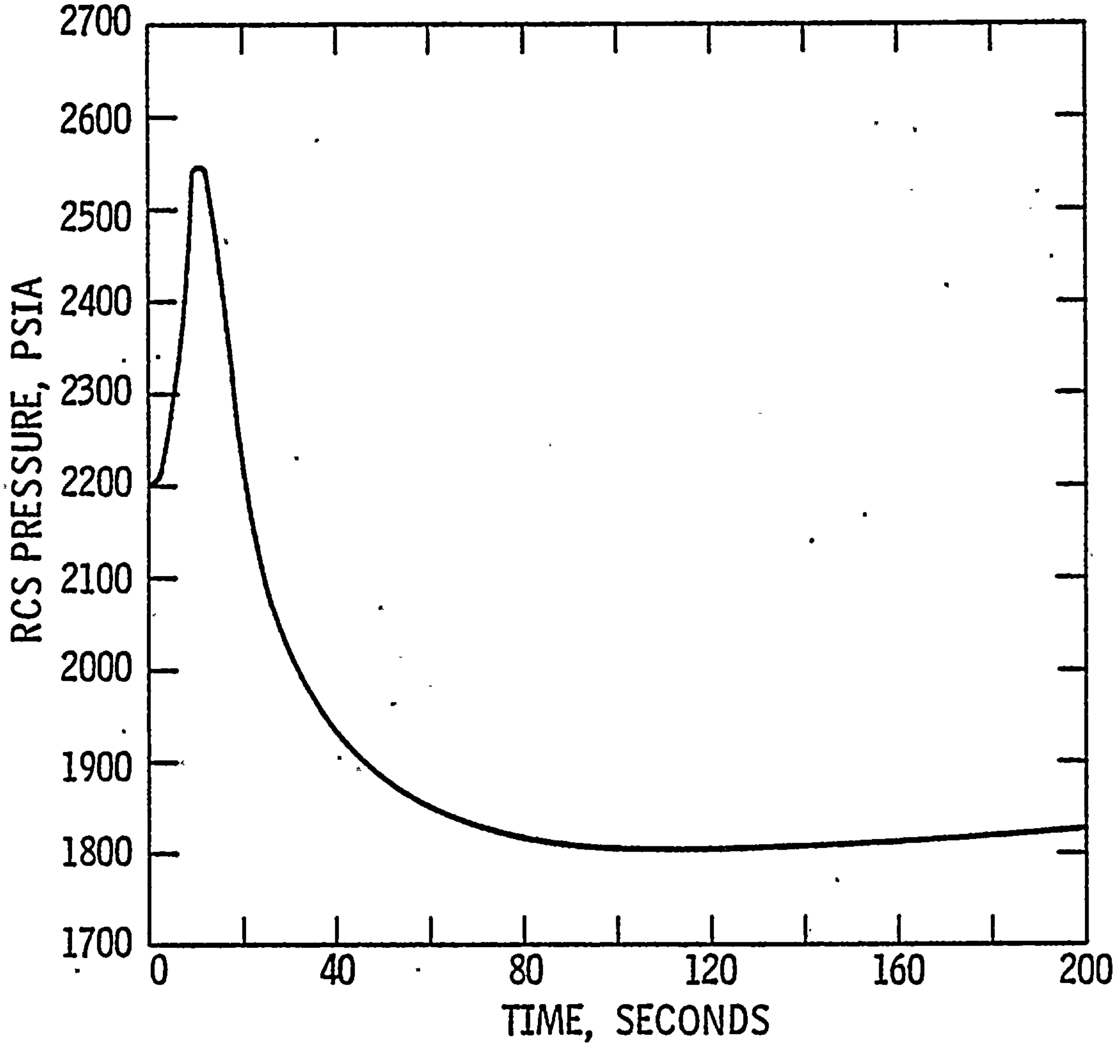
Figure
7.1.4-1



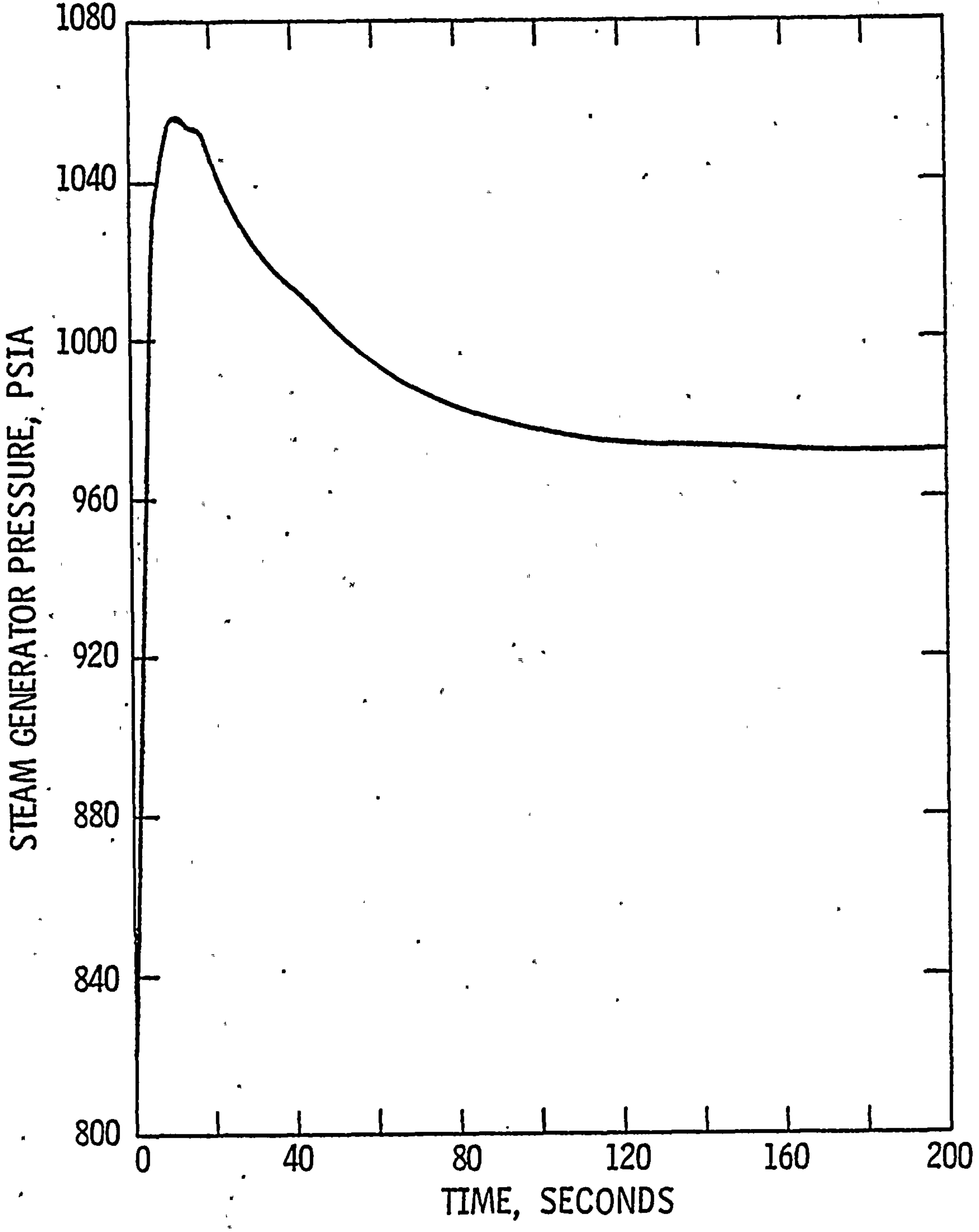
FLORIDA POWER & LIGHT CO. St. Lucie Plant	LOSS OF LOAD EVENT CORE AVERAGE HEAT FLUX vs TIME	Figure 7.1.4-2



FLORIDA POWER & LIGHT CO. St. Lucie Plant	LOSS OF LOAD EVENT REACTOR COOLANT SYSTEM TEMPERATURE vs TIME	Figure 7.1.4-3



FLORIDA POWER & LIGHT CO. St. Lucie Plant	LOSS OF LOAD EVENT REACTOR COOLANT SYSTEM PRESSURE vs TIME	Figure 7.1.4-4



FLORIDA POWER & LIGHT CO. St. Lucie Plant	LOSS OF LOAD EVENT STEAM GENERATOR PRESSURE vs TIME	Figure 7.1.4-5

7.1.5 LOSS OF FEEDWATER FLOW EVENT

The Loss of Feedwater Flow event was reanalyzed to determine that the DNBR limit and RCS upset pressure limit of 2750 psia are not exceeded during Cycle 4. In addition, the event was analyzed to demonstrate that the water inventory remaining in the steam generators following trip is sufficient to provide at least ten minutes for the operator to initiate auxiliary feedwater before steam generator dryout occurs.

The analysis was performed assuming an instantaneous reduction in main feedwater flow to the steam generators without a corresponding reduction in steam flow. The result of this mismatch is a reduction of the steam generator liquid inventories.

The initial conditions presented in Table 7.1.5-1 were used to analyze the event to demonstrate that the RCS upset pressure limit is not exceeded. Initiating the event from the conditions presented in Table 7.1.5-1 results in a high pressurizer pressure trip at 28.8 seconds. Low initial RCS and steam generator pressures lead to the maximum rate of change of pressure and thus a higher overshoot following trip. Since the goal was to maximize the calculated RCS pressure, no credit was taken for the low steam generator water level trip which would have occurred earlier. The pressurizer pressure reached a maximum value of 2506 psia at 32.8 seconds. The sequence of events is given in Table 7.1.5-2. The transient behavior of core power, core average heat flux, RCS coolant temperatures and RCS pressure are presented in Figures 7.1.5-1 to 7.1.5-4.

The initial conditions listed in Table 7.1.5-3 were used to analyze the event to demonstrate that at least 10 minutes are available to the operator to initiate auxiliary feedwater flow before steam generator dryout occurs. The steam dump and bypass valves, the pressurizer spray system, and the pressurizer relief valves were assumed to be in operation since this maximizes the steam flow from the steam generators and the rate of decrease of the water inventory in the steam generators. An inoperative pressurizer spray system and relief valves could potentially lead to an earlier reactor trip on high pressurizer pressure. An initial secondary pressure of 893 psia was also assumed to maximize steam releases from the steam generators via the secondary safety valves. The analysis shows that a reactor trip on low steam generator level occurs at 12.8 seconds. This corresponds to a water level which is 60 inches below the normal operating level. The analysis shows that the water remaining in the steam generators following trip is sufficient to provide at least 15 minutes for the operator to initiate auxiliary feedwater. Figure 7.1.5-5 presents the water inventory in the steam generators as a function of time.

The event was also analyzed with initial conditions listed in Table 7.2 to demonstrate that the acceptable DNBR limit will not be exceeded. The minimum transient DNBR calculated for the event is 1.53 as compared to the design DNBR limit of 1.23.

TABLE 7.1.5-1

KEY PARAMETERS ASSUMED IN THE LOSS OF FEEDWATER FLOW ANALYSIS TO MAXIMIZE CALCULATED RCS PEAK PRESSURE

Parameter	Units	Reference* Cycle	Cycle 4
Initial Core Power Level	MWt	2611	2754
Inlet Coolant Temperature	°F	544	551
Core Mass Flow Rate	$X10^6$ lbm/hr	134.8	138.3
Reactor Coolant System Pressure	psia	2250	2200
Steam Generator Pressure	psia	841	815
Moderator Temperature Coefficient	$X10^{-4}\Delta\rho/°F$	+.5	+.5
Doppler Coefficient Multiplier	- - -	.85	.85
Reactor Regulating System	Operating Mode	Manual	Manual **
Steam Dump and Bypass System	Operating Mode	Auto	Inoperative**
Feedwater Regulating System	Operating Mode	Inoperative	Inoperative**
Auxiliary Feedwater System	Operating Mode	Manual	Manual **
Pressurizer Pressure Control System	Operating Mode	Auto	Inoperative**
Pressurizer Level Control System	Operating Mode	Auto	Inoperative**

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* FSAR

** These modes of control system operation maximize the peak RCS pressure.

TABLE 7.1.5-2

SEQUENCE OF EVENTS FOR LOSS OF FEEDWATER FLOW ANALYSIS TO MAXIMIZE CALCULATED RCS PEAK PRESSURE

Time (sec)	Event	Setpoint or Value
0.0	Loss of Main Feedwater	- - -
28.8	High Pressurizer Pressure Trip Signal Generated	2422 psia
30.2	CEAs Begin to Drop into Core	- - -
30.9	Steam Generator Safety Valves Begin to Open	990 psia
32.4	Primary Safety Valves Begin to Open	2500 psia
32.8	Maximum RCS Pressure	2506 psia
36.0	Maximum Steam Generator Pressure	1046 psia

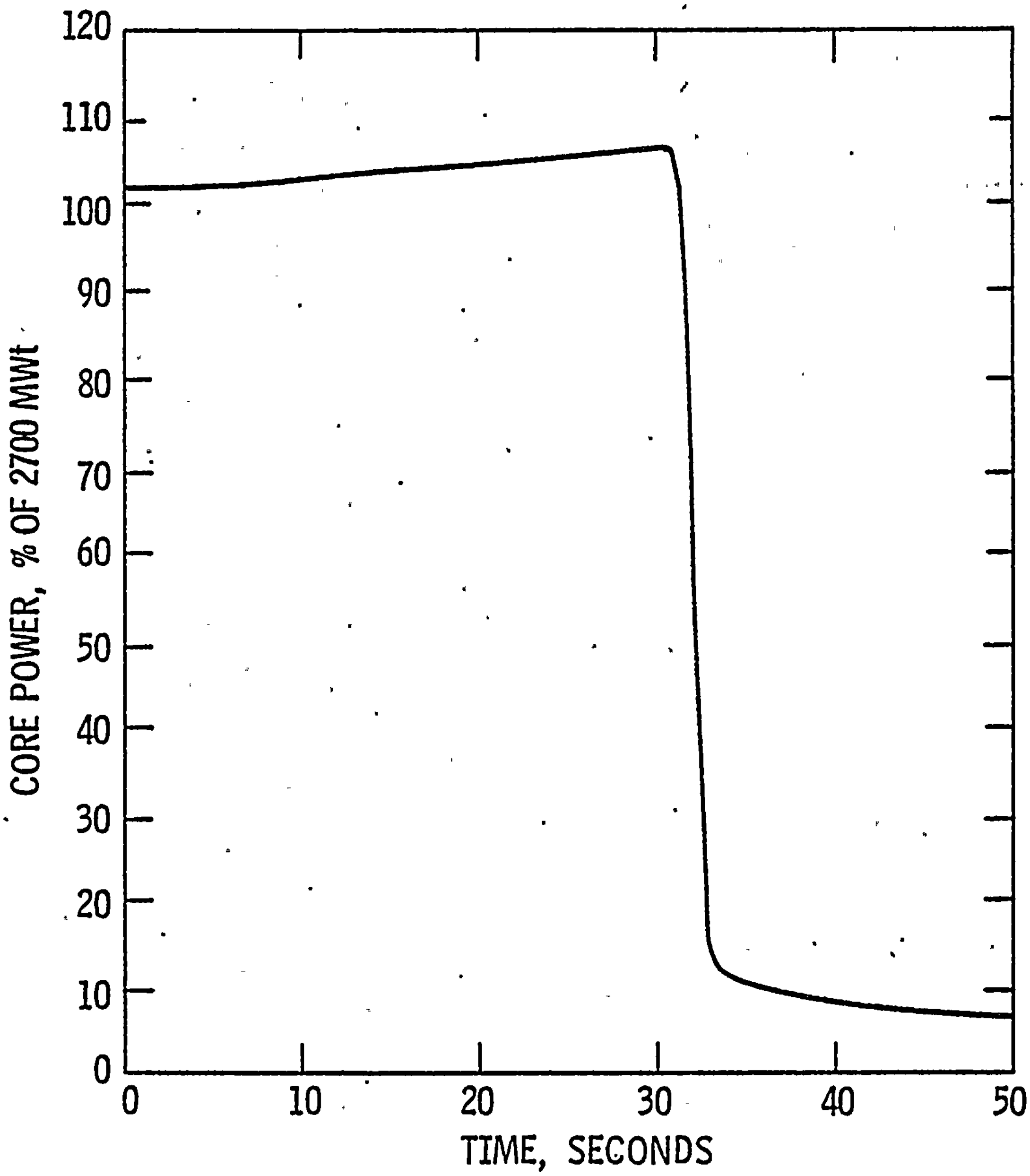
TABLE 7.1.5-3

KEY PARAMETERS ASSUMED IN THE LOSS OF FEEDWATER FLOW ANALYSIS TO MINIMIZE CALCULATED STEAM GENERATOR DRYOUT TIME

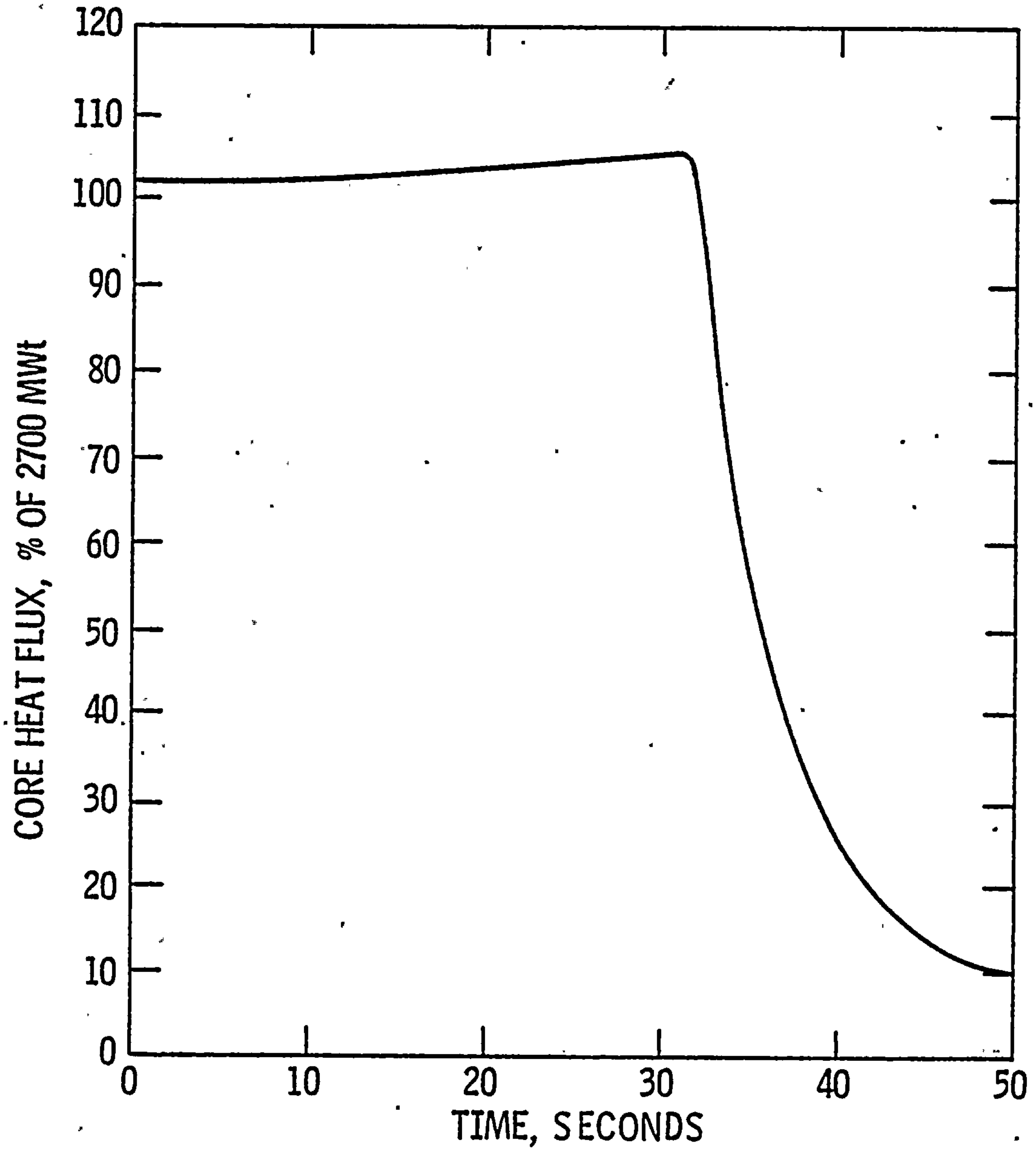
Parameter	Units	Reference* Cycle	Cycle 4
Initial Core Power Level	MWt	2611	2754
Inlet Coolant Temperature	°F	544	551
Core Mass Flow Rate	$X10^6$ lbm/hr	134.8	138.3
Reactor Coolant System Pressure	psia	2250	2200
Steam Generator Pressure	psia	841	893
Moderator Temperature Coefficient	$X10^{-4}\Delta\rho/°F$	+.5	+.5
Doppler Coefficient Multiplier	- - -	.85	.85
Reactor Regulating System	Operating Mode	Manual	Manual **
Steam Dump and Bypass System	Operating Mode	Auto	Auto **
Feedwater Regulating System	Operating Mode	Inoperative	Inoperative **
Auxiliary Feedwater System	Operating Mode	Manual	Manual **
Pressurizer Pressure Control System	Operating Mode	Auto	Auto **
Pressurizer Level Control System	Operating Mode	Auto	Auto **

* FSAR

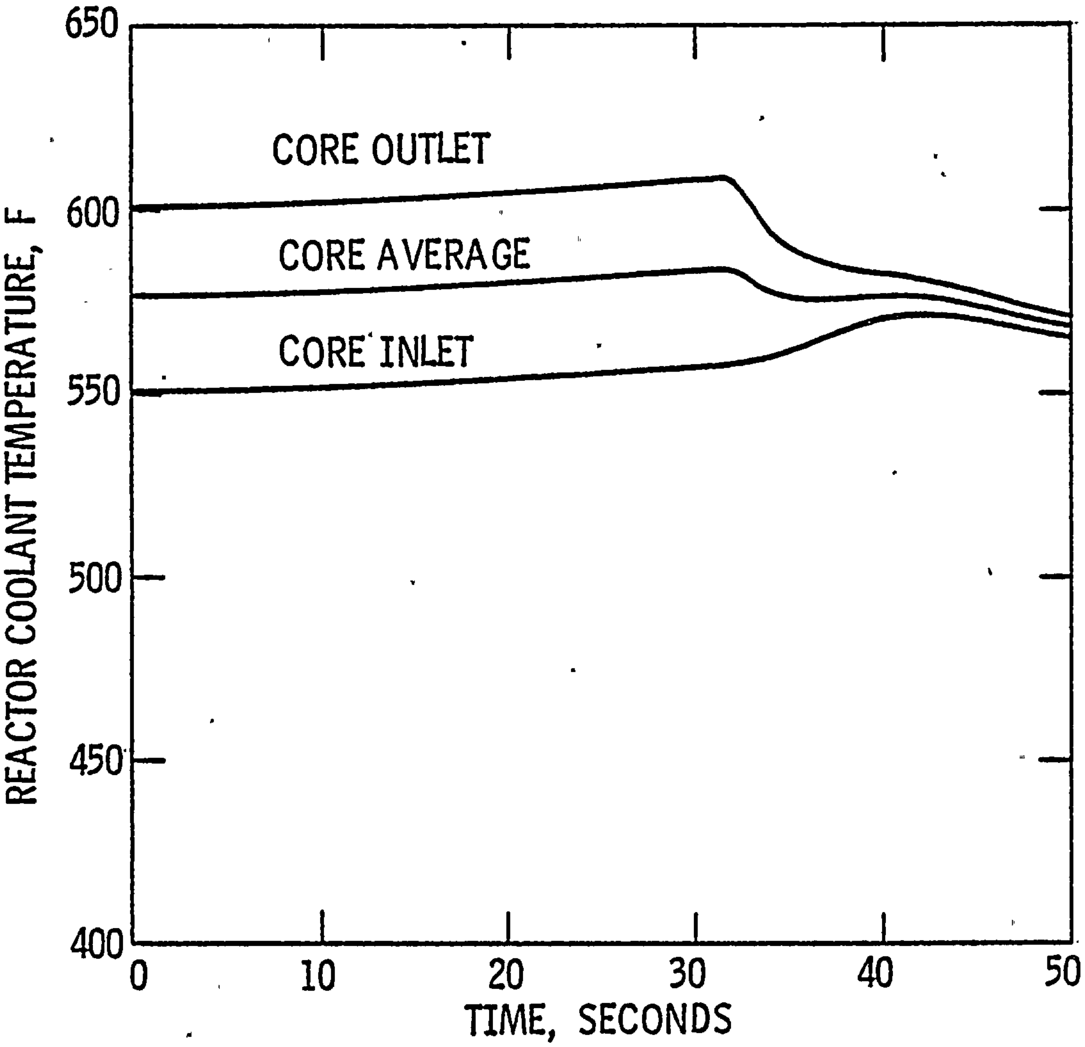
** These modes of control system operation minimize the steam generator dryout time.



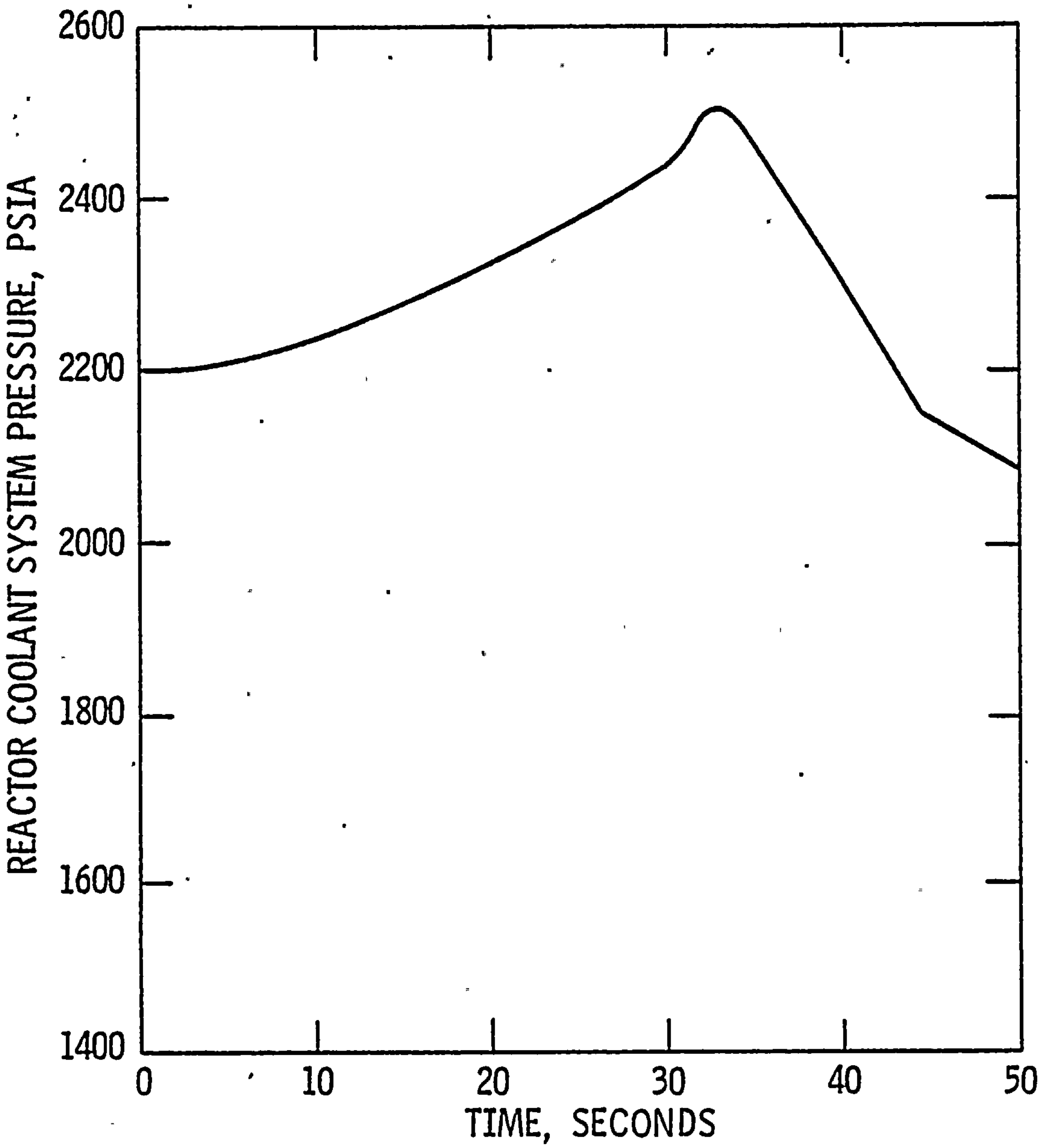
FLORIDA POWER & LIGHT CO. St. Lucie Plant	LOSS OF FEEDWATER FLOW EVENT CORE POWER vs TIME	Figure 7.1.5-1



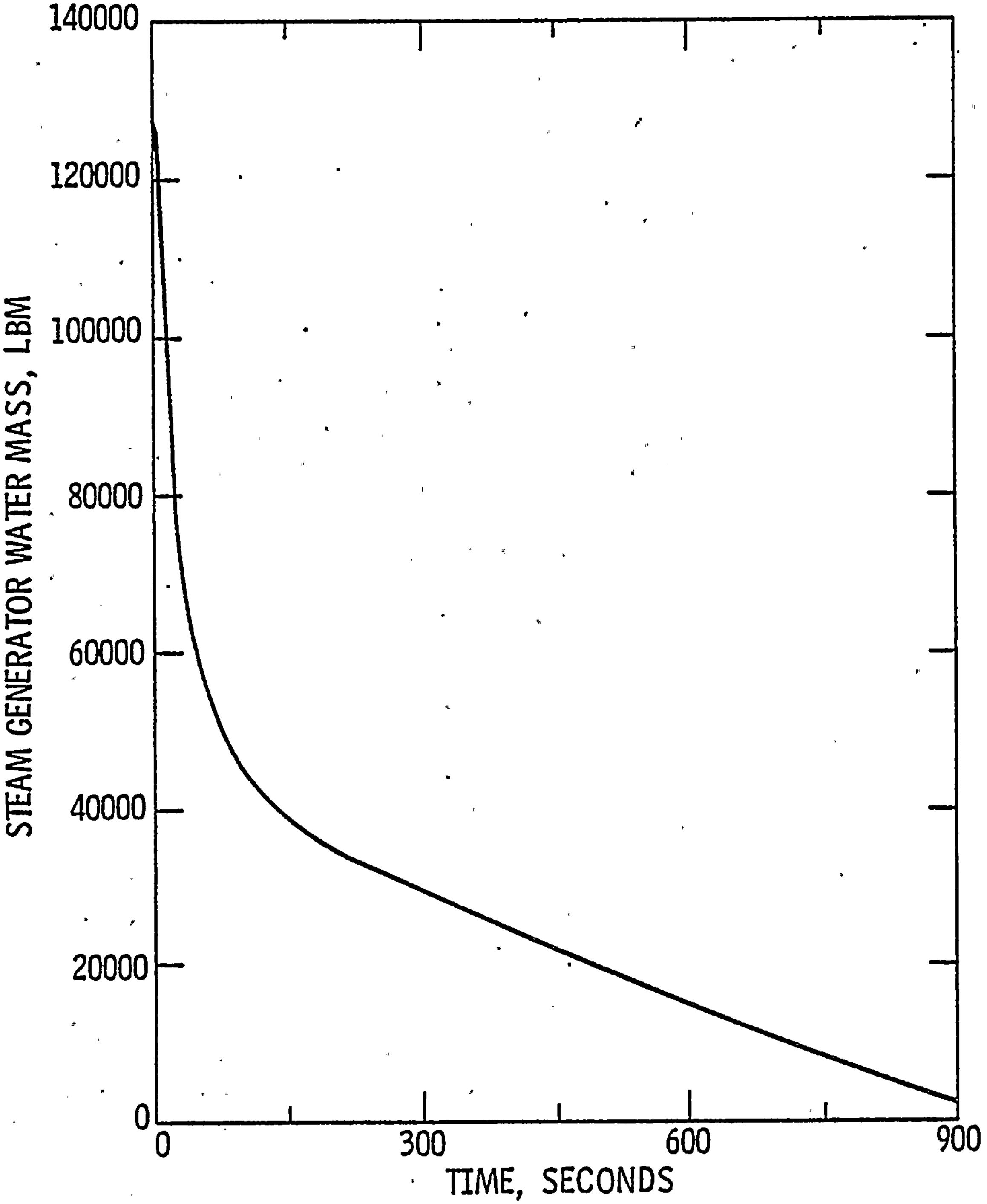
FLORIDA POWER & LIGHT CO. St. Lucie Plant	LOSS OF FEEDWATER FLOW EVENT CORE AVERAGE HEAT FLUX vs TIME	Figure 7.1.5-2



FLORIDA POWER & LIGHT CO. St. Lucie Plant	LOSS OF FEEDWATER FLOW EVENT REACTOR COOLANT SYSTEM TEMPERATURE vs TIME	Figure 7.1.5-3



FLORIDA POWER & LIGHT CO. St. Lucie Plant	LOSS OF FEEDWATER FLOW EVENT REACTOR COOLANT SYSTEM PRESSURE vs TIME	Figure 7.1.5-4



FLORIDA POWER & LIGHT CO. St. Lucie Plant	LOSS OF FEEDWATER FLOW EVENT STEAM GENERATOR WATER MASS vs TIME	Figure 7.1.5-5

7.1.6 EXCESS HEAT REMOVAL DUE TO FEEDWATER MALFUNCTION EVENT

The Excess Heat Removal was reanalyzed to demonstrate that the DNBR limit is not exceeded during Cycle 4. The event is assumed to result from the instantaneous loss of the high pressure feedwater heaters which reduces the temperature of the main feedwater supplied to the steam generators and leads to increased heat extraction from the primary coolant. The event has the same effect on the primary system as a small increase in turbine demand which is not matched by an increase in core power. The loss of the high pressure feedwater heaters is the most adverse feedwater malfunction event in terms of cooling action on the RCS. The analysis methods as well as the conclusions are the same as presented in the FSAR. The minimum transient CE-1 DNBR during the event is less limiting than the minimum transient CE-1 DNBR for the Excess Load event (see Section 7.1.3). Consequently the results of the Excess Heat Removal event are not presented.

7.1.7 RCS DEPRESSURIZATION EVENT

The RCS Depressurization event was reanalyzed for Cycle 4 to determine the pressure bias factor for the TM/LP trip setpoint.

The RCS Depressurization event is one of the DBEs analyzed to determine the maximum pressure bias factor input to the TM/LP trip. The methodology used for Cycle 4 is the same as that used for Cycle 3 and is described in References 2 and 14. The pressure bias factor accounts for margin degradation attributable to measurement and trip system processing delay times. Changes in core power, inlet temperature, RCS pressure and axial shape index during the transient are monitored by the TM/LP trip directly. Consequently, with TM/LP trip setpoints and the bias term determined in this analysis, adequate protection will be provided for the Depressurization Event to prevent acceptable DNBR design limit from being exceeded.

The assumptions used to maximize the rate of pressure decrease and, consequently, the fastest approach to DNBR limits are:

1) The event is assumed to occur due to an inadvertent opening of both pressurizer relief valves while operating at rated thermal power. This results in a rapid drop in the RCS pressure and, consequently, a rapid decrease in DNBR.

2) The initial axial power shape and the corresponding scram worth versus insertion used in the analysis is a bottom peaked shape. This power distribution maximizes the time required to terminate the decrease in DNBR following a trip.

3) The charging pumps, the pressurizer heaters, and the pressurizer backup heaters are assumed to be inoperable. This maximizes the rate of pressure decrease and, consequently, maximizes the rate of approach to the DNBR limit.

The analysis of this event shows that a pressure bias factor of 30.0 psia is required. This is greater than that input from other events. Hence, the use of the pressure bias factor determined by this event in conjunction with the TM/LP trip, will prevent exceeding the DNBR design limit for AOO's which require TM/LP trip protection.

7.2 ANTICIPATED OPERATIONAL OCCURRENCES WHICH ARE DEPENDENT ON INITIAL OVERPOWER MARGIN AND/OR RPS TRIPS FOR PROTECTION AGAINST VIOLATION OF LIMITS

The events in this category were analyzed for stretch power operation of Florida Power and Light St. Lucie Unit 1, Cycle 4, to determine the initial margins that must be maintained by the Tech Spec LCO limits such that acceptable DNBR, CTM and upset pressure limits will not be exceeded during any of these events. The initial margin required to prevent the appropriate limits from being exceeded for any of these events was determined by analyzing them using the initial conditions specified in Table 7-2. These conditions were chosen to assure that sufficient initial overpower margin is available at the initiation of the most limiting AOO in this category. The method of generating Limiting Conditions for Operation (LCO) is discussed in Reference 14.

As noted in Section 7.1, initial conditions used in the evaluation of upset pressure limit and dose rates may differ from those given in Table 7.2, since for these limits the effects of NSSS parameter uncertainties are not combined statistically.

7.2.1 CEA WITHDRAWAL EVENT

The CEA Withdrawal event was reanalyzed for Cycle 4 to determine the initial margins that must be maintained by the LCOs such that in conjunction with the RPS (Variable High Power Trip) the DNBR and fuel centerline to melt (CTM) design limits will not be exceeded.

As stated in CEN-126 (F)-P, (Reference 13), the CEA Withdrawal event is now classified as one for which the acceptable DNBR and centerline to melt limits are not violated by virtue of sufficient initial steady state thermal margin provided by the DNBR and Linear Heat Rate (LHR) related Limiting Conditions for Operations (LCO's). Depending on the initial conditions and the reactivity insertion rate associated with the CEA Withdrawal, either the Variable High Power Level or Thermal Margin/Low Pressure (TM/LP) trip, in conjunction with the initial steady state LCOs, prevents DNBR limits from being exceeded. An approach to the CTM limit is terminated by either the Variable High Power Level Trip or the Local Power Density Trip. The analysis only took credit for the Variable High Power Trip to determine the required initial overpower margin for DNBR.

The zero power case was analyzed to demonstrate that acceptable DNBR and centerline to melt limits are not exceeded. For the zero power case, a reactor trip, initiated by the variable high power trip at 25% (15% + 10% uncertainty) of rated thermal power, was assumed in the analysis.

The key parameters for the cases analyzed are reactivity insertion rate due to rod motion, moderator temperature feedback effects, and initial axial power distribution. The input values selected maximize the power increase and thus the margin degradation. The range of reactivity insertion rates considered in the analysis is given in Table 7.2.1-1. The values of other key parameters used in the analysis of this event are also presented in Table 7.2.1-1.

The zero power case initiated at the limiting conditions of operation results in a minimum CE-1 DNBR of 1.86. Also, the analysis shows that the fuel-centerline temperatures are well below those corresponding to the acceptable fuel centerline melt limit. The sequence of events for the zero power case is presented in Table 7.2.1-2 Figures 7.2.1-1 to 7.2.1-4 present the transient behavior of core power, core average heat flux, RCS coolant temperatures, and the RCS pressure for the zero power case.

Protection against exceeding the DNBR limit for a CEA Withdrawal at full power is provided by the initial steady state thermal margin which is maintained by adhering to the Technical Specifications' LCOs on DNBR margin and by the response of the RPS which provides an automatic reactor trip on high power level. The minimum DNBR for this event, when initiated from the extremes of the LCOs, is 1.52 . The analysis shows that the fuel centerline temperatures are well below those corresponding to the acceptable CTM limit. The sequence of events for the full power case is presented in Table 7.2.1-3. Figures 7.2.1-5 to 7.2.1-8 present the transient behavior of core power, core average heat flux, RCS coolant temperatures, and the RCS pressure for the full power case.

The event initiated from the Tech Spec LCOs (in conjunction with the Variable High Power Trip if required) will not lead to a DNBR or fuel temperature which exceed the DNBR and centerline to melt design limits.

TABLE 7-2

ST. LUCIE 1
CORE PARAMETERS INPUT TO SAFETY ANALYSES
FOR DNB AND CTM (CENTERLINE TO MELT) DESIGN LIMITS

Physics Parameters	Units	Reference Cycle Values	Cycle 4 Values
Radial Peaking Factors			
For DNB Margin Analyses (F_r)			
Unrodded Region		1.59	1.65 *
Bank 7 Inserted		1.80	1.90 *
For Planar Radial Component (F_{xy}) of 3-D Peak (CMT Limit Analyses)			
Unrodded Region		1.58	1.65 **
Bank 7 Inserted		1.82	1.90 **
Maximum Augmentation Factor		1.071	1.071
Moderator Temperature Coefficient	$10^{-4}\Delta\rho$/°F	-2.5 → +.5	-2.5 → +.5
Shutdown Margin (Value assumed in Zero Power SLB) (1 loop/2 loop)		-4.1/-3.3	-5.1/-4.3
Safety Parameters			
Power Level	MWt	2611	2700 *, **
Maximum Steady State Core Inlet Temperature	°F	544	549 *
Minimum Steady State RCS Pressure	psia	2200	2225 *
Reactor Coolant Core Flow	10^6 lb/hr	134.9	138.3*
Negative Axial Shape Index LCO extreme assumed at Full Power	I_p	-.23	-.11*, **
Maximum CEA Insertion at Full Power	% Insertion of Bank 7	25	25
Maximum Initial Linear Heat Rate for transient other than LOCA	KW/ft	16.0	16.0
Steady State Linear Heat Rate to Fuel Centerline Melt	KW/ft	21.0	21.7
CEA Drop Time from Removal of Power to Holding Coils to 90% Insertion	sec	3.1	3.1

* For DNBR calculations, effects of uncertainties on these parameters were accounted for statistically.

** For CTM calculations, effects of uncertainties on these parameters are accounted for statistically. Numerical values of these uncertainties and the procedures used in the statistical combination of uncertainties as they pertain to DNB and CTM limits are detailed in Reference 14.

TABLE 7.2.1-1

KEY PARAMETERS ASSUMED IN THE CEA WITHDRAWAL ANALYSIS

Parameter	Units	Reference* Cycle	Cycle 4
Range of Initial Core Power Level	MWt	0 - 102% of 2560	0 - 100% of 2700
Core Inlet Coolant Temperature	°F	532-544	532-549
Reactor Coolant System Pressure	psia	2200	2225
Moderator Temperature Coefficient	$10^{-4}\Delta\rho/°F$	+.5	-2.5 to +0.5
Doppler Coefficient Multiplier		.85	.85
CEA Worth at Trip - FP	$10^{-2}\Delta\rho$	-4.32	-4.70
CEA Worth at Trip - ZP	$10^{-2}\Delta\rho$	-3.3	-4.3
Range of Differential Rod Worth	$X10^{-4}\Delta\rho/in$	0 to -2.6	0 to -3.2
CEA Group Withdrawal Rate	in/min	30	30
Holding Coil Delay Time	sec	0.5	0.5
CEA Time to 90 Percent Insertion (Including Holding Coil Delay)	sec	3.1	3.1

* Cycle 3

TABLE 7.2.1-2

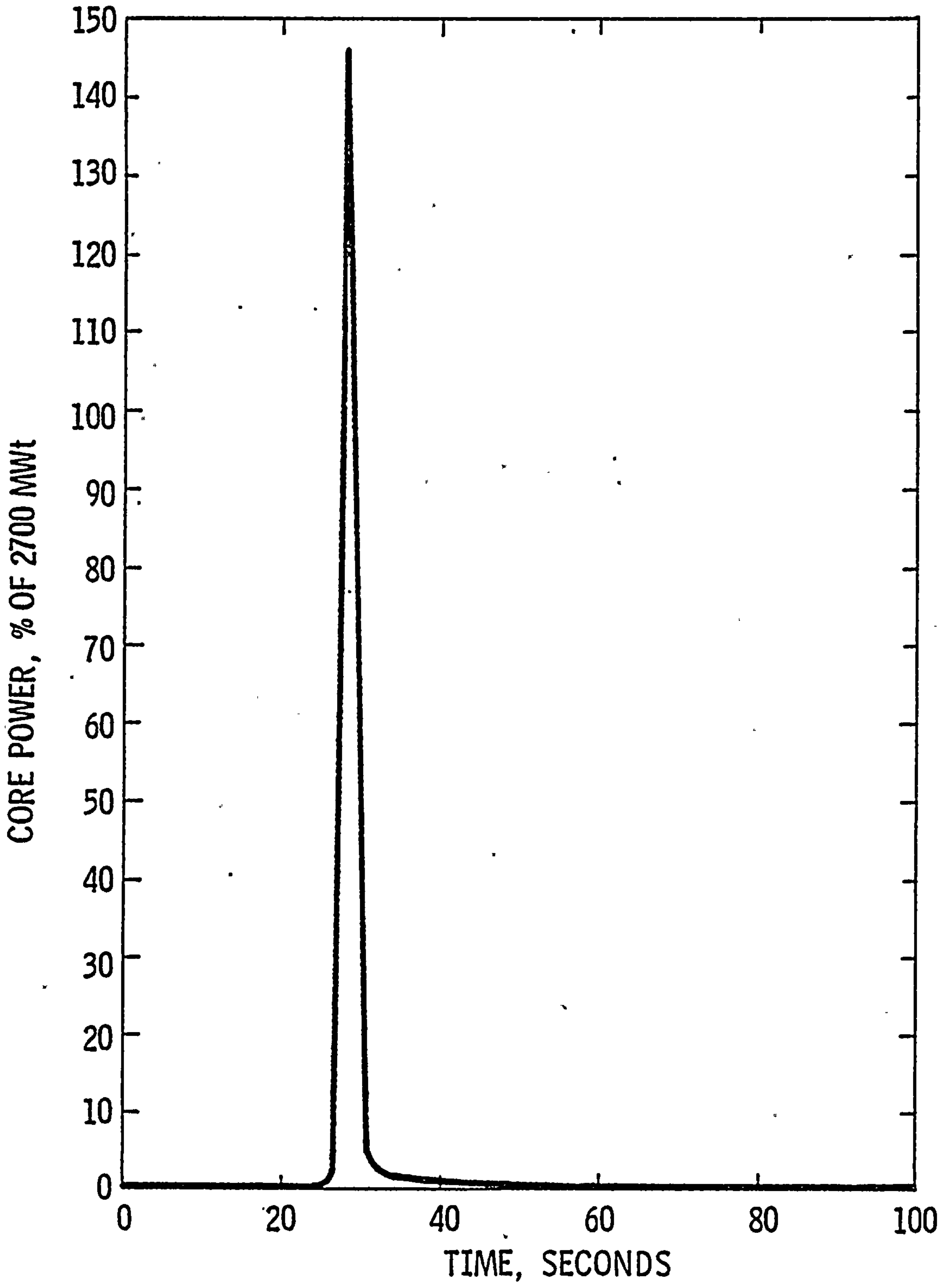
SEQUENCE OF EVENTS FOR CEA WITHDRAWAL FROM ZERO POWER

Time (Sec)	Event	Setpoint or Value
0.0	CEA Withdrawal Causes Uncontrolled Reactivity Insertion	- - -
26.8	High Power Trip Signal Generated	25% of 2700 MWt
27.2	Reactor Trip Breakers Open	- - -
27.7	CEAs Begin to Drop Into Core	- - -
27.8	Maximum Core Power	145% of 2700 MWt
29.1	Maximum Heat Flux	60.8 of 2700 MWt
29.1	Minimum CE-1 DNBR	1.86
32.5	Maximum Pressurizer Pressure, psia	2397

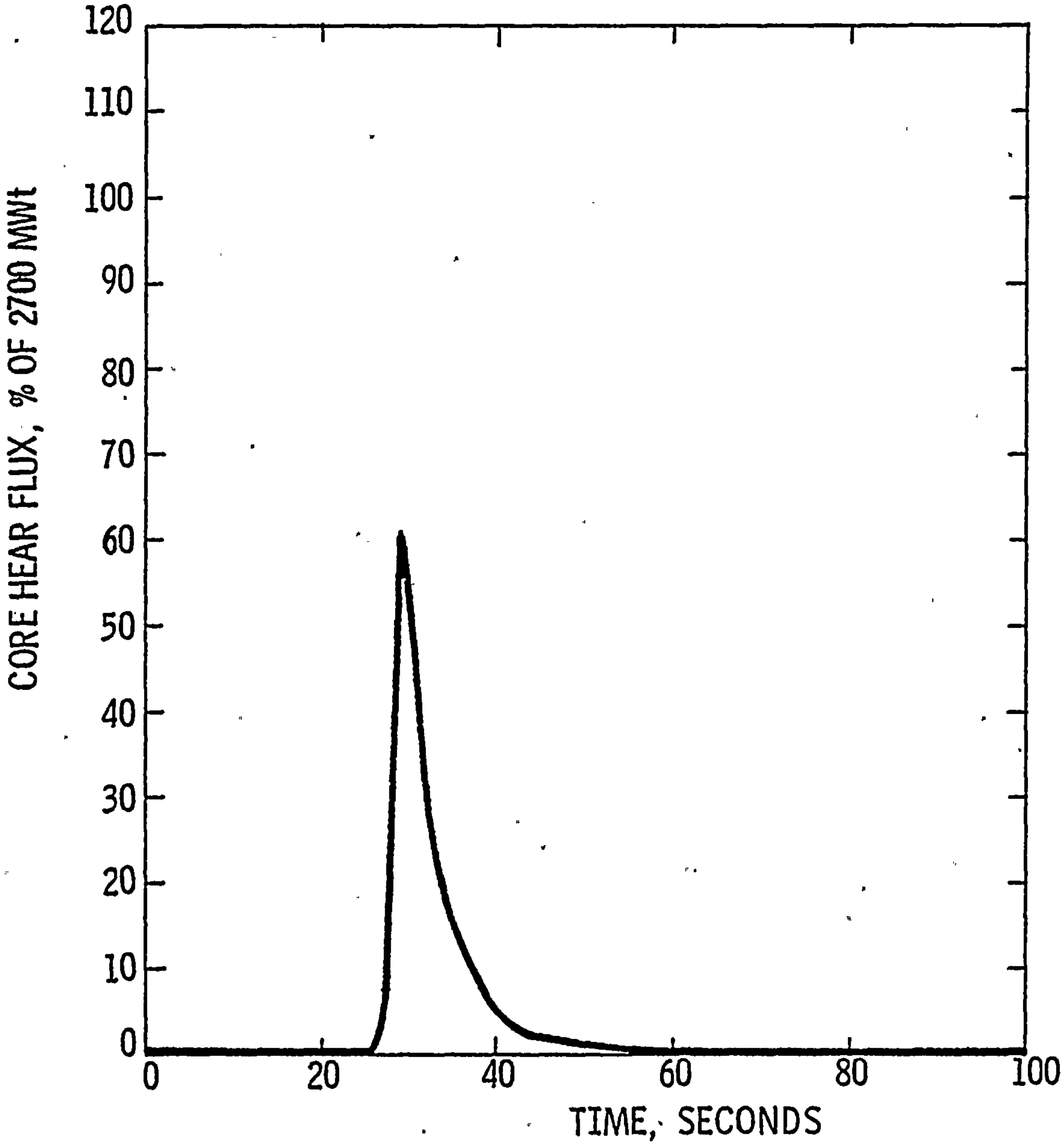
TABLE 7.2.1-3

SEQUENCE OF EVENTS FOR CEA WITHDRAWAL FROM FULL POWER

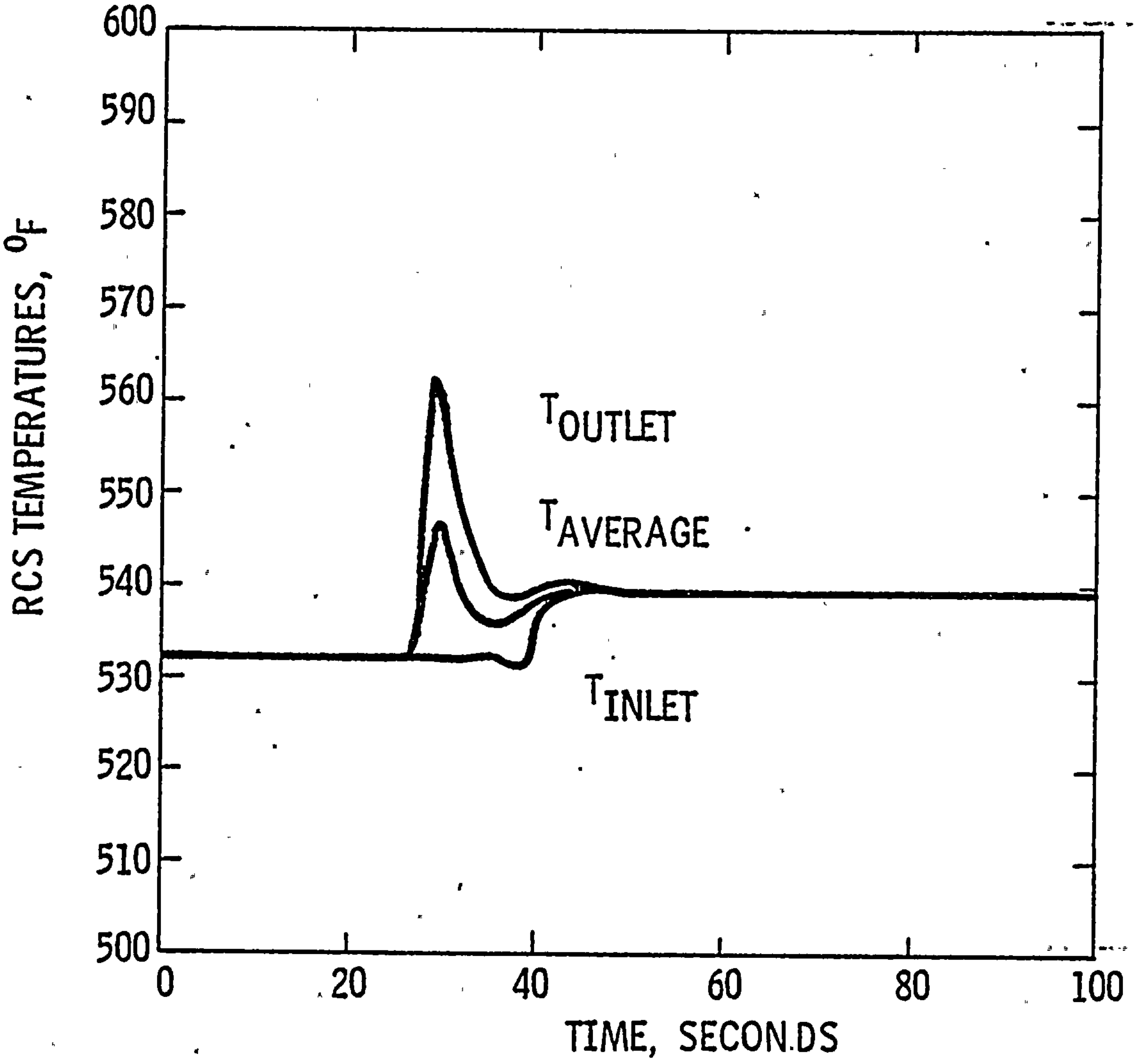
Time (Sec)	Event	Setpoint or Value
0.0	CEA Withdrawal Causes Uncontrolled Reactivity Insertion	- - -
2.4	High Power Trip Signal Generated	110% of 2700 Mwt
2.8	Reactor Trip Breakers Open	- - -
3.3	CEAs Begin to Drop Into Core	- - -
3.6	Maximum Core Power	115.4% of 2700 MWt
4.1	Maximum Heat Flux	106.3 of 2700 MWt
4.1	Minimum CE-1 DNBR	1.52
5.4	Maximum Pressurizer Pressure, psia	2260



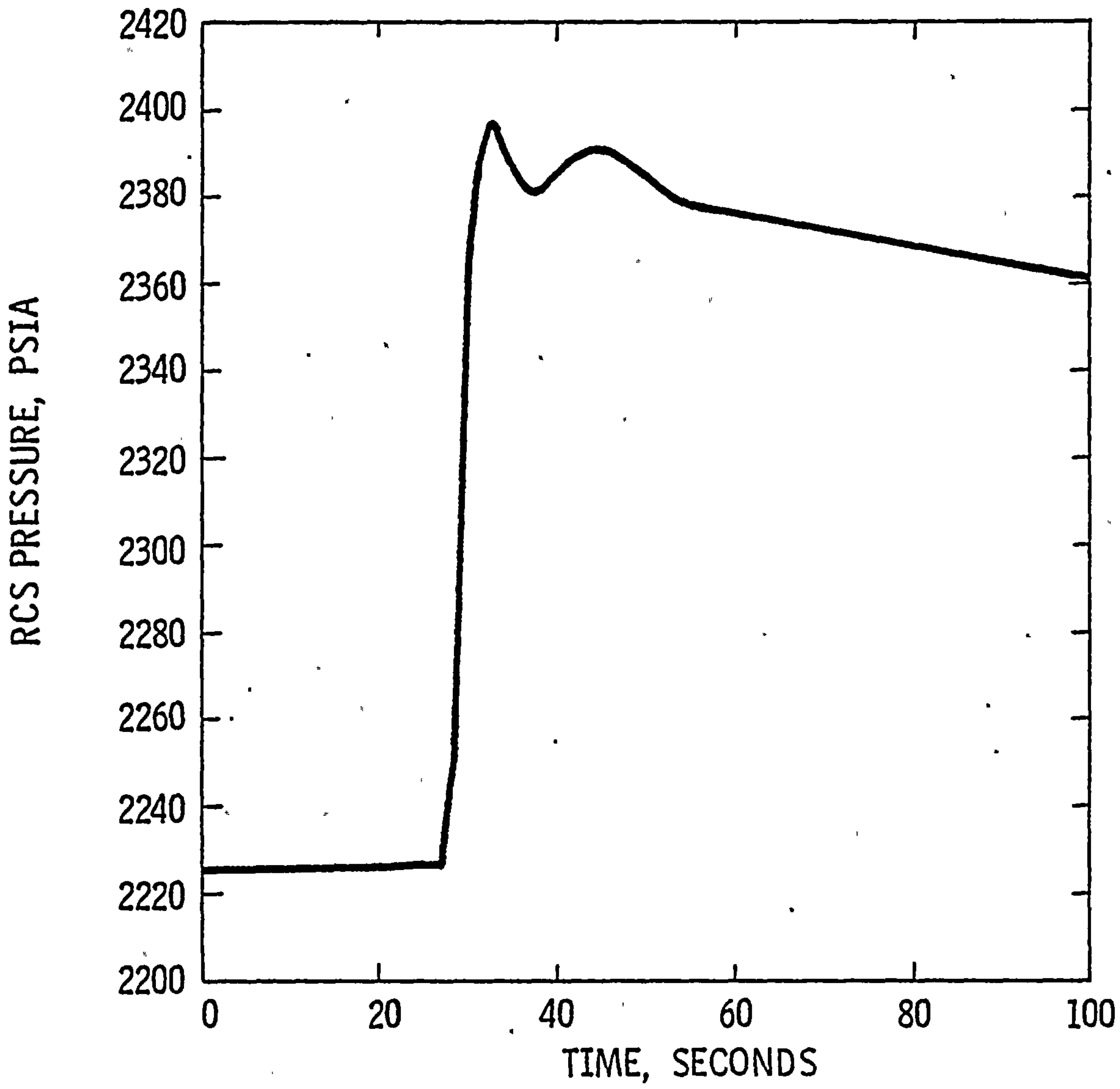
FLORIDA POWER & LIGHT CO. St. Lucie Plant Unit 1	CEA WITHDRAWAL EVENT CORE POWER vs TIME	Figure 7.2.1-1



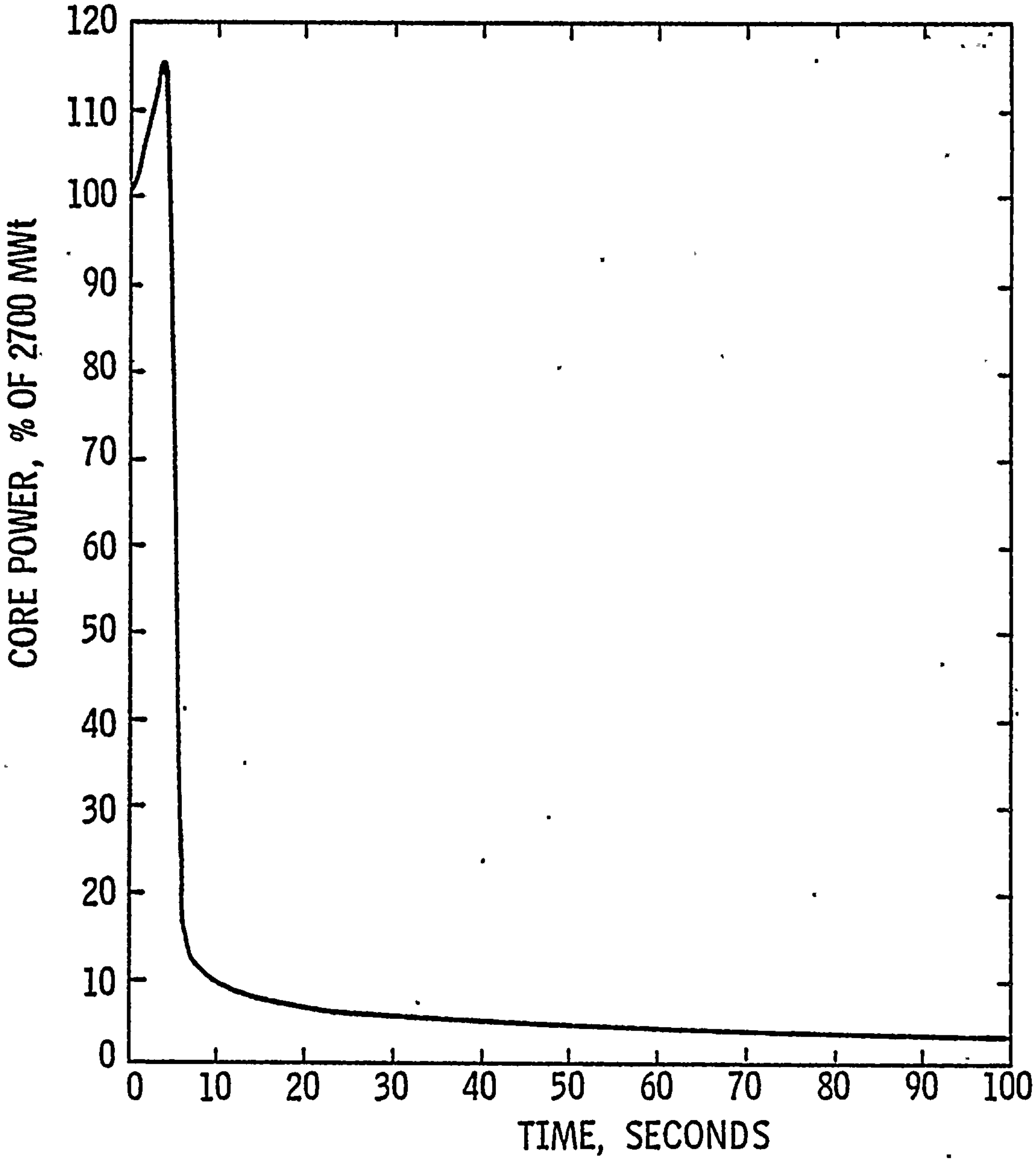
FLORIDA POWER & LIGHT CO. St. Lucie Plant Unit 1	CEA WITHDRAWAL EVENT CORE AVERAGE HEAT FLUX vs TIME	Figure 7.2.1-2



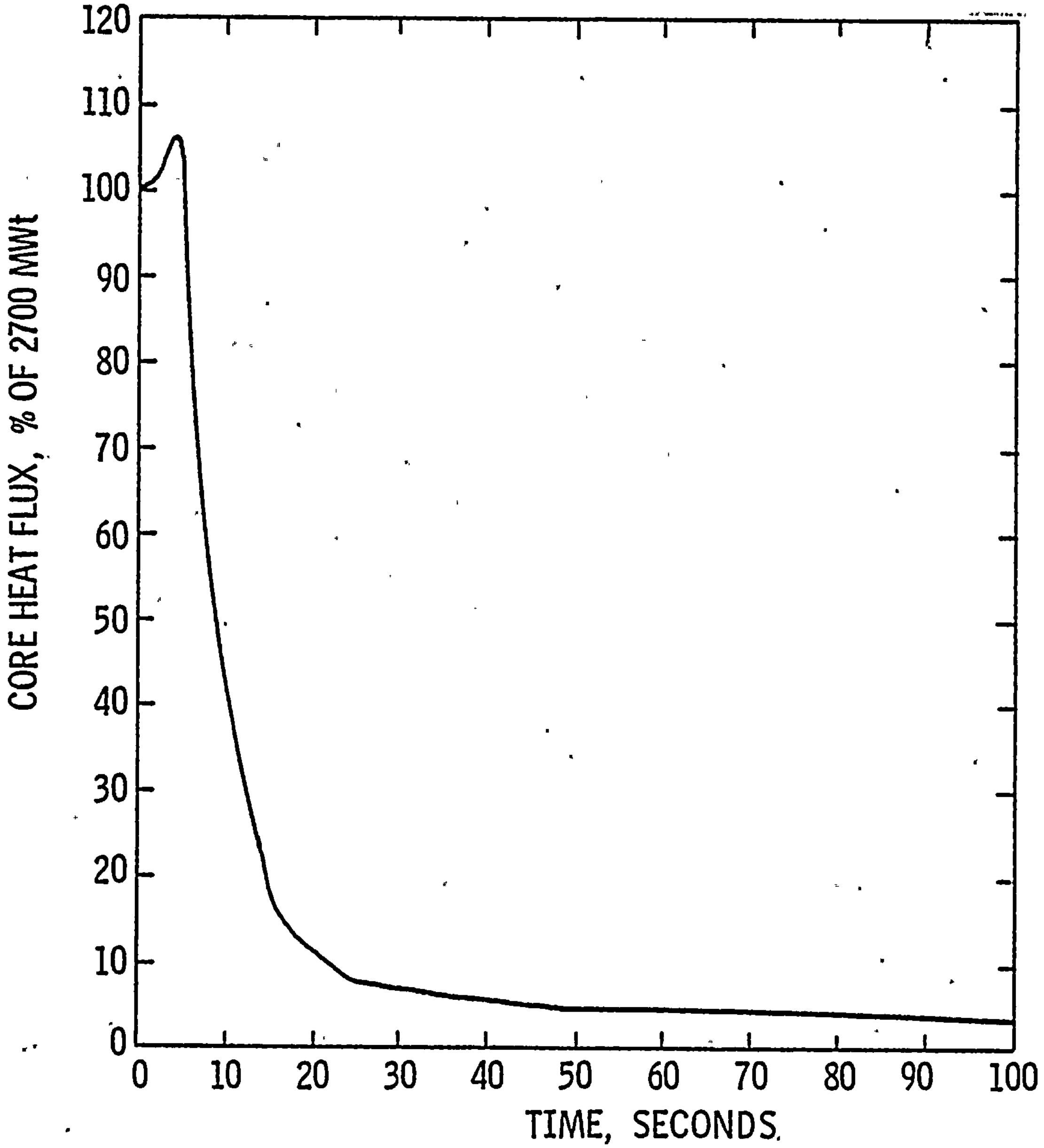
FLORIDA POWER & LIGHT CO. St. Lucie Plant Unit 1	CEA WITHDRAWAL EVENT REACTOR COOLANT SYSTEM TEMPERATURES vs TIME	Figure 7.2.1-3



FLORIDA POWER & LIGHT CO. St. Lucie Plant Unit 1	CEA WITHDRAWAL EVENT REACTOR COOLANT SYSTEM PRESSURE vs TIME	Figure 7.2.1-4



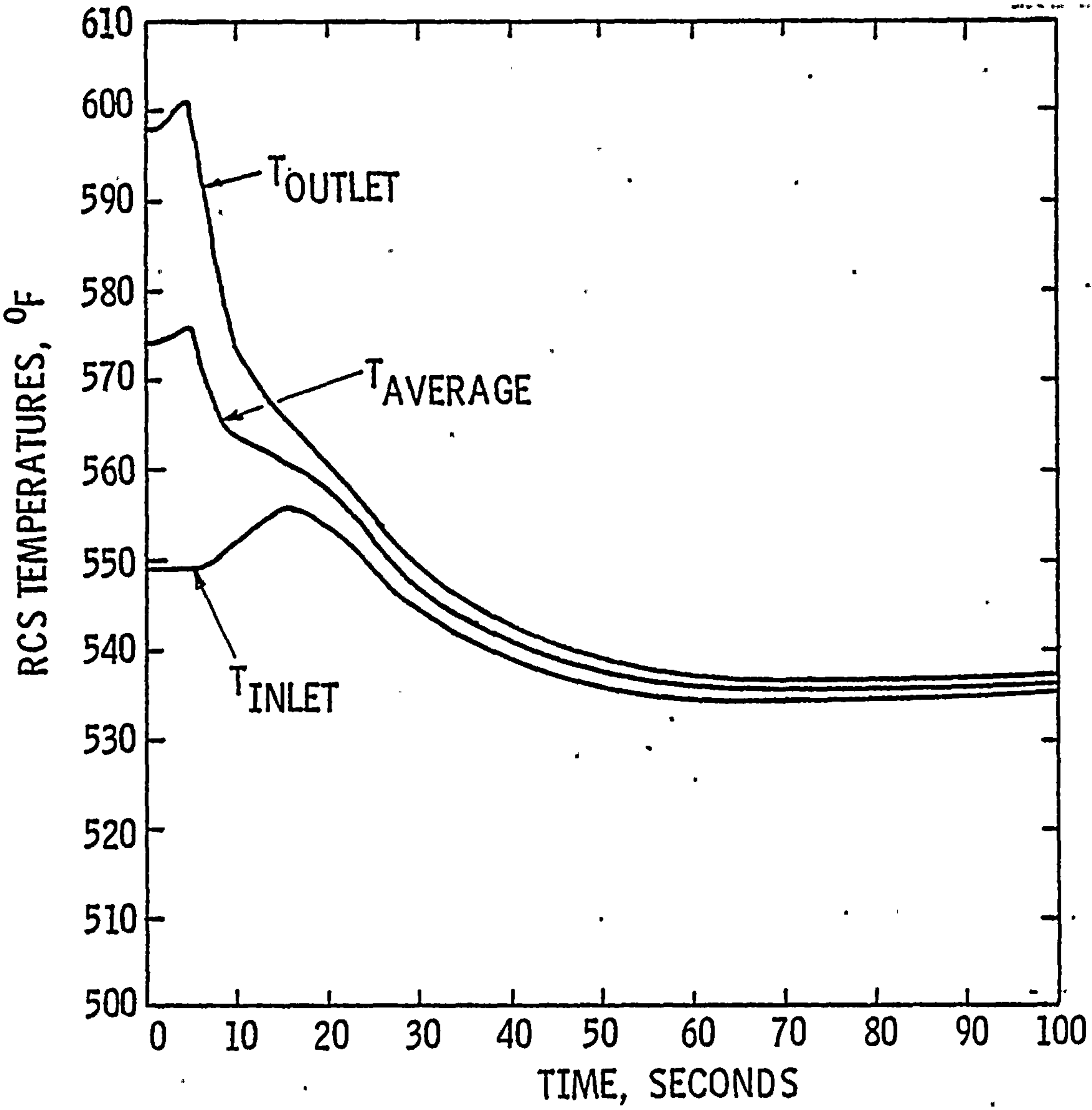
FLORIDA POWER & LIGHT CO. St. Lucie Plant Unit 1	CEA WITHDRAWAL EVENT CORE POWER vs TIME	Figure 7.2.1-5



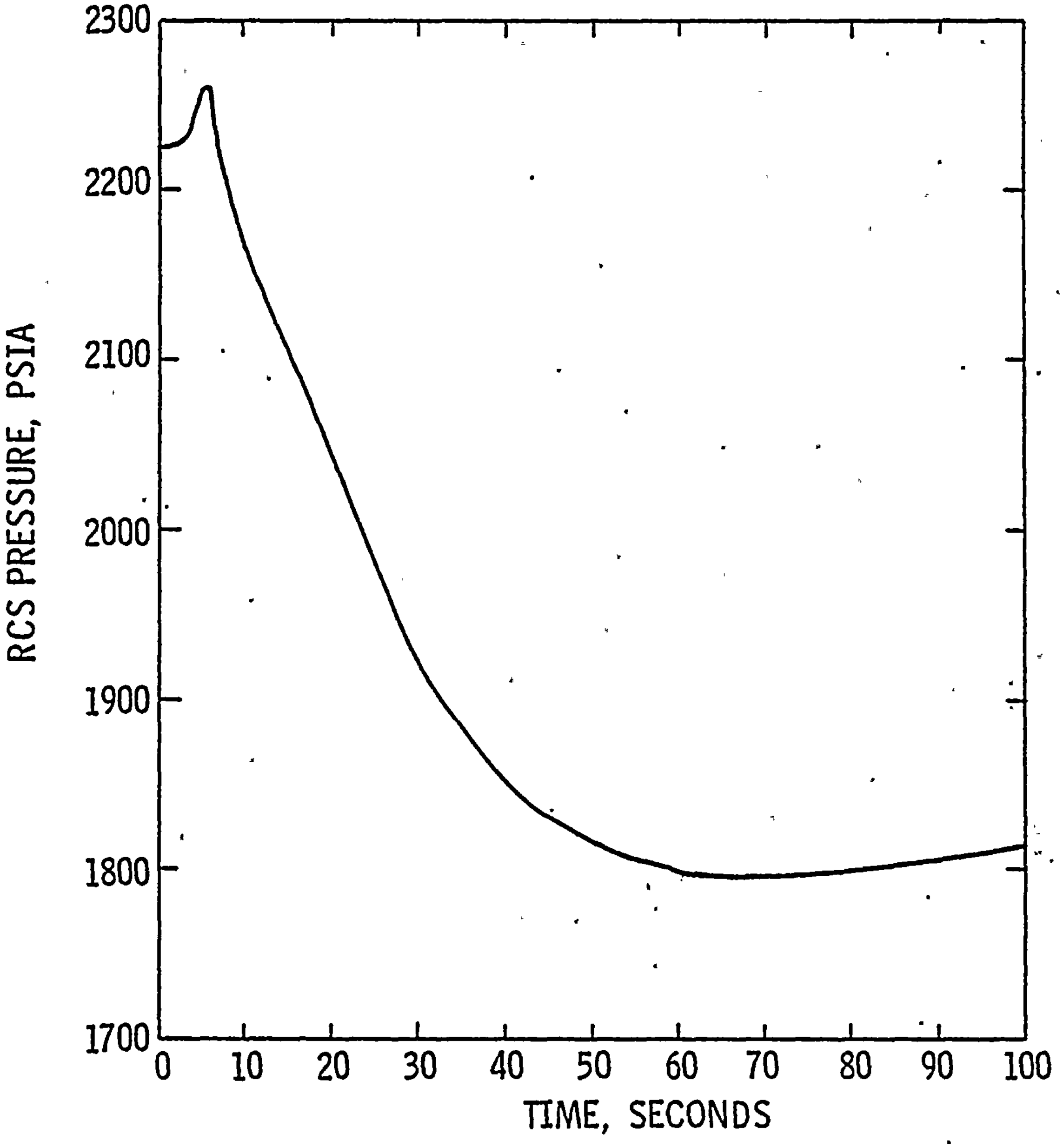
FLORIDA
POWER & LIGHT CO.
St. Lucie Plant
Unit 1

CEA WITHDRAWAL EVENT
CORE AVERAGE HEAT FLUX vs TIME

Figure
7.2.1-6



FLORIDA POWER & LIGHT CO. St. Lucie Plant Unit 1	CEA WITHDRAWAL EVENT REACTOR COOLANT SYSTEM TEMPERATURES vs TIME	Figure 7.2.1-7



FLORIDA POWER & LIGHT CO. St. Lucie Plant Unit 1	CEA WITHDRAWAL EVENT REACTOR COOLANT SYSTEM PRESSURE vs TIME	Figure 7.2.1-8

7.2.2 LOSS OF COOLANT FLOW EVENT

The Loss of Coolant flow event was reanalyzed for Cycle 4 to determine the minimum initial margin that must be maintained by the Limiting Conditions for Operations (LCOs) such that in conjunction with the RPS (low flow trip), the DNBR limit will not be exceeded.

The methods used to analyze this event are consistent with those discussed in Reference 14.

The computer code TORC (Reference 5) was used for all DNBR calculations. This is consistent with methods used by C-E, and approved by NRC, to calculate the DNB margin requirements.

The 4-Pump Loss of Coolant Flow produces a rapid approach to the DNBR limit due to the rapid decrease in the core coolant flow. Protection against exceeding the DNBR limit for this transient is provided by the initial steady state thermal margin which is maintained by adhering to the Technical Specifications' LCOs on DNBR margin and by the response of the RPS which provides an automatic reactor trip on low reactor coolant flow as measured by the steam generator differential pressure transmitters.

The transient is characterized by the flow coastdown curve given in Figure 7.2.2-1. Table 7.2.2-1 lists the key transient parameters used in the present analysis.

Table 7.2.2-2 presents the NSSS and RPS responses during a four pump loss of flow initiated at the most negative shape index (-.11) allowed by the DNBR related shape index LCO. The low flow trip setpoint is reached at .86 seconds and the scram rods start dropping into the core 1.15 seconds later. A minimum CE-1 DNBR of 1.23 is reached at 2.5 seconds. Figures 7.2.2-2 to 7.2.2-5 present the core power, heat flux, RCS pressure, and core coolant temperatures as a function of time. Figure 7.2.2-6 presents a trace of hot channel DNBR vs. time for the limiting case that is characterized by an axial shape index = -.11.

The event initiated from the Tech Spec LCOs in conjunction with the Low Flow Trip will not exceed the design DNBR limit.

TABLE 7.2.2-1

KEY PARAMETERS ASSUMED IN THE LOSS OF COOLANT FLOW ANALYSIS

Parameter	Units	Reference Cycle*	Cycle 4
Initial Core Power Level	MWt	2611	2700
Initial Core Inlet Coolant Temperature	°F	544	549
Initial Core Mass Flow Rate	10^6 lbm/hr	134.9	138.3
Reactor Coolant System Pressure	psia	2200	2225
Moderator Temperature Coefficient	$10^{-4}\Delta\rho/F$	+.5	+.5
Doppler Coefficient Multiplier	- -	.85	1.00***
LFT Response Time	sec	0.65	0.65
CEA Holding Coil Delay	sec	0.5	0.5
CEA Time to 90% Insertion (Including Holding Coil Delay)	sec	3.1	3.1
CEA Worth at Trip (all rods out)	$10^{-2}\Delta\rho$	-5.41 **	-5.60 **
Total Unrodded Radial Peaking Factor (F_r^T)		1.64 **	1.70 **
4-Pump RCS Flow Coastdown		Figure 7.3-1 of Reference 1	Figure 7.2.2-1

* Cycle 3

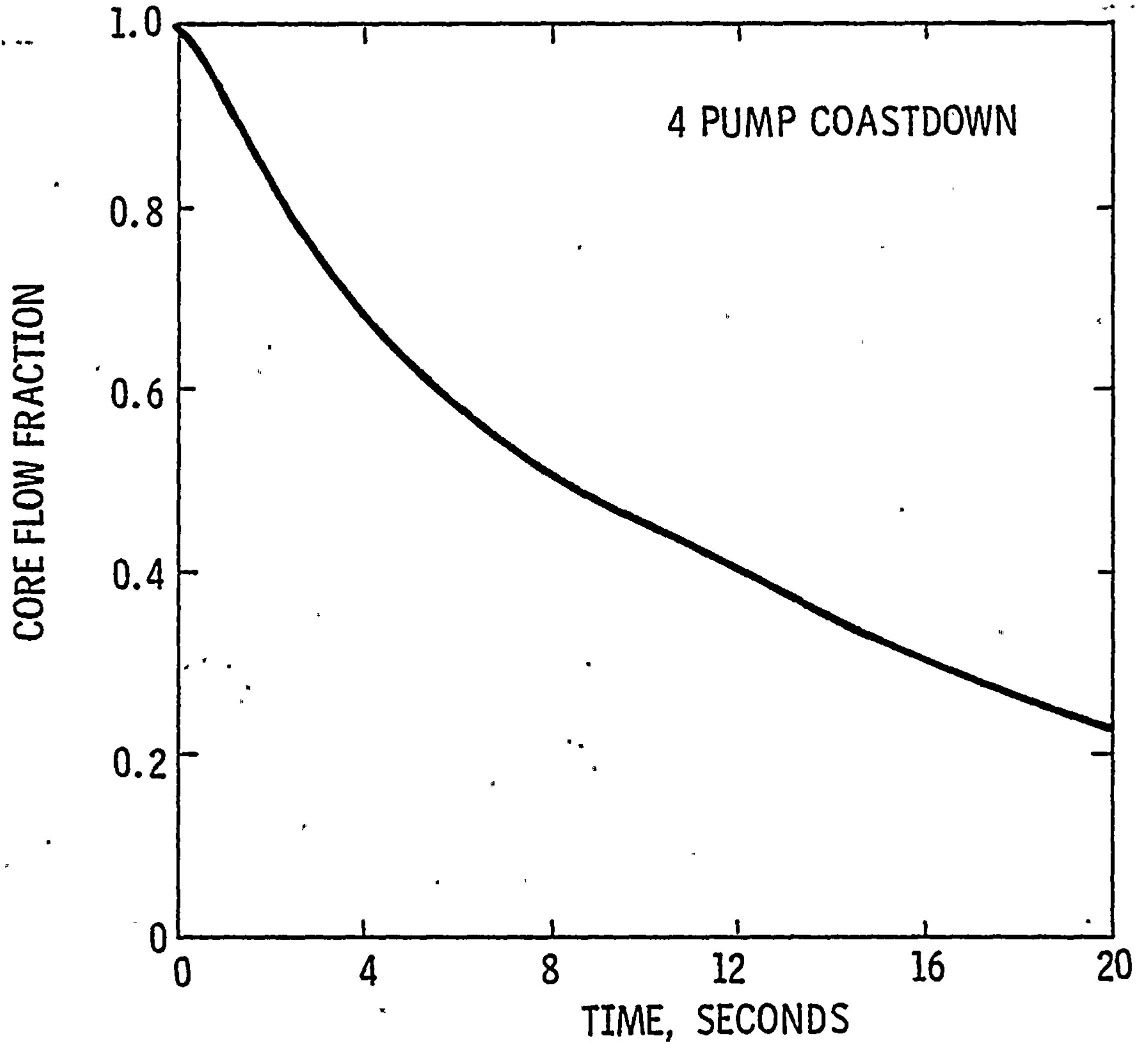
** The most limiting of the allowed full insertion cases is used to establish LCO limits.

*** Since this is a second order effect and the most limiting doppler multiplier varies during the transient, a nominal value is used.

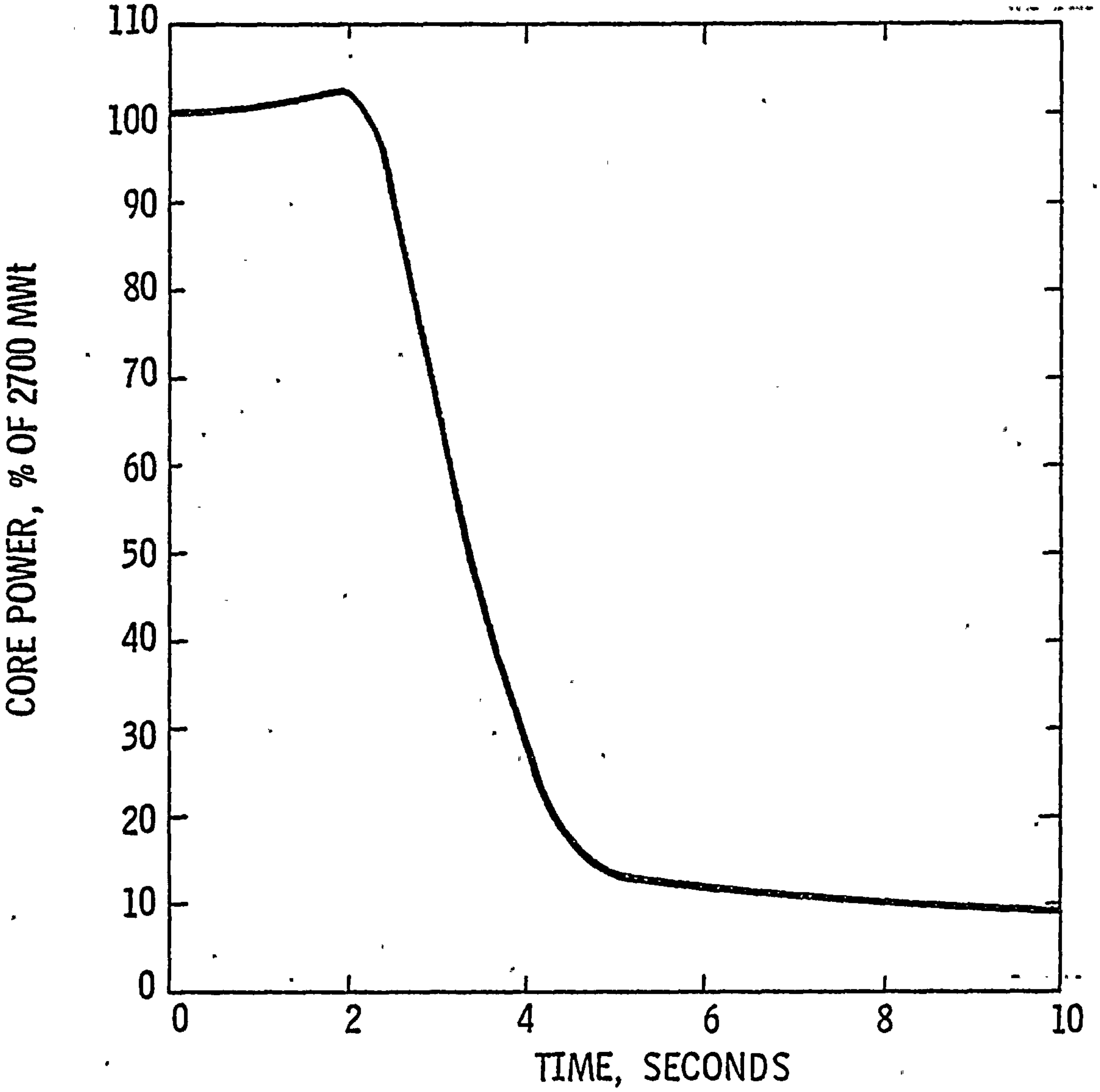
TABLE 7.2.2-2

SEQUENCE OF EVENTS FOR LOSS OF FLOW

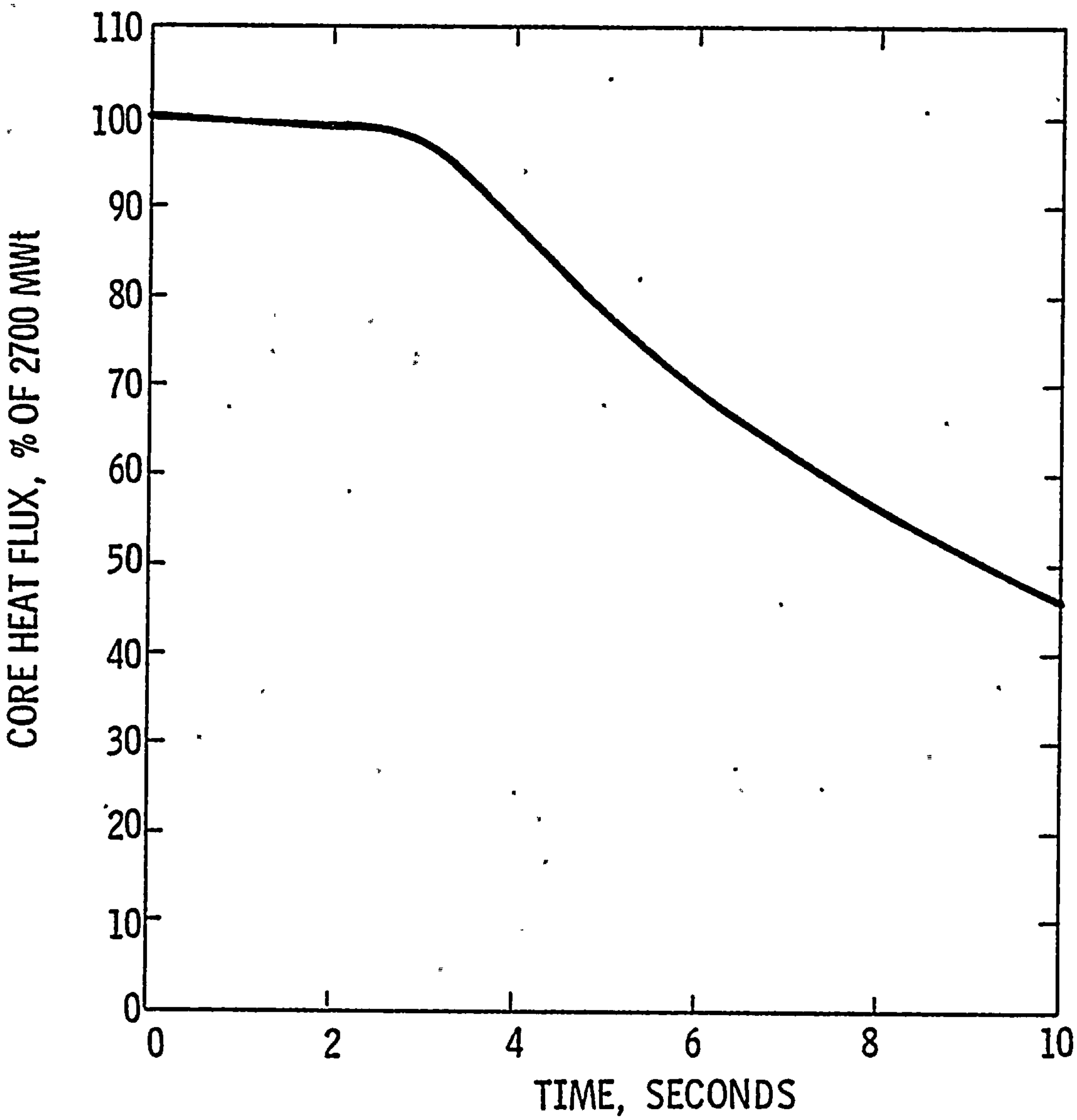
Time (Sec)	Event	Setpoint or Value
0.0	Loss of Power to all Four Reactor Coolant Pumps	- - - -
0.86	Low Flow Trip Signal Generated	93% of 4-Pump Flow
1.51	Trip Breakers Open	- - - -
2.01	Shutdown, CEAs Begin to Drop into Core	- - - -
2.5	Minimum CE-1 DNBR	1.23
5.26	Maximum RCS Pressure, psia	2326



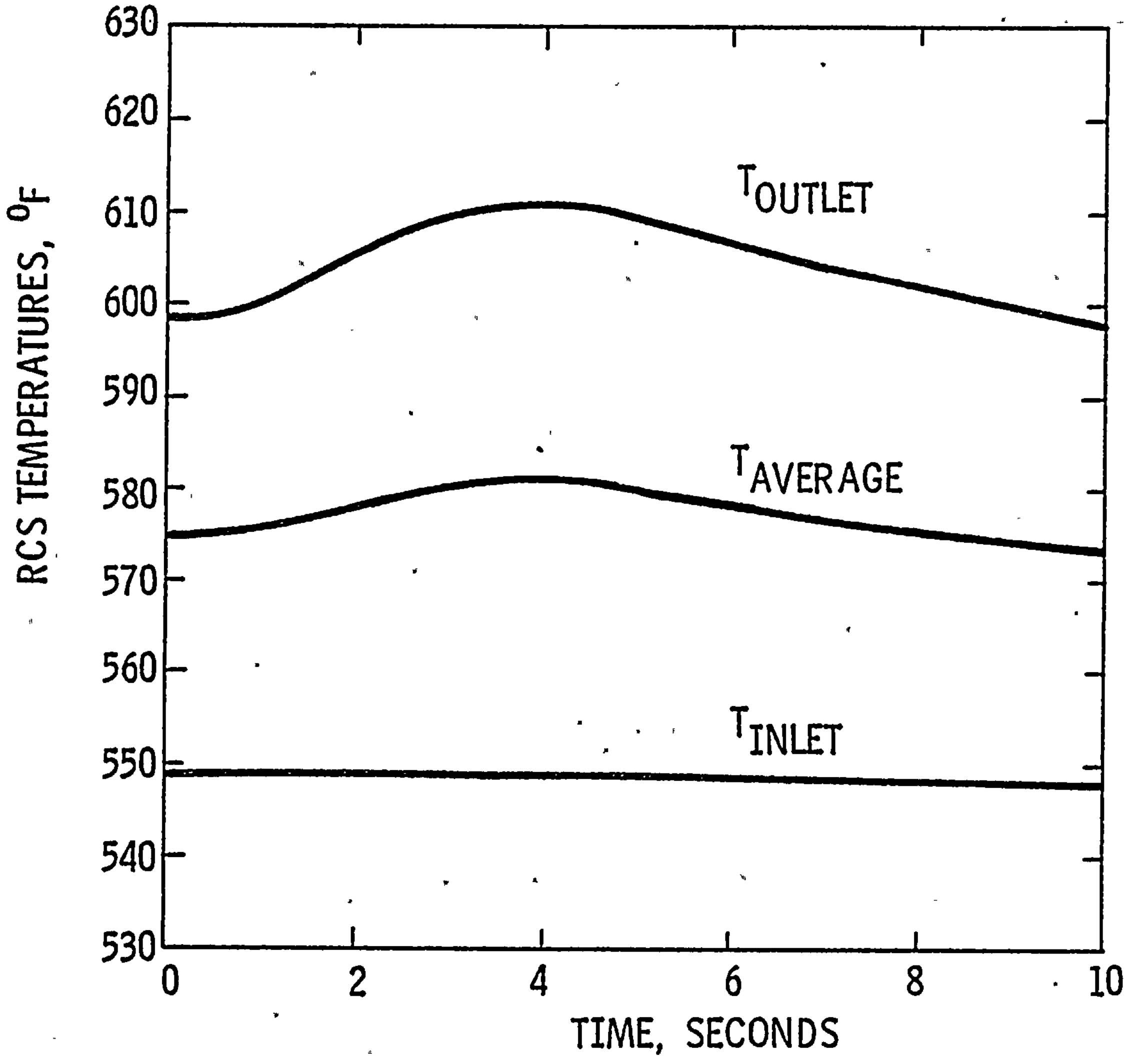
FLORIDA POWER & LIGHT CO. St. Lucie Plant Unit 1	LOSS OF COOLANT FLOW EVENT CORE FLOW FRACTION vs TIME	Figure 7.2.2-1



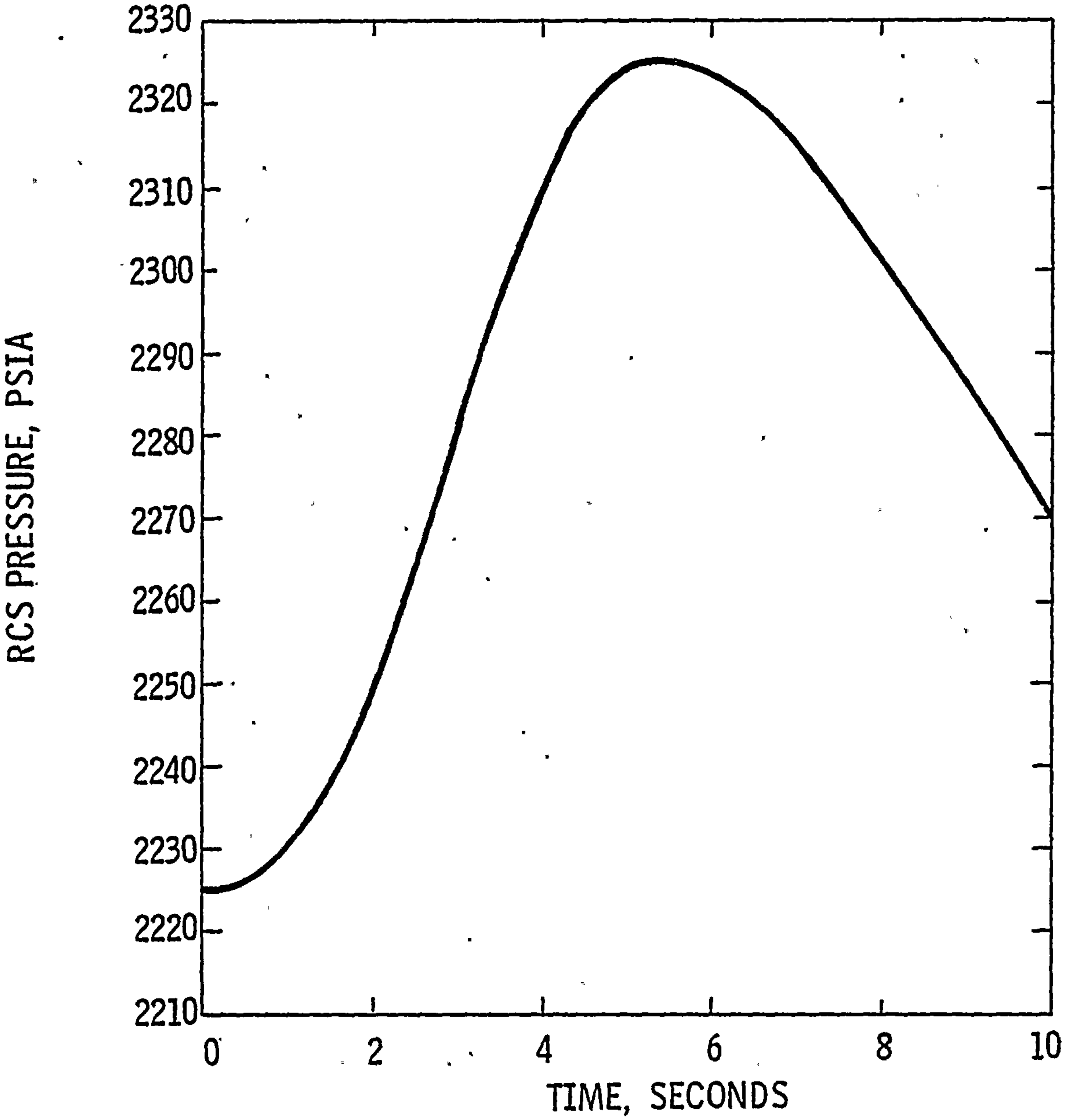
FLORIDA POWER & LIGHT CO. St. Lucie Plant Unit 1	LOSS OF COOLANT FLOW EVENT CORE POWER vs TIME	Figure 7.2.2-2



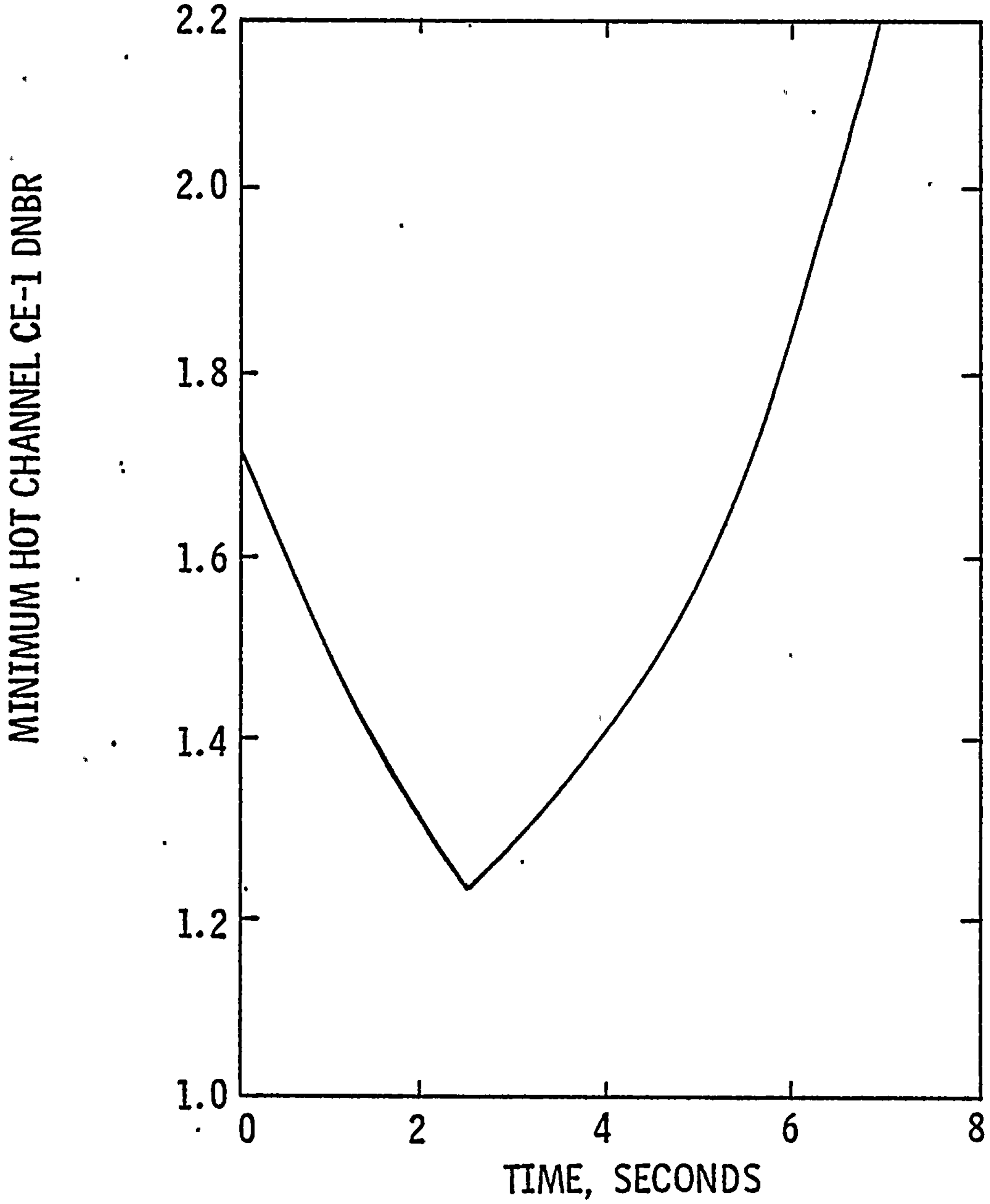
FLORIDA POWER & LIGHT CO. St. Lucie Plant Unit 1	LOSS OF COOLANT FLOW EVENT CORE AVERAGE HEAT FLUX vs TIME	Figure 7.2.2-3



FLORIDA POWER & LIGHT CO. St. Lucie Plant Unit 1	LOSS OF COOLANT FLOW EVENT REACTOR COOLANT SYSTEM TEMPERATURE vs TIME	Figure 7.2.2-4



FLORIDA POWER & LIGHT CO. St. Lucie Plant Unit 1	LOSS OF COOLANT FLOW EVENT REACTOR COOLANT SYSTEM PRESSURE vs TIME	Figure 7.2.2-5



FLORIDA POWER & LIGHT CO. St. Lucie Plant Unit 1	LOSS OF COOLANT FLOW EVENT MINIMUM LOT CHANNEL CE-1 DNBR vs TIME	Figure 7.2.2-6

7.2.3 LOSS OF ALL NON-EMERGENCY A-C POWER EVENT

Identification of Cause

The Loss of all Non-Emergency A-C Power event was reanalyzed for Cycle 4 to determine that the DNBR limit will not be exceeded and the site boundary doses will not exceed the 10CFR100 guidelines.

The loss of non-emergency AC causes the loss of electrical power to the station auxiliaries such as the reactor coolant pumps and the main circulating water pumps. Under such circumstances, the plant would experience a simultaneous loss of load, loss of feedwater flow, and loss of forced reactor coolant flow.

The loss of all non-emergency power is followed by automatic startup of the emergency diesel generators. The power output of each diesel is sufficient to supply electrical power to all engineered safety features and to provide the capability of achieving and maintaining the plant in a safe shutdown condition.

Subsequent to reactor trip, stored heat and fission product decay heat must be dissipated. In the absence of forced reactor coolant flow, convective heat transfer through the core is maintained by natural circulation. Initially, the residual water inventory in the steam generators is used and steam is released to the atmosphere via the steam generator safety valves. Subsequent to the availability of standby power, auxiliary feedwater is manually initiated and plant cooldown is controlled via remotely-operated atmospheric steam dump valves.

Analysis of Effects and Consequences

The site boundary dose analysis was performed with an initial power level of 2754 MWt and core inlet temperature of 551°F. The DNBR was evaluated using the same assumptions as given in Section 7.2.2. The following additional assumptions have been made for this transient:

A. At time zero, when all electrical power is lost to the station auxiliaries, the following assumptions are made:

1. The turbine stop valves close, and the area of the turbine admission valves is instantaneously reduced to zero;
2. The steam generator feedwater flow to both steam generators is instantaneously reduced to zero;
3. The reactor coolant pumps begin to coast down. Following coastdown, the coolant flow necessary to remove decay heat is maintained by natural circulation.
4. Emergency diesel generators start automatically after the loss of all non-emergency A-C power.

B. Manual action is taken to:

1. Initiate auxiliary feedwater flow 15 minutes subsequent to initiation of the event;
2. Actuate the steam generator atmospheric steam dump valves 15 minutes subsequent to initiation of the event to initiate plant cooldown to 325°F;

To determine the maximum possible radioactivity release associated with a loss of all non-emergency A-C power, the following additional assumptions are made:

1. A-C offsite power is not restored and action is initiated to put the plant in a cold shutdown condition;
2. The Reactor Coolant System specific activity equals the Technical Specification limit of 1.0 μCi/gm (I-131 Dose Equivalent Curies);
3. The secondary system specific activity equals the Technical Specification limit of 0.1 μCi/gm (I-131 Dose Equivalent Curies);
4. The primary to secondary leak rate is the Technical Specification limit of 1 GPM (0.5 per steam generator).
5. Atmospheric steam release is required until the reactor coolant temperature is reduced to the point where shutdown cooling can be initiated at 325°F.
6. Cooldown is undertaken at the maximum allowable rate of 100°F/Hr.
7. The shutdown cooling system is then employed to remove decay heat, terminating release of steam through the atmospheric dump valves.

All of these assumptions increase the total steam release calculated and thus maximize the predicted doses. In determining the site boundary dose, the thyroid and whole body doses were conservatively calculated. For the purpose of the thyroid dose calculation, it is assumed that all leakages and releases during a given period of time occur instantaneously at the end of the period. In addition, the concentration in the steam generators is based on the minimum liquid mass occurring during that period. In this analysis the major periods of time for radiological releases are:

0 - 2 hour accident condition;

1. 0 - 15 min - Releases from steam generator safety valves.
2. 15 - 120 min - Releases from atmoshperic steam dump valves and steam driven auxiliary feedwater pump turbine.

The concentration of I-131 in the steam generators was calculated by the following equation:

Concentration during period (Ci/lb)=
Initial Conc. (Ci/lb) + [Amount of activity leaked to steam generators assuming Tech Spec primary to secondary leak rate ÷ minimum steam generator liquid mass during period].

The thyroid dose is then calculated using the following equation:

Dose (REM) = Concentration of I-131 (dose equivalent curie)

X amount of steam released
X Steam Generator Partition Factor
X Breathing Rate
X the 0 - 2 hour atmospheric dispersion coefficient
X dose conversion factor

In determining the whole body dose, the major assumption made is that all noble gases leaked to the steam generators will be released to the atmosphere. The major periods of time for noble gas releases are the same as those indicated for the thyroid dose. Therefore, the whole body dose is calculated by the following equation:

Dose (REM) = 0.25

X average energy of betas and gammas per disintegration
X primary coolant activity concentration
X amount of primary to secondary leak during period
X the 0 - 2 hour atmospheric dispersion coefficient

The radiological release criterion for this analysis is that the 2-hour dose at the site boundary should not exceed 10CFR100 guidelines.

Table 7.2.3-1 shows the assumptions used in the site boundary dose analyses and Table 7.2.3-2 summarizes the assumptions used in the calculation of radiological release.

A Moderator Temperature Coefficient (MTC) of $+.5X10^{-4}\Delta\rho/°F$ was used in the analysis since this causes a positive reactivity change during the initial portion of the transient. This positive reactivity change results in a slight increase in the power level which maximizes the steam released through the steam generator safety valves. An end of cycle fuel temperature coefficient (FTC) was used since this FTC results in the slowest rate of change in the decay power. The slowest rate of change in decay power maximizes the steam released during the cooldown period.

Figures 7.2.3-1 to 7.2.3-5 show the NSSS response during the transient and Table 7.2.3-3 presents the Sequence of Events for this event. For the first few seconds of the transient, the Loss of All Non-Emergency AC Power event behaves like the complete loss of forced primary coolant flow event. Hence, the transient DNBR variation for this event is the same as that reported for the Loss of Flow event.

Table 7.2.3-4 lists the steam releases during a Loss of All Non-Emergency AC event. Based on the releases, the 0 - 2 hr site boundary doses are:

Thyroid (DEQ I-131) : 0.6 REM
Whole Body (DEQ XE-133) : $.7X10^{-3}$ REM

From the analysis it can be concluded that the loss of All Non-Emergency A-C power event, initiated at the conditions given in Table 7.2, would lead to a hot channel CE-1 DNBR during the transient of not less than the design limit of 1.23. The radiological consequences for this event are a small fraction of 10CFR100 guidelines.

TABLE 7.2.3-1

KEY PARAMETERS ASSUMED IN THE LOSS OF ALL NON-EMERGENCY AC POWER FOR THE DETERMINATION OF SITE BOUNDARY DOSES

Parameter	Units	FSAR Value	Cycle 4 Value
Initial Core Power Level	MWt	2611	2754
Core Inlet Coolant Temperature	°F	544	551
Core Mass Flow Rate	$X10^6$ lbm/hr	117.5	133.8
Reactor Coolant System Pressure	psia	2250	2300 *
Steam Generator Pressure	psia	841	909
Moderator Temperature Coefficient	$X10^{-4}\Delta\rho/°F$	+.5	+.5
Doppler Coefficient Multiplier	- - -	.85	1.15 *
CEA Worth at Trip	$\%\Delta\rho$	-4.6	-5.3
Reactor Regulating System	Operating Mode	Manual	Manual
Steam Bypass System	Operating Mode	Inoperative	Inoperative
Auxiliary Feedwater System	Operating Mode	Manual	Manual

* With the set of assumptions used to determine dose rates, these are limiting.

TABLE 7.2.3-2

ASSUMPTIONS FOR THE RADIOLOGICAL EVALUATION FOR THE LOSS OF ALL NON-EMERGENCY AC POWER

Parameter	Units	Value
Primary to Secondary Leak Rate[1]	GPM	1.0
Reactor Coolant System Volume (excluding Pressurizer)	Ft^3	9601.
Reactor Coolant System Maximum Allowable Concentration (DEQ I-131)[1]	µCi/gm	1.0
Steam Generator Maximum Allowable Concentration (DEQ I-131)[1]	µCi/gm	.1
Reactor Coolant System Maximum Allowable[1] Concentration of Noble Gases (DEQ Xe-133)	µCi/gm	$\frac{100}{\bar{E}}$
Steam Generator Partition Factor	- -	0.1
Atmospheric Dispersion Coefficient[2]	sec/M^3	8.55×10^{-5}
Breathing Rate	M^3/sec	3.47×10^{-4}
Dose Conversion Factor (I-131)	REM/Ci	1.48×10^6

---

[1] Tech Spec limits

[2] 0 - 2 hour accident condition

TABLE 7.2.3-3

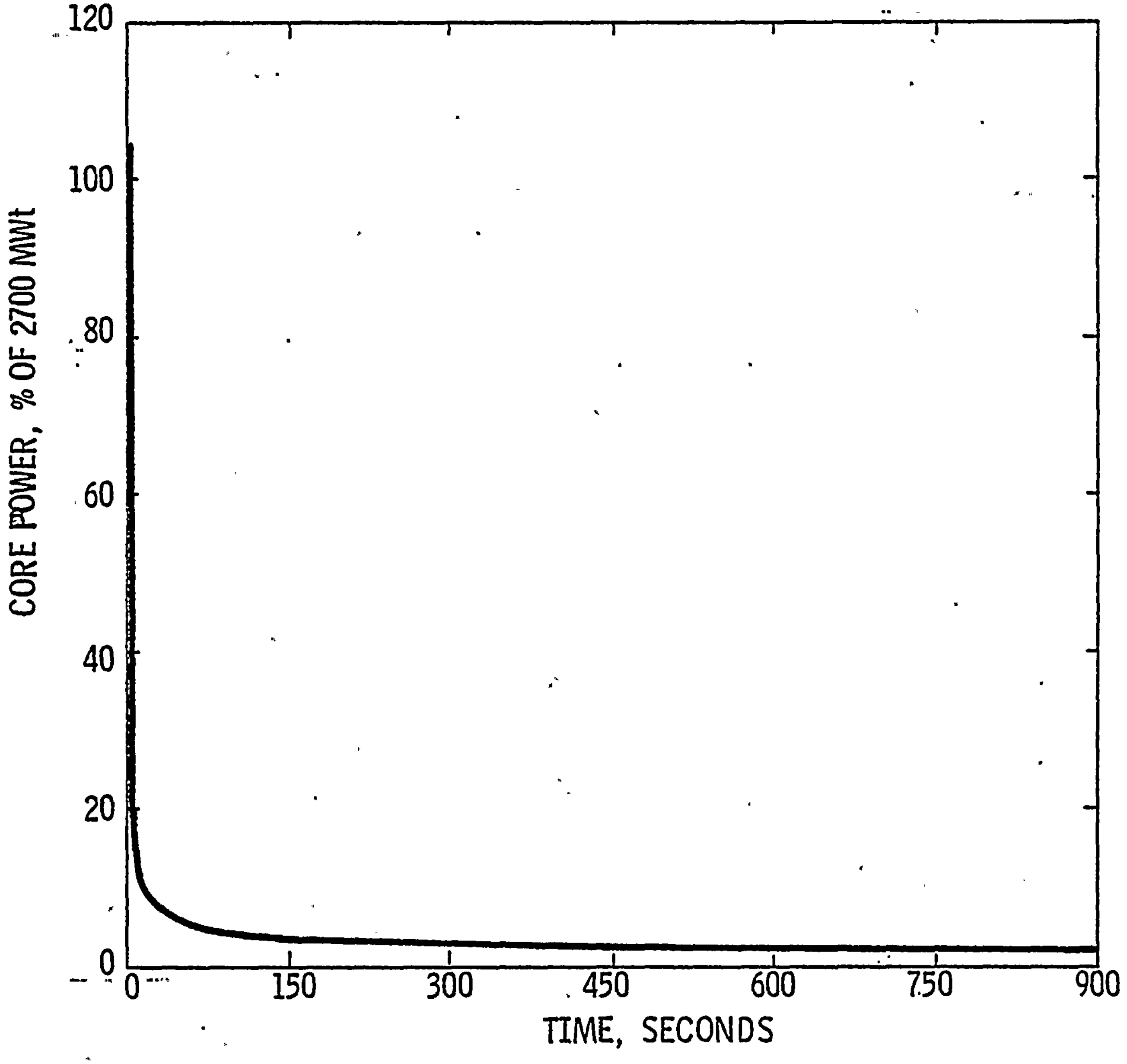
SEQUENCE OF EVENTS FOR THE LOSS OF ALL NON-EMERGENCY A-C POWER

Time (Sec)	Event	Setpoint or Value
0.0	Loss of All Non-Emergency AC Power	- - -
0.86	Low Flow Trip Signal, % of 4 Pump Value	93.0
1.51	Trip Breakers Open	- - -
2.00	Steam Generator Safety Valves Start to Open	990 psia
2.01	CEAs Begin to Drop Into Core	- - -
6.4	Maximum Steam Generator Pressure	1034 psia
7.4	Maximum RCS Pressure	2534 psia
900.0	Operator Initiates Plant Cooldown by Initiating Auxiliary Feedwater and Remotely Opening the Atmospheric Dump Valves	
900.0	Steam Generator Safety Valves Close	950 psia
9007	Shutdown Cooling Initiated RCS Average Temperature	325°F

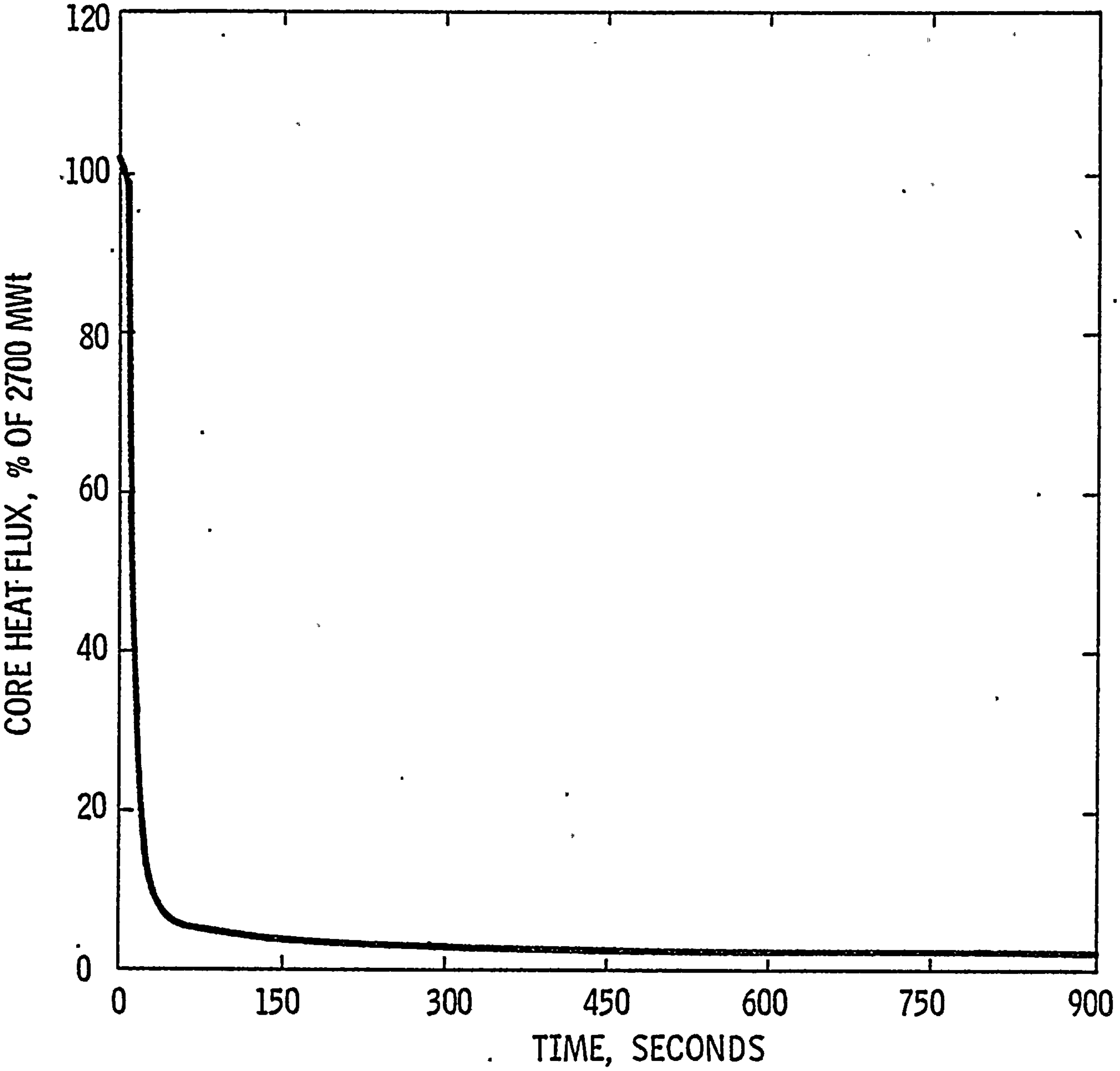
TABLE 7.2.3-4

STEAM RELEASES DURING A LOSS OF ALL NON-EMERGENCY AC EVENT

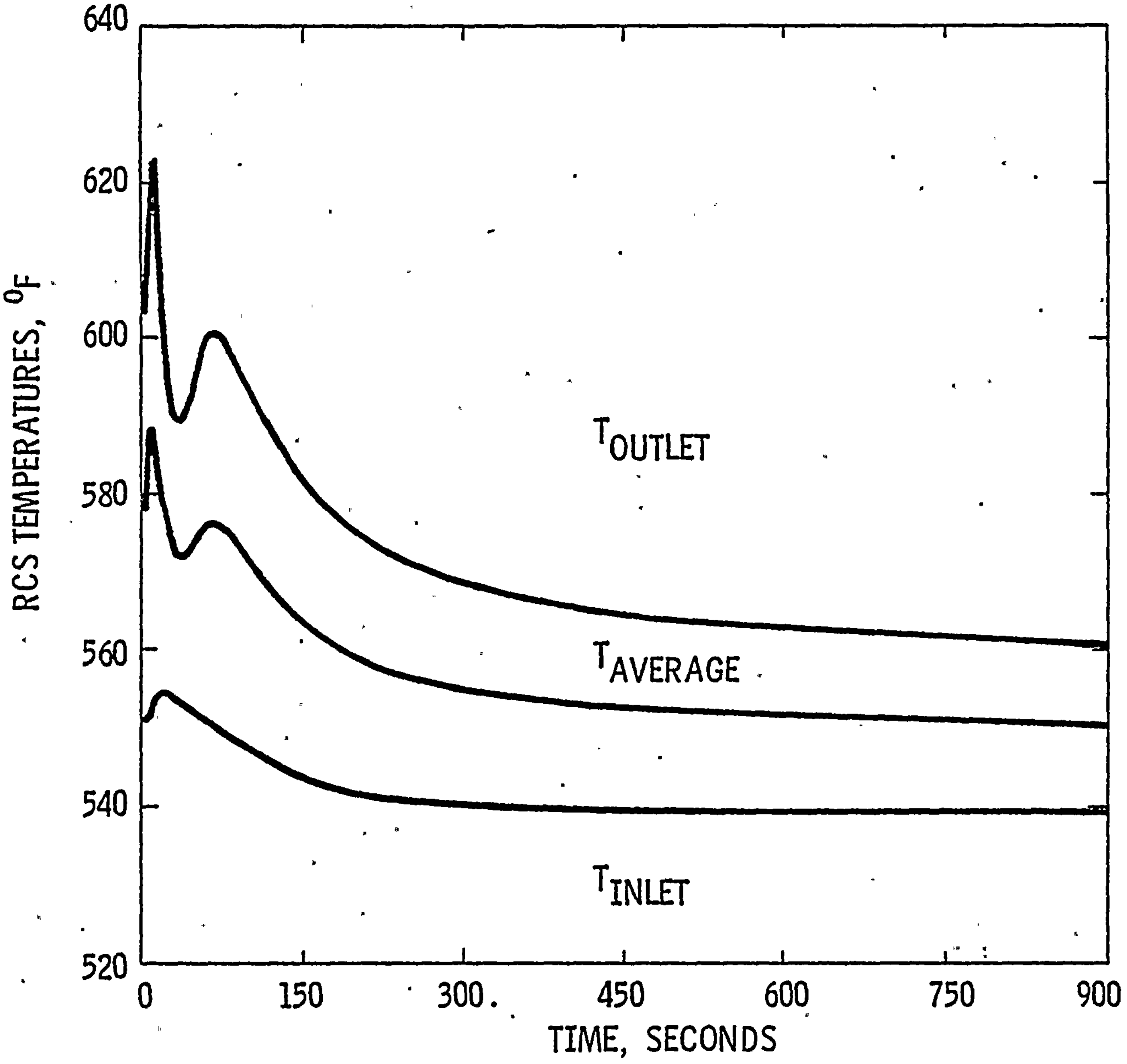
Integrated Steam Releases	Value
Steam Release Through Safety Valves	1.63×10^5 lbm
Steam Release Through Atmospheric Steam Dump Valves and Feedwater Pump Turbines Atmospheric Dump Valves	5.90×10^5 lbm
Total Amount of Steam Released During 0 - 2 hr	7.53×10^5 lbm
Total Amount of Steam Released Until Shutdown Cooling is Initiated (325°F)	9.03×10^5 lbm



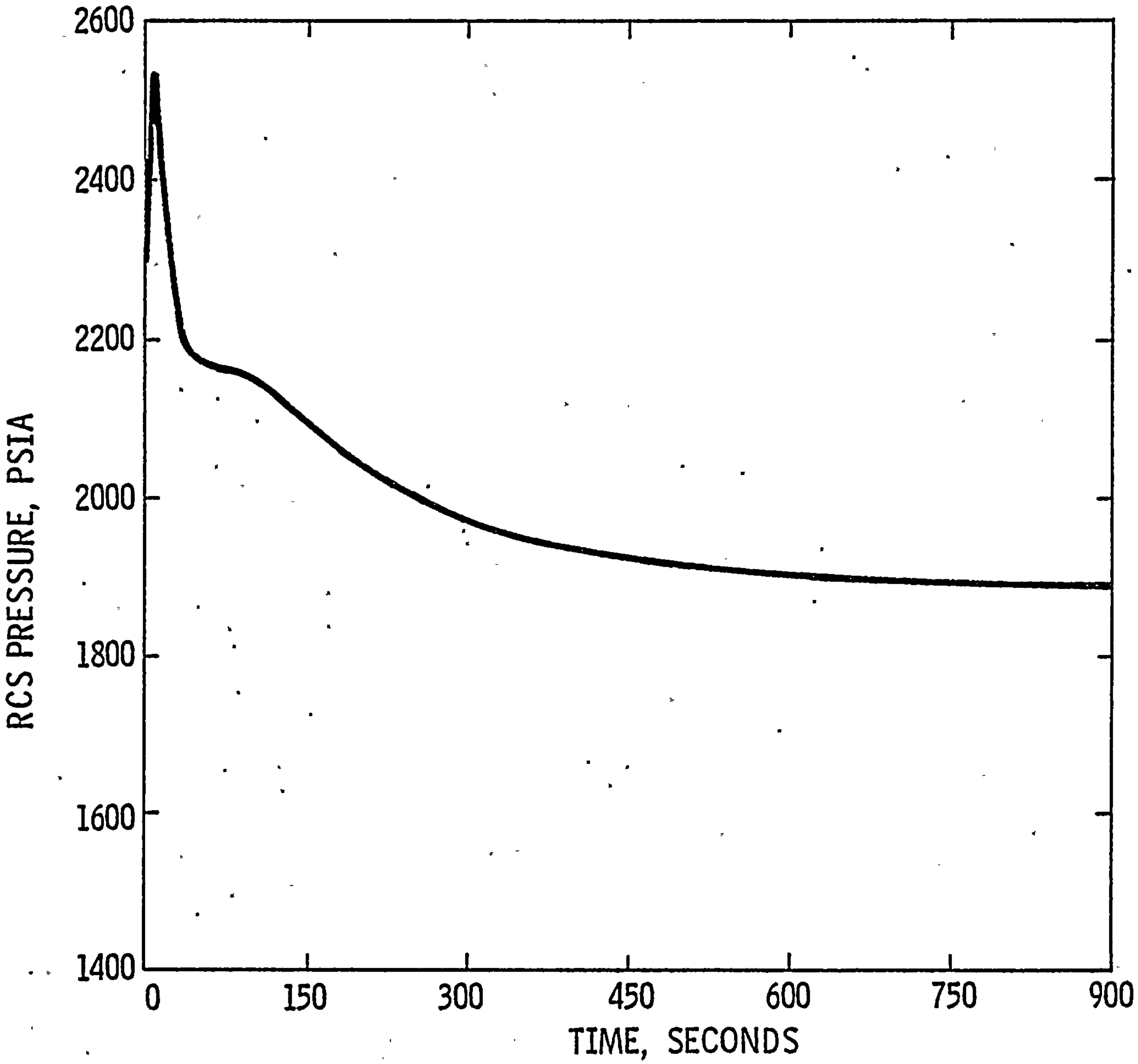
FLORIDA POWER & LIGHT CO. St. Lucie Plant Unit 1	LOSS OF NORMAL ON-SITE, OFF-SITE ELECTRICAL POWER EVENT CORE POWER vs TIME	Figure 7.2.3-1



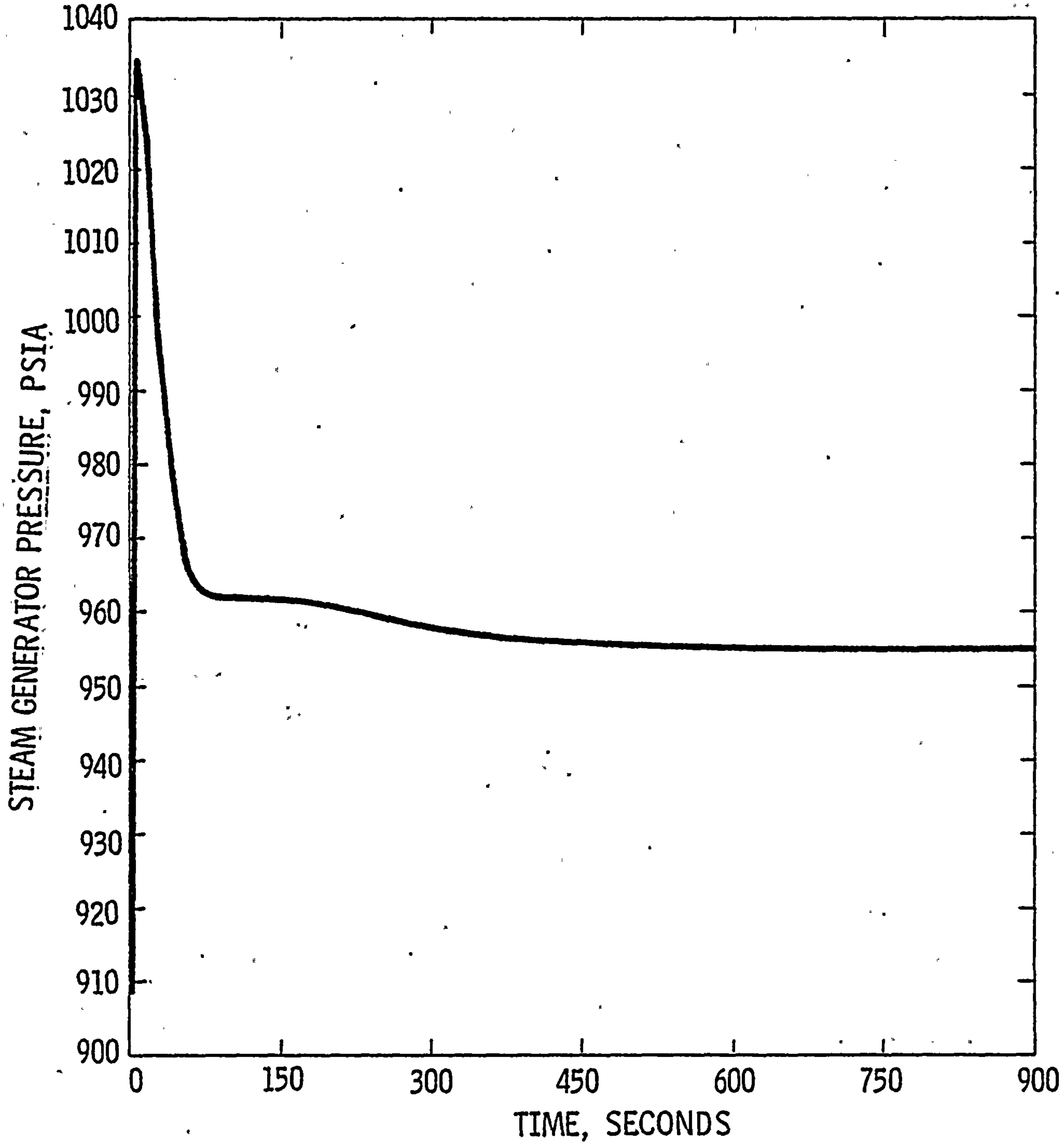
FLORIDA POWER & LIGHT CO. St. Lucie Plant Unit 1	LOSS OF NORMAL ON-SITE, OFF-SITE ELECTRICAL POWER EVENT CORE AVERAGE HEAT FLUX vs TIME	Figure 7.2.3-2



FLORIDA POWER & LIGHT CO. St. Lucie Plant Unit 1	LOSS OF NORMAL ON-SITE, OFF-SITE ELECTRICAL POWER EVENT REACTOR COOLANT SYSTEM TEMPERATURES vs TIME	Figure 7.2.3-3



FLORIDA POWER & LIGHT CO. St. Lucie Plant Unit 1	LOSS OF NORMAL ON-SITE, OFF-SITE ELECTRICAL POWER EVENT REACTOR COOLANT SYSTEM PRESSURE vs TIME	Figure 7.2.3-4



FLORIDA POWER & LIGHT CO. St. Lucie Plant Unit 1	LOSS OF NORMAL ON-SITE, OFF-SITE ELECTRICAL POWER STEAM GENERATOR PRESSURE vs TIME	Figure 7.2.3-5

7.2.4 FULL LENGTH CEA DROP EVENT

The Full Length CEA Drop event was reanalyzed for Cycle 4 to determine the initial thermal margins that must be maintained by the Limiting Conditions for Operation (LCOs) such that the DNBR and fuel centerline melt design limit will not be exceeded.

The methods used to analyze this event are consistent with those discussed in Reference 14.

Table 7.2.4-1 lists the key input parameters used for Cycle 4 and compares them to the reference cycle values. Conservative assumptions used in the analysis include:

1. The most negative moderator and fuel temperature coefficients of reactivity (including uncertainties), because these coefficients produce the minimum RCS coolant temperature decrease upon return to 100% power level and lead to the minimum DNBR.

2. Charging pumps and proportional heater systems are assumed to be inoperable during the transient. This maximizes the pressure drop during the event.

3. All other systems are assumed to be in manual mode of operation and have no impact on this event.

The event is initiated by dropping a full length CEA over a period of 1.0 second. The maximum increases in (integrated and planar) radial peaking factors in either rodded or unrodded planes were used in all axial regions of the core once the power returns to the initial level. Values of 16% were assumed for these peak increases. The axial power shape in the hot channel is assumed to remain unchanged and hence the increase in the 3-D peak for the maximum power is directly proportional to the maximum increase in radial peaking factor of 16%. Since there is no trip assumed, the peaks will stabilize at these asymptotic values after a few minutes as the secondary side continues to demand 100% power.

Table 7.2.4-2 presents the sequence of events for the Full Length CEA Drop event initiated at the conditions described in Table 7.2.4-1. The transient behavior of key NSSS parameters are presented in Figures 7.2.4-1 to 7.2.4-5.

The transient initiated at the most negative shape index LCO (-.11) and at the maximum power level allowed by the LCO, results in a minimum CE-1 DNBR of 1.29. A maximum allowable initial linear heat generation rate of 17.9 KW/ft could exist as an initial condition without exceeding the acceptable fuel centerline melt limit of 21.7 KW/ft during this transient. This amount of margin is assured by setting the Linear Heat Rate related LCO's based on the more limiting allowable linear heat rate for LOCA.

The event initiated from the Tech Spec LCOs will not exceed the DNBR and centerline to melt design limits.

TABLE 7.2.4-1

KEY PARAMETERS ASSUMED IN THE FULL LENGTH CEA DROP ANALYSIS

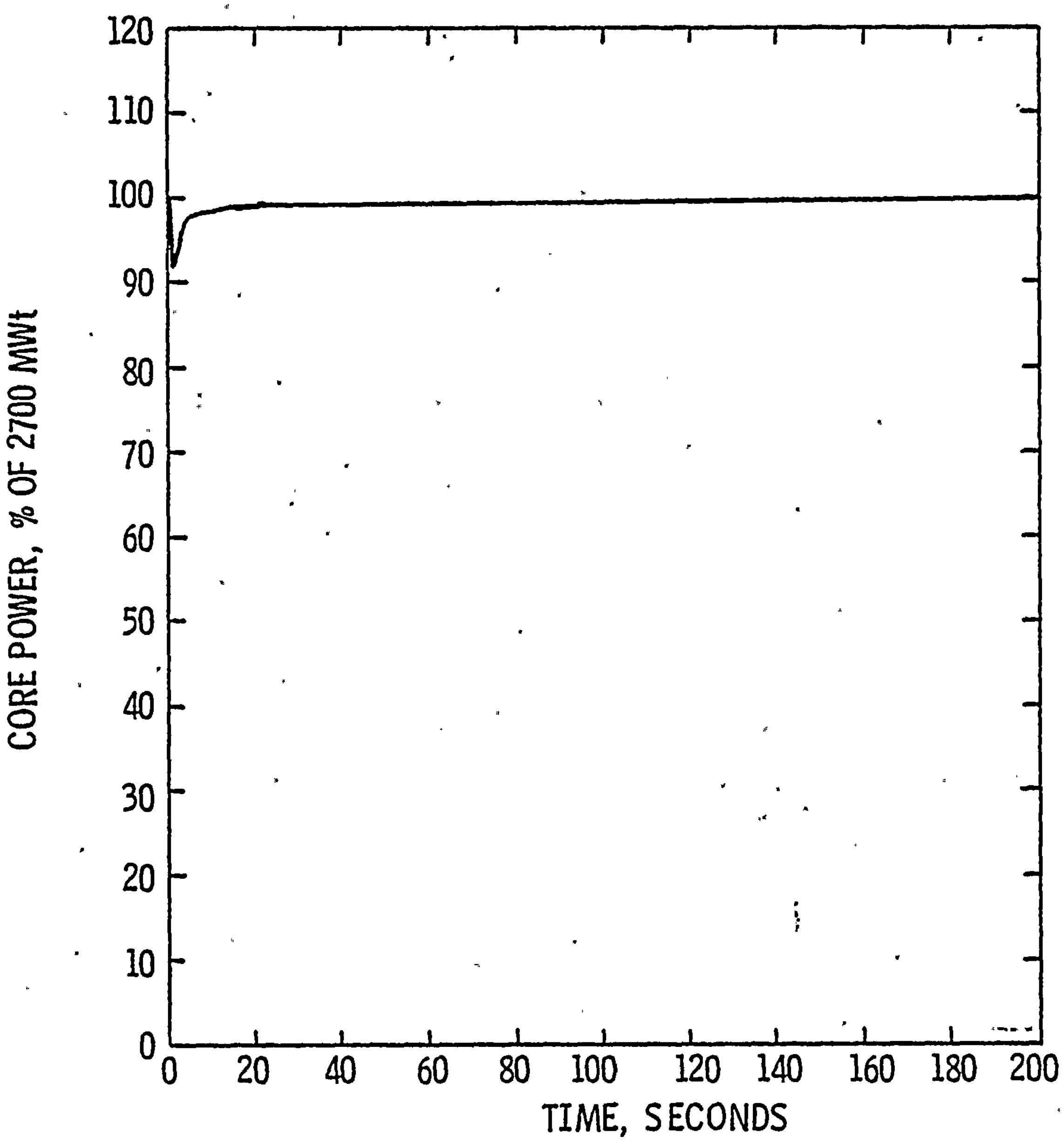
Parameter	Units	Reference Cycle*	Cycle 4
Initial Core Power Level	MWt	2611	2700
Core Inlet Temperature	^{o}F	544	549
Reactor Coolant System Pressure	psia	2200	2225
Core Mass Flow Rate	$x10^{6}$ lbm/hr	134.9	138.3
Moderator Temperature Coefficient	$x10^{-4} \cdot \Delta\rho/^{o}F$	-2.5	-2.5
Doppler Coefficient Multiplier	--	1.15	1.15
CEA Insertion at Maximum Allowed Power	% Insertion of Bank 7	25	25
Dropped CEA Worth	%Δρ unrodded PDIL	-.10 -.04	-.04 -.04
Maximum Allowed Power Axial Shape Index at Negative Extreme of LCO Band		-.21	-.11
Integrated and Planar Radial Peaking Distortion Factor	Unrodded Region Bank 7 Inserted Region	1.17 1.17	1.16 1.16

* Cycle 2

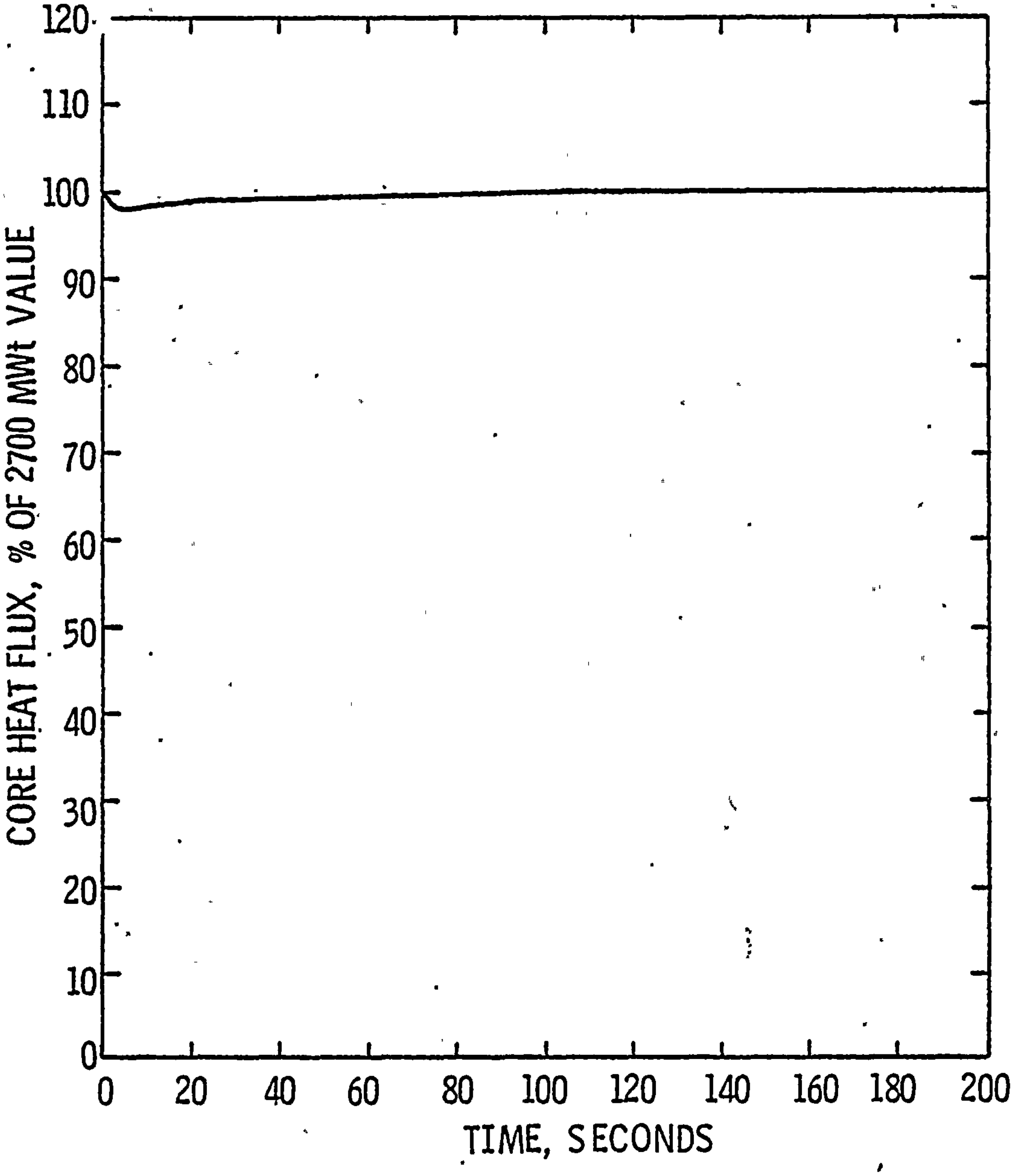
TABLE 7.2.4-2

SEQUENCE OF EVENTS FOR FULL LENGTH CEA DROP

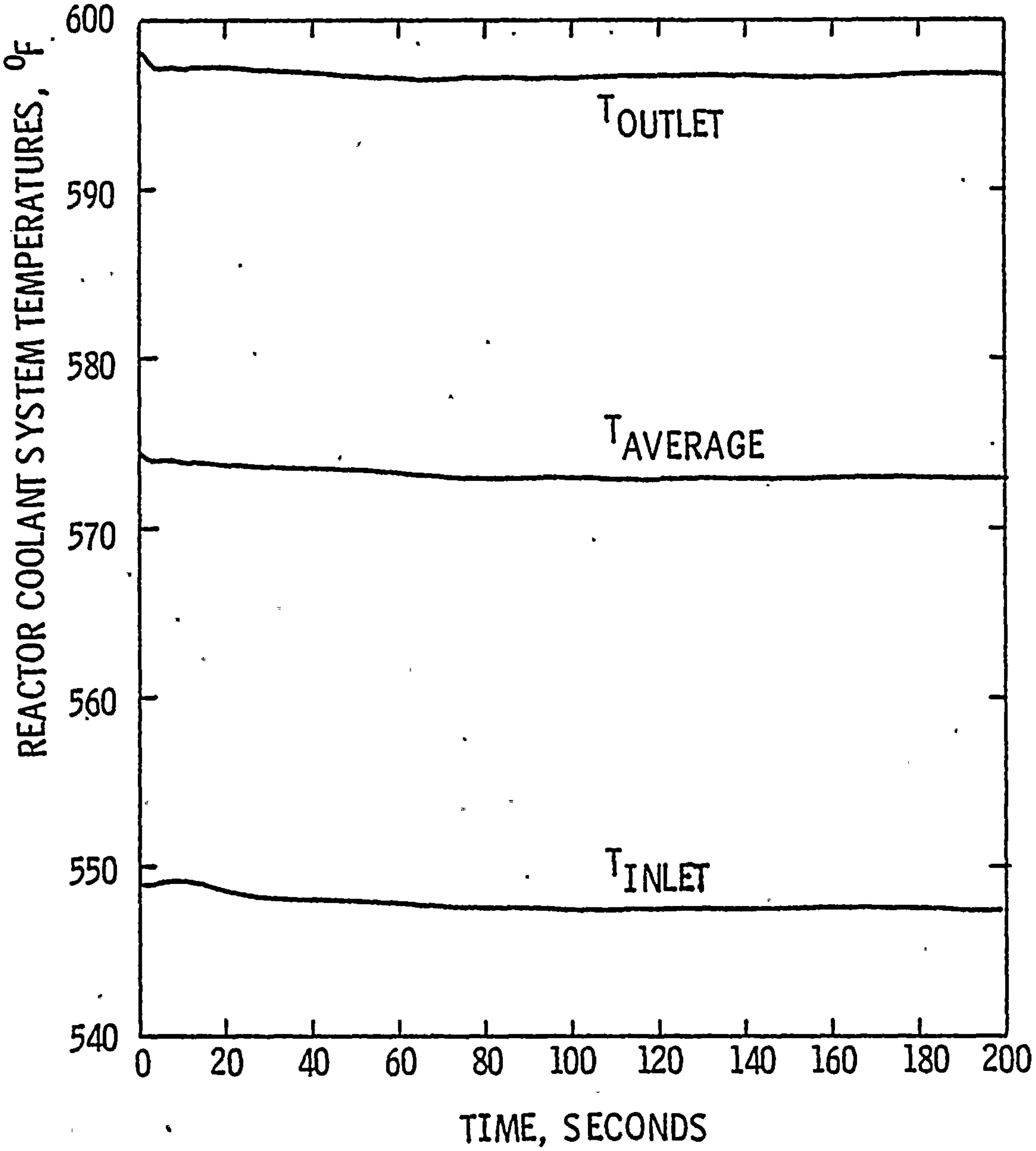
Time (Sec)	Event	Setpoint or Value
0.0	CEA Begins to Drop into Core	--
1.0	CEA Reaches Full Inserted Position	100% Inserted
1.2	Core Power Level Reaches Minimum and Begins to Return to Power due to Reactivity Feedbacks	91.7 of 2700 MWt
150.0	Reactor Coolant System Pressure Reaches a Minimum Value	2205 psia
170.0	Core Inlet Temperature Reaches a Minimum Value	547.5
200.0	Core Power Returns to its Maximum Value	100% of 2700 MWt
200.0	Minimum DNBR is Reached	1.29



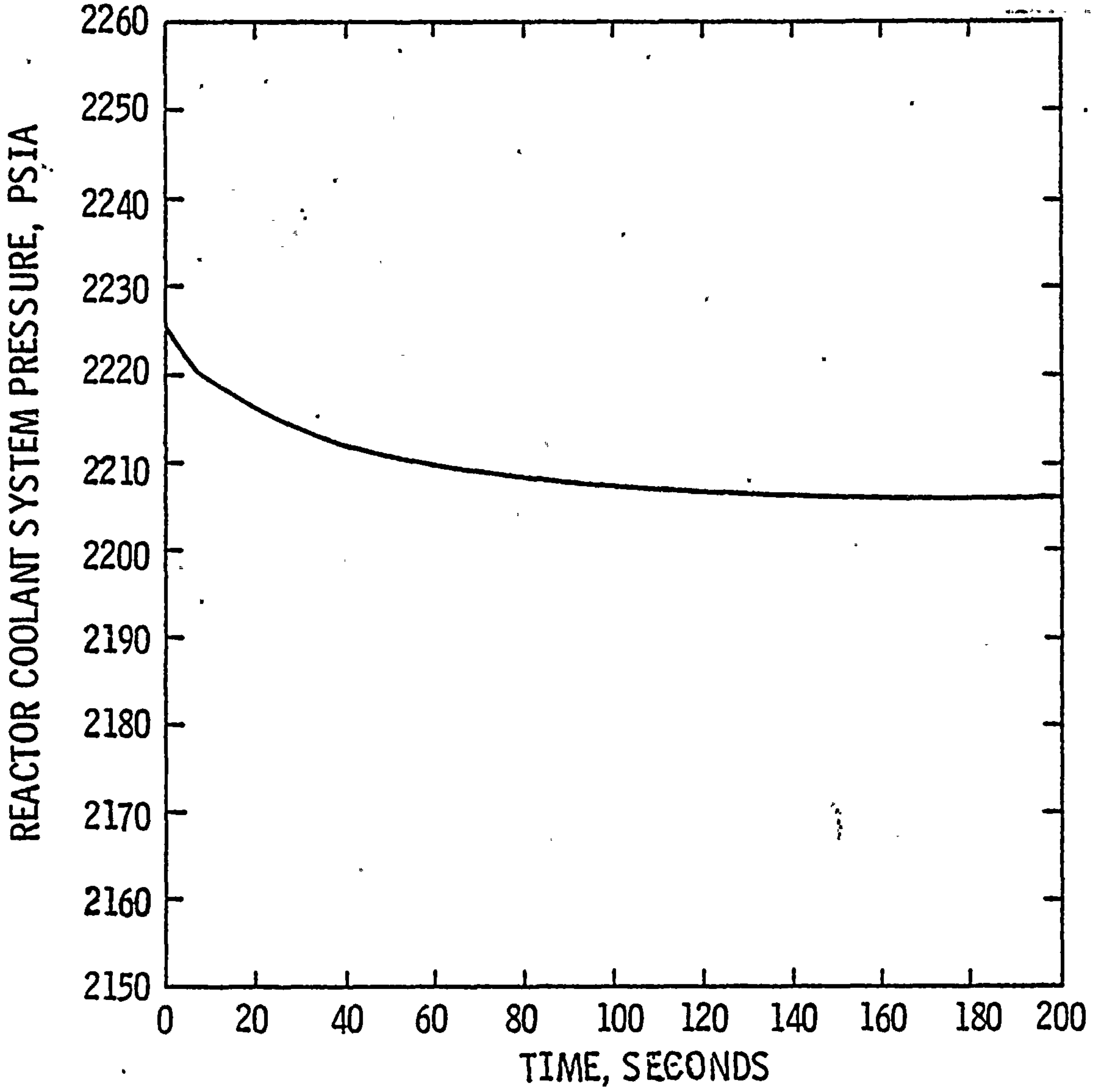
FLORIDA POWER & LIGHT CO. St. Lucie Plant	FULL LENGTH CEA DROP CORE POWER vs TIME	Figure 7.2.4-1



FLORIDA POWER & LIGHT CO. St. Lucie Plant	FULL LENGTH CEA DROP CORE AVERAGE HEAT FLUX vs TIME	Figure 7.2.4-2



FLORIDA POWER & LIGHT CO. St. Lucie Plant	FULL LENGTH CEA DROP REACTOR COOLANT SYSTEM TEMPERATURES vs TIME	Figure 7.2.4-3



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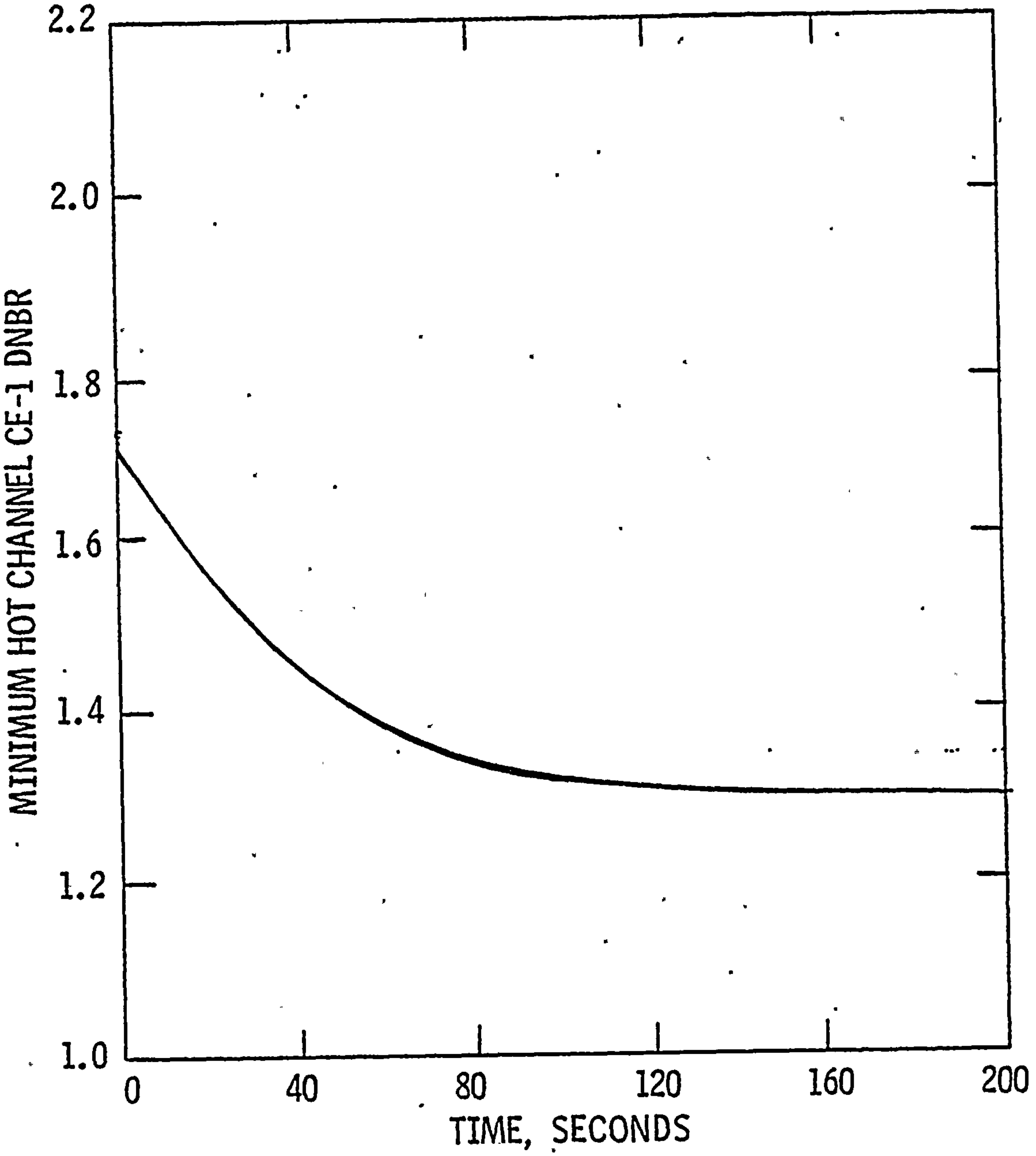
FULL LENGTH CEA DROP
REACTOR COOLANT SYSTEM PRESSURE vs TIME

Figure 7.2.4-4



FLORIDA POWER & LIGHT CO. St. Lucie Plant	FULL LENGTH CEA DROP MINIMUM DNBR (CE-1) vs TIME	Figure 7.2.4-5

7.2.5 PART LENGTH CEA DROP

The Part Length CEAs have been removed; hence, this event was not analyzed.

7.2.6 PART LENGTH CEA MALPOSITIONING

The Part Length CEAs have been removed; hence, this event was not analyzed.

7.2.7 AOO'S RESULTING FROM THE MALFUNCTION OF ONE STEAM GENERATOR

The transients resulting from the malfunction of one steam generator were analyzed for Cycle 4 to determine the initial margins that must be maintained by the LCO's such that in conjunction with the RPS (asymmetric steam generator protective trip) the DNBR and fuel centerline melt design limits are not exceeded. The methods used to analyze these events are consistent with those reported in Section 7.2.3 of Reference 2, except TORC/CE-1 was used instead of COSMO/W-3 to calculate the DNBR. In addition, the Asymmetric Steam Generator Protective Trip (ASGPT) replaces low steam generator level trip as the primary trip to mitigate this event. A description of this addition to the RPS is described in Section 9.0.

The four events which affect a single generator are identified below:

1. Loss of Load to One Steam Generator
2. Excess Load to One Steam Generator
3. Loss of Feedwater to One Steam Generator
4. Excess Feedwater to One Steam Generator

Of the four events described above, it has been determined that the Loss of Load to One Steam Generator (LL/1SG) transient is the limiting asymmetric event. Hence, only the results of this transient are reported.

The event is initiated by the inadvertent closure of a single main steam isolation valve. Upon the loss of load to the single steam generator, its pressure and temperature increase to the opening pressure of the secondary safety valves. The intact steam generator "picks up" the lost load, which causes its temperature and pressure to decrease, thus causing the core average inlet temperature to decrease and enhancing the asymmetry in the reactor inlet temperature. In the presence of a negative moderator temperature coefficient this causes an increase in core power and radial peaking. Thus, the most negative value of this coefficient is used in the analysis. With this assumed sequence of events, the LL/1SG event results in the greatest asymmetry in core inlet temperature distribution and the most limiting DNBR for the transients resulting from the malfunction of one steam generator.

The LL/1SG was initiated at the initial conditions given in Table 7.2.7-1 at a shape index =-.11. A reactor trip is generated by the Asymmetric Steam Generator Trip at 2.5 seconds based on high differential pressure between the steam generators.

Table 7.2.7-2 presents the sequence of events for the Loss of Load to One Steam Generator. The transient behavior of key NSSS parameters are presented in Figures 7.2.7-1 to 7.2.7-5. The minimum transient DNBR calculated for this LL/1SG event is 1.42, as compared to the acceptable DNBR limit of 1.23.

A maximum allowable initial linear heat generation rate of 18.5 KW/ft could exist as an initial condition without exceeding the acceptable fuel to centerline melt of 21.7 KW/ft during this transient. This amount of margin is assured by setting the Linear Heat Rate LCO based on the more limiting allowable linear heat rate for LOCA.

The event initiated from the extremes of the LCO in conjunction with the ASGPT protective trip will not lead to DNBR or centerline fuel temperatures which exceed the DNBR and centerline to melt design limits.

TABLE 7.2.7-1

KEY PARAMETERS ASSUMED IN THE ANALYSIS OF LOSS OF LOAD TO ONE STEAM GENERATOR*

Parameter	Units	Reference Cycle	Cycle 4
Initial Core Power	MWt	2611	2700
Initial Core Inlet Temperature	°F	544	549
Initial Reactor Coolant System Pressure		2200	2225
Moderator Temperature Coefficient	$\Delta\rho/°F$	-2.5×10^{-4}	-2.5×10^{-4}
Doppler Coefficient Multiplier		0.85	0.85

---

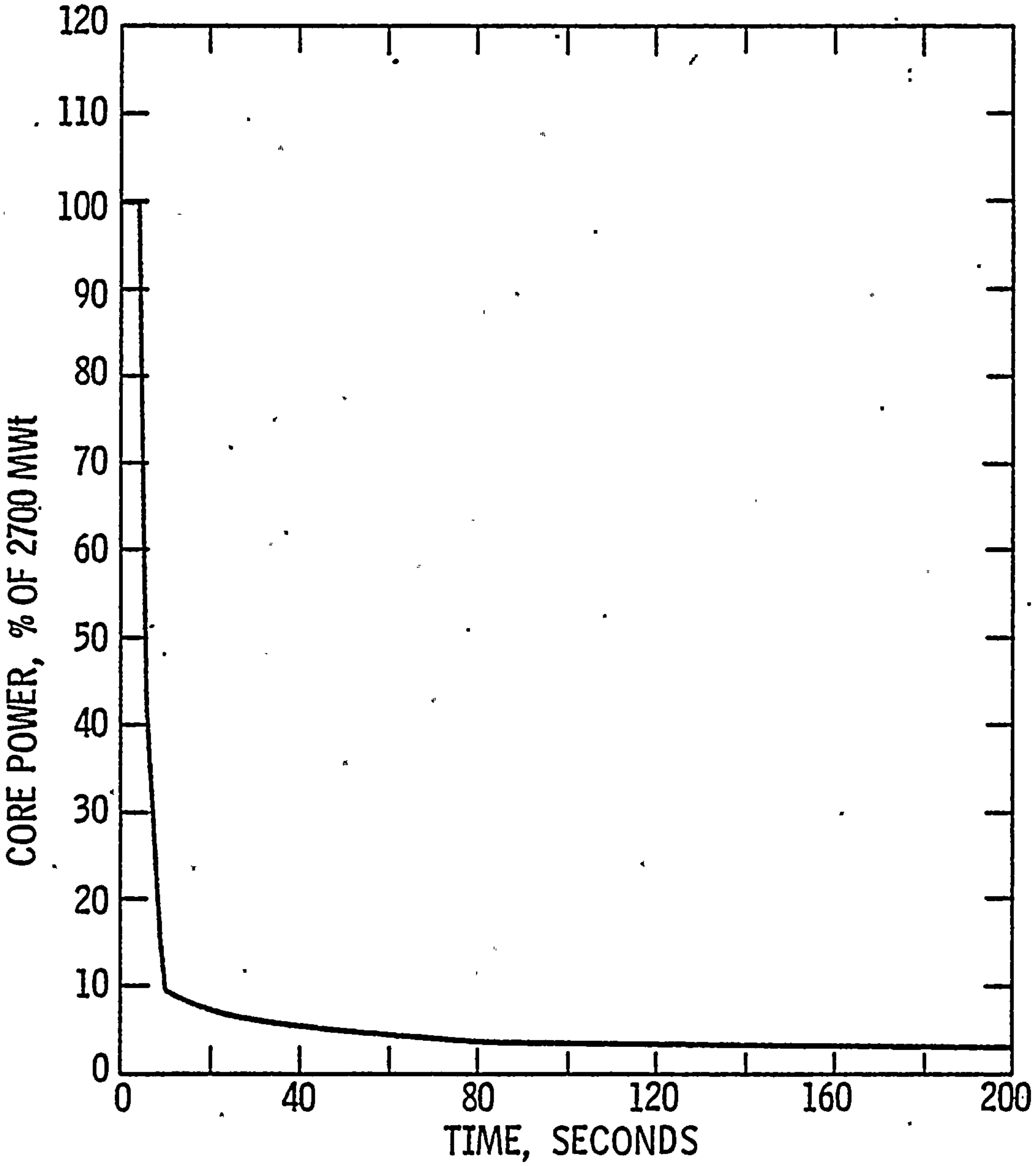
* This event was not analyzed in the FSAR, but was evaluated in CENPD-199-P (Reference 2). Thus Reference 2 is the Reference Cycle.

TABLE 7.2.7-2

SEQUENCE OF EVENTS FOR LOSS OF LOAD TO ONE STEAM GENERATOR

Time (sec)	Event	Setpoint or Value
0.0	Spurious closure of a single main steam isolation valve	- -
0.0	Steam flow from unaffected steam generator increases to maintain turbine power	- -
2.5	ASGPT* setpoint reached (differential pressure)	175 psid
2.6	Safety valves open on isolated steam generator	1010 psia
3.0	ASGPT signal generates signal to open dump and bypass valves to condenser and to trip turbine	- -
3.4	Trip Breakers open	
3.9	CEAs begin to drop into core	- -
6.0	Minimum DNBR occurs	1.42
9.6	Maximum steam generator pressure	1063 psia

* ASGPT - Asymmetric Steam Generator Protection Trip



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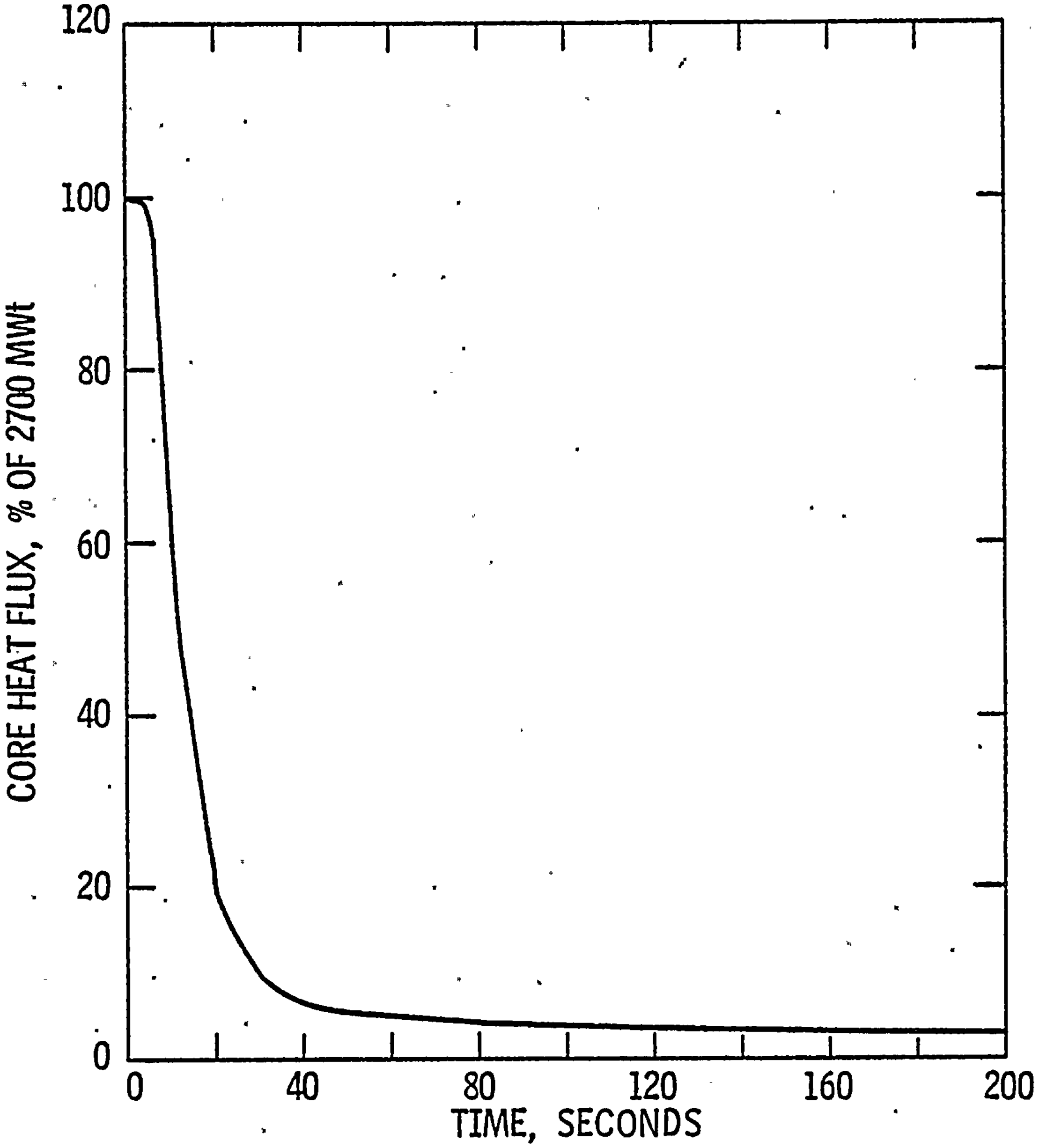
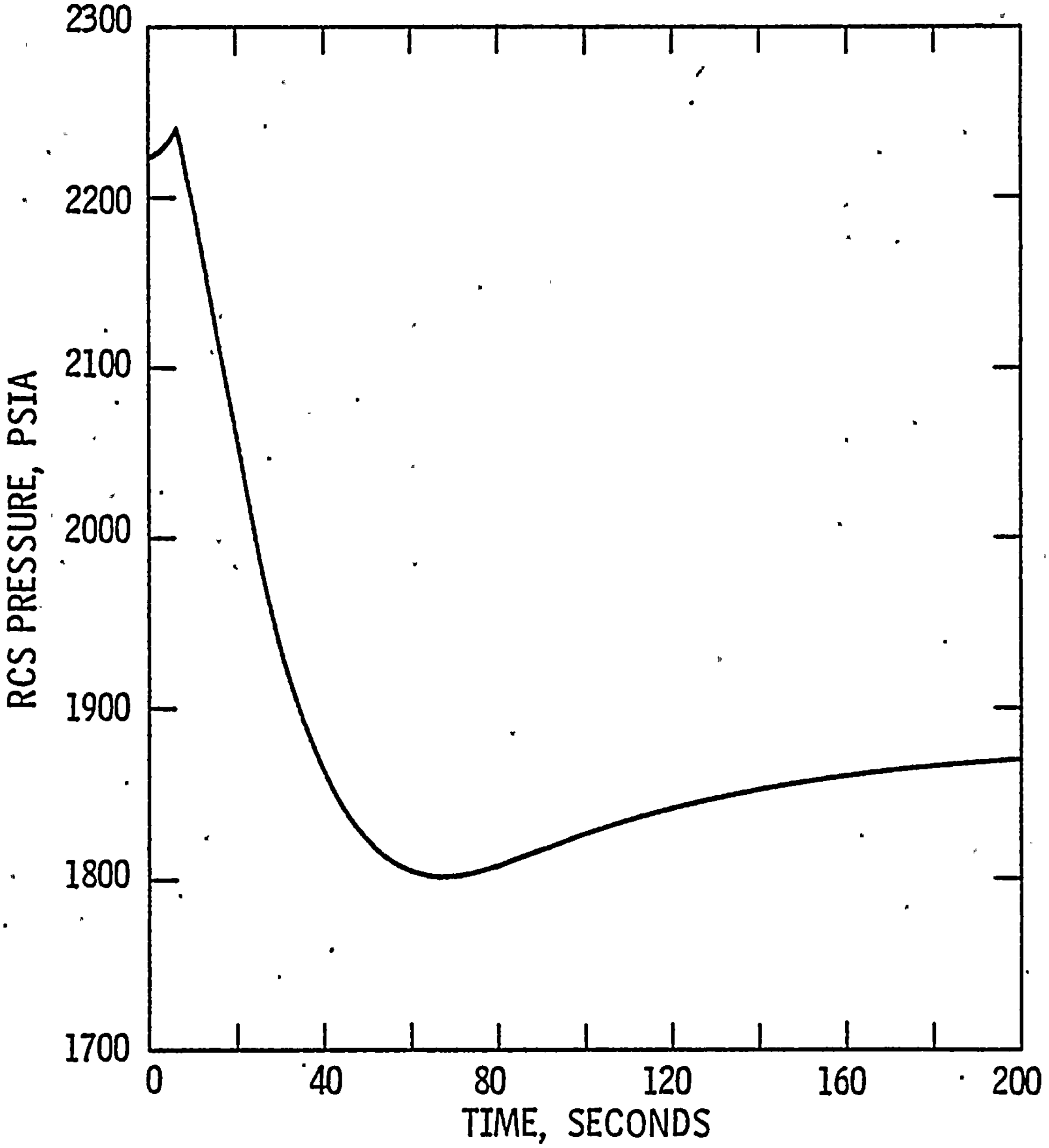
LOSS OF LOAD/1STEAM GENERATOR EVENT
CORE POWER vs TIME

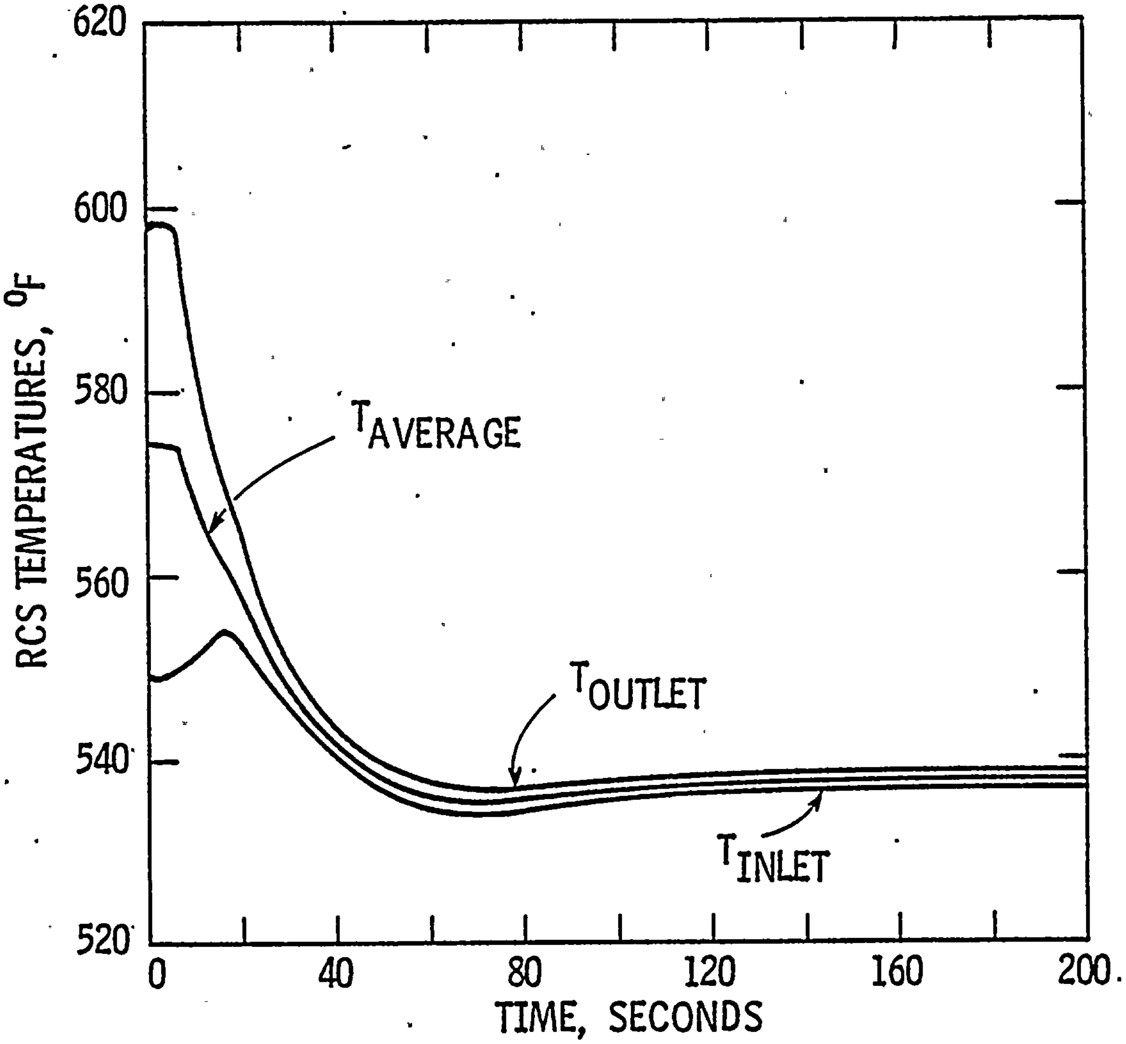
Figure
7.2.7-1



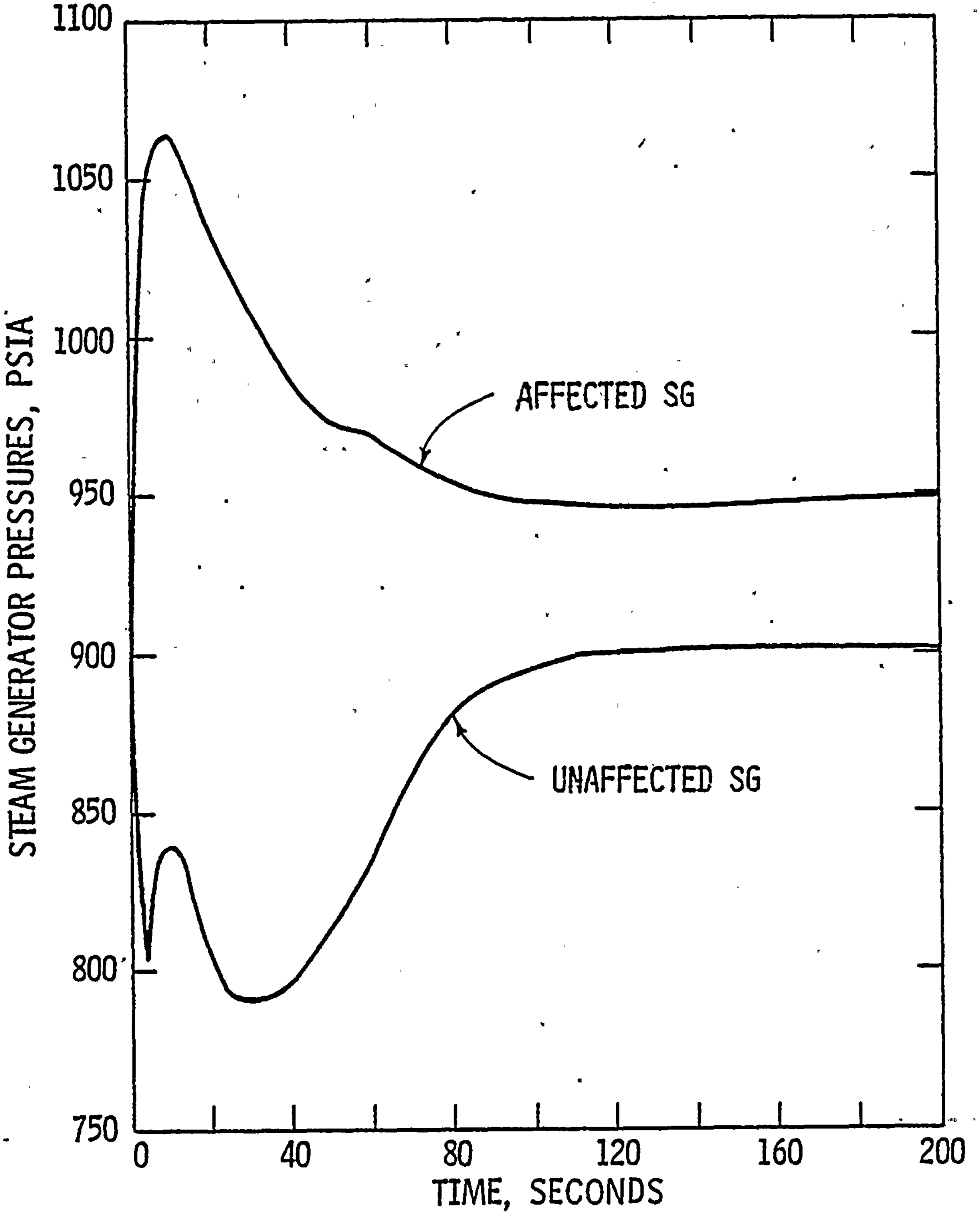
FLORIDA POWER & LIGHT CO. St. Lucie Plant	LOSS OF LOAD/1STEAM GENERATOR EVENT CORE AVERAGE HEAT FLUX vs TIME	Figure 7.2.7-2



FLORIDA POWER & LIGHT CO. St. Lucie Plant	LOSS OF LOAD/1STEAM GENERATOR EVENT REACTOR COOLANT SYSTEM PRESSURE vs TIME	Figure 7.2.7-3



FLORIDA POWER & LIGHT CO. St. Lucie Plant	LOSS OF LOAD/1STEAM GENERATOR EVENT REACTOR COOLANT SYSTEM TEMPERATURE vs TIME	Figure 7.2.7-4



FLORIDA
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St. Lucie Plant

LOSS OF LOAD/1 STEAM GENERATOR EVENT
STEAM GENERATOR PRESSURE vs TIME

Figure
7.2.7-5

7.3 POSTULATED ACCIDENTS

The events in this category were analyzed for stretch power operation of St. Lucie Unit 1, Cycle 4 to ensure acceptable consequences. For these transients some amount of fuel failure is acceptable provided the predicted site boundary dose rates meet 10CFR100 guidelines.

The following sections present the results of the analyses.

7.3.1 CEA EJECTION EVENT

The CEA Ejection event was reanalyzed for Cycle 4 to determine the fraction of fuel pins that exceed the criteria for clad damage.

The analytical method employed in the reanalysis of this event is the NRC approved Combustion Engineering CEA Ejection method which is described in CENPD-190-A, (Reference 8). As stated in the Cycle 2 license submittal, (Reference 7), results generated with this approved methodology are less conservative than the methods used and described in the FSAR.

The key parameters used in this event are listed in Table 7.3.1-1. With these key parameters, selected to add conservatism, the procedure outlined in Figure 2.1 of Reference 8 is then used to determine the average and centerline enthalpies in the hottest spot of the rod. The calculated enthalpy values are compared to threshold enthalpy values to determine the amount of fuel exceeding these thresholds. These threshold enthalpy values are (References 9, 10, and 11).

Clad Damage Threshold:
Total Average Enthalpy = 200 cal/gm

Incipient Centerline Melting Threshold:
Total Centerline Enthalpy = 250 cal/gm

Fully Molten Centerline Threshold:
Total Centerline Enthalpy = 310 cal/gm

To bound the most adverse conditions during the cycle, the most limiting of either the Beginning of Cycle (BOC) or End of Cycle (EOC) parameter values were used in the analysis. A BOC Doppler defect was used since it produces the least amount of negative reactivity feedback to mitigate the transient. A BOC moderator temperature coefficient of $+0.5X10^{-4}\Delta\rho/°F$ was used because a positive MTC results in postive reactivity feedback and thus increases coolant temperatures. An EOC delayed neutron fraction was used in the analysis to produce the highest power rise during the event.

The zero power CEA ejection event was analyzed assuming the core is initially operating at 1 MWt. At zero power, a Variable Overpower trip is conservatively assumed to initiate at 25% (15% + 10% uncertainty) of 2700 MWt and terminates the event.

The full and zero power cases were analyzed, assuming the value of 0.05 seconds for the total ejection time, which is consistent with the FSAR and previous reload submittals.

Table 7.3.1-1 lists all the key parameters used in this analysis.

The power transient produced by a CEA ejection initiated at the maximum allowed power is shown in Figure 7.3.1-1. Similar results for the zero power case are shown in 7.3.1-2.

The results of the two CEA ejection cases analyzed (Table 7.3.1-2) show that the maximum total energy deposited during the event is less than the criterion for clad damage (i.e., 200 cal/gm). Also, an acceptably small fraction of the fuel reaches the incipient centerline melt threshold. Consequently, no fuel pin failures occur.

TABLE 7.3.1-1

KEY PARAMETERS ASSUMED IN THE CEA EJECTION ANALYSES

Parameter	Units	Reference Cycle Cycle 3	Cycle 4
Full Power			
Core Power Level	MWt	2754	2754
Core Average Linear Heat Generation Rate at 2754 MWt	KW/ft	6.29	6.43
Moderator Temperature Coefficient	$10^{-4} \Delta\rho/°F$	+.5	+.5
Ejected CEA Worth	$\%\Delta\rho$	.29	.31
Delayed Neutron Fraction, β		.0047	.0044
Post-Ejected Radial Power Peak		3.6	3.6
Axial Power Peak		1.39	1.35**
CEA Bank Worth at Trip	$\%\Delta\rho$	-3.0	-3.0
Tilt Allowance		1.03	-+
Doppler Multiplier		0.85	0.85
Zero Power			
Core Power Level	MWt	1.0	1.0
Ejected CEA Worth	$\%\Delta\rho$	.65	.63
Post-Ejected Radial Power Peak		8.34	9.40
Axial Power Peak		1.59	1.75
CEA Bank Worth at Trip	$\%\Delta\rho$	-1.47	-1.50
Tilt Allowance		1.10	1.10
CEA Drop Time*			
Doppler Multiplier		0.85	0.85

* See Table 7-2.

** The axial peak has decreased because the axial shape index band has decreased.

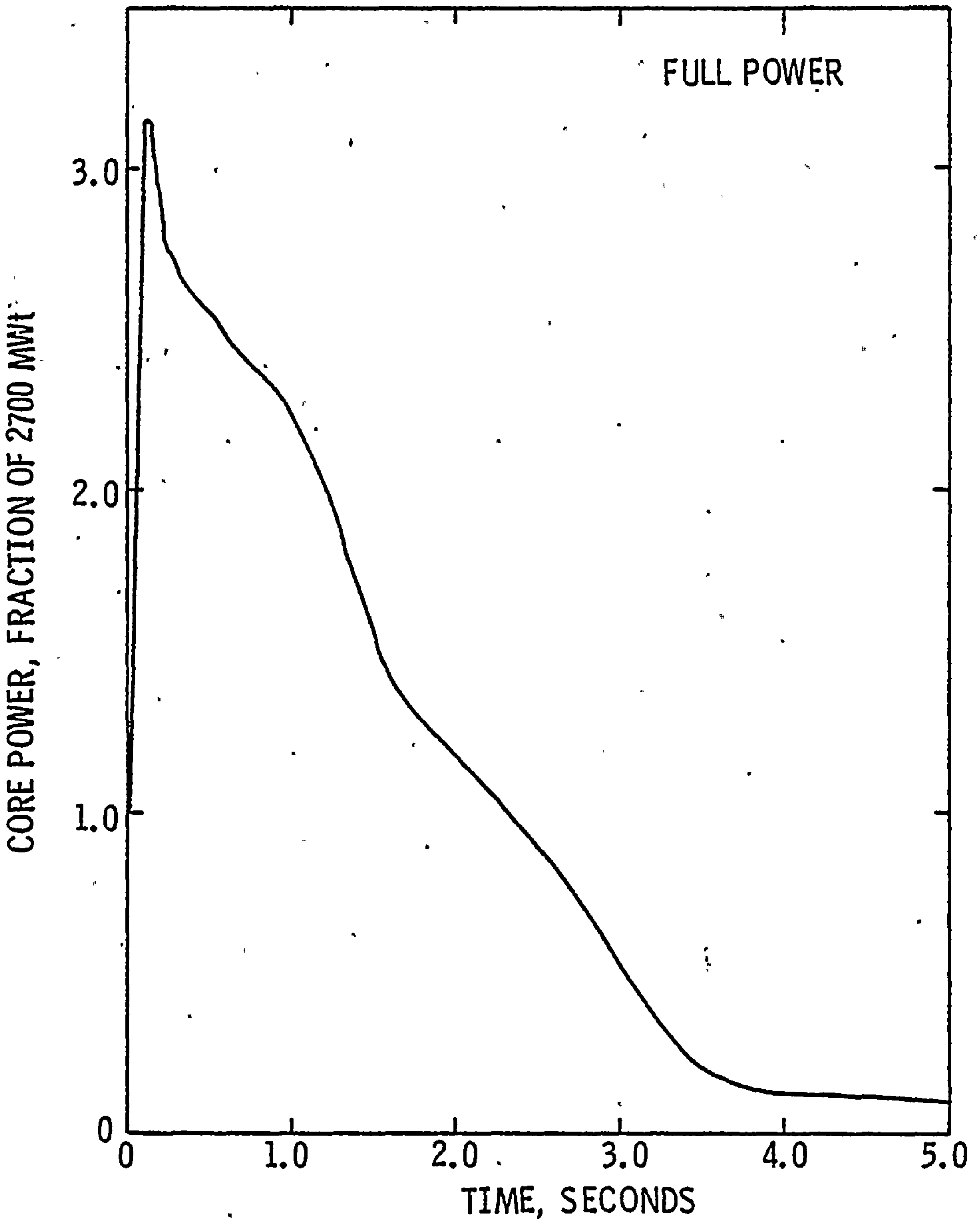
\+ Included in F_r^T limits stated in Table 7.2.

<u>TABLE 7.3.1-2</u>

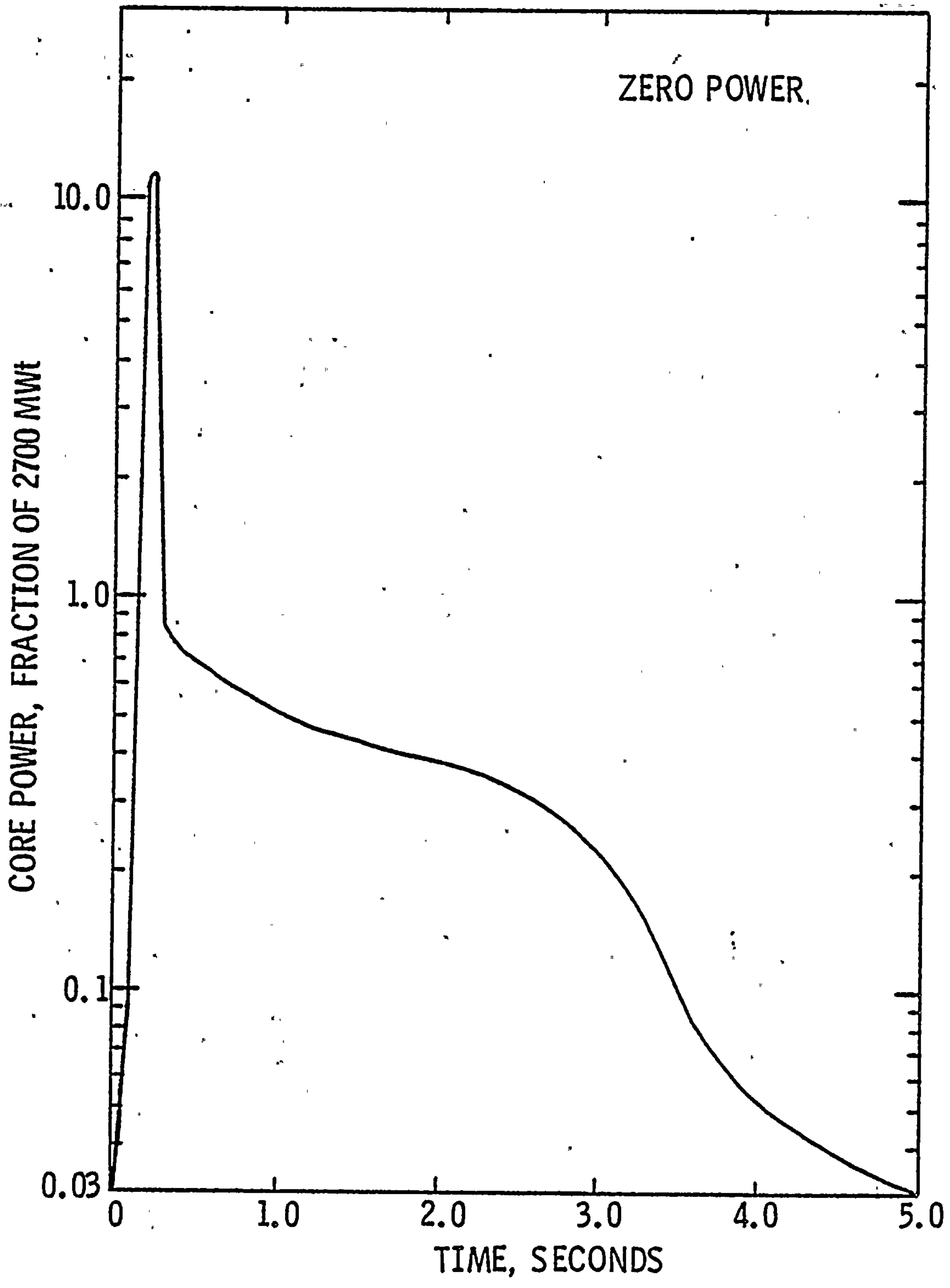
CEA EJECTION EVENT RESULTS

Full Power	Reference Cycle Cycle 3	Cycle 4
Total Average Enthalpy of Hottest Fuel Pellet (cal/gm)	194.0	166.0
Total Centerline Enthalpy of Hottest Fuel Pellet (cal/gm)	289.0	280.0
Fraction of Rods that Suffer Clad Damage (average Enthalpy ≥ 200 cal/gm)	0	0
Fraction of Fuel Having at Least Incipient Centerline Melting (Centerline Enthalpy ≥ 250 cal/gm)	.028	.040
Fraction of Fuel Having a Fully Molten Centerline Condition (Centerline Enthalpy ≥ 310 cal/gm)	0	0

Zero Power	Reference Cycle Cycle 3	Cycle 4
Total Average Enthalpy of Hottest Fuel Pellet (cal/gm)	186.0	140.0
Total Centerline Enthalpy of Hottest Fuel Pellet (cal/gm)	209.5	218.0
Fraction of Rods that Suffer Clad Damage (Average Enthalpy ≥ 200 cal/gm)	0	0
Fraction of Fuel Having at Least Incipient Centerline Melting (Centerline Enthalpy ≥ 250 cal/gm)	0	0
Fraction of Fuel Having a Fully Molten Centerline Condition (Centerline Enthalpy ≥ 310 cal/gm)	0	0



FLORIDA POWER & LIGHT CO. St. Lucie Plant	CEA EJECTION EVENT CORE POWER vs TIME	Figure 7.3.1-1



FLORIDA POWER & LIGHT CO. St. Lucie Plant	CEA EJECTION EVENT CORE POWER vs TIME	Figure 7.3.1-2

7.3.2 STEAM LINE RUPTURE EVENT

The Steam Line Rupture event was reanalyzed for Cycle 4,to determine that the critical heat flux will not be exceeded during this event.

The analysis assumed that the event is initiated by a circumferential rupture of a 34 inch (inside diameter) steam line at the steam generator-main steam line nozzle. This break size is the most limiting from the standpoint of potential return to power, since it results in the greatest rate and magnitude of temperature reduction in the reactor core region. The analysis of the Steam Line Rupture event was performed with the methodology reported in the FSAR. The three steam line rupture events considered during stretch power operation were:

1) 2 Loop Full Load - 2754 MWt

2) 2 Loop - no load

3) 1 Loop - no load

The one-loop case for operation at power has not been analyzed since this operating condition is precluded by the Technical Specifications (paragraph 3.4.1). The 2-loop no load case analyzed with the associated 2-loop Technical Specification required shutdown margin of $-4.3\%\Delta\rho$ is more adverse (i.e., closer approach to criticality) than the 1-loop no load case with the associated 1-loop Technical Specification required shutdown margin of $-5.1\%\Delta\rho$. Consequently, only the 2-loop no load results are presented.

Two-Loop - 2754 MWt

The Two Loop - 2754 MWt case was initiated at the conditions listed in Table 7.3.2-1. The Moderator Temperature Coefficient (MTC) of reactivity assumed in the analysis corresponds to end of cycle, since this MTC results in the greatest positive reactivity change during the RCS cooldown caused by the Steam Line Rupture. Since the reactivity change associated with moderator feedback varies significantly over the moderator temperature covered in the analysis, a curve of reactivity insertion versus temperature (i.e., moderator cooldown curve) rather than a single value of MTC is assumed in the analysis. The moderator cooldown curve used in this analysis is given in Figure 7.3.2-1. It is associated with an MTC of $-2.5\text{X}10^{-4}\Delta\rho/^\circ\text{F}$ at hot full power conditions. The reactivity defect associated with fuel temperature decreases is also based on end of cycle Doppler defect. The end of cycle Fuel Temperature Coefficient (FTC), in conjunction with the decreasing fuel temperatures, causes maximum positive reactivity insertion during the Steam Line Rupture event. The uncertainty on the FTC assumed in the analysis is given in Table 7.3.2-1. The β fraction assumed is the maximum absolute EOC value including uncertainties. This is conservative since it maximizes the contribution of delayed neutron multiplication to the total positive reactivity insertion during cooldown.

The minimum CEA worth assumed to be available for shutdown at the time of reactor trip at the maximum allowed power (2754 MWt) is 6.25%. This shutdown worth includes an allowance for the most reactive CEA being stuck in the fully withdrawn position during a scram. The analysis conservatively assumed that the boron injected from the safety injection tank is worth -1.0%Δρ per 105 PPM.

Table 7.3.2-2 presents the sequence of events for the case initiated at the limiting conditions given in Table 7.3.2-1. The reactivity insertion as a function of time is given in Figure 7.3.2-2. As seen from the figure, the Steam Line Rupture event initiated at the maximum allowed power level (2754 MWt) remains at least .064%Δρ subcritical during the event compared to -.43%Δρ for Cycle 2. The transient behavior of core power, heat flux, RCS pressure, RCS temperatures, and steam generator pressure are presented in Figures 7.3.2-3 to 7.3.2-7.

Two Loop - No Load

The Two-Loop - no load case was initiated at the conditions given in Table 7.3.2-3. The moderator cooldown curve given in Figure 7.3.2-1 corresponds to an initial MTC of $-2.5\times10^{-4}\Delta\rho/°F$. The end of cycle MTC was used for the reasons given in the two loop - 2754 case. The FTC used in the analysis also corresponds to end of cycle for the reasons previously given for the two loop - 2754 MWt case.

The minimum CEA shutdown worth available is conservatively assumed to be -4.3%Δρ. A maximum inverse boron worth of 100 PPM/%Δρ was conservatively assumed for the no load case for the time interval subsequent to when the safety injection has been actuated.

The sequence of events for the two-loop no load case is given in Table 7.3.2-4. The reactivity insertion as a function of time is given in Figure 7.3.2-8. The results of the analysis show a peak total reactivity of -.038%Δρ during the event in comparison to -.12%Δρ for the FSAR. Since the peak total reactivity is negative, there is no return to power during a two loop-no load Steam Line Rupture event initiated at zero power for stretch power-long cycle operations. The transient behavior of the core power, core average heat flux, RCS pressure, RCS coolant temperatures, and steam generator pressures are presented in Figures 7.3.2-9 to 7.3.2-12.

Conclusions

The results of the full power and zero power Steamline Rupture indicate that the core remains subcritical by .064%Δρ and 0.038%Δρ, respectively. Since there is no return to criticality for both the full power and zero power cases, the results confirm that the critical heat flux would not be exceeded.

TABLE 7.3.2-1

KEY PARAMETERS ASSUMED IN THE STEAM LINE RUPTURE ANALYSIS 2 LOOP - 2754 MWt

Parameters	Units	Reference* Cycle	Cycle 4
Initial Core Power	MWt	2700	2754
Initial Core Coolant Inlet Temperature	°F	544	551
Initial RCS Pressure	psia	2250	2300
Initial Core Mass Flow Rate	$X10^6$ lbm/hr	116.8	133.8
Initial Steam Generator Pressure	psia	841.3	909
Minimum CEA Worth Available at Trip	$\%\Delta\rho$	-5.2	-6.25
Doppler Multiplier		1.15	1.15
Moderator Cooldown Curve		See Figure 7.3.2-1	See Figure 7.3.2-1
Inverse Boron Worth	PPM/$\%\Delta\rho$	92	105
Effective MTC	$X10^{-4}$°F/$\%\Delta\rho$	-2.2	-2.5
β fraction (including uncertainty)		.0045	.0060

* Cycle 2

TABLE 7.3.2-2

SEQUENCE OF EVENTS FOR STEAM LINE BREAK INSIDE CONTAINMENT WHILE OPERATING AT FULL POWER, 2 LOOP CONDITIONS

Time	Event	Value
0.0	Steam Line Break Occurs	
1.3	Low Steam Generator Pressure Alarm Actuated	678 psia
2.3	Steam Generator Low Pressure Trip Signal Generated	578 psia
3.2	Main Steam Isolation Valves Begin to Close Trip Breakers Open for Trip on Low Steam Generator Pressure	- - -
3.7	Shutdown CEAs Begin to Drop into Reactor Core	- - -
3.8	Peak Power Resulting from Overshoot Following Reactor Trip	108.4 % of 2710 MWt
3.95	Peak Heat Flux Resulting from Overshoot Following Reactor Trip	102.9 %
9.2	Main Steam Isolation Valves are Closed	- - -
15.7	Pressurizer Empties	- - -
16.8	Safety Injection Actuation Signal is Actuated	1578 psia
62.1	Ruptured Steam Generator Blows Dry	14.7 psia
65.1	Peak Total Reactivity	-.064 %Δρ
65.6	Peak Power Following Reactor Trip	16.7% of 2700 MWt

TABLE 7.3.2-3

KEY PARAMETERS ASSUMED IN THE STEAM LINE RUPTURE ANALYSIS 2 LOOP - NO LOAD

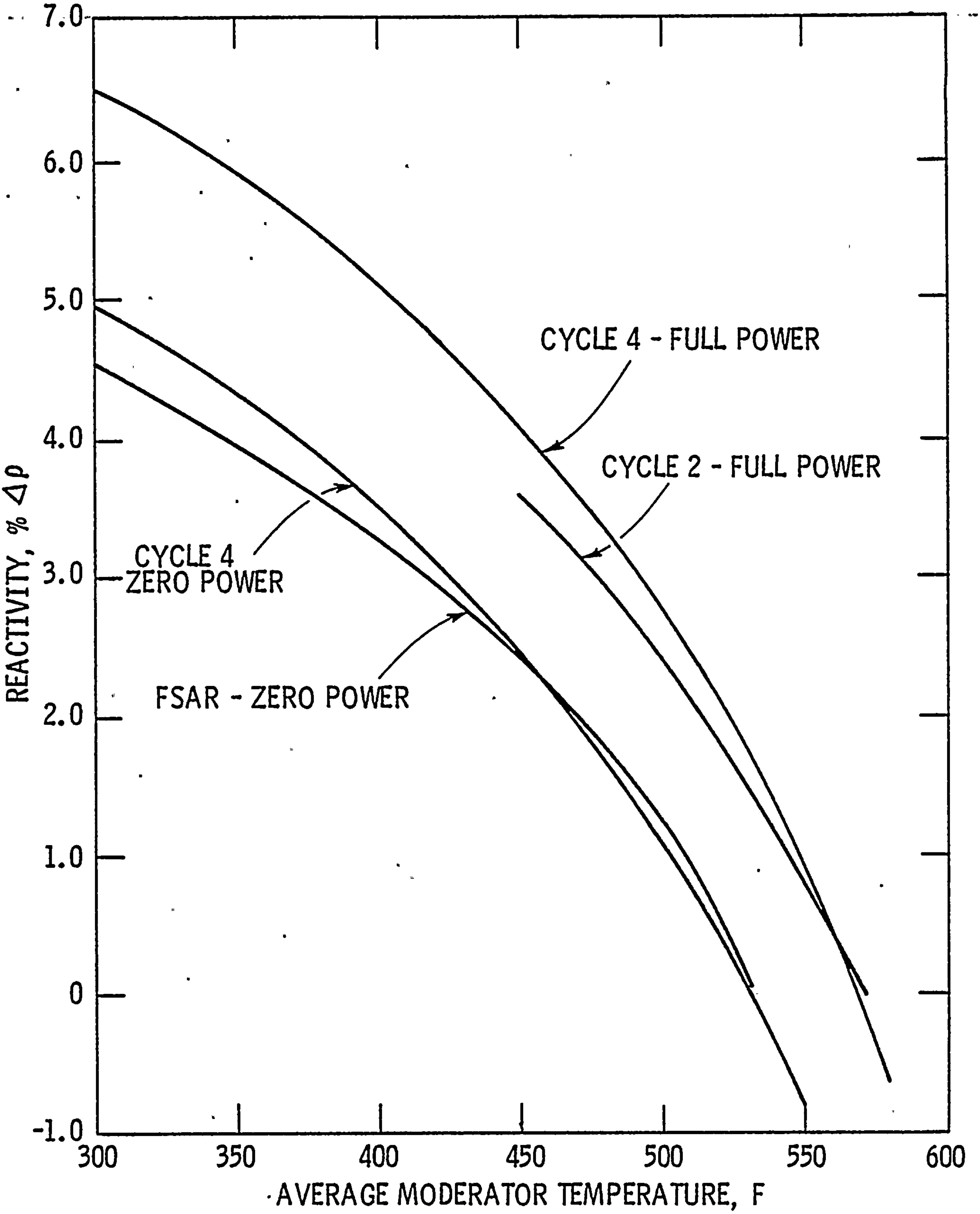
Parameter	Units	FSAR	Cycle 4
Initial Core Power Level	MWt	1.0	1.0
Iniital Core Coolant Inlet Temperature	°F	532	532
Initial RCS Pressure	psia	2250	2300
Initial Core Mass Flow Rate	$X10^6$ lbm/hr	118.6	137.2
Initial Steam Generator Pressure	psia	900	900
Minimum CEA Worth Available at Trip	%Δρ	-2.45	-4.3
Doppler Multiplier*		.85	1.15*
Moderator Cooldown Curve		See Figure 7.3.2-1	See Figure 7.3.2-1
Inverse Boron Worth	PPM/%Δρ	87	100
Effective MTC	$X10^{-4}$ °F/%Δρ	-2.2	-2.5
β fraction (including uncertainty)		.0045	.0060

* In the FSAR analysis there was a return-to-power and the 0.85 Doppler Multiplier was used to maximize the return-to-power. For Cycle 4 since there is no return-to-power the 1.15 Doppler Multiplier is used since it maximizes the Doppler feedback.

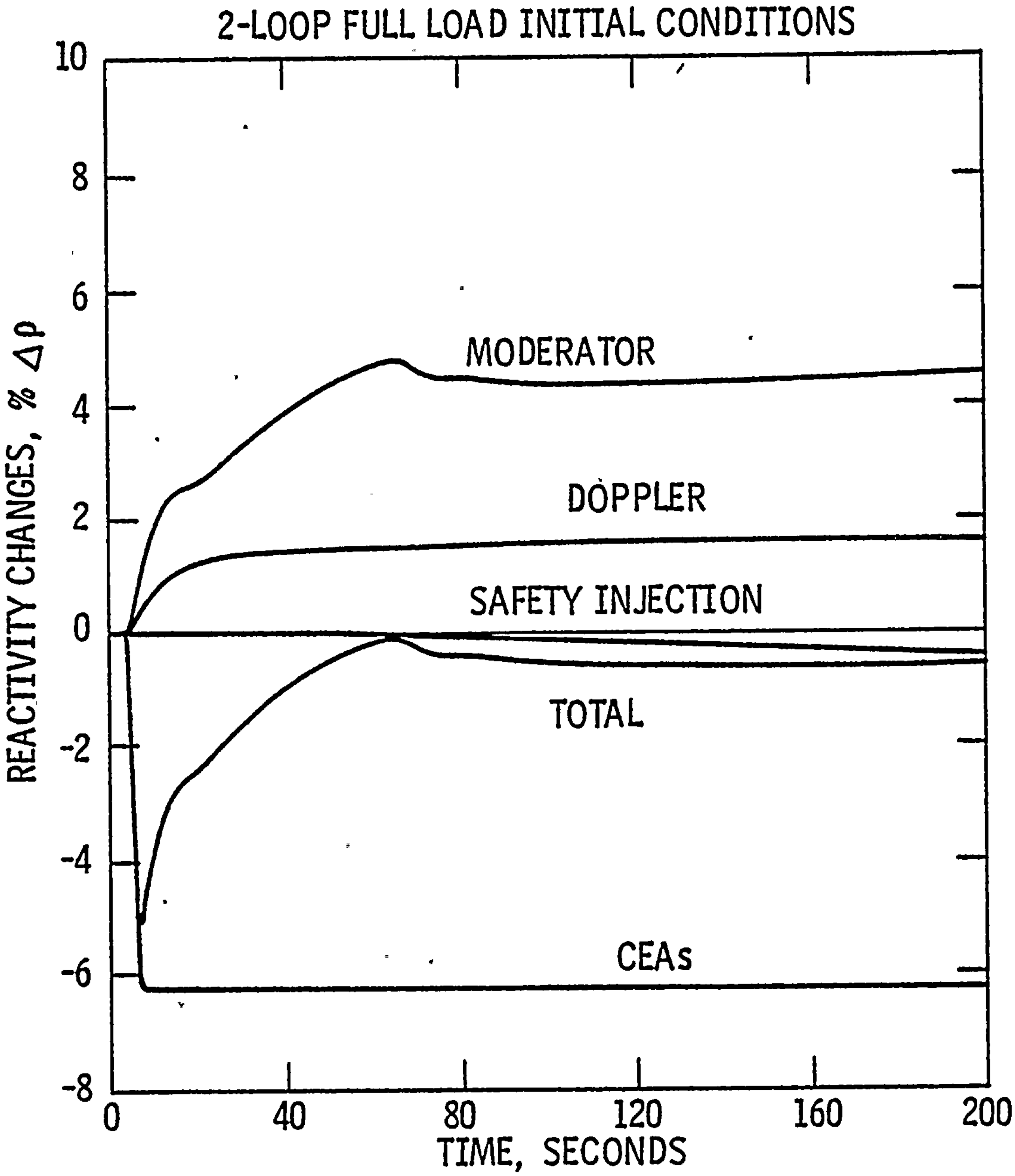
TABLE 7.3.2-4

SEQUENCE OF EVENTS FOR ZERO POWER (NO LOAD), 2 LOOP OPERATION FOR A SLB INSIDE CONTAINMENT

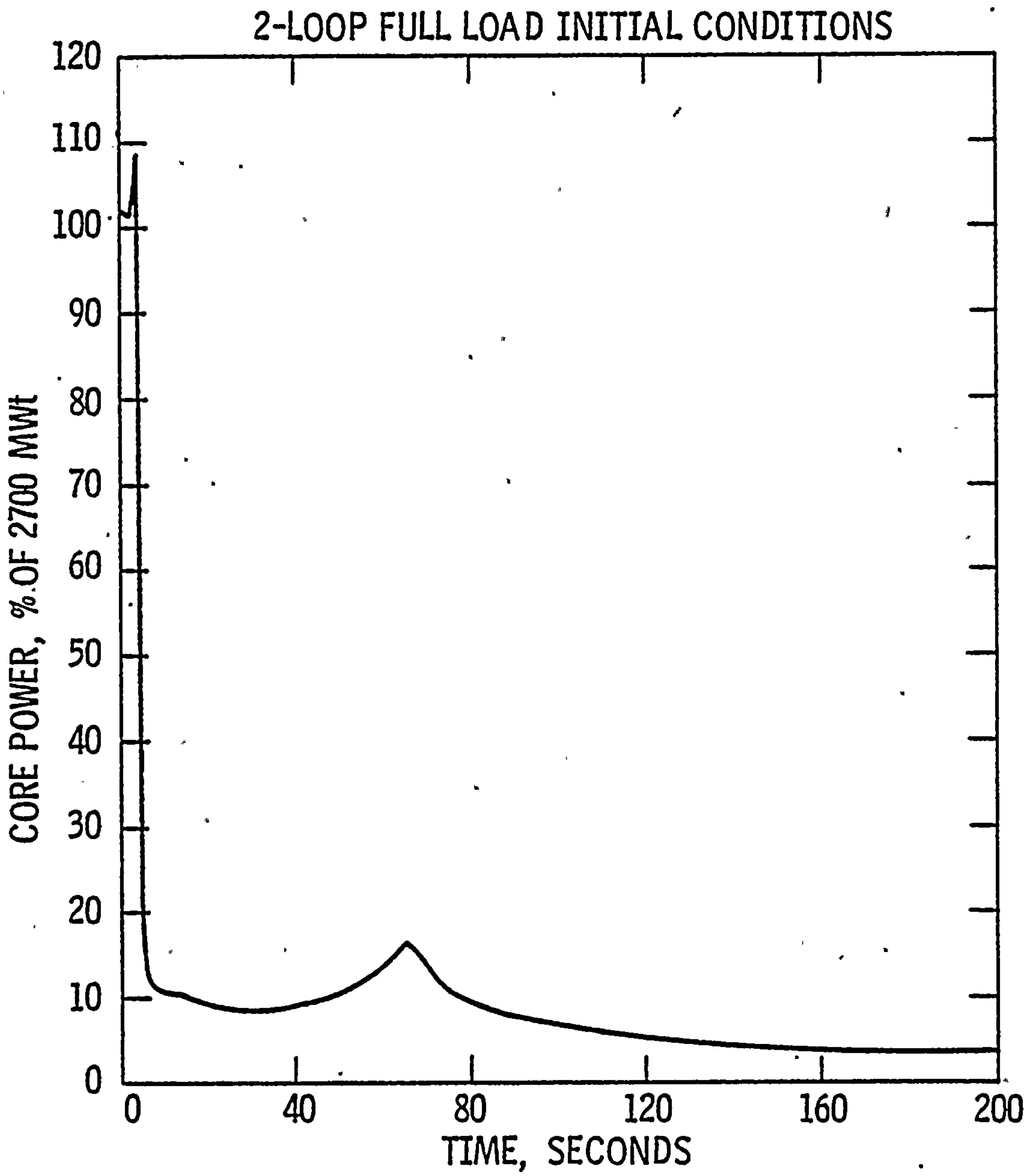
Time	Event	Value
0.0	Steam Line Rupture occurs	
1.4	Low Steam Generator Pressure Alarm Initiated	678 psia
2.4	Steam Generator Low Pressure Signal Generated	578 psia
3.3	Main Steam Isolation Valves Actuation Signal Trip Breakers Open for Trip on Low Steam Generator Pressure	- - -
3.8	Shutdown CEAs Begin to Drop Into Reactor Core	- - -
9.3	Main Steam Isolation Valves are Closed	- - -
11.3	Pressurizer Empties	- - -
16.2	Safety Injection Actuation Signal Initiated	1578 psia
105.2	Ruptured Steam Generator Blows Dry	14.7 psia
108.7	Peak Total Reactivity	-.038%Δρ
109.4	Peak Power Following Reactor Trip	.252 MWt



FLORIDA POWER & LIGHT CO. St. Lucie Plant	STEAM LINE RUPTURE EVENT MODERATOR COOLDOWN CURVE	Figure 7.3.2-1

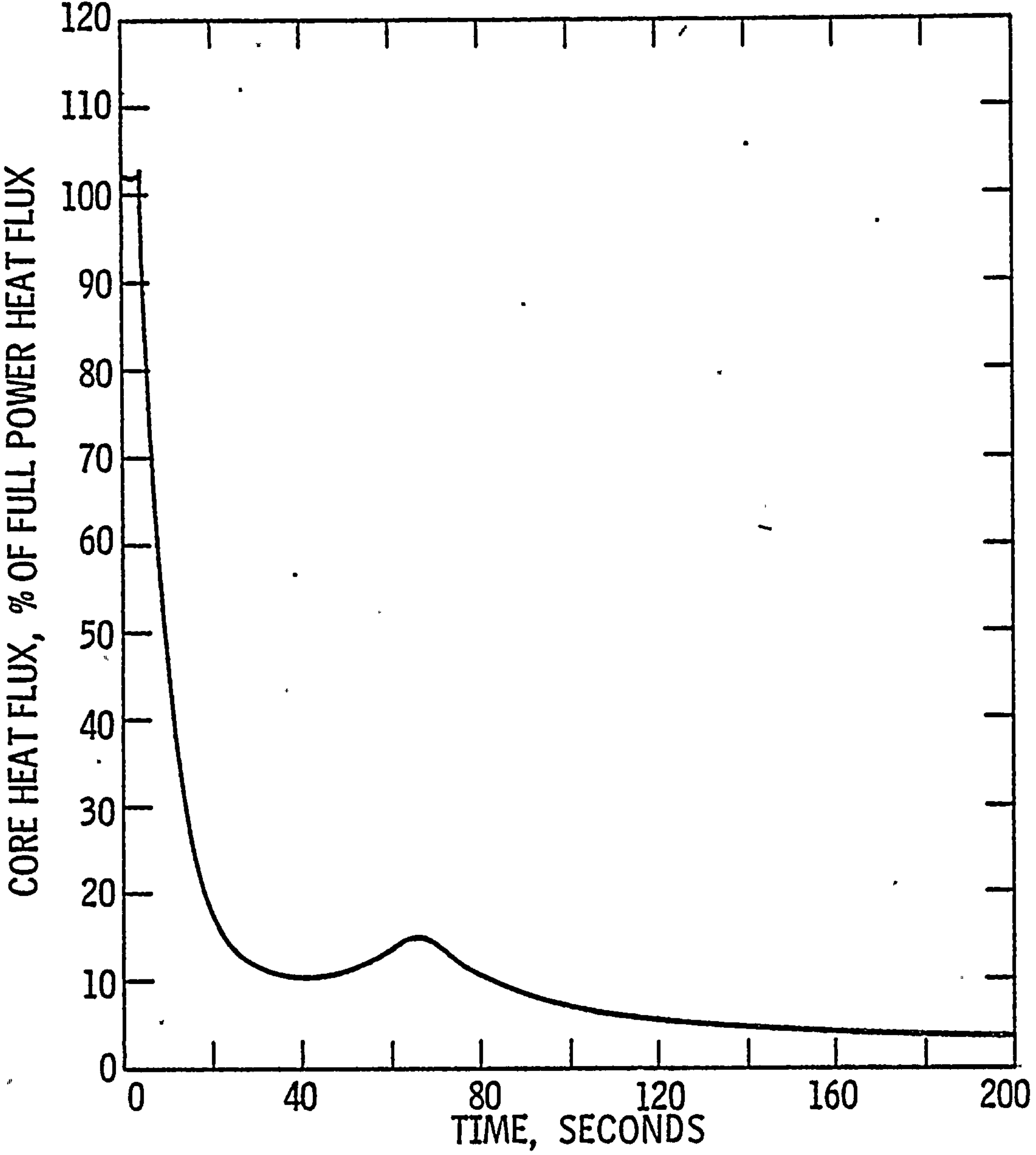


FLORIDA POWER & LIGHT CO. St. Lucie Plant	STEAM LINE RUPTURE EVENT REACTIVITY CHANGES vs TIME	Figure 7.3.2-2

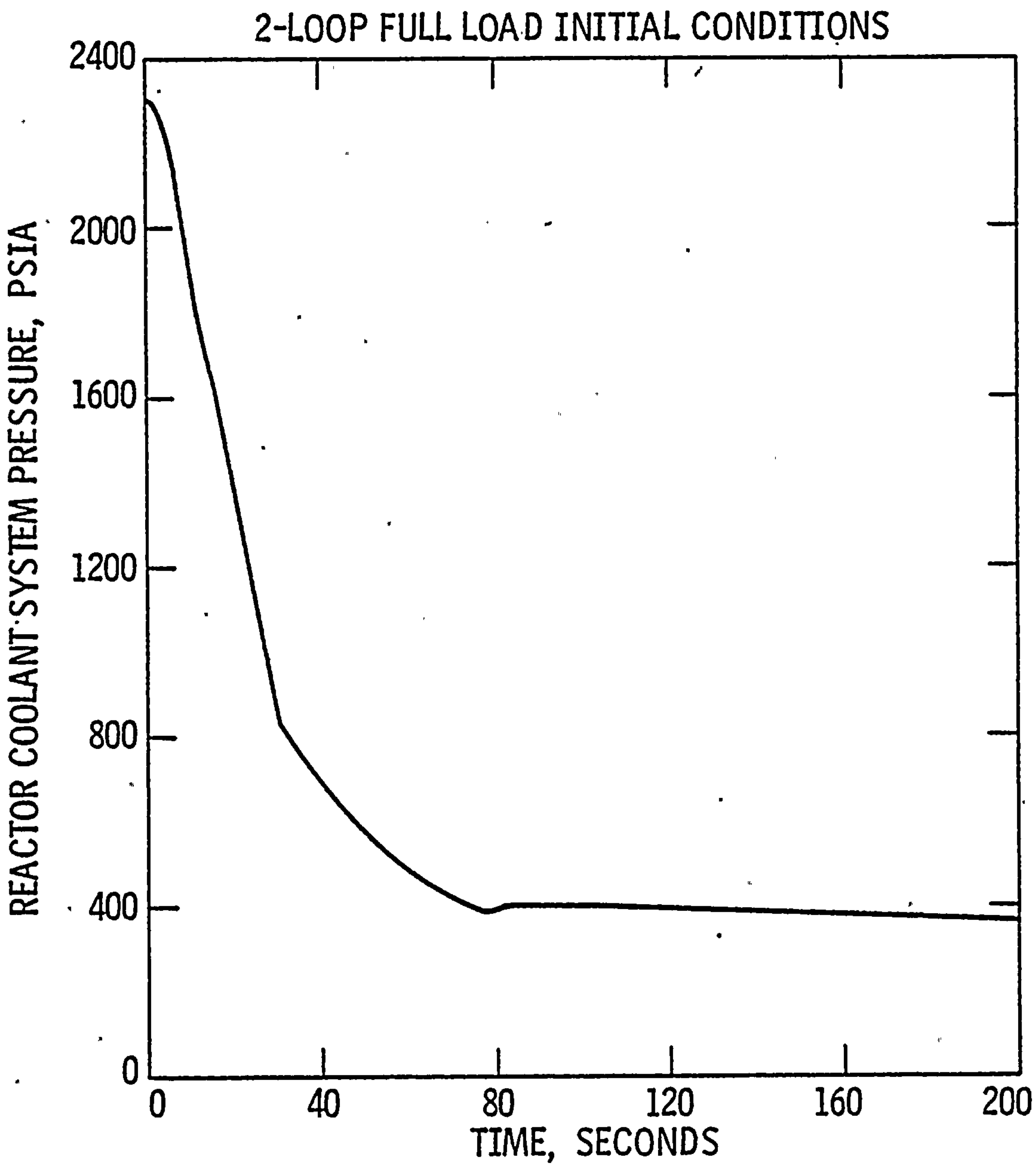


FLORIDA POWER & LIGHT CO. St. Lucie Plant	STEAM LINE RUPTURE EVENT CORE POWER vs TIME	Figure 7.3.2-3

2-LOOP FULL LOAD INITIAL CONDITIONS

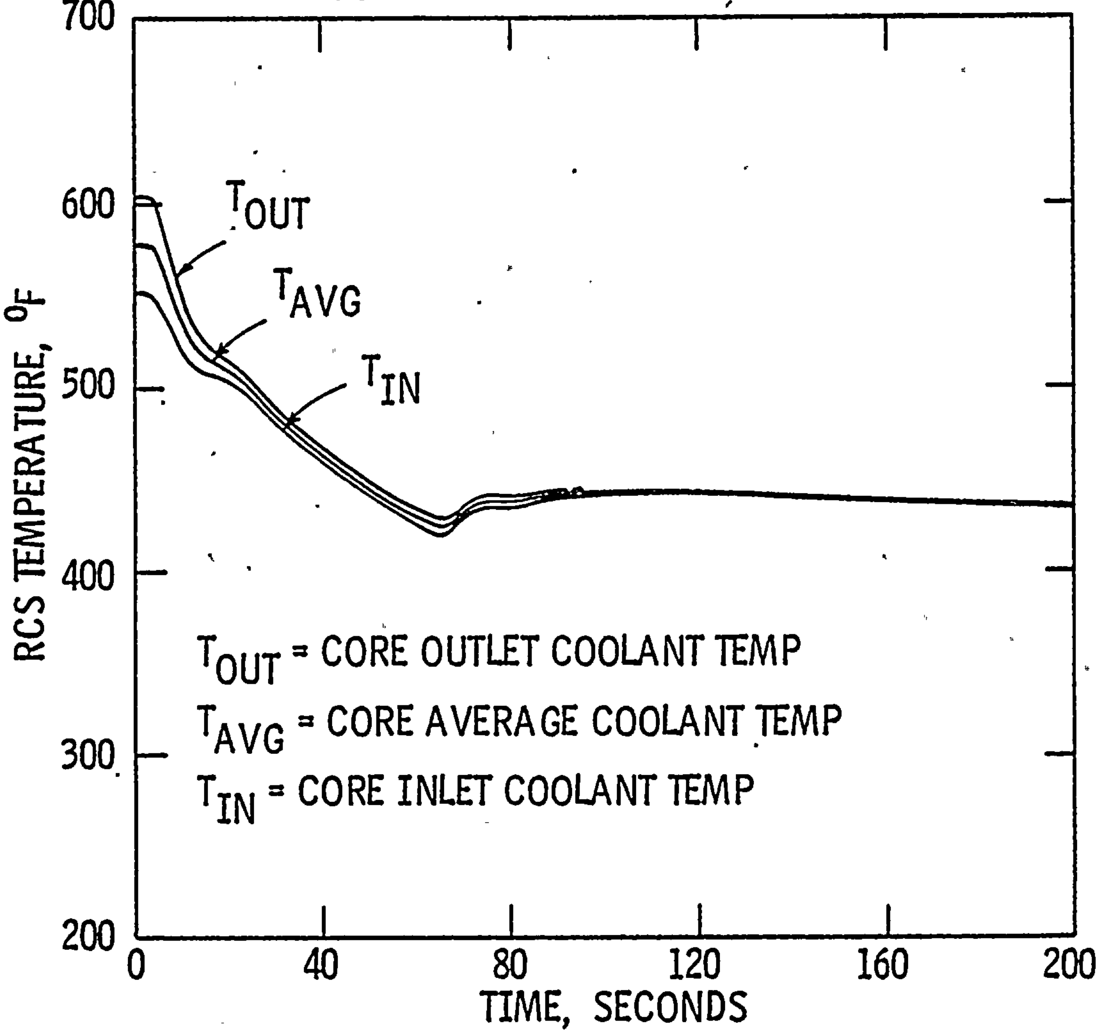


FLORIDA POWER & LIGHT CO. St. Lucie Plant	STEAM LINE RUPTURE EVENT CORE AVERAGE HEAT FLUX vs TIME	Figure 7.3.2-4

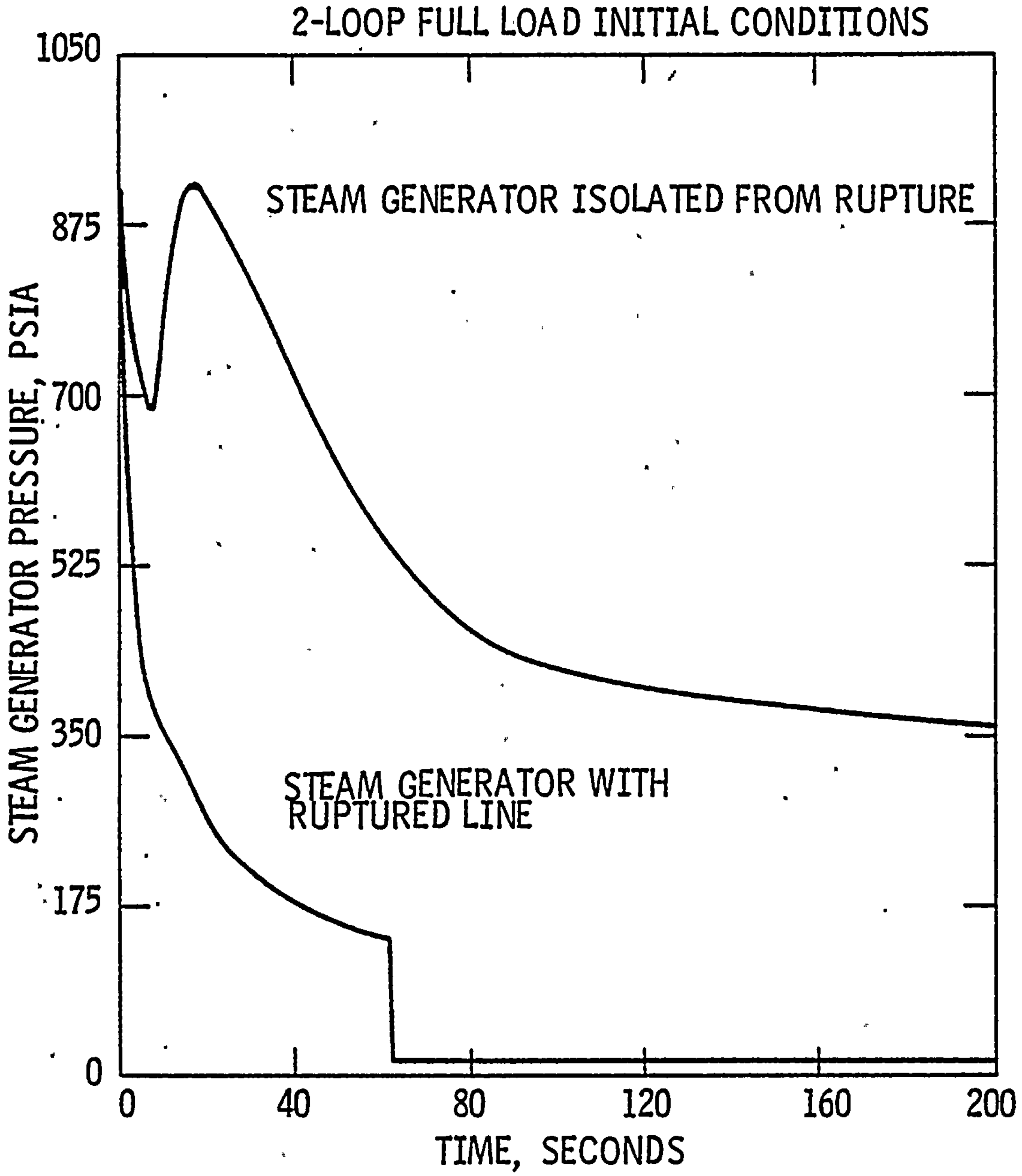


FLORIDA POWER & LIGHT CO. St. Lucie Plant	STEAM LINE RUPTURE EVENT REACTOR COOLANT SYSTEM PRESSURE vs TIME	Figure 7.3.2-5

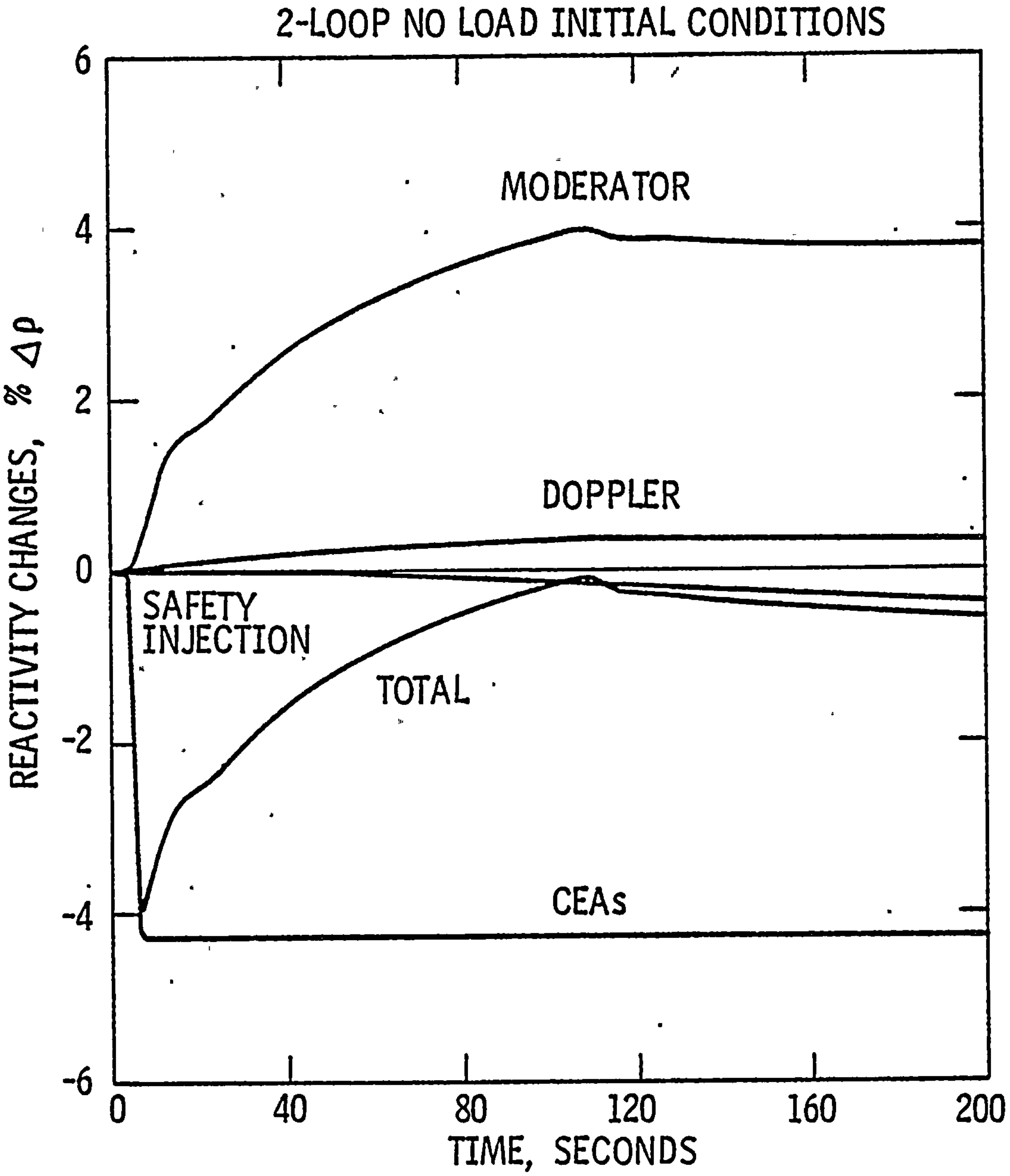
2-LOOP FULL LOAD INITIAL CONDITIONS



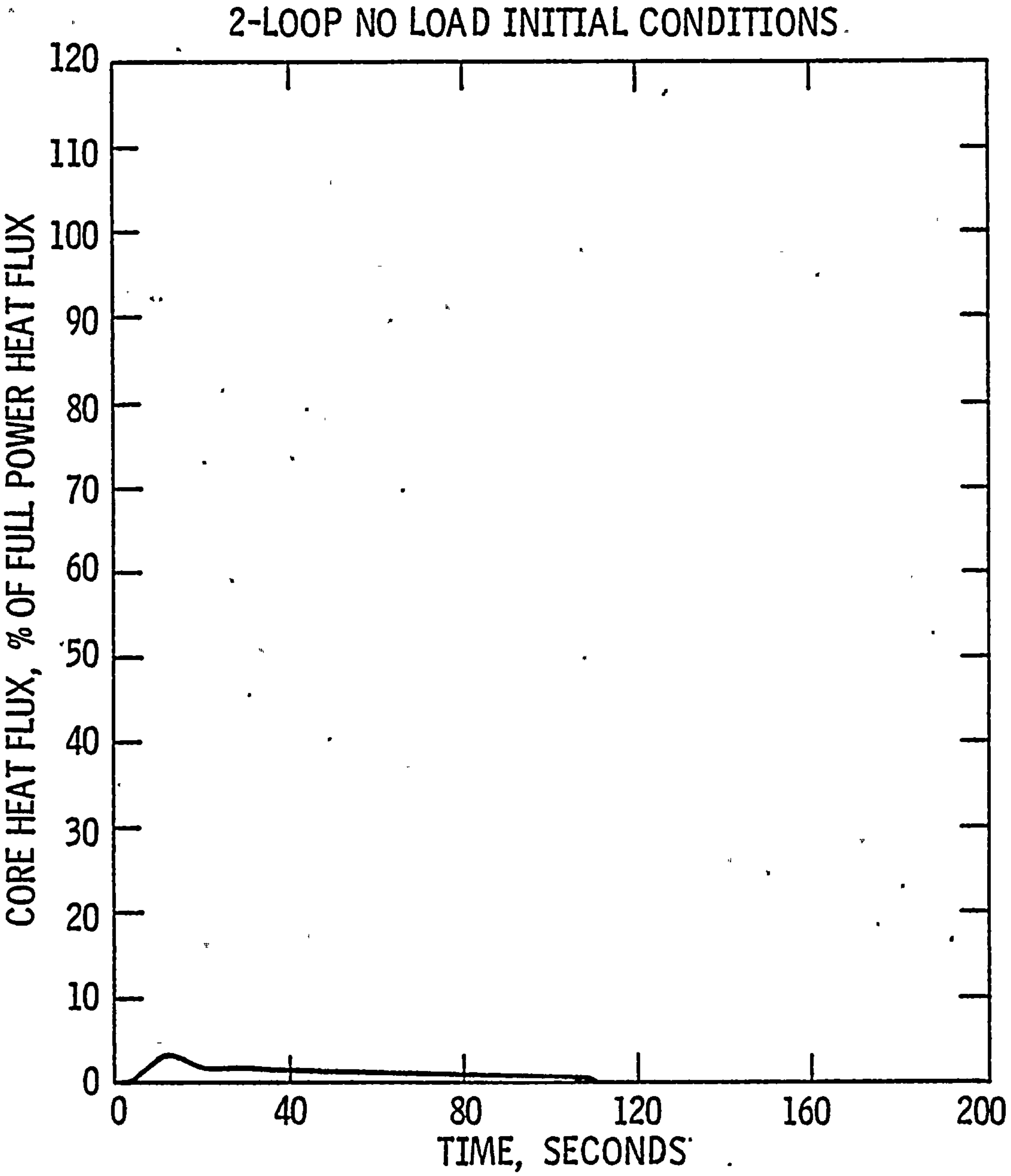
FLORIDA POWER & LIGHT CO. St. Lucie Plant	STEAM LINE RUPTURE EVENT TEMPERATURE vs TIME	Figure 7.3.2-6



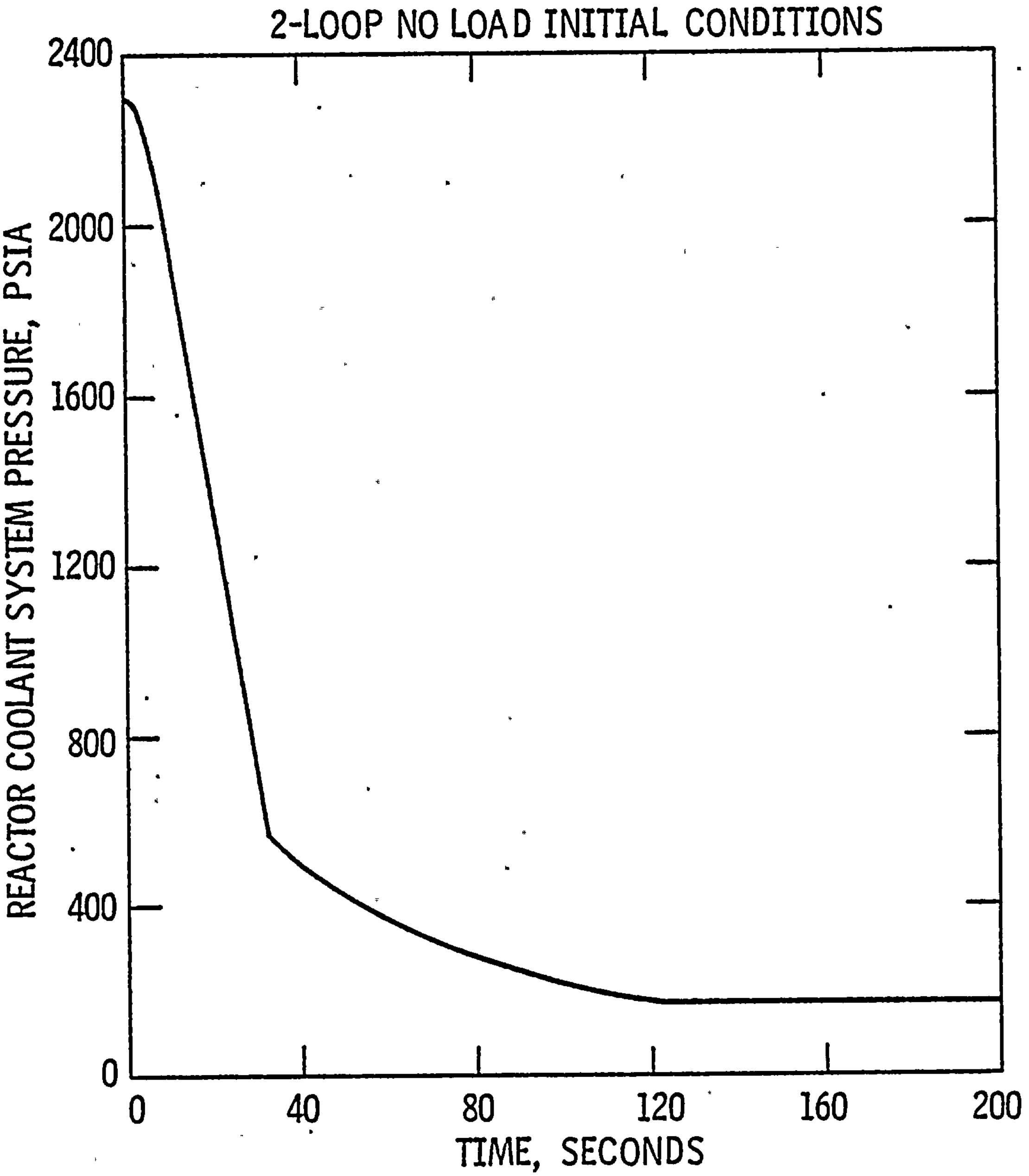
FLORIDA POWER & LIGHT CO. St. Lucie Plant	STEAM LINE RUPTURE EVENT STEAM GENERATOR PRESSURE vs TIME	Figure 7.3.2-7



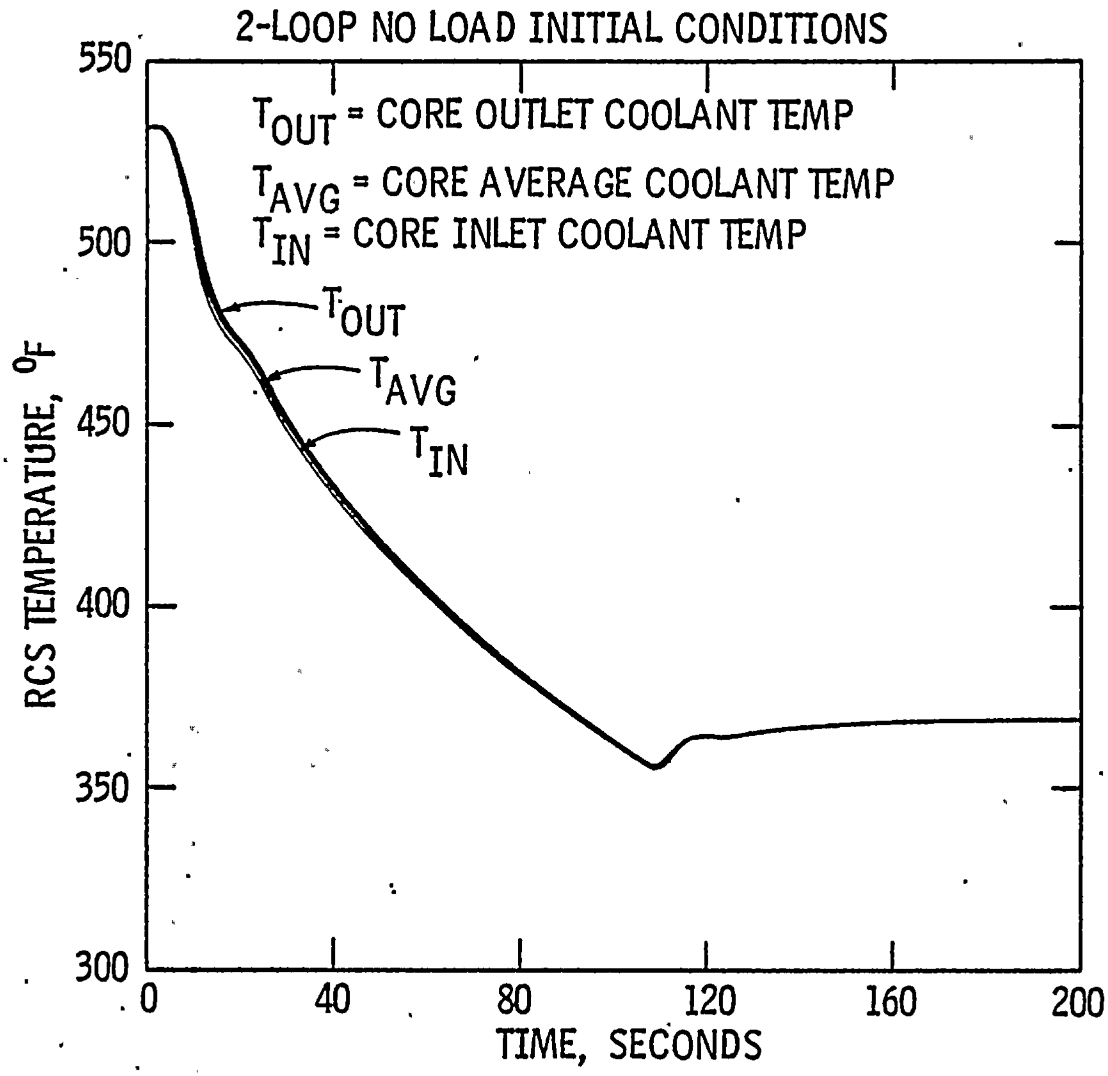
FLORIDA POWER & LIGHT CO. St. Lucie Plant	STEAM LINE RUPTURE EVENT REACTIVITY CHANGES vs TIME	Figure 7.3.2-8



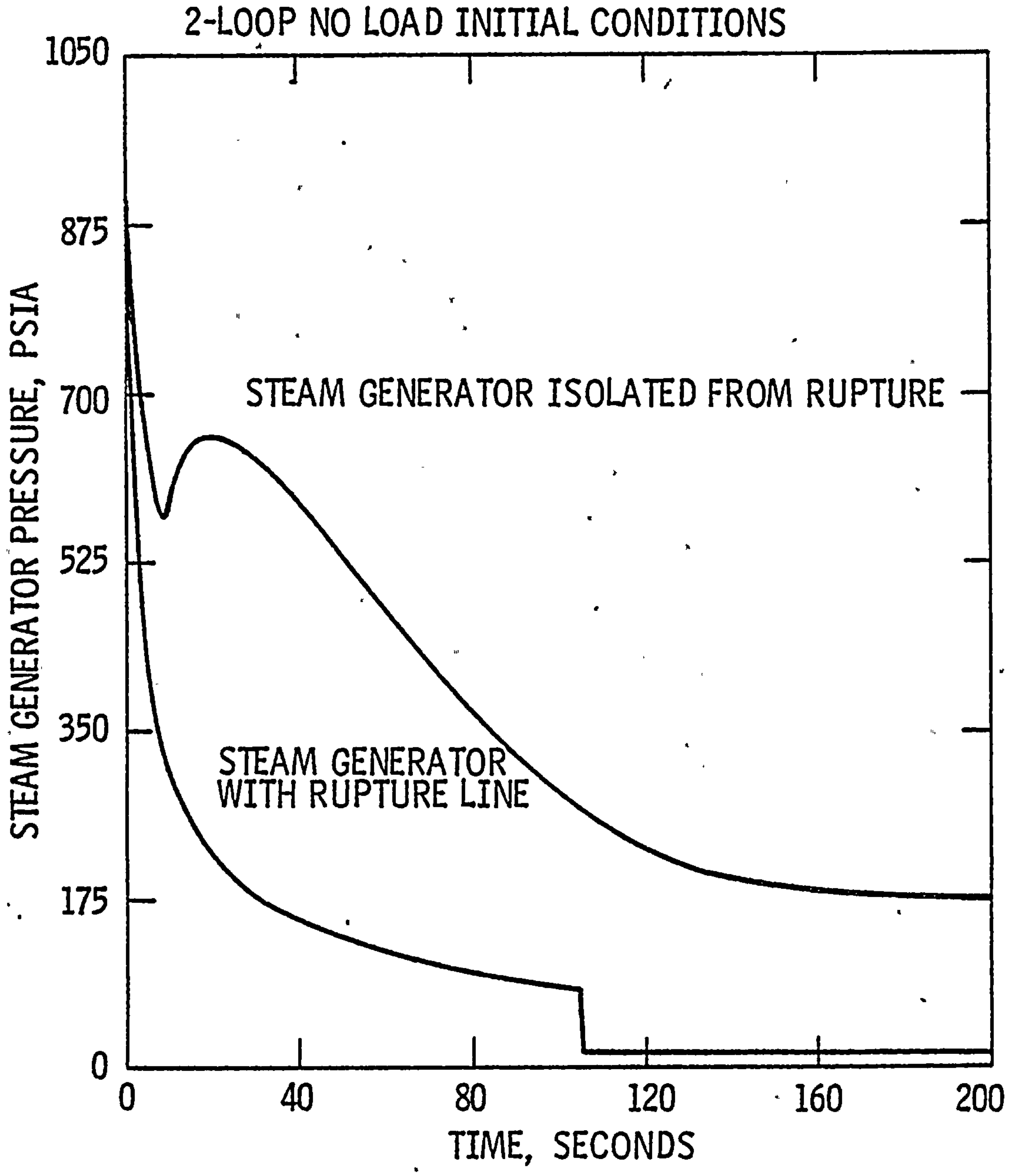
FLORIDA POWER & LIGHT CO. St. Lucie Plant	STEAM LINE RUPTURE EVENT CORE AVERAGE HEAT FLUX vs TIME	Figure 7.3.2-9



FLORIDA POWER & LIGHT CO. St. Lucie Plant	STEAM LINE RUPTURE EVENT REACTOR COOLANT SYSTEM PRESSURE vs TIME	Figure 7.3.2-10



FLORIDA POWER & LIGHT CO. St. Lucie Plant	STEAM LINE RUPTURE EVENT RCS TEMPERATURE vs TIME	Figure 7.3.2-11



FLORIDA POWER & LIGHT CO. St. Lucie Plant	STEAM LINE RUPTURE EVENT STEAM GENERATOR PRESSURE vs TIME	Figure 7.3.2-12

7.3.3 STEAM GENERATOR TUBE RUPTURE EVENT

The Steam Generator Tube Rupture (SGTR) event was reanalyzed for Cycle 4 to verify that the site boundary doses will not exceed the guidelines of 10CFR100. The design basis SGTR is a double ended break of one steam generator U-tube. Table 7.3.3-1 lists the key transient related parameters used in this analysis. In the analysis, it is assumed that the initial RCS pressure is as high as 2300 psia. This initial RCS pressure maximizes the amount of primary coolant transported to the secondary steam system since the amount of leak is directly proportional to the difference between the primary and secondary pressure. In addition, the higher pressure delays the low pressurizer pressure trip. This too maximizes the primary to secondary leakage.

For this event, the acceptable DNBR limit is not exceeded due to the action of the Thermal Margin/Low Pressure (TM/LP) trip which provides a reactor trip to maintain the DNBR above 1.23. Therefore, no fuel failure occurs during the transient and the activity in the reactor coolant is assumed to be initially at the maximum allowable Tech Spec values.

The Thermal Margin/Low Pressure trip, with conservative coefficients which account for the limiting radial and axial peaks, maximum inlet temperature, RCS pressure, core power, and conservative CEA scram characteristics, would be the primary RPS trip intervening during the course of the transient. However, to maximize the coolant transported from the primary to the secondary and thus the radioactive steam releases to the atmosphere, the analysis was performed assuming the reactor does not trip until the minimum setpoint (floor) of the Thermal Margin/Low Pressure trip is reached. This prolongs the steam releases to the atmosphere and thus maximizes the site boundary doses. The methodology to calculate the site boundary doses for Steam Generator Tube Rupture is identical to the procedure used for Loss of All non-Emergency A-C Power (See Section 7.2.3).

The sequence of events for this transient is given in Table 7.3.3-2. Figures 7.3.3-1 through 7.3.3-6 present the transient behavior of core power, core heat flux, the RCS pressure, the RCS coolant temperatures, the steam generator pressure and the ruptured tube leak rate.

The results of the analysis are that 63,200 lbs. of primary coolant are transported to steam generator secondary side. Based on this mass transport and values in Table 7.3.3-3, the site boundary doses calculated are:

Thyroid (DEQ I-131) : 5.3×10^{-3} REM
Whole Body (DEQ XE-133) : 0.06 REM

These results compare with the respective values quoted in the FSAR of 9.8×10^{-5} and 0.0344 REM respectively.

The reactor protective system (TM/LP) is adequate to protect the core from thermal damage in the event of the complete severance of a steam generator U-tube. The doses resulting from the activity released as a consequence of a double-ended rupture of one steam generator tube, assuming the maximum allowable Tech Spec activity for the primary concentration at a core power of 2700 MWt, are significantly below the guidelines of 10CFR100.

TABLE 7.3.3-1

KEY PARAMETERS ASSUMED IN THE STEAM GENERATOR TUBE RUPTURE EVENT

Parameter	Units	Reference Cycle* Value	Cycle 4 Value
Initial Core Power Level	MWt	2611	2754
Core Inlet Temperature	°F	544	551
Initial RCS Pressure	psia	2300	2300
Core Mass Flow Rate	$X10^6$ lbm/hr	117.5	133.8
Initial Steam Generator Pressure	psia	841	810
CEA Worth at Trip	$\%\Delta\rho$	-4.8	-4.7
Moderator Temperature Coefficient	$X10^{-4}\Delta\rho$	-2.5	-2.5
Doppler Multiplier		1.15	1.15

* FSAR

TABLE 7.3.3-2

SEQUENCE OF EVENTS FOR THE STEAM GENERATOR TUBE RUPTURE EVENT

Time (sec)	Event	Setpoint or Value
0.0	Tube Rupture Occurs	- -
552.2	Pressurizer Empties	- -
539.6	Low Pressurizer Pressure Trip Signal Generated	1853 psia
539.6	Dump Valves Open	- -
539.6	Bypass Valves Open	- -
541.0	CEAs Begin to Drop into Core	- -
550.0	Maximum Steam Generator Pressure	903 psia
552.2	Safety Injection Actuation Signal Generated	1578 psia
554.6	Dump Valves Close	- -
592.6	Bypass Valve Closes	- -
1800.0	Operator Initiates Appropriate Action and Begins Cooldown to 325°F	- -
8892.0	RCS Average Temperature	325°F
	Operation Initiates Shutdown Cooling	

TABLE 7.3.3-3

ASSUMPTIONS FOR THE RADIOLOGICAL EVALUATION FOR THE STEAM GENERATOR TUBE RUPTURE

Parameter	Units	Cycle 4 Value
Reactor Coolant System Maximum Allowable Concentration (DEQ I-131)[1]	μCi/gm	1.0
Steam Generator Maximum Allowable Concentration (DEQ I-131)[1]	μCi/gm	.1
Reactor Coolant System Maximum Allowable Concentration of Noble Gases (DEQ Xe-133)	μCi/gm	$100/\bar{E}$
Steam Generator Partition Factor	*	.1
Air Ejector Partition Factor	*	.0005
Atmospheric Dispersion Coefficient[2]	sec/M^3	$8.55X10^{-5}$
Breathing Rate	M^3/sec	$3.47X10^{-4}$
Dose Conversion Factor (I-131)	REM/Ci	$1.48X10^6$

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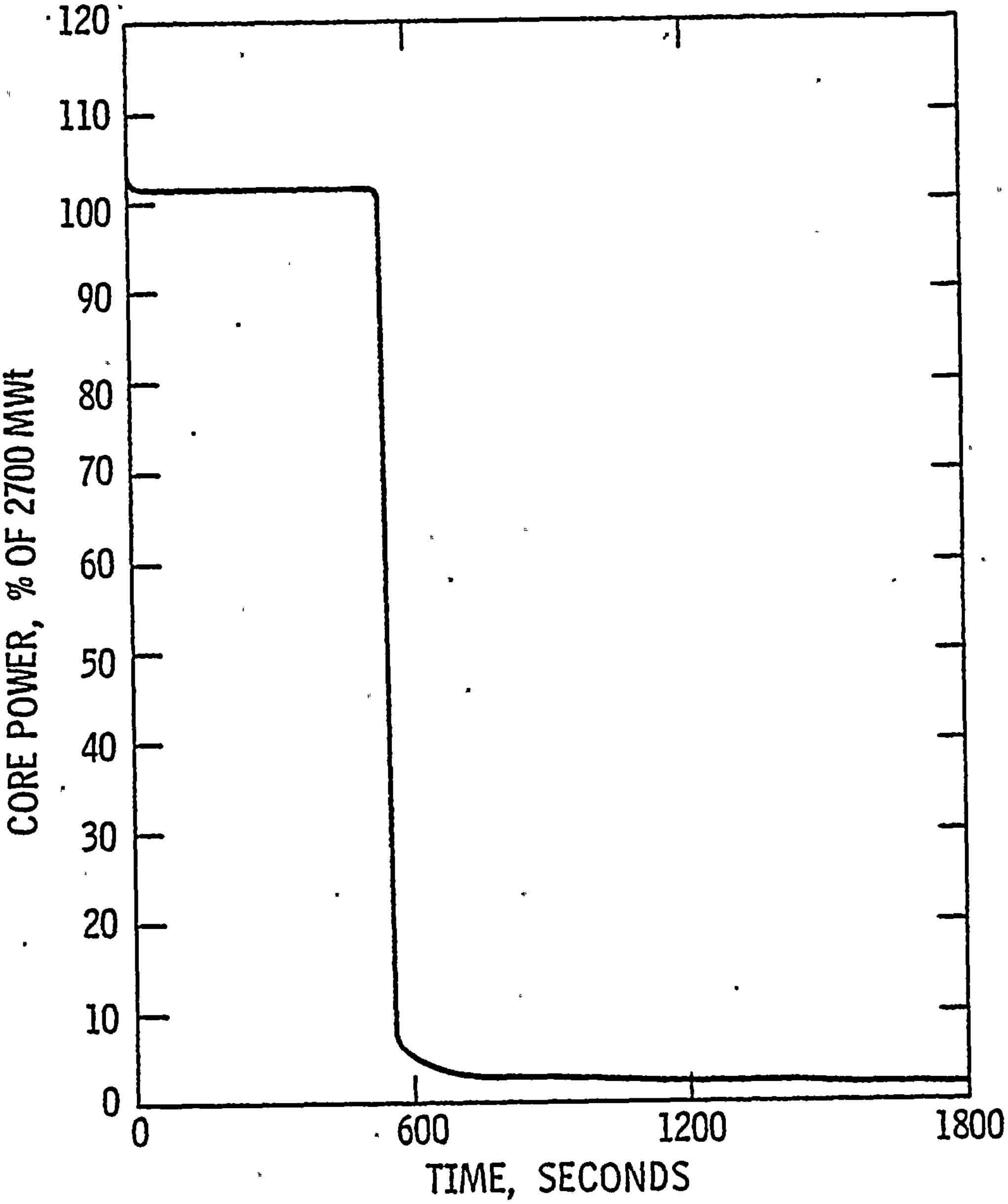
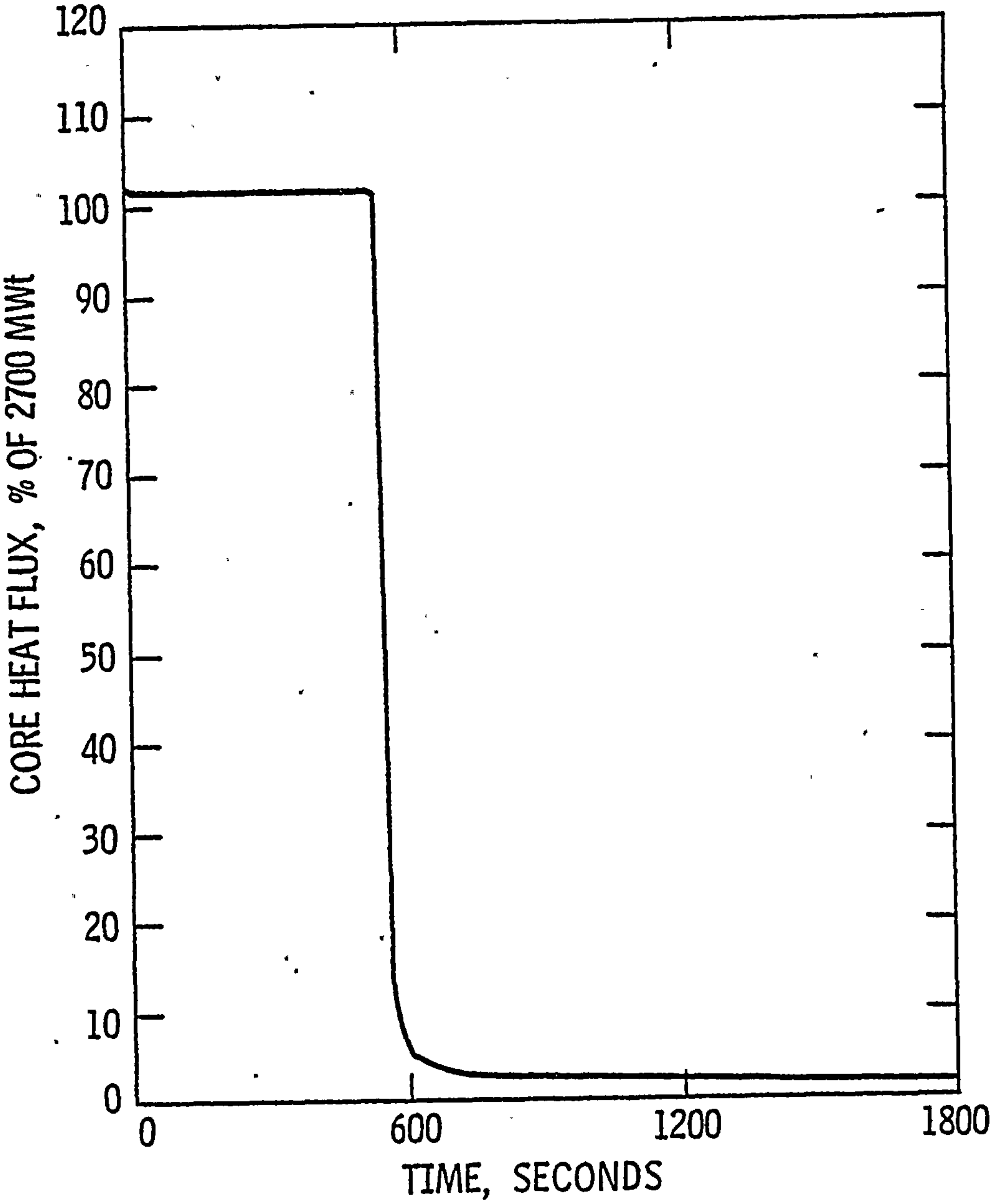
[1] Tech Spec limits

[2] 0 - 2 hour accident condition

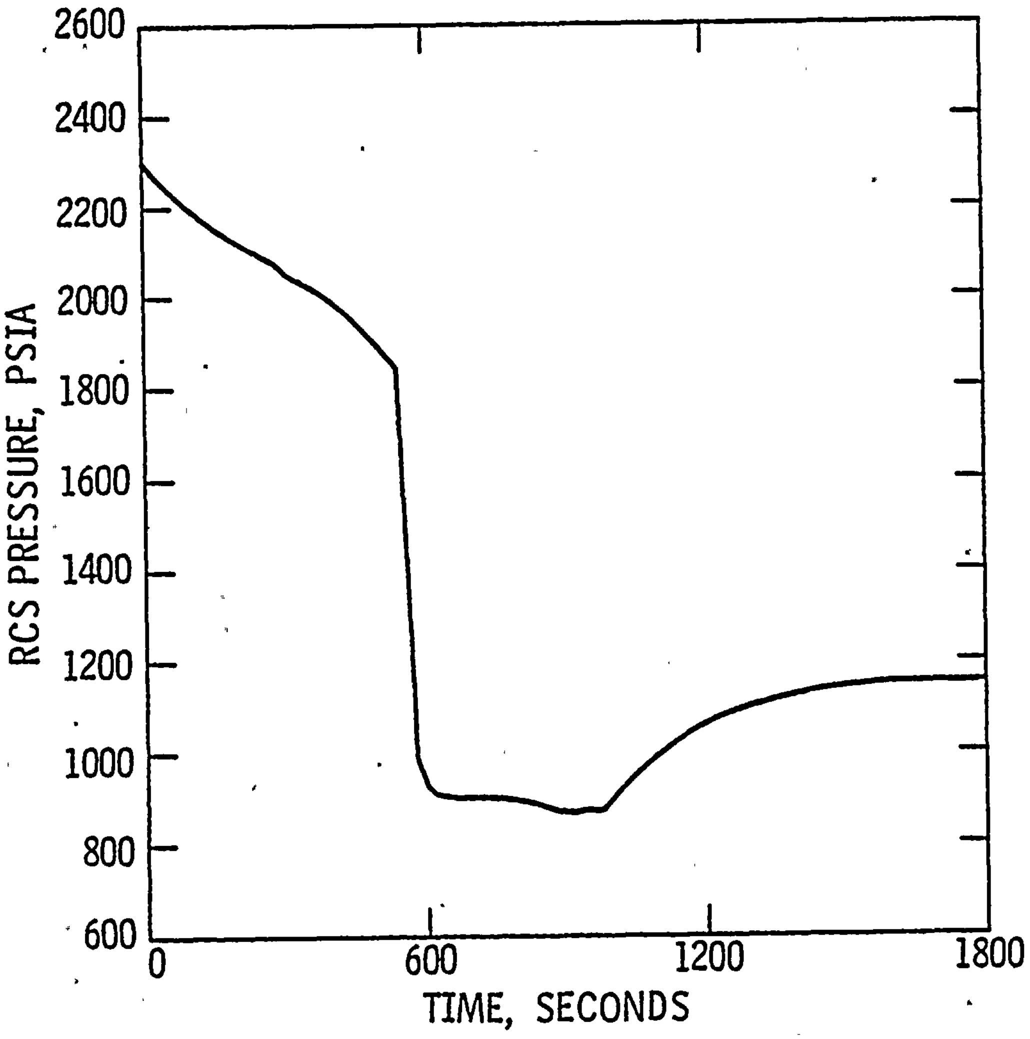
* For the FSAR the combined Partition Factor of the Steam Generator and Air Ejector was $2.0X10^{-6}$.



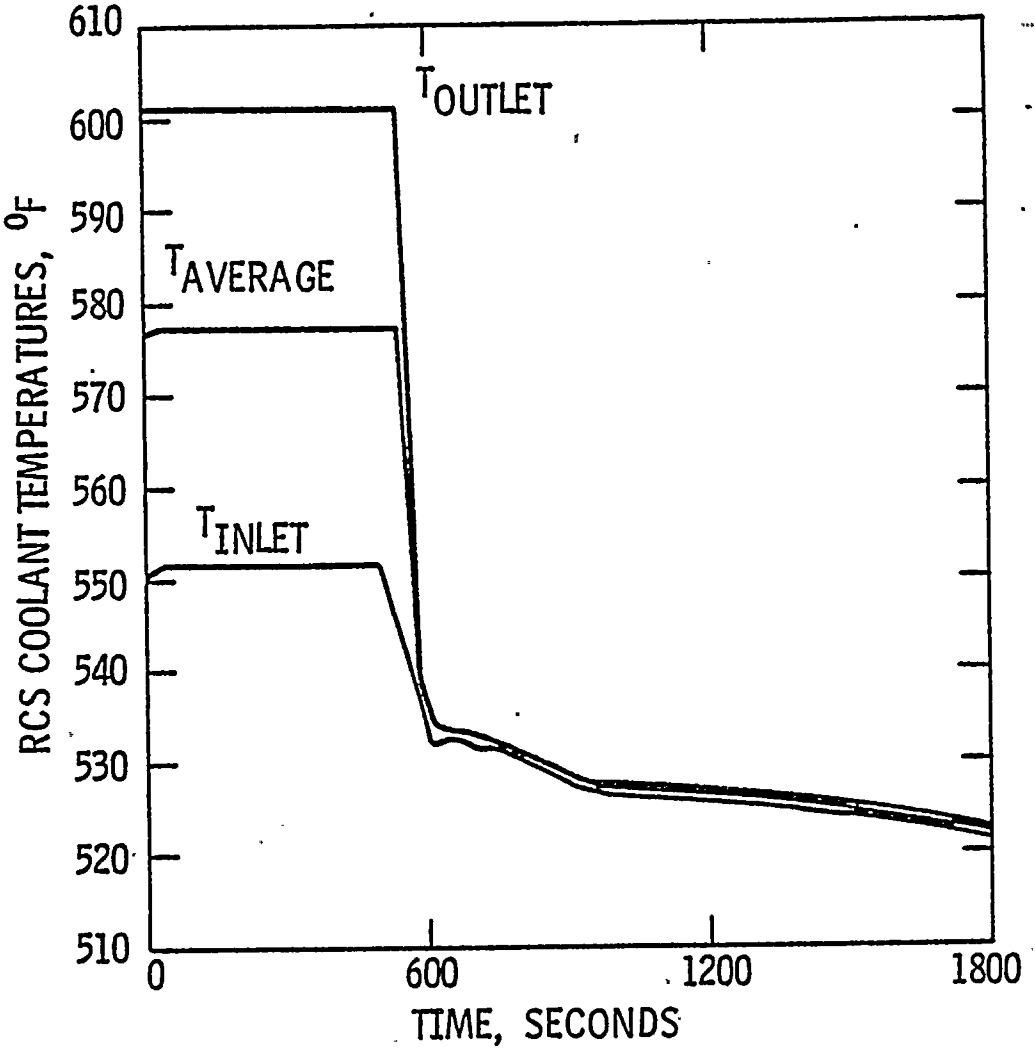
FLORIDA POWER & LIGHT CO. St. Lucie Plant	STEAM GENERATOR TUBE FAILURE EVENT CORE POWER vs TIME	Figure 7.3.3-1



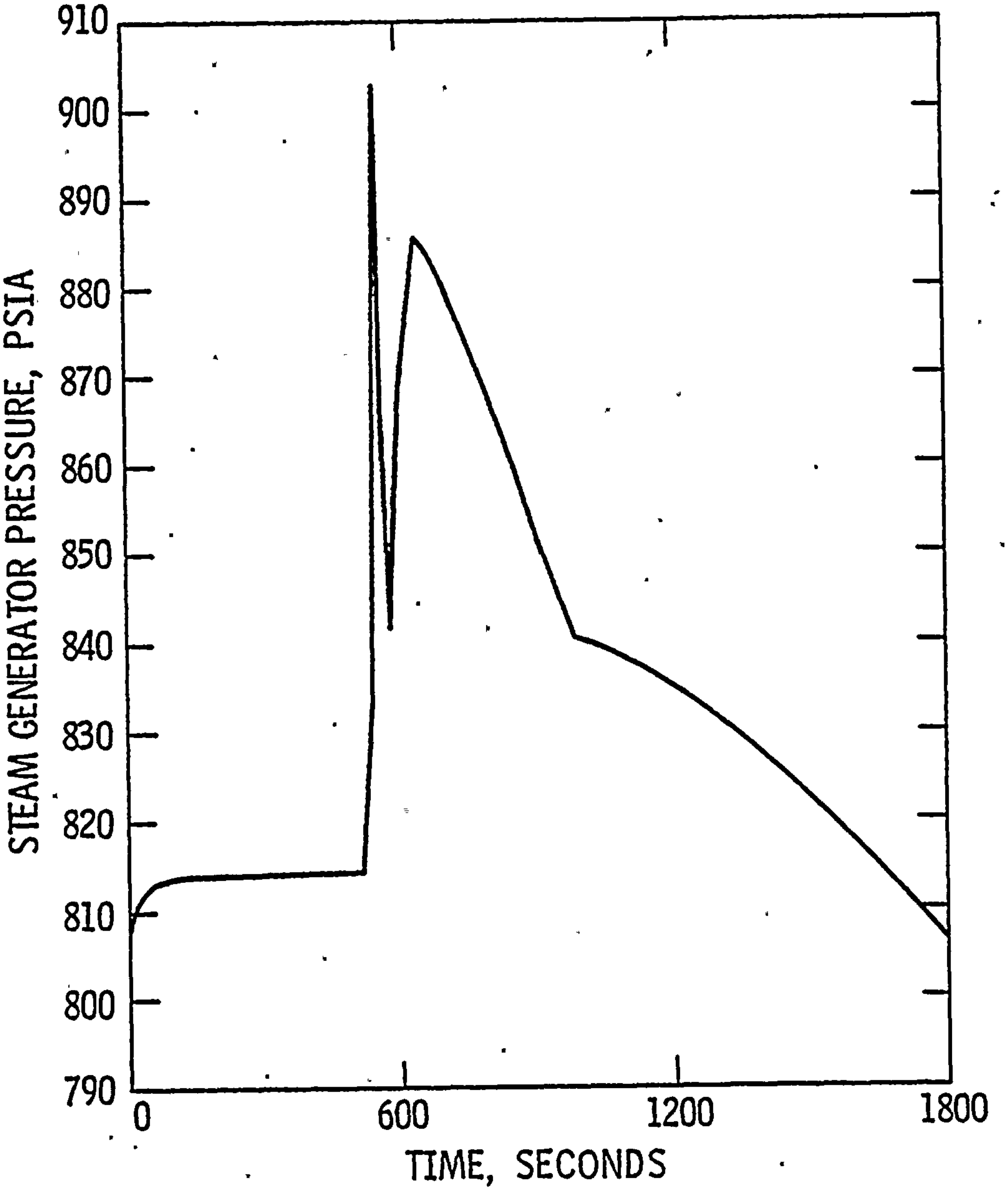
FLORIDA POWER & LIGHT CO. St. Lucie Plant	STEAM GENERATOR TUBE FAILURE EVENT CORE AVERAGE HEAT FLUX vs TIME	Figure 7.3.3-2



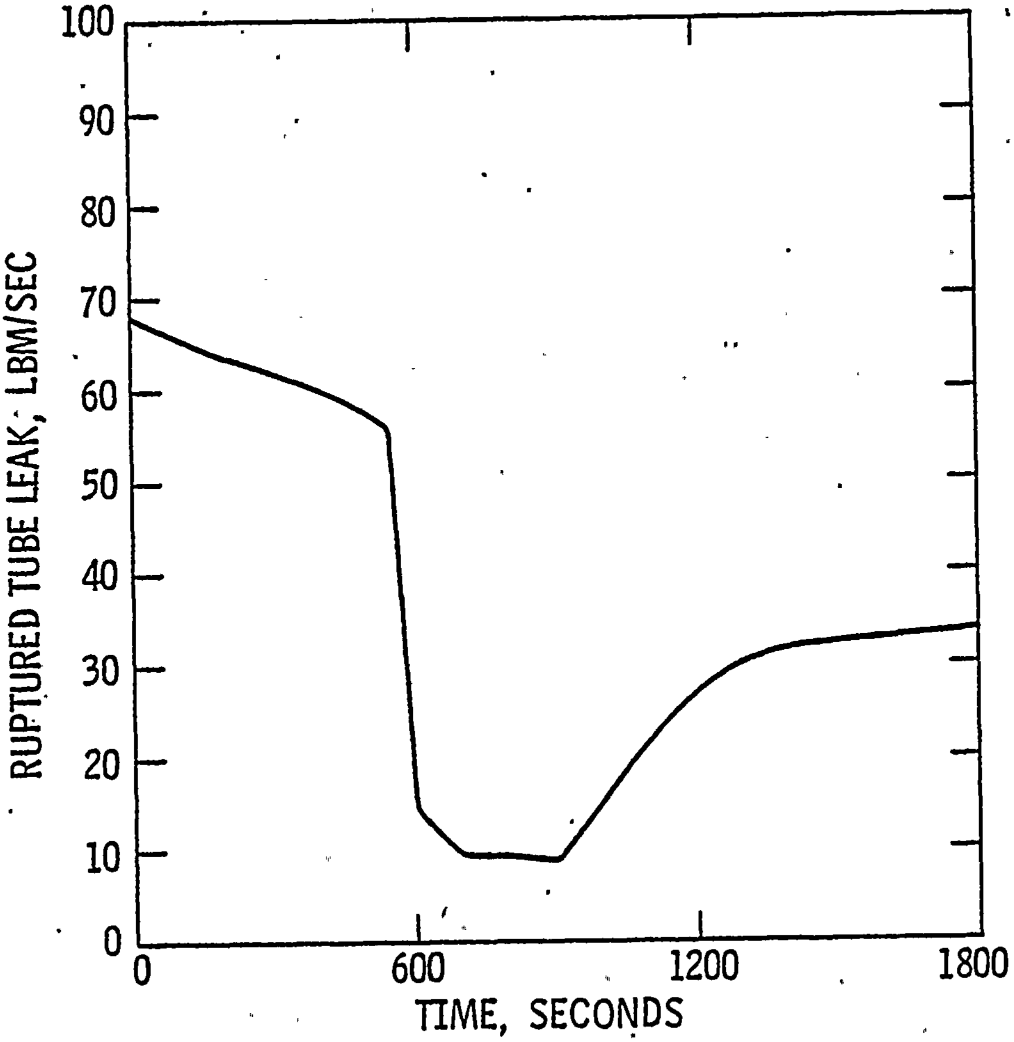
FLORIDA POWER & LIGHT CO. St. Lucie Plant	STEAM GENERATOR TUBE FAILURE EVENT REACTOR COOLANT SYSTEM PRESSURE vs TIME	Figure 7.3.3-3



FLORIDA POWER & LIGHT CO. St. Lucie Plant	STEAM GENERATOR TUBE FAILURE EVENT REACTOR COOLANT SYSTEM TEMPERATURE vs TIME	Figure 7.3.3-4



FLORIDA POWER & LIGHT CO. St. Lucie Plant	STEAM GENERATOR TUBE FAILURE EVENT STEAM GENERATOR PRESSURE vs TIME	Figure 7.3.3-5



FLORIDA POWER & LIGHT CO. St. Lucie Plant	STEAM GENERATOR TUBE FAILURE EVENT RUPTURED TUBE LEAKAGE RATE vs TIME	Figure 7.3.3-6

7.3.4 SEIZED ROTOR EVENT

The Seized Rotor event was reanalyzed for Cycle 4 to demonstrate that the RCS upset pressure limit of 2750 psia will not be exceeded and only a small fraction of fuel pins are predicted to fail during this event.

The single reactor coolant pump shaft seizure is postulated to occur as a consequence of a mechanical failure. The single reactor coolant pump shaft seizure results in a rapid reduction in the reactor coolant flow to the three-pump value. A reactor trip for the seized rotor event is initiated by a low coolant flow rate as determined by a reduction in the sum of the steam generator hot or cold leg pressure drops. This signal is compared with a setpoint which is a function of the initial number of operating reactor coolant pumps. For this event a trip will be initiated when, or before, the flow rate drops to 93 percent of initial flow.

The initial conditions for the Seized Rotor event are listed in Table 7.3.4-1. These conditions are consistent with the initial conditions assumed for the LOF event (see Section 7.2.2). Other assumptions on key parameters are also listed in this table.

The analysis was performed in the following steps:

A. Upon initiation of this transient, core flow rate is assumed to drop immediately to the asymptotic three pump core flow value of 77.2% of four pump flow. For conservatism in the analysis, it is assumed that the flow at the core inlet is instantaneously reduced to the three pump core flow value.

B. The resultant flow is used as input to CESEC, a digital computer code described in Reference 4 which simulates the NSSS to demonstrate that the reactor coolant system (RCS) pressure will remain below the upset limit of 2750 psia (110% of design).

C. The RCS flow coastdown, the limiting axial power distribution for the most negative axial shape index allowed within the full power shape index LCO, and a consistent scram reactivity curve is input to STRIKIN II (see description in Reference 6) to determine the hot channel and core average heat fluxes versus time during the transient. [See Reference 14 for the procedures used to determine the assumed axial power distribution].

D. TORC/CE-1 was used for calculation of the minimum DNBR for the transient. The seized rotor transient is initiated at the Limiting Conditions for Operation to determine the minimum DNBR.

E. In determining the predicted number of fuel pin failures, the TORC code is used to calculate the DNBR versus radial peaking factor. An integral fuel damage calculation is then carried out by combining the results from TORC with the number of fuel rods having a given radial peaking factor. The number of fuel rods versus radial peaking factor is taken from a cumulative distribution of the fraction of fuel rods with nuclear radial peaking factors in a given range. This yields a distribution of the fraction of pins with a particular DNBR as a function of DNBR. This information is then convoluted with a probability of burnout vs. DNBR to obtain the amount of fuel failure. This method is discussed in detail in CENPD-183, "C-E Methods for Loss of Flow Analysis" (Reference 12). It is totally consistent with the method described in that topical report and with methods previously used and approved for St. Lucie Unit 1, Cycle 3 (Reference 1).

The methods used to analyze the Seized Rotor event are consistent with the methods previously used and approved for Calvert Cliffs (Reference 15) and Millstone Point 2, Cycle 3 (Reference 16).

In Table 7.3.4-2, the NSSS and RPS responses are shown for the seized rotor event initiated from an axial shape index value of -.11. The pressurizer pressure reached a maximum value of 2306 psia at 3.75 seconds. Figures 7.3.4-1 through 7.3.4-5 show core power, core average heat flux, RCS pressure, and coolant temperatures during the transient.

A conservatively "flat" pin census distribution (a histogram of the number of pins with radial peaks in intervals of 0.01 in radial peak normalized to the maximum peak) is used to determine the number of pins that experience DNB. The results show that the number of fuel pins predicted to fail is equal to 1.06% in comparison to .99% for Cycle 3. This is a slight increase over Cycle 3, and remains a small fraction of the total number of fuel pins.

For the case of the loss of coolant flow resulting from a seizure of a reactor coolant pump shaft, a trip on low coolant flow is initiated to limit the predicted fuel failure to only a small fraction of the total number of pins. Based on the low probability of this event, the small number of predicted fuel pin failures will be acceptable. In addition, the maximum RCS pressure experienced during the event will be well under the upset pressure limit of 2750 psia.

TABLE 7.3.4-1

KEY PARAMETERS ASSUMED IN SEIZED ROTOR ANALYSIS

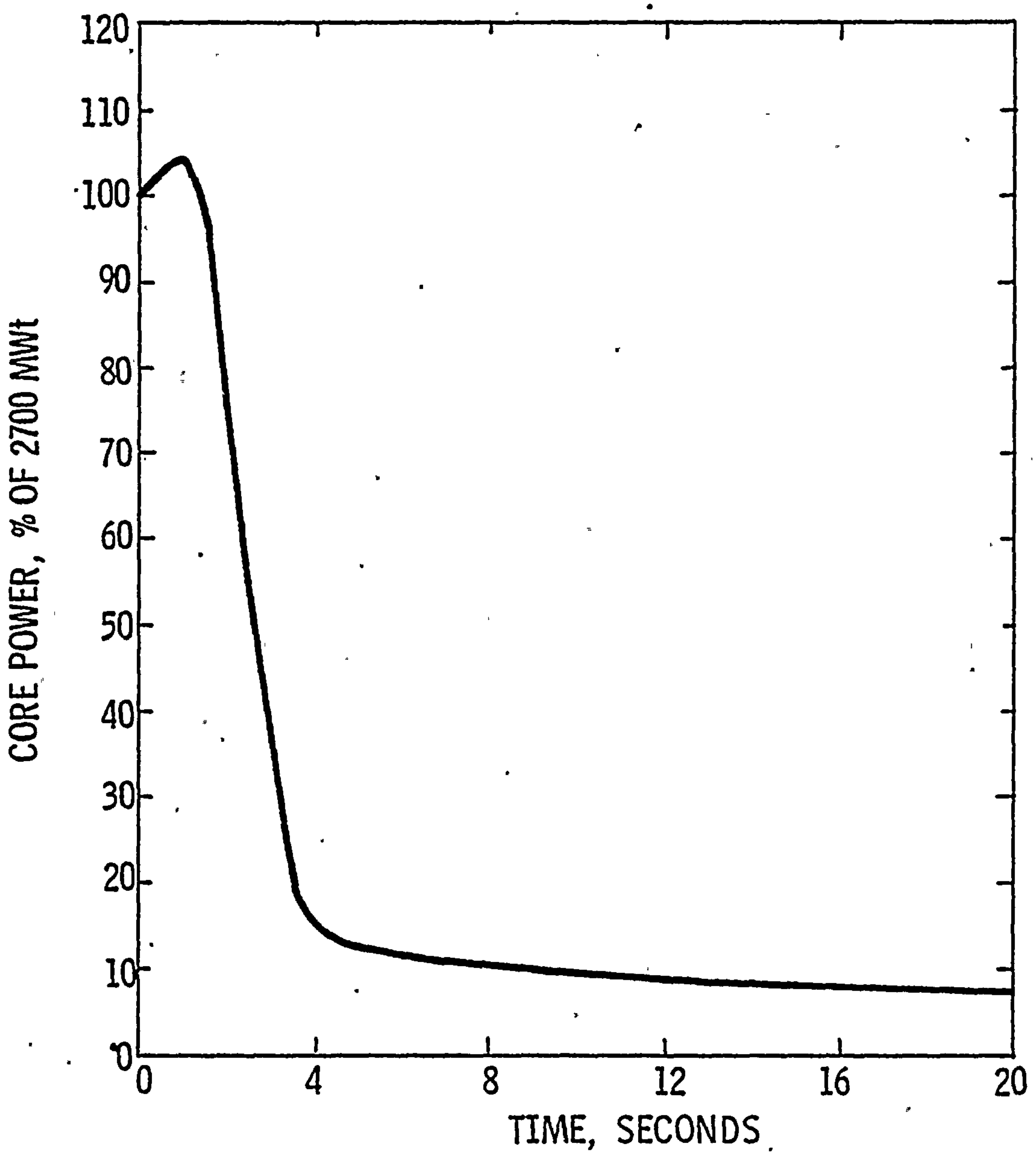
Parameter	Units	Cycle 3	Cycle 4
Initial Core Power Level	MWt	2754	2700*
Core Inlet Coolant Temperature	°F	544	549*
4 Pump Core Mass Flow Rate	10^6 lbm/hr	134.9	138.3*
3 Pump Core Mass Flow Rate	10^6 lbm/hr	104.1	106.8*
Reactor Coolant System Pressure	psia	2200	2225*
Moderator Temperature Coefficient	$\times 10^{-4} \Delta\rho/°F$	+.5	+.5
Doppler Coefficient Multiplier	- -	.85	.85
CEA Worth on Trip	$\%\Delta\rho$	-5.4	-5.6
Integrated Radial Peaking Factor with Tilt; F_r^T		1.64	1.70*
Axial Shape Index		-.23	-.11*

* Uncertainties on these parameters were combined using the methods discussed in Section 7.2 and are consistent with LOF.

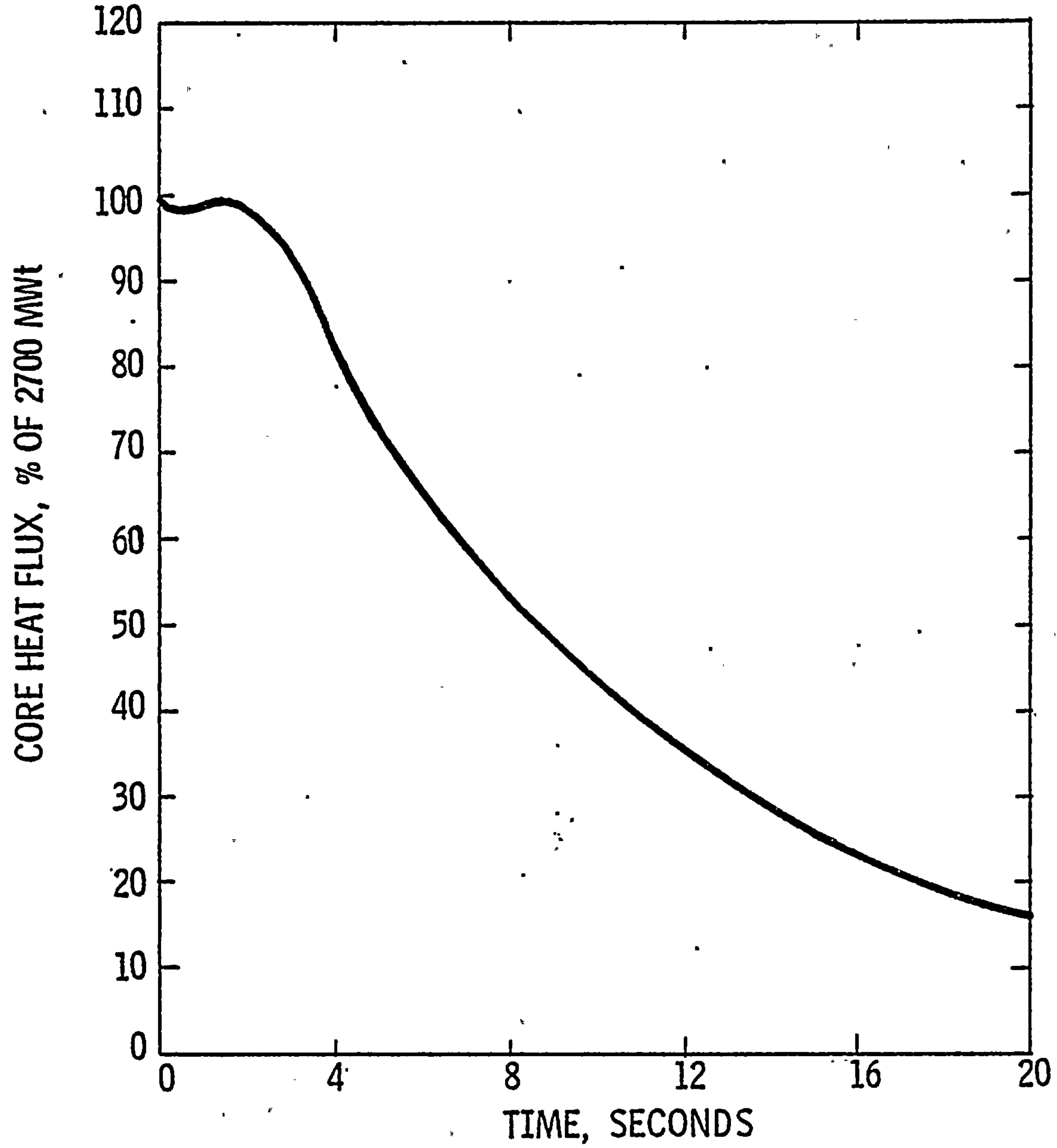
TABLE 7.3.4-2

SEQUENCE OF EVENTS FOR SEIZED ROTOR

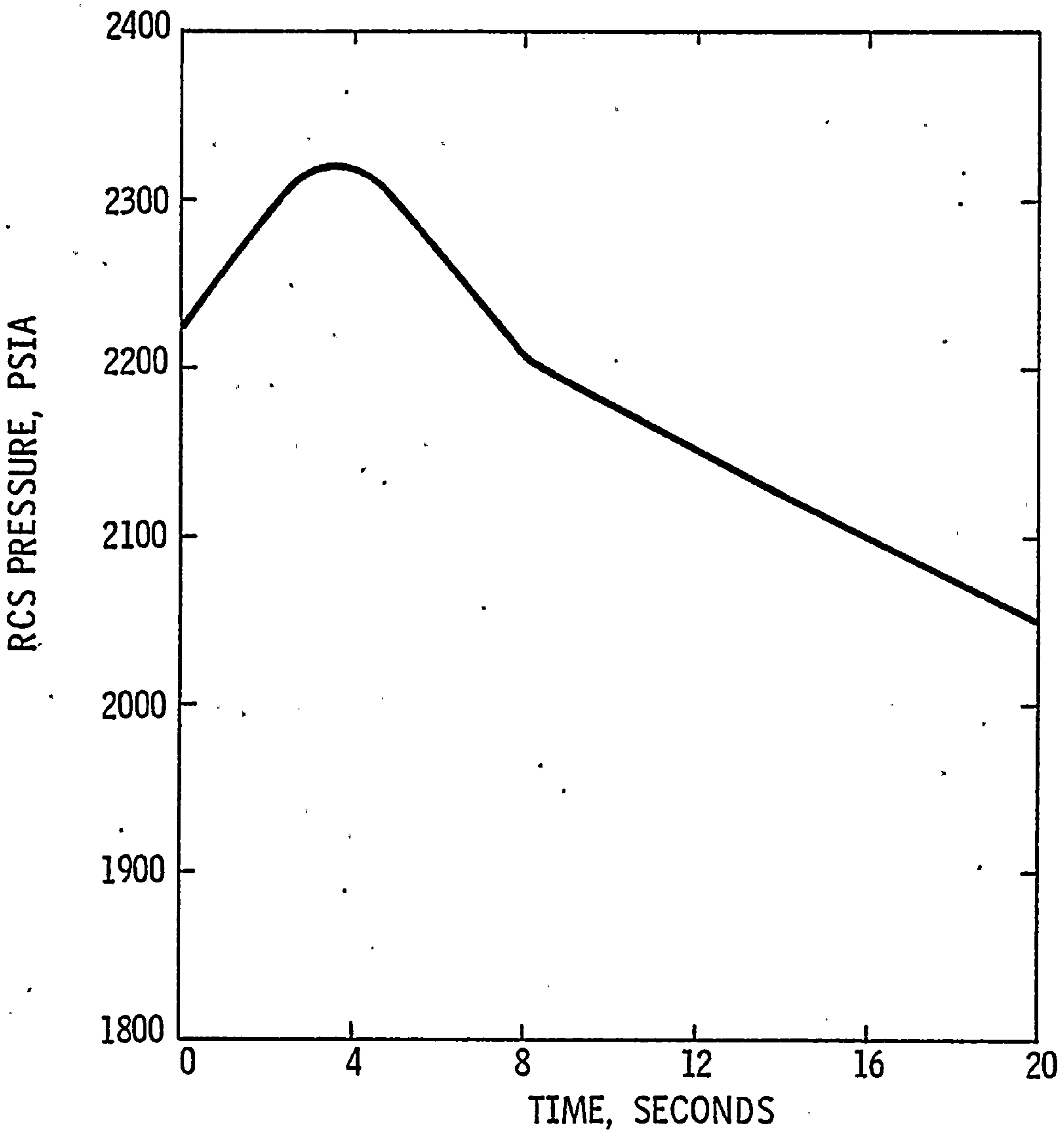
Time (Sec)	Event	Setpoint or Value
0.0	Seizure of One Reactor Coolant Pump	- -
0.0	Low Coolant Flow Signal Generated	93% of Initial 4-pump Flow
0.65	Trip Breakers Open	- -
1.15	CEAs Begin Dropping into Core	- -
3.75	Maximum RCS Pressure, psia	2306



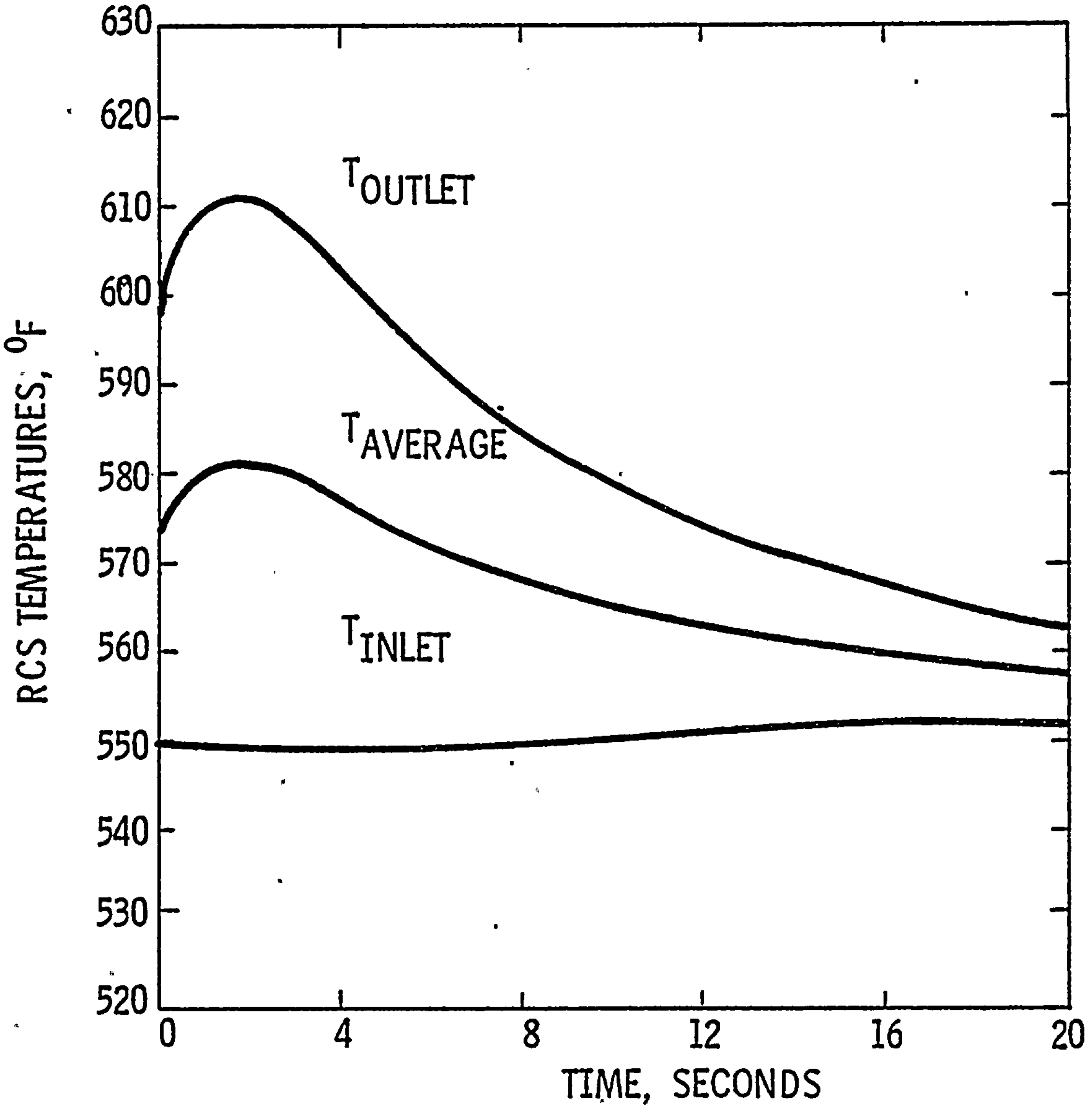
FLORIDA POWER & LIGHT CO. St. Lucie Plant Unit 1	SEIZED ROTOR EVENT CORE POWER vs TIME	Figure 7.3.4-1



FLORIDA POWER & LIGHT CO. St. Lucie Plant Unit 1	SEIZED ROTOR EVENT CORE AVERAGE HEAT FLUX vs TIME	Figure 7.3.4-2



FLORIDA POWER & LIGHT CO. St. Lucie Plant Unit 1	SEIZED ROTOR EVENT REACTOR SYSTEM PRESSURE vs TIME	Figure 7.3.4-3



FLORIDA POWER & LIGHT CO. St. Lucie Plant Unit 1	SEIZED ROTOR EVENT REACTOR COOLANT SYSTEM TEMPERATURES vs TIME	Figure 7.3.4-4

REFERENCES

1. Letter, Robert E. Uhrig, (FP&L) to Victor Stello (NRC), dated February 22, 1979, "St. Lucie Unit 1 Docket No. 50-335 Proposal Amendment to Facility Operating License DPR-67".
2. CENPD-199-P, "C-E Setpoint Methodology," April, 1976.
3. CENPD-98, "COAST Code Description," April, 1973.
4. CENPD-107, "CESEC- Digital Simulation of a C-E Nuclear Steam Supply System," April, 1974.
5. CENPD-161-P, "TORC Code - A Computer Code for Determining the Thermal Margin of a Reactor Core," July, 1975.
6. CENPD-135-P, "STRIKIN II, A Cylindrical Geometry Fuel Rod Heat Transfer Program," August 1974.
7. Letter, Robert E. Uhrig, (FP&L) to Victor Stello (NRC), dated March 22, 1978, "St. Lucie Unit 1 Docket No. 50-335 Proposal Amendment to Facility Operating License DPR-67".
8. CENPD-190A, "CEA Ejection, C-E Method for Control Element Assembly Ejection," July, 1976.
9. GEMP-482, H. C. Brassfield, et. al., "Recommended Property and Reactor Kinetics Data for Use in Evaluating a Light Water-Cooled Reactor Loss-of-Coolant Incident Involving Zircaloy-4 or 304-SS, Clad UO_2," April, 1968.
10. Idaho Nuclear Corporation, Monthly Report, Ny-123-69, October, 1969.
11. Idaho Nuclear Corporation, Monthly Report, Hai-127-70, March, 1970.
12. CENPD-183, "C-E Methods for Loss of Flow Analysis," July, 1975.
13. CEN-126 (F)-P, "CEAW, Method of Analyzing Sequential Control Element Assembly Group Withdrawal Events for Analog Protection Systems," November, 1979.
14. Statistical Combination of Uncertainties Methodology, CEN-123 (F)-P, February 1980.
15. Letter, A. E. Lundvall (BG&E), to R. Reid (NRC); dated February 23, 1979, "Calvert Cliffs Unit 1 License Amendment," Docket No. 50-317, DPR-53.
16. Letter, W. G. Counsil (NNECO) to R. Reid (NRC), dated February 12, 1979, "Millstone Point-2 License Amendment, Power Uprating," Docket No. 50-336, DPR-65.

St. Lucie Unit 1 Cycle 4
Large Break LOCA ECCS Performance Results

1.0 INTRODUCTION AND SUMMARY

A large break loss-of-coolant accident ECCS performance evaluation for St. Lucie 1, Cycle 4, presented herein demonstrates conformance with the Acceptance Criteria for Light-Water-Cooled Reactors as presented in 10CFR50.46(1). Conformance is summarized in Section 4.0. The evaluation demonstrates acceptable ECCS performance for St. Lucie 1 during Cycle 4 at a reactor power level of 2754 Mwt and a peak linear heat generation rate (PLHGR) of 15.0 kw/ft. The method of analysis and results are presented in the following sections.

2.0 METHOD OF ANALYSIS

The calculations performed for this evaluation used the NRC approved C-E Large Break Evaluation Model which is described in References 2 through 8. Blowdown, refill/reflood, and temperature calculations were performed to incorporate the Cycle 4 fuel characteristics and reactor power level of 2754 Mwt into the ECCS performance evaluation. The blowdown hydraulic calculations were performed with the CEFLASH-4A(4) code while the refill/reflood hydraulic calculations were performed with the COMPERC-II(5) code. The hot rod clad temperature and clad oxidation calculations were performed with the STRIKIN-II(6) and PARCH(8) codes. Core wide clad oxidation calculations were also performed in this analysis.

The ECCS analysis assumptions are the same as those stated in Reference 9. The core and system parameters which differ from the previous analysis(9) are shown in Table A1 which is consistent with the PLHGR of 15.0 kw/ft. The containment parameters pertinent to this analysis are listed in Table A2.

All possible break locations are considered in a LOCA analysis. It was demonstrated in Reference 2 that ruptures in the cold leg pump discharge location produce the highest clad temperatures. This is due to the minimization of core flow for this break location. Since core flow is a function of the break size, the St. Lucie Unit 1 Cycle 4 large break calculations have been performed for the cold leg pump discharge breaks for both guillotine and slot breaks over a range of break sizes from 5.89 ft^2 to twice the flow area of the cold leg.

3.0 RESULTS

Included in the Cycle 4 core are 88 fresh Batch F fuel assemblies, along with previously irradiated assemblies: 68 Batch E assemblies, 60 Batch D assemblies and one Batch C assembly. Burnup dependent calculations for the various fuel types were performed with the FATES(7) and STRIKIN-II(6) codes. The results demonstrated that the most limiting fuel rod during Cycle 4 operation is a rod in one of the partially depleted Batch E assemblies retained from Cycle 3.

For the limiting Batch E assembly rod, clad rupture was predicted to occur during the reflood period. As a consequence, this analysis was performed at the time of minimum fuel-clad gap conductance, when the fuel stored energy is at a maximum. The fuel pin pressure was not high enough to cause rupture during blowdown for any break size. Therefore, all break sizes were analyzed at the time of maximum fuel stored energy.

The break spectrum analysis described in Section 2.0 was performed for the limiting Batch E assembly rod. It was determined from this analysis that the allowable peak linear heat generation rate (PLHGR) for the E assembly rod is 15.0 kw/ft with the limiting break size identified as the 1.0 DEG/PD* break.

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*DEG/PD = Double-Ended Guillotine at Pump Discharge

The 1.0 DEG/PD break produced the highest peak clad temperature (2176°F) and the highest local clad oxidation percentage (<16.0%). The 1.0 DEG/PD also resulted in the highest core wide clad oxidation which was less than 0.74%. The PLHGR of 15.0 kw/ft is therefore demonstrated to be an acceptable limit for Cycle 4 operation.

The times of interest for each of the breaks are presented in Table A3. The clad rupture times are included in Table A4, which contains a summary of the peak clad temperatures and oxidation percentages for the break spectrum. Table A5 contains a list of the pertinent variables plotted for each break in this analysis. Table A6 contains a list of additional parameters plotted for the limiting break (1.0 DEG/PD break). Mass and energy release to the containment during blowdown is presented in Table A7 for the worst break. Also presented in this table is the steam expulsion data during reflood. Figure A7 shows the peak clad temperature plotted versus break size and type, demonstrating that the worst break is the 1.0 DEG/PD rupture. The ECC water spillage and containment spray flow rates are presented graphically in Figure A8.

4.0 CONCLUSION

The results of the ECCS performance evaluation for St. Lucie 1, Cycle 4 demonstrated a peak clad temperature of 2176°F, a peak local clad oxidation percentage of less than 16.0% and a peak core wide clad oxidation percentage of less than 0.74%. The acceptance criteria are, respectively, 2200°F, 17.0% and 1.0%. Based on these ECCS performance results, it is concluded that operation of St. Lucie 1 at a reactor power level of 2754 Mwt and a PLHGR of 15.0 kw/ft is acceptable for Cycle 4.

5.0 COMPUTER CODE VERSION IDENTIFICATION

The following NRC approved code versions were used in this analysis:

CEFLASH-4A	Version 76041
COMPERC-II	Version 75097
STRIKIN-II	Version 77036
PARCH	Version 77004

6.0 References

1. Acceptance Criteria for Emergency Core Cooling Systems for Light-Water Cooled Nuclear Power Reactors, Federal Register, Vol. 39, No. 3 - Friday, January 4, 1974.

2. CENPD-132, "Calculative Methods for the CE Large Break LOCA Evaluation Model", August 1974 (Proprietary).

   CENPD-132, Supplement 1, "Updated Calculative Methods for the CE Large Break LOCA Evaluation Model", December 1974 (Proprietary).

3. CENPD-132, Supplement 2, "Calculational Methods for the CE Large Break LOCA Evaluation Model", July 1975 (Proprietary).

4. CENPD-133, "CEFLASH-4A, A FORTRAN IV Digital Computer Program for Reactor Blowdown Analysis", April 1974 (Proprietary).

   CENPD-133, Supplement 2, "CEFLASH-4A, A FORTRAN IV Digital Computer Program for Reactor Blowdown Analysis (Modification)", December 1974 (Proprietary).

5. CENPD-134, "COMPERC-II, A Program for Emergency Refill-Reflood of the Core", April 1974 (Proprietary).

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6. CENPD-135, "STRIKIN, A Cylindrical Geometry Fuel Rod Heat Transfer Program, April 1974 (Proprietary)."

   CENPD-135, Supplement 2, "STRIKIN-II, A Cylindrical Geometry Fuel Rod Heat Transfer Program (Modification)", February 1975.

CENPD-135, Supplement 4, "STRIKIN-II, A Cylindrical Geometry Fuel Rod Heat Transfer Program", August 1976 (Proprietary).

CENPD-135, Supplement 5-P, "STRIKIN-II, A Cylindrical Geometry Fuel Rod Heat Transfer Program", April, 1977 (Proprietary).

7. CENPD-139, "CE Fuel Evaluation Model", July 1974 (Proprietary).

8. CENPD-138, and Supplement 1 "PARCH, A FORTRAN IV Digital Program to Evaluate Pool Boiling, Axial Rod and Coolant Heatup", February, 1975.

CENPD-138, Supplement 2, "PARCH, A FORTRAN IV Digital Program to Evaluate Pool Boiling, Axial Rod and Coolant Heatup", January, 1977.

9. St. Lucie Nuclear Power Plant Unit 1, Final Safety Analysis Report in Support of Docket No. 50-335, License No. DPR-67.

TABLE A1

St. Lucie Unit 1 Cycle 4 Core Parameters

Quantity	Value	
Core Power Level (102% of Nominal)	2754	Mwt
Average Linear Heat Rate (102% of Nominal)	6.427	kw/ft
Peak Linear Heat Generation Rate (PLHGR)	15.0	kw/ft
Core Inlet Temperature	551	°F
Core Outlet Temperature	602	°F
System Flow Rate (total)	138.9×10^6	lbm/hr
Core Flow Rate	133.8×10^6	lbm/hr
Gap Conductance at PLHGR	1602	BTU/hr-ft^2-°F
Fuel Centerline Temperature at PLHGR	3538	°F
Fuel Average Temperature at PLHGR	2203	°F
Hot Rod Gas Pressure	1088	psia
Hot Rod Burnup	1522	MWD/MTU

Table A-2

St. Lucie 1 Cycle 4
Containment Physical Parameters

Net Free Volume	2.5111×10^6 Ft^3
Containment Initial Conditions:	
Humidity	100%
Containment Temperature	60^0F
Enclosure Building Temperature	38^0F
Initial Pressure	14.6 psia
Initial Time For:	
Spray Flow	25 seconds
Fans (4)	0.0 seconds
Containment Spray Water:	
Temperature	55^0F
Flow Rate (Total, both pumps)	6750 gpm

Fan Cooling Capacity (per fan)

Vapor Temperature (^{0}F)	Capacity (BTU/Sec)
60	0.0
120	3472.0
180	7388.8
220	11611.1
264	20833.3

Heat Transfer Coefficient

a. Containment structure to enclosure building atmosphere heat transfer coefficient - 13.0 BTU/hr-ft^2-^{0}F.

b. Sump to base slab - 10 BTU/hr-ft^2-^{0}F.

c. Containment atmosphere to sump - 500 BTU/hr-ft^2-^{0}F.

Table A-2 Continued

St. Lucie 1 Cycle 4 Passive Heat Sink Information

	Wall	Material	Thickness Ft	Area Ft^2	k $\frac{BTU}{Hr\text{-}ft\text{-}^oF}$	ρC_p $\frac{BTU}{Ft^3\text{-}^oF}$	Exposure Side 1	Exposure Side 2
1.	Containment Shell	Steel	.1171	86700	25.9	53.57	Cont. Vapor	Annulus
2.	Floor Slab	Concrete	20.0	12682	1.0	34.2	Cont. Vapor	Insulated
3.	Misc. Concrete	Concrete	1.5	87751	1.0	34.2	Cont. Vapor	Insulated
4.	Galvanized Steel	Zinc Steel	0.0005833 0.01417	130000	64.0 25.9	40.6 53.57	Cont. Vapor	Insulated
5.	Carbon Steel	Steel	0.03125	25000	30.0	53.8	Cont. Vapor	Insulated
6.	Stainless Steel	Steel	0.0375	22300	9.8	54.0	Cont. Vapor	Insulated
7.	Misc. Steel	Steel	0.0625	40000	25.9	53.57	Cont. Vapor	Insulate
8.	Misc. Steel	Steel	0.02083	41700	25.9	53.57	Cont. Vapor	Insulate
9.	Misc. Steel	Steel	0.17708	7000	25.9	53.57	Cont. Vapor	Insulate
10.	Imbedded Steel	Steel Concrete	0.0708 7.00	18000	25.9 1.0	53.57 34.2	Cont. Vapor	Insulate

TABLE A3

St. Lucie Unit 1 Cycle 4

TIMES OF INTEREST (SECONDS)

BREAK	START OF SAFETY INJECTION	TIME OF ANNULUS DOWNFLOW	CONTACT TIME	TIME SAFETY INJECTION TANKS EMPTY
1.0 DES/PD	17.2	20.3	34.60	61.5
0.8 DES/PD	17.7	20.8	35.12	62.0
0.6 DES/PD	19.2	22.4	36.71	63.6
1.0 DEG/PD	17.2	20.4	34.72	61.6
0.8 DEG/PD	18.1	21.2	35.51	62.4
0.6 DEG/PD	20.1	23.3	37.62	64.5

TABLE A4

St. Lucie Unit 1 Cycle 4

Break	Peak Clad Temperature (^{o}F)	Hot Rod Rupture Time (sec)	Peak Local Clad Oxidation (%)	Core-Wide Clad Oxidation (%)
1.0 x DES/PD	2174	52.13	< 15.33	< .72
0.8 x DES/PD	2173	53.52	< 15.26	< .70
0.6 x DES/PD*	2161	59.89	< 14.62	< .65
1.0 x DEG/PD	2176	51.24	< 15.44	< .74
0.8 x DEG/PD	2175	52.13	< 15.36	< .74
0.6 x DEG/PD*	2057	61.8	< 14.16	< .61

Table A5

St. Lucie Unit 1 Cycle 4
Variables Plotted as a Function of Time
for Each Large Break in the Spectrum

Variable	Figure Designation
Core Power	A
Pressure in Center Hot Assembly Node	B
Leak Flow	C
Hot Assembly Flow (below hot spot)	D.1
Hot Assembly Flow (above hot spot)	D.2
Hot Assembly Quality	E
Containment Pressure	F
Mass Added to Core During Reflood	G
Peak Clad Temperature	H

Table A6

St. Lucie Unit 1 Cycle 4

Additional Variables Plotted as a Function of Time for the Large Break Having the Highest Clad Temperature

Variables	Figure Designation
Mid Annulus Flow	I
Qualities Above and Below the Core	J
Core Pressure Drop	K
Safety Injection Tank Flow into Intact Discharge Legs	L
Water Level in Downcomer During Reflood	M
Hot Spot Gap Conductance	N
Peak Local Clad Oxidation	O
Clad Temperature, Centerline Fuel Temperature, Average Fuel Temperature and Coolant Temperature for Hottest Node	P
Hot Spot Heat Transfer Coefficient	Q
Containment Temperature	R
Sump Temperature	S
Hot Rod Internal Gas Pressure	T
Core Bulk Channel Flow Rate	U

TABLE A7

TIME SEC	MASS FLOW LBM/SEC	ENERGY RELEASE BTU/SEC	INTEGRAL OF MASS FLOW LBM	INTEGRAL OF ENERGY RELEASE BTU
0.0	0.0	0.0	0.0	0.0
0.05	7.1456 x 10 ^{4}	3.8809 x 10 ^{7}	3.5496 x 10 ^{3}	1.9270 x 10 ^{6}
0.10	8.1687	4.4422	7.6989 x 10 ^{3}	4.1842
0.15	7.9074	4.2929	1.1251 x 10 ^{4}	6.3860
0.20	7.6621	4.1657	1.5598	8.4755 x 10 ^{6}
0.25	7.4988	4.0777	1.9419	1.0553 x 10 ^{7}
0.35	7.1931	3.9180	2.6740	1.4538
0.45	7.0200	3.8246	3.3834	1.8404
0.60	6.9065	3.7670	4.4295	2.4108
0.80	6.7044	3.6585	5.7898	3.1529
1.0	6.5295	3.5653	7.1125	3.8249
1.4	6.1890	3.3857	9.6630 x 10 ^{4}	5.2688
1.8	5.7330	3.1419	1.2045 x 10 ^{5}	6.5732
2.2	5.4458	2.9893	1.4285	7.8016
2.6	5.0377	2.7683	1.6382	8.9535 x 10 ^{7}
3.0	4.6426	2.5552	1.8312	1.0015 x 10 ^{8}
3.4	4.2806	2.3642	2.0097	1.0998
3.8	4.0430	2.2398	2.1760	1.1917
4.4	3.6993	2.0702	2.4080	1.3208
5.2	3.3038	1.8910	2.6887	1.4796
6.0	3.0015	1.7436	2.9398	1.6245
6.8	2.7872	1.6358	3.1715	1.7597
7.6	2.5313	1.5090	3.3843	1.8856
8.4	2.3045	1.3852	3.5774	2.0013
9.2	2.0886 x 10 ^{4}	1.2474 x 10 ^{7}	3.7535 x 10 ^{5}	2.1075 x 10 ^{8}

TABLE A7 (CONT'D)

TIME SEC	MASS FLOW LBM/SEC	ENERGY RELEASE BTU/SEC	INTEGRAL OF MASS FLOW LBM	INTEGRAL OF ENERGY RELEASE BTU
10.0	1.8252×10^4	1.1443×10^7	3.9106×10^5	2.2041×10^8
11.0	1.1788×10^4	9.5073×10^6	4.0637	2.3090
12.0	9.5728×10^3	8.1889	4.1683	2.3971
13.0	7.9172	7.1260	4.2559	2.4734
14.0	6.0278	6.0487	4.3258	2.5396
15.0	4.3742	4.8218	4.3720	2.5941
16.0	3.3797	3.8265	4.4153	2.6371
17.0	2.7397	3.0865	4.4457	2.6715
18.0	1.7654	2.1300	4.4682	2.6980
19.0	1.1946×10^3	1.4558×10^6	4.4825	2.7149
20.0	4.7819×10^2	5.8024×10^5	4.4910	2.7253
20.4	1.1146×10^3	1.3628×10^6	4.4937×10^5	2.7286×10^8
		TIME OF ANNULUS DOWNFLOW		
		START OF REFLOOD (VALUES BELOW ARE FOR STEAM ONLY)		
34.7	0.0	0.0	4.4937×10^5	2.7286×10^8
44.7	0.0	0.0	4.4937	2.7286
54.7	0.0	0.0	4.4937	2.7286
64.7	1.9649×10^2	2.5563×10^5	4.5000	2.7368
74.7	1.7904	2.3293	4.5186	2.7611
84.7	1.9407	2.5248	4.5382	2.7865
94.7	1.9108	2.4860	4.5574	2.8115
104.7	1.8771	2.4421	4.5762	2.8360
124.7	1.8415×10^2	2.3958×10^5	4.6134×10^5	2.8843×10^8

TABLE A7 (CONT'D)

TIME SEC	MASS FLOW LBM/SEC	ENERGY RELEASE BTU/SEC	INTEGRAL OF MASS FLOW LBM	INTEGRAL OF ENERGY RELEASE BTU
144.7	1.8262×10^{2}	2.3759×10^{5}	4.6501×10^{5}	2.9321×10^{8}
164.7	1.8237	2.3726	4.6866	2.9796
184.7	1.8272	2.3772	4.7231	3.0270
204.7	1.8227	2.3713	4.7597	3.0746
224.7	1.8428	2.3975	4.7964	3.1224
244.7	1.8628	2.4235	4.8334	3.1706
264.7	1.9189	2.4965	4.8707	3.2190
284.7	1.8849	2.4523	4.9081	3.2677
304.7	1.8942	2.4644	4.9457	3.3147
324.7	1.9022	2.4747	4.9835	3.3658
344.7	1.9010	2.4732	5.0214	3.4151
364.7	1.9077	2.4819	5.0694	3.4646
384.7	1.9196	2.4974	5.0977	3.5144
404.7	1.9094	2.4841	5.1360	3.5642
434.7	1.9372×10^{2}	2.5203×10^{5}	5.1937×10^{5}	3.6393×10^{8}

FIGURE I.1-A
ST LUCIE UNIT I STRETCH POWER
1.0 x DOUBLE ENDED SLOT BREAK IN PUMP DISCHARGE LEG
CORE POWER

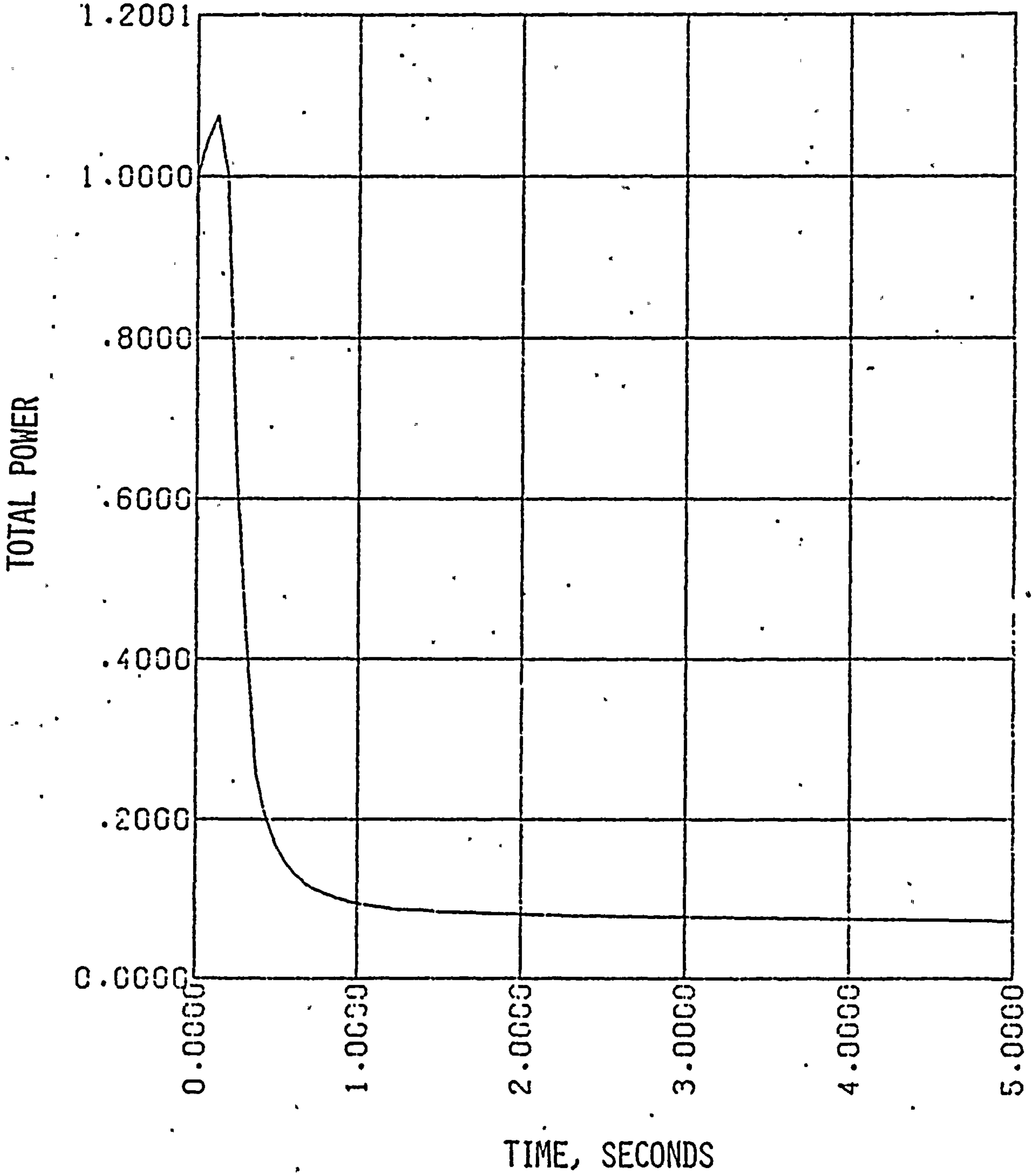


FIGURE I.1-B
ST LUCIE UNIT I STRETCH POWER
1.0 x DOUBLE ENDED SLOT BREAK IN PUMP DISCHARGE LEG
PRESSURE IN CENTER HOT ASSEMBLY NODE

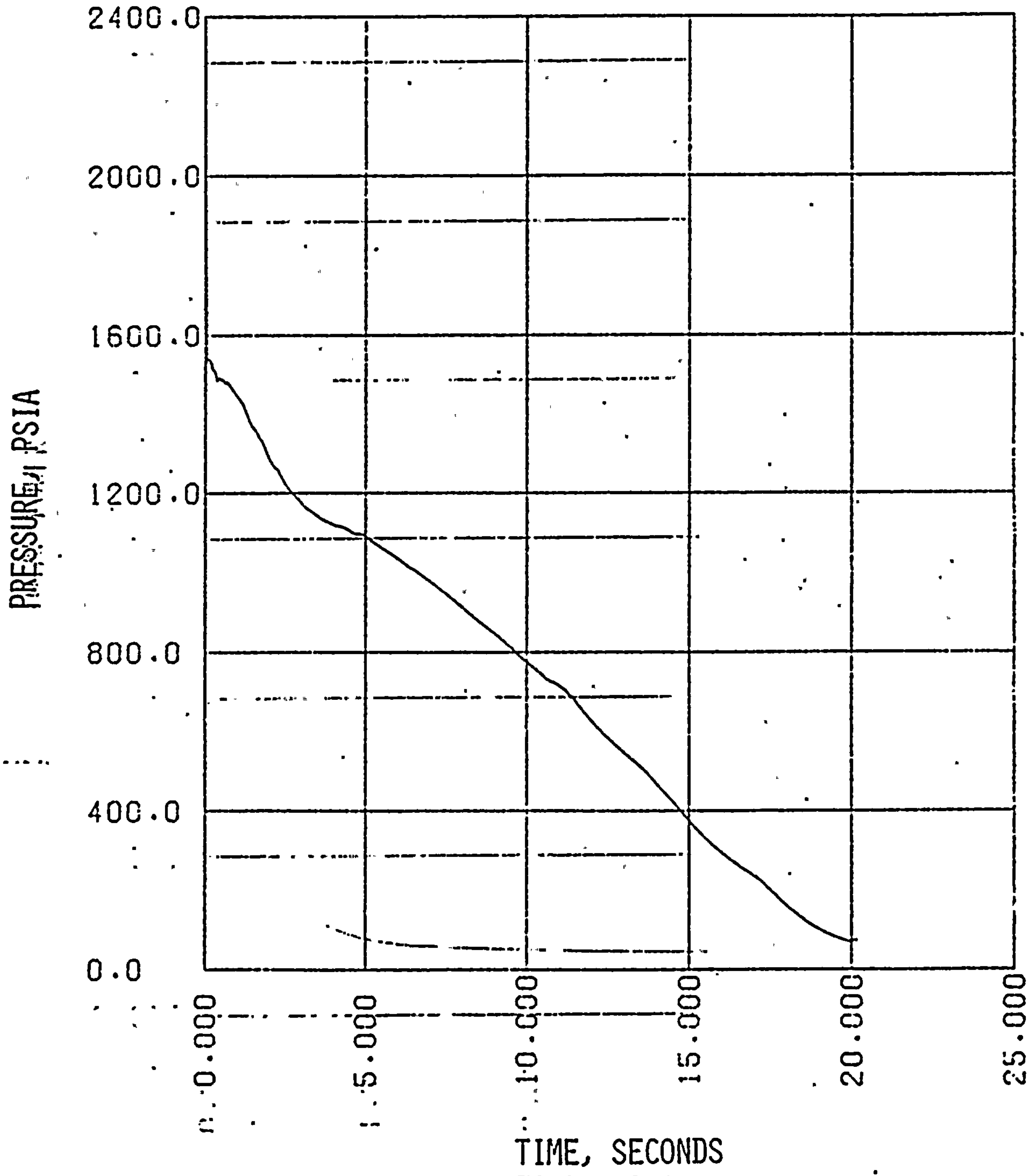


FIGURE I.1-C
ST LUCIE UNIT I STRETCH POWER
1.0 x DOUBLE ENDED SLOT BREAK IN PUMP DISCHARGE LEG
LEAK FLOW

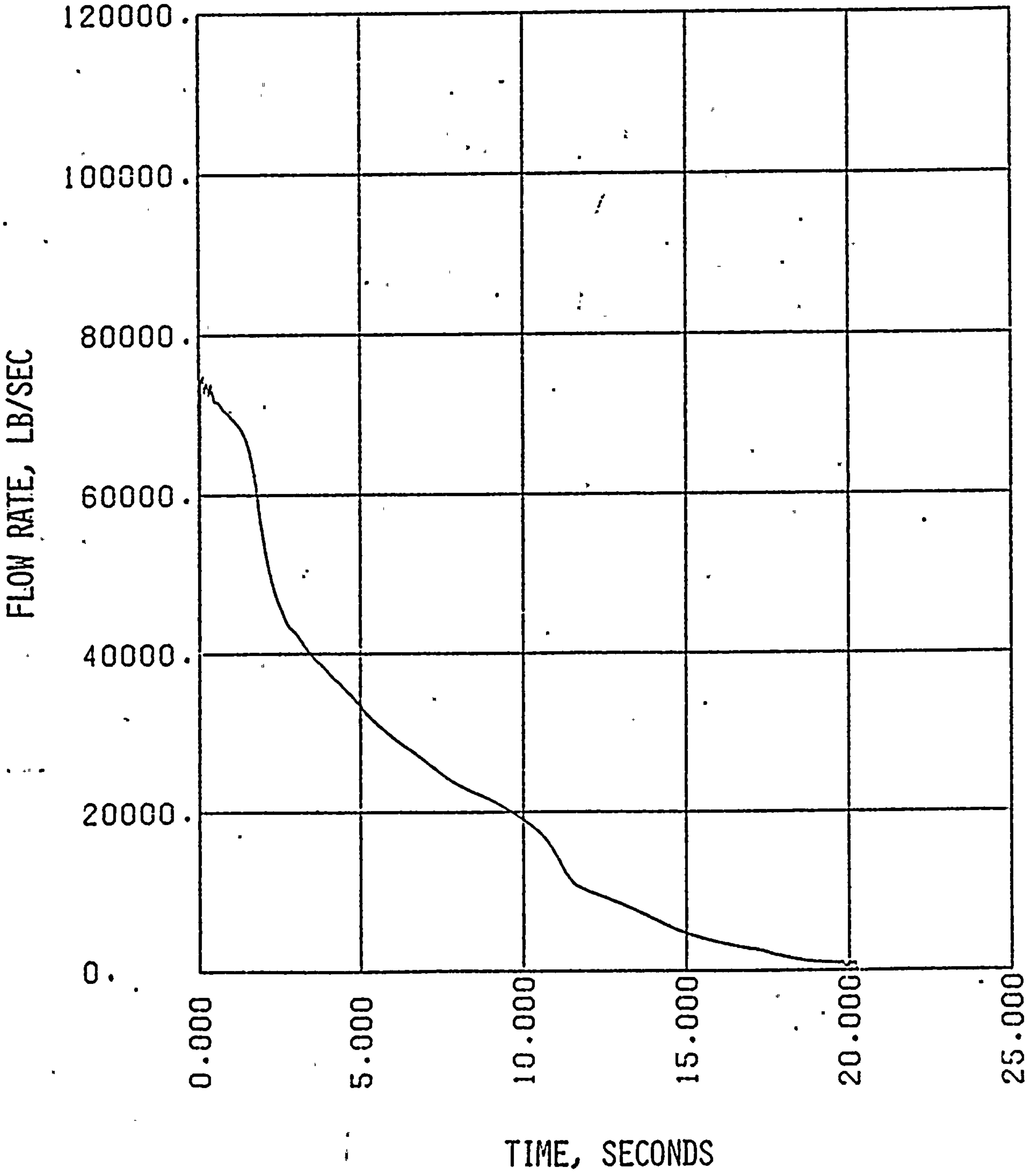


FIGURE I.1-D.1
ST LUCIE UNIT I STRETCH POWER
1.0 x DOUBLE ENDED SLOT BREAK IN PUMP DISCHARGE LEG
FLOW IN HOT ASSEMBLY-PATH 16, BELOW HOT SPOT

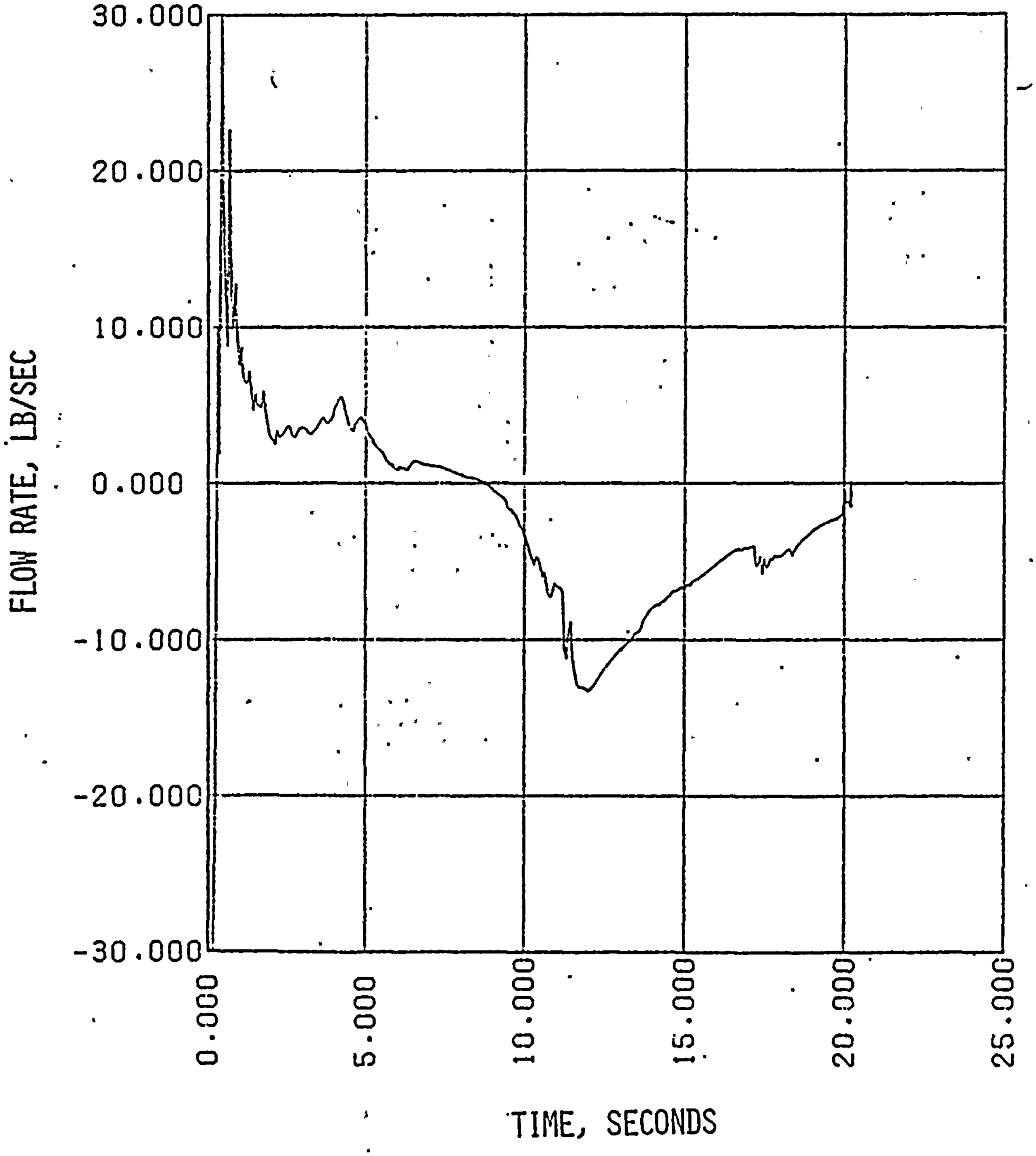


FIGURE I.1-D.2
ST LUCIE UNIT I STRETCH POWER
1.0 x DOUBLE ENDED SLOT BREAK IN PUMP DISCHARGE LEG
FLOW IN HOT ASSEMBLY-PATH 17, ABOVE HOT SPOT

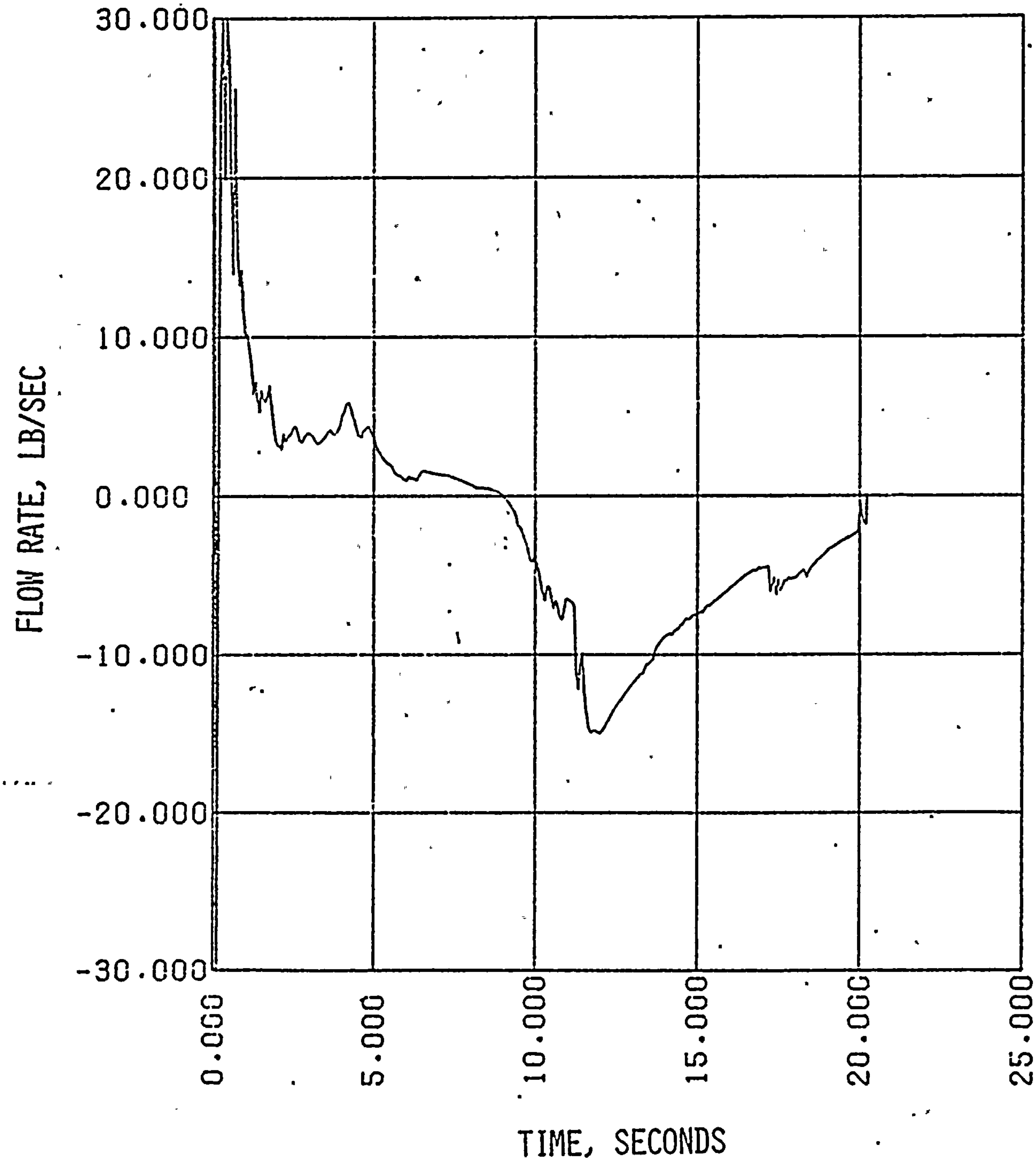


FIGURE I.1-E
ST LUCIE UNIT I STRETCH POWER
1.0 x DOUBLE ENDED SLOT BREAK IN PUMP DISCHARGE LEG
HOT ASSEMBLY QUALITY

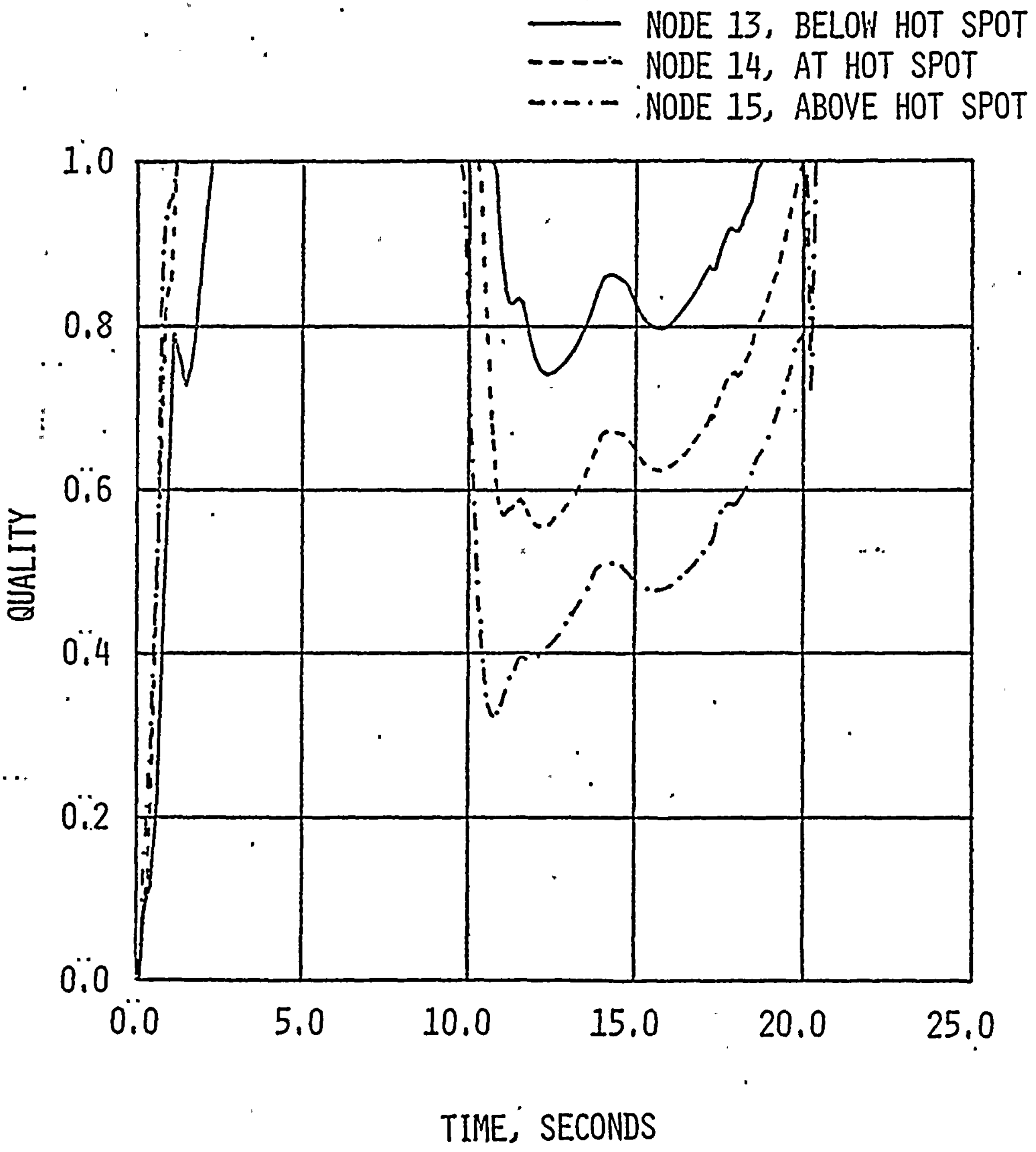


FIGURE I.1-F
ST LUCIE UNIT I STRETCH POWER
1.0 x DOUBLE ENDED SLOT BREAK IN PUMP DISCHARGE LEG
CONTAINMENT PRESSURE

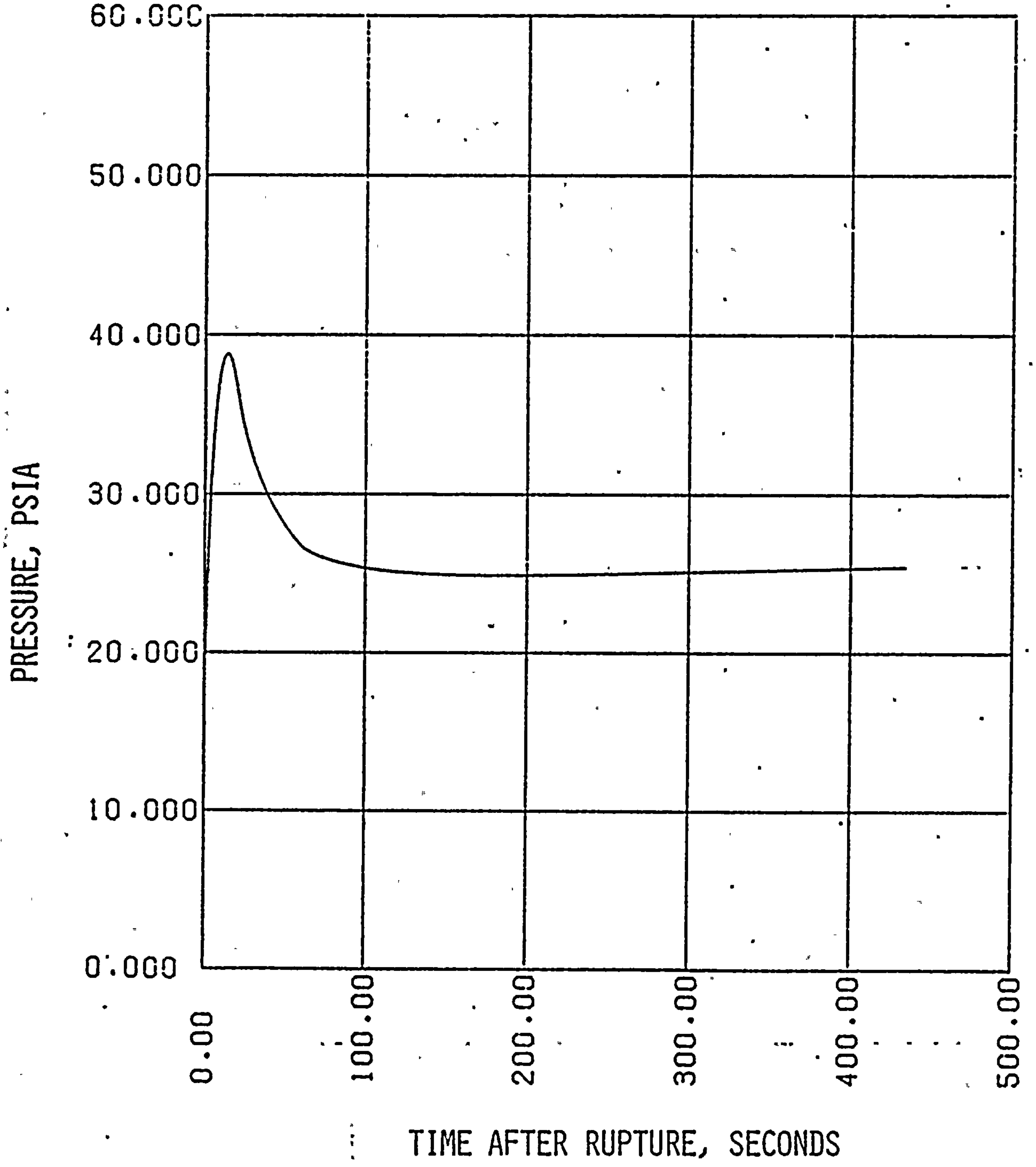


FIGURE I.1-G
ST LUCIE UNIT I STRETCH POWER
1.0 x DOUBLE ENDED SLOT BREAK IN PUMP DISCHARGE LEG
MASS ADDED TO CORE DURING REFLOOD

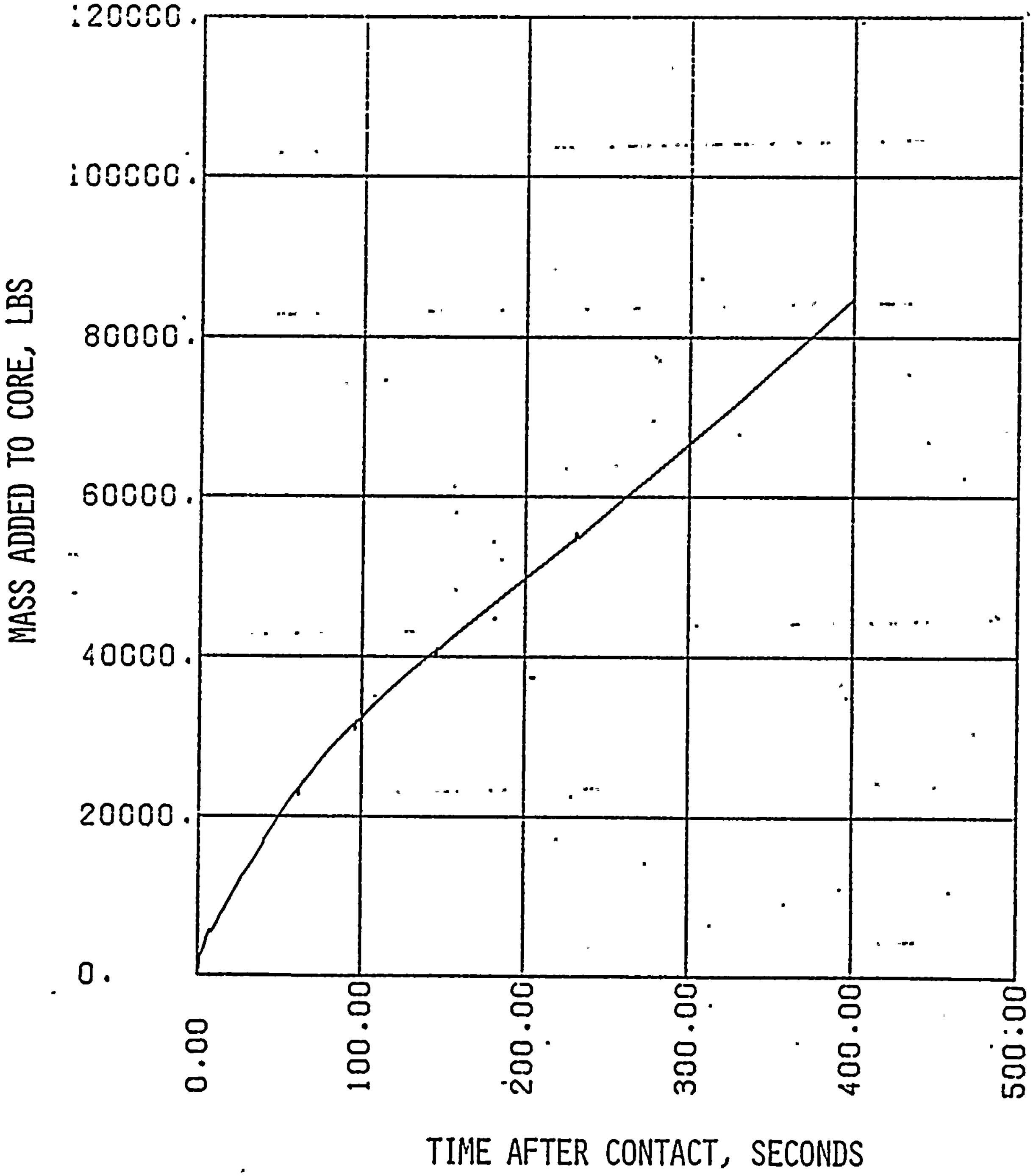


FIGURE I.1-H
ST LUCIE UNIT I STRETCH POWER
1.0 x DOUBLE ENDED SLOT BREAK IN PUMP DISCHARGE LEG
PEAK CLAD TEMPERATURE

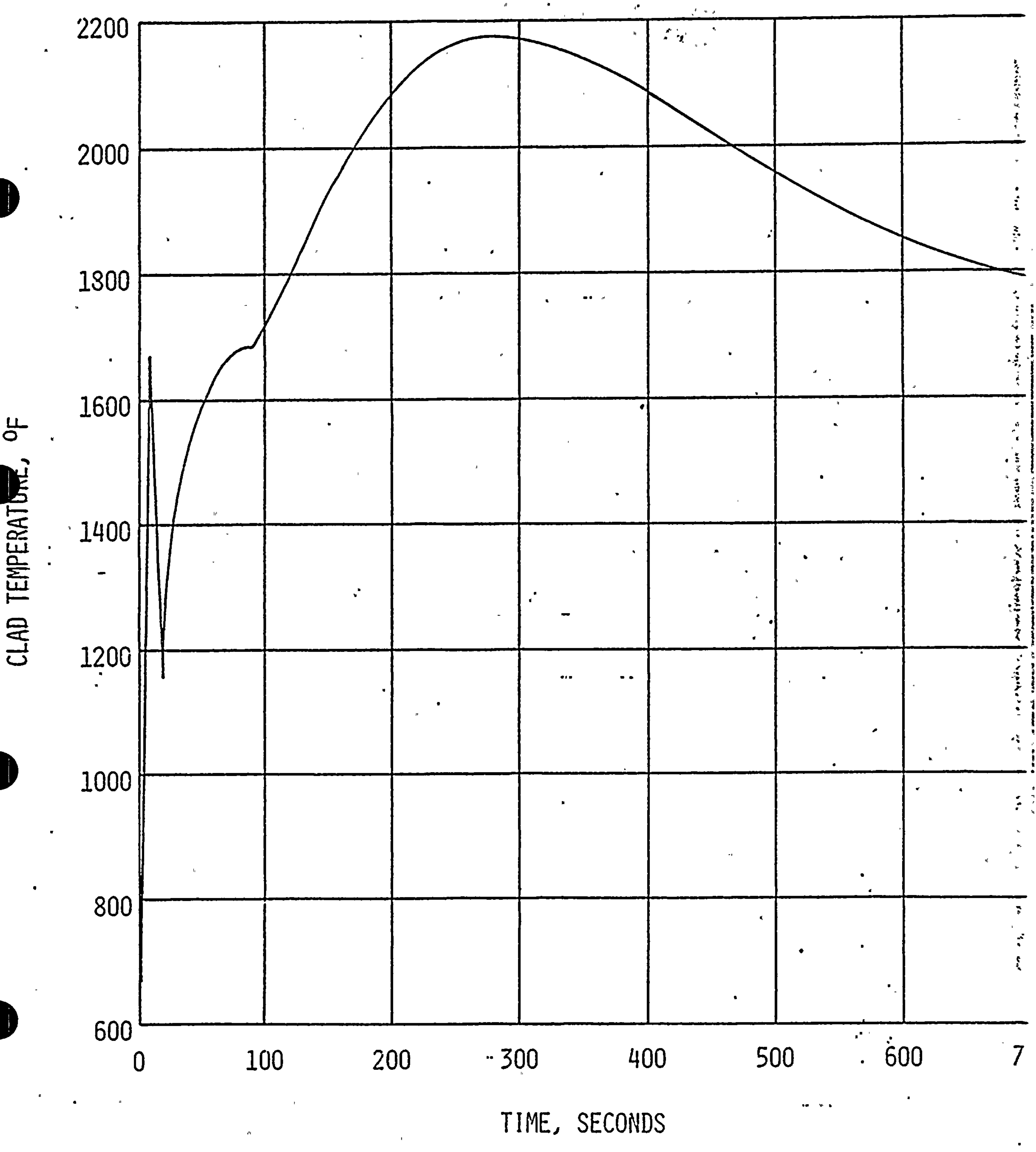


FIGURE I.2-A
ST LUCIE UNIT I STRETCH POWER
0.8 x DOUBLE ENDED SLOT BREAK IN PUMP DISCHARGE LEG
CORE POWER

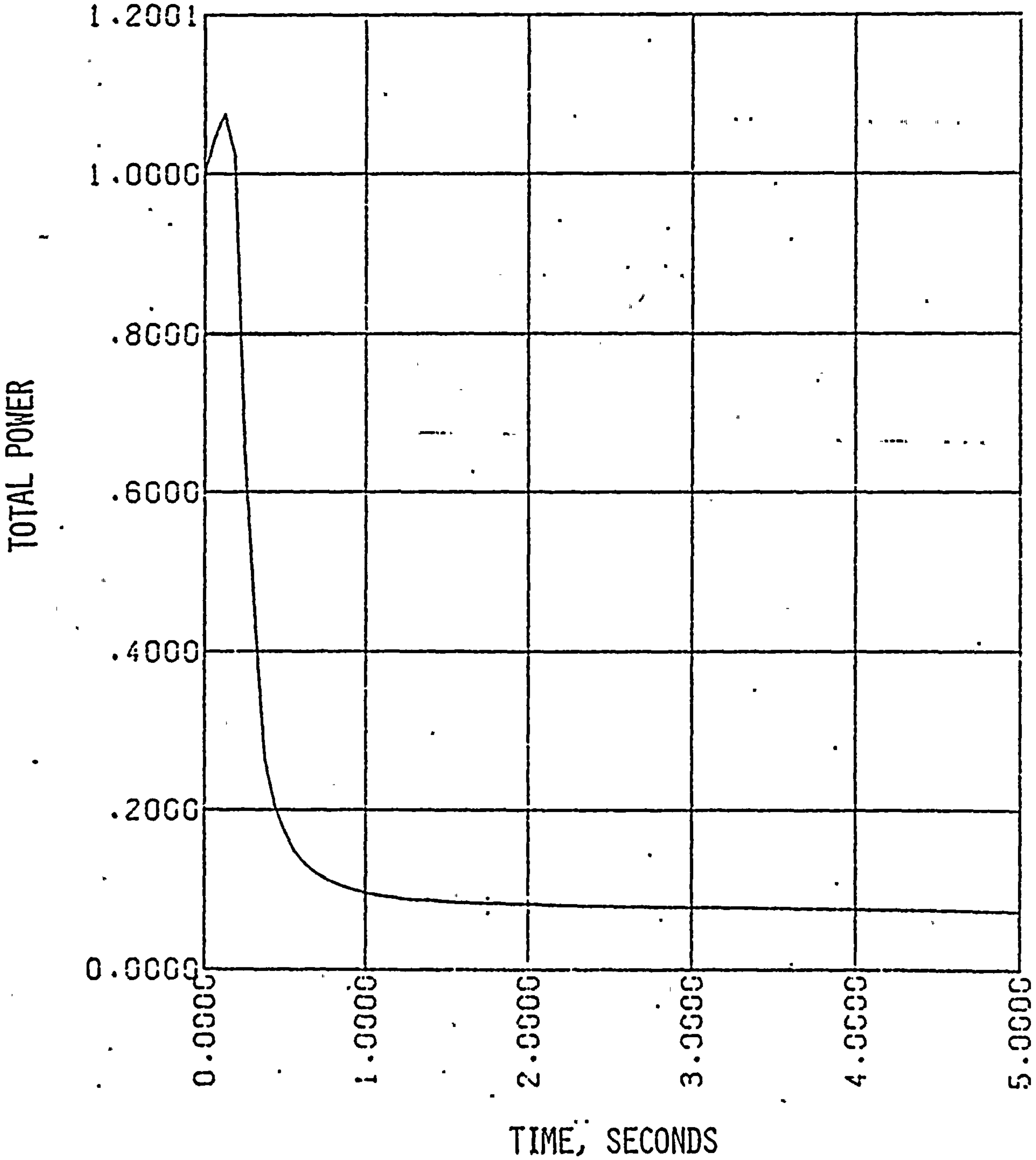


FIGURE I.2-B
ST LUCIE UNIT I STRETCH POWER
0.8 x DOUBLE ENDED SLOT BREAK IN PUMP DISCHARGE LEG
PRESSURE IN CENTER HOT ASSEMBLY NODE

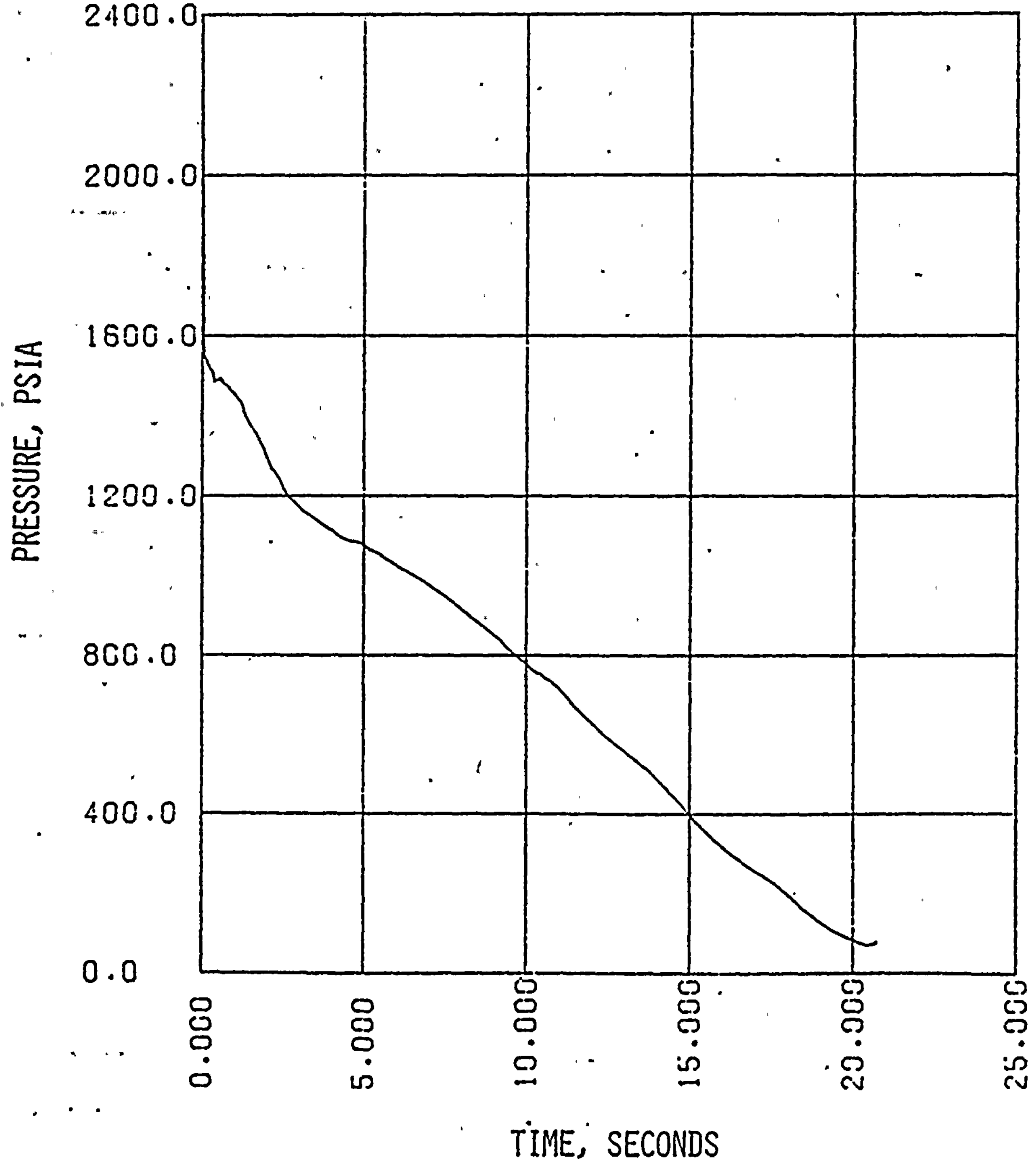


FIGURE I.2-C
ST LUCIE UNIT I STRETCH POWER
0.8 x DOUBLE ENDED SLOT BREAK IN PUMP DISCHARGE LEG
LEAK FLOW

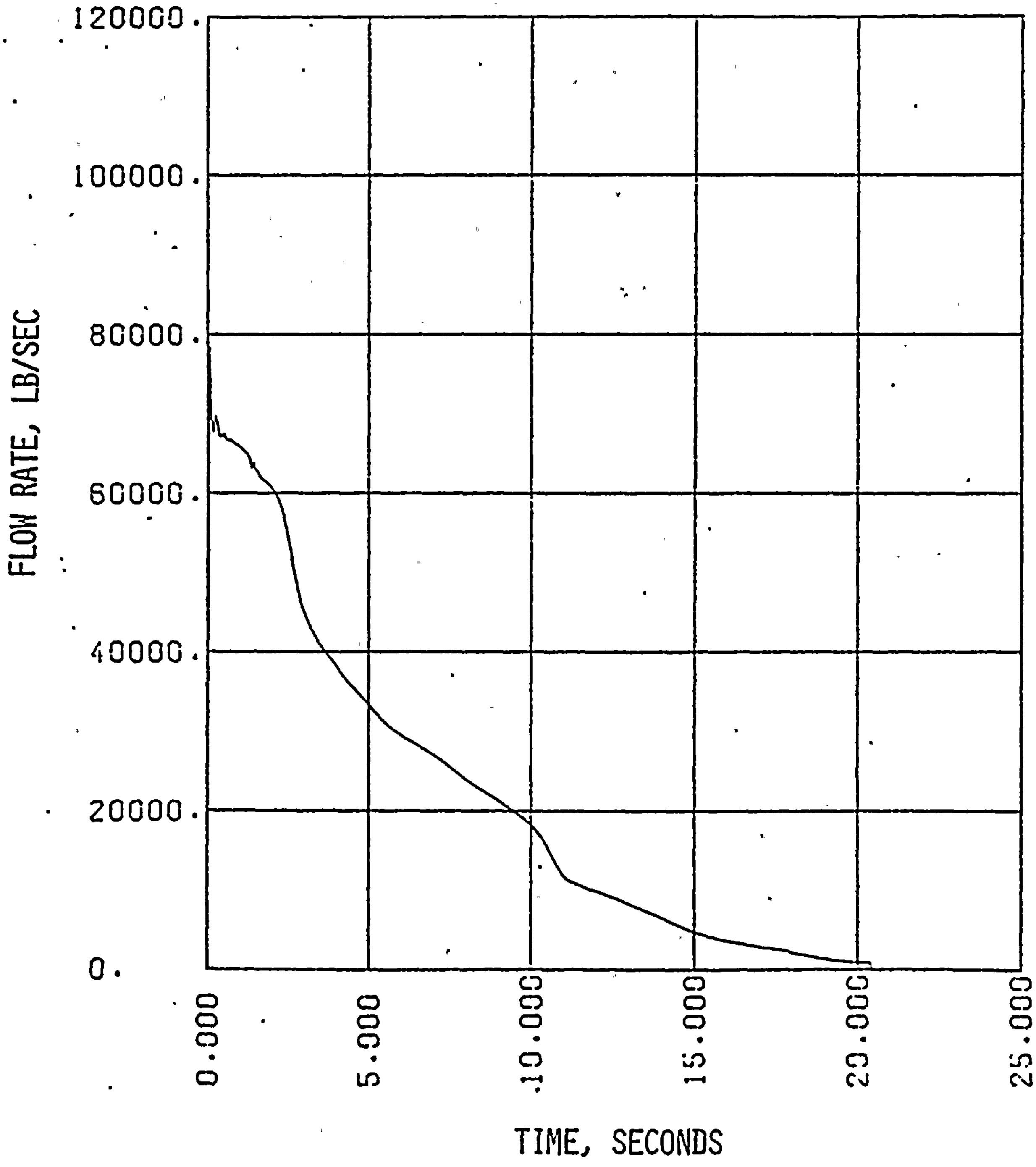


FIGURE I.2-D.1
ST LUCIE UNIT I STRETCH POWER
0.8 x DOUBLE ENDED SLOT BREAK IN PUMP DISCHARGE LEG
FLOW IN HOT ASSEMBLY-PATH 16, BELOW HOT SPOT

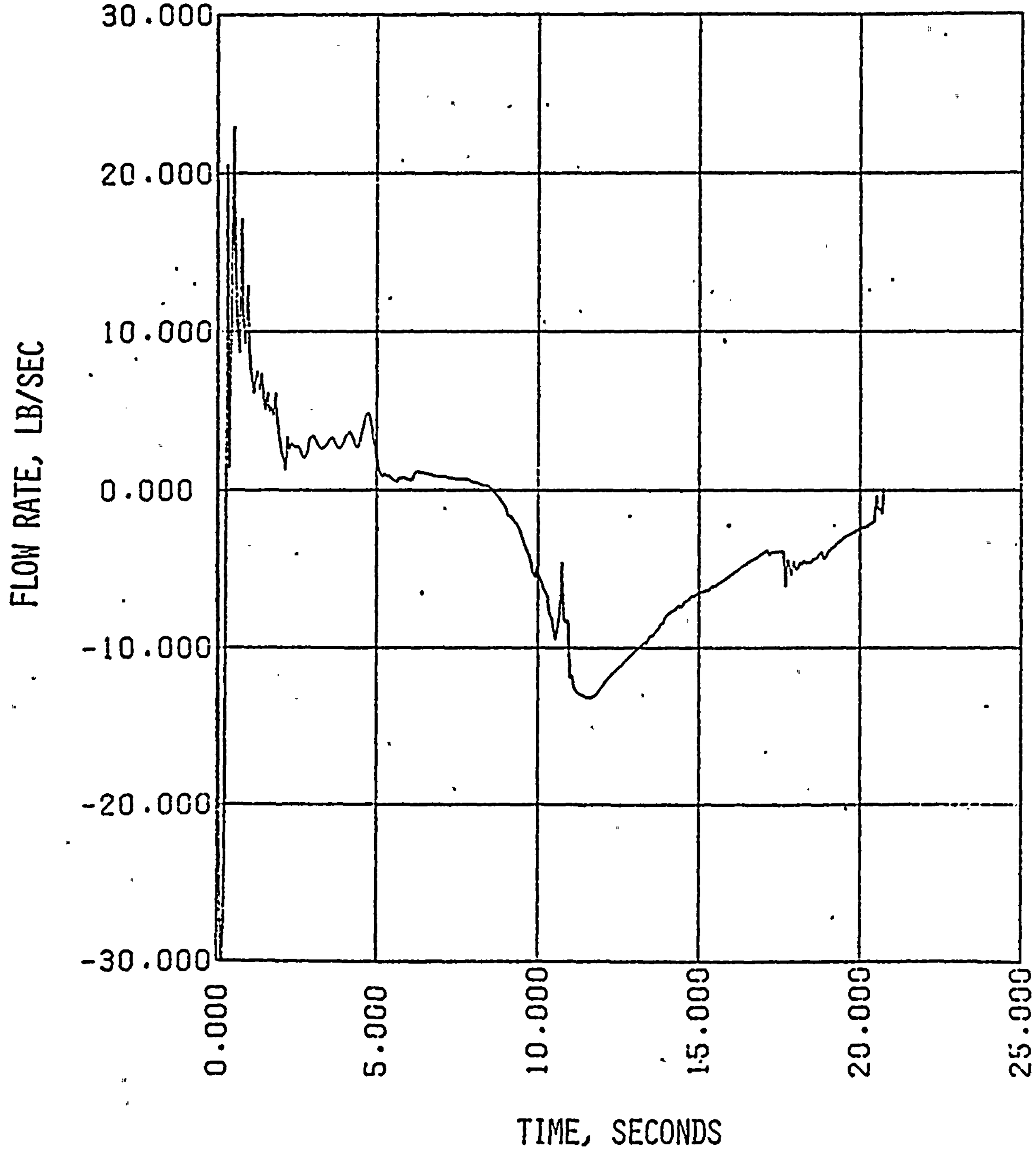


FIGURE I.2-D.2
ST LUCIE UNIT I STRETCH POWER
0.8 x DOUBLE ENDED SLOT BREAK IN PUMP DISCHARGE LEG
FLOW IN HOT ASSEMBLY-PATH 17, ABOVE HOT SPOT

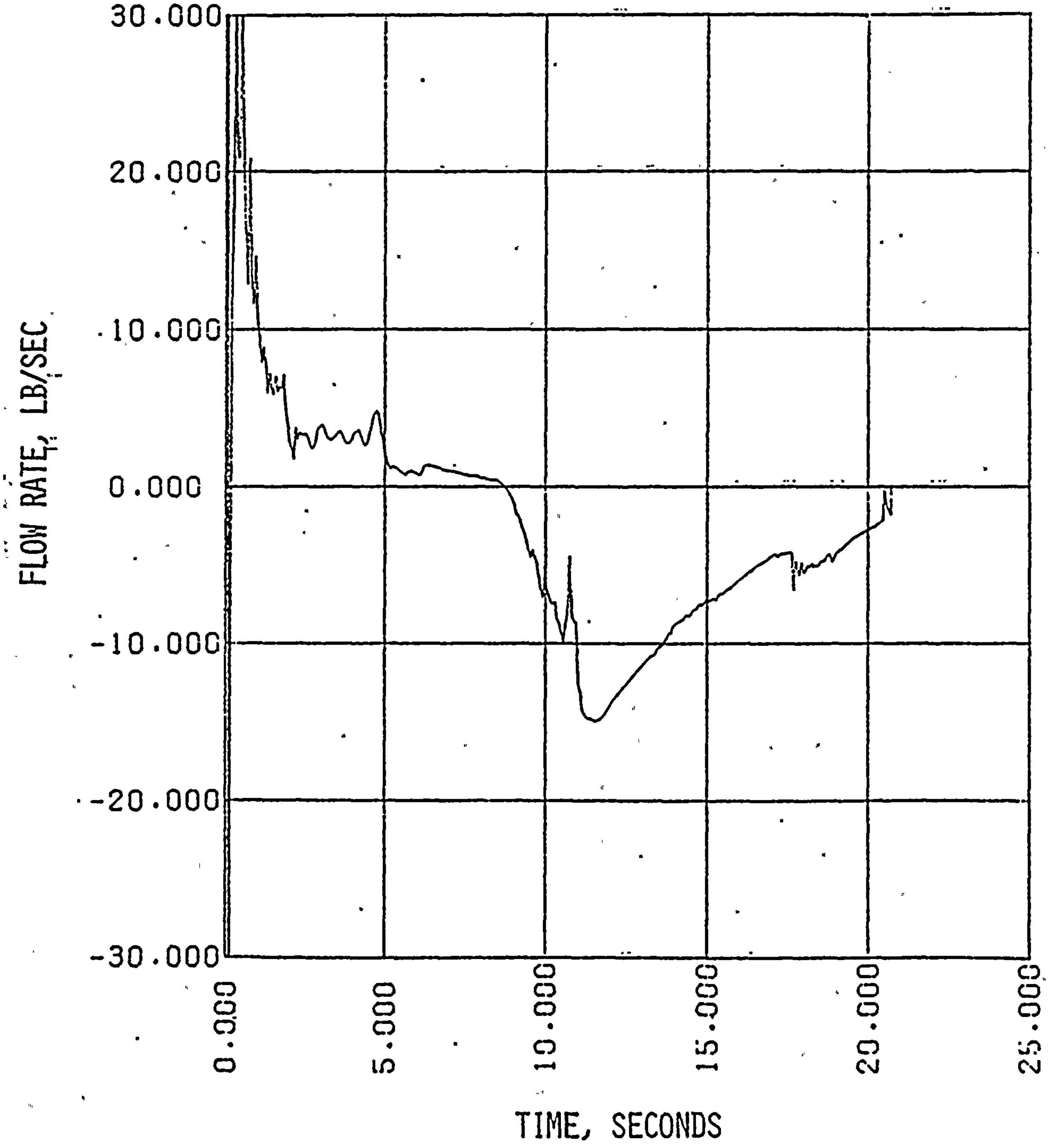


FIGURE I.2-E
ST LUCIE UNIT I STRETCH POWER
0.8 x DOUBLE ENDED SLOT BREAK IN PUMP DISCHARGE LEG
HOT ASSEMBLY QUALITY

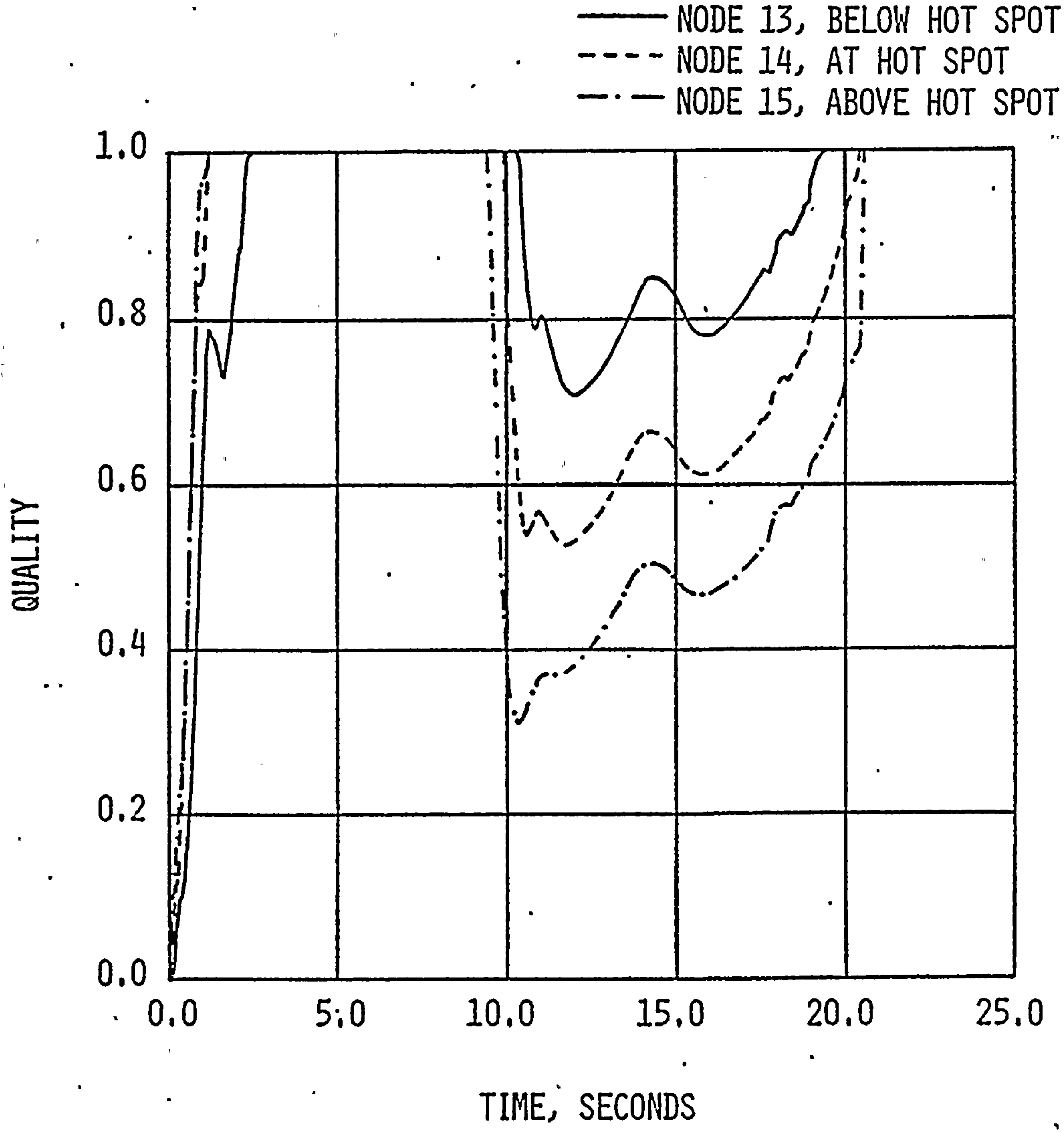
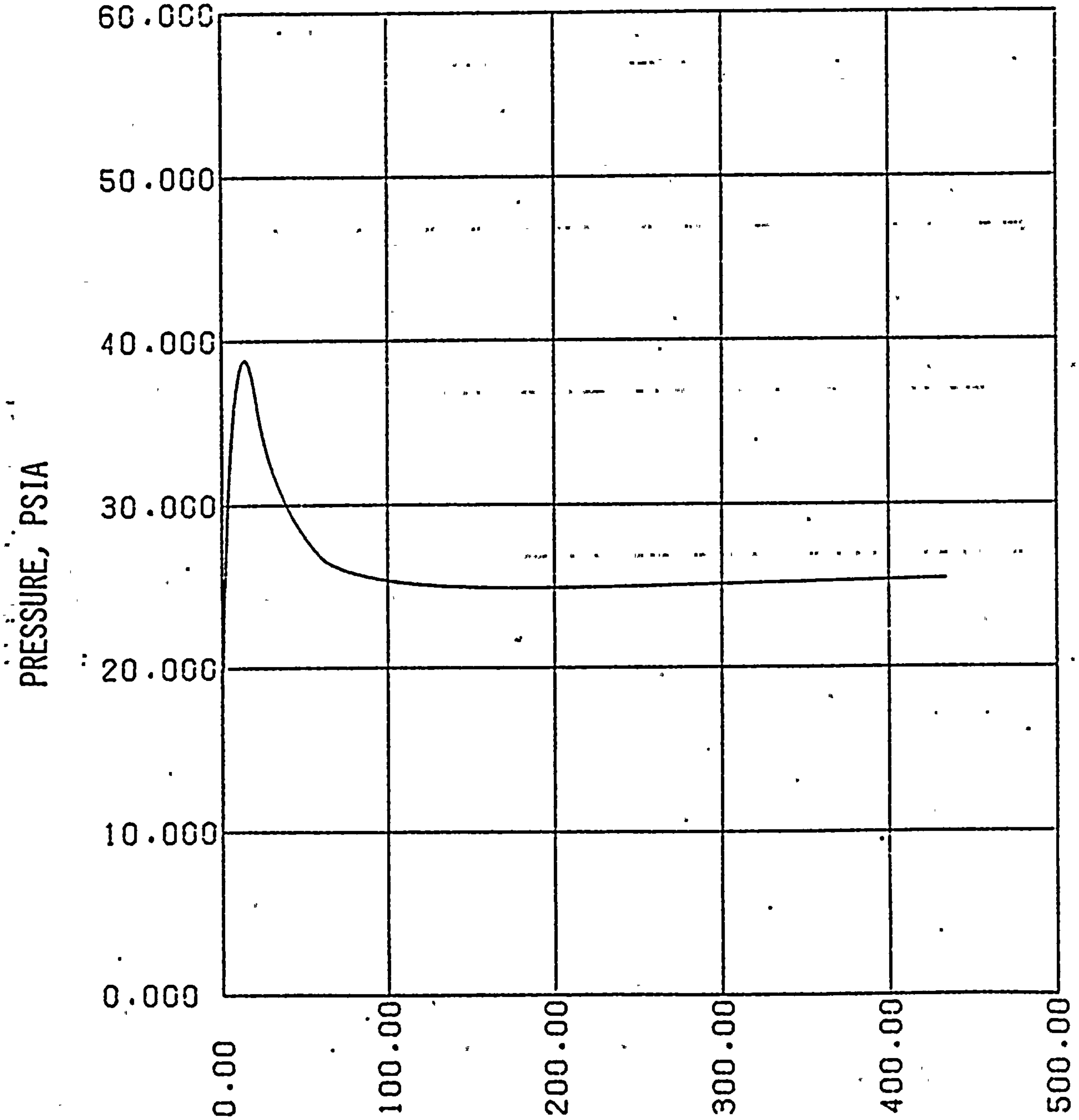


FIGURE I.2-F
ST LUCIE UNIT I STRETCH POWER
0.8 x DOUBLE ENDED SLOT BREAK IN PUMP DISCHARGE LEG
CONTAINMENT PRESSURE



TIME AFTER RUPTURE, SECONDS

FIGURE I.2-G

ST LUCIE UNIT I STRETCH POWER
0.8 x DOUBLE ENDED SLOT BREAK IN PUMP DISCHARGE LEG
MASS ADDED TO CORE DURING REFLOOD

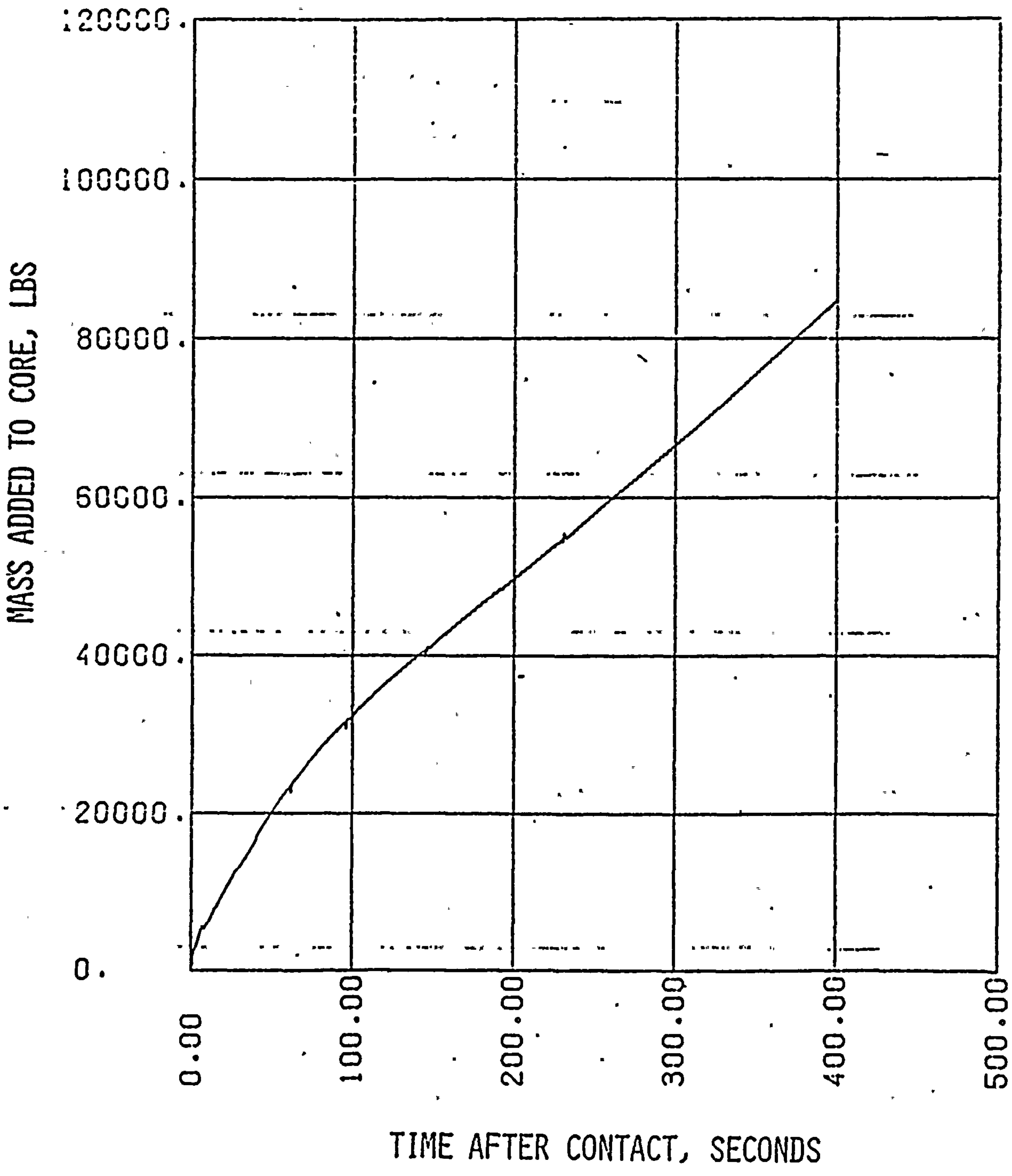


FIGURE I.2-H
ST LUCIE UNIT I STRETCH POWER
0.8 x DOUBLE ENDED SLOT BREAK IN PUMP DISCHARGE LEG
PEAK CLAD TEMPERATURE

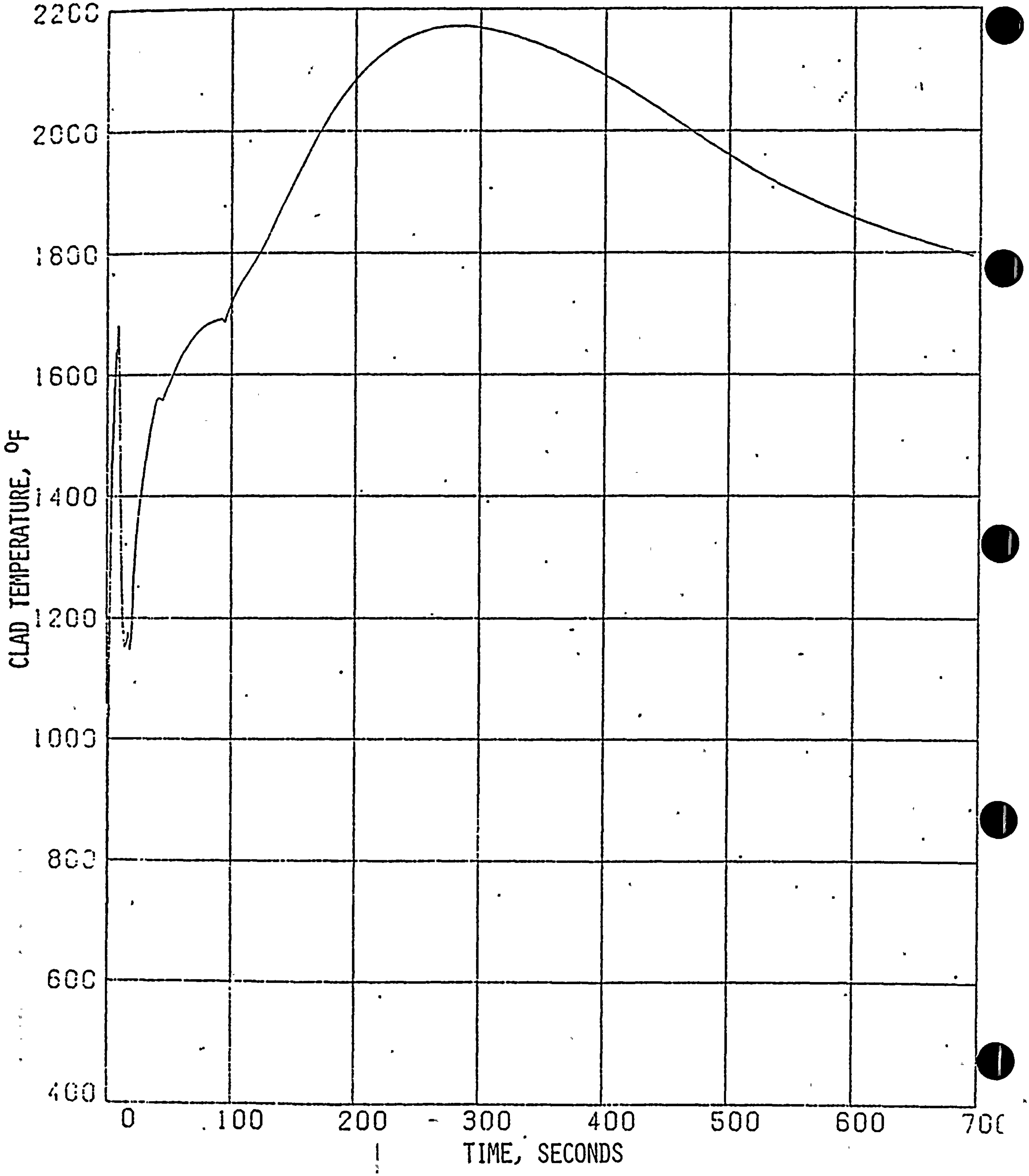


FIGURE I.3-A
ST LUCIE UNIT I STRETCH POWER
0.6 x DOUBLE ENDED SLOT BREAK IN PUMP DISCHARGE LEG
CORE POWER

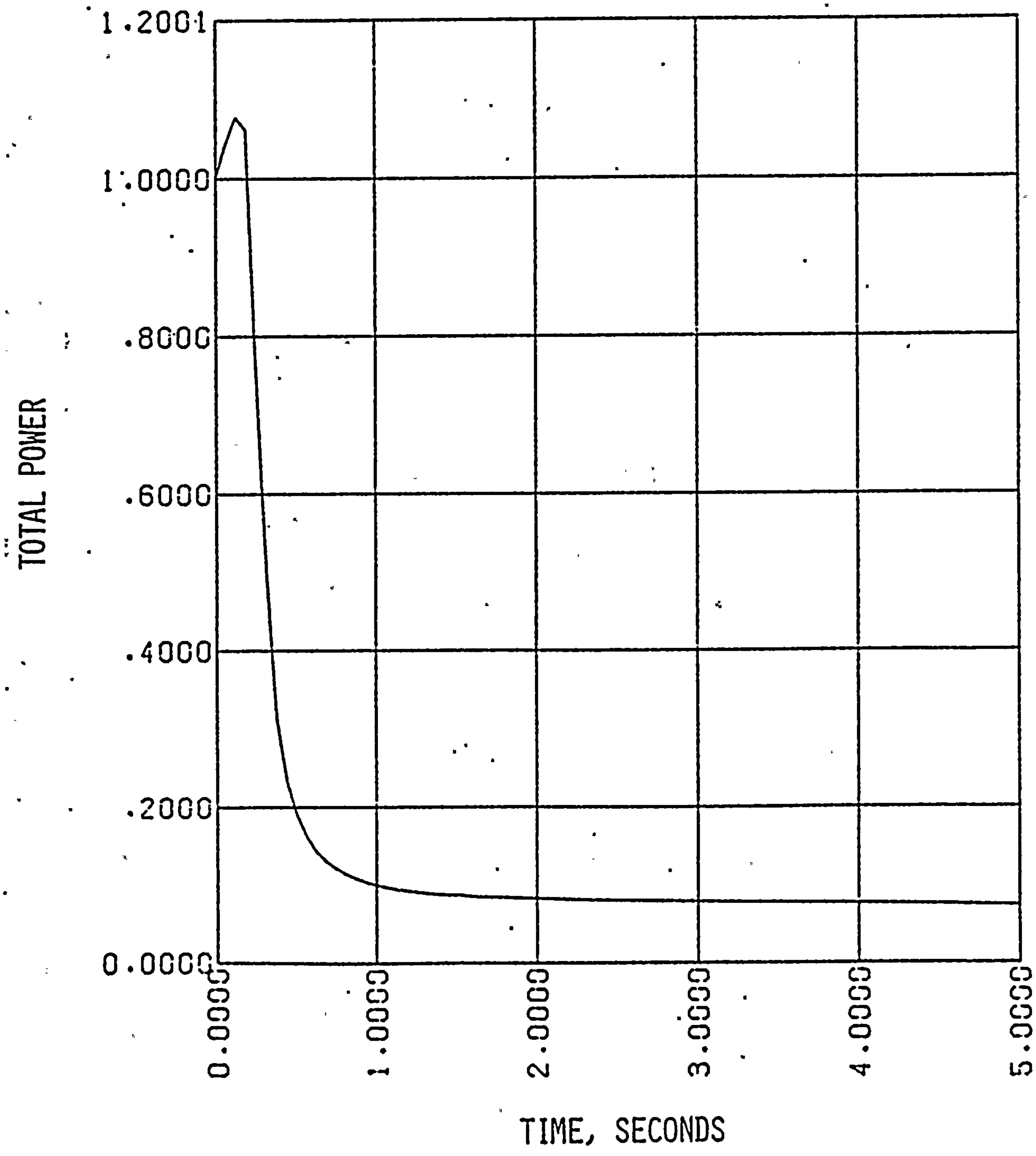


FIGURE I.3-B
ST LUCIE UNIT I STRETCH POWER
0.6 x DOUBLE ENDED SLOT BREAK IN PUMP DISCHARGE LEG
PRESSURE IN CENTER HOT ASSEMBLY NODE

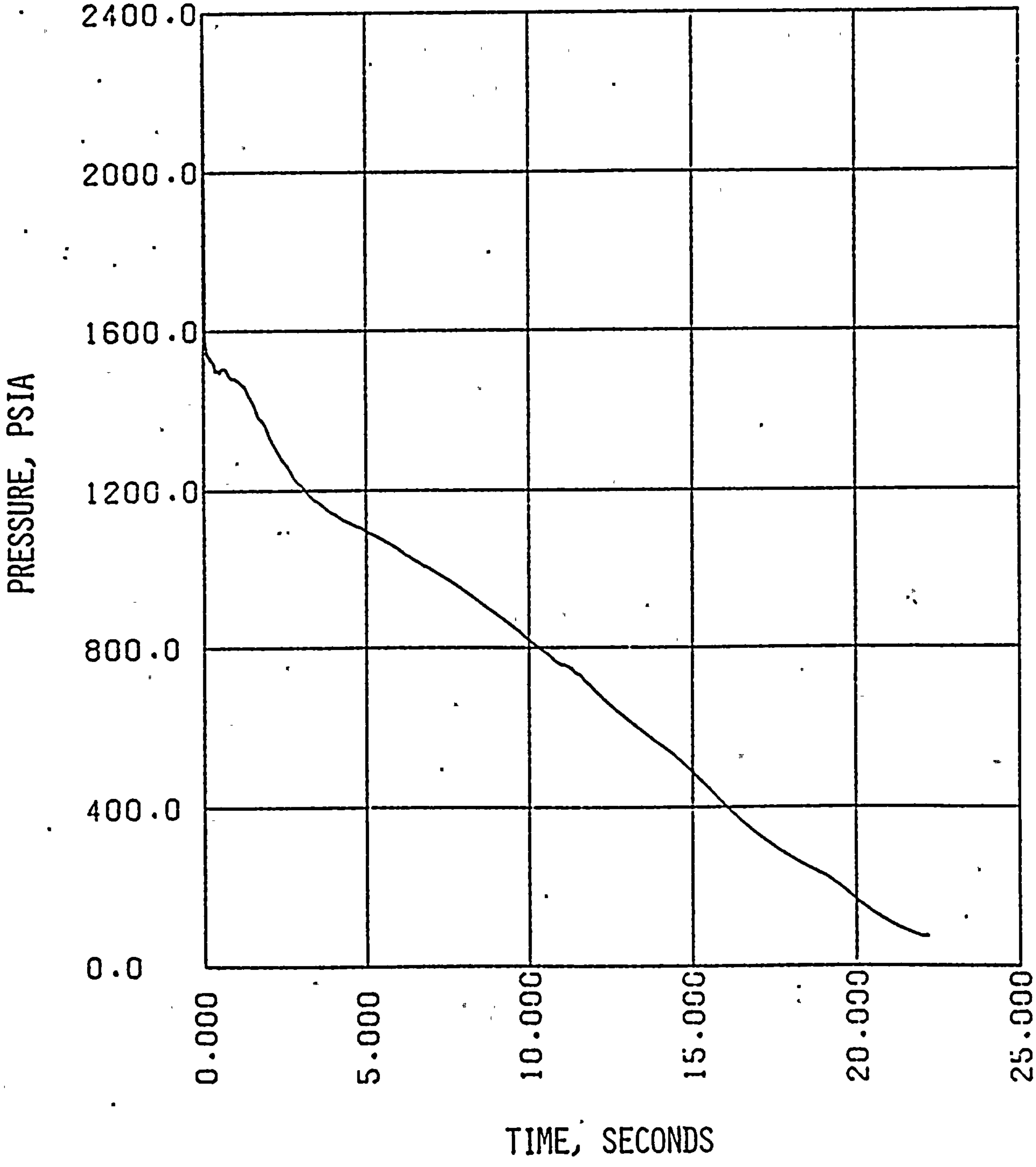


FIGURE I.3-C
ST LUCIE UNIT I STRETCH POWER
0.6 x DOUBLE ENDED SLOT BREAK IN PUMP DISCHARGE LEG
LEAK FLOW

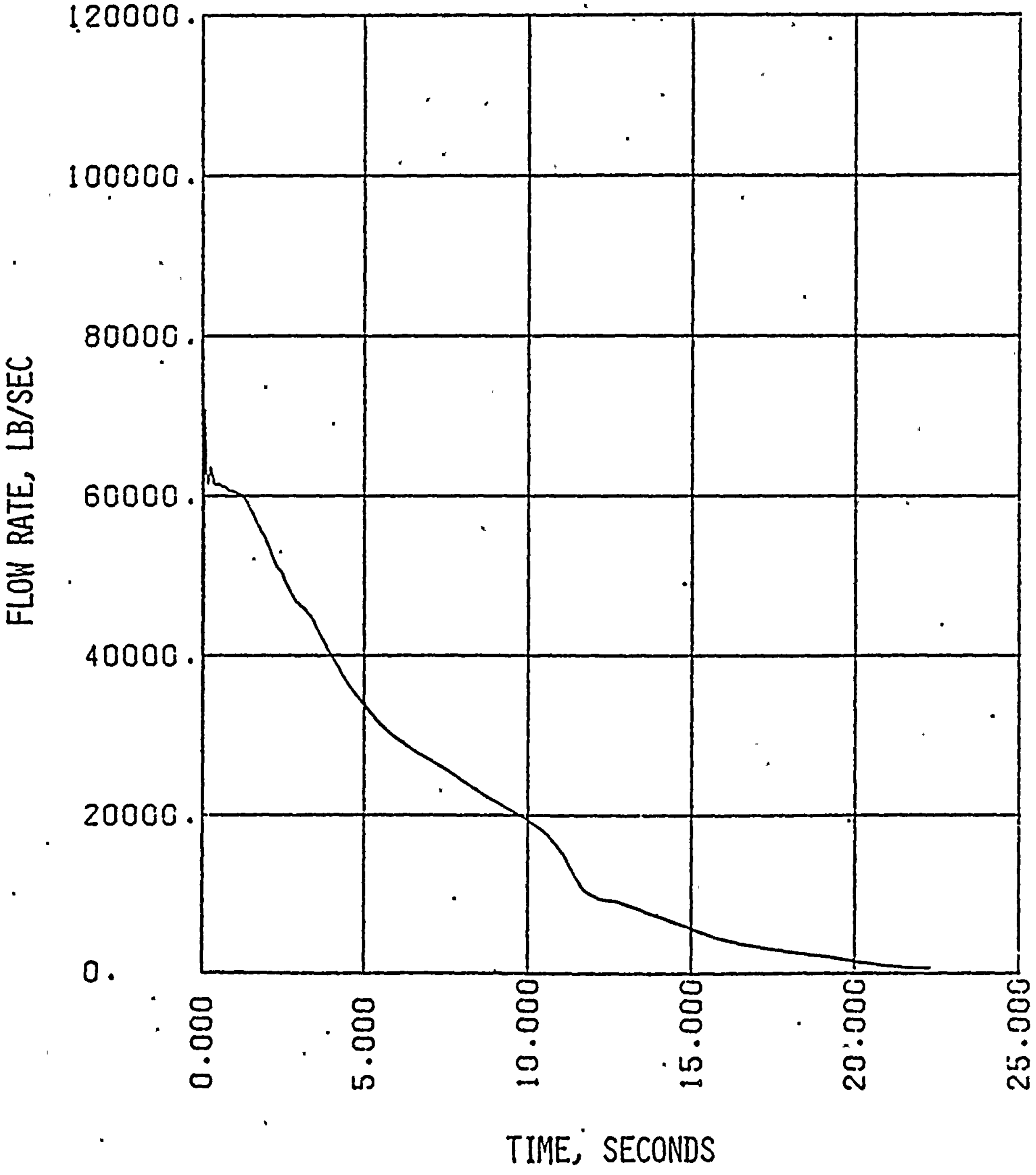


FIGURE I.3-D.1
ST LUCIE UNIT I STRETCH POWER
0.6 x DOUBLE ENDED SLOT BREAK IN PUMP DISCHARGE LEG
FLOW IN HOT ASSEMBLY-PATH 16, BELOW HOT SPOT

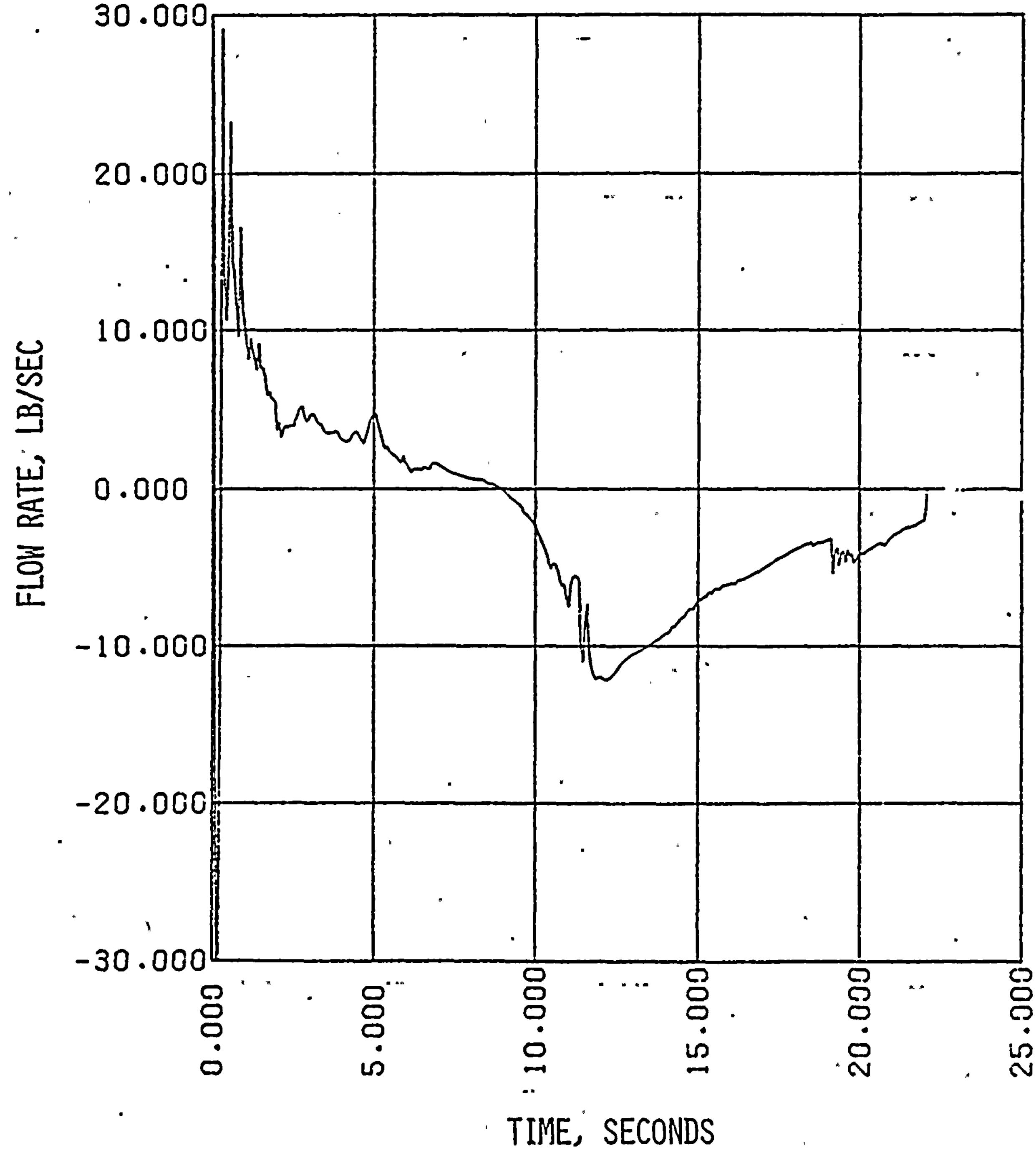


FIGURE I.3-D.2
ST LUCIE UNIT I STRETCH POWER
0.6 x DOUBLE ENDED SLOT BREAK IN PUMP DISCHARGE LEG
FLOW IN HOT ASSEMBLY-PATH 17, ABOVE HOT SPOT

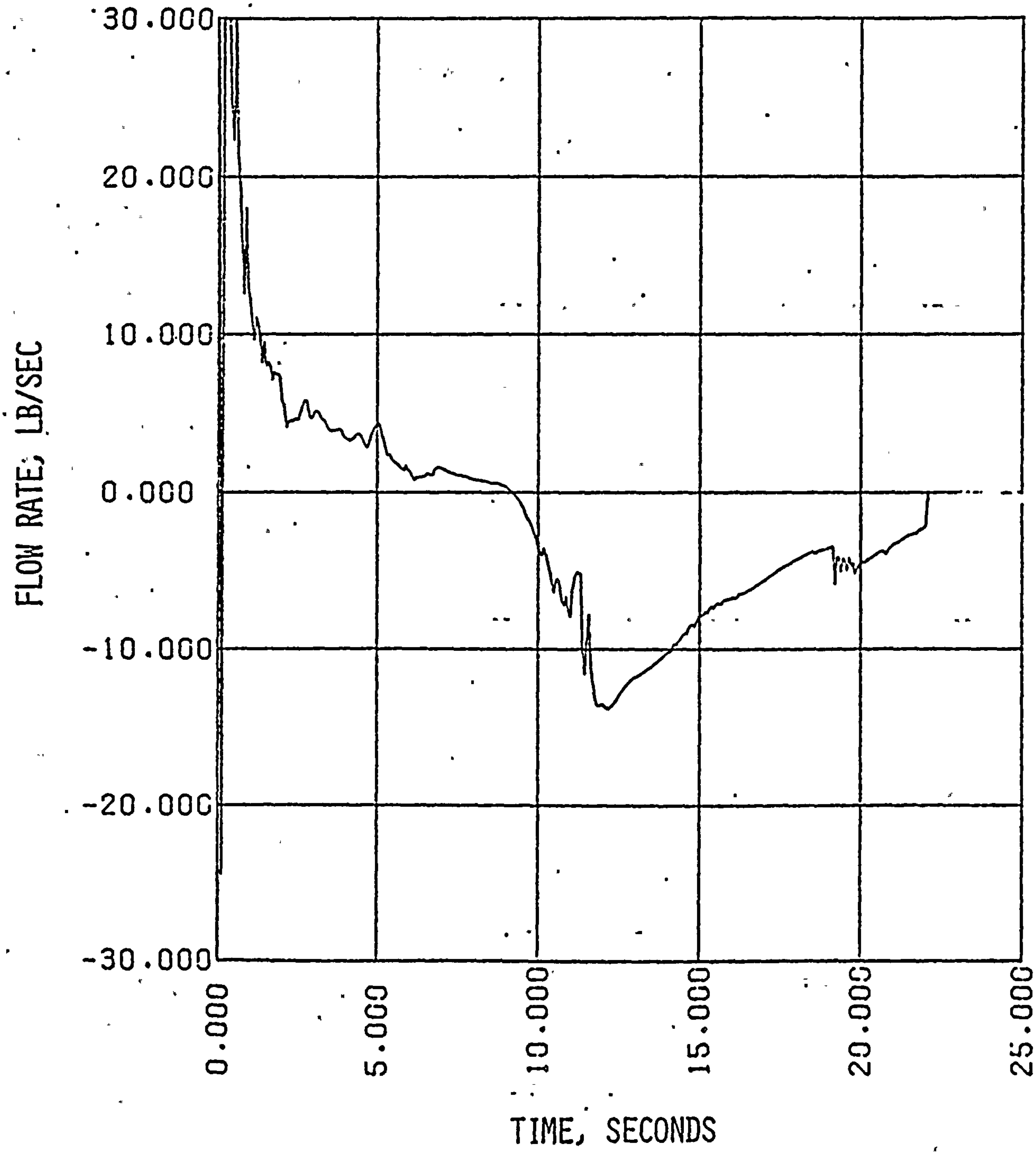


FIGURE I.3-E
ST LUCIE UNIT I STRETCH POWER
0.6 x DOUBLE ENDED SLOT BREAK IN PUMP DISCHARGE LEG
HOT ASSEMBLY QUALITY

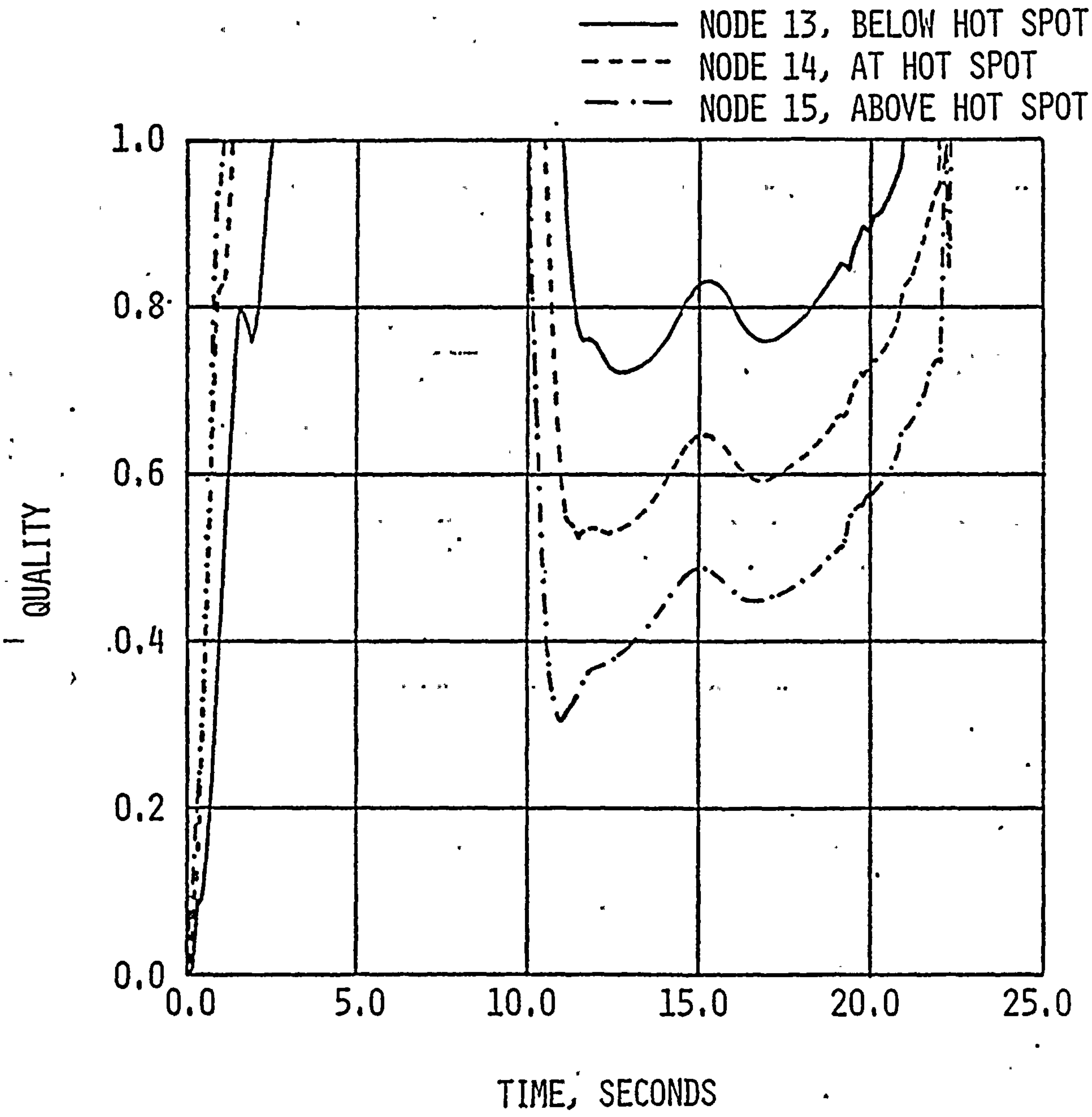


FIGURE I.3-F
ST LUCIE UNIT I STRETCH POWER
0.6 x DOUBLE ENDED SLOT BREAK IN PUMP DISCHARGE LEG
CONTAINMENT PRESSURE

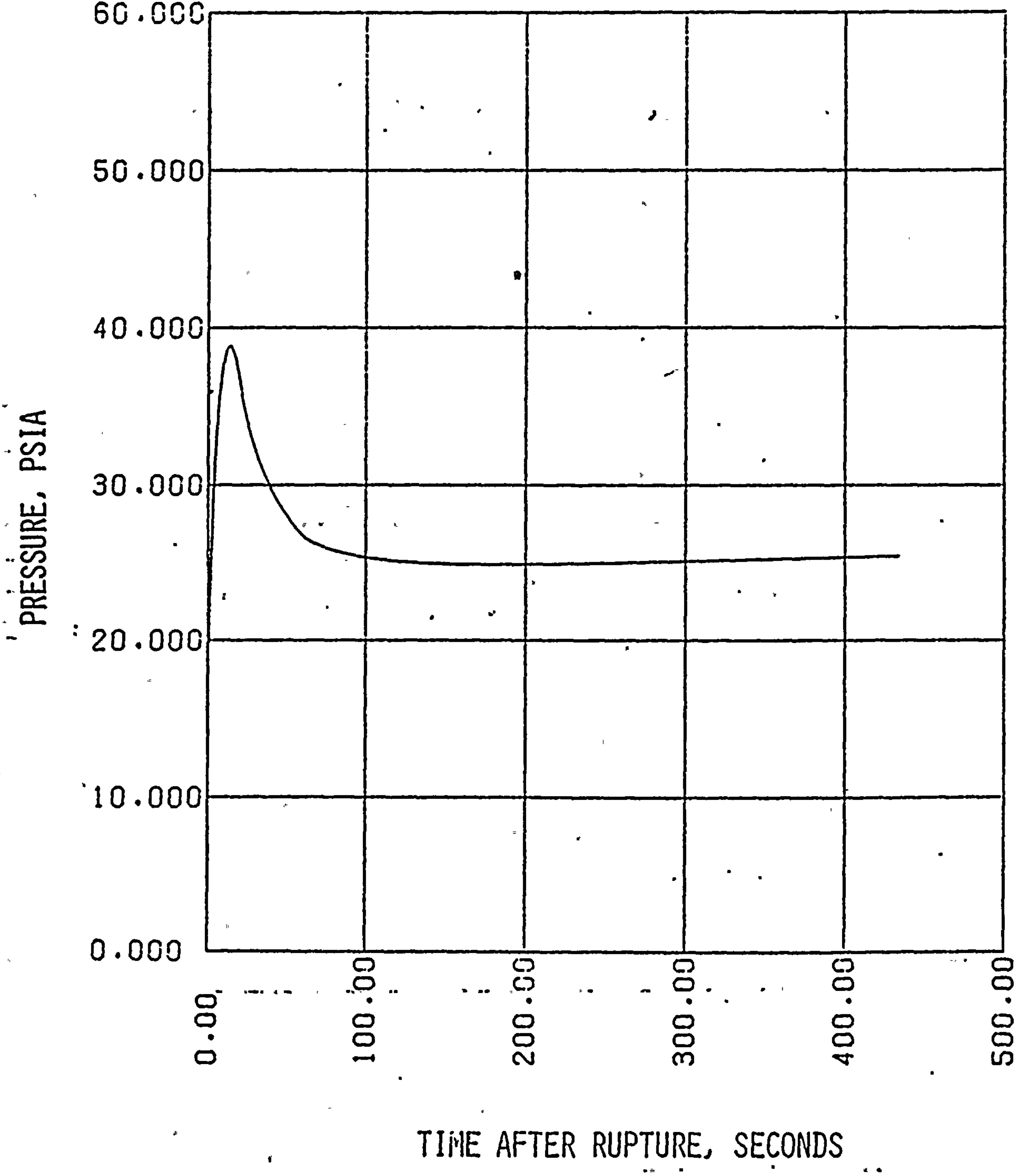


FIGURE I.3-G

ST LUCIE UNIT I STRETCH POWER

0.6 x DOUBLE ENDED SLOT BREAK IN PUMP DISCHARGE LEG

MASS ADDED TO CORE DURING REFLOOD

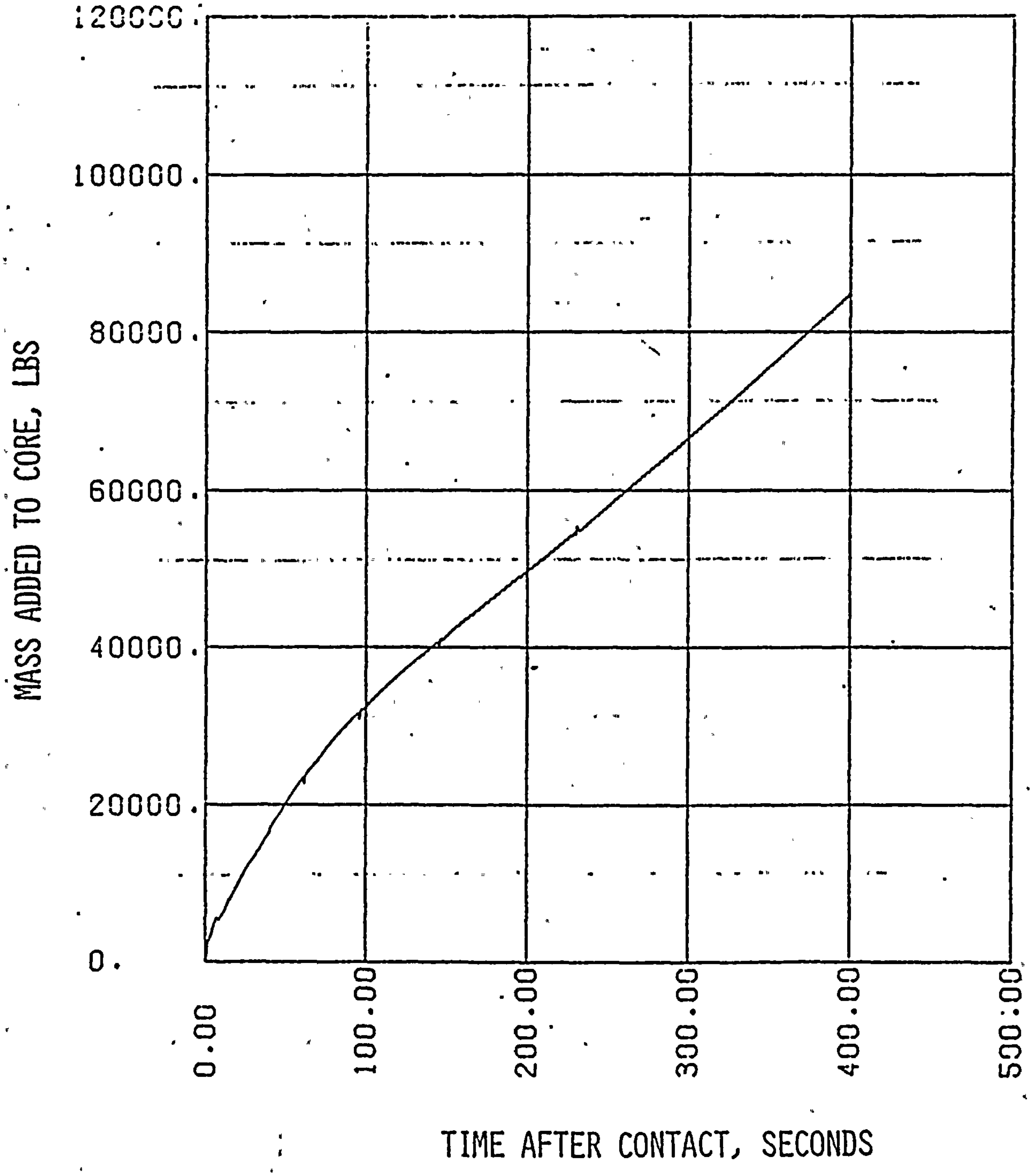


FIGURE I.3-H
ST LUCIE UNIT I STRETCH POWER
0.6 x DOUBLE ENDED SLOT BREAK IN PUMP DISCHARGE LEG
PEAK CLAD TEMPERATURE

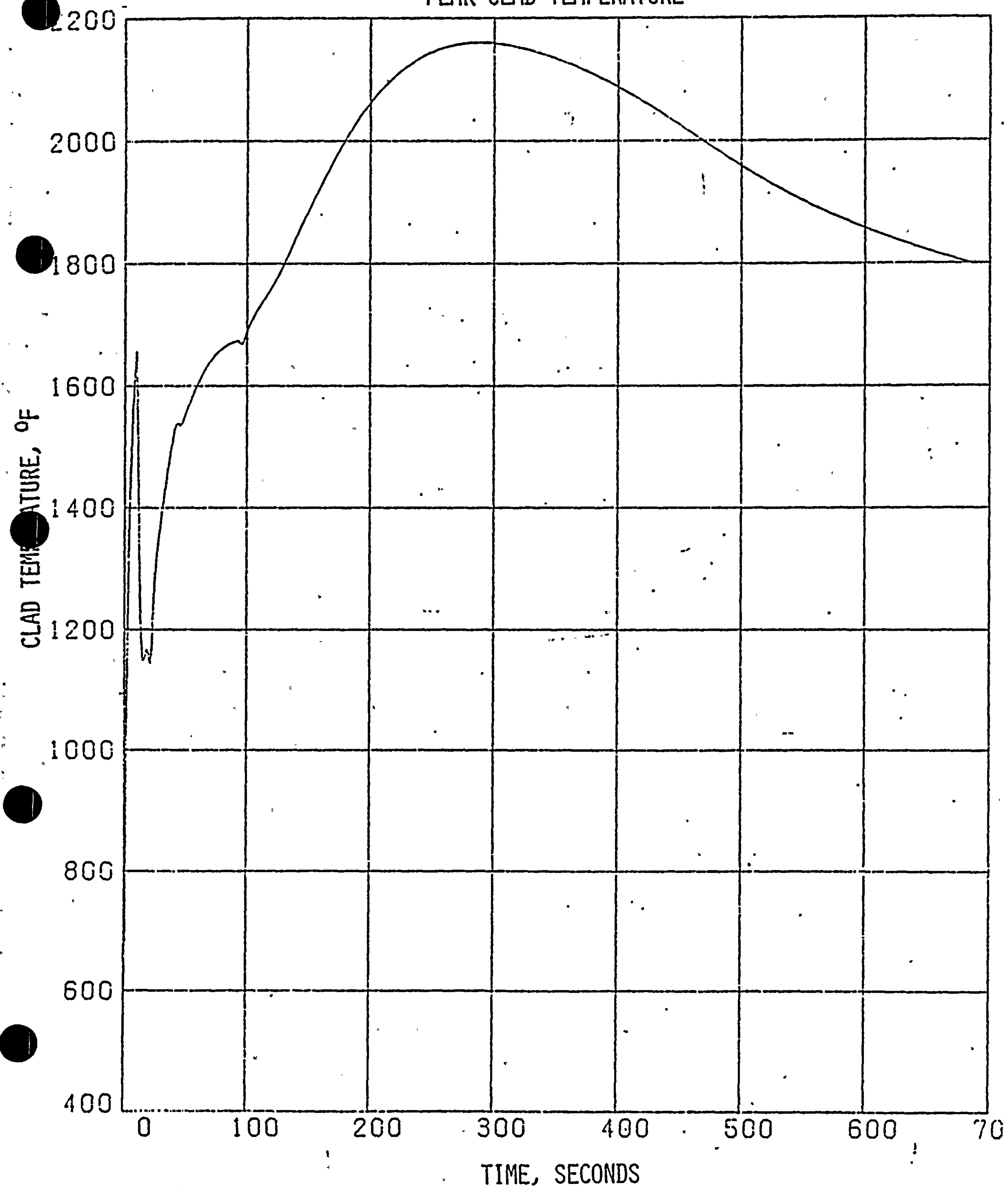


FIGURE I.4-A
ST LUCIE UNIT I STRETCH POWER
1.0 x DOUBLE ENDED GUILLOTINE BREAK IN PUMP DISCHARGE LEG
CORE POWER

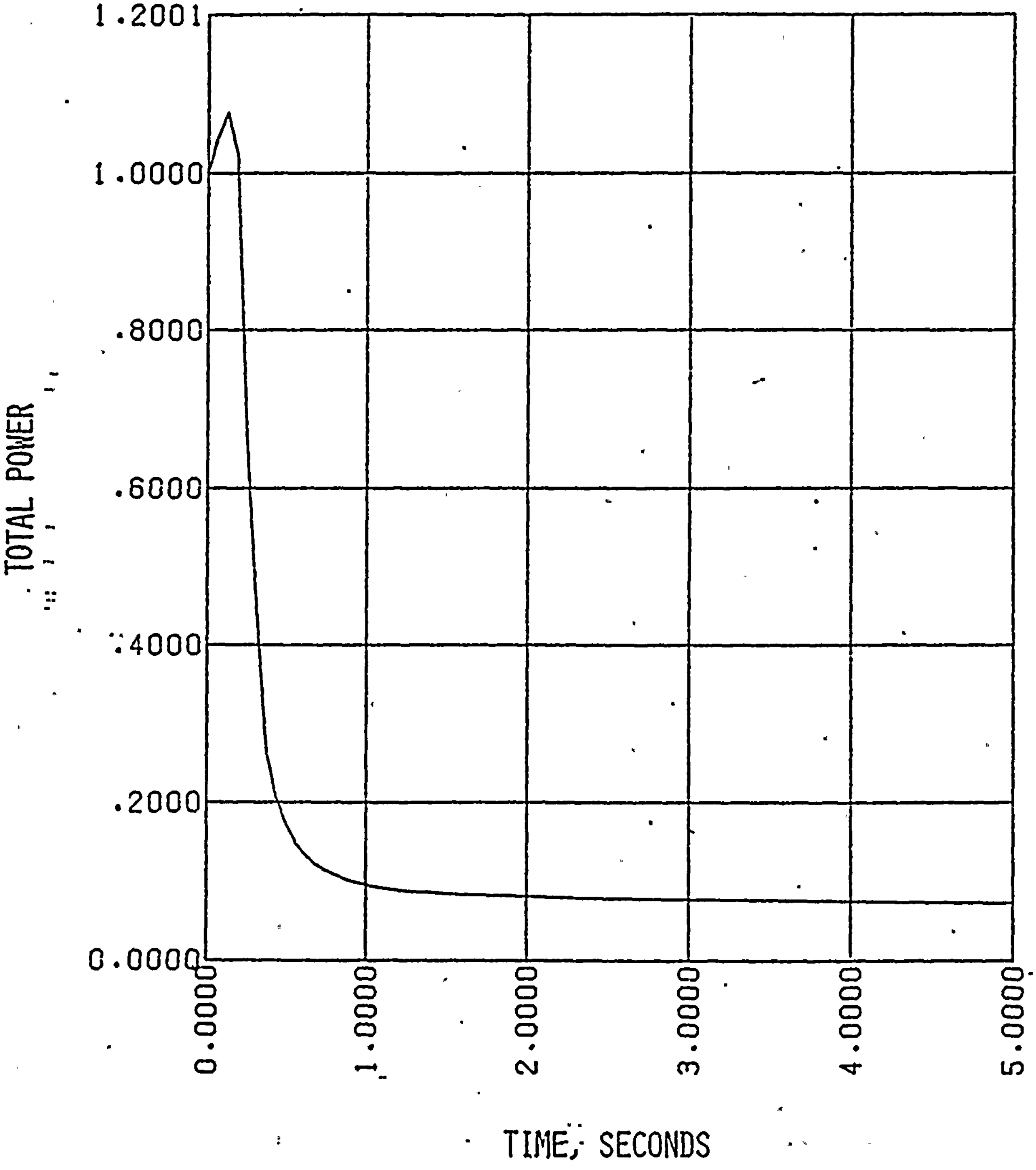


FIGURE I.4-B
ST LUCIE UNIT I STRETCH POWER
1.0 x DOUBLE ENDED GUILLOTINE BREAK IN PUMP DISCHARGE LEG
PRESSURE IN CENTER HOT ASSEMBLY NODE

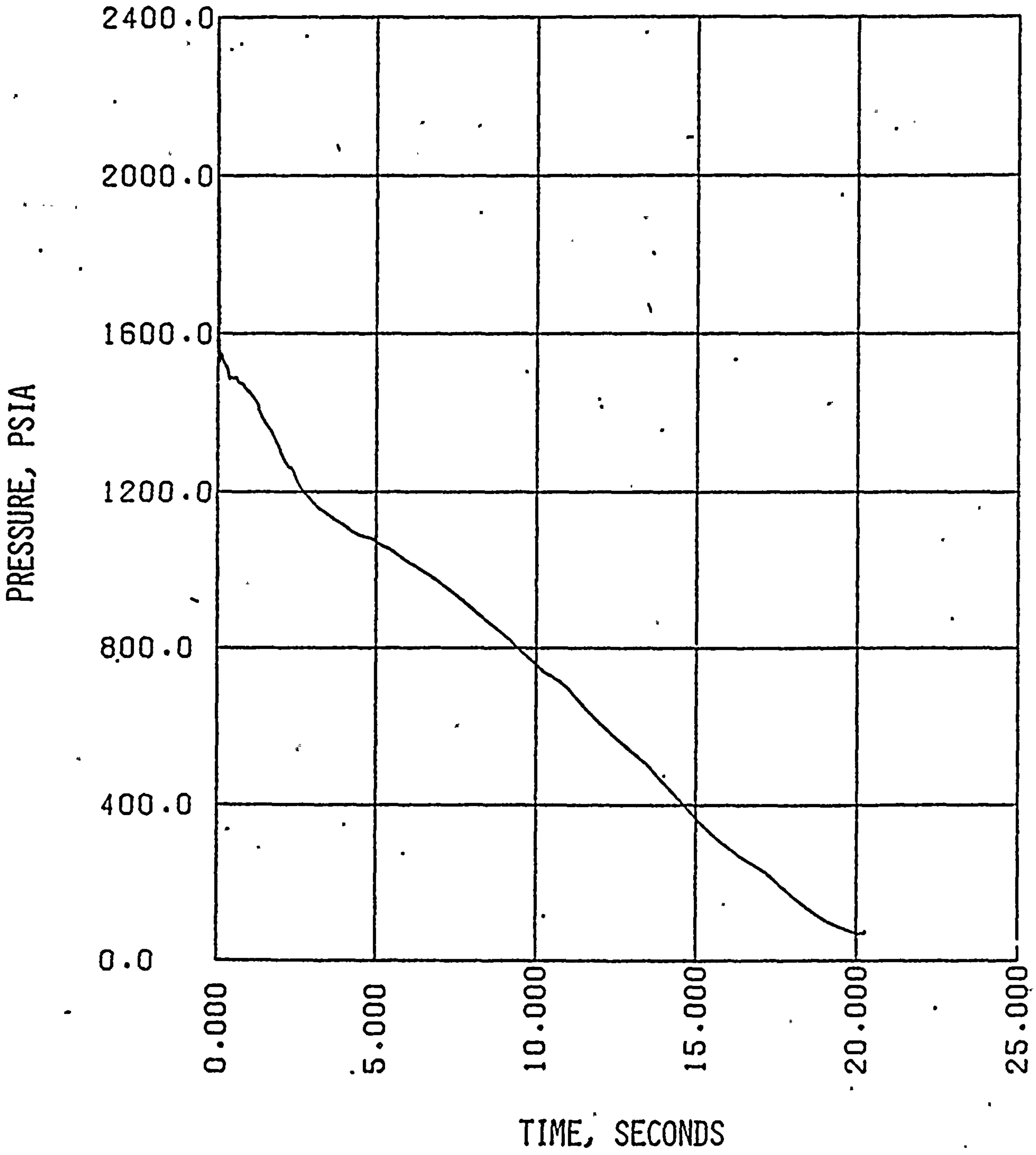


FIGURE I.4-C
ST LUCIE UNIT I STRETCH POWER
1.0 x DOUBLE ENDED GUILLOTINE BREAK IN PUMP DISCHARGE LEG
LEAK FLOW

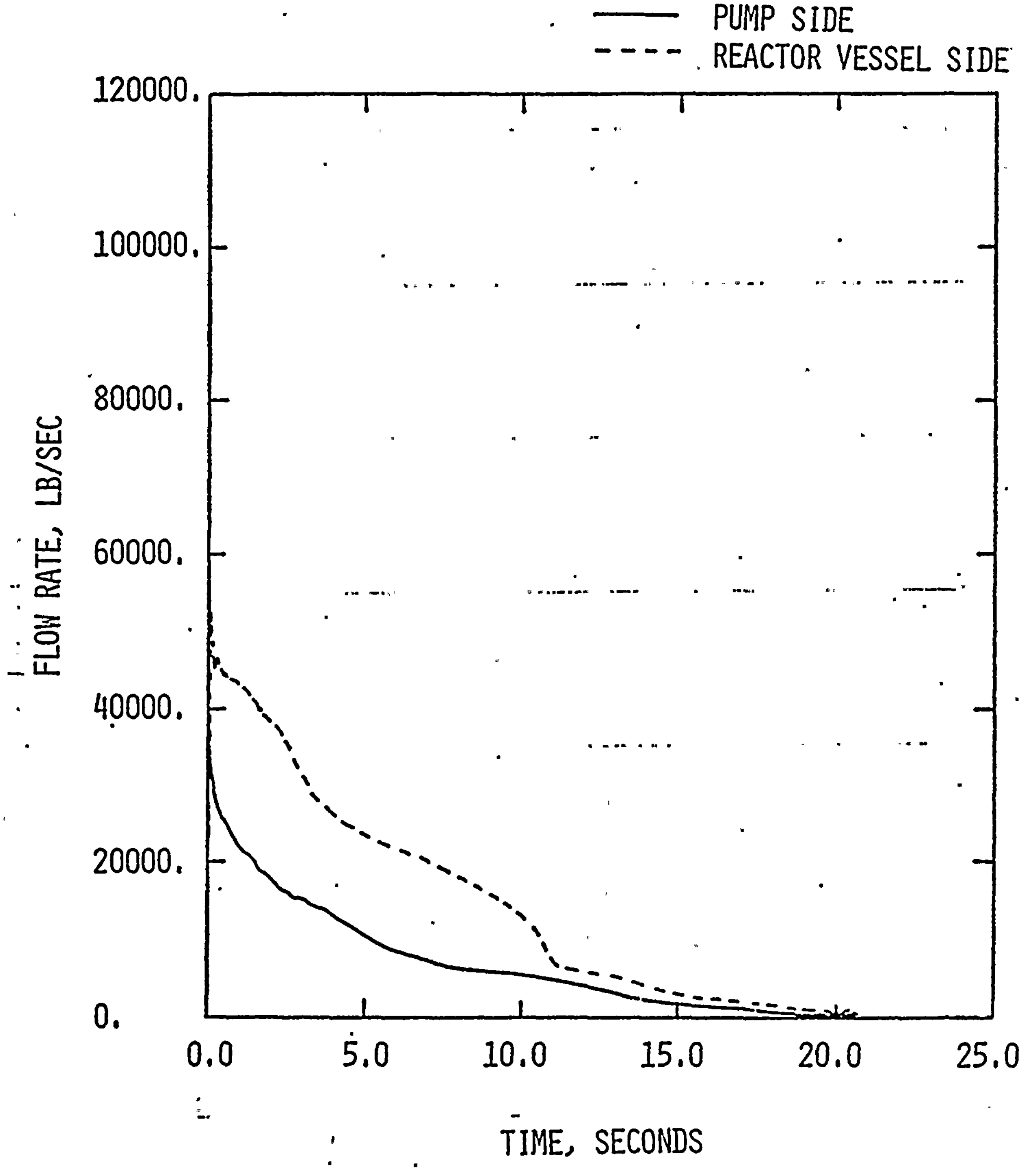


FIGURE I.4-D.1
ST LUCIE UNIT I STRETCH POWER
1.0 x DOUBLE ENDED GUILLOTINE BREAK IN PUMP DISCHARGE LEG
FLOW IN HOT ASSEMBLY-PATH 16, BELOW HOT SPOT

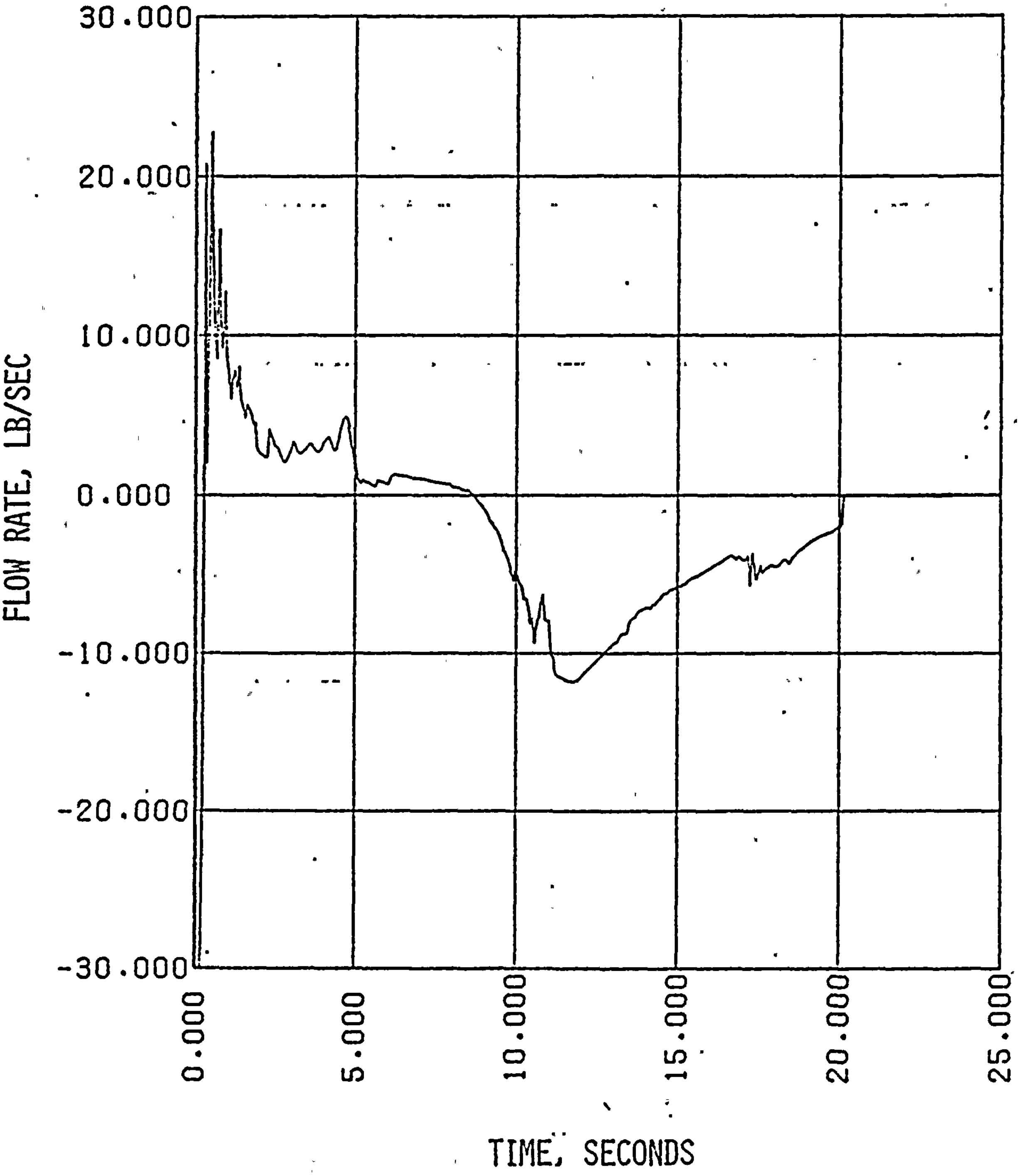


FIGURE I.4-D.2
ST LUCIE UNIT I STRETCH POWER
1.0 x DOUBLE ENDED GUILLOTINE BREAK IN PUMP DISCHARGE LEG
FLOW IN HOT ASSEMBLY-PATH 17, ABOVE HOT SPOT

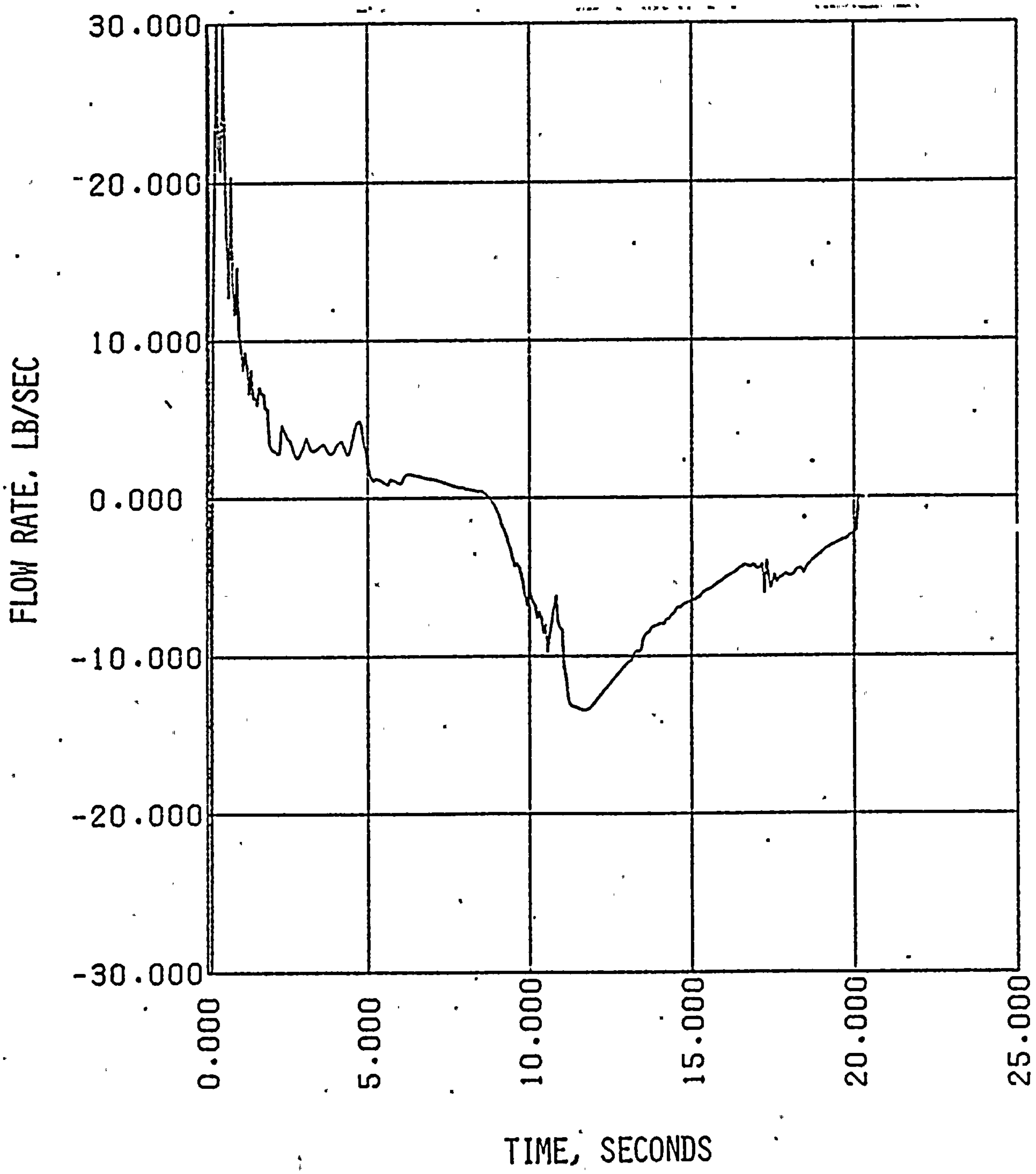


FIGURE I.4-E
ST LUCIE UNIT I STRETCH POWER
1.0 x DOUBLE ENDED GUILLOTINE BREAK IN PUMP DISCHARGE LEG
HOT ASSEMBLY QUALITY

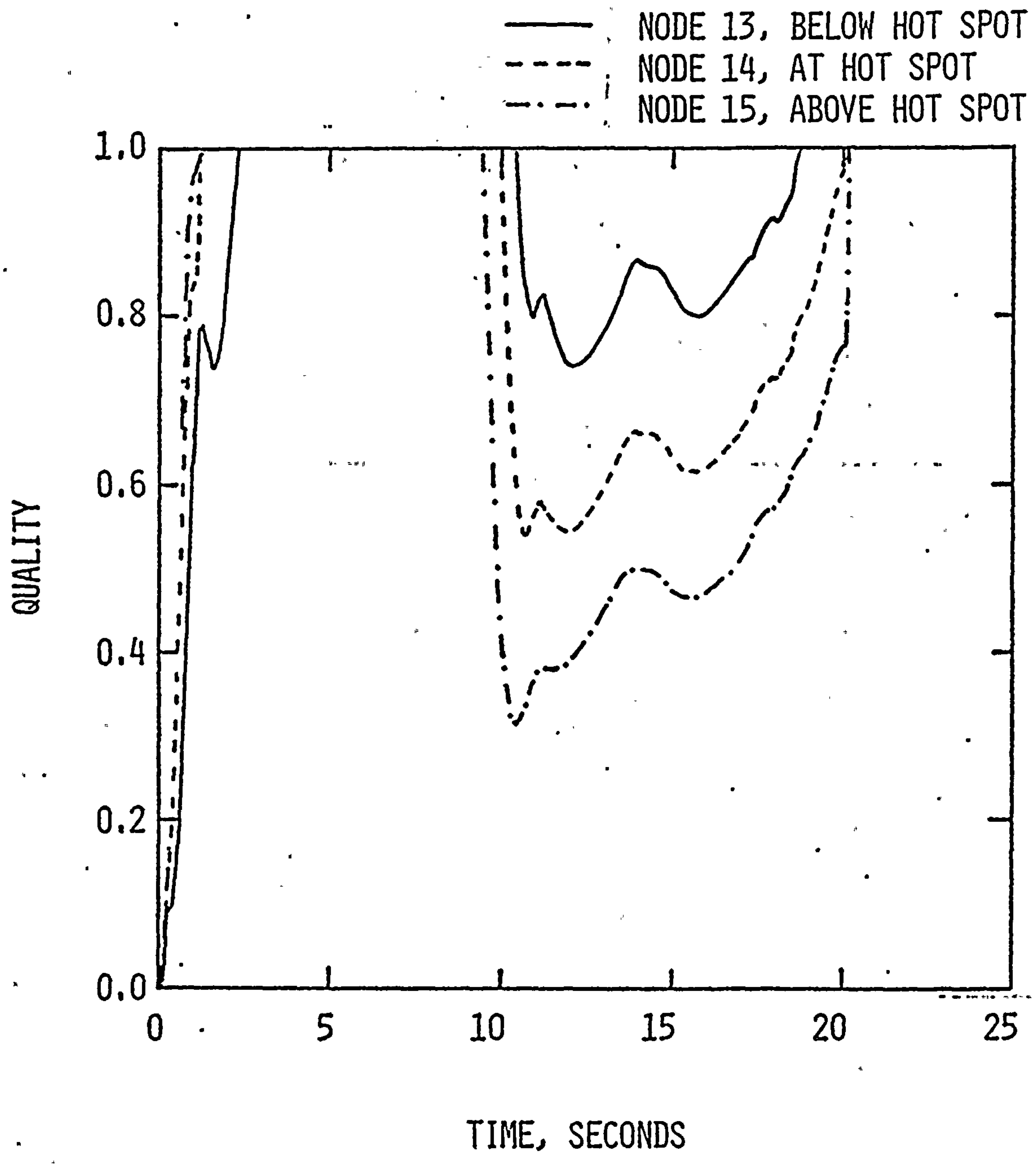


FIGURE I.4-F
ST LUCIE UNIT I STRETCH POWER
1.0 x DOUBLE ENDED GUILLOTINE BREAK IN PUMP DISCHARGE LEG
CONTAINMENT PRESSURE

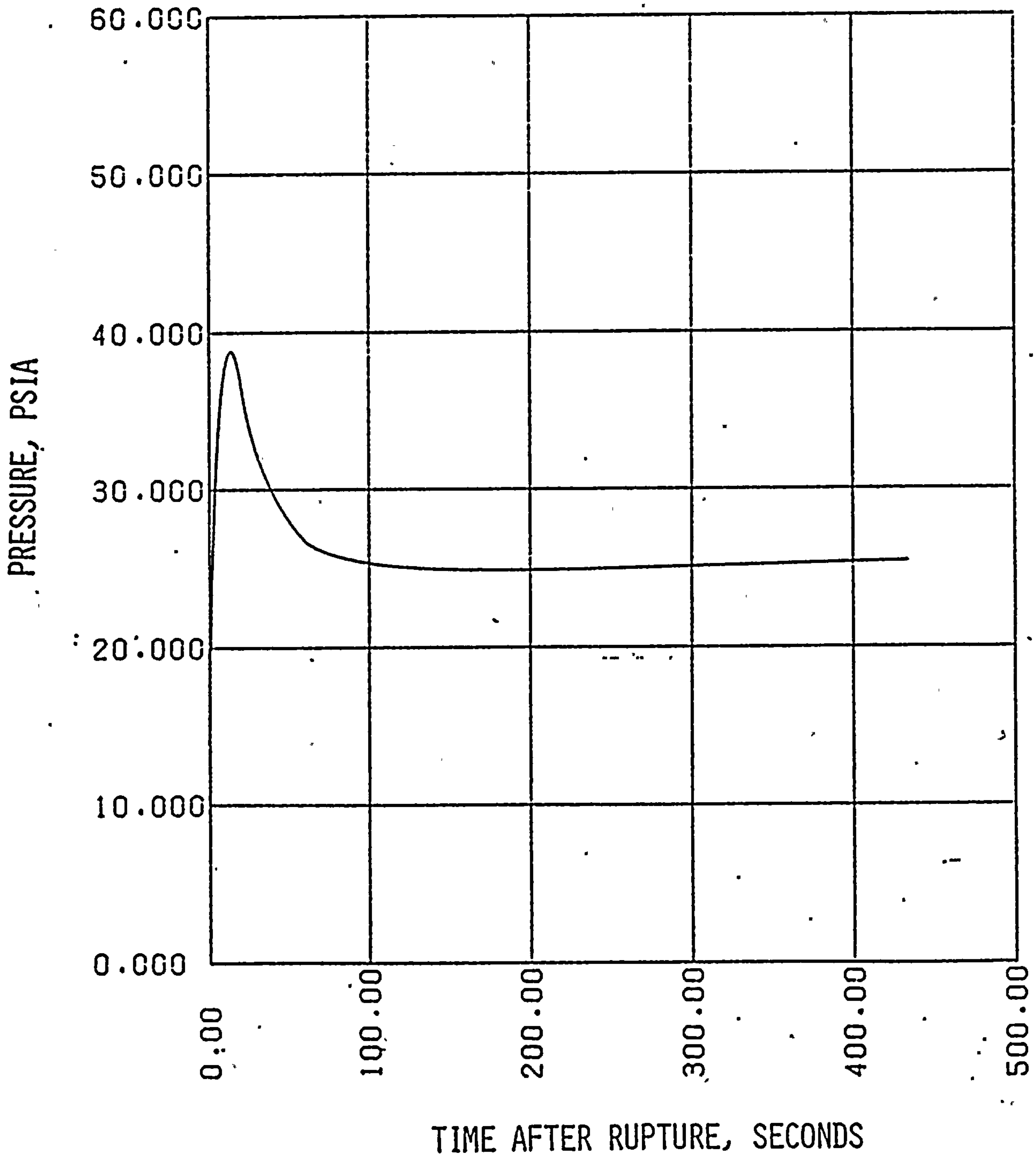


FIGURE I.4-G
ST LUCIE UNIT I STRETCH POWER
1.0 x DOUBLE ENDED GUILLOTINE BREAK IN PUMP DISCHARGE LEG
MASS ADDED TO CORE DURING REFLOOD

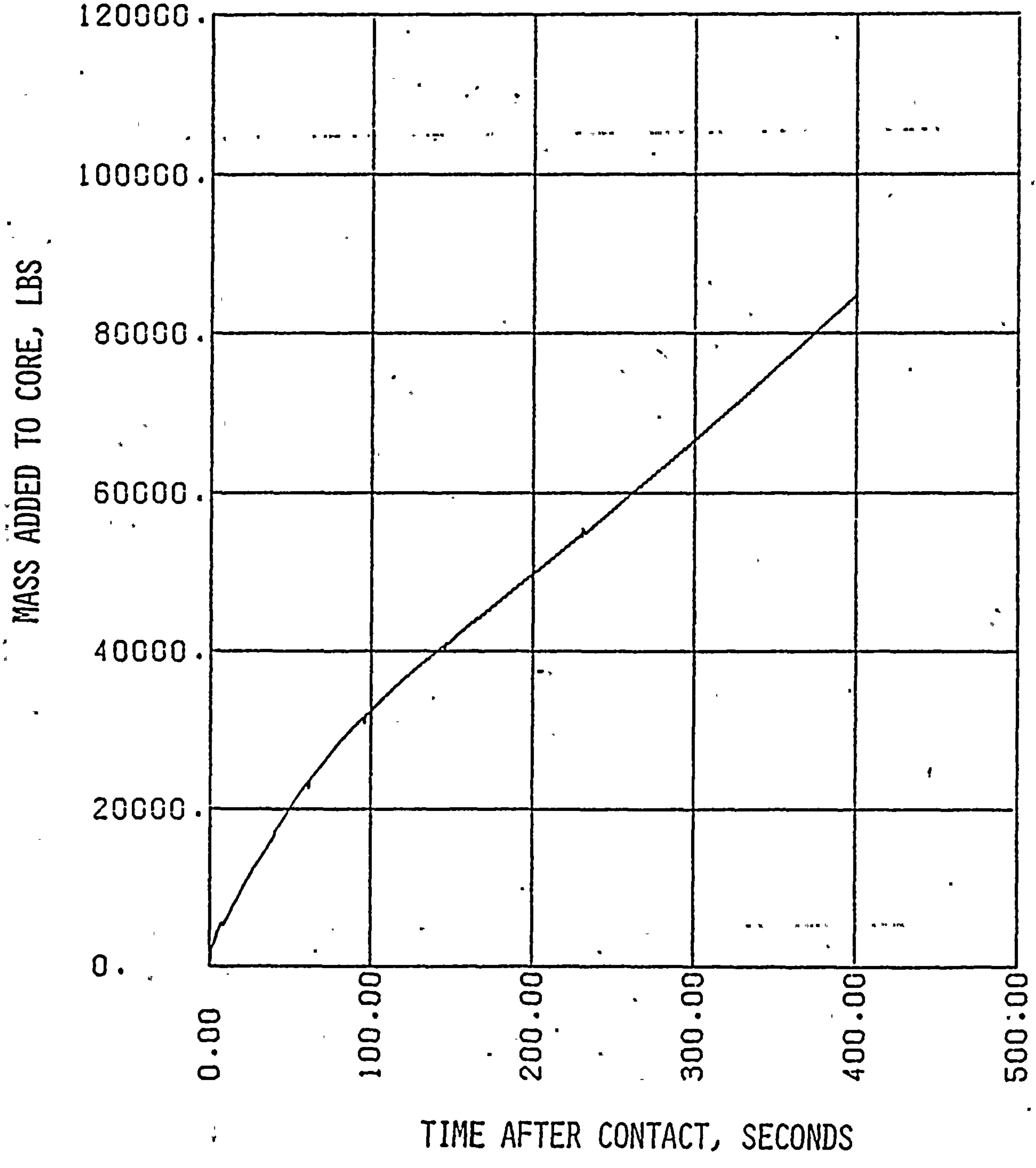


FIGURE I.4-H
ST LUCIE UNIT I STRETCH POWER
1.0 x DOUBLE ENDED GUILLOTINE BREAK IN PUMP DISCHARGE LEG
PEAK CLAD TEMPERATURE

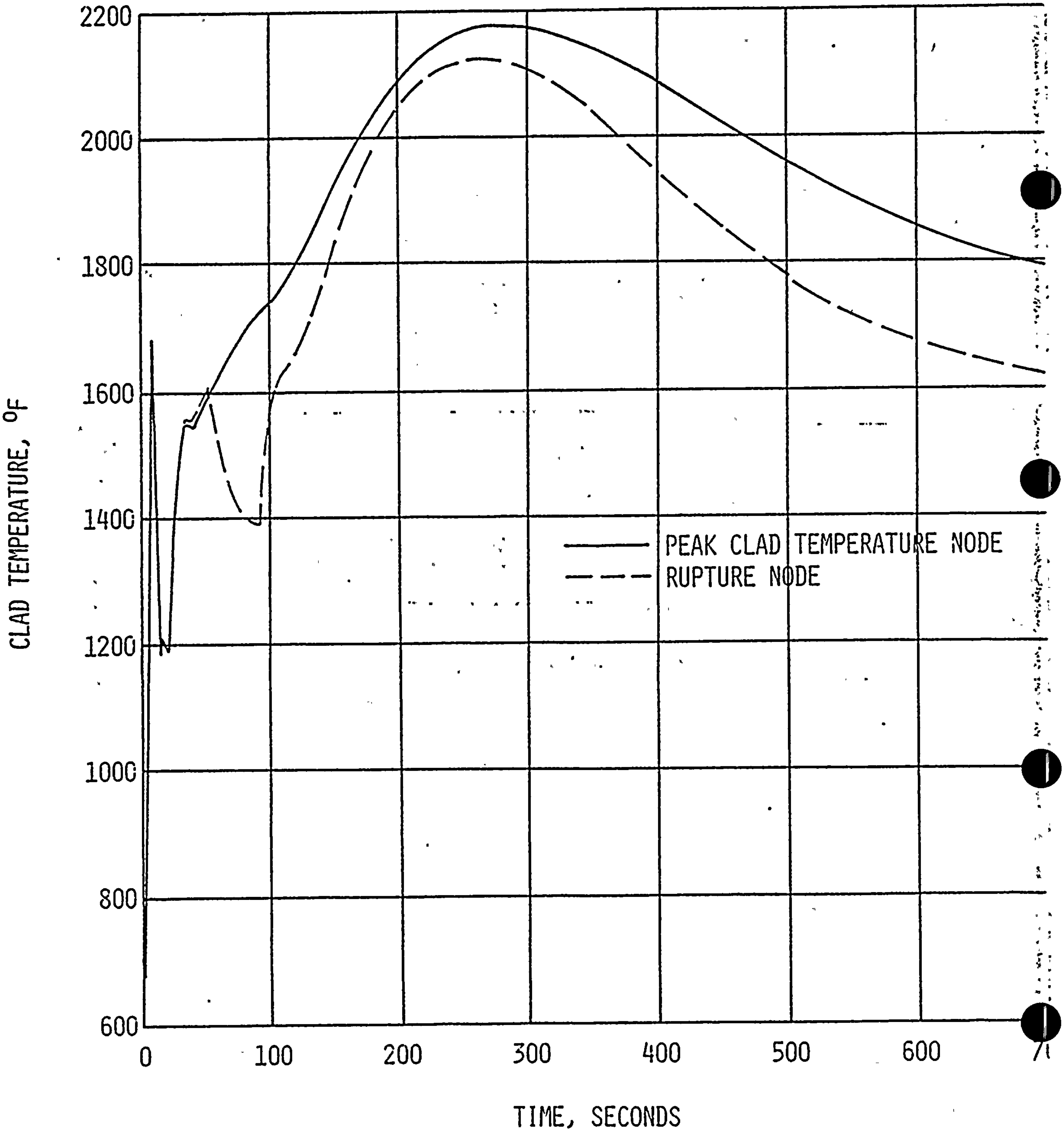


FIGURE I.4-I

ST. LUCIE UNIT I STRETCH POWER

1.0 x DOUBLE ENDED GUILLOTINE BREAK IN PUMP DISCHARGE LEG

MID ANNULUS FLOW

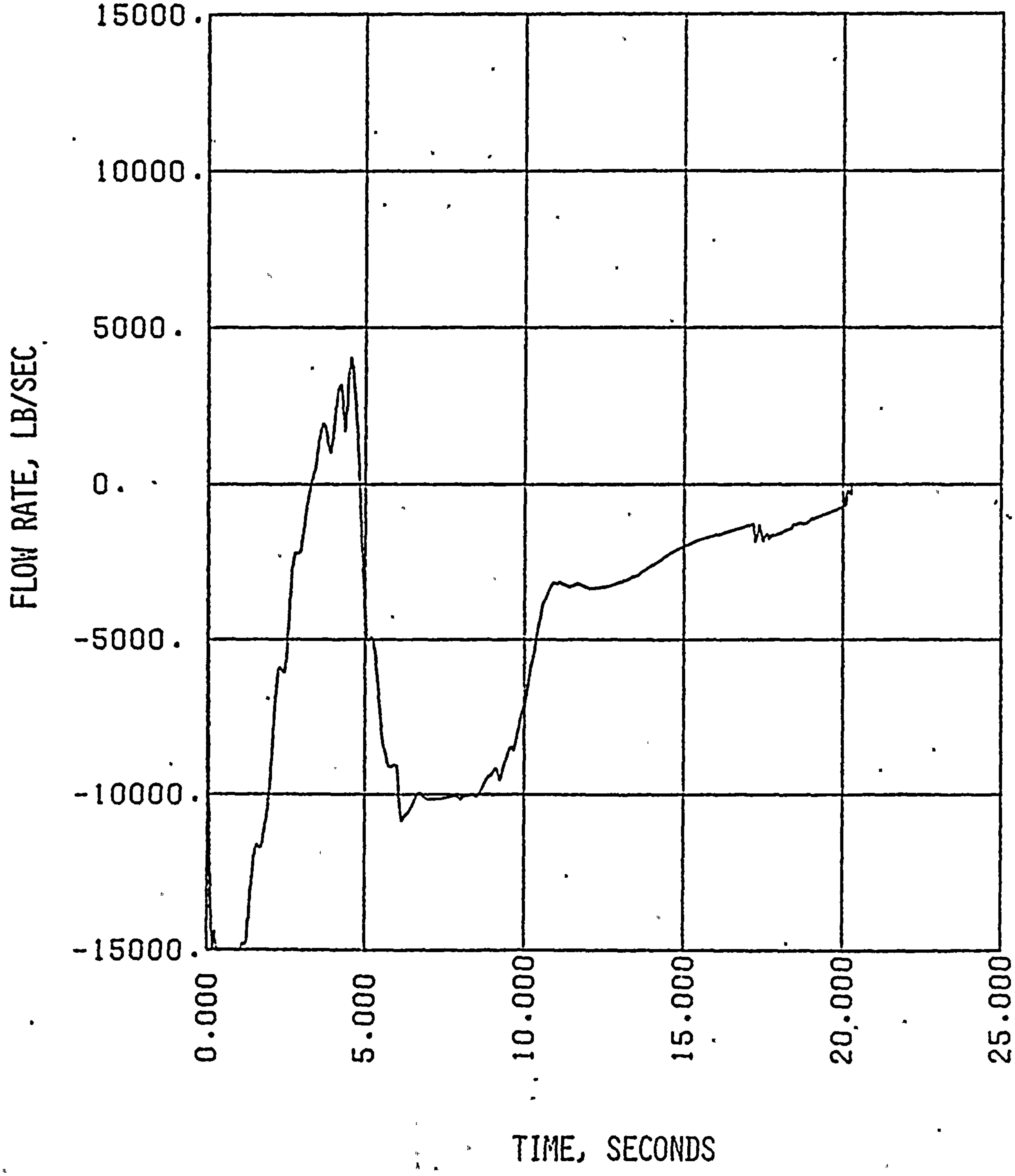


FIGURE I.4-J
ST. LUCIE UNIT I STRETCH POWER
1.0 x DOUBLE ENDED GUILLOTINE BREAK IN PUMP DISCHARGE LEG
QUALITIES ABOVE AND BELOW THE CORE

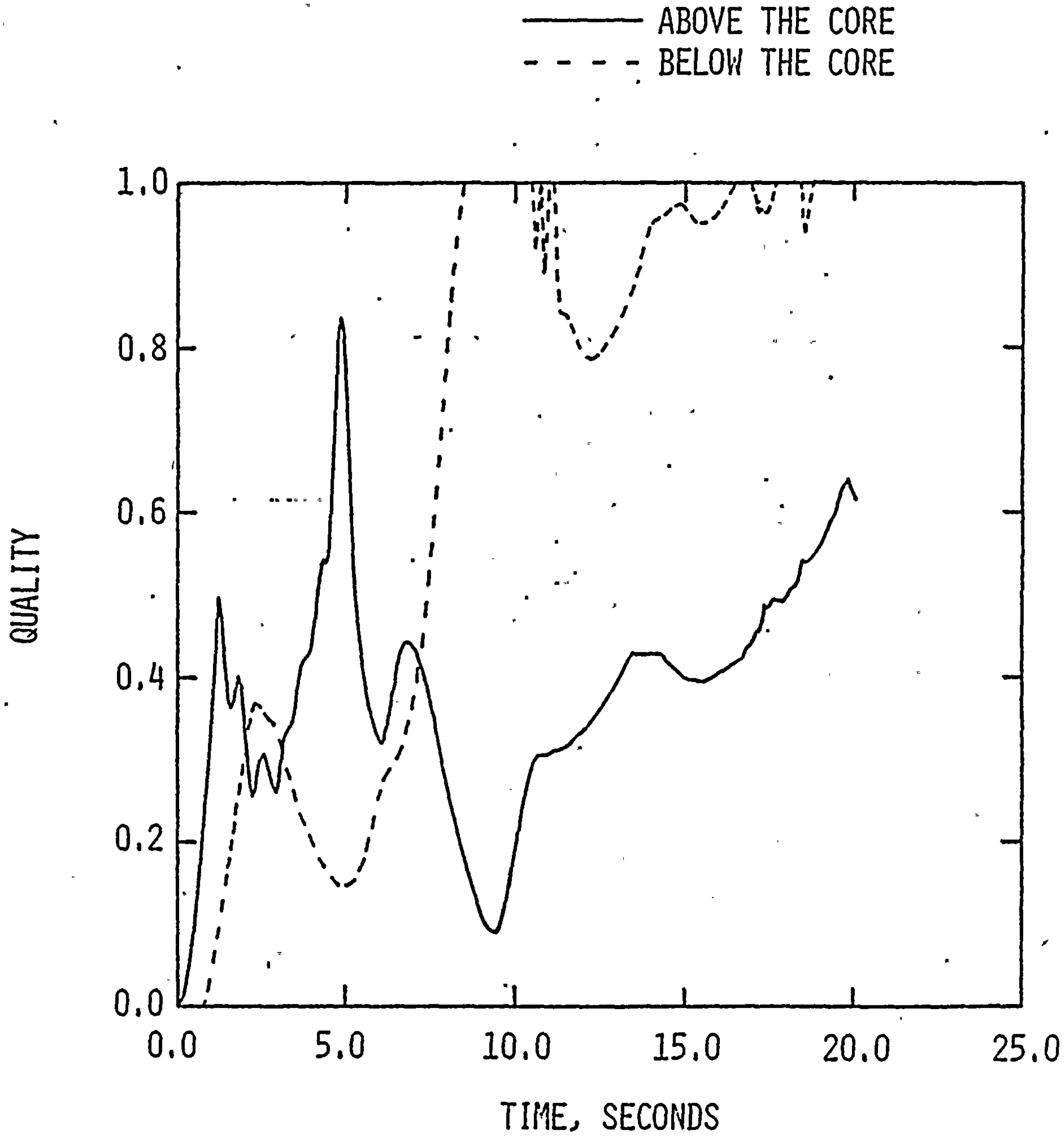


FIGURE I.4-K
ST. LUCIE UNIT I STRETCH POWER
1.0 x DOUBLE ENDED GUILLOTINE BREAK IN PUMP DISCHARGE LEG
CORE PRESSURE DROP

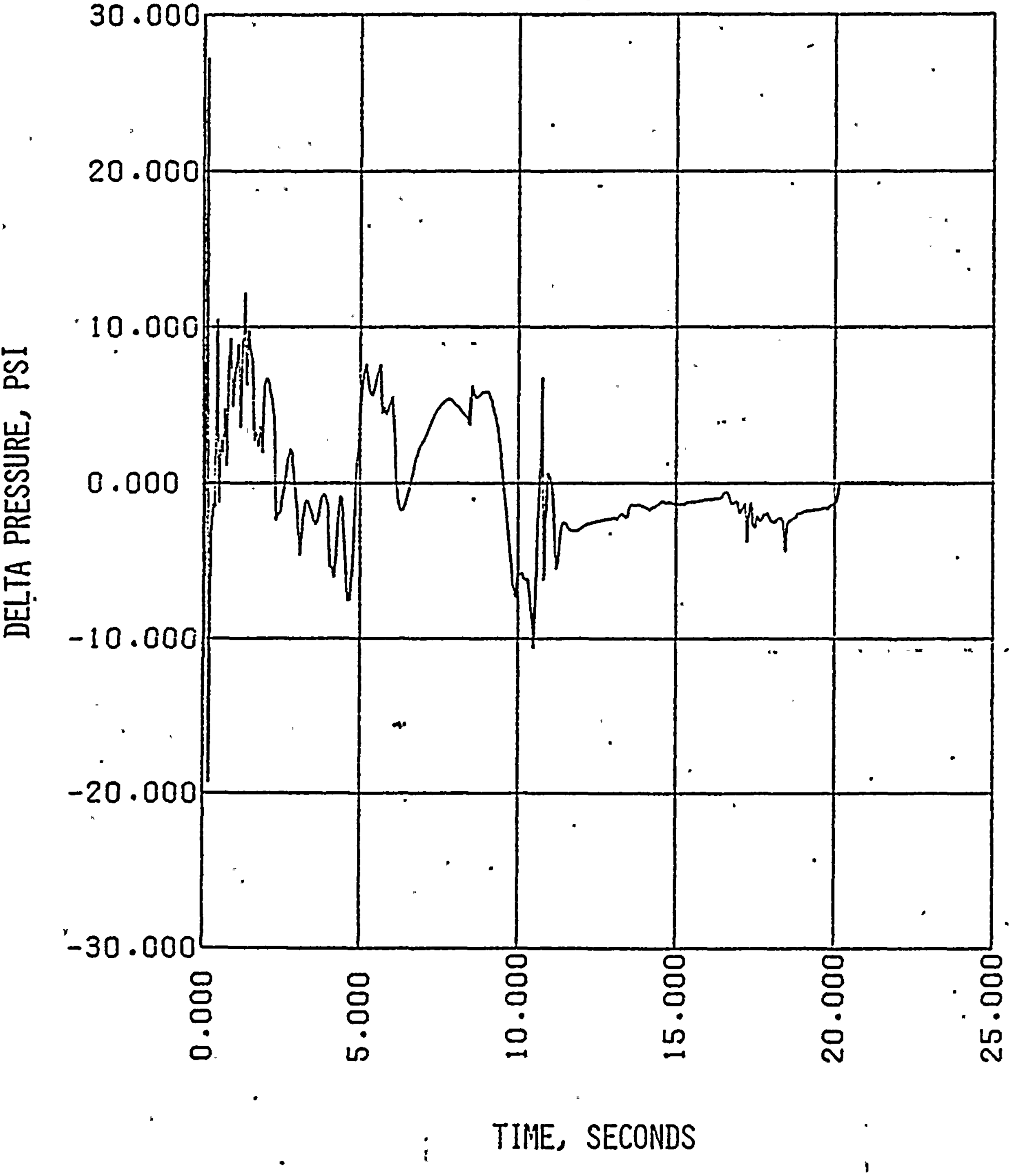


FIGURE I.4-L

ST. LUCIE UNIT I STRETCH POWER

1.0 x DOUBLE ENDED GUILLOTINE BREAK IN PUMP DISCHARGE LEG

SAFETY INJECTION TANK FLOW INTO DISCHARGE LEGS

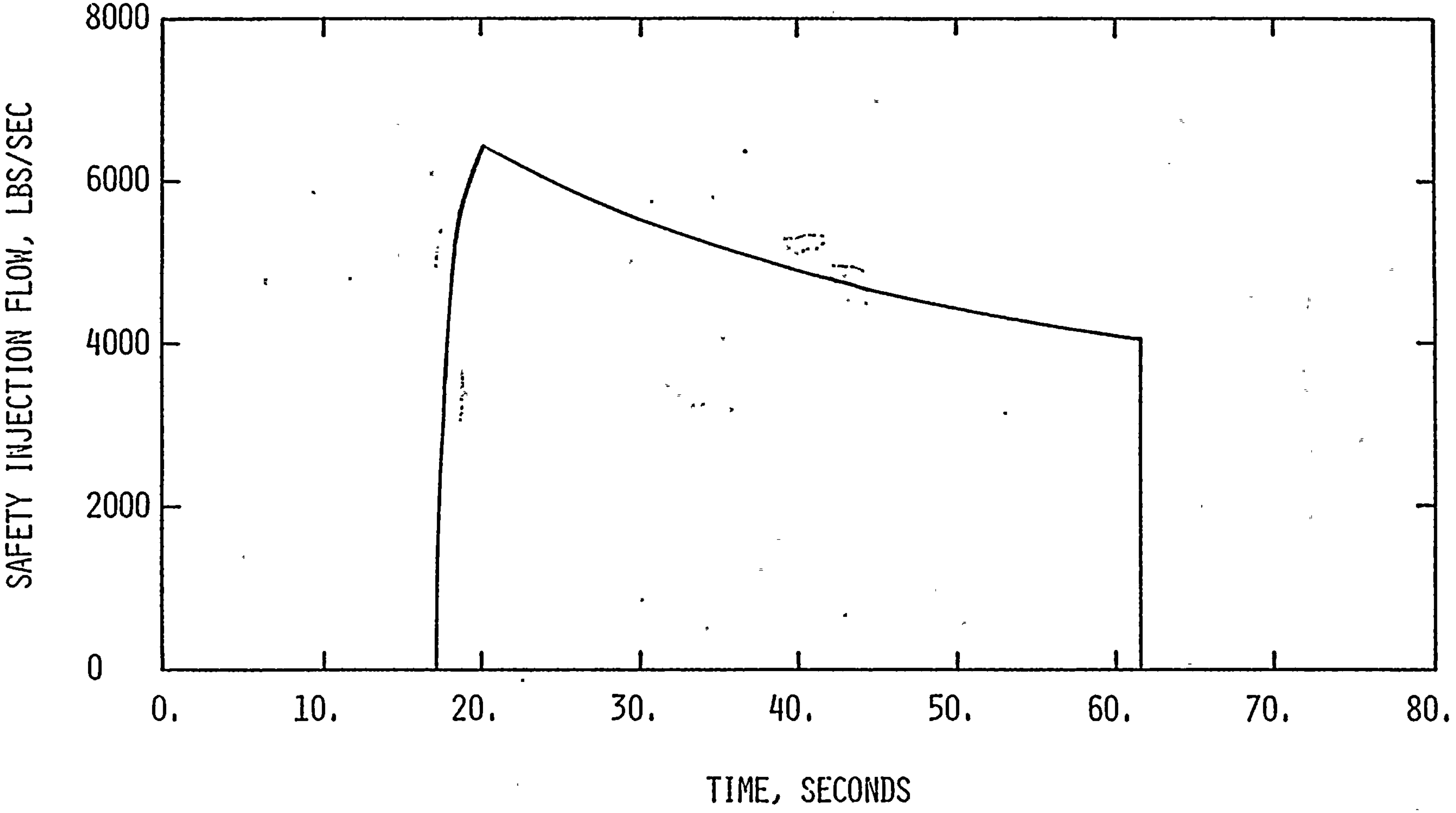


FIGURE I.4-M
ST. LUCIE UNIT I STRETCH POWER
1.0 x DOUBLE ENDED GUILLOTINE BREAK IN PUMP DISCHARGE LEG
WATER LEVEL IN DOWNCOMER DURING REFLOOD

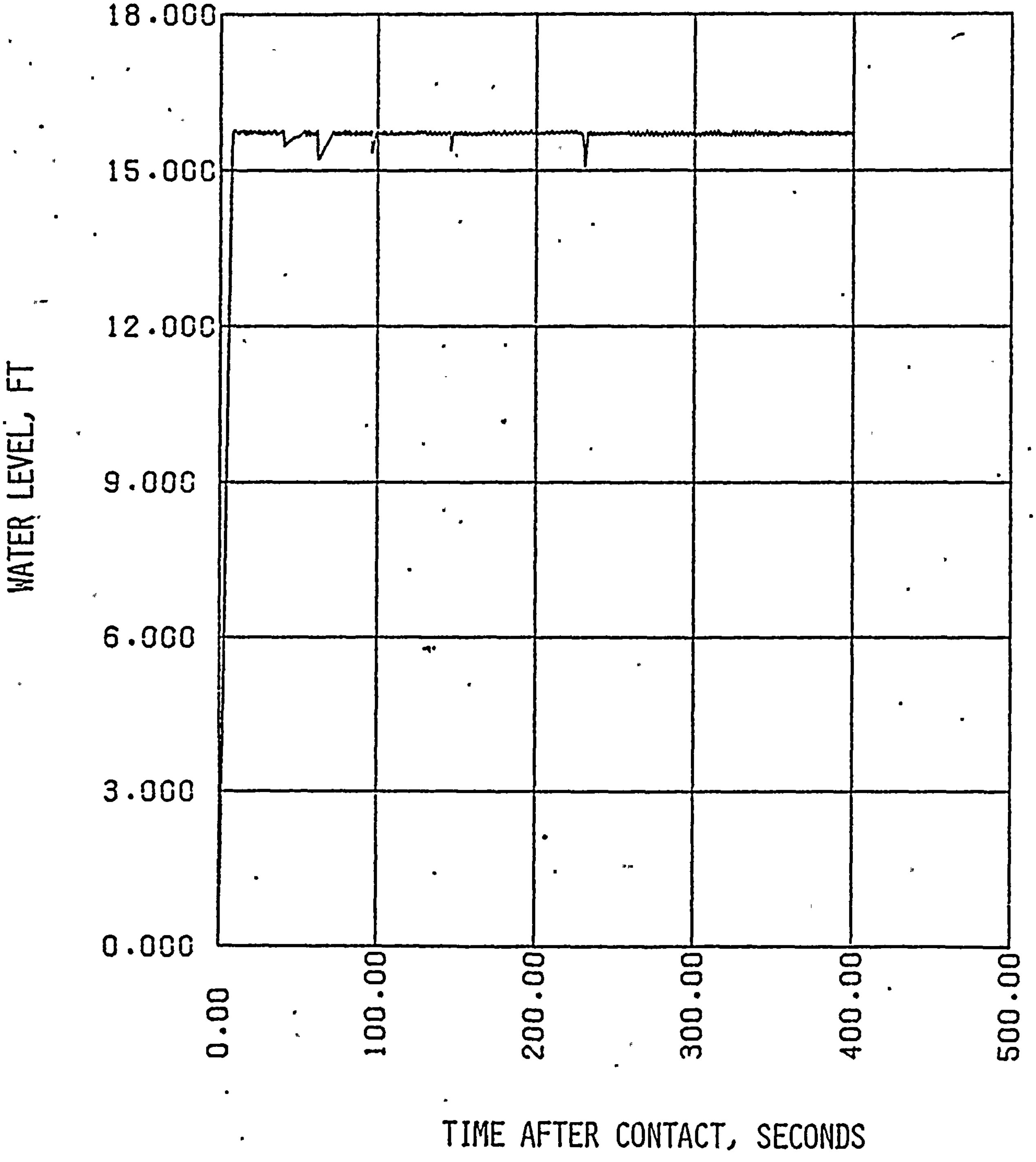


FIGURE I.4-N
ST. LUCIE UNIT I STRETCH POWER
1.0 x DOUBLE ENDED GUILLOTINE BREAK IN PUMP DISCHARGE LEG
HOT SPOT GAP CONDUCTANCE

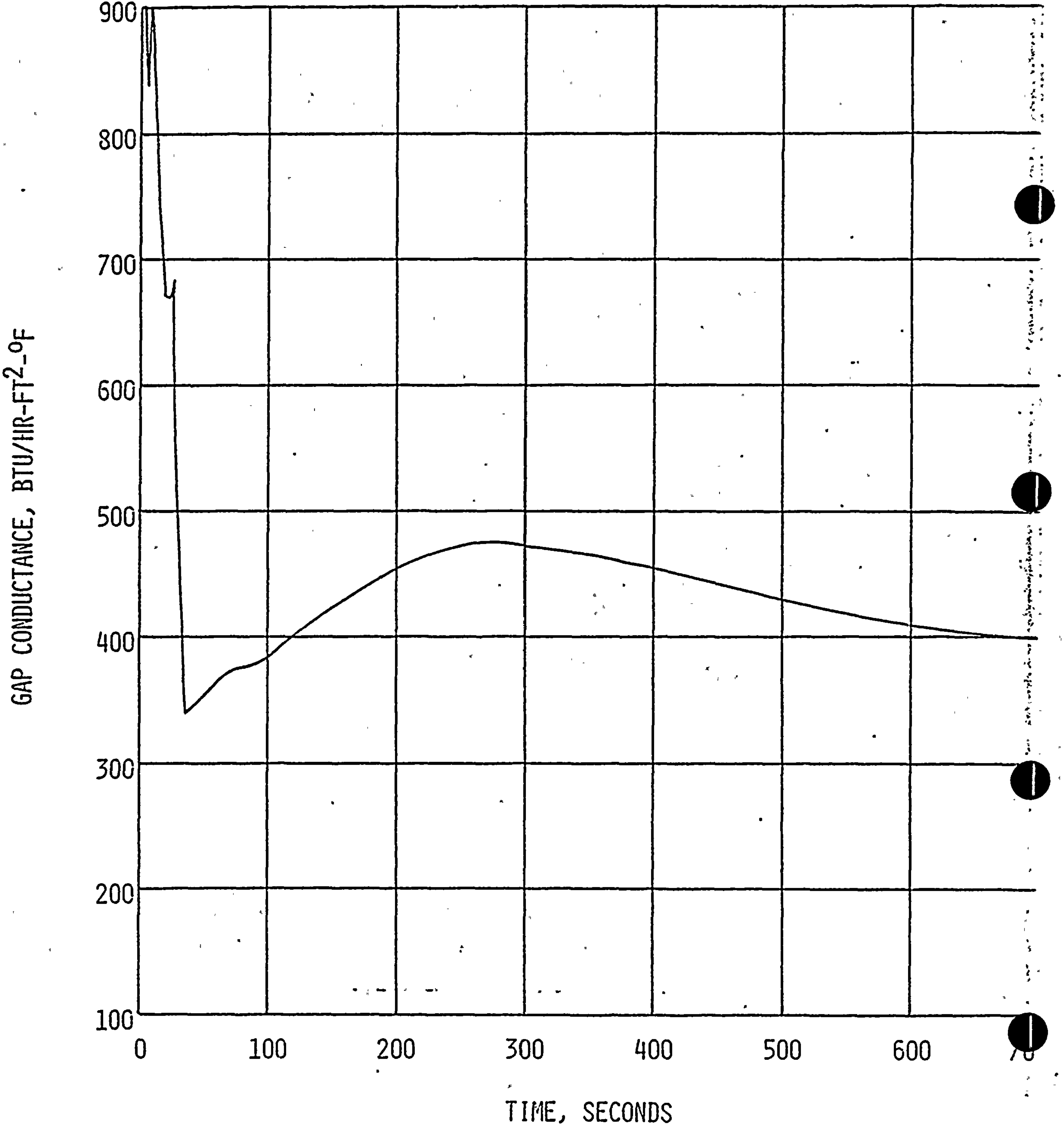


FIGURE I.4-0
ST. LUCIE UNIT I STRETCH POWER
1.0 x DOUBLE ENDED GUILLOTINE BREAK IN PUMP DISCHARGE LEG
PEAK LOCAL CLAD OXIDATION

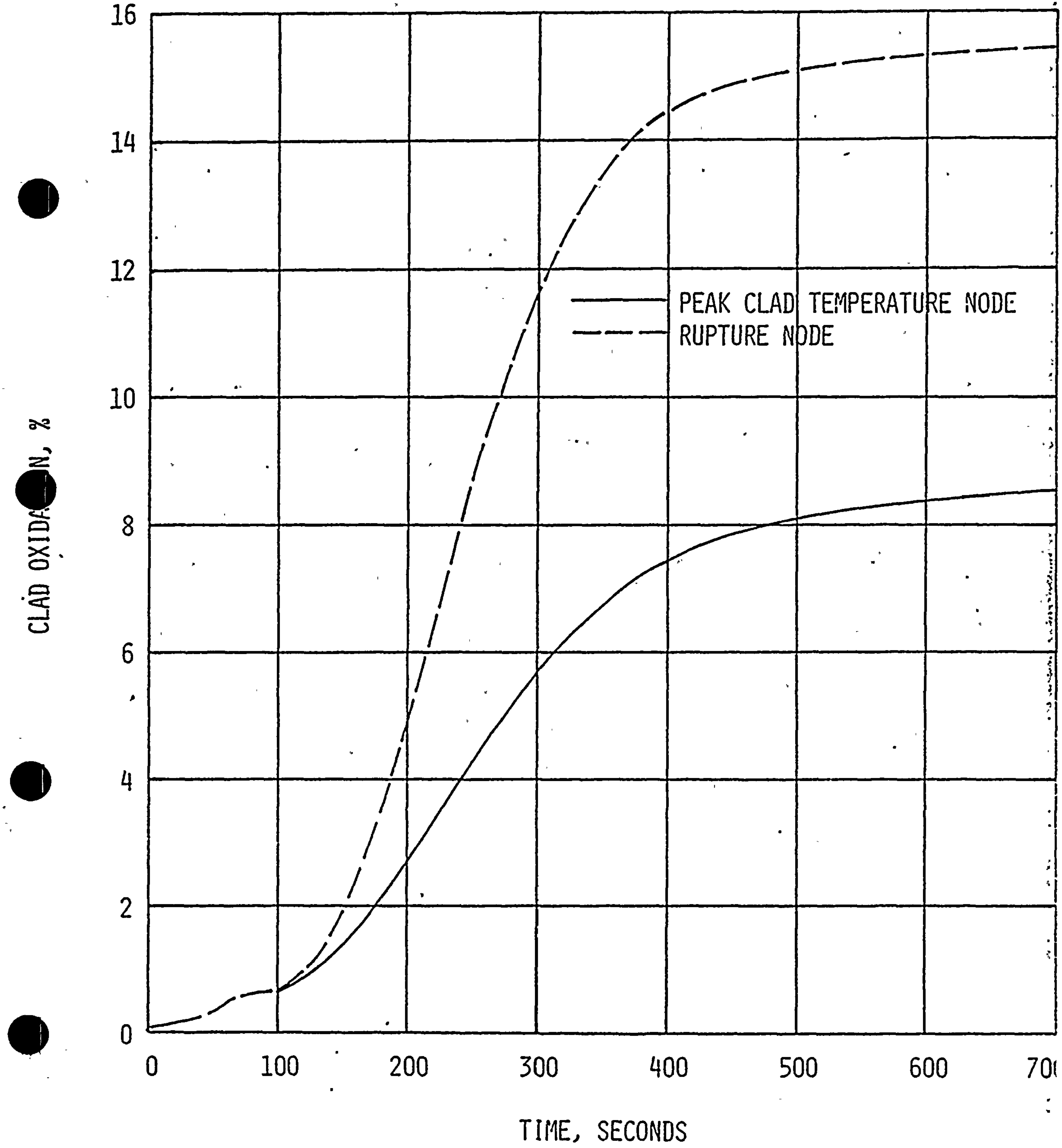


FIGURE 1.4-F

ST. LUCIE UNIT I STRETCH POWER
1.0 x DOUBLE ENDED GUILLOTINE BREAK IN PUMP DISCHARGE LEG
CLAD TEMPERATURE, CENTERLINE FUEL TEMPERATURE, AVERAGE
FUEL TEMPERATURE AND COOLANT TEMPERATURE FOR HOTTEST NODE

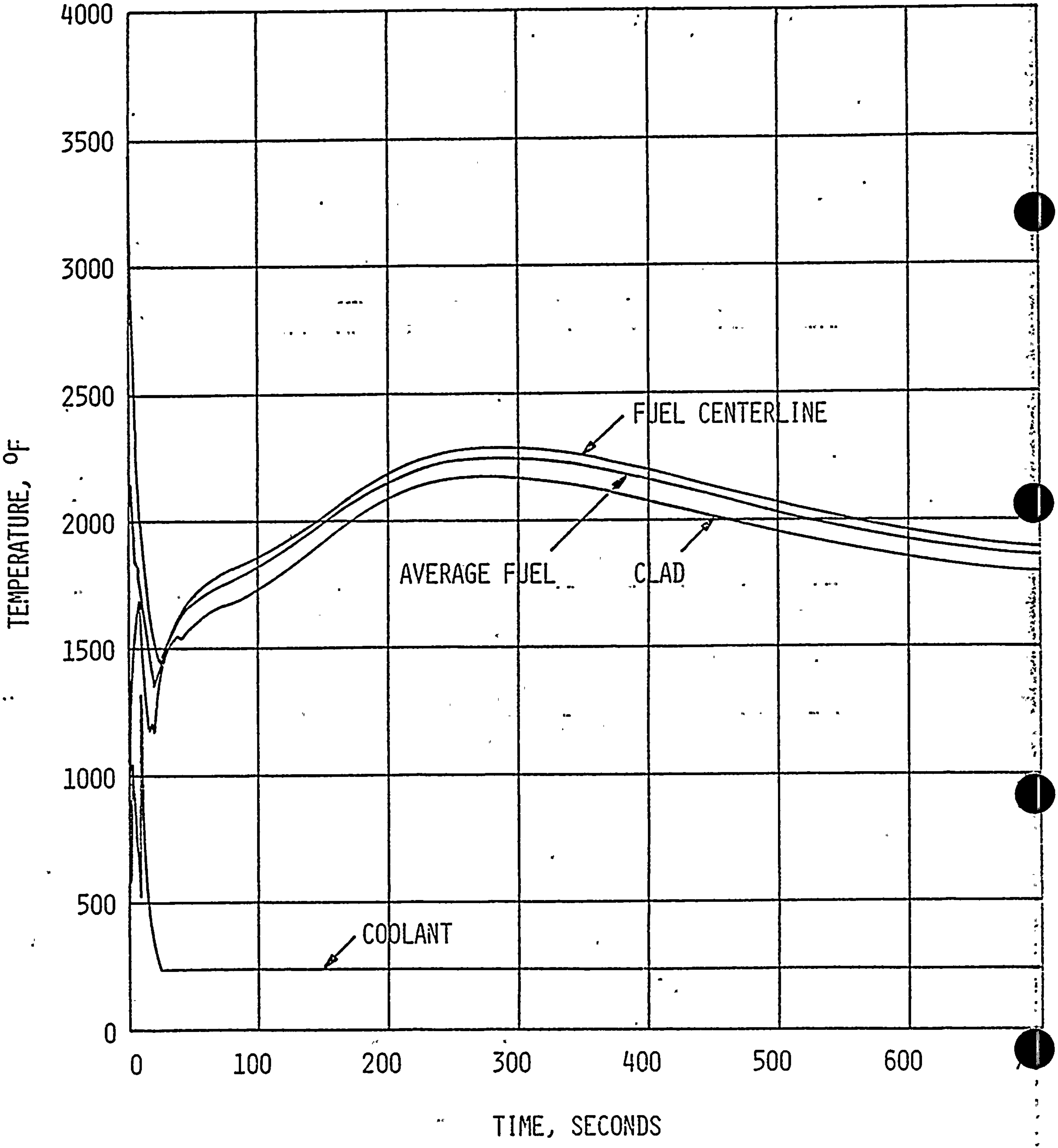


FIGURE I.4-Q
ST. LUCIE UNIT I STRETCH POWER
1.0 x DOUBLE ENDED GUILLOTINE BREAK IN PUMP DISCHARGE LEG
HOT SPOT HEAT TRANSFER COEFFICIENT

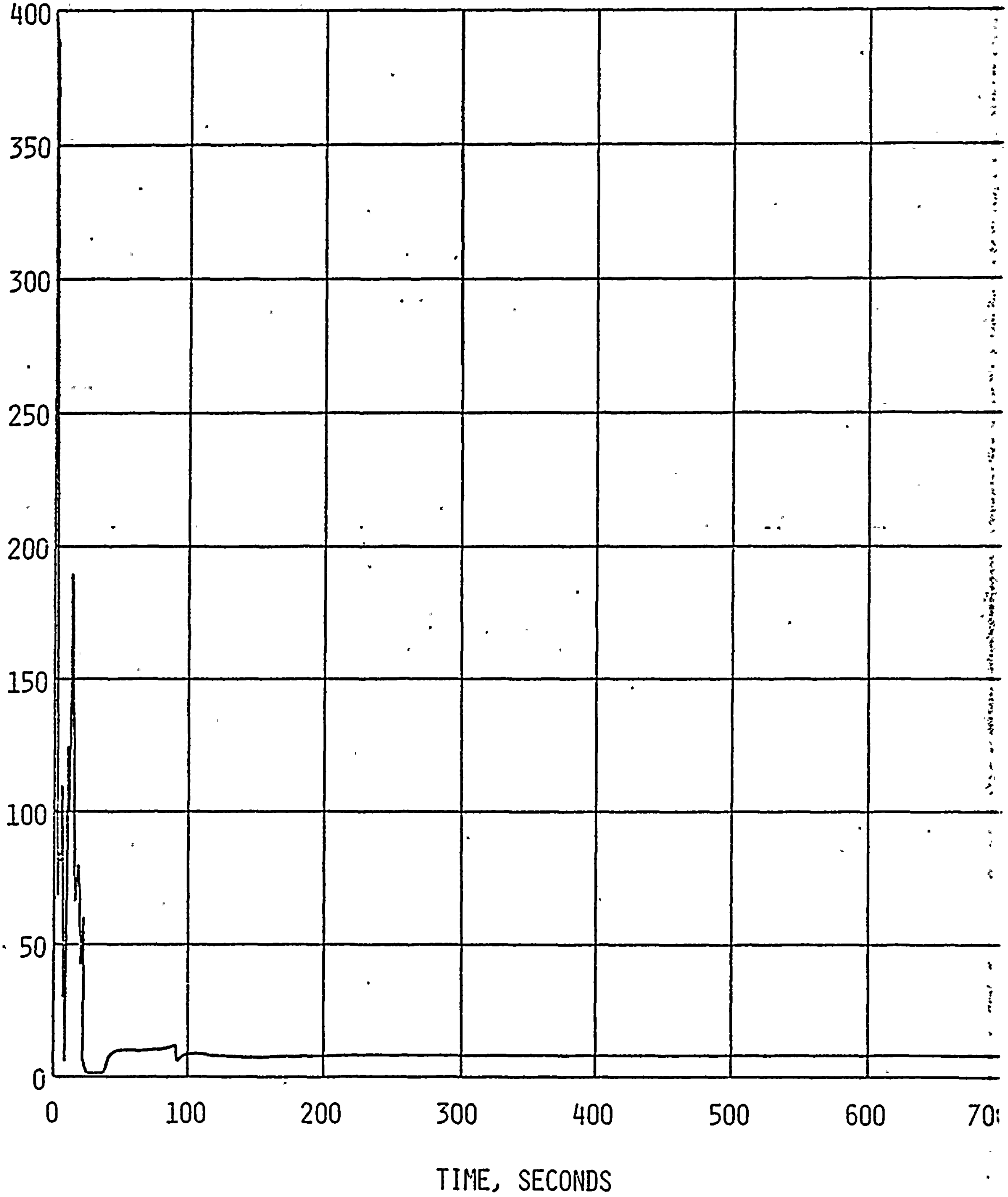


FIGURE I.4-R

ST. LUCIE UNIT I STRETCH POWER

1.0 x DOUBLE ENDED GUILLOTINE BREAK IN PUMP DISCHARGE LEG

CONTAINMENT TEMPERATURE

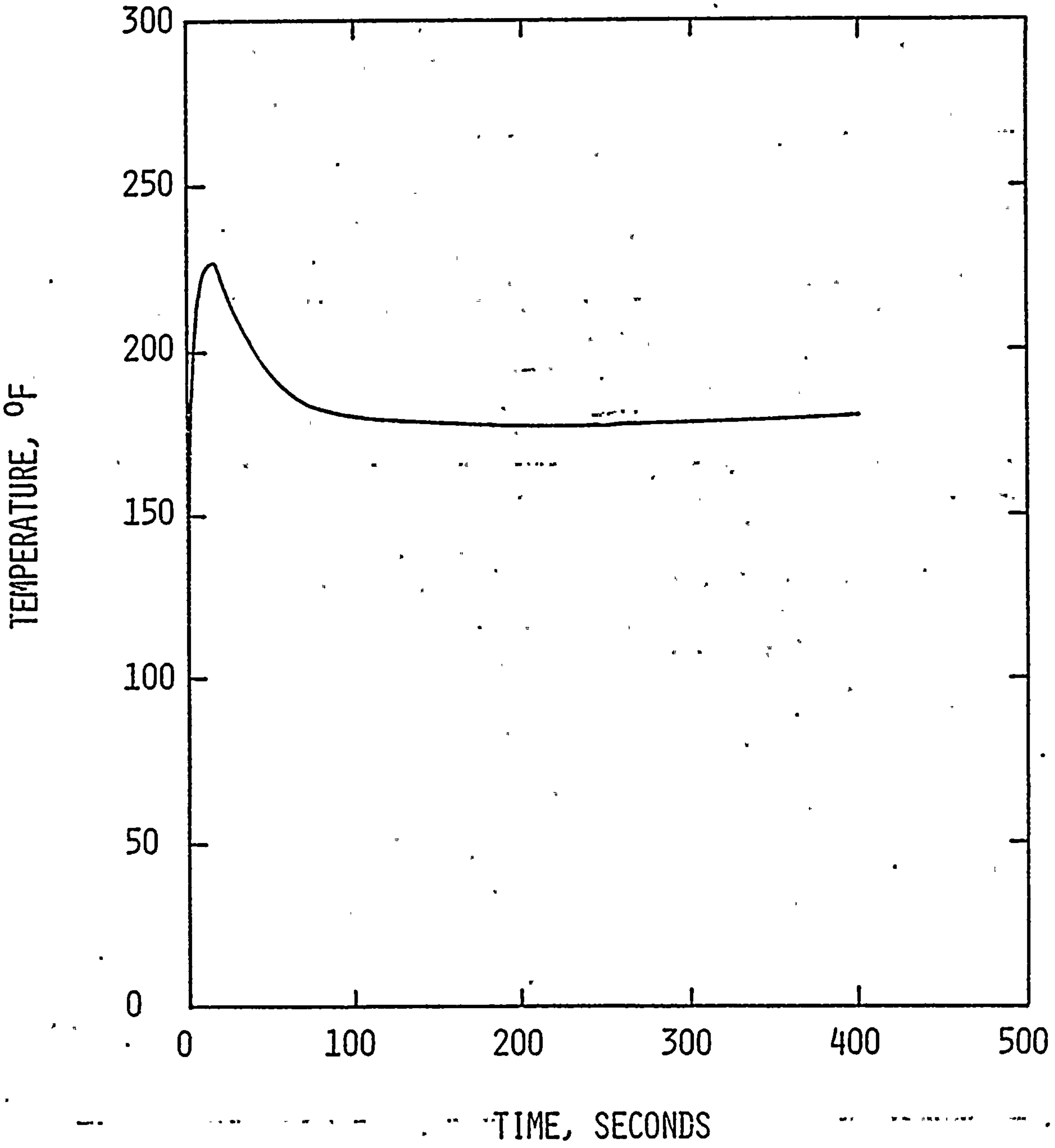


FIGURE I.4-S
ST. LUCIE UNIT I STRETCH POWER
1.0 x DOUBLE ENDED GUILLOTINE BREAK IN PUMP DISCHARGE LEG
SUMP TEMPERATURE

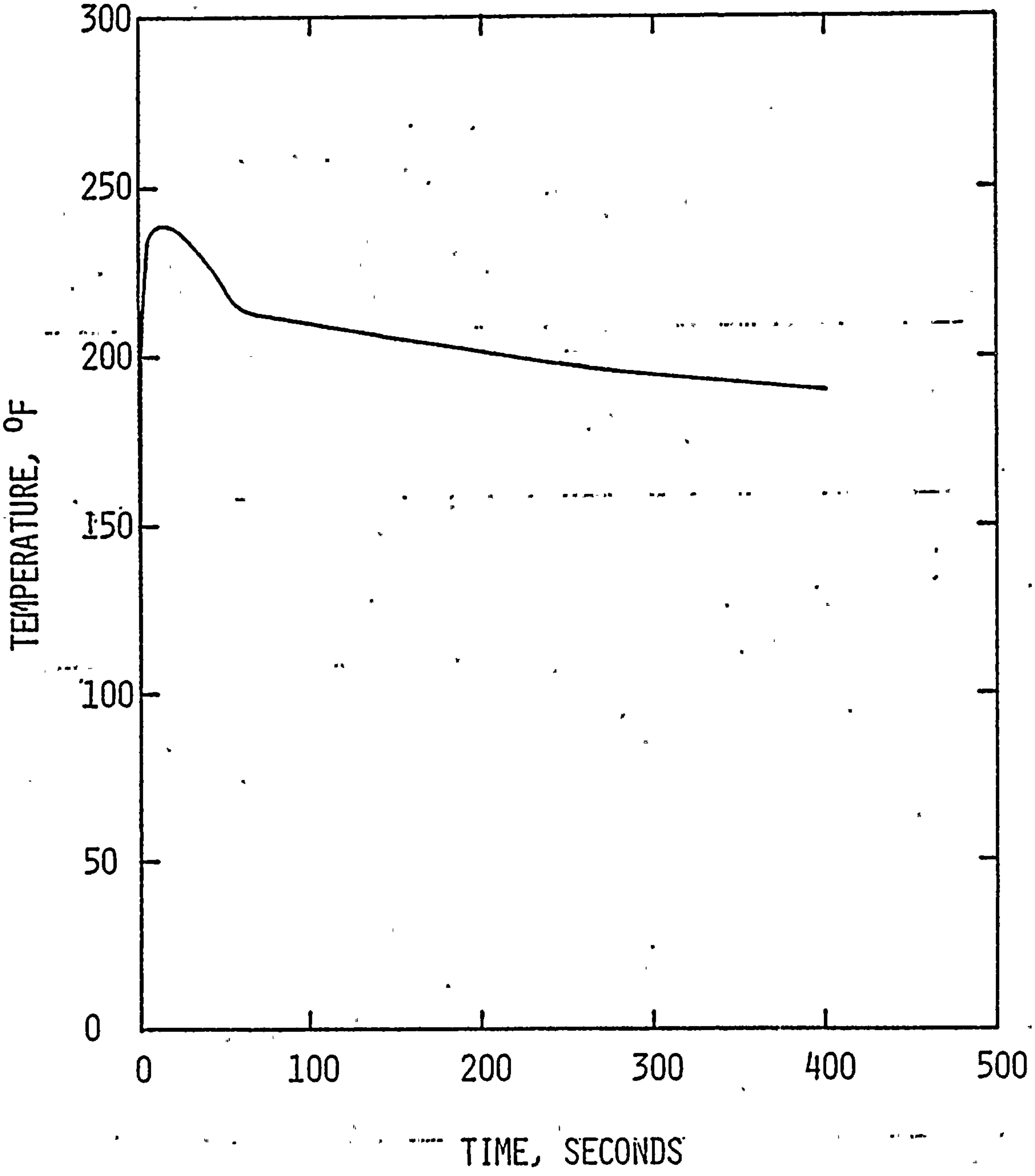


FIGURE I.4-T
ST. LUCIE UNIT I STRETCH POWER
1.0 x DOUBLE ENDED GUILLOTINE BREAK IN PUMP DISCHARGE LEG
HOT ROD INTERNAL GAS PRESSURE

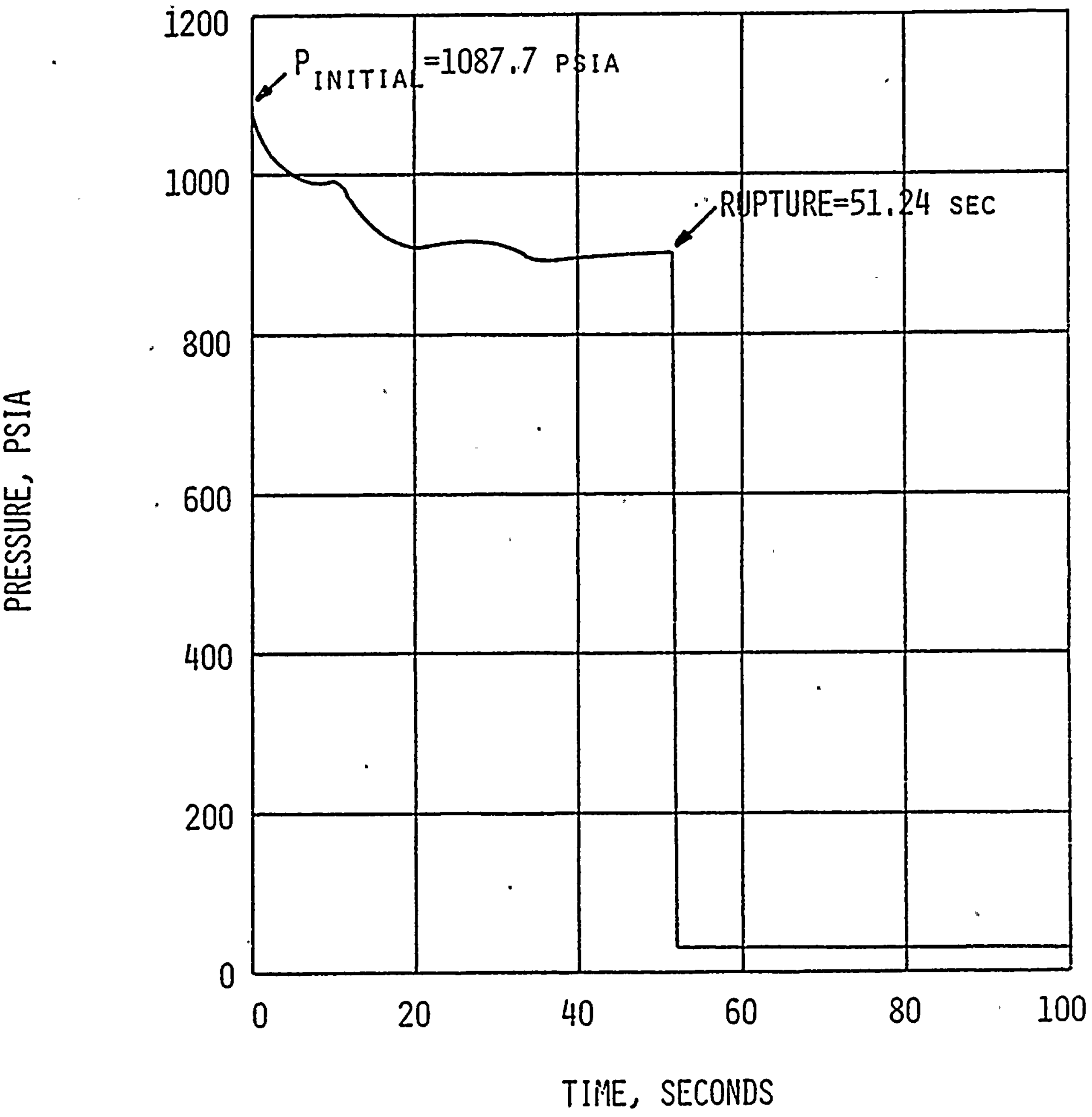


FIGURE I.4-U
ST. LUCIE UNIT I STRETCH POWER
1.0 x DOUBLE ENDED GUILLOTINE BREAK IN PUMP DISCHARGE LEG
CORE BULK CHANNEL FLOW RATE

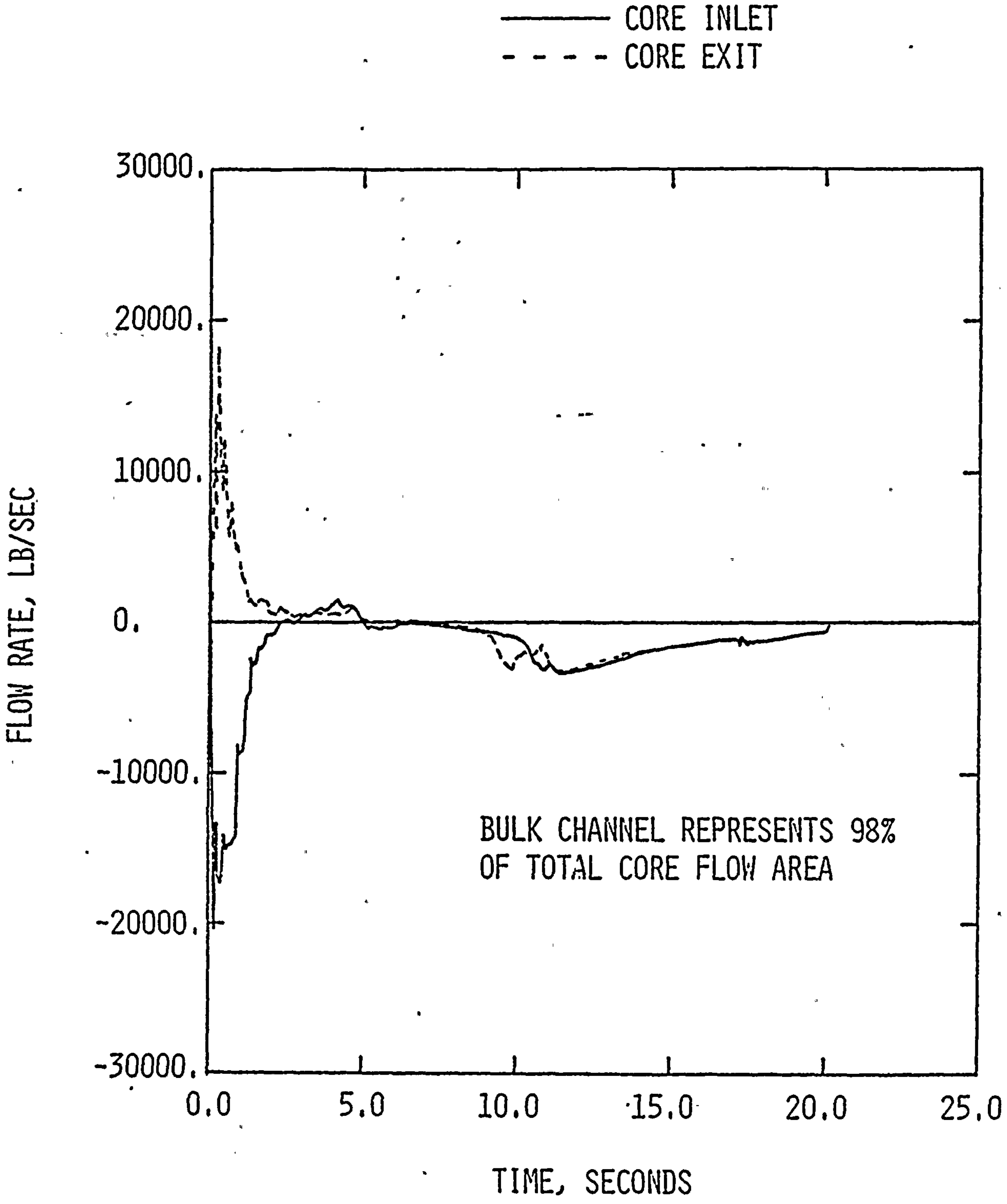


FIGURE I.5-A
ST LUCIE UNIT I STRETCH POWER
0.8 x DOUBLE ENDED GUILLOTINE BREAK IN PUMP DISCHARGE LEG
CORE POWER

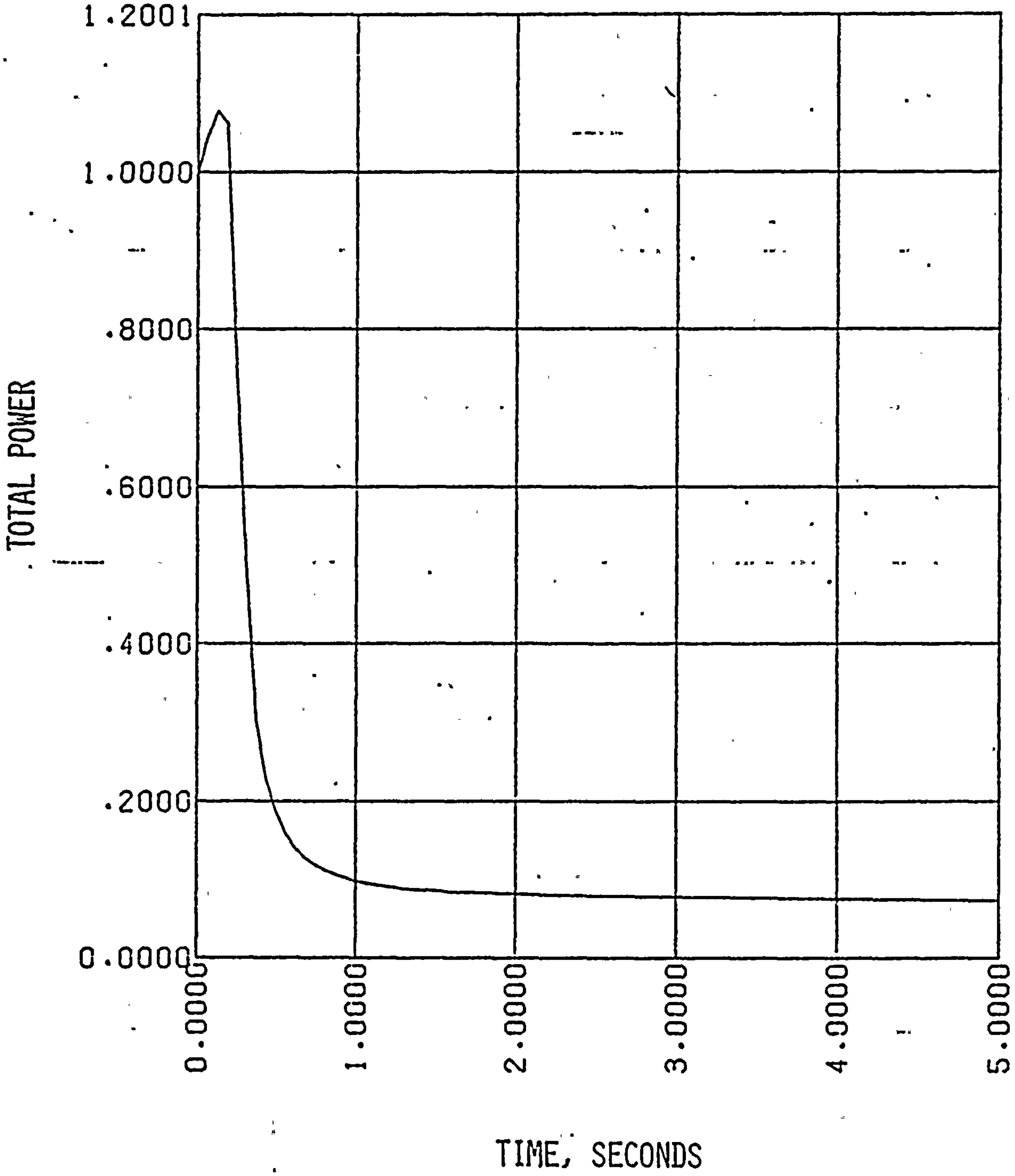


FIGURE I.5-B
ST LUCIE UNIT I STRETCH POWER
0.8 x DOUBLE ENDED GUILLOTINE BREAK IN PUMP DISCHARGE LEG
PRESSURE IN CENTER HOT ASSEMBLY NODE

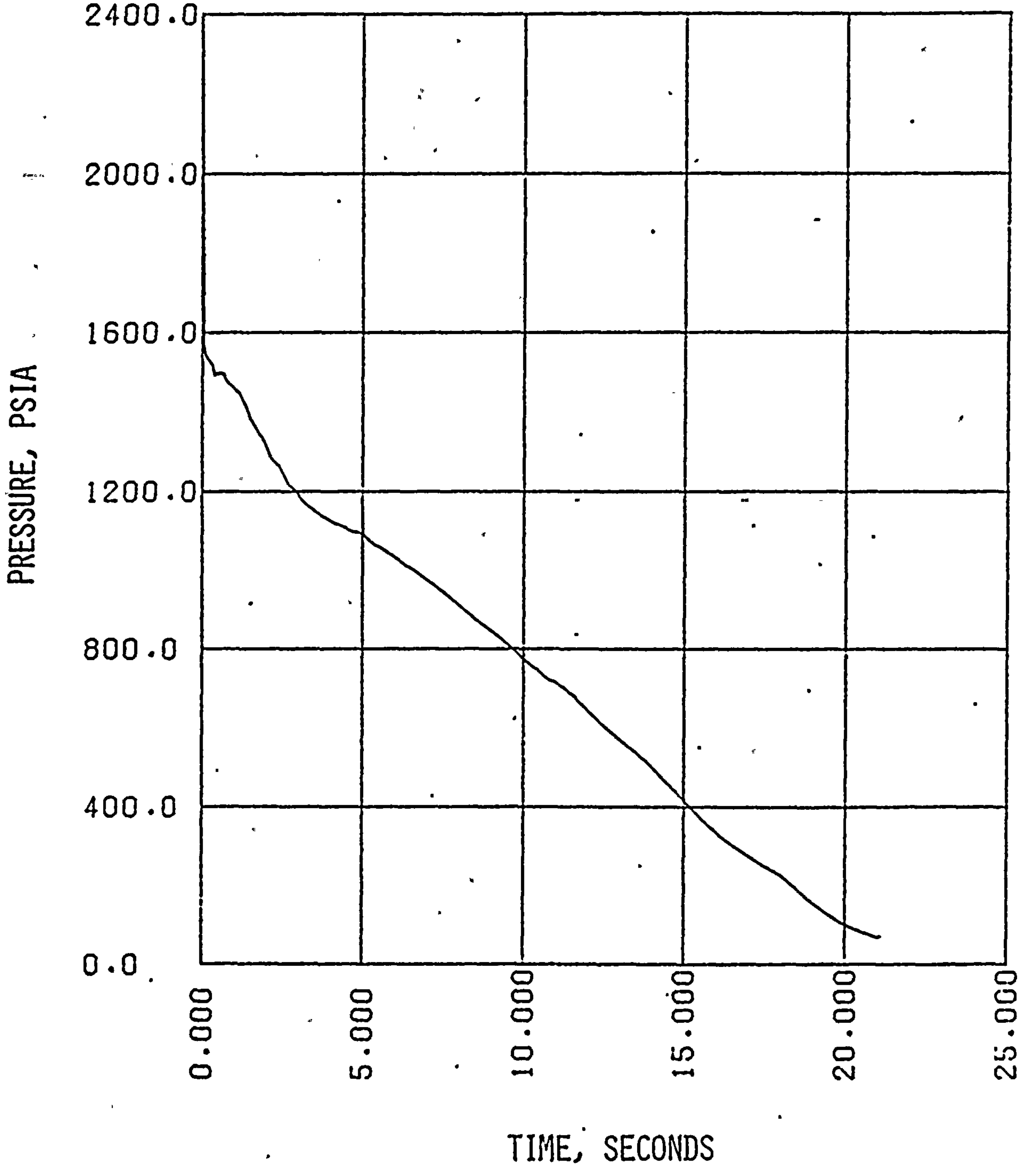


FIGURE I.5-C
ST LUCIE UNIT I STRETCH POWER
0.8 x DOUBLE ENDED GUILLOTINE BREAK IN PUMP DISCHARGE LEG
LEAK FLOW

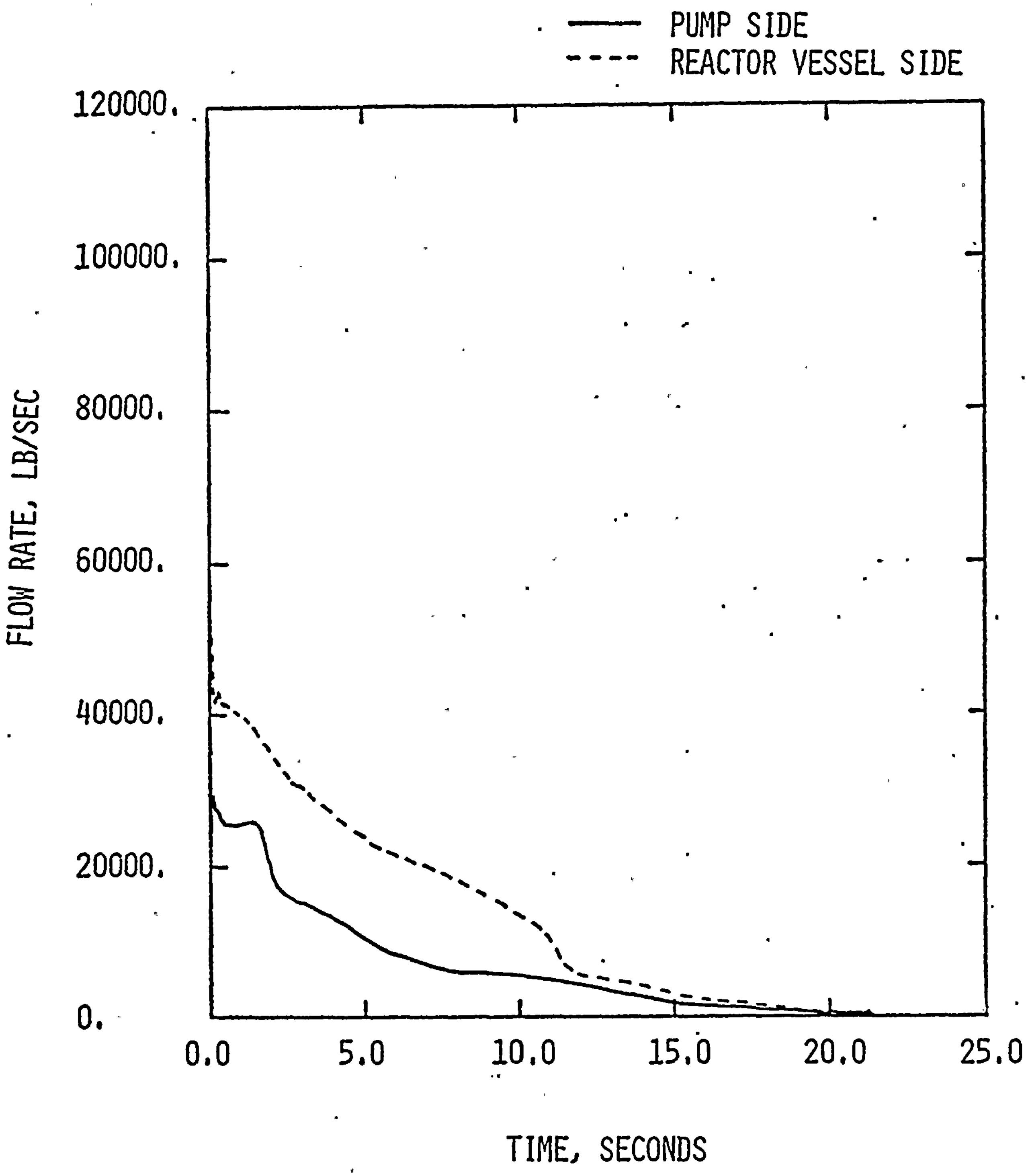


FIGURE I.5-D.1
ST LUCIE UNIT I STRETCH POWER
0.8 x DOUBLE ENDED GUILLOTINE BREAK IN PUMP DISCHARGE LEG
FLOW IN HOT ASSEMBLY-PATH 16, BELOW HOT SPOT

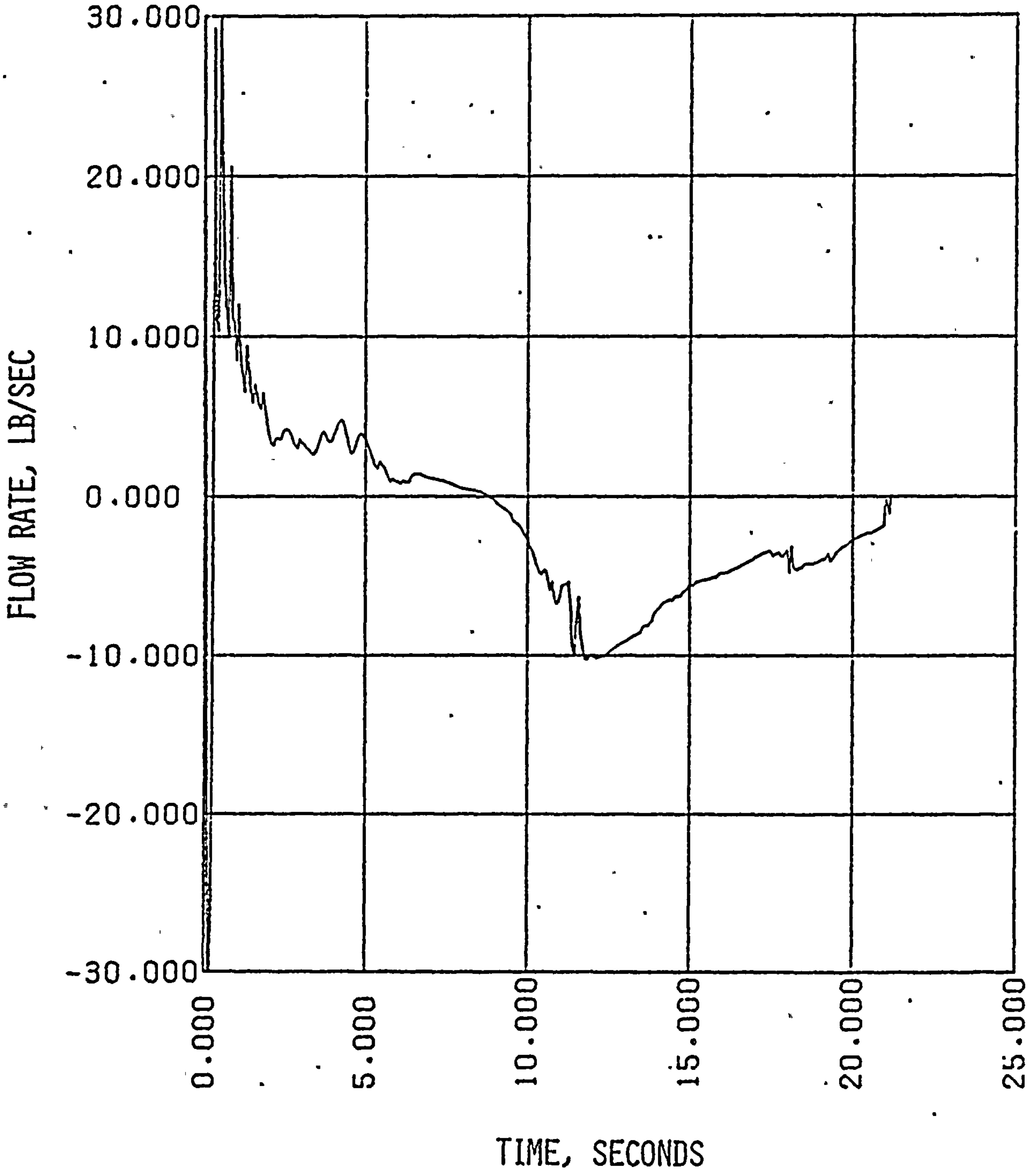


FIGURE I.5-D.2
ST LUCIE UNIT I STRETCH POWER
0.8 x DOUBLE ENDED GUILLOTINE BREAK IN PUMP DISCHARGE LEG
FLOW IN HOT ASSEMBLY-PATH 17, ABOVE HOT SPOT

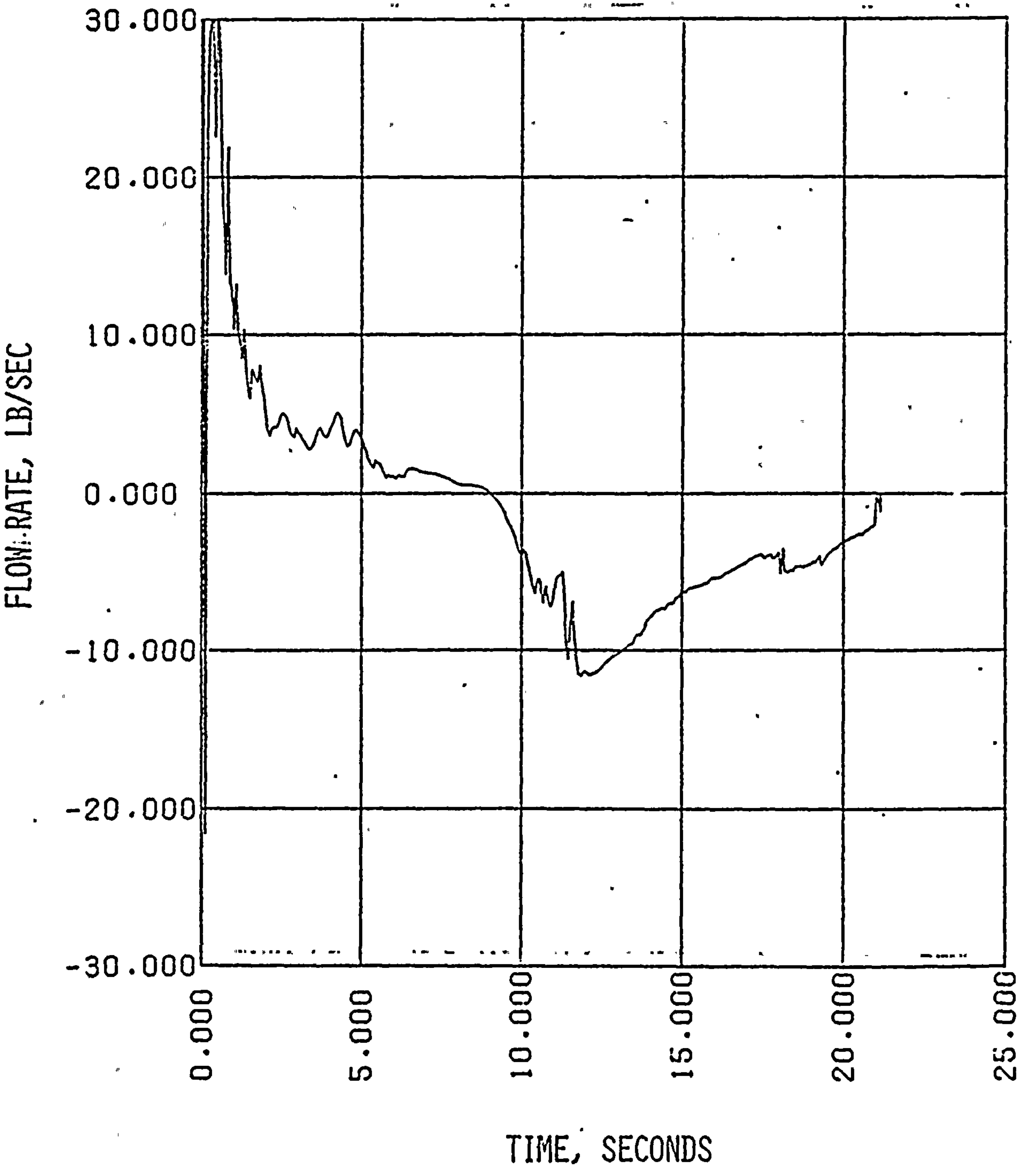


FIGURE I.5-E
ST LUCIE UNIT I STRETCH POWER
0.8 x DOUBLE ENDED GUILLOTINE BREAK IN PUMP DISCHARGE LEG
HOT ASSEMBLY QUALITY

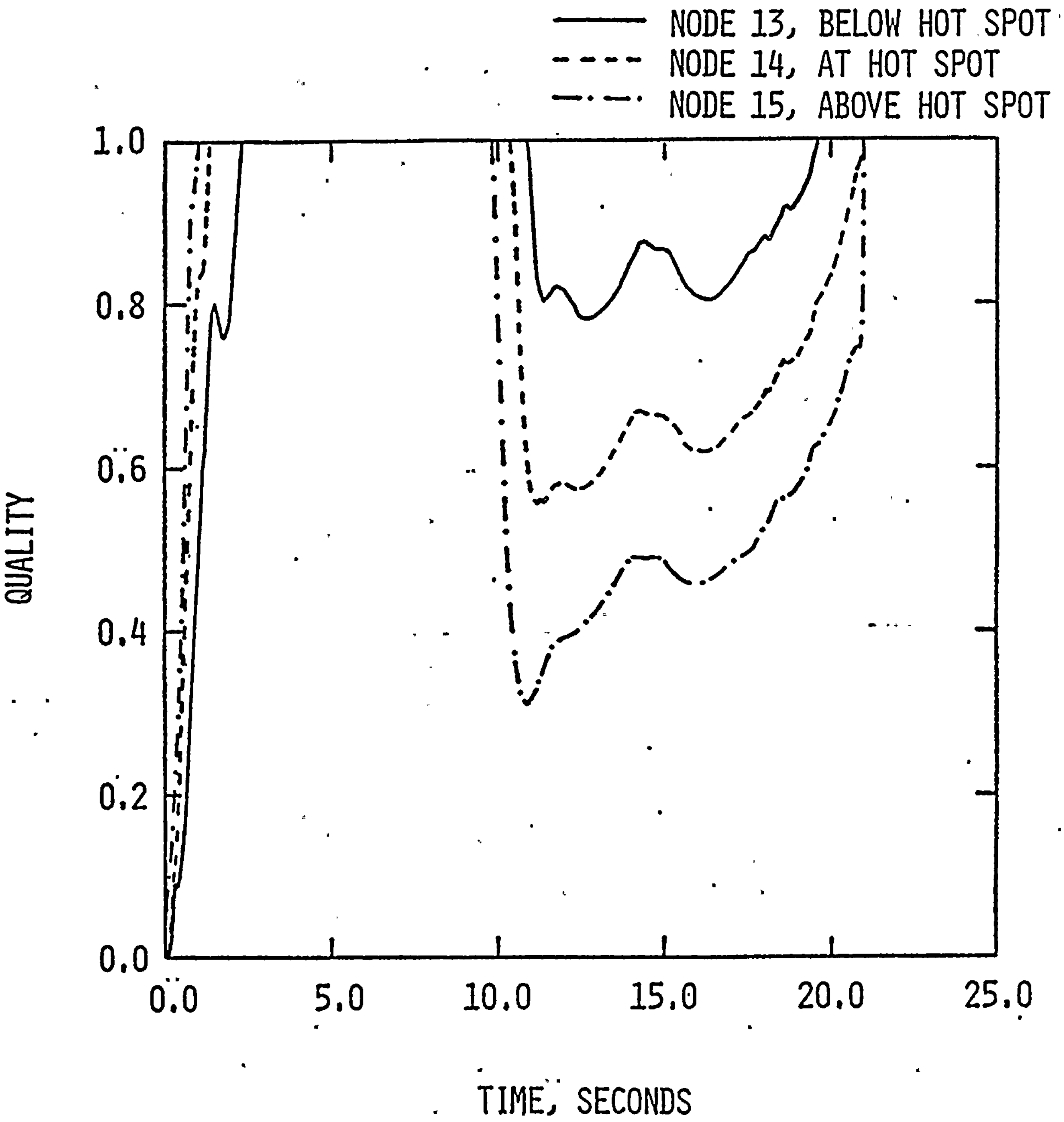


FIGURE I.5-F
ST LUCIE UNIT I STRETCH POWER
0.8 x DOUBLE ENDED GUILLOTINE BREAK IN PUMP DISCHARGE LEG
CONTAINMENT PRESSURE

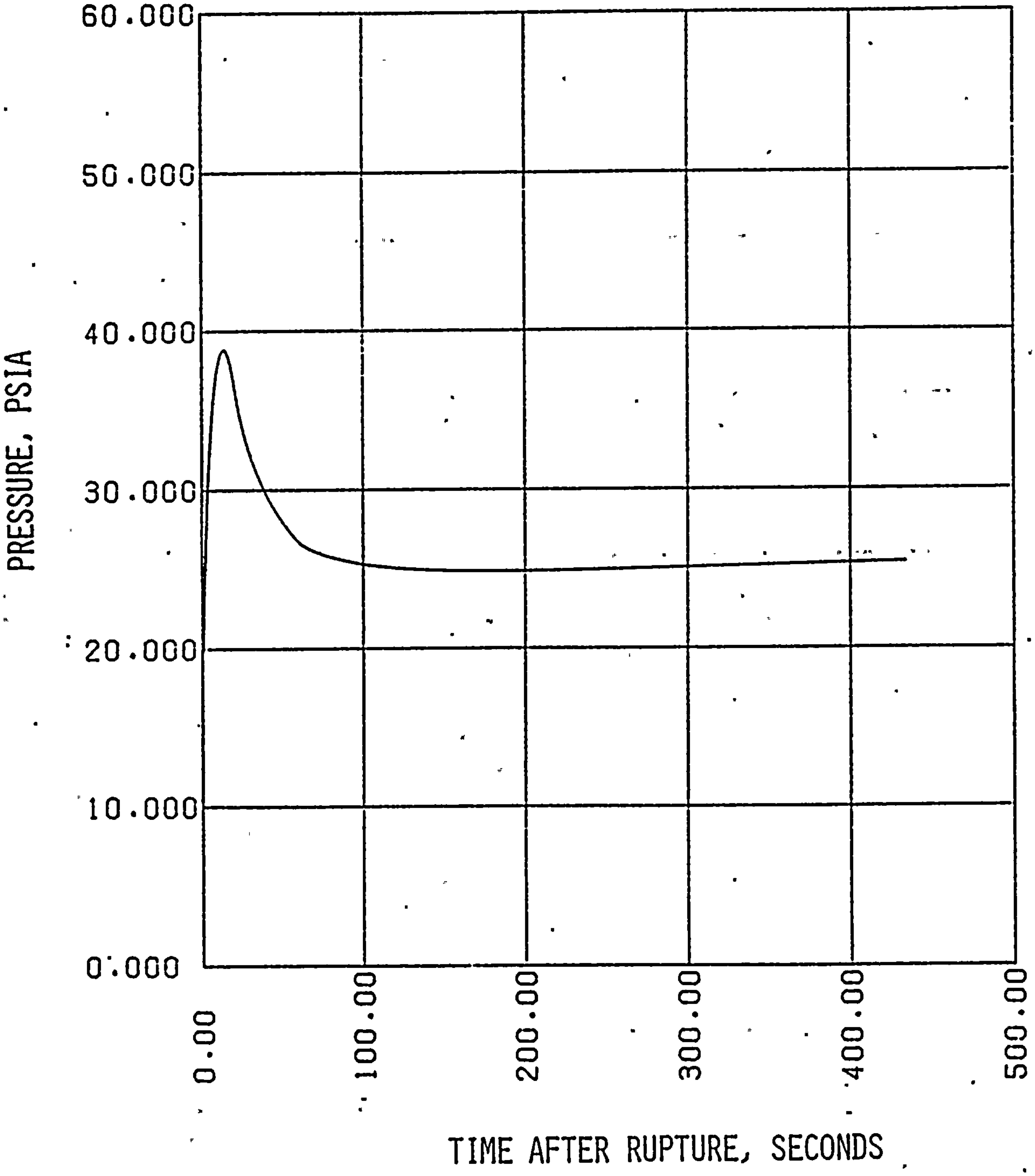


FIGURE I.5-G
ST LUCIE UNIT I STRETCH POWER
0.8 x DOUBLE ENDED GUILLOTINE BREAK IN PUMP DISCHARGE LEG
MASS ADDED TO CORE DURING REFLOOD

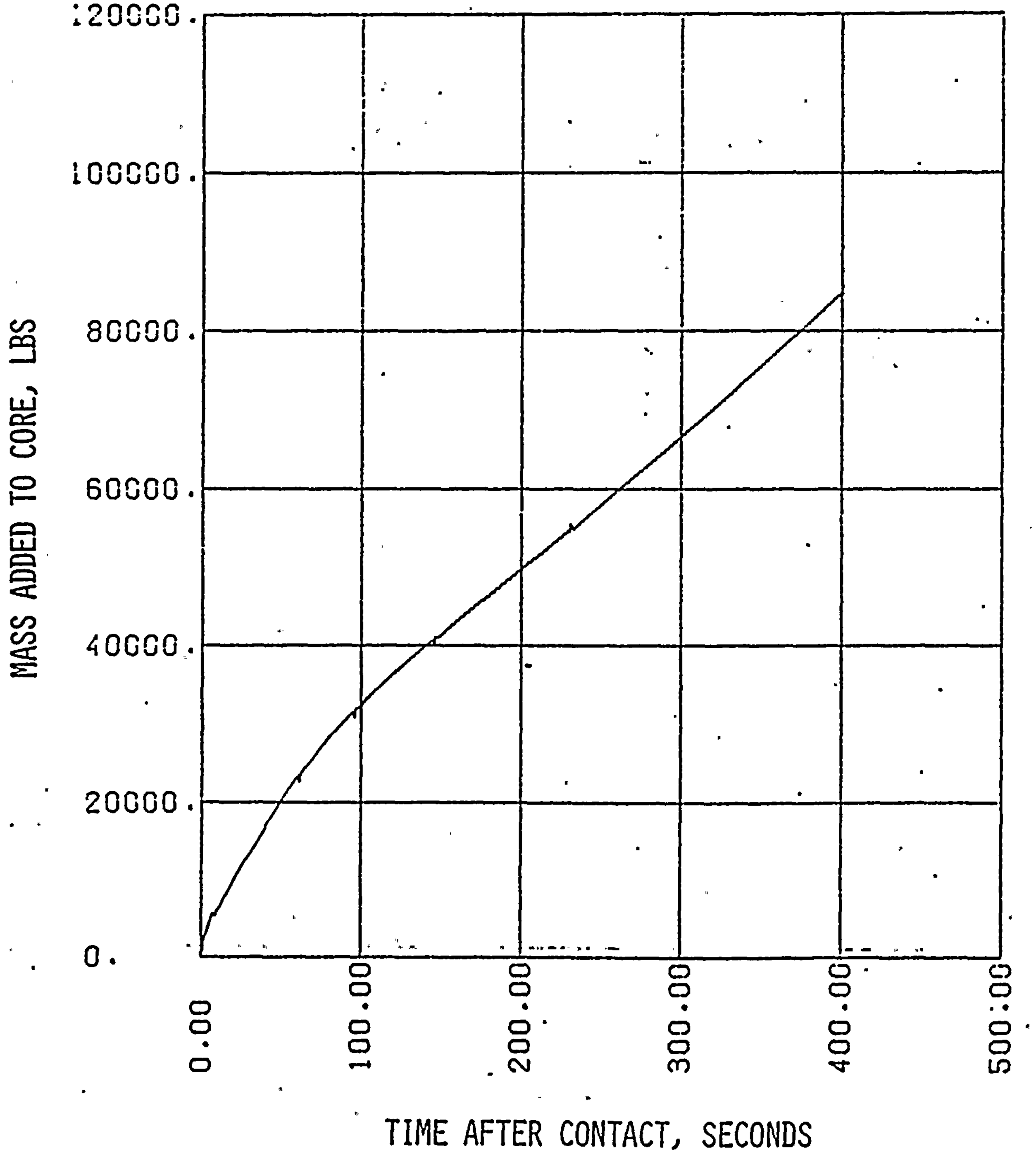


FIGURE I.5-H
ST LUCIE UNIT I STRETCH POWER
0.8 x DOUBLE ENDED GUILLOTINE BREAK IN PUMP DISCHARGE LEG
PEAK CLAD TEMPERATURE

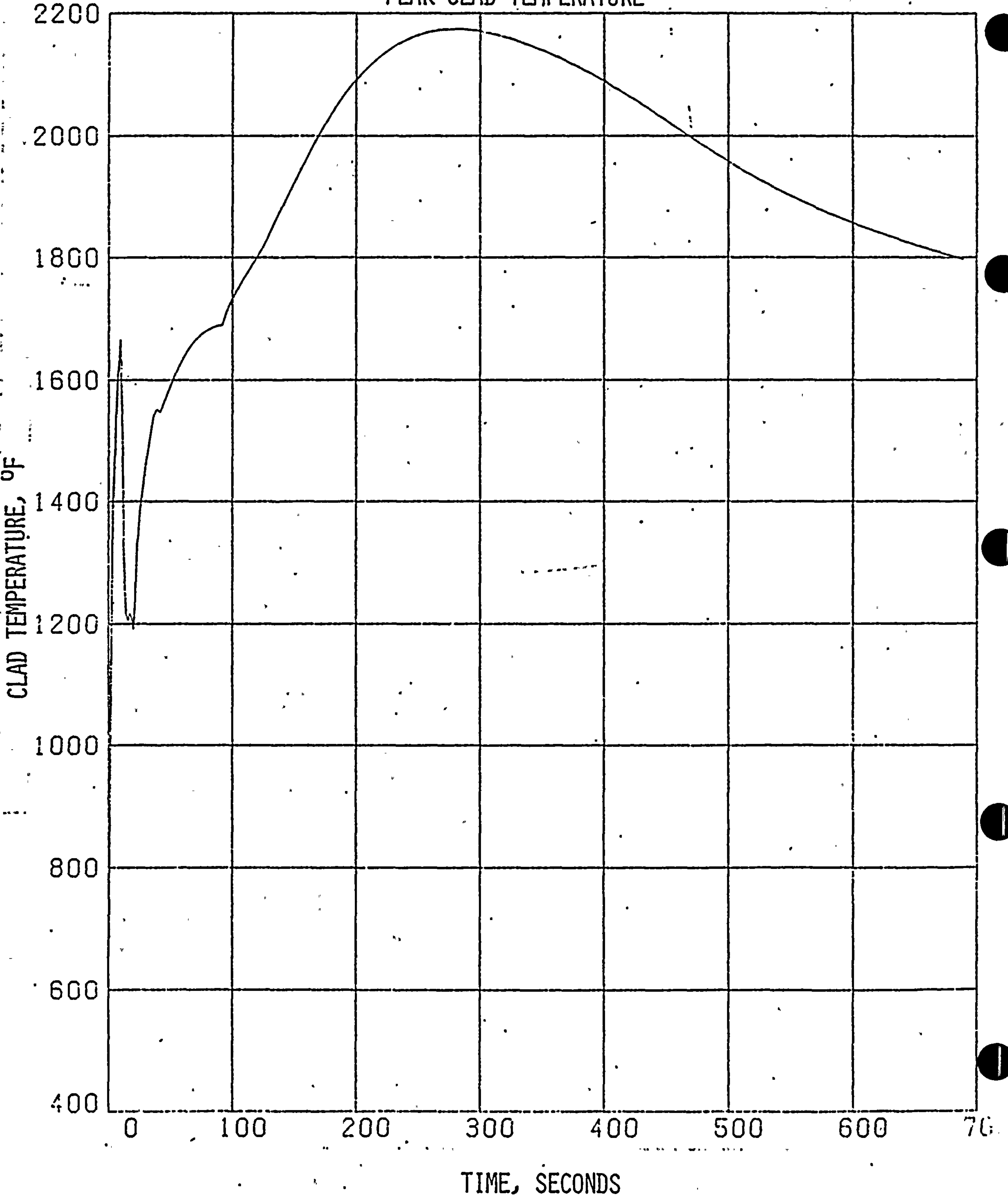


FIGURE I.6-A
ST LUCIE UNIT I STRETCH POWER
0.6 x DOUBLE ENDED GUILLOTINE BREAK IN PUMP DISCHARGE LEG
CORE POWER

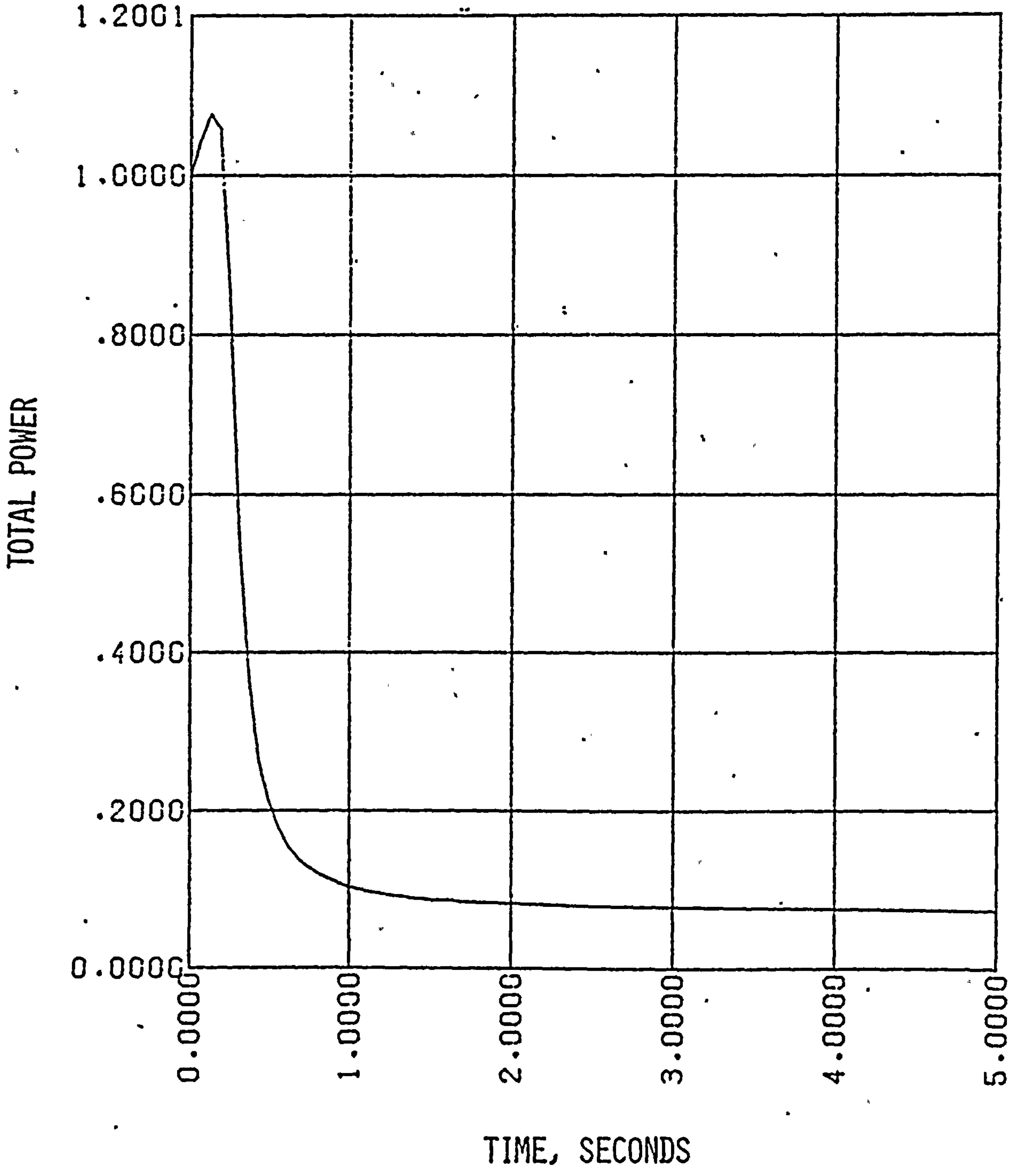


FIGURE I.6-B
ST LUCIE UNIT I STRETCH POWER
0.6 x DOUBLE ENDED GUILLOTINE BREAK IN PUMP DISCHARGE LEG
PRESSURE IN CENTER HOT ASSEMBLY NODE

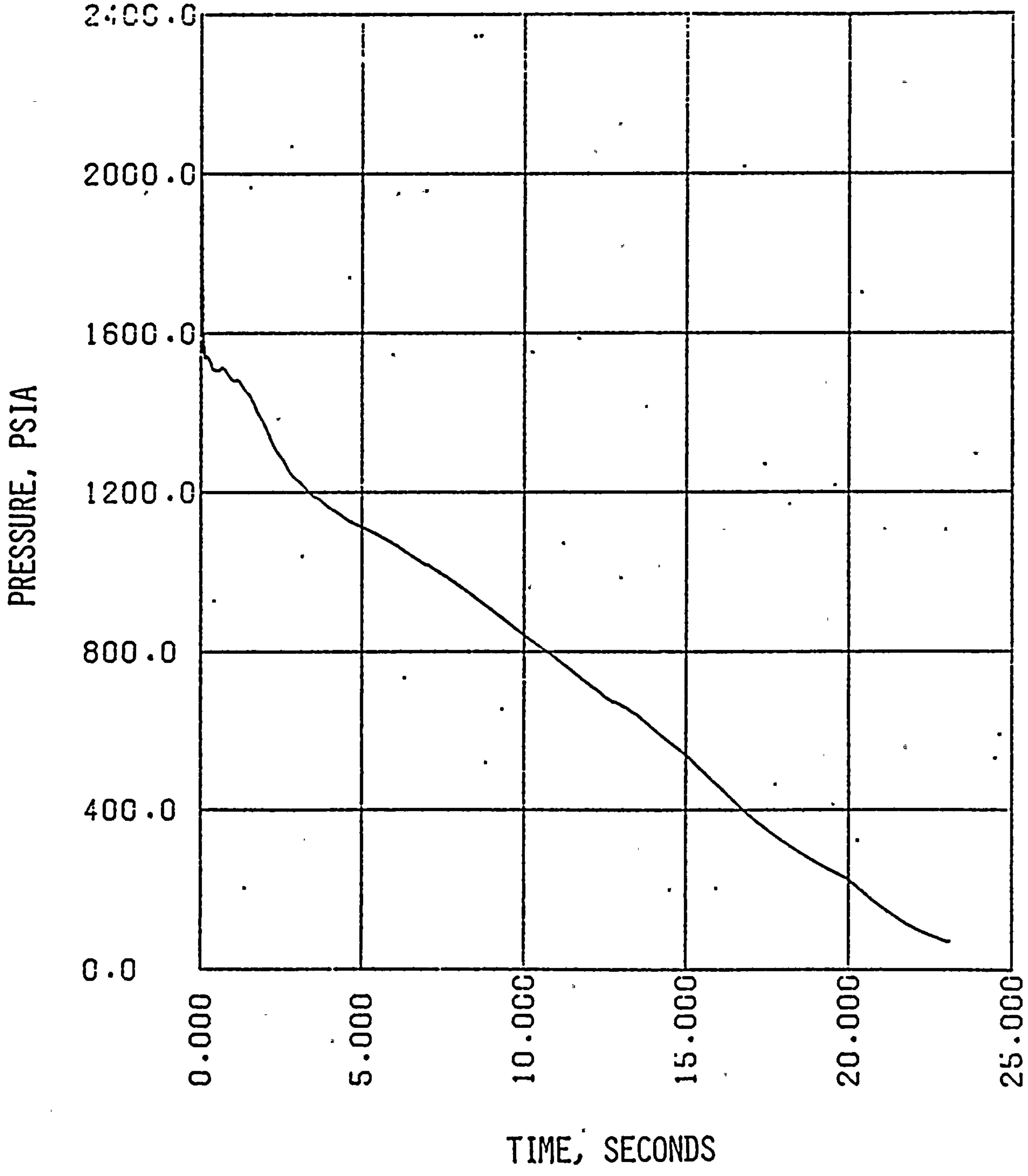


FIGURE I.6-C
ST LUCIE UNIT I STRETCH POWER
0.6 x DOUBLE ENDED GUILLOTINE BREAK IN PUMP DISCHARGE LEG
LEAK FLOW

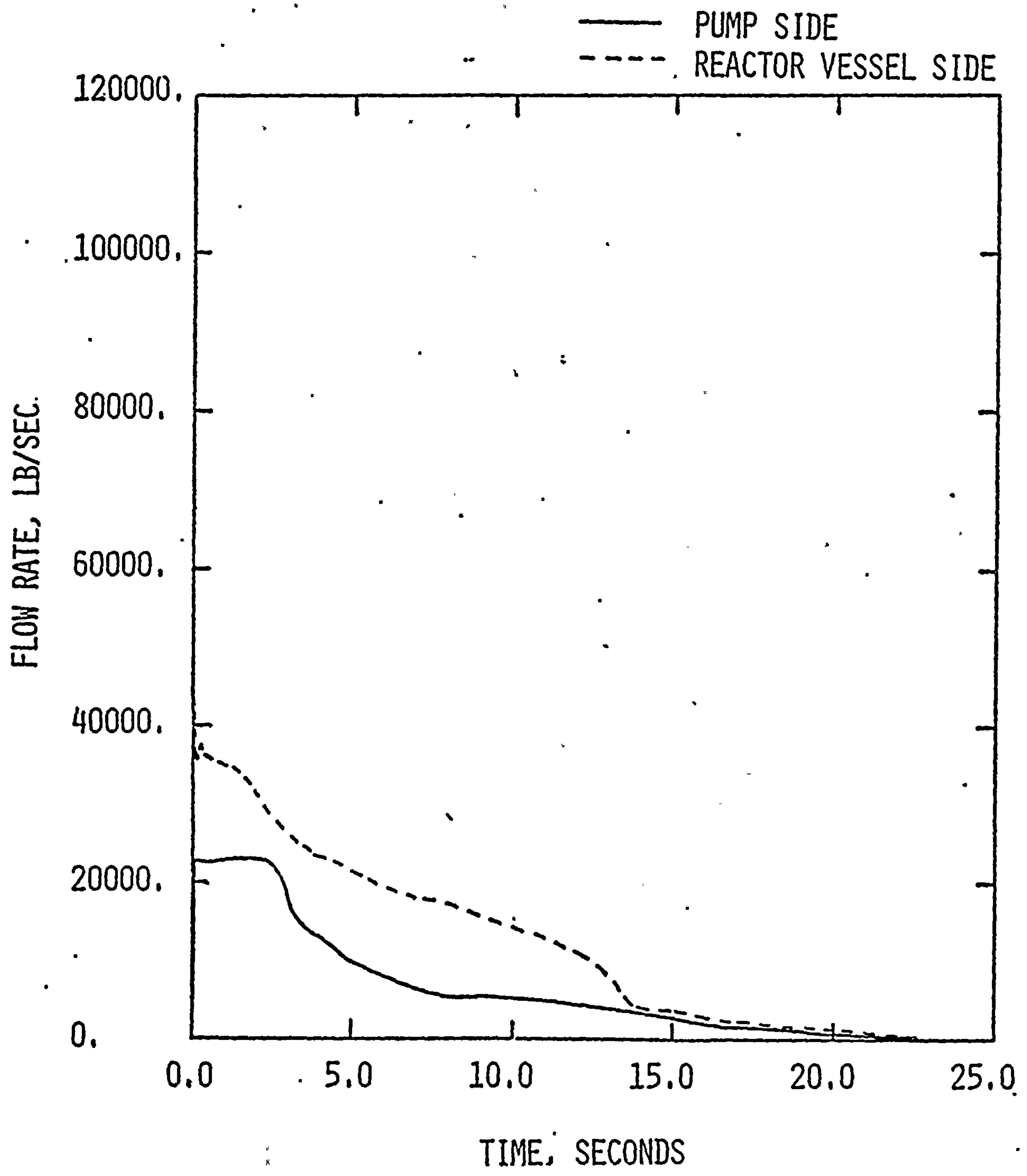


FIGURE I.6-D.1
ST LUCIE UNIT I STRETCH POWER
0.6 x DOUBLE ENDED GUILLOTINE BREAK IN PUMP DISCHARGE LEG
FLOW IN HOT ASSEMBLY-PATH 16, BELOW HOT SPOT

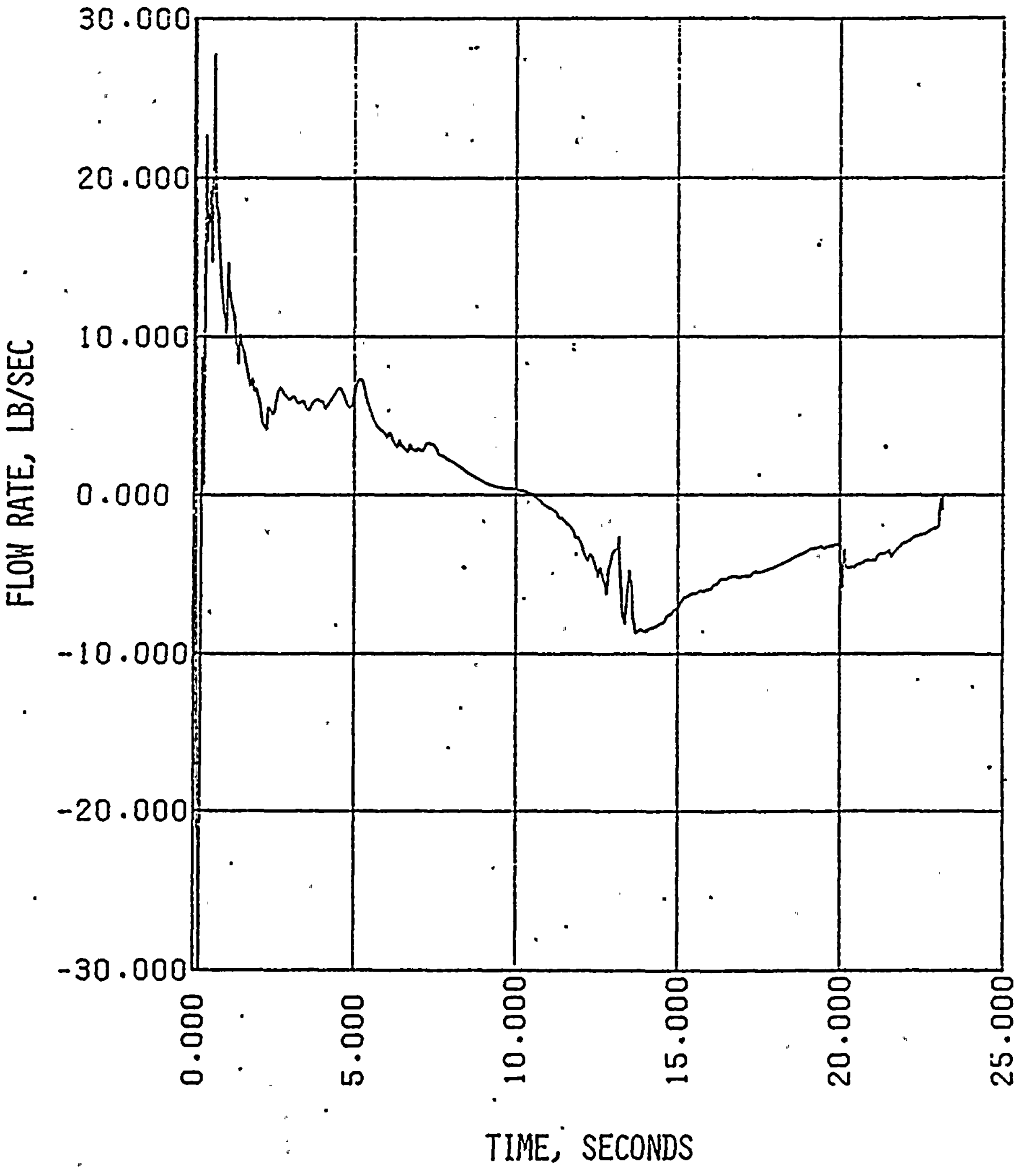


FIGURE I.6-D.2
ST LUCIE UNIT I STRETCH POWER
0.6 x DOUBLE ENDED GUILLOTINE BREAK IN PUMP DISCHARGE LEG
FLOW IN HOT ASSEMBLY- PATH 17, ABOVE HOT SPOT

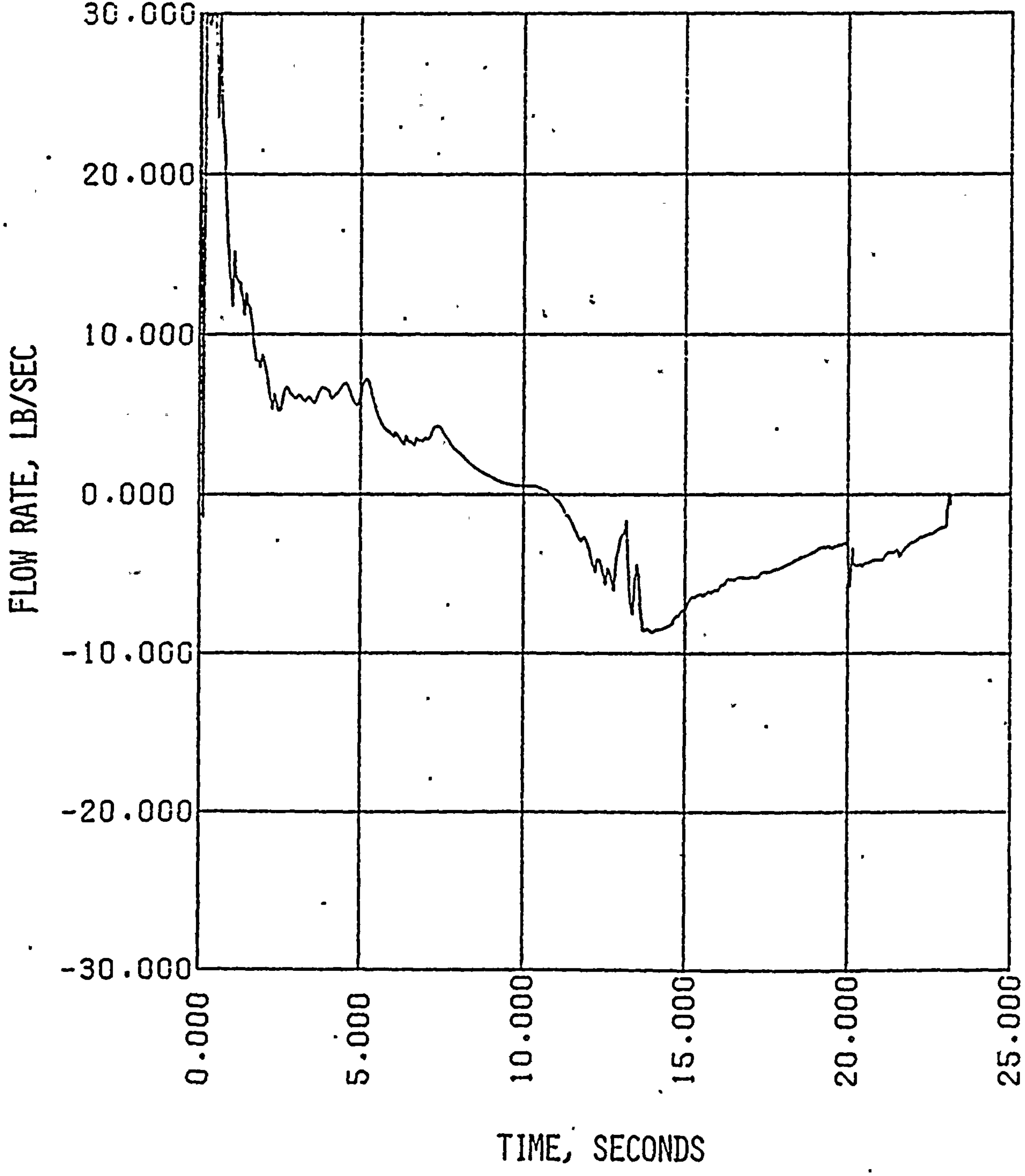


FIGURE I.6-E
ST LUCIE UNIT I STRETCH POWER
0.6 x DOUBLE ENDED GUILLOTINE BREAK IN PUMP DISCHARGE LEG
HOT ASSEMBLY QUALITY

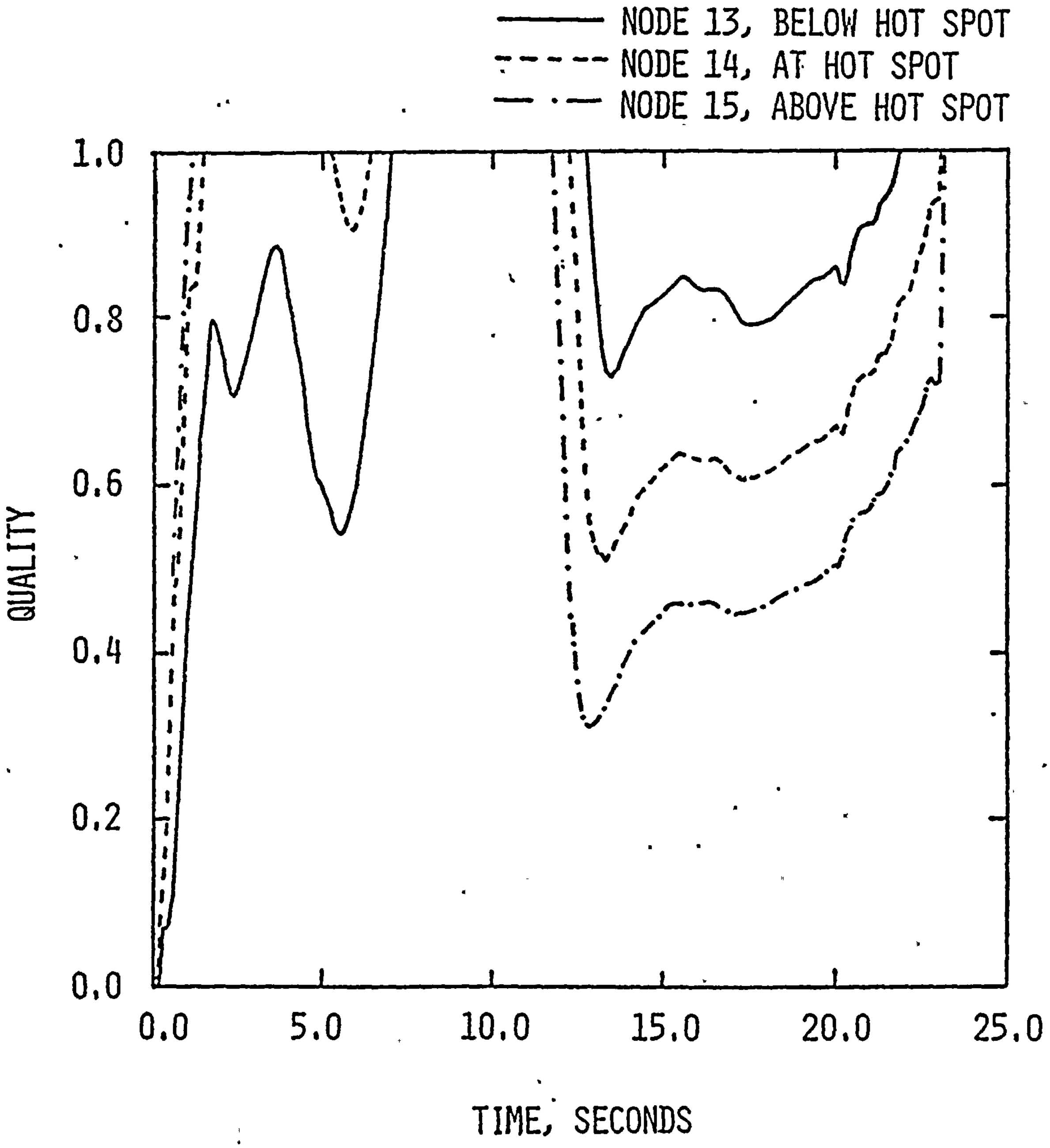


FIGURE I.6-F
ST LUCIE UNIT I STRETCH POWER
0.6 x DOUBLE ENDED GUILLOTINE BREAK IN PUMP DISCHARGE LEG
CONTAINMENT PRESSURE

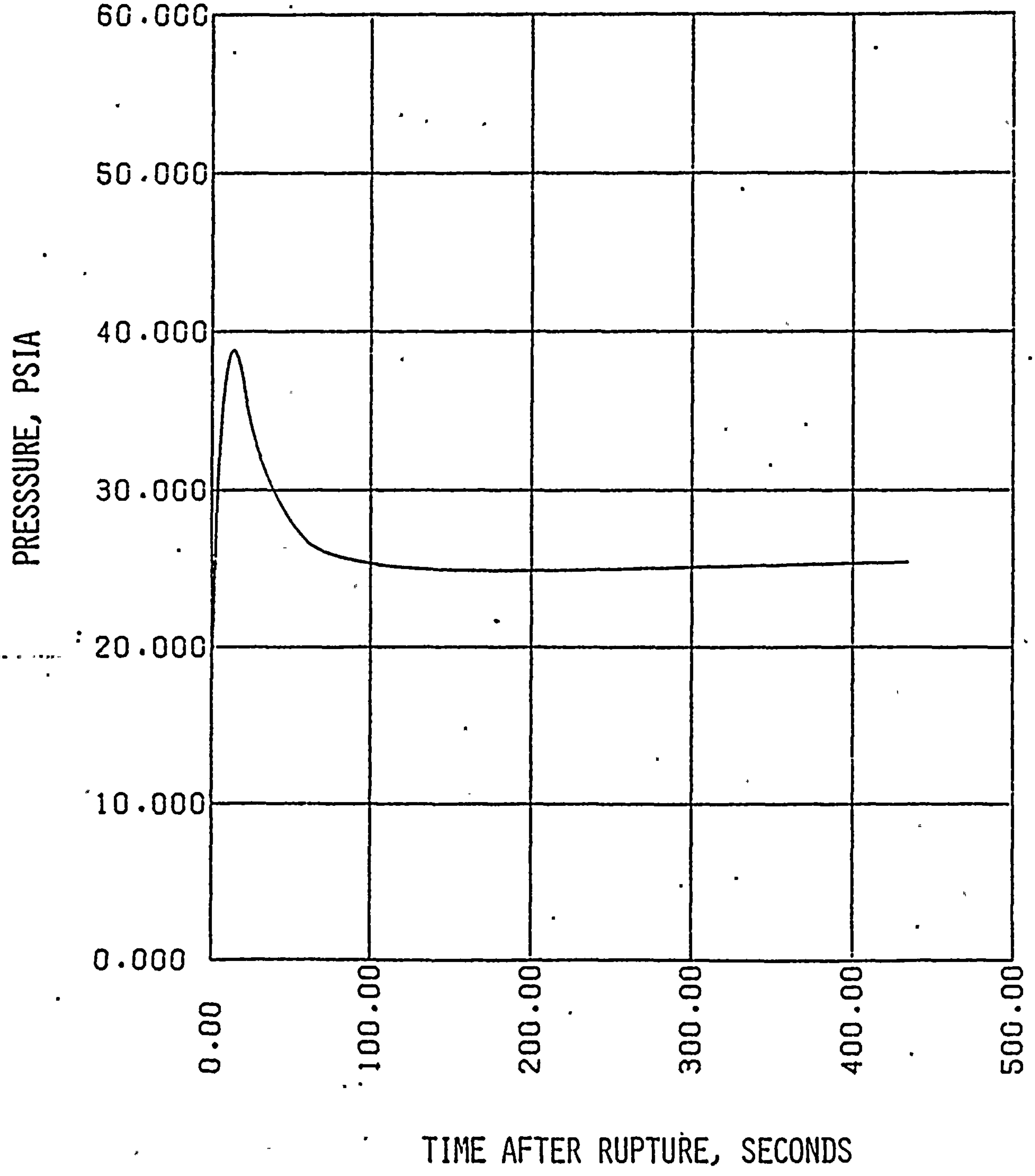


FIGURE I.6-G

ST LUCIE UNIT I STRETCH POWER

0.6 x DOUBLE ENDED GUILLOTINE BREAK IN PUMP DISCHARGE LEG

MASS ADDED TO CORE DURING REFLOOD

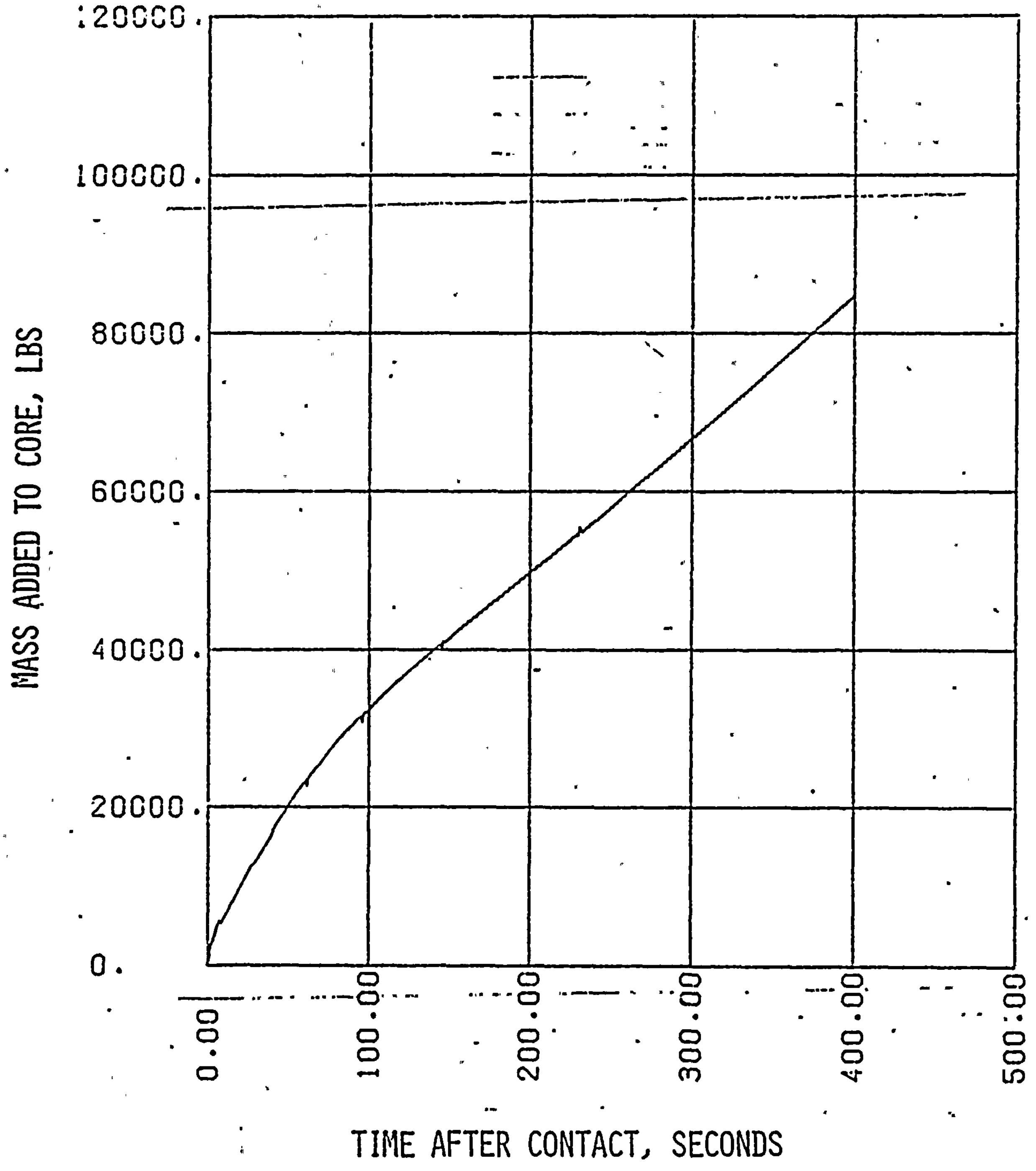


FIGURE I.6-H
ST LUCIE UNIT I STRETCH POWER
0.6 x DOUBLE ENDED GUILLOTINE BREAK IN PUMP DISCHARGE LEG
PEAK CLAD TEMPERATURE

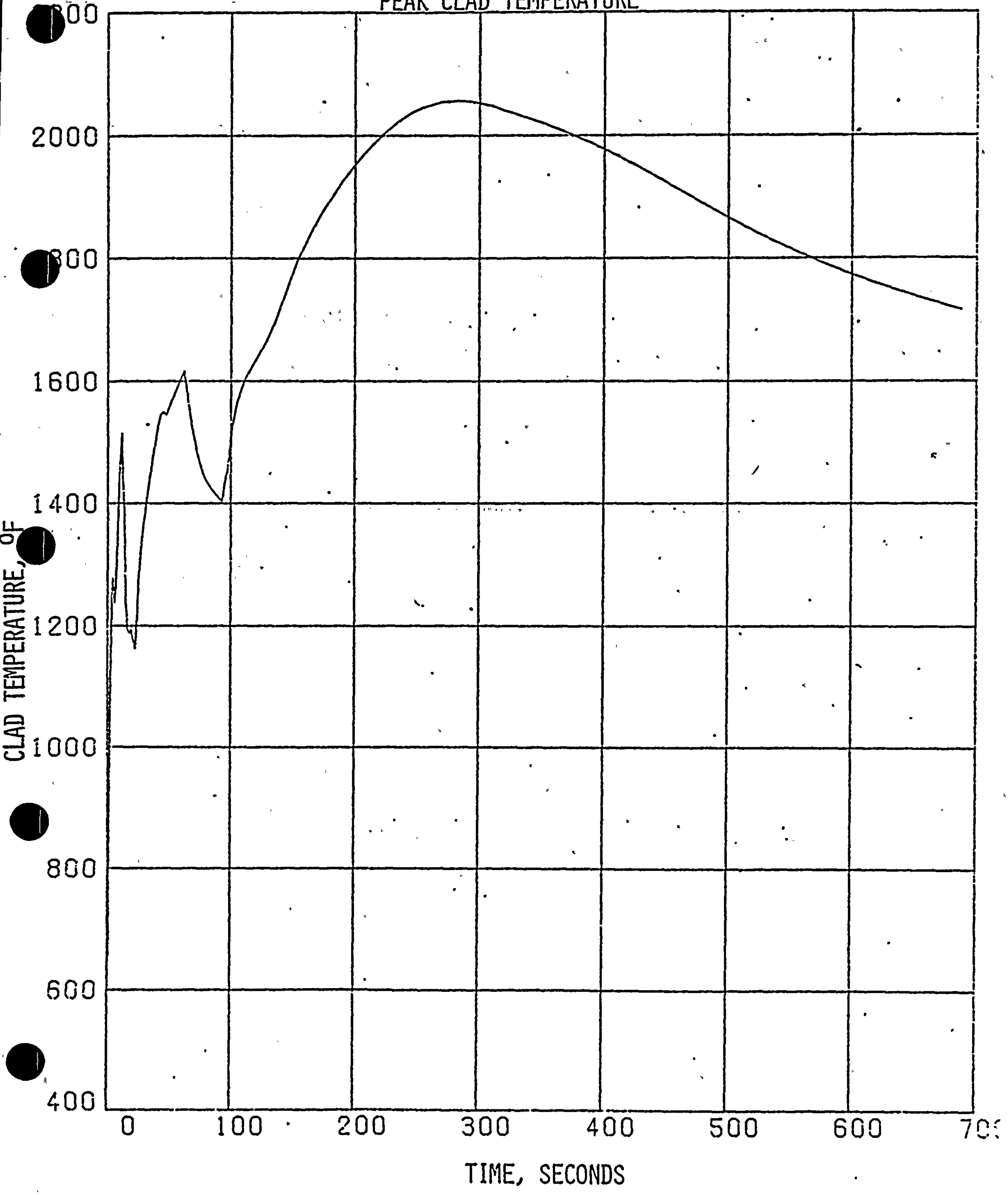


FIGURE I.7

ST. LUCIE UNIT I STRETCH POWER

PEAK CLAD TEMPERATURE vs. BREAK AREA

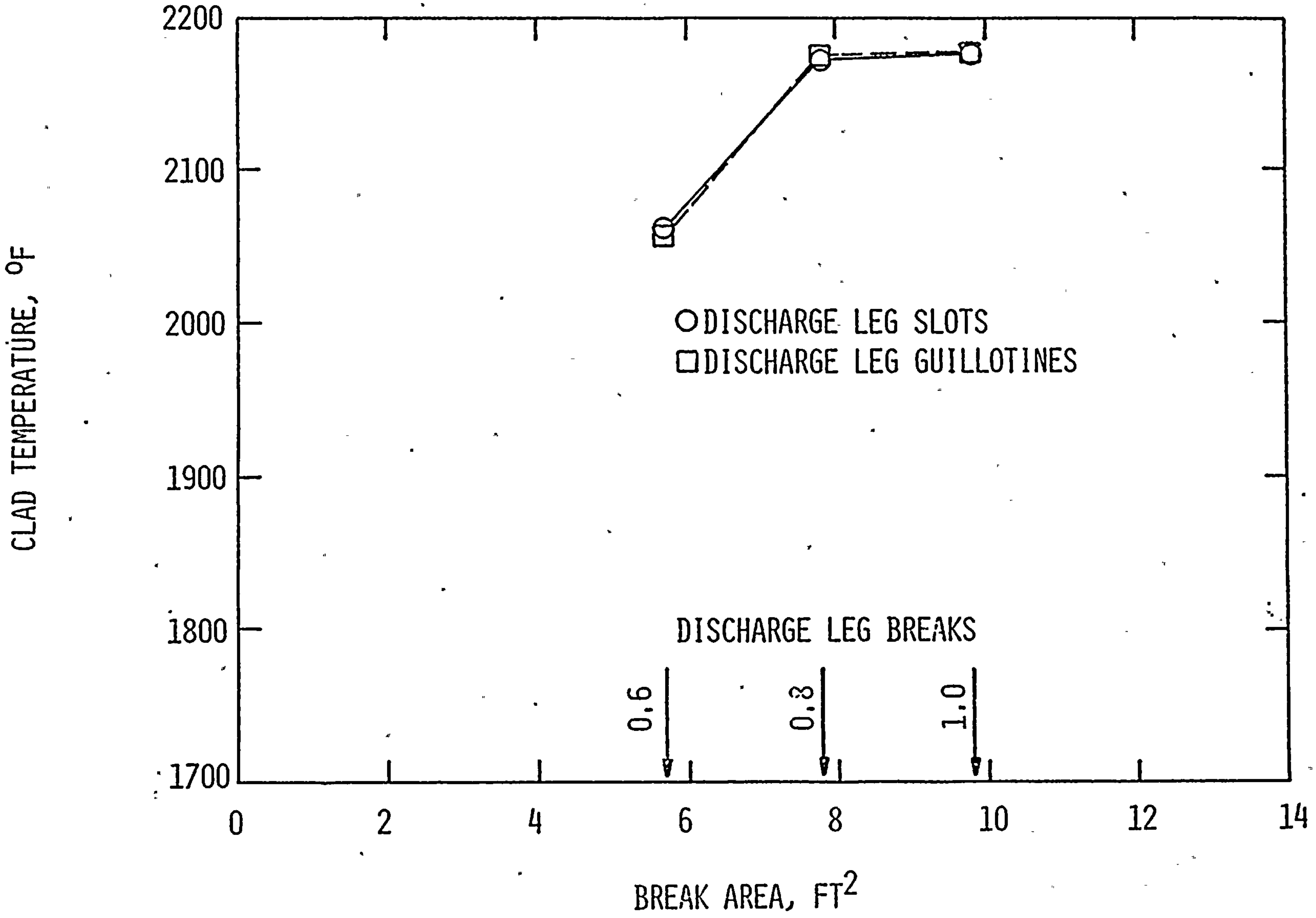


Table 1

Characteristics of St. Lucie 1 and Millstone 2

	St. Lucie 1	
	St. Lucie 1	Millstone 2
Full power level, Mwt (102% of Nominal)	2754	2754
Peak linear heat rate, kw/ft	16.0	16.0
Average linear heat rate, kw/ft	6.43	6.40
Core inlet temperature, °F	551	551
Core outlet temperature, °F	602	602
Active core height, ft	11.39	11.39
Fuel rod OD, in	0.44	0.440
Number of cold legs	4	4
Number of hot legs	2	2
Cold leg diameter, in	30	30
Hot leg diameter, in	42	42
Total primary system volume, ft^3	10,867	10,853
Active core volume, ft^3	655	653
Primary system volume above top of core, ft^3	8280	8129
Low pressurizer pressure scram setpoint, psia	1750	1750
Initial system pressure, psia	2250	2250
Safety injection actuation signal setpoint, psia	1600	1600
Setpoint uncertainties, psi	±22	±22
Safety injection tank pressure/liquid volume, psia/ft^3	215/1090	215/1107
High pressure safety injection pump runout flow, gpm	640**	655*
High pressure safety injection pump flow at steam generator secondary relief valve setpoint, (985 psig), gpm	315**	294*
High pressure safety injection pump shutoff head, psia	1245	1225
Low pressure safety injection pump runout flow, gpm	4000	3750
Low pressure safety injection pump shutoff head, psia	192	207

*Includes charging pump flow.

**Excludes charging pump flow.

Section 9

ST. LUCIE UNIT 1 REACTOR PROTECTION SYSTEM
ASYMMETRIC STEAM GENERATOR TRANSIENT PROTECTION TRIP FUNCTION

LICENSING DESCRIPTION

1.0 INTRODUCTION

This document describes the Reactor Protection System (RPS) Asymmetric Steam Generator Transient Protection Trip Function (ASGTPTF) and its design bases. The ASGTPTF is designed to protect against Anticipated Operational Occurrences (AOOs) associated with secondary system malfunctions which result in asymmetric primary loop temperatures. The most limiting event is the Loss of Load to One Steam Generator (LL/1SG) caused by a single Main Steam Isolation Valve (MSIV) closure.

The St. Lucie 1 RPS presently employs an analog thermal margin trip calculator as part of the Thermal Margin/Low Pressure (TM/LP) trip function. To provide a reactor trip for asymmetric design basis events, pressure in each of the two steam generators will be monitored and these signals input to the thermal margin calculator. Secondary pressure imbalances between the two generators will be calculated and a corresponding factor applied in the TM/LP calculator to generate a trip signal.

Protection against exceeding the DNBR and maximum Kw/Ft Specified Acceptable Fuel Design Limits (SAFDL's) during the LL/1SG event is presently provided by the Low Steam Generator Level reactor trip in conjunction with sufficient initial margin maintained by the Limiting Conditions for Operation (LCO's).

The ASGTPTF will result in a reactor trip sooner than the Low Steam Generator Level trip and, hence, will produce a smaller margin degradation during this event. The additional margin gain allows full advantage to be taken of margin recovery programs designed to achieve stretch power, and 18 month fuel cycles for St. Lucie 1, Cycle 4, by assuring that the asymmetric transients would not be limiting AOO's for establishing the LCO's.

2.0 SYSTEM DESCRIPTION

2.1 General

The ASGTPTF consists of:

1. Existing steam generator pressure sensors (one for each steam generator per channel) and associated process equipment.
2. Existing Thermal Margin/Low Pressure (TM/LP) calculators modified to include a bistable with an input of the absolute value of the pressure difference between the two steam generators $|P_{SG1} - P_{SG2}|$. The output of the bistable signals the TM/LP calculation when trip conditions are reached.
3. Existing RPS trip logic and Reactor Trip Switchgear.

Modifications to the existing TM/LP calculator will be discussed next as the rest of the system consists of previously licensed installed equipment. A functional block diagram of this portion of the system is provided in Figure 1.

2.2 TM/LP Modifications

A steam generator pressure signal is input to each of the TM/LP calculators from each steam generator. In each TM/LP calculator, the difference between the two pressure signals is calculated. If the difference exceeds a set amount, a bias is input to the TM/LP calculation. This will result in a reactor trip. The additional bias input to the TM/LP trip calculation is the asymmetric factor signal (Fas). This will raise the setpoint to a high enough level to ensure a trip if the steam generator pressures differ by more than the setpoint value. Figure 2 illustrates the functional relationship between the absolute value of the pressure difference, $|P_{SG1} - P_{SG2}|$, and the asymmetric factor signal, Fas.

3.0 DESIGN BASES

3.1 Design Basis Events

The ASGTPTF is designed to provide a reactor trip for those design basis events associated with secondary system malfunctions which result in asymmetric primary loop coolant temperatures. The most limiting event is the LL/1SG caused by a single Main Steam Isolation Valve (MSIV) closure.

3.2 Design Criteria

The ASGTPTF is designed to the following criteria to ensure adequate performance of its trip function:

a. The trip function is designed in compliance with the applicable criteria of the General Design Criteria for Nuclear Power Plants, Appendix A of 10 CFR 50, July 15, 1971.

b. Instrumentation, function and operation of the trip logic conform to the requirements of IEEE Standard 279-1968, Criteria for Protective Systems for Nuclear Power Plants.

c. The trip function is designed consistent with the recommendations of Regulatory Guide 1.53, Application of the Single-Failure Criterion to Nuclear Power Plant Protective Systems, and Regulatory Guide 1.22, Periodic Testing of Protection System Actuation Functions.

d. Four independent measurement channels are provided.

e. The protective system ac power is supplied from four separate vital instrument buses.

f. The ASGTPTF can be tested with the reactor in operation or shut down.

g. Trip signal is preceded by a pretrip alarm to alert the operator of undesirable operating conditions in cases where operator action can correct the abnormal condition and avoid a reactor trip.

h. The ASGTPTF components which will be used are of the same type presently in use at SL1, and will meet the same industry standard as applied to the original RPS (i.e., IEEE-279, August 1968). The operation of the ASGTPTF is not required during or subsequent to any Design Basis Event which significantly alters the containment environment (LOCA, Main Steam Line Break or Feedwater Line Break). Therefore, it is not required that additional in-containment equipment installed specifically for the ASGTPTF be qualified for the adverse environments associated with these events.

i. The trip function is designed so that protective action will not be initiated due to normal operation of the generating station.

j. All equipment will be designed in accordance with the QADM. Vendor quality control will be in accordance with C-E Procedure WQC 11.1, Revision 0.

k. Modification to the TM/LP Calculator for the ASGTPTF will not jeopardize previous qualification of this equipment.

3.3 Performance Requirements

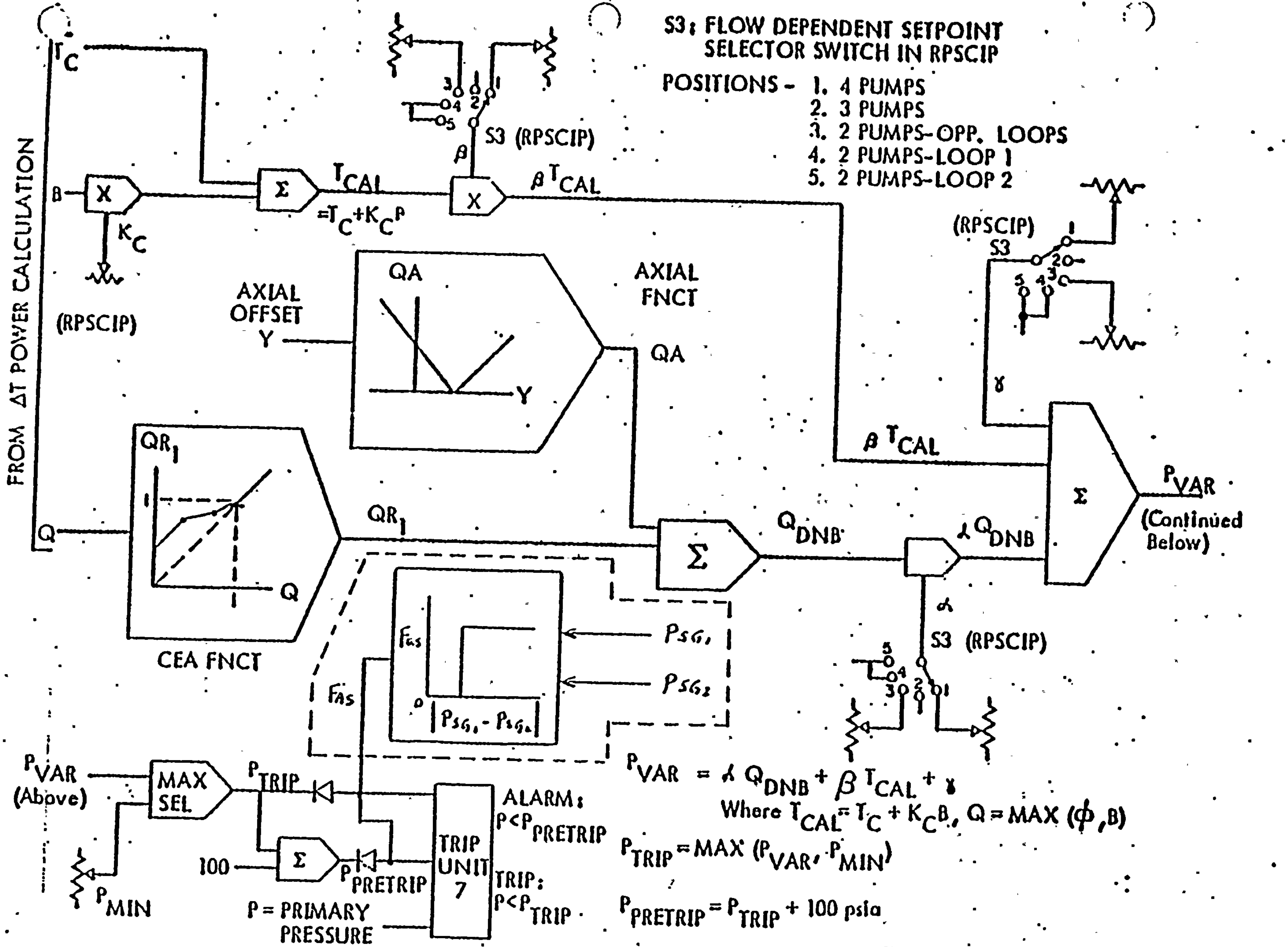
The selection of a trip setpoint is such that adequate protection is provided when all sensor and processing time delays and inaccuracies are taken into account. Final determination of an equipment setpoint is based on equipment characteristics, operating environment, NSSS performance and safety analysis. The nominal setpoint, uncertainties and response time are provided in Table 1.

TABLE 1

ASYMMETRIC STEAM GENERATOR TRANSIENT PROTECTION TRIP FUNCTION NOMINAL CHARACTERISTICS

Nominal System Accuracy	±35 psi
Analysis Setpoint	+175 psid
Nominal Equipment Setpoint	+140 psid
Nominal Pretrip Setpoint	+100 psid
Nominal System Response Time	≤.9 seconds

Nominal: Expected value only. Final values are to be determined later, and included in the plant Technical Specifications as appropriate.



S3: FLOW DEPENDENT SETPOINT SELECTOR SWITCH IN RPSCIP

POSITIONS -
1. 4 PUMPS
2. 3 PUMPS
3. 2 PUMPS-OPP. LOOPS
4. 2 PUMPS-LOOP 1
5. 2 PUMPS-LOOP 2

$P_{VAR} = \alpha Q_{DNB} + \beta T_{CAL} + \gamma$

Where $T_{CAL} = T_C + K_C B$, $Q = MAX (\phi, B)$

$P_{TRIP} = MAX (P_{VAR}, P_{MIN})$

$P_{PRETRIP} = P_{TRIP} + 100$ psia

TM/LP Modification for Asymmetric SG Transient Protection (Changes to the TM/LP Calculators are shown in dashed lines).

FIGURE 1

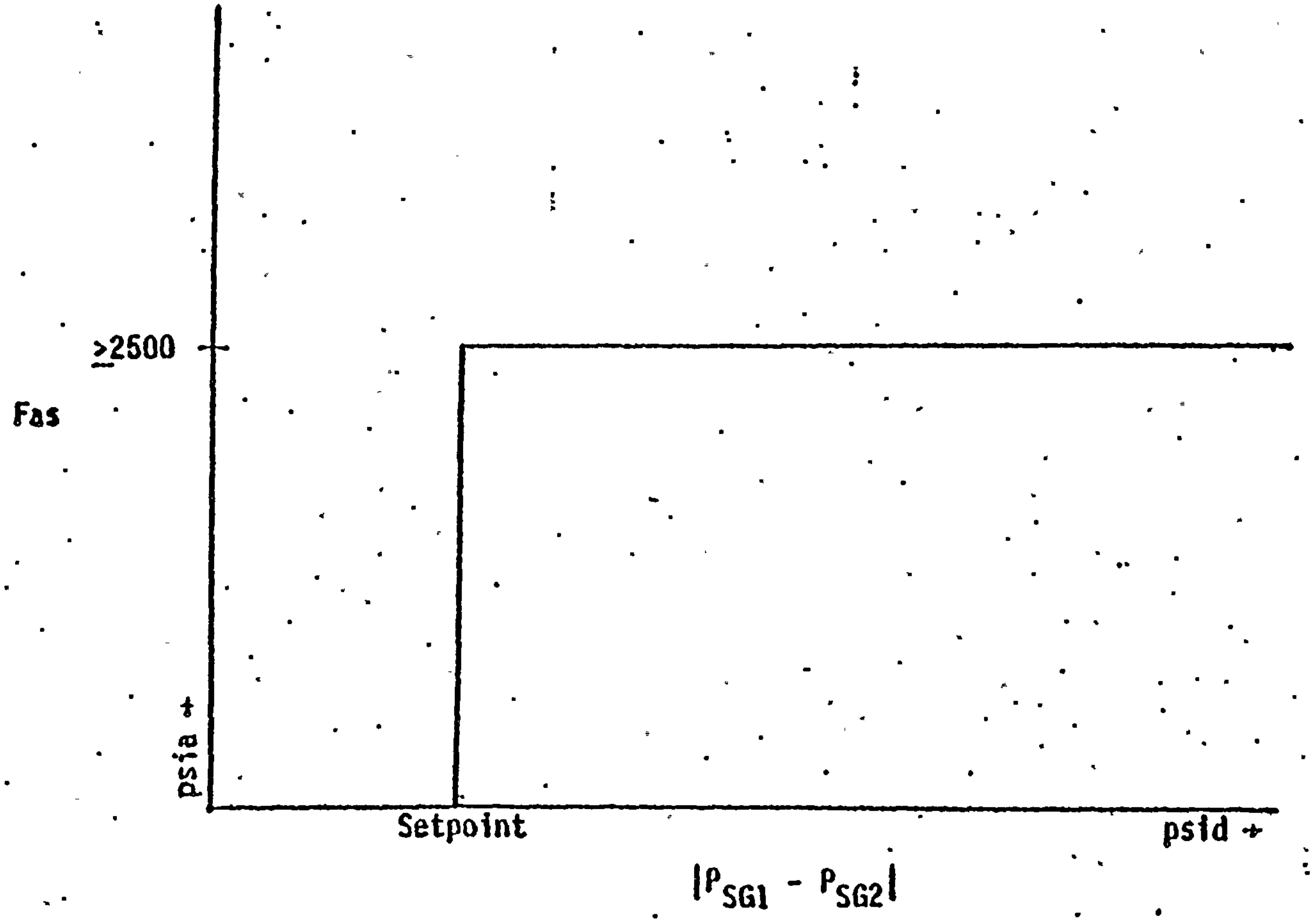


FIGURE 2

Fas vs. $|P_{SG1} - P_{SG2}|$

ASYMMETRIC FACTOR SIGNAL

ATTACHMENT 4

ST. LUCIE UNIT 1

STRETCH POWER

ENVIRONMENTAL REPORT

TABLE OF CONTENTS

ATTACHMENTS

1. St. Lucie Unit 2 Environmental Report - Operating License, Sections 2.1.1, 2.1.2 and 2.1.3.
2. St. Lucie Unit 2 Final Safety Analysis Report, Section 2.1.2
3. St. Lucie Unit 2 Final Safety Analysis Report, Section 2.3
4. St. Lucie Unit 2 Environmental Report - Operating License, Section 2.2
5. St. Lucie Unit 2 Environmental Report - Operating License, Section 2.4
6. St. Lucie Unit 2 Environmental Report - Operating License, Sections 3.3 and 3.4
7. St. Lucie Unit 2 Environmental Report - Operating License, Section 6.1

Section 1 - INTRODUCTION

The Florida Power & Light Company has prepared this document in support of an application to the U.S. Nuclear Regulatory Commission to increase the generating capacity of St. Lucie Unit 1 by 40 Mwe (electric) in order to assess the environmental impacts associated with such an increase. Currently, St. Lucie Unit 1 operates at 2560 Mwt (thermal) core power in accordance with Operating License DPR-67 obtained March 1, 1976. It is planned to increase (stretch) core power to a level 5.4% greater than the present level, i.e., from 2560 Mwt (thermal) to 2700 Mwt (thermal).

The primary objective in obtaining a stretch rating is to reduce some future capacity additions to FPL's system and to allow a reduction in the amount of petroleum consumed by FPL. The stretch power developed at St. Lucie Unit 1 would save approximately 450,000 barrels of oil per year thus providing economic benefits to FPL's customers and assist the nation towards the goal of energy self-reliance. The economic benefits can be shown by comparing the cost of generating electricity with oil versus nuclear fuel. Differential fuel costs for 1980 are approximately 30 MILS per KWHr using low sulfur oil. A savings to consumers of $8.5 million per year could be realized at this differential by increasing the generating capacity of St. Lucie Unit 1.

The following report demonstrates that stretch power at St. Lucie Unit 1 will have no adverse impact on the environment.

Section 2 - THE SITE AND ENVIRONMENTAL INTERFACES

2.1 Site Location And Description

A comprehensive description of the St. Lucie site and its location is given in Section 2.1.1 of the St. Lucie Unit 2 Environmental Report - Operating License. (See Attachment 1)

2.2 Population

A study of the distribution of the present and projected resident population within 50 miles of the St. Lucie site and the transient population within 30 miles of the site is given in Section 2.1.2 of the St. Lucie Unit 2 Environmental Report - Operating License. (See Attachment 1)

2.3 Land And Water Use

A detailed description of present and projected land and water uses within 50 miles of the plant site is given in Section 2.1.3 of the St. Lucie Unit 2 Environmental Report - Operating License. (See Attachment 1) The authority and control of land and water uses within the site boundary lines is summarized in Section 2.1.2 of the St. Lucie Unit 2 Final Safety Analysis Report. (See Attachment 2)

2.4 Meteorology

Discussions of regional climatology, local meteorology and onsite meteorological measurement program and estimates of short-term and long-term diffusion of airborne contaminants are presented in Section 2.3 of the St. Lucie Unit 2 Final Safety Analysis Report. (See Attachment 3)

2.5 Ecology

Section 2.2 of the St. Lucie Unit 2 Environmental Report - Operating License discusses the ecological aspects of the vicinity of the St. Lucie Units 1 and 2 site. The discussion includes detailed descriptions of the terrestrial vegetation, wildlife, and aquatic ecology of Hutchinson Island and the surrounding area. (See Attachment 4)

2.6 Hydrology

The Atlantic Ocean, east of the plant site, provides most of the water required for plant operation, and receives liquid wastes and waste heat from plant operation. Surface water hydrology and water quality characteristics of the Atlantic Ocean in this area are described in Section 2.4 of the St. Lucie Unit 2 Environmental Report - Operating

License. (See Attachment 5) The groundwater regime at the St. Lucie site and in the surrounding region is described in Section 2.5 of the St. Lucie Unit 2 Environmental Report - Construction Permit.

2.7 Geology

A description of the major geological aspects of the St. Lucie and surrounding environs is presented in Section 2.4 of the St. Lucie Unit 2 Environmental Report - Construction Permit.

2.8 Regional Historic Features

The regional historic, archeological, architectural, scenic, cultural, and natural features of the area surrounding St. Lucie Unit 1 will not be impacted by stretching core power.

Section 3 - THE PLANT

3.1 External Appearance

No change in plant external appearance will occur due to increased power level.

3.2 Reactor And Steam Electric System

A comprehensive description of the reactor and steam electric system is presented in Sections 4.0 and 10.0 of the St. Lucie Unit 1 Final Safety Analysis Report. Operation at stretch power will not require design modifications to the reactor and power generation system. The NSSS thermal power level will be increased from 2570 to 2710 Mwt. Electrical power generating capacity will increase to 879 Mwe. Saturated steam flow (full load) will increase to 11.9×10^6 lb/hr. Secondary steam pressure will remain essentially unchanged at 815 psia. Other operating parameters will not be affected by operation at stretch power.

3.3 Plant Water Use And Heat Dissipation

A description of plant water uses and the heat dissipation system is given in Section 3.3 and 3.4 of the St. Lucie Unit 2 Environmental Report - Operating License. (See Attachment 6) There will be no change in plant water use due to operation at stretch power. Since circulating cooling water flow will remain unchanged while heat rejection is increased during operation at stretch power, the delta T of the cooling water will increase from 24° F to about 25.5° F at full circulating water flow (1150 cfs).

No modification in the heat dissipation system is required to accommodate the increased power level. The environmental impact of the thermal discharge is discussed in Section 4.1 below.

3.4 Radwaste System

As described in Chapter 11 of the St. Lucie Unit 1 Final Safety Analysis Report, the radwaste systems have been designed to accommodate reactor operation at 2700 Mwt. Thus no modification of the radwaste system is required for operation at stretch power.

3.5 Chemical And Sanitary Wastes

Operation at stretch power will not affect chemical and sanitary waste systems at St. Lucie Unit 1.

3.6 Electrical Distribution

Operation at stretch power will not require any modification to the existing distribution facilities.

Section 4 — ENVIRONMENTAL EFFECTS OF PLANT OPERATION

4.1 Non-Radiological Effects

Applied Biology, Inc (1978)* analyzed the effects of thermal discharge for St. Lucie Unit 1. The analysis describes the effects of thermal discharges of up to a delta T of 28° F at full circulating water flow and up to 32° F at reduced circulating water flow. Operation of St. Lucie Unit 1 at stretch power will result in a delta T of 25.5° F (See Section 3.3 above). Thus the results of the analysis of Applied Biology, Inc (1978) are conservative with respect to the thermal discharge at stretch power. Operation at stretch power will not require modification of the existing NPDES Permit for St. Lucie Unit 1, which specifies a maximum delta T for the circulating water of 26° F.

4.2 Radiological Effects

As indicated in Section 3.4, modification of the radwaste system is not required to support operation at stretch power, and no significant increases in radiological releases are expected to occur. All releases are made in accordance with the dose design objectives of 10 CFR 50, Appendix I.

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*Applied Biology, Inc. 1978. Effects of Increased Water Temperature on Marine Biota of the St. Lucie Plant Areas. December, 1978.

Section 5 - EFFLUENT MONITORING

5.1 Non-Radiological Monitoring

Non-radiological monitoring programs for St. Lucie 1 are described in the St. Lucie Unit 1 Technical Specifications and NPDES permit, and in Section 6.1 of the St. Lucie Unit 2 Environmental Report - Operating License. (See Attachment 7) Operation at stretch power will not require any modifications to existing non-radiological monitoring programs.

5.2 Radiological Monitoring

The Operational Radiological Environmental Surveillance Program is conducted to measure radiation levels and radioactivity in the environs, and to assist in verifying any projected or anticipated radioactive releases resulting from plant operations. The ongoing program is described in detail in the St. Lucie Unit 1 Environmental Technical Specifications. No change to the program is expected due to the operation of St. Lucie Unit 1 at stretch power.

Section 6 - ENVIRONMENTAL EFFECTS OF ACCIDENTS

In order to insure that the exposure requirements of 10CFR100 and the various Standard Review Plans (SRP's) are met during stretch power operation, the following accident analysis is presented. Emphasis has been placed on those more severe accidents that could result in the release of radioactive materials and could have significant radiological consequences involving the general public. Although this type of analysis is presented in the St. Lucie Unit 1 Environmental Report, the realistic postulated accident assumptions of Regulatory Guide 4.2, Revision 2 have not been used. Rather, applicable accident assumptions presented in the various Regulatory Guides and SRP's for use in the Safety Analysis Report have been used as identified herein. Evaluations of accidents are performed at an assumed power level of 2764 Mwt, which represents 102% of the NSSS thermal power level of 2710 Mwt. Brief descriptions of each accident, taken from the St. Lucie Unit 1 FSAR, are provided here. More detailed accident scenarios are given in Chapter 15 of the St. Lucie Unit 1 FSAR.

6.1 Loss of External Load Accident and/or Turbine Stop Valve Closure

A large rapid reduction of power demand on the reactor while operating at full power can cause a corresponding reduction in the rate of heat removal from the reactor coolant system. The most probable cause of this accident is a turbine trip. This accident can also be postulated to result from abnormal variations in network frequency.

The plant is designed to accept a 45% step reduction in load without actuating a reactor trip signal. In the event of a complete loss of load, the steam dump and bypass system is normally available to remove energy from the reactor coolant system. When no credit is taken for the steam dump and bypass system or the pressurizer power operated relief valves as was done for this analysis, the pressurizer and main steam safety valves function to ensure that neither the reactor coolant system nor the steam generator pressures exceed their design limits.

The sequence of events for this accident is given in Table 6.1-1. The assumptions used to calculate the radiological consequences are provided in Table 6.1-2, the calculated radionuclide releases are presented in Table 6.1-3. As shown in Table 6.1-4, the offsite doses which result from this accident are small fractions of the 10CFR100 exposure limits.

TABLE 6.1-1

Sequence of Events for a Loss of Load Accident

Time (sec)	Event
0.0	Complete loss of secondary load
5.1	Secondary safety valves open
7.8	High pressurizer pressure reactor trip (2422 psia) PORV's fail to open. Steam Dump and Bypass valves fail to open. Feedwater flow ramps to 5%.
9.0	Primary safety valves open (2500 psia)
9.2	CEAs start to drop into the core
13.	Primary safety valves close
380.	Secondary safety valves close
1800	Plant cooldown initiated using steam dump to atmosphere.
9000	Average reactor coolant temperature $< 325^{\circ}F$, shutdown cooling initiated

TABLE 6.1-2

Assumptions

Initial Power (including pump heat)	2764 MWt
Initial RCS Pressure	2200 psia
Initial Main Steam Pressure	820 psia
Moderator Temperature Coefficient	$+0.5(-4)\Delta\rho/{}^{\circ}F$
Pressurizer PORVs are not operable	
Steam Dump and Bypass System is not operable	
Operator initiates plant cooldown procedure at 30 minutes.	
DEC of I-131	
Reactor Coolant	60 uCi/gm
Secondary Coolant	0.1uCi/gm
Noble Gas Conc. in Reactor Coolant	FSAR Table 11.1-1
Primary-to-Secondary Leakage	1 gpm
Atmospheric Diffusion	
0-2 Hour at the EAB	$1.2(-4)sec/m^3$
0-8 Hour at the LPZ	$6.6(-5)sec/m^3$
Breathing Rate	$3.47(-4)m^3/sec$
Mass of Steam Released	
Secondary Safety Valves	
0-30 minutes	112000 lbm
Atmospheric Dump Valves	
0.5-2.0 hours	529000 lbm
2.0-2.5 hours	166000 lbm

TABLE 6.1-3

Radionuclide Releases

	Release (Curies)	
	0-2 hours	Duration
I-131 DEC	5.6	7.1
Kr-85m	6.8(-1)	8.5(-1)
Kr-85	4.0(-1)	5.0(-1)
Kr-87	3.7(-1)	4.6(-1)
Kr-88	1.2	1.5
Xe-131m	6.7(-1)	8.4(-1)
Xe-133	8.2(+1)	1.0(+2)
Xe-135	3.4	4.3
Xe-138	1.6(-1)	2.0(-1)

TABLE 6.1-4

Radiological Consequences of a Loss of External Load Accident

Organ	Dose (Rem)
At the EAB	
Whole Body	2.3 (-4)
Thyroid	3.4 (-1)
At the LPZ	
Whole Body	1.6 (-4)
Thyroid	2.4 (-1)

6.2 Excess Load Accidents

An excess load accident is defined as any rapid increase in steam generator steam flow other than a steam line rupture. Such rapid increases in steam flow result in a power mismatch between core power and steam generator load demand. Consequently, there is a decrease in reactor coolant temperature and pressure. Under these conditions a negative moderator temperature coefficient of reactivity causes an increase in core power.

The high power level trip provides protection against damage to the core as a consequence of an excessive load increase since the high power trip set point is a function of initial power level. Additional protection is provided by other trip signals including high rate-of-change of power, thermal margin, low steam generator level, and low steam generator pressure.

The specific excess load accident analyzed was the inadvertent opening of a power operated atmospheric dump valve, while at hot standby conditions. The assumptions used to calculate the radiological consequences are presented in Table 6.2-1, the radionuclide releases calculated are presented in Table 6.2-2. The offsite doses which result from this accident, shown in Table 6.2-3, are small fractions of the 10CFR100 exposure limits,

TABLE 6.2-1

Assumptions

Initial Power	1.0 Mwt (2 loop, no load)
Core Inlet Temperature	534°F
Secondary Pressure	915 psia
Atmospheric Dump Valve Flowrate	85 lbs/sec

Credit was not taken for the reduction in secondary pressure during the event which would reduce the atmospheric dump valve flowrate.

No reactor trip occurs due to the increased steam flow. The event is terminated by remote manual closure of the valve by the operator.

DEC of I-131	
Reactor Coolant	60 uCi/gm
Secondary Coolant	0.1 uCi/gm
Noble Gas Reactor Coolant	FSAR Table 11.1-1
Primary to Secondary Leakage	1.gpm
Atmospheric Diffusion	
0-2 hours at the EAB	1.2(-4)sec/m^3
0-8 hours at the LPZ	6.6(-5)sec/m^3
Breathing Rate	3.47(-4)m^3/sec
Mass of Steam Released	
Atmospheric Dump Valves	
0-10 minutes	51000 lbm

TABLE 6.2-2

Radionuclide Releases

	Release (Curies)
I-131 DEC	4.6(-1)
Kr-85m	5.6(-2)
Kr-85	3.4(-2)
Kr-87	3.1(-2)
Kr-88	9.8(-2)
Xe-131m	5.6(-2)
Xe-133	6.9
Xe-135	2.9(-1)
Xe-138	1.4(-2)

TABLE 6.2-3

Radiological Consequences of An Excess Load Accident

Organ	Dose (Rem)
At the EAB	
Whole Body	2.0(-5)
Thyroid	2.8(-2)
At the LPZ	
Whole Body	1.1(-5)
Thyroid	1.6(-2)

6.3 Major Reactor Coolant System Pipe Rupture (Loss-of-Coolant Accident)

The radiological consequences of a major reactor coolant system pipe rupture (LOCA) have not been recalculated for the stretch power case. This was not done because the analysis presented in the FSAR was based upon Regulatory Guide 1.4 assumptions and was performed at a 2700 Mwt core power level.

Regulatory Guide 1.4 assumes standard radionuclide core release fractions into the containment which are independent of power level (100% of the noble gases and 50% of the iodines). Therefore, even if stretch power operation has an effect on plant parameters (temperature, pressure, etc) following a LOCA, it will not have any effect on the core release fractions assumed. Also, Regulatory Guide 1.4 assumes that the containment leaks at its Technical Specification limit following a large LOCA (1/2 the Tech Spec limit after one day) regardless of the post LOCA containment pressure.

The power level assumed in the analysis of a large LOCA would have an effect on the core radionuclide inventory. This in turn may have an effect on the radiological consequences of such an accident. The FSAR assumed core power level of 2700 Mwt is within about 2% of the stretch NSSS thermal power level of 2764 Mwt. This is well within the uncertainty of this type of calculation.

6.4 Waste Gas Decay Tank Leakage or Rupture

As with the LOCA, the radiological consequences of a waste gas decay tank rupture have not been reanalyzed for the stretch power case. This was not done because changes in plant parameters (temperature, pressure, etc) which may occur due to stretch power operation are expected to have little effect on the radiological activity release for this type of accident.

Since the FSAR assumed core power level of 2700 Mwt is within about 2% of the stretch NSSS thermal power level of 2764 Mwt, the radionuclide inventory of the waste gas decay tanks is expected to change by only this amount. Two percent is well within the uncertainty for this type of calculation.

6.5 Steam Generator Tube Failure

The steam generator tube failure is a penetration of the barrier between the reactor coolant system and the main steam system. The integrity of this barrier is significant from the standpoint of radiological safety in that a leaking steam generator tube allows for the transfer of reactor coolant into the main steam system. Radioactivity contained in the reactor coolant mixes with water in the shell side of the affected steam generator and is transported by steam to the turbine and then to the condenser, or directly to the condenser via the main steam dump and bypass system. Noncondensible radioactive gases in the condenser are discharged to the atmosphere by the condenser air ejector.

For this analysis, an area equivalent to a double-ended break of one steam generator tube is assumed. At normal operating conditions the leak rate through the double-ended rupture of one tube is greater than the maximum flow available from three charging pumps. Consequently, the reactor coolant system pressure decreases and a low pressurizer pressure trip occurs. Following this trip, the reactor coolant average temperature is reduced by exhausting steam through the main steam dump and bypass system.

The sequence of events for this accident are given in Table 6.5-1. The assumption used to calculate the radiological consequences of a steam generator tube failure are provided in Table 6.5-2, with the radionuclide releases being given in Table 6.5-3. The radiological consequences presented in Table 6.5-4 are well within the 10CFR100 exposure limits for this accident.

TABLE 6.5-1

Sequence of Events Of A Steam Generator Tube Failure

Time (sec)	Event
0	Rupture occurs
540	Low pressurizer pressure trip (1853 psia), rods drop. Steam dump and bypass valves quickly open. Feedwater flow ramps down to 5% of flow.
552	Pressurizer empties. Safety injection initiated (1578 psia)
592	Steam dump and bypass valves close
944	Pressurizer begins to refill
1800	Plant cooldown initiated using steam dump to condenser.
9000	Average reactor coolant temperature <325°F, shutdown cooling initiated.

TABLE 6.5-2

Assumptions

Initial Power (including pump heat)	2764 MWt
Initial RCS Pressure	2300 psia
Initial Main Steam Pressure (low initial steam pressure leads to slightly greater releases)	810 psia

A double ended rupture of one steam generator tube occurs instantaneously.

The discharge rate through the break is assumed to be proportional to the square root of the pressure differential between the primary side and the secondary side.

Under full load operating conditions, the steam mixture containing reactor coolant passes through the turbine and condenser.

Following the reactor and turbine trip, the main steam dump and bypass system is automatically actuated for removal of decay heat from the reactor coolant system.

The reactor coolant pumps are left in operation even after safety injection occurs.

At the end of 30 minutes the reactor operator has diagnosed the problem and has isolated the damaged steam generator by closing the main steam isolation valve. Plant cooldown procedures are then initiated.

DEC of I-131	
Reactor Coolant	60 uCi/gm
Secondary Coolant	0.1 uCi/gm
Noble Gas Concentration in Reactor Coolant	FSAR Table 11.1-1

No credit was taken for the reduction of the specific fission product inventory in the reactor coolant system resulting from dilution, safety injection and charging flow.

Primary-to-Secondary Leakage	6.3(+4) lbm
Steam Generator Iodine Decontamination Factor	10

TABLE 6.5-2 (Cont'd)

Assumptions

Atmospheric Diffusion	
0-2 Hours at the EAB	1.2(-4) sec/m^3
0-8 Hours at the LPZ	6.6(-5) sec/m^3
Breathing Rate	3.47(-4) m^3/sec
Mass of Steam Released	
Condenser via the Turbine	
0-0.5 Hour	1810000 lbm
Condenser via the SD&B Valves	
0-0.5 Hour	46000 lbm
0.5-2.0 Hours	549000 lbm
2.0-2.5 Hours	158000 lbm

TABLE 6.5-3

Radionuclide Releases

	Release (Curies)
I-131 DEC	1.8(+1)
Kr-85m	4.3(+1)
Kr-85	2.5(+1)
Kr-87	2.3(+1)
Kr-88	7.4(+1)
Xe-131m	4.2(+1)
Xe-133	5.2(+3)
Xe-135	2.2(+2)
Xe-138	1.0(+1)

TABLE 6.5-4

Radiological Consequences Of A Steam Generator Tube Failure

Organ	Dose (Rem)
At the EAB	
Whole Body	1.3 (-2)
Thyroid	1.1 (+1)
At the LPZ	
Whole Body	7.1 (-3)
Thyroid	6.2

6.6 Control Element Assembly Ejection Accident

Rapid ejection of a control element assembly (CEA) from the core would require a complete circumferential break of the control element drive mechanism (CEDM) housing or of the CEDM nozzle on the reactor vessel head. The CEDM housing and CEDM nozzle are an extension of the reactor coolant boundary and designed and manufactured to Section III of the ASME Boiler and Pressure Vessel Code. Hence, the occurrence of such a failure is considered highly unlikely.

A typical CEA ejection transient behaves in the following manner: After ejection of a CEA from a full power or zero power (critical) initial conditions, the core power rises rapidly for a brief period. The rise is terminated by the Doppler effect. Reactor shutdown is initiated by the high power level trip, and the power transient is then completed. The core is protected against severe fuel damage by the allowable CEA patterns and by the high power trip.

The radiological consequences of this type of accident have been determined for two types of radionuclide pathways: 1) leakage via the containment building and 2) leakage through the secondary system. The assumptions used to calculate these consequences are provided in Table 6.6-1, with the radionuclide releases provided in Table 6.6-2. Although the resulting doses in case of an actual accident would be a composite of the doses computed for releases via the containment building and through the secondary system both sets of doses are presented in Table 6.6-3. As shown in Table 6.6-3, the offsite radiological consequences of the CEA ejection accident are well within the guidelines of 10CFR100.

TABLE 6.6-1

Assumptions

Initial Power (including pump heat)	2764 MWt
DEC of I-131	
Reactor Coolant	60 uCi/gm
Secondary Coolant	0.1 uCi/gm
Noble Gas Reactor Coolant	FSAR Table 11.1-1
Fuel Rods in which:	
Centerline Melting is Experienced	4%
Cladding is Breached	0%
Atmospheric Diffusion	
0-2 hours at the EAB	1.2(-4)sec/m^3
0-8 hours at the LPZ	6.6(-5)sec/m^3
8-24 hours at the LPZ	1.2(-5)sec/m^3
Breathing Rate	3.47(-4)m^3/sec

Releases from the Containment

Primary Coolant Released to the Containment	5.2(+5)lbm (total inventory)
Containment Leak Rate	0.5%/day
Iodine Composition:	
Inorganic Iodines	90%
Organic Iodines	10%
SBVS Filter Efficiency	
Inorganic Iodines	90%
Organic Iodines	70%
Noble Gases	0%

TABLE 6.6-1 (Cont'd)

Assumptions

Released from the Secondary Side

Core Inlet Temperature	551.°F
Initial RCS Pressure	2200.psia
Main Steam Pressure	893.psia
CEA Ejection Time	0.5 seconds
Worth of Ejected CEA (bounding worth of an ejected CEA at full power)	-0.31% $\Delta\rho$
Pressurizer power operated relief valve are inoperative	

No rupture of CEDM housing following the CEA ejection; this maximizes steam release from the secondary system.

Automatic trip for this event is initiated by a high power level trip signal.

Cooldown Rate	100°F/hr (Tech Spec)
Primary-to-Secondary Leakage	1.gpm
Mass of Steam Released	
Steam Dump and Bypass to Condenser	
0-30 minutes	128500 lbm
0.5-2.0 hours	518000 lbm
2.0-2.46 hours	148000 lbm
SG Safety Valves to Atmosphere	
0-30 minutes	18000 lbm
Turbine to Condenser	
0-30 minutes	500 lbm

TABLE 6.6-2

Radionuclide Releases

Released From the Containment

	Release (Curies)		
	0-2 hours	0-8 hours	0-24 hours
I-131 DEC	7.1(-1)	2.8	8.5
Kr-85M	1.5(-1)	5.9(-1)	1.8
Kr-85	8.7(-2)	3.5(-1)	1.0
Kr-87	8.0(-2)	3.2(-1)	9.6(-1)
Kr-88	2.6(-1)	1.0	3.1
Xe-131m	1.5(-1)	5.8(-1)	1.8
Xe-133	1.8(+1)	7.1(+1)	2.1(+2)
Xe-135	7.4(-1)	3.0	8.9
Xe-138	3.6(-2)	1.4(-1)	4.3(-1)

TABLE 6.6-2 (Cont'd)

Releases From the Secondary Side

	Release (Curies)	
	0-2 hours	2-2.46 hours
I-131	5.7	1.3
Kr-85m	6.8(-1)	1.6(-1)
Kr-85	4.0(-1)	9.2(-2)
Kr-87	3.7(-1)	8.5(-2)
Kr-88	1.2(-1)	2.7(-1)
Xe-131m	6.7(-1)	1.5(-1)
Xe-133	8.2(+1)	1.9(+1)
Xe-135	3.4	7.9(-1)
Xe-138	1.6(-1)	3.8(-2)

TABLE 6.6-3

Radiological Consequences of a Control Element Assembly Ejection Accident

Doses From the Containment Release

Organ	Dose (Rem)
At the EAB	
Whole Body	4.6(-5)
Thyroid	4.4(-2)
At the LPZ	
Whole Body	1.4(-4)
Thyroid	1.3(-1)

Doses From the Secondary Side Releases

Organ	Dose (Rem)
At the EAB	
Whole Body	2.9(-4)
Thyroid	3.3(-1)
At the LPZ	
Whole Body	1.9(-4)
Thyroid	2.3(-1)

6.7 Steam Line Break Accident

A break in the main steam system increases the rate of heat extraction by the steam generators and causes cooldown of the reactor coolant. With a negative coefficient of reactivity, the cooldown will produce a positive reactivity addition.

Following a steam line break accident the reactor will trip on low steam generator pressure and both main steam isolation valves will close. Although the main steam isolation signal on either steam generator will also initiate closure of the feedwater isolation and feedwater pump discharge valves on both steam generators, a five percent flow has been conservatively assumed. If the break occurs between the steam generator and the isolation valve, blowdown of the affected steam generator continues. Flow from the intact steam generator stops with closure of both isolation valves, either of which is capable of stopping flow.

Since the steam generators are designed to withstand reactor coolant system operating pressure on the tube side with atmospheric pressure on the shell side, the continued integrity of the reactor coolant system barrier is assumed.

The sequence of events for this accident is given in Table 6.7-1. The assumptions used to calculate the radiological consequences are provided in Table 6.7-2. The calculated radionuclide releases are presented in Table 6.7-3. As shown in Table 6.7-4, the offsite doses from this accident are small fractions of the 10CFR100 exposure limits.

TABLE 6.7-1

Sequence of Events for a Steam Line Break Accident

Time (sec)	Event
0.	Steam line rupture occurs.
7.9	Steam generator pressure - low trip signal is generated (578 psia). Main steam isolation valves begin to close.
8.8	Trip breakers open for trip on low steam generator pressure.
9.3	Shutdown CEAs begin to drop into the reactor core.
14.8	Main steam isolation valves are closed; intact steam generator is isolated.
17.5	The pressurizer empties.
22.8	Safety injection actuation signal actuated on low RCS pressure (1578 psia).
182.4	Affected steam generator blows dry.
1800	Plant cooldown initiated using atmospheric dump valves.
7200	Average reactor coolant temperature $\leq$ 325°F, shutdown cooling initiated.

TABLE 6.7-2

Assumptions

Initial Power	1.MWt
Required Shutdown Margin	$-4.3\%\Delta\rho$

Only one of the three HPSI pumps is assumed to be available.

No credit was taken for charging and letdown flows.

The break assumed is a double ended rupture of a main steam line outside containment and upstream of a MSIV.

Blowdown from the affected steam generator is saturated steam; no credit is taken for moisture carryover.

Automatic trip of the reactor for this event is initiated by a Low Steam Generator Pressure Trip Signal.

No credit is taken for the check valve in the main steam isolation valve assembly of the ruptured steamline which terminates the blowdown from the steam generator with intact steamline.

The reactor coolant pumps are left in operation even after safety injection occurs.

At 30 minutes the operator initiates plant cooldown via atmospheric dump valves.

DEC of I-131	
Reactor Coolant	60.uCi/gm
Secondary Coolant	0.1.uCi/gm
Noble Gas Reactor Coolant	FSAR Table 11.1-1
Primary-to-Secondary Leakage	5 gpm

Upon entering the affected steam generator, all of the leaking coolant is assumed to instantaneously flash to steam which is released to the atmosphere.

Atmospheric Diffusion	
0-2 hour at the EAB	1.2(-4)sec/m^3
0-8 hour at the LPZ	6.6(-5)sec/m^3

TABLE 6.7-2 (Cont'd)

Assumptions

Breathing Rate	3.47(-4)m^3/sec
Mass of Steam Released	
Intact Steam Generator	
0-0.5 hours	41314 lbm
0.5-2.0 hours	175936 lbm
Affected Steam Generator	
0 -0.5 hours	246181 lbm
0.5-2.0 hours	1084 lbm

TABLE 6.7-3

Radionuclide Releases

	Release (Curies)
I-131 DEC	1.5(+2)
Kr-85m	3.4
Kr-85	2.0
Kr-87	1.8
Kr-88	5.9
Xe-131m	3.4
Xe-133	4.1(+2)
Xe-135	1.7(+1)
Xe-138	8.2(-1)

TABLE 6.7-4

Radiological Consequences of a Steam Line Break Accident

Organ	Dose (Rem)
At the EAB	
Whole Body	1.4(-3)
Thyroid	9.3
At the LPZ	
Whole Body	7.5(-4)
Thyroid	5.1

Section 7 - ALTERNATE ENERGY SOURCES

There are several alternate energy sources available to replace the stretch power of St. Lucie Unit 1. Purchased power, new coal fired generation and base loading some peaking units are among the major considerations. All of these options involve the increased use of fossil fuels and by a fuel cost analysis alone, render them inferior to the St. Lucie Unit 1 stretch power. Other considerations are; capital requirements, environmental impact and potential for the reduction of oil consumption which is the primary goal of the National Energy Policy. All of these considerations results in the St. Lucie Unit 1 stretch power option as the superior choice.

ATTACHMENT 1

ST. LUCIE UNIT 2 ENVIRONMENTAL REPORT - OPERATING LICENSE, SECTIONS 2.1.1, 2.1.2 AND 2.1.3

2.1 GEOGRAPHY AND DEMOGRAPHY

2.1.1 SITE LOCATION AND DESCRIPTION

2.1.1.1 Specification and Location

Florida Power & Light Company's (FP&L) St Lucie site is located on Hutchinson Island, St Lucie County, Florida. St Lucie Unit 2 is located at latitude 27° 20' 55" north and longitude 80° 14' 47" west; the Universal Transverse Mercator (UTM) coordinates are 3025150 meters north and 574500 meters east in Zone 17. Approximately 300 feet to the north of St Lucie Unit 2 is FP&L's St Lucie Unit 1, which has been operational since 1976. The coordinates for St Lucie Unit 1 are latitude 27° 20' 58" north and longitude 80° 14' 48" west; the UTM coordinates are 3025250 meters north and 574450 meters east.

The eastern boundary of the site is the Atlantic Ocean and the western boundary is the Indian River, a tidal lagoon. Other prominent natural features within 50 miles of the site include Lake Okeechobee, 30 miles to the west-southwest of the site and a portion of the Everglades approximately 24 miles to the south of the site. Figure 2.1-1 shows the site in relation to the region within 50 miles. Figure 2.1-2 shows the area within five miles of the site.

Prominent cities within ten miles of the site include Fort Pierce, approximately seven miles to the northwest of the site; Port St Lucie, 4.5 miles to the south-southwest of the site; and Stuart, 8.0 miles to the south of the site. The largest urbanized area within 50 miles of the site is West Palm Beach located 36 miles to the south southeast. All distances are straight line measurements from the site to the closest boundary of each city or area.

Transportation facilities within five miles of the site include U S Highway 1; State Roads (SR) AIA, 712 and 707; the Florida East Coast Railroad, shipping on the Atlantic Ocean and the Intracoastal Waterway which is located in the Indian River. SR AIA, the major north-south route on Hutchinson Island, traverses FP&L's property to the east of St Lucie Units 1 and 2. Figure 2.1-2 shows the location of these transportation facilities.

2.1.1.2 Site Description

A map of FP&L's St Lucie site is shown in Figure 2.1-3, entitled Site Area Map. This map includes plant property lines, site boundary, principle plant structures and boundary lines of the exclusion area and low population zone. FP&L owns approximately 1132 acres of land. The site is generally flat, and has dense vegetation characteristic of Florida coastal mangrove swamps. At the ocean shore, the land rises slightly to a dune or ridge approximately 19 feet above mean sea level.

Figure 3.1-1 shows the location and orientation of the principal plant facilities for St Lucie Units 1 and 2. The area preempted by the plant is about 300 acres, or 27 percent of the total land owned by FP&L.

There are no industrial, commercial, institutional, recreational or residential structures within the plant area. SR A1A traverses FP&L's property approximately 1,000 feet east of the St Lucie Unit 2 containment building.

The exclusion area and the low population zone are shown in Figure 2.1-3. The radius of the exclusion area is 0.97 miles from the St Lucie Unit 2 containment building. The low population zone includes that area within approximately one mile of the St Lucie Unit 2 reactor.

2.1.1.3 Boundaries for Establishing Effluent Release Limits

The minimum boundary distance for establishing gaseous effluent release limits is that noted on Figure 2.1-4, Property Plan, directly north of the St Lucie Unit 2 reactor containment building. Also indicated in Figure 2.1-4 are other boundary line distances from plant liquid and gasesous release points. The restricted area, as defined in 10CFR20 includes the fenced area shown in Figure 2.1-5.

2.1.2 POPULATION DISTRIBUTION

2.1.2.1 Population Within Ten Miles

Table 2.1-1 and Figure 2.1-6 show the distribution of present and projected population within ten miles of St Lucie Unit 2. The estimated 1978 population within ten miles of the plant is 71,051 persons, concentrated in the cities of Fort Pierce and Stuart which are the seats of government and centers of activity for St Lucie and Martin Counties, respectively. Most of the area within ten miles of St Lucie Unit 2 is in St Lucie County; only annular sectors S and SSW between the five and ten mile radii, fall within Martin County. The total population in 1978 for St Lucie County is estimated to be 76,500 persons(1). The 58,095 residents of St Lucie County, within the ten mile radius, represent 75.9 percent of the county total. In the same manner, the 12,956 residents of Martin County, within the ten mile radius, comprise 24.4 percent of the total estimated county population of 53,100 in 1978(1).

2.1.2.1.1 Cities, Towns and Settlements

Cities, towns and settlements within ten miles of St Lucie Unit 2 are shown in Figure 2.1-7. All or part of several incorporated areas fall within the ten mile radius. The largest of these is the city of Fort Pierce, with an estimated 1978 population of 33,083. The mainland portion of Fort Pierce falls in sectors NW and NNW, while the section of Fort Pierce on the northern end of Hutchinson Island is in sector NNW. This area, called South Beach, is linked to the mainland by South Bridge, a continuation of State Route (SR) A1A.

Nearly all of Fort Pierce's population is located within the five to ten mile annulus. A part of the Fort Pierce incorporated area, a long narrow extension to the southeast, comes within 4.1 miles of St Lucie Unit 2: However, most of this area consists of the Savannahs Recreation Area and has few residents.

The second incorporated area in St Lucie County within the ten mile radius is the city of Port St Lucie. The total population for Port St Lucie in 1978 is estimated to be 6,465(2). Approximately 75 percent of the incorporated area falls within ten miles of St Lucie Unit 2, extending from the S to W sectors. Although lots have been platted and sold in many sections, residential development in 1978 is concentrated in annular sector SW five to ten and WSW five to ten(3). In 1978, that part of Port St Lucie east of US Highway 1, (US 1) within five miles of the site, has no residential development(4).

A portion of the incorporated area of the city of Stuart falls within annular five Sector to ten. The estimated 1978 population for the city of Stuart is 10,760 persons. As in the Fort Pierce area, the city of Stuart offers residents services and employment, proximity to the Atlantic Ocean and beaches, and access to Hutchinson Island. Two of the three means of access to Hutchinson Island, the Jensen Beach Bridge and Stuart Causeway, are located in annular sector SSE five to ten.

The town of Ocean Breeze Park is located in Martin County, north of the city of Stuart, on the western shore of the Indian River in annular sector SSE five to ten. Ocean Breeze Park adjoins the community of Jensen Beach, located at the intersection of SR 707 and the Jensen Beach Causeway (SR A1A) to Hutchinson Island. Also, in the SSE sector is a portion of the Town of Sewall's Point, which occupies the peninsula separating the St Lucie River from the Indian River.

Along the western shoreline of the Indian River (paralleling SR 707 east of the Florida East Coast Railroad) is a ridge of dry sandy soils(22). This area, which is predominately low density residential throughout the five mile radius, includes the unincorporated settlements of Eden, Walton, and Ankona. A development called Indian River Estates is located in sectors W and WNW, between three and five miles of St Lucie Unit 2. Approximately 40 percent of its land was developed for residential use in 1978(4). Collins Park Estates, also in annular sector WNW four to five, is west of Indian River Estates and is smaller in area but more densely settled. Together, these developments contain about 500 dwelling units.

Spanish Lakes is another major development in the unincorporated county inside the five mile radius. This mobile home community, which has 1387 lots(5), is located in annular sector WSW four to five, east of US 1. To the west of US 1, in sector WSW, the developers of Spanish Lakes have completed a second project called Riverfront, which has a total of 620 units(5). In both projects, a significant proportion of dwelling units are owned or occupied by seasonal vistors rather than residents.

There are extensive areas of vacant land south of Indian River Estates between US 1 and the coastal ridge. Portions of this area are being acquired by the State of Florida for the Savannahs State Preserve(6).

On Hutchinson Island, in 1978, all resident population within the five mile radius was limited to annular sector SSE four to five. The 1928 persons in SSE four to five included residents of Nettles Island, a trailer park of 1588 lots(7), most of which are located in a man-made island reached by a short causeway. Many of the lots are owned or rented by persons who are seasonal vistors.

2.1.2.1.2 Population by Annular Sectors

The most heavily populated annular sectors are those which cover the towns and developments mentioned above. The most heavily populated annular sector in 1978 was NW five to ten, which includes much of the city of Fort Pierce with an estimated 36,483 residents.

2.1.2.1.3 Population by Annuli

In 1978, the annulus between five and ten miles of St Lucie Unit 2 was more densely populated than the area within five miles. Population density for the five to ten mile annulus (excluding the seven sectors over the Atlantic Ocean) has 473 persons per square mile. Inside five miles, the four to five mile annulus has a density of 427 persons per square mile.

In 1978, the area within four miles of the plant was sparsely populated, with an overall density of 46.1 persons per square mile (excluding the five sectors over the Atlantic Ocean). Within two miles of St Lucie Unit 2, there was an estimated total of 97 residents, a population density of approximately 11 persons per square mile. The entire area within one mile of the plant is owned by FP&L and is included in the exclusion area and low population zone. Much of the area in the one to two mile annulus is over water.

2.1.2.1.4 Population by Sectors

The most populous sector within ten miles of St Lucie Unit 2 is the NW sector which, because of the large concentration of resident population in the city of Fort Pierce, contains 36,657 persons. The second most heavily populated sector is SSE, which has 8140 persons and includes Hutchinson Island, the Atlantic Coast in the vicinity of Stuart, and Nettles Island. The adjacent sector, S, is third highest with 7179 residents in 1978.

2.1.2.1.5 Projected Population

The population within ten miles of St Lucie Unit 2 is expected to more than double during the life of the plant, from 71,051 in 1978 to 158,851 in 2030. This represents an increase of 123.6 percent over the 52 year period; an average annual rate of growth of 2.4 percent. The State of Florida is expected to grow by an average annual rate of 2.1 percent, or by 88 percent over the period from 1978 to 2020 (1,8), as discussed in Section 2.1.2.2.5.

It is expected that in the year 2030, as in 1978, sector NW will have the highest population of all sectors, 54,756 persons, but will have the slowest rate of growth, 49.4 percent over 52 years. Likewise, annular sector NW five to ten is expected to grow from 36,483 to 54,497, a gain of 49.4 percent. In 2030, the second highest population by sector is expected to be in sector WSW, which will grow by 268.7 percent from 6691 residents in 1978 to 24,669 in 2030.

Within the ten mile radius, the sectors expected to experience the highest growth rate are sectors SW and SSW. They are estimated to grow by more than 1200 percent, from 812 to 13,971 residents, and from 1,434 to 19,127, respectively. Both sectors will show an increase from the expected continued growth of Port St Lucie.

The Fort Pierce area will maintain a significant share of the total population within ten miles of St Lucie Unit 2. However, Port St Lucie will gain in its share of total county residents as absentee lot owners build homes and move to Port St Lucie, as promotion of lot and home sales continues, and as long as Port St Lucie offers more moderately priced housing than traditionally available at beachfront locations.

Port St Lucie is one of the strongest growth areas in St Lucie County. To illustrate, between 1970 and 1978, Fort Pierce grew from 29,721 persons to 33,083, an increase of 11 percent. During the same period, Port St Lucie grew from 330 to 6465 persons, an increase of approximately 1800 percent.

If building permit activities of 1975, 1976 and 1977 were to continue, it is possible that Port St Lucie would reach a population of 36,000 by the year 2000(2).

Within the city limits of Port St Lucie, a proposed development of 2,200 dwelling units, called Midport(9), has been approved under State Development of Regional Impact (DRI) regulations(10,11). Its estimated population of approximately 5000 people will reside in annular sectors SSW and SW between 3.5 and 5.5 miles of St Lucie Unit 2. It is expected that Midport will be completed and fully occupied by 1983. Therefore, the 1983 population estimates include the Midport project.

Also, the developers of Spanish Lakes and Riverfront have started development of a third mobile home community called Golf Village. The development as planned will add 740 dwelling units to annular sector SW four to five. As in many of the residential developments in this region, many of the homes will be occupied by seasonal visitors rather than residents.

The part of Hutchinson Island which falls within the five mile radius is another area expected to undergo considerable growth. In 1978, there was a total of 1,928 residents; this population is expected to reach 2,678 by 2030, a gain of 39 percent. These residents will probably represent only a fraction of the island's future population since many new dwelling units for seasonal visitors and tourist accommodations will be constructed on this highly valued beachfront property.

In annular sector SE one to two, a project called Sand Dollar Villas is under construction and scheduled for completion in 1980. It will have 203 apartments and 32 townhouses(12). While it is likely that development will continue to occur in the form of projects such as Sand Dollar Villas, it is impossible to predict the size and location of such projects until they are initiated.

County planning officials have indicated that congestion of the bridges from the mainland to Hutchinson Island could restrict development(13,14). A bridge has been proposed which would cross the Indian River at SR 712 and link US 1, the Florida Turnpike, and Interstate 95 to Hutchinson Island(13). An additional river crossing would induce development on the Island. However, it is uncertain if, when, or where another river crossing will be constructed because the waters of the Indian River in this area are part of an aquatic preserve(13).

2.1.2.1.6 Age Distribution

The age distribution of the projected population for the year 2000, within ten miles of St Lucie Unit 2, is presented in Table 2.1-2. In each annular sector, the number of people under 11 years of age; between 12 and 18; and over 18 have been estimated, based on the distribution of these age groups in the United States in 1970(17).

2.1.2.2 Population Between Ten and 50 Miles

Table 2.1-1 and Figure 2.1-8 show the distribution of the estimated 1978 population between ten and 50 miles of St Lucie Unit 2. The estimated 1978 population is 412,714 persons (see Section 6.1.4.2, Methodology) and represents 85.3 percent of the total population within 50 miles of the plant. This population is confined to sectors SSE through NNW since sectors N through SE, beyond the ten mile radius, include only the Atlantic Ocean. The major concentration of population occurs in annular sector SSE 40-50, which includes the city of West Palm Beach. West Palm Beach is the northern limit of the Florida Gold Coast development extending north from Miami through Dade and Broward Counties into Palm Beach County. The 126,615 residents in annular sector SSE 40-50 live on approximately 48 square miles of land (the eastern three quarters of annular sector SSE 40-50 extends over the Atlantic Ocean). Annular sectors S 40-50 and SSE 30-40 have the second and third highest populations, respectively, per annular sector, and reflect that Palm Beach County is more highly developed than any other part of the region. In the 1970 Census, Palm Beach County was one of the nine Standard Metropolitan Statistical Areas (SMSA's) in Florida. Of the total 525,200 residents of Palm Beach County in 1978, 277,881 lived within 50 miles of St Lucie Unit 2.

2.1.2.2.1 Cities and Towns Between Ten and 50 Miles

Table 2.1-3 lists towns, cities, and communities with a 1978 population of more than 5,000 persons (see Figure 2.1-9). There are eight towns with a population of more than 10,000, the largest of which is West Palm Beach, with a 1978 population of 62,616 (see Methodology, Section 6.1.4.2). The second largest is the city of Fort Pierce, with 33,083 persons; the third largest is Riviera Beach in Palm Beach County, with 27,735 persons; and the fourth largest is Vero Beach, seat of government for Indian River County, with 16,800 persons. Of the eight largest towns, five are in the West Palm Beach Urbanized Area (as defined by the US Census(15)). In addition to West Palm Beach and Riviera Beach, the five include North Palm Beach (15,014 persons), Palm Springs (11,300 persons), and Palm Beach Gardens (10,792 persons). Stuart, the largest city in Martin County, has an estimated 1978 population of 10,760.

Of the eight towns with populations between 5,000 and 10,000, four are within the West Palm Beach Urbanized Area. These include the towns of Palm Beach, with 9,952 persons; Lake Park, with 8,652 persons; Greenacres City, with 6,773 persons; and Royal Palm Beach, with 5,598 persons. Pahokee, with an estimated 1978 population of 5,864, is also in Palm Beach County but is located in the northwestern quarter of the county, on the shore of Lake Okeechobee.

There are three other towns with populations between 5,000 and 10,000 persons. These include Gifford, located in Indian River County, with an estimated 1978 population of 9,485; Jupiter in Palm Beach County with 9,156(2) people; and Port St Lucie, in St Lucie County with 6,465 residents.

2.1.2.2.2 Population by Annular Sectors

The most heavily populated annular sectors between ten and 50 miles from St Lucie Unit 2 are those which encompass the cities and towns with the greatest populations as discussed in Section 2.1.2.2.1. The most populous annular sector, SSE 40-50, includes West Palm Beach, Palm Beach Shores, Riviera Beach, and Palm Beach (see Figure 2.1-8).

Immediately to the west of annular sector SSE 40-50 lies the second most populous annular sector, S 40-50, including Greenacres City (6,773 persons) and Haverhill (1,004 persons estimated for 1978), as well as numerous large residential developments of up to 7,400 acres(16).

The third most populous annular sector between ten and 50 miles from St Lucie Unit 2 lies north of West Palm Beach on the Atlantic Coast (SSE 30-40). Although its land area is less than half of the 137 square miles which comprise the annular sector, it includes Lake Park, North Palm Beach, Juno Beach, portions of Riviera Beach, Palm Beach Gardens, and the town of Jupiter, all of which are heavily populated. When the above three annular sectors are combined, they comprise 59.6 percent of the total population between ten and 50 miles of the St Lucie Unit 2.

2.1.2.2.3 Population by Annuli

Populations by annuli between ten and 50 miles of St Lucie Unit 2 range in number of residents from the largest, with a total of 211,061 persons (the 40-50 miles annulus), to the smallest, with 51,504 persons (the ten to 20 mile annulus). The annulus between 30 and 40 miles has the second largest population of 83,240, while the annulus between 20 and 30 miles contains 66,909 persons (see Figure 2.1-8).

The 40-50 mile annulus has not only the largest population (211,061) and the greatest overall area (approximately 1,590 square miles, excluding the seven sectors over the Atlantic Ocean), but also the highest population density in the region. The population density of the 40-50 mile annulus is 133 persons per square mile. Ninety-one percent of the population is located on 22 percent of the total annulus area, in sectors SSE and S, which include West Palm Beach and environs.

2.1.2.2.4 Population by Sectors

The most populous sectors between ten and 50 miles of St Lucie Unit 2 are those which cover the West Palm Beach area and the Atlantic Coast. Sectors SSE and S have estimated 1978 populations of 206,199 and 90,040, respectively, and densities of 483 persons per square mile and 183 persons per square mile, respectively. Sector NNW has a population of 51,541, and a density of 109 persons per square mile; sector NW, the next one inland, has a total population of 19,037 and a density of 40 persons per square mile. The five remaining sectors have densities which range from two to 31 persons per square mile.

The sparseness of population in the five interior sectors can be attributed to extensive acreage covered by wetlands and surface water (Lake Okeechobee), inaccessibility to population centers, and the extent of range and cropland.

2.1.2.2.5 Projected Population

Figure 2.1-8 shows the projected residential population between ten and 50 miles of St Lucie Unit 2. Total population between ten and 50 miles is expected to grow by 121.3 percent between 1978 and 2030, or from 412,714 to 913,463. The average annual growth rate for this area would be 2.14 percent for the 52 year period. This rate of growth can be compared to the rate for the State of Florida, which is expected to be 2.1 percent per year from 1978 to 2020(1,8) and 0.76 percent per year for the United States from 1978 to 2025(17). Florida is presently one of the most rapidly growing states in the US. Between 1970 and 1977, the state grew by 28 percent, a net addition of almost two million people. Ninety percent of this growth was attributed to net migration(1).

2.1.2.2.6 Areas of Development

The principal area of development between ten and 50 miles of St Lucie Unit 2 occurs in Palm Beach County in the sectors including and adjacent to the Atlantic Coast. Major development activity outside of Palm Beach is concentrated in what can be called the "Atlantic Corridor", the five to ten mile area between the Atlantic Ocean and either Interstate 95 or the Florida Turnpike in Martin, St Lucie, Indian River, and southern Brevard Counties.

Land to the west of this region is mostly used for pasture, agricultural production (citrus, sugar cane, and truck farming), or remains undeveloped. Access is limited and population sparse. In a few widely scattered sites, tracts of land have been platted and sold as home sites or proposed for such development. No significant development of any of these projects which lie west of the Atlantic corridor has yet taken place.

Development is focused in the Atlantic corridor for reasons such as the following:

1) Proximity to existing population centers and services;

2) Access to the Atlantic Ocean and Indian River, and the amenities they provide: scenic beauty, sports and recreation, tourist industry potential;

3) Presence of soils suitable for development on the coastal ridge;

4) Zoning and planning policies developed by county and regional agencies which permit development in these areas; and

5) Availability of land suitable for development.

Only three significant clusters of development occur outside the Atlantic corridor between ten and 50 miles of St Lucie Unit 2. Two are on or near the shores of Lake Okeechobee (which covers 400 square miles in sectors SW and WSW between 30 and 50 miles of the plant). On the southeastern shore of the lake in Palm Beach County, the community of Pahokee serves the agricultural community of the western section as well as the sport fishing community using the lake. A few miles north of the lake in Okeechobee County, a regional center has developed at Okeechobee City. The third location where significant development is occurring is Indiantown, in south central Martin County, at the intersection of the St Lucie Canal and the Seaboard Coast Rail Line.

The following is a summary of development trends by county within 50 miles of St Lucie Unit 2.

a) Palm Beach County

The principal area of growth within 50 miles of St Lucie Unit 2 is in the northeastern quadrant of Palm Beach County, which lies south of the plant, at a distance of more than 27 miles. About 40 percent of Palm Beach County falls within 50 miles of St Lucie Unit 2; the total population of this area is expected to increase from 277,881 in 1978 to 617,422 in 2030. This increase represents a growth of 122 percent over the entire period, or 2.3 percent averaged annually. The corridor in Palm Beach County between the Atlantic Ocean and the Florida Turnpike is intensively developed with contiguous towns and cities such as Palm Beach, West Palm Beach, Riviera Beach and Lake Park. Residential development activity in 1977 included a sizable number of dwelling units under construction west of the Turnpike in sectors S and SSW(16). Development is expected to continue in this area because of strong growth to date and its reputation as a desirable place to live. Many developments include self-contained recreation amenities. The Professional Golfers' Association (PGA) has recently located its headquarters in Palm Beach County(18).

Another area of growth exists in the northwestern quadrant of Palm Beach County where Pahokee is located on the shore of Lake Okeechobee. Pahokee is one of the 15 largest cities and towns within 50 miles of St Lucie Unit 2 (see Table 2.1-3). It has an estimated population for 1978 of 5,864.

b) Martin County

While Palm Beach County has the greatest population, Martin County has the highest rate of growth. Nearly all (75 percent) of Martin County's 1978 population resided between ten and 50 miles of the plant. The remaining residents were within ten miles of St Lucie Unit 2. The 1978 total of 39,359 persons between ten and 50 miles is expected to grow by 139 percent to 94,359 by the year 2030. This represents an average annual growth rate of 2.7 percent. The city of Stuart is the major population center for the county; in 1978, its estimated population of 10,760 represents 20 percent of the total county population of 53,100. Population is expected to grow in and around the city of Stuart and on the barrier beaches in the Atlantic Corridor in Martin County(16).

Indiantown, with an estimated 1978 population of 3,411, is an incorporated area located approximately 26 miles southwest of St Lucie

Unit 2, at the intersection of SR 710 and SR 76. FP&L is presently constructing at the Martin County site two generating units and a 6,600 acre cooling lake west of Indiantown. Two additional units will be constructed there(19).

The western part of Martin County is largely range and cropland, with few permanent residents outside of Indiantown. A project formerly known as "Rotunda", and now called Palm Beach Heights, was proposed for land west of the Turnpike and was platted and sold for home sites. To date, there has been no actual development of these properties, and the wetness of soils is expected to limit the development of many lots which have been sold(20).

c) St Lucie County

St Lucie County extends from the plant site west to the 30 mile radius. Of the County's total estimated population of 76,500 in 1978, approximately one-quarter, or 19,181 persons, are estimated to reside outside the ten mile radius. This number is expected to grow at the rate of 120 percent (or 2.3 percent average annual rate) to a population of 42,226 in 2030.

St Lucie County's major population center is the city of Fort Pierce, with an estimated 1978 population of 33,083, located inside and out of the ten mile radius. While the county as a whole grew 29.4 percent between 1960 and 1970, the city of Fort Pierce grew only 17.7 percent(15). As Fort Pierce is built up, development is expected to occur within the Atlantic corridor, outside the city limits(21).

In St Lucie County, the only coastal area outside the ten mile radius lies north of the St Lucie Unit 2. Sectors NNW and NW contain more than 85 percent of the 1978 St Lucie County population outside of ten miles. The western portion of St Lucie County is dominated by pasture and croplands.

In 1974, Ashland Oil proposed a refinery and new town for the northwest corner of the county where the Turnpike runs NW-SE(19). No firm plans or schedules exist for the development of this area.

d) Indian River County

All of Indian River County falls within the ten to 50 mile radius. The county population, estimated at 50,776 in 1978, is expected to grow to 109,270 by 2030(1). This overall growth of 115 percent represents an annual average growth of 2.2 percent. The principal community in the Atlantic corridor is the county seat, Vero Beach, with an estimated 1978 population of 16,765 persons (one-third of the total county population). Other cities and towns include Gifford, 9,475 persons for 1978; Sebastian, 1,556 persons in 1978; and Indian River Shores, 1,013 persons in 1978. Only one settlement, the Town of Fellsmere, with a 1978 population of 1,056, is located outside the Atlantic corridor. Aside from the community at Fellsmere (NW 30-40), the area west of Interstate 95 is for the most part protected wetlands which are part of the St Johns River Flood Control District.

e) Brevard County

The portion of Brevard County (about 18 percent of total county land area) which lies within the 50 mile radius of the St Lucie Unit 2 has a 1978 population of 3,185. This number, which represents 1.2 percent of the county's total 1978 population is expected to increase by 80 percent, to 6,023 by 2030. Brevard has the slowest expected growth rate of the nine counties included in the 50 mile radius. Major development is Brevard County has taken place at Cape Canaveral, Cocoa Beach, Merrit Island, and Melbourne, all north of the 50 mile radius.

In southern Brevard County, development has occurred along the Indian River and Atlantic Coast. Small communities include Micco, Melbourne Shores, and Floridana. The only incorporated town entirely within the 50 mile radius of St Lucie Unit 2 is Malabar, which in 1970 had a population of 625. The town of Palm Bay lies to the north of Malabar, just outside the 50 mile radius, on the Indian River. However, part of Palm Bay's incorporated area falls within the 50 mile radius. In this portion, a large-scale development called Port Malabar has been proposed. Because of lot sales and promotion, development will be directed to this area, but there is no definitive schedule which could be incorporated into projections made at the present time. In southern Brevard, as in Indian River County, development will be confined to the eastern coastal area because of restrictions imposed in the western region by the St Johns River Flood Control District.

f) Okeechobee County

Located inland of Martin, St Lucie, and Indian River Counties, Okeechobee County accounts for approximately 4.5 percent of the residents between ten and 50 miles of St Lucie Unit 2. About 98 percent of its estimated 1978 population, or 18,629 persons, reside within the ten to 50 mile area. By the year 2030, this number is expected to increase by 130 percent to 42,762. With this rate of growth, averaged annually to 2.5 percent, Okeechobee County ranks second (behind Martin, with a 2.7 percent annual growth rate) in rate of growth of all counties within 50 miles of St Lucie Unit 2. Okeechobee's population is concentrated in and around the county seat of Okeechobee City. The county seat is at the convergence of US 98 and US 441 and SR 70, SR 78 and SR 710, less than five miles north of Lake Okeechobee. This accessibility is expected to ensure its continued growth as a regional center. The city's 1978 population of 4,490 represented about 24 percent of the county total. The adjacent town of Cypress Quarters has a population of approximately 2,176. In 1978, these towns together comprised 35 percent of the total county population. A large scale development has been proposed for sectors W and WNW at the 50 mile radius(23).

g) Glades, Osceola, and Highlands Counties

Three counties on the periphery of the 50 mile study area contribute a total of only 739 persons to the 1978 population between ten and 50 miles of St Lucie Unit 2. In Glades County, on the northwest shore of Lake Okeechobee, a community known as Buckhead Ridge has developed since 1970. Although only 12 percent of Glades County's land area falls within the 50 mile radius, its most significant growth occurs in this location(24,25,26). The only other settlement of greater size is the county seat of More Haven, which had a 1970 population of 974, an increase of 23.3 percent from 1960(22). Buckhead Ridge's 566 permanent residents represent approximately ten percent of the total county population for 1978(28).

Osceola County is included in the 50 mile radius in sectors NW and WNW. Approximately three percent of the county's 1,313 square miles are included in the 50 mile radius. There, the small settlement of Yeehaw Junction is estimated to have 119 persons in 1978(29). The population is expected to increase by 123 percent to 265 in 2030, which is an average annual growth rate of 2.37 percent.

Like Osceola, Highlands County has roughly three percent of its land area within the 50 mile radius. In this area, a small settlement has developed on SR 70(30). Its 1978 estimated population of 100 is expected to grow by 106 percent, to 206 in 2030. The average annual growth rate is expected to be two percent. Highlands County's predominant growth is expected to continue outside of the 50 mile radius in the vicinity of Sebring, Avon Park and Lake Placid, in the central part of the county(31,32,33). All three interior counties reflect the low levels of development taking place in Florida's central regions, which are not adjacent to the Atlantic or Gulf coasts.

2.1.2.2.7 Projected Growth Rates Between Ten and 50 Miles

The total population between ten and 50 miles is expected to grow by 121.3 percent from an estimated 412,714 persons in 1978 to 913,463 in 2030. The area of greatest growth between ten and 50 miles of St Lucie Unit 2 is in Palm Beach County, in the three annular sectors surrounding West Palm Beach. Annular sector S 40-50 is expected to experience the highest rate of growth, with its 1978 population growing by 183.4 percent from 65,250 to 176,411 in 2030. Annular sectors SSE 30-40 and S 30-40 are each expected to grow by 170 percent over the entire 52 year period. In contrast, a relatively low rate of growth is expected for annular sector SSE 40-50 which contains the city of West Palm Beach. This can be attributed to the shift in development from heavily urbanized areas to vacant land in the north and west as well as to the recognized tendency of heavily populated areas to exhibit low growth rates while surrounding areas with low densities undergo high rates of growth(34).

Another area showing relatively intensive growth is located south and southwest of the plant between ten and 30 miles. This includes Martin County's Atlantic corridor and the city of Stuart. Because the method for estimating growth by annular sector is based on projected growth for each county, the annular sectors reflect the growth rates for the county occupying the major portion of the sector.

The fastest growing annulus is expected to be between 30 to 40 miles of St Lucie Unit 2. This band is influenced by the high rates of growth expected for south and southeast sectors located just north of West Palm Beach. The greatest growth by sector is expected to occur in sector S which includes the expanding area west of the Turnpike in Palm Beach County as well as the area surrounding Stuart in Martin County.

2.1.2.2.8 Age Distribution

The age distribution of the projected population for the year 2000, between ten and 50 miles of St Lucie Unit 2, is presented in Table 2.1-4. In each annular sector, the numbers of persons under 12 between 12 and 18, and over 18 were estimated based on the distribution of these age groups in the United States in 1970(17).

2.1.2.3 Transient Population

Transient population within 30 miles of St Lucie is estimated to be 74,368 persons in 1978. This figure is based on estimates in each annular sector of peak daily tourists and seasonal visitors. These estimates are presented in Table 2.1-5 and in Figures 2.1-10 and 2.1-11, and represent both daily and seasonal variations in the movement of persons or their temporary redistribution within the 30 mile radius.

As in much of Florida, this region experiences significant fluctuations in population as thousands come to the area for the winter season (generally from Christmas/New Year to Easter) or for summer or winter vacation. Many attractions and events are held throughout the year which draw thousands of people. Although few in number, major industries and colleges draw many workers and students every day. The population from each of these sources has been estimated, and projected for the required years through 2030. Estimates and projections for these three components are presented in Tables 2.1-6, -7 and -8, and discussed in the sections which follow.

Transient population resulting from transportation by road, rail, waterway, and air is estimated by calculating the average daily passengers at locations where vehicles or passenger counts have been made. To avoid double counting, passenger estimates have not been incorporated into transient totals by annular sector.

Throughout the region, Atlantic Coast beaches are enjoyed for their scenic beauty and recreation potential. Both St Lucie and Martin Counties provide public access strips to the beaches, and State sovereignty guarantees public access to all lands seaward of the mean high water line(35).

Because of the lack of comprehensive data concerning both the use of the beaches and the number of users, estimates were not included in peak daily transient totals. The only data available on beach usage is as follows:

Best estimates available from St Lucie County(36) indicate that average daily beach usage was 656 persons at four guarded beaches on Hutchinson Island. Between October 1, 1977 and September 30, 1978, a cumulative total of approximately 239,000 persons attended all four beaches in sector NNW. If beach usage were to grow at the same rate of growth as resident and seasonal population, average daily beach usage would reach 1,503 by the year 2030.

In Martin County, there were two guarded beaches within ten miles of St Lucie Unit 2 (in sector SSE). Average daily usage for both was estimated at 2,340 persons in 1978(27). This number could be expected to reach 5,362 by 2030. Attendance is the greatest in the summer. It was estimated that as many as 2,000 persons attend Jensen Beach, at the junction of 42nd Street (from the Jensen Beach Bridge) and SR A1A on holidays such as Memorial Day, Fourth of July and Labor Day(37).

2.1.2.3.1 Tourists and Seasonal Visitors

The total of tourists and seasonal visitors within ten miles of St Lucie Unit 2, in 1978, is estimated to be 28,179 (see Table 2.1-5). This figure includes persons staying in tourist accommodations, campgrounds, dwelling units occupied by seasonal visitors, and visitors staying with friends and relatives.

Inside the ten mile radius, the following annular sectors had the highest transient population totals in 1978:

a) NW, zero to ten, had an estimated 7,804 tourists

b) SSE, zero to ten, had an estimated 11,572 tourists

These numbers reflect the fact that both sectors have the greatest number of tourist accommodations as compared with the other annular sectors. Sector SSE, for instance, contains three campgrounds on Hutchinson Island: Venture Out; Windmill Village and Holiday Out - St Lucie. Sector NW has a high resident population which presumably houses out-of-town visitors.

Between ten and 30 miles of St Lucie Unit 2, the greatest number of tourists in 1978 were located in sectors NNW, with an estimated 19,460 visitors, and SSE, with an estimated 11,755 visitors. These numbers reflect the fact that between ten and 30 miles of St Lucie Unit 2, these sectors afforded the largest number of tourist accommodations, such as motels, campgrounds and permanent residents' homes. Estimates for the 1978 tourist population and projects through 2030 are presented in Table 2.1-5.

2.1.2.3.2 Attractions and Events

Many attractions and events draw large crowds in this part of Florida; they include high school football games, major league exhibition games, county fairs, jai alai frontons and a dog track, tournaments, rodeos, and festivals. Attendance at events within 50 miles of St Lucie Unit 2 is presented in Table 2.1-6 for the years 1978 to 2030.

Within the ten mile radius, peak daily attendance in 1978 occurred at two walk through events. Each lasts two days, and has a total estimated attendance of 40,000 persons. The Art-on-the-Green Festival brought 20,000 persons per day to the Indian River Memorial Park in January of 1978(39). In March, 20,000 persons walked through the Auto Show, held at the St Lucie County Civic Center in Fort Pierce(38). The third largest event was the Jensen Beach Fireworks, held on the Jensen Beach Causeway each Fourth of July(40). Other attractions include the high school football games held at Lawnwood Stadium in Fort Pierce(50), and annual events such as the Sailfish Regatta (a hydroplane event on the St Lucie River)(41), the October Art Festival in Jensen Beach in March(40), the Sandy Shoes Festival (a week of events with a country and western theme) in Fort Pierce in January(51), the Sea Turtle Watch at Jensen Beach on Hutchinson Island in June(40), and Leif Erikson Day in Jensen Beach in October(40).

In February of 1978, a total of 20,800 persons attended the week long St Lucie County Fair(46), which is held at the County Fairgrounds in Fort Pierce, located approximately 12 miles from St Lucie Unit 2. The Martin County Fair(47), held at the fairgrounds in Stuart, had a peak daily attendance of 7,559 and a total attendance of 27,000 persons. Other attractions and events include the football games at Vero Beach High School Stadium and at Martin County High School, exhibition games by the Los Angeles Dodgers at Dodgertown Sports Complex in Vero Beach, and attendance at jai alai games in Fort Pierce.

Between 30 and 50 miles from St Lucie Unit 2, there are several attractions and events held annually. The highest daily attendance at any event (in fact, for the entire 50 mile radius) took place at the South Florida Fair, at the Palm Beach County Fairgrounds. In 1978, 470,752 people attended the Fair, with 88,000 persons on the peak day(52). Other events, such as fireworks, football games, and festivals, may draw from 1,000 to 10,000 persons on a single day. These are listed in Table 2.1-6, Part C, and shown on Figure 2.1-12.

2.1.2.3.3 Major Industrial Employers

Most industrial employers within the 30 mile radius have fewer than 50 workers each and are involved in citrus growing, packing and processing; construction materials; or marine industries. Major employers are included in Table 2.1-7 and in Figure 2.1-13. Three employers in the 50 mile radius employ 500 or more workers per shift; none is within ten miles of St Lucie Unit 2.

Between the 20 and 30 mile radii, two employers are considered significant. The first, Piper Aircraft, at the Vero Beach Airport in Indian River County in sector NNW, has a total employment of 2,887 persons and a peak daily shift of 2,000 persons in 1978(45). The second, Grumman Aerospace, in 1978 employed 731 workers at its Stuart plant near the Martin County Airport(48). The peak daily shift is 700 workers. Grumman is located in sector SW, between ten and 20 miles of St Lucie Unit 2.

Between the 30 and 50 mile radii, Pratt & Whitney Aircraft is located on SR 710 in Palm Beach County. Total employment is 7,261 at the plant, with a peak shift of 6,094 persons in 1978(52).

2.1.2.3.4 Enrollment at Major Colleges

Two major colleges are located inside the 30 mile radius. Estimates and projections of their enrollments are presented in Table 2.1-7. In annular sector SSE five to ten, Florida Institute of Technology-Jensen Beach Campus(42) has a peak enrollment of 900 students with dormitories accomdating approximately 300 students. Enrollment ranges from 200 in the summer trimester to 800 in the fall trimester and 900 in the winter session. The Jensen Beach Campus has a capacity for 1,200 students, which administrators expect to be reached by 1982(42).

Indian River Community College (IRCC)(44) has a total enrollment of 16,000 students on four campuses within the 50 mile radius. The main campus is located in Fort Pierce, in sector NW between the ten and 20 mile radii. Seventy percent of the students, who come from St Lucie, Martin, Indian River and Okeechobee Counties, attend classes in Fort Pierce. Peak daily attendance in 1978 is an estimated 1,500 students. Between ten and 30 miles of St Lucie Unit 2, there are campuses in Vero Beach and Stuart. In Stuart (SSW 10-20), approximately 1,280 students, or a peak daily estimate of 171, attended class in 1978, while in Vero Beach, the total is 3,200 students, or an estimated peak daily attendance of 428. Only two percent of the students attended class on the Okeechobee Campus, located outside the 30 mile radius with peak daily enrollment estimated at 43 students.

Projections for IRCC, included in Table 2.1-7, incorporate the ten percent annual rate of growth expected through 1983 (expansion of facilities underway in 1978); in subsequent years, it is assumed that enrollment would grow at an annual average rate of 2.4 percent, the rate for the 50 mile radius area.

2.1.2.3.5 Transporation Sources of Transient Population

The transient population resulting from the four basic modes of transportation is estimated by calculating the average daily number of passengers at locations on roads, waterways, rails, and airports where vehicles, vessels or passengers are counted. Since there is no way to know which or how many annular sectors people have traveled through and to avoid counting people as both residents and as passengers, transient population resulting from transporation has not been incorporated into the transient population totals by annular sector (Section 2.1.2.3). Estimates and projections of passengers for 1978 through 2030 are presented in Tables 2.1-8, 2.1-9 and 2.1-10; estimates for 1978 also appear in Figures 2.1-14 and 2.1-15.

2.1.2.3.5.1 Highway Traffic

Within ten miles of St Lucie Unit 2, highways and roads are a major source of transient population. SR A1A, SR 707, and US 1 are major north-south arterials. SR A1A passes within approximately 1000 feet of St Lucie

Unit 2 on Hutchinson Island. SR 707 along the mainland coast is less than two miles from the St Lucie site at its nearest point. US 1 is not only a major arterial north and south, but also a focus of commercial activity in St Lucie County. At its closest point, US 1 is approximately 4.8 miles from St Lucie Unit 2.

At or near the ten mile radius, four major river crossings concentrate traffic over the St Lucie and Indian Rivers (Figure 2.1-14). These include the South Bridge, Jensen Beach Bridge and Stuart Causeway from the mainland to Hutchinson Island and the Roosevelt Bridge on US 1 in Stuart. In February and March, traffic congestion in the Fort Pierce area and at the access points to Hutchinson Island is a severe problem; in fact, it is considered a limit to growth(14). Recommendations for an additional bridge crossing the Indian River have been made for the northern end of Hutchinson Island, within Fort Pierce City limits or in adjacent areas(14). Traffic from the larger region comes within ten miles of St Lucie Unit 2 on Florida's Turnpike, Interstate 91. At its closest point, the Florida Turnpike is approximately 7.5 miles from St Lucie Unit 2. At Interchange 56, in sector NW at the ten mile radius, the southbound average daily traffic (ADT) count was 5,920 vehicles(55) in 1977. Northbound traffic on the Turnpike in sector SSW had an ADT count of 9,980 vehicles. Passenger estimates for major state roads and interstates within ten miles of St Lucie Unit 2 in 1978 are displayed in Table 2.1-8 and in Figures 2.1-14 and 2.1-15.

Between ten and 30 miles, in sector NW, Interstate 95 (I-95) terminates approximately one mile east of the Florida Turnpike at SR 70. At the 30 mile radius, southbound traffic on I-95 had an ADT count in 1977 of 3,896, while the Turnpike, in sector WNW at the 30 mile radius, had a southbound ADT count of 5,920. To the south, in sector SSE, the northbound traffic on the Florida Turnpike had an ADT count of 10,365.

In 1978, I-95 was approximately 85 percent complete from the Georgia state line to South Miami(54). The 55 miles of I-95 remaining to be built are located in St Lucie, Martin and Palm Beach Counties. In St Lucie County, an eight mile section between SR 614 and SR 70 is under construction and scheduled to open in 1979. The remaining 47 miles south of SR 70 to completed sections in Palm Beach County are in the planning and/or design stages. In St. Lucie County, the proposed corridor is located west of the Turnpike. In Martin County, serveral alternate routes have been considered at public hearings(55), but as of early 1979 no decision had been reached.

Average daily traffic counts for interstate highways have been converted into average daily passengers (2.5 passengers per vehicle) in Table 2.1-8 and on Figures 2.1-14 and 2.1-15. (See Methodology, Section 6.1.4.2).

2.1.2.3.5.2 Waterway Traffic

The potential total of average daily passengers on waterways within ten miles of St Lucie Unit 2 in 1978 is 1,999 persons. This total is derived from available vessel or passenger counts for commercial and pleasure craft (see Table 2.1-10). As in the case of highways, the figure represents an approximation of potential passengers because there is no way to know in which or through how many annular sectors persons on the waterways may have traveled.

The St Lucie site on Hutchinson Island is bounded to the west by the Indian River, in which is located the Intracoastal Waterway, a major north-south route for commercial and pleasure craft along the eastern seaboard. Between Jacksonville and Miami, the US Army Corps of Engineers estimated a total of 518,841 excursion passengers in 1976(56), or an estimated average daily passenger count in 1978 of 1,490 passengers. This number is for the total length of the Intracoastal Waterway section between Jacksonville and Miami and therefore is a conservative estimate of the actual number of passengers within one mile of St Lucie Unit 2. There is no way to estimate how many passengers actually pass within one mile of the site from the data available.

Located in sector NW at the ten mile radius, Fort Pierce Harbor is the only shipping port within 30 miles of St Lucie Unit 2. The harbor is reached from the Atlantic Ocean shipping lanes via Fort Pierce Inlet, at the northern end of Hutchinson Island. Fort Pierce Harbor is a US Army Corps of Engineers project; in 1976, the Corps recorded a total of 7,800 passengers on ships entering the harbor(56).

The Florida peninsula is transversed from Fort Myers to Stuart by the Okeechobee Waterway, a cross-land lock system providing access from the Gulf of Mexico to the Atlantic Ocean and Intracoastal Waterway. From(57) September 1977 to September 1978, 9,671 vessels used the Waterway. These vessels were pleasure craft, cargo ships, and shrimpers under eight foot draft (maximum draft on Lake Okeechobee in 1978). The Waterway runs from Fort Myers Harbor to Lake Okeechobee. At Port Mayaca in Martin County, the Waterway enters the St Lucie Canal. Heading north and east through Indiantown, the Canal connects with the South Fork of the St Lucie River in Stuart. This eastern terminus of the Waterway lies within the ten mile radius in sectors S and SSE. In 1978, the average daily number of passengers on ships going through the locks was estimated to be 108 persons. Within the ten mile radius, in sectors NW, S and SSE, five drawbridges must be opened for large vessels on the St Lucie and Indian Rivers. In 1978, bridge openings represent an average daily estimate of 379 passengers.(56) These passenger estimates supplement the Intracoastal Waterway data which include only commercial vessels. Although there are no data available on the numbers of small craft passing under the bridges, it is likely that those passengers are local residents or transient population accounted for in estimates of resident and seasonal population. Estimates and projections of waterborne passengers are presented in Table 2.1-10. Figure 2.1-14 shows estimates for 1978 and the locations where passenger and vessel counts were taken.

2.1.2.3.5.3 Rail Passengers

Within ten miles of St Lucie Unit 2, the Florida East Coast Rail Line passes at a distance of approximately two miles from St Lucie Unit 2. It carries no passengers(58). To the southwest, Amtrak trains on the Seaboard Coast Line carried a total of 135,336 passengers between October 1, 1976 to September 30, 1977. At its closest point, the Seaboard Coast Line is approximately 26 miles from St Lucie Unit 2. Peak daily capacity, which means all seats available on all six trains on the line, was 2,474 in August, 1978(58). As indicated in Table 2.1-9 and Figure 2.1-14, the Seaboard Coast Line, which passes through the 30, 40 and 50 mile annuli, had a daily average of 389 passengers in 1978 between Sebring, Florida and West Palm Beach. A cutback in the number of passenger trains is expected to reduce passenger totals after 1978(59).

2.1.2.3.5.4 Airport Passengers

No regularly scheduled airline passenger service was available at any of the airports within 30 miles of St Lucie Unit 2 in 1978. Although no airports exist within the ten mile radius, both St Lucie and Martin Counties have airports located between the ten and 20 mile radii. The St Lucie County Airport is located north of the city of Fort Pierce in sector NW. St Lucie is a landing rights airport with complete US Customs facilities. In 1979, a small commuter airline known as Golden South expects to begin operation with five round trip flights to West Palm Beach, Melbourne, and Orlando. Longer range plans (1982-1985) include expansion of the runway to accommodate DC-9's and improvements of the tower to meet FAA Standards(60). In developing scheduled passenger service, St Lucie County Airport has the advantages of sufficient land area for runway expansion and US Custom Service facilities for non-US destinations in the Bahamas or the Caribbean.

The Stuart/Martin County Airport is located south of Stuart in annular sector S ten to 20. As of 1978, its use was limited primarily to test flights for Grumman Aerospace. No plans exist for expansion of structures or facilities.

Between 20 and 30 miles of St Lucie Unit 2, in Indian River County, the Vero Beach Municipal Airport will resume scheduled passenger service in 1979. Eastern Airlines discontinued its service into Vero Beach in 1973. Allegheny Commuter Service will offer round trip service for 150 passengers daily between Vero Beach and Orlando. Allegheny has found a good frequency/small aircraft type of service a success in other parts of the US, and expects strong growth here(61,62).

The West Palm Beach International Airport is located in sector SSE, inside the 50 mile radius (Figure 2.1-14). In 1977, a total of 1,603,971 arriving and departing passengers used the airport. In 1978, the average daily number of passengers is estimated to be 4,878. Although the number of landings grows at a rate of only two percent per year (see Section 2.2), the use of larger aircraft accommodates the increasing demand for seats. It is expected that at least 4,474,000 passengers will use the West Palm Beach International Airport in 1990(63). Plans are underway for construction of new terminal, runway, and road facilities. In addition to passengers, airport officials estimated that in 1978 there were 1,800 workers at the airport on a peak day, and that passengers were accompanied on the average by two persons each prior to departure and upon arrival. If passengers, workers and persons accompanying passengers are totalled for 1978, the average daily number of persons at the West Palm Beach International Airport for 1978 would be 6,992. Estimates and projections of average daily passengers are included in Table 2.1-9.

2.1.3 USES OF ADJACENT LANDS AND WATERS

2.1.3.1 Existing Land Uses on Applicant's Property

The St Lucie site boundaries, exclusion area boundary, and station perimeter, are shown in Figures 2.1-3 and 2.1-5. A map showing existing land uses on this property is given in Figure 2.2-1. Acreages of each category of land use within the property boundaries are given in Table 2.2-1.

Table 4.1-1 lists the various uses and the respective acreages required for the St Lucie site. A detailed discussion of the site area breakdown is given in Section 4.1.

2.1.3.2 Land Uses Within The Exclusion Area

The exclusion area falls within FP&L property boundaries, and encompasses the area within a one mile radius of the plant (See Figure 2.1-3). Apart from the utility facility itself, the only other principal land uses/land cover within the exclusion area are SR A1A, undeveloped mangrove, sandy beaches and dirt trails along the eastern coast of Hutchinson Island.

2.1.3.3 Future Land Use on the Applicant's Property

There are no proposed land uses within the applicant's property boundaries other than the structures and facilities related to St Lucie Unit 2. Apart from the three acres required for the discharge canal extension and headwall, no disturbance to existing land is expected. Power generated by St Lucie Unit 2 will be transmitted by existing switchyard and transmission lines constructed for St Lucie Unit 1. Therefore, land use changes on the applicant's property will be minimal.

2.1.3.4 Nearest Residences and Agricultural Activities

Table 2.1-11 gives the location of the nearest cow, goat, meat animal, vegetable garden (greater than 500 square feet in area), and residence found within five miles of St Lucie Unit 2. The location of these items is given by annular sector. The following is a discussion of this Table(66,67,68).

- The nearest milk cows are located outside the five mile radius, 14 miles W of the site. These milk cows are found in a dairy operation close to the Martin County line. The dairy is one of four in St Lucie County.
- The nearest milk goat is located 2.2 miles SW from the site. It is also the nearest grazing animal to the plant.
- The nearest meat animal is located 3.2 miles W of St Lucie Unit 2.
- The ground survey showed the nearest vegetable garden of 500 square feet or greater to be located 1.9 miles WSW of the facility.
- The nearest residence lies 1.9 miles WSW of the plant site.

2.1.3.5 Existing Land Uses Within Five Miles of St Lucie Unit 2

Table 2.1-12 lists each land use found within five miles of St Lucie Unit 2 with the acreage involved for each category. Figure 2.1-16 is a map showing the distribution of these land uses(69-72). The site survey and land use classification methodologies are discussed in Section 6.1.4.2.1.

A detailed discussion of existing land uses within five miles of St Lucie Unit 2 is given below.

2.1.3.5.1 Land Use/Land Cover by USGS Categories

a) Residential

The residential category of land use includes single family units, multiple family units, group quarters, mobile home parks, and transient lodgings, (motels and hotels). Permanent residents live, for the most part, in single family units consisting of free standing houses and mobile homes. Transient accommodations include residential units which are rented out, motels, hotels and individual housing units which are visited by friends or relatives.

Housing developments on the mainland are clustered along US Highway 1 (US 1) and SR 707 (along the western coast of Indian River). Housing facilities on Hutchinson Island are located at the shoreline and are, for the most part, transient accommodations. These residential units are used by seasonal visitors throughout the year and include motel rooms, condominiums and mobile home park facilities. Residential developments within five miles of St Lucie Unit 2 are discussed below. See Figure 2.1-7 for their location.

Mainland Residential Units

Indian River Estates, located between three and five miles of St Lucie Unit 2, east of US 1, and just south of Fort Pierce, is a single family housing development designed primarily for permanent residents(73). Althouth streets and plots were laid out for this development many years ago, only roughly 40 percent of the land within Indian River Estates was occupied in early 1978.

Collins Park Estates, just west of Indian River Estates, occupies much less land area than does Indian River Estates, but is more densely settled. Most of the residents are permanent(74). Taken together, these developments contain more than 500 dwelling units (Section 2.1.2).

Spanish Lakes is a mobile home community east of US 1 and contains 1,387 lots(75). Although most of the occupants are permanent residents, a significant number of dwelling units are owned or occupied by seasonal visitors. West of Spanish Lakes and US 1 is a mobile home project known as Riverfront. A small portion of this development extends into the area within five miles of St Lucie Unit 2. Like Spanish Lakes, it accommodates both permanent and transient residents.

Along US 1, there are a number of individual dwelling units which are scattered between, adjacent to, or atop commercial establishments. These residential units are used by both permanent residents and seasonal visitors.

Paralleling SR 707 is a strip of individual houses on the shore of the Indian River(76). Typically, these houses sit on lots which extend back from the shoreline approximately 1000 ft. Most of the people residing in this area are permanent residents. The area is primarily low density and includes the settlements of Ankona, Walton, and Eden.

There are a few isolated houses in the largely undeveloped area between the Florida East Coast Railroad and the housing developments adjacent to US 1. These are also predominantly owned and occupied by permanent residents. The multiple housing units built on the mainland are primarily located alongside US 1.

Hutchinson Island Residential Units

In February 1978, most of the residential units on Hutchinson Island were concentrated in an area four to five miles from St Lucie Unit 2. The principal residential developments on the Island are described below.

Extending into the Indian River is a large, densely populated, mobile home park known as Nettles Island. It has 1588 lots (see Section 2.1.2.1.1)(75). Many of the lots are used by seasonal visitors. Across from Nettles Island on the ocean are three lodgings: Hutchinson Island Inn (21 rooms), Sheraton Resort Inn (122 rooms) and Oceana (126 condominiums)(77-79).

Under construction are a housing development called Sand Dollar Villas and an expansion of Oceana. Sand Dollar Villas is 1.4 miles from the plant site and will contain 203 apartments and 32 townhouses on the ocean. It is expected to attract seasonal visitors. Sand Dollar Villas is scheduled for completion in 1980(80). The condominium development known as Oceana is currently being expanded to add another 160 condominiums. This expansion is scheduled for completion by December, 1979(79).

b) Commercial and Services

The commercial and service category includes areas used for the sale of products and services as well as institutions such as schools, medical centers and churches. A total of 28 acres within five miles of St Lucie Unit 2 fall within this category.

Commercial

Of the total area under consideration, only 22 acres consist of commercial and service establishments. Most of these facilities, such as drycleaners and supermarkets, serve local residents. There are two shopping centers within five miles of St Lucie Unit 2, located on US 1.. Most other commercial establishments are related to the automotive industry (gas stations, used car lots, mechanic's shops) or tourists.

There are few commercial and service establishments on Hutchinson Island. For the most part, they are specialized facilities such as beauty shops, and bait and tackle shops. As a result, people on the island have to cross over to the mainland for most supplies and services required.

The principal commercial centers serving the area are Fort Pierce and Stuart. A smaller commercial center is located in Jensen Beach. All three centers are located outside the five mile radius.

Institutional - Schools, Medical Facilities, Churches

The classification of commercial and services, includes institutional land uses such as schools and hospitals. There are no schools located within five miles of St Lucie Unit 2. The nearest school, White City Elementary School, is about six miles WNW from St Lucie Unit 2. There is one medical facility, approximately five miles WSW from the plant site, called the Port St Lucie Medical Center. Several churches fall within the five mile radius and include the Kingdom Hall of the Jehovah's Witnesses and the New Testament Baptist Church. Roughly six acres fall within this category.

c) Industrial

The General Development Corporation (GDC) owns approximately 32 acres, used as a small industrial park located off US 1, roughly four and a half miles WSW of the plant. One of the tenants is FP&L, one is a surgical and dental equipment firm and one is a plumbing supplier. The 18 acres leased by FP&L is classified as utility use. The remaining 14 acres, leased by other firms is classified as light industrial.

d) Transportation, Communications, and Utilities

This category encompasses major transportation routes, such as highways and railways, and communications and utilities areas, "such as those involved in processing, treatment, and transportation of water, gas, oil, and electricity(69)..."

Within five miles of St Lucie Unit 2, 964 acres can be classified as transportation, communications, or utility use, representing about two percent of the total acreage. Nearly three quarters of this (704 acres) is given over to utility structures and facilities.. All of these are owned and operated by FP&L. Most of this acreage supports St Lucie Units 1 and 2, and related structures. However, as mentioned above, FP&L leases an 18 acre storage and maintenance yard in GDC's Industrial Park.

Transportation

The principal transportation corridors on the mainland are US 1, SR 707, and the Florida East Coast Railroad. US 1 is a four lane divided highway which runs from north to south. SR 707 is a two lane road which parallels the Indian River. The Florida East Coast Railroad is a two track installation for most of its length, except for a section between Ankona and a point approximately 1.3 miles south of Weatherbee Road, where it narrows to a single track. Secondary transportation routes on the mainland include Walton Road (two lane), which runs due west from Walton; Weatherbee Road, (two lane) which runs due west from White City Station; and Route 712, also known as White City Road (two lane), which also runs east to west (Figure 2.1-2).

The only major paved road on Hutchinson Island is SR A1A. It has a width of two to three lanes and transects the entire length of the island.

Communications

With the exception of an underground telephone line which transects the western rim of the five mile area, there are no communications areas within five miles of St Lucie Unit 2.

There are no major pipelines located within five miles of St Lucie Unit 2.

Utilities

Roughly 704 acres fall within the utilities category. Of this total, approximately 300 acres on Hutchinson Island are committed to FP&L's Units 1 and 2 and their related structures. Roughly 386 acres accommodate the transmission lines which extend from the plant site to the circumference of the area within five miles. For most of its length, the transmission line right of way is 660 feet in width; however, for a short distance immediately adjacent to the Indian River, the width is 1,200 feet(81). The remaining 18 acres support a utility storage area within the GDC Industrial Park.

e) Urban or Built-Up Land

Included in this category are miscellaneous urban land uses such as cemeteries, urban parks, undeveloped urban land, and recreational facilities. Approximately 235 acres (or less than 1/2 percent) have been classified as urban or built-up land. Forty-seven of these acres comprise both a cemetery off SR 707, and pockets of undeveloped urban land contingent to US 1. A total of 188 acres are given over to both public and private recreational facilities. The private facilities consist of the golf course within the Spanish Lakes compound and the Tu Bahd Saddle Club. The public establishments are the southern end of the Savannahs Recreational Area (a park in the NW quadrant, owned by the City of Fort Pierce and used for picnicking, boating and camping) and public picnicking and beach facilities on

Hutchinson Island. Recreational beach usage is discussed in Section 2.1.3.9.2.

f) Agricultural Land

Approximately 541 acres of agricultural land (or less than one percent) fall within five miles of St Lucie Unit 2. Most of this land supports citrus groves. In 1976-1977, 73,912 acres were in citrus production in St Lucie County(113). Several nurseries comprise part of the agricultural acreage and produce ornamentals for local use.

g) Forest Land and Wetlands

Approximately 16 percent of the area under consideration can be identified as pine flatwood forest/fresh water marsh. This land cover consists of a mixture of pine, sawgrass marsh, and palmetto. The soils underlying this area are nearly level, poorly drained, sandy, and belong to the Myakka-Immokalee-Basinger Association(71). Much of the undeveloped land between the Florida East Coast Railroad and US 1 is marshy, and supports a scattering of pine trees. The ridge along SR 707 has drier soils and supports a denser forest canopy consisting mostly of pines(82). The forest within five miles of St Lucie Unit 2 is not commercially logged(83).

The other principal vegetation community within five miles of St Lucie Unit 2 is the mangrove community located on Hutchinson Island. For a discussion of this community, see Section 2.2.1.

h) Water

Most of the area within five miles of St Lucie Unit 2 is covered with water, and accounts for more than two-thirds of the total area; most of this consists of the Atlantic Ocean. One-third is a section of the Indian River, and the remainder is mainland water bodies. The Indian River is a brackish tidal lagoon. Most of the water on the mainland is concentrated in a string of lakes running from north to south at the eastern edge of the Savannahs. The boundaries of these lakes vacillate with seasonal flooding and often merge with the surrounding marsh. The rest of the water is concentrated in small man made ponds and canals located towards the western boundary of the five mile perimeter.

i) Barren Land

The classification system considers barren land as land which has a limited ability to support life. Beaches are an example.

There are three types of barren land within five miles of St Lucie Unit 2. The first type is located at the site of the sand mining operation, just west of the Florida East Coast Railroad tracks and on either side of Weatherbee Road. Roughly 195 acres serve this extraction operation.

The second type of barren land is found along the Atlantic Coast of Hutchinson Island in the form of beaches. Almost 100 acres of beaches occur within five miles of St Lucie Unit 2.

The third type of barren land is found within the so-called transitional areas. "The Transitional Areas category is intended for those areas which are in transition from one land use activity to another(69)." There are three transitional areas within five miles of St Lucie Unit 2. Two of these are located north of Weatherbee Road and appear to have once supported agricultural activity. The third is located near the southern boundary of the five mile circumference. It contains land which has been cleared and drained for a commercial/residential development known as "Midport"(37).

2.1.3.6 Future Land Uses Within Five Miles of St Lucie Unit 2

To determine future land uses within five miles of St Lucie Unit 2, the St Lucie County Growth Management Plan (The Plan) and other critical planning documents, such as The Plan for Hutchinson Island, were examined(84,86). In addition, projects under construction or in the process of obtaining permits were considered, as well as growth trends in St Lucie County, and local site suitability characteristics. Figures 2.1-17 and 2.1-18 present the proposed land uses.

The Plan states, "After adopting a plan, local governments and their agencies may not issue building permits, approve zoning changes or subdivision requests, undertake public development projects or approve development actions that are inconsistent with the plan for the area. In addition, the adoption or amendment of land development regulations (e.g., zoning, subdivision regulations) shall be consistent with the adopted comprehensive plan or element thereof"(84).

Anticipated future land uses, by USGS land use categories, are discussed below:

Residential

The greatest increase in land use is expected to occur in residential development. Projected population increases suggest that housing construction activity will be necessary to accommodate population growth. (See Tables 2.1-1 and 2.1-5).

Most of the land area within five miles of St Lucie Unit 2 is undeveloped pine flatwood/fresh water marsh. It is anticipated that with the projected increase in population, much of this land will be cleared and drained to accommodate new dwelling units.

In the following discussion of future residential development, separate consideration is given to the mainland and to Hutchinson Island.

a) Future Residential Development on the Mainland

According to The Plan, land abutting the eastern right of way of US 1, south of General Development Corporation's (GDC) Industrial Park, will be set aside for medium and low density residential use. It is expected that those areas designated for residential development by The Plan will support dwelling units in the future. In addition, residential development is anticipated in other areas.

Most of the undeveloped land extending from US 1 to the western border of the Florida East Coast Railroad right of way is designated in The Plan for Agricultural Use. In practice, however, portions of this "agricultural" land have already been committed for residential use.

Golf Village, for example, is an approved project of 740 mobile home units which will be constructed by the managers of Spanish Lakes and Riverfront (75). It will be located south of GDC's Industrial Park and east of US 1.

Another example of the pressure being placed on "agricultural" land for residential use is the project known as Midport. Midport is located north and south of Walton Road and east of US 1 (see Section 2.1.2.1.5). It will introduce 2,201 dwelling units which will be both single and multiple family units (87). Much of the Midport development will fall within the five mile area, although it is difficult to specify exactly how many residential units will be built within five miles of St Lucie Unit 2. The Midport Project has been issued a DRI (Development of Regional Impact) permit (87). The locations of both Golf Village and Midport are shown on Figure 2.1-7.

b) Future Residential Development on Hutchinson Island

That portion of Hutchinson Island which falls within the five mile radius is expected to experience considerable development. Specifically, the 1973 estimated population of 1,928 is expected to grow to 2,678 by the year 2030 (see Table 2.1-1). These projections reflect the fact that most of the Atlantic Coast of Hutchinson Island is undeveloped, and the demand for beach front property is growing. In recognition of this, The Plan has designated most of the land area within five miles of St Lucie Unit 2 as low or medium density residential.

However, there are some considerations which may affect the rate at which demand for Hutchinson Island property will increase. For example, there are no fresh water wells on Hutchinson Island; therefore, all potable water has to be piped in from the mainland. In the past, the city of Fort Pierce has supplied potable water to the Island. However, at this time, the distribution system supplying the island has reached its capacity. Until this system is expanded, development on the island will be hampered (88).

In general, it is anticipated that residential development within five miles of St Lucie Unit 2 will consist of a mixture of single family and multiple family units. It is also expected that these units will house both permanent residents and seasonal visitors.

Commercial and Services

a) Commercial

Commercial establishments on the mainland are concentrated along US 1. It is expected that there will be an increase in commercial land uses in conjunction with the predicted increase in residential land use, and that this increase will occur adjacent to US 1 on the mainland. As is currently the case, it is anticipated that new commercial establishments will serve both local residents and highway travellers. Two car dealers, Buick and Cadillac, are planning to move into the area, and other automotive related services may follow (73).

On Hutchinson Island, it is expected that the new residential projects will house commercial establishments such as beauty shops, sports equipment outlets, etc. In addition, other commercial establishments may be constructed along SR A1A. In fact, The Plan has zoned pockets of land on Hutchinson Island for such commercial development.

b) Institutions

At the present time, there are no plans to construct any schools or medical facilities within five miles of St Lucie Unit 2. However, pressure has been brought by local citizens on the General Development Corporation and other developers to provide school facilities for children residing within developments. For example, Port St Lucie, a development run by the GDC, has asked that schools be built to accommodate their children's needs (74). GDC has provided land for three schools within the Midport development. If these schools are built, a middle school-high school will be located about 3.5 miles south-west of St Lucie Unit 2, and an elementary school will be located about 4.5 miles south southwest of the plant.

Industrial

Currently there is very little industrial land use (roughly 14 acres) within five miles of St Lucie Unit 2. It is not expected that a significant amount of new industrial activity will be initiated in this area.

According to The Plan, only the area currently abutting the GDC Industrial Park (roughly 180 acres) will be zoned light industrial. According to local planning officials, there are no new firms currently seeking to relocate within the 180 zoned acres (37).

Transportation, Communication, and Utilities

Within the transportation, communications and utilities classification, limited growth is anticipated. The Plan calls for the widening of roads currently intersecting with limited access highways. The Plan indicates that these roads could be expanded to four lanes. Within the five mile area, this objective would affect White City Road and SR A1A.

In June 1978, a traffic study of Hutchinson Island was published for the St Lucie Board of County Commissioners. The report concluded that the three existing connecting structures - South Bridge, Jensen Causeway, and Stuart Bridge - were inadequate to handle existing traffic volumes. The report recommended that a fourth bridge be constructed at SR 712 (White City Road) which would link US 1, the Florida Turnpike, and Interstate 95 to Hutchinson Island(89). However, it is uncertain if, when, or where another river crossing will be constructed because the waters of the Indian River in this area are part of an aquatic preserve(85).

No expansion of the communications category is anticipated at this time. Future utility land use associated with the construction of St Lucie Unit 2 is discussed in Section 2.1.3.3.

Other Urban and Built-Up Land

The other urban and built-up land category encompasses miscellaneous urban land uses, such as urban parks, and recreational facilities.

A major land use change which will occur is the establishment of the State Savannahs Preserve. Using state funds, 3372 acres of land located at the western edge of the Florida East Coast Railroad right of way and paralleling SR 707 have been purchased for a conservation preserve(90). It is intended that the property which is eventually included in this preserve will be restricted to public access, and will serve primarily as a wildlife refuge. According to the Recreation and Parks Division of the Natural Resources Department, most of the land which will be included in the State Savannahs Preserve has been purchased to date(91).

With the increase in residential and commercial land uses, it is expected that some growth in private recreational facilities will also occur. New residential complexes will probably include such recreational amenities as tennis courts, swimming pools, and possibly golf courses. Other urban land uses will probably increase as the area becomes more developed. For example, it can be expected that urban land, such as that given over to urban parks and water control structures, may be expanded in the future. At this time, there are no specific plans for such development; therefore, it is not possible to predict where such development will occur. However, it is likely that most of this type of development will occur along US 1 and other major roads, such as White City Road and Walton Road.

Agricultural Land

There are currently roughly 450 acres of actively used agricultural land within five miles of St Lucie Unit 2. It is unlikely that there will be an expansion of agricultural activities in the future. According to the local County Agricultural Agent, the expansion of agricultural activities is likely to occur to the west of US 1 and not within the five mile area(92). The soils found within five miles of the plant, belonging to the Myakka-Immokolee-Basinger Association, have low potential for citrus production, which is the primary agricultural activity within five miles of the plant(71).

According to The Plan, "Prime agricultural, especially citrus, land should be preserved for continued production and benefit to the County economy". In spite of this stated concern for the preservation of agricultural land, it is expected that pressure to develop this land for residential or commercial use will be intense. Typically, the agricultural land within five miles of the plant which has been drained, is located near existing transportation corridors, and is easy to develop. Therefore, it is prime developable land in an area which will experience considerable development pressure in the future.

Other Land Uses

Little change is expected to occur in the future in the following USGS land cover/land use categories: forest land, water, and barren land.

Some of the pine forest scattered on the mainland will probably be cleared to accommodate new residential and commercial development. However, it is not anticipated that a significant percentage of the total forested acreage will be affected.

At this time, no major changes are projected within the barren land category. The transitional areas will eventually support one or more other land uses. Specifically, the transitional land north of Weatherbee Road, which was once agricultural, will probably evolve back into forested land.

2.1.3.7 Agriculture and Fisheries Within 50 Miles of St Lucie Unit 2

2.1.3.7.1 Introduction

This section consists principally of tabulated data concerning agricultural, livestock, and commercial and recreational marine landings within 50 miles of the St Lucie Unit 2 nuclear generating facility.

Data have been compiled on a county basis from field surveys and from information provided by federal, state, and county agencies, and reporting services. All or parts of ten counties are included within the 50 mile radius. These are St Lucie, Indian River, Brevard, Martin, Palm Beach, Okeechobee, Osceola, Glades, Highlands and Hendry counties. All of Indian River, St Lucie and Martin counties fall within the fifty mile radius. Approximately 75 percent of Okeechobee County, 50 percent of Palm Beach County and 20 percent of Brevard County fall within the 50 mile radius. Less than five percent of Osceola, Highlands, Glades and Hendry Counties are contained within the 50 mile area.

Agricultural data for those counties whose land area is not completely within the 50 mile area was allocated to the 50 mile area in the following manner:

The area of the entire county was analyzed using 1972 US Geological Survey Maps (Scale 1:250,000) to exclude those areas where agriculture or livestock farming could not occur. This would include water, wetland, urban recreation or "forested areas". The remaining "open" lands have been analyzed to determine what percentage falls within the 50 mile radius. This percentage is then applied to the county data to calculate what proportion of agricultural production falls within 50 miles of the site.

For fisheries production, data on marine landings for each county are used since data on fishing locations are not available.

2.1.3.7.2 Beef Production

Beef cattle production is one of the primary agricultural activities in southeastern Florida counties, with a production of approximately 137,000 head within the 50 mile study area. Table 2.1-13 shows Okeechobee, Martin and St Lucie counties as the major beef producers, producing 10,020 x 10^3 kilograms in 1977(93).

Presently there are 77 beef cattle ranches in St Lucie County, occupying 200,000 acres or 57 percent of the county area. Of this, 80,000 are improved pasture and 45,000 acres are highly improved pasture. By 1980-85, it is expected that beef cattle production will increase in the county along with an intensification in the cultivation of improved grasses and clover(94).

The grazing season for beef cattle in the study area begins in February, peaks in April, May and June, and ends by mid-November. During this period, bahia and pangola grasses are the principal pasture feeds; hay grasses rank second, and bermuda grasses, third(95). In the cooler months from mid-November through January, small grains, hay and grass silage are necessary feed supplements, though in some areas the availability of white clover allows year around pasture feeding(95).

2.1.3.7.3 Milk Production

Milk production within the study area totaled approximately 151 x 10^6 kilograms in 1977(96). Okeechobee County accounted for about two-thirds of this total, producing 102.5 x 10^6 kilograms in 1977(96). Within the Okeechobee area, corn and grass silage are the principal dairy cow feeds, although State figures show that commercial mixed feeds consisting of corn, cotton seed meal, wheat bran, shorts and alfalfa pellets, are fed on the average at 16 pounds per day(96).

Table 2.1-14 identifies dairy herds and milk production within 50 miles of the proposed facility. Table 2.1-15 shows that approximately 97.5 percent of the annual milk produced within the 0-50 mile radius study area is sold to plants for manufacturing dairy products. Of the remaining, approximately 0.6 percent is used raw on the farm for milk, cream and butter; 0.3 is fed to calves; and 1.5 percent is sold locally(96).

2.1.3.7.4. Egg Production

Egg production, from poultry farms within the study area, accounts for less than nine percent of the state total(97). Within the study area there are approximately 109 x 10^3 layers producing 26 x 10^6 eggs. Indian River, Martin and St Lucie counties are the largest egg producers in the 50 mile area. Each of these counties has 25,000 layers producing on the average of 16,250 eggs per day. Table 2.1-16 is a breakdown by county of the egg production within 50 miles of St Lucie Unit 2.

2.1.3.7.5 Commercial Vegetables, Fruit and Sugarcane Crops

Commercial vegetables and citrus fruits are the main agricultural products in the area. Table 2.1-17 provides vegetable harvest statistics for the 0-50 mile radius area. Tomatoes and watermelon are the principal produce within 50 miles of the site, accounting for annual harvests of approximately 3,000 acres and 650 acres respectively(98). Table 2.1-18 provides yield statistics for those counties in the southeastern part of the state; Table 2.1-19 shows state-wide yield statistics.

Citrus crops are grown throughout the study area. Table 2.1-20 lists, by county, the amounts and types of citrus crops grown in the 50 mile area. St Lucie and Indian River Counties are the largest producers in the area. In 1977, St Lucie County produced 3.7 x 10^8 kilograms of oranges and 3.3 x 10^8 kilograms of grapefruit. In the same year Indian River produced 2.1 x 10^8 kilograms of oranges and 3.3 x 10^8 kilograms of grapefruit(99). These two counties accounted for 73 percent of the total citrus produced in the study area and 13 percent of the state total(100).

Florida statistics show a net decline in Florida citrus acreage since 1970. In 1977, 21,538 acres were removed from production. St Lucie and Martin Counties were major contributors to the decline, while Hendry and Palm Beach Counties were the only two counties within the study area (and two of three counties within the State) showing significant gains in citrus acreage(100).

Sugarcane is produced in the Everglades in the south and southwest portion of the study area in Glades, Martin, and Palm Beach counties. Table 2.1-21 lists sugarcane production in Florida was produced in the 50 mile study area(100).

2.1.3.7.6 Commercial Fish and Shellfish Landings

Commercial landing statistics of fish and shellfish for the coastal counties within 50 miles of St Lucie Unit 2 (Brevard, Indian River, St Lucie, Martin, and Palm Beach counties) are presented by total landing in 1976 and principal species in Table 2.1-22. While Florida east coast landings in 1976 dropped by four percent from 1975(101), total fish and shellfish landings for the coastal counties within 50 miles of the site showed a marked increase. Total landings for these counties were up approximately 18.6 percent from 1975 (See Table 2.1-23). The increase was the result of a 33.6 percent increase in fish landings from 7.1 x 10^6 kilograms in 1975 to 9.5 x 10^6 kilograms in 1976. Total shellfish landings however, declined by 36.9 percent from 1.9 x 10^6 kilograms in 1975 to 1.2 x 10^6 in 1976. Brevard was the only county which experienced a decline in both fish and shellfish landings, with a 3.9 percent decrease in fish landings and 26.1 percent decrease in shellfish landings between 1975 and 1976.

Table 2.1-23 compares 1976 to 1975 total fish and shellfish marine landings for Brevard, Indian River, St Lucie, Martin and Palm Beach counties. Approximately 90 percent of the fish caught is consumed by humans (See Table 2.1-24). Twenty percent of fish catch is consumed locally(102). Principal finfish species taken were black mullet, menhaden, Spanish mackeral, bluefish, pompano and red snapper. The major commercial ports within this area include Fort Pierce in St Lucie County, Port Salerno in Martin County, and Riveria Beach and Jupiter in Palm Beach County.

According to the National Marine Fisheries Service, future commercial fish and shellfish landings are difficult to project, since catch is dependent largely on weather conditions, and the statistics are influenced by reporting estimates. Nonetheless, the trend in Florida marine landings over the past several years has been a decline of from two to four percent annually(101).

2.1.3.7.7 Recreational Fishing

Principal sport fishing areas within 50 miles of the plant site include the waters off Hutchinson Island, where pompano, bluefish, false albacore, kingfish, sailfish, dolphins, amberjack, flounder, mackerel and barracuda are common, and the St Lucie Inlet, predominated by snook, tarpon, redfish, spotted sea trout and bottom fish(103).

Shore fishing occurs along the beaches of Hutchinson Island in the vicinity of St Lucie Unit 2. Access along the beach is not restricted, so it is possible for someone to fish directly on shore front of the discharge pipeline. However, information is not available concerning the quality of the fishing in the area.

The variety of species of fish which may be caught while shore fishing include kingfish, pompano, palometa and spotfin mojarra(104).

2.1.3.7.8 Hunting Statistics

Hunting statistics have been tabulated for the J W Corbett Wildlife Management Area and are shown in Table 2.1-25. The J W Corbett Wildlife Management Area occupies approximately 500 square miles of the western portion of the study area, mainly in Palm Beach County.

Hunting season lasts from September 10 through March 26; the second week of January through the end of February each year is small game season and the month of March is spring turkey season(105). Quail, snipe and duck are the most common fowl taken while deer, hogs and squirrels are the principal wild animals taken(105). The game biologist for the J W Corbett Wildlife Management Area assumes that 100 percent of the wild game harvest is consumed locally(105).

2.1.3.8 Surface Water Use

2.1.3.8.1 Consumptive Use

This is no potable water use of any water resource which would be affected by St Lucie Unit 2 discharge(81). Since drinking water supplies are brought to Hutchinson Island by pipeline and since groundwater flows are from west to east toward the ocean, no contamination of drinking water is considered plausible(81). Therefore, no analyses of consumptive surface water use were performed.

2.1.3.8.2 Recreational Water Use

Since the discharge of St Lucie Unit 2 is into the Atlantic Ocean, only those recreational uses associated with saltwater activities have been considered. These include beach activities, fishing, boating, and surfing, as defined in <u>Outdoor Recreation in Florida 1976</u>, a publication of the State of Florida Department of Natural Resources(106).

It is difficult to estimate accurately the number and location of people involved in these activities because of the lack of information on the places at which people take part in recreational pursuits. However, by utilizing the results of state user surveys(106), a general order of magnitude estimate of saltwater recreational activities with 50 miles of St Lucie Unit 2 can be generated. Statewide 1975 annual per capita participation rates for each saltwater related activity were modified to reflect average daily recreational use (see Table 2.1-26 for methodology). These average daily per capita participation rates were applied to the projected population (resident and tourist) within 50 miles of St Lucie Unit 2 (see Section 2.1.2) to estimate the average daily number of recreational saltwater users. The results of these calculations are shown in Table 2.1-26.

These projections are based on the following assumptions:

a) Recreational users will pursue their activities only within 50 miles of St Lucie Unit 2. Residents and tourists in this area will sometimes journey out of the area for saltwater recreation, and, in turn, people from outside this area will enter it for these purposes. However, it is felt that these movements largely counterbalance one another, and because of the lack of more specific data, the numbers shown in Table 2.1-26 reflect a reasonable estimate of recreational saltwater use.

b) Recreational participation rates will not change over time. As stated in <u>Outdoor Recreation In Florida 1976</u>, such factors "have not been accurately estimated and quantified"(41). Because of this assumption, recreational use varies directly with the projected population.

c) Participation rates for only Region X (southeast Florida from St Lucie to Dade Counties) would apply in the study area. Indian River and Brevard Counties fall in a different Region, where participation rates are considerably lower. However, it was felt that using the Region X rates would result in a more conservative estimate, taking into account possible future increases in participation.

A 1978 average daily total of 110,431 recreational saltwater users is estimated within 50 miles of St Lucie Unit 2. This is expected to increase to 246,908 by 2030. Each category of saltwater recreational activity is discussed in the following paragraphs:

Beach Activities

Beach activities include saltwater swimming, sunbathing, relaxing, beachcombing and shell collecting. These activities account for 60 percent of all saltwater related recreational use. The density of these users will vary according to whether or not access is available to the beach, and whether or not the beach is public (i.e., has lifeguards). For example, according to a survey of beaches in Martin County(107) performed in 1978, guarded beaches had an average density of 0.9 persons per lineal foot, while unprotected areas had as few as 0.0036 people per linear foot. In a survey of beaches within two miles of St Lucie Unit 2 conducted by FP&L in July, 1975(108), the average density was 0.0122 people per lineal foot on the July 4th weekend. On other weekends this density was as low as 0.0025 people per lineal foot. The beaches near St Lucie Unit 2 have relatively few access points.

The differences in user density along the coast within 50 miles of St Lucie Unit 2 can be shown generally by mapping the public beaches and access points. This is done in Figure 2.1-19(109,110). The public beaches closest to the St Lucie Unit 2 discharge are on Hutchinson Inland about four miles NNW of the plant. Average daily usage at these beaches was 656 persons between October 1, 1977 and September 30, 1978(111). In general, the public beaches tend to be clustered near bridges over the Indian River.

Saltwater Fishing

Saltwater fishing activities account for 18.4 percent of recreational water users within 50 miles of St Lucie Unit 2. These activities can include surf casting, crabbing, and deep sea fishing. No information on distribution of these users is available.

Boating

Boating includes both power boating and sailing. Power boating is a considerably more popular activity than sailing, occupying 17.9 percent of the recreational saltwater users, as opposed to only 1.4 percent for sailing. Boating activity takes place in conjunction with marinas and boat ramps, and the greatest density of this activity probably take place in the vicinity of these facilities. Marinas within 50 miles of St Lucie Unit 2 are shown in Figure 2.1-19. Most of these facilities are located near the populated areas and the Indian River inlets. The nearest public marina to St Lucie Unit 2 is approximately six miles south of the St Lucie plant(112). It can also be expected that extensive pleasure boating takes place in most other areas of the Indian River as well as the nearby areas of the Atlantic Ocean.

Surfing

Surfing is a relatively unimportant activity in this area, with only 1.8 percent of the recreational saltwater users involved in this pursuit.

2.1.3.9 Groundwater Use

Field permeability tests at the plant site have indicated a seepage or flow of about 15,000 feet per year in the top 30 feet of the sand deposits. Taking the highest permeability coefficient obtained and a hydraulic gradient of 100 percent, any discharge introduced into the ground at the plant site would reach the Indian River in about a day. The discharge would then be greatly diluted. Because of the width of Indian River and presence of a continuous flow of groundwater toward the coastline, there is no possibility of subsurface flow from the site to the mainland. This precludes any intrusion of plant releases into the mainland groundwater supplies(81).

In addition, no successful fresh water wells have been found on Hutchinson Island(81). For these reasons, no analysis of groundwater users has been made.

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113. Florida Crop and Livestock Reporting Service, "Citrus Summary 1977 - Florida Agricultural Statistics," Orlando, Florida.

TABLE 2.1-1

RESIDENT POPULATION WITHIN 50 MILES OF ST LUCIE UNIT 2
1978

Annular Sector	0-1	1-2	2-3	3-4	4-5	5-10	*	Total 0-10	*	10-20	20-30	30-40	40-50	*	Total 10-50	*	Total 0-50
N	0	0	0	0	0	0	*	0	*	0	0	0	0	*	0	*	0
NNE	0	0	0	0	0	0	*	0	*	0	0	0	0	*	0	*	0
NE	0	0	0	0	0	0	*	0	*	0	0	0	0	*	0	*	0
ENE	0	0	0	0	0	0	*	0	*	0	0	0	0	*	0	*	0
E	0	0	0	0	0	0	*	0	*	0	0	0	0	*	0	*	0
ESE	0	0	0	0	0	0	*	0	*	0	0	0	0	*	0	*	0
SE	0	0	0	0	0	0	*	0	*	0	0	0	0	*	0	*	0
SSE	0	0	0	0	1928	6212	*	8140	*	7508	18119	53957	126615	*	206199	*	214339
S	0	0	0	212	223	6744	*	7179	*	17948	568	6274	65250	*	90040	*	97219
SSW	0	0	104	0	0	1330	*	1434	*	1752	3452	158	4044	*	9406	*	10840
SW	0	19	70	0	0	723	*	812	*	1752	1646	74	11029	*	14501	*	15313
WSW	0	59	0	11	2767	3854	*	6691	*	0	0	9120	566	*	9686	*	16377
W	0	19	44	532	517	482	*	1594	*	1913	0	8360	1223	*	11496	*	13090
WNW	0	0	108	382	1229	3302	*	5021	*	689	0	0	119	*	808	*	5829
NW	0	0	0	33	141	36483	*	36657	*	15799	1079	2159	0	*	19037	*	55694
NNW	0	0	0	0	0	3523	*	3523	*	4143	42045	3138	2215	*	51541	*	55064
Total	0	97	326	1170	6805	62653	*	71051	*	51504	66909	83240	211061	*	412714	*	483765

TABLE 2.1-1

RESIDENT POPULATION WITHIN 50 MILES OF ST LUCIE UNIT 2 1980

Annular Sector	0-1	1-2	2-3	3-4	4-5	5-10	*	Total 0-10	*	10-20	20-30	30-40	40-50	*	Total 10-50	*	Total 0-50
N	0	17	0	0	0	0	*	17	*	0	0	0	0	*	0	*	17
NNE	0	0	0	0	0	0	*	0	*	0	0	0	0	*	0	*	0
NE	0	0	0	0	0	0	*	0	*	0	0	0	0	*	0	*	0
ENE	0	0	0	0	0	0	*	0	*	0	0	0	0	*	0	*	0
E	0	0	0	0	0	0	*	0	*	0	0	0	0	*	0	*	0
ESE	0	0	0	0	0	0	*	0	*	0	0	0	0	*	0	*	0
SE	0	15	0	0	0	0	*	15	*	0	0	0	0	*	0	*	15
SSE	0	10	0	29	1983	6487	*	8509	*	8385	19776	60385	132498	*	221044	*	229553
S	0	0	0	218	240	6965	*	7423	*	20043	633	7022	73024	*	100722	*	108145
SSW	0	0	112	208	520	2754	*	3594	*	1957	3885	171	4378	*	10391	*	13985
SW	0	20	74	93	2543	2717	*	5447	*	1957	1838	83	11941	*	15819	*	21266
WSW	0	63	5	22	2878	5938	*	8906	*	0	0	10032	608	*	10640	*	19546
W	0	20	51	560	559	738	*	1928	*	2070	0	9196	1343	*	12609	*	14537
WNW	0	0	114	402	1309	3414	*	5239	*	745	0	0	129	*	874	*	6113
NW	0	0	0	34	146	37962	*	38142	*	17084	1159	2318	0	*	20561	*	58703
NNW	0	8	12	10	16	3619	*	3665	*	4471	45154	3322	2272	*	55219	*	58884
Total	0	153	368	1576	10194	70594	*	82885	*	56712	72445	92529	226193	*	447879	*	530764

TABLE 2.1-1 Sheet 3 of 8

RESIDENT POPULATION WITHIN 50 MILES OF ST LUCIE UNIT 2
1983

Annular Sector	0-1	1-2	2-3	3-4	4-5	5-10	*	Total 0-10	*	10-20	20-30	30-40	40-50	*	Total 10-50	*	Total 0-50
N	0	25	0	0	0	0	*	25	*	0	0	0	0	*	0	*	25
NNE	0	0	0	0	0	0	*	0	*	0	0	0	0	*	0	*	0
NE	0	0	0	0	0	0	*	0	*	0	0	0	0	*	0	*	0
ENE	0	0	0	0	0	0	*	0	*	0	0	0	0	*	0	*	0
E	0	0	0	0	0	0	*	0	*	0	0	0	0	*	0	*	0
ESE	0	0	0	0	0	0	*	0	*	0	0	0	0	*	0	*	0
SE	0	22	0	0	0	0	*	22	*	0	0	0	0	*	0	*	22
SSE	0	14	0	44	2006	6719	*	8783	*	9672	22043	68820	140290	*	240825	*	249608
S	0	0	0	221	248	7107	*	7576	*	23119	728	8002	83224	*	115073	*	122649
SSW	0	0	115	218	549	3063	*	3945	*	2257	4446	188	4818	*	11709	*	15654
SW	0	21	76	102	2574	2886	*	5659	*	2257	2120	96	13140	*	17613	*	23272
WSW	0	65	8	27	2933	6834	*	9867	*	0	0	11232	670	*	11902	*	21769
W	0	20	54	573	578	850	*	2075	*	2278	0	10296	1501	*	14075	*	16150
WNW	0	0	117	412	1346	3496	*	5371	*	820	0	0	143	*	963	*	6334
NW	0	0	0	35	148	38698	*	38881	*	18778	1264	2528	0	*	22570	*	61451
NNW	0	12	16	14	23	3681	*	3746	*	4903	49244	3566	2349	*	60062	*	63808
Total	0	179	386	1646	10405	73334	*	85950	*	64084	79845	104728	246135	*	494792	*	580742

TABLE 2.1-1

RESIDENT POPULATION WITHIN 50 MILES OF ST LUCIE UNIT 2
1990

Annular Sector	0-1	1-2	2-3	3-4	4-5	5-10	*	Total 0-10	*	10-20	20-30	30-40	40-50	*	Total 10-50	*	Total 0-10
N	0	68	0	0	0	0	*	68	*	0	0	0	0	*	0	*	68
NNE	0	0	0	0	0	0	*	0	*	0	0	0	0	*	0	*	0
NE	0	0	0	0	0	0	*	0	*	0	0	0	0	*	0	*	0
ENE	0	0	0	0	0	0	*	0	*	0	0	0	0	*	0	*	0
E	0	0	0	0	0	0	*	0	*	0	0	0	0	*	0	*	0
ESE	0	0	0	0	0	0	*	0	*	0	0	0	0	*	0	*	0
SE	0	60	0	0	0	0	*	60	*	0	0	0	0	*	0	*	60
SSE	0	38	0	119	2144	7155	*	9456	*	11369	25837	84538	155048	*	276792	*	286248
S	0	0	0	237	291	7582	*	8110	*	27175	855	9830	102232	*	140092	*	148202
SSW	0	0	133	269	700	5022	*	6124	*	2653	5226	220	5641	*	13740	*	19864
SW	0	25	86	146	2730	3955	*	6942	*	2653	2492	113	15385	*	20643	*	27585
WSW	0	75	21	54	3214	12495	*	15859	*	0	0	13296	783	*	14079	*	29938
W	0	21	71	641	680	1563	*	2976	*	2668	0	12188	1774	*	16630	*	19606
WNW	0	0	133	461	1542	3685	*	5821	*	960	0	0	168	*	1128	*	6949
NW	0	0	0	39	160	41058	*	41257	*	21980	1472	2944	0	*	26396	*	67653
NNW	0	30	42	38	62	3898	*	4070	*	5731	57342	4115	2650	*	69838	*	73908
Total	0	317	486	2004	11523	86413	*	100743	*	75189	93224	127244	283681	*	579338	*	680081

TABLE 2.1-1

RESIDENT POPULATION WITHIN 50 MILES OF ST LUCIE UNIT 2
2000

Annular Sector	0-1	1-2	2-3	3-4	4-5	5-10	*	Total 0-10	*	10-20	20-30	30-40	40-50	*	Total 10-50	*	Total 0-50
N	0	115	0	0	0	0	*	115	*	0	0	0	0	*	0	*	115
NNE	0	0	0	0	0	0	*	0	*	0	0	0	0	*	0	*	0
NE	0	0	0	0	0	0	*	0	*	0	0	0	0	*	0	*	0
ENE	0	0	0	0	0	0	*	0	*	0	0	0	0	*	0	*	0
E	0	0	0	0	0	0	*	0	*	0	0	0	0	*	0	*	0
ESE	0	0	0	0	0	0	*	0	*	0	0	0	0	*	0	*	0
SE	0	102	0	0	0	0	*	102	*	0	0	0	0	*	0	*	102
SSE	0	64	0	201	2295	7345	*	9905	*	13207	30012	101810	171690	*	316719	*	326624
S	0	0	0	254	335	7712	*	8301	*	31569	994	11838	123119	*	167520	*	175821
SSW	0	0	154	326	867	8010	*	9357	*	3082	6071	255	6552	*	15960	*	25317
SW	0	28	97	195	2904	5523	*	8747	*	3082	2895	131	17870	*	23987	*	32725
WSW	0	86	37	84	3525	20000	*	23732	*	0	0	15447	911	*	16358	*	40090
W	0	23	90	717	792	2702	*	4324	*	3099	0	14160	2062	*	19321	*	23645
WNW	0	0	150	516	1758	3790	*	6214	*	1115	0	0	195	*	1310	*	7524
NW	0	0	0	42	173	41806	*	42021	*	25533	1711	3422	0	*	30666	*	72687
NNW	0	52	70	64	105	3927	*	4219	*	6658	66653	4782	3078	*	81171	*	85390
Total	0	470	598	2399	12755	100815	*	117037	*	87345	108336	151845	325477		673003		790040

TABLE 2.1-1

Sheet 6 of 8

RESIDENT POPULATION WITHIN 50 MILES OF ST LUCIE UNIT 2
2010

Annular Sector	0-1	1-2	2-3	3-4	4-5	5-10	*	Total 0-10	*	10-20	20-30	30-40	40-50	*	Total 10-50	*	Total 0-50
N	0	155	0	0	0	0	*	155	*	0	0	0	0	*	0	*	155
NNE	0	0	0	0	0	0	*	0	*	0	0	0	0	*	0	*	0
NE	0	0	0	0	0	0	*	0	*	0	0	0	0	*	0	*	0
ENE	0	0	0	0	0	0	*	0	*	0	0	0	0	*	0	*	0
E	0	0	0	0	0	0	*	0	*	0	0	0	0	*	0	*	0
ESE	0	0	0	0	0	0	*	0	*	0	0	0	0	*	0	*	0
SE	0	137	0	0	0	0	*	137	*	0	0	0	0	*	0	*	137
SSE	0	85	0	272	2421	8163	*	10941	*	14758	33537	116302	185967	*	350564	*	361505
S	0	0	0	268	375	8551	*	9194	*	35277	1111	13524	140645	*	190557	*	199751
SSW	0	0	172	374	1009	11103	*	12658	*	3444	6784	285	7322	*	17835	*	30493
SW	0	32	107	237	3049	6863	*	10288	*	3444	3236	146	19969	*	26795	*	37083
WSW	0	96	49	110	3788	20000	*	24043	*	0	0	17262	1019	*	18281	*	42324
W	0	25	106	781	887	3343	*	5142	*	3463	0	15823	2304	*	21590	*	26732
WNW	0	0	164	562	1942	4200	*	6868	*	1247	0	0	218	*	1465	*	8333
NW	0	0	0	46	183	46391	*	46620	*	28533	1912	3824	0	*	34269	*	80889
NNW	0	70	94	85	140	4348	*	4737	*	7441	74482	5344	3439	*	90706	*	95443
Total	0	600	692	2735	13794	112962	*	130783	*	97607	121062	172510	360883	*	752062	*	882845

TABLE 2.1-1

RESIDENT POPULATION WITHIN 50 MILES OF ST LUCIE UNIT 2
2020

Annular Sector	0-1	1-2	2-3	3-4	4-5	5-10	*	Total 0-10	*	10-20	20-30	30-40	40-50	*	Total 10-50	*	Total 0-50
N	0	194	0	0	0	0	*	194	*	0	0	0	0	*	0	*	194
NNE	0	0	0	0	0	0	*	0	*	0	0	0	0	*	0	*	0
NE	0	0	0	0	0	0	*	0	*	0	0	0	0	*	0	*	0
ENE	0	0	0	0	0	0	*	0	*	0	0	0	0	*	0	*	0
E	0	0	0	0	0	0	*	0	*	0	0	0	0	*	0	*	0
ESE	0	0	0	0	0	0	*	0	*	0	0	0	0	*	0	*	0
SE	0	171	0	0	0	0	*	171	*	0	0	0	0	*	0	*	171
SSE	0	106	0	339	2543	8865	*	11853	*	16266	36964	130364	199908	*	383502	*	395355
S	0	0	0	282	413	9272	*	9967	*	38882	1223	15159	157649	*	212913	*	222880
SSW	0	0	189	421	1146	14126	*	15882	*	3796	7477	314	8070	*	19657	*	35539
SW	0	35	116	277	3191	8500	*	12119	*	3796	3566	161	22010	*	29533	*	41652
WSW	0	105	62	135	4044	20000	*	24346	*	0	0	19026	1123	*	20149	*	44495
W	0	26	122	844	980	4424	*	6396	*	3816	0	17440	2539	*	23795	*	30191
WNW	0	0	178	607	2120	4555	*	7460	*	1374	0	0	240	*	1614	*	9074
NW	0	0	0	49	196	50317	*	50562	*	31449	2108	4215	0	*	37772	*	88334
NNW	0	87	117	106	175	4715	*	5200	*	8201	82094	5890	3791	*	99976	*	105176
Total	0	724	784	3060	14808	124774	*	144150	*	107580	133432	192569	395330	*	828911	*	973061

TABLE 2.1-1

RESIDENT POPULATION WITHIN 50 MILES OF ST LUCIE UNIT 2
2030

Annular Sector	0-1	1-2	2-3	3-4	4-5	5-10	Total 0-10	10-20	20-30	30-40	40-50	Total 10-50	Total 0-50
N	0	237	0	0	0	0	237	0	0	0	0	0	237
NNE	0	0	0	0	0	0	0	0	0	0	0	0	0
NE	0	0	0	0	0	0	0	0	0	0	0	0	0
ENE	0	0	0	0	0	0	0	0	0	0	0	0	0
E	0	0	0	0	0	0	0	0	0	0	0	0	0
ESE	0	0	0	0	0	0	0	0	0	0	0	0	0
SE	0	209	0	0	0	0	209	0	0	0	0	0	209
SSE	0	129	0	414	2678	9869	13090	17925	40735	145878	215143	419681	432771
S	0	0	0	298	456	10306	11060	42848	1349	16963	176411	237571	248631
SSW	0	0	208	473	1298	17148	19127	4183	8240	346	8893	21662	40789
SW	0	38	126	322	3349	10136	13971	4183	3930	177	24255	32545	46516
WSW	0	115	76	152	4326	20000	24669	0	0	20966	1237	22203	46872
W	0	28	139	912	1082	5506	7667	4206	0	19219	2798	26223	33890
WNW	0	0	194	656	2316	5066	8232	1514	0	0	265	1779	10011
NW	0	0	0	52	207	54497	54756	34657	2323	4645	0	41625	96381
NNW	0	108	143	129	214	5239	5833	9038	90468	6491	4177	110174	116007
Total	0	864	886	3408	15926	137767	158851	118554	147045	214685	433179	913463	1072314

TABLE 2.1-2

AGE DISTRIBUTION OF THE PROJECTED POPULATION FOR THE YEAR 2000 WITHIN TEN MILES OF ST LUCIE UNIT 2

	0-1 miles			1-2 miles			2-3 miles			3-4 miles			4-5 miles			5-10 miles			Total 0-10 miles			Total 0-10 miles
Sector	12*	12-18**	18***	12	12-18	18	12	12-18	18	12	12-18	18	12	12-18	18	12	12-18	18	12	12-18	18	All ages
N	0	0	0	29	18	83	0	0	0	0	0	0	0	0	0	0	0	0	29	18	83	130
NNE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ENE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
E	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ESE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SE	0	0	0	26	15	74	0	0	0	0	0	0	0	0	0	0	0	0	26	15	74	115
SSE	0	0	0	16	10	45	0	0	0	51	30	146	521	316	1,500	1,731	1,048	4,982	2,319	1,404	6,673	10,396
S	0	0	0	0	0	0	0	0	0	58	35	166	78	47	225	1,777	1,076	5,115	1,913	1,158	5,506	8,577
SSW	0	0	0	0	0	0	36	22	103	35	21	100	103	62	296	1,852	1,121	5,333	2,026	1,226	5,832	9,084
SW	0	0	0	6	4	19	22	14	65	30	18	87	107	64	307	1,078	652	3,102	1,243	752	3,580	5,575
WSW	0	0	0	20	12	58	9	6	27	21	13	60	808	489	2,327	4,460	2,700	12,840	5,318	3,220	15,312	23,850
W	0	0	0	5	3	16	21	13	62	165	100	475	184	112	531	767	465	2,210	1,142	693	3,294	5,129
WNW	0	0	0	0	0	0	35	21	99	119	72	342	407	246	1,172	878	531	2,528	1,439	870	4,141	6,450
NW	0	0	0	0	0	0	0	0	0	9	6	28	39	24	114	9,618	5,822	27,689	9,666	5,852	27,831	43,349
NNW	0	0	0	13	8	38	17	11	50	16	9	46	27	16	77	901	545	2,593	974	589	2,804	4,367
	0	0	0	115	70	333	140	87	406	504	304	1,450	2,274	1,376	6,549	23,062	13,960	66,392	26,095	15,797	75,130	117,022

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*Persons eleven years of age or younger.
**Persons between and including twelve to eighteen years of age.
***Persons nineteen years of age or older.

TABLE 2.1-3

CITIES, TOWNS AND COMMUNITIES OF OVER 5,000 PERSONS WITHIN 50 MILES OF ST LUCIE UNIT 2 ESTIMATED FOR 1978

a) Communities of over 10,000 Persons

City or Town	County	1970 Population	1976 Population (Estimated)	1978 Population (Estimated)[**]
West Palm Beach[***]	Palm Beach	57,375	61,236	62,616
Fort Pierce	St Lucie	29,721	32,182	33,083
Riviera Beach[***]	Palm Beach	21,401	25,892	27,735
Vero Beach	Indian River	11,908	15,303	16,800
North Palm Beach[***]	Palm Beach	9,035	13,026	15,014
Palm Springs[***]	Palm Beach	4,340	8,437	11,300
Palm Beach Gardens[***]	Palm Beach	6,102	9,182	10,792
Stuart	Martin	4,820	8,479	10,760

b) Communities of between 5,000 and 10,000 Persons

County or Town	County	1970 Population[*]	1976 Population (Estimated)[*]	1978 Population (Estimated)[**]
Palm Beach[***]	Palm Beach	9,086	9,724	9,952
Gifford	Indian River	3,509	5,772	9,485
Lake Park[***]	Palm Beach	6,993	8,182	8,652
Greenacres City[***]	Palm Beach	1,731	4,447	6,773
Pahokee	Palm Beach	5,663	5,813	5,864
Port St Lucie[++]	St Lucie	330	4,463	6,465
Royal Palm Beach	Palm Beach	475	2,380	5,598

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[*] Treasure Coast Regional Planning Council, Regional Profile, September 1977, Table 30.

[**] Methodology discussed in Section 6.1.4.2.

[***] Part of West Palm Beach Urbanized Area, 1970 Census, Florida, Number of Inhabitants, Table 11 and Figure 11-45.

[+] 1978 population estimated on basis of annual average growth rate from the 1960 population of 3,509 to the 1970 population of 5,772 (1970 Census, Florida, Number of Inhabitants, Table 6) because 1976 estimate was not available.

[++] "Population Estimates and Projections", Comprehensive Planning Program, prepared by the City Planning Dept, Port St Lucie, Florida, February 1978.

TABLE 2.1-4

AGE DISTRIBUTION OF THE PROJECTED POPULATION FOR THE YEAR 2000 BETWEEN TEN AND 50 MILES OF ST LUCIE UNIT 2

	10-20 miles			20-30 miles			30-40 miles			40-50 miles			Total 10-50 miles			Total 10-50 miles
Sector	12*	12-18**	18***	12	12-18	18	12	12-18	18	12	12-18	18	12	12-18	18	All ages
N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NNE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ENE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
E	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ESE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SSE	2,945	1,783	8,479	6,693	4,052	19,267	22,704	13,744	65,362	38,287	23,178	110,225	70,629	42,757	203,333	316,719
S	7,040	4,262	20,267	222	134	638	2,640	1,598	7,600	27,455	16,621	79,043	37,357	22,615	107,548	167,520
SSW	687	416	1,979	1,354	820	3,897	57	34	164	1,461	885	4,206	3,559	2,155	10,246	15,960
SW	687	416	1,979	646	391	1,858	29	18	84	3,985	2,412	11,473	5,347	3,237	15,394	23,978
WSW	0	0	0	0	0	0	3,445	2,085	9,917	203	123	585	3,648	2,208	10,502	16,358
W	691	418	1,990	0	0	0	3,158	1,912	9,090	460	278	1,324	4,309	2,608	12,404	19,321
WNW	249	150	716	0	0	0	0	0	0	43	26	126	292	176	842	1,310
NW	5,694	3,447	16,392	382	231	1,098	763	462	2,197	0	0	0	6,839	4,140	19,687	30,666
NNW	1,485	899	4,274	14,864	8,998	42,791	1,066	646	3,070	686	416	1,976	18,101	10,959	52,111	81,171
	19,478	11,791	56,076	24,161	14,626	69,549	33,862	20,499	97,484	72,580	43,939	208,958	150,081	90,855	432,067	673,003

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*Persons eleven years of age or younger.

**Persons between and including twelve to eighteen years of age.

***Persons nineteen years of age or older.

TABLE 2.1-5

Sheet 1 of 8

PEAK DAILY TOURISTS AND SEASONAL VISITORS WITHIN 30 MILES OF ST LUCIE UNIT 2

1978

Annular Sector	0-1	1-2	2-3	3-4	4-5	5-10	* Total 0-10 *	10-20	20-30	* Total 10-30 *	Total 0-30
N	0	0	0	0	0	0	* 0 *	0	0	* 0 *	0
NNE	0	0	0	0	0	0	* 0 *	0	0	* 0 *	0
NE	0	0	0	0	0	0	* 0 *	0	0	* 0 *	0
ENE	0	0	0	0	0	0	* 0 *	0	0	* 0 *	0
E	0	0	0	0	0	0	* 0 *	0	0	* 0 *	0
ESE	0	0	0	0	0	0	* 0 *	0	0	* 0 *	0
SE	0	0	0	0	0	0	* 0 *	0	0	* 0 *	0
SSE	0	0	0	0	5133	6439	* 11572 *	3407	8348	* 11755 *	23327
S	0	0	0	42	44	1680	* 1766 *	6814	190	* 7004 *	8770
SSW	0	0	20	0	0	1861	* 1881 *	572	1125	* 1697 *	3578
SW	0	4	14	0	0	142	* 160 *	572	536	* 1108 *	1268
WSW	0	11	0	2	544	757	* 1314 *	0	0	* 0 *	1314
W	0	4	9	105	102	95	* 315 *	649	0	* 649 *	964
WNW	0	0	21	75	773	866	* 1735 *	234	0	* 234 *	1969
NW	0	0	0	6	154	7644	* 7804 *	3845	437	* 4282 *	12086
NNW	0	0	0	0	50	1582	* 1632 *	2467	16993	* 19460 *	21092
TOTAL	0	19	64	230	6800	21066	* 28179 *	18560	27629	* 46189 *	74368

TABLE 2.1-5

Sheet 2 of 8

PEAK DAILY TOURISTS AND SEASONAL VISITORS WITHIN 30 MILES OF ST LUCIE UNIT 2

1980

Annular Sector	0-1	1-2	2-3	3-4	4-5	5-10	*	Total 0-10	*	10-20	20-30	*	Total 10-30	*	Total 0-30
N	0	0	0	0	0	0	*	0	*	0	0	*	0	*	0
NNE	0	0	0	0	0	0	*	0	*	0	0	*	0	*	0
NE	0	0	0	0	0	0	*	0	*	0	0	*	0	*	0
ENE	0	0	0	0	0	0	*	0	*	0	0	*	0	*	0
E	0	0	0	0	0	0	*	0	*	0	0	*	0	*	0
ESE	0	0	0	0	0	0	*	0	*	0	0	*	0	*	0
SE	0	0	0	0	0	0	*	0	*	0	0	*	0	*	0
SSE	0	0	0	0	10160	7326	*	17486	*	4470	9014	*	13484	*	30970
S	0	0	0	49	52	1840	*	1941	*	7962	194	*	8156	*	10097
SSW	0	0	24	0	0	1585	*	1609	*	586	1153	*	1739	*	3348
SW	0	4	17	0	447	167	*	635	*	586	550	*	1136	*	1771
WSW	0	13	0	2	638	889	*	1542	*	0	0	*	0	*	1542
W	0	4	10	123	119	111	*	367	*	660	0	*	660	*	1027
WNW	0	0	24	88	1335	935	*	2382	*	237	0	*	237	*	2619
NW	0	0	0	7	162	8989	*	9158	*	4693	478	*	5171	*	14329
NNW	0	0	0	0	102	1717	*	1819	*	3471	18599	*	22070	*	23889
TOTAL	0	21	75	269	13015	23559	*	36939	*	22665	29988	*	52653	*	89592

TABLE 2.1-5

PEAK DAILY TOURISTS AND SEASONAL VISITORS WITHIN 30 MILES OF ST LUCIE UNIT 2

1983

Annular Sector	0-1	1-2	2-3	3-4	4-5	5-10	* Total 0-10 *	10-20	20-30	* Total 10-30 *	Total 0-30
N	0	0	0	0	0	0	* 0 *	0	0	* 0 *	0
NNE	0	0	0	0	0	0	* 0 *	0	0	* 0 *	0
NE	0	0	0	0	0	0	* 0 *	0	0	* 0 *	0
ENE	0	0	0	0	0	0	* 0 *	0	0	* 0 *	0
E	0	0	0	0	0	0	* 0 *	0	0	* 0 *	0
ESE	0	0	0	0	0	0	* 0 *	0	0	* 0 *	0
SE	0	0	0	0	0	0	* 0 *	0	0	* 0 *	0
SSE	0	0	0	0	12799	9228	* 22027 *	5631	11355	* 16986 *	39013
S	0	0	0	62	65	2317	* 2444 *	10030	237	* 10267 *	12711
SSW	0	0	29	0	0	1997	* 2026 *	738	1453	* 2191 *	4217
SW	0	5	21	0	564	210	* 800 *	738	692	* 1430 *	2230
WSW	0	16	0	3	804	1120	* 1943 *	0	0	* 0 *	1943
W	0	5	13	156	151	140	* 465 *	831	0	* 831 *	1296
WNW	0	0	31	111	1681	1179	* 3002 *	299	0	* 299 *	3301
NW	0	0	0	9	168	11326	* 11503 *	5910	540	* 6450 *	17953
NNW	0	0	0	0	129	1919	* 2048 *	4372	21008	* 25380 *	27428
TOTAL	0	26	94	341	16361	29436	* 46258 *	28549	35285	* 63834 *	110092

TABLE 2.1-5

Sheet 4 of 8

PEAK DAILY TOURISTS AND SEASONAL VISITORS WITHIN 30 MILES OF ST LUCIE UNIT 2

1990

Annular Sector	0-1	1-2	2-3	3-4	4-5	5-10	*	Total 0-10	*	10-20	20-30	*	Total 10-30	*	Total 0-30
N	0	0	0	0	0	0	*	0	*	0	0	*	0	*	0
NNE	0	0	0	0	0	0	*	0	*	0	0	*	0	*	0
NE	0	0	0	0	0	0	*	0	*	0	0	*	0	*	0
ENE	0	0	0	0	0	0	*	0	*	0	0	*	0	*	0
E	0	0	0	0	0	0	*	0	*	0	0	*	0	*	0
ESE	0	0	0	0	0	0	*	0	*	0	0	*	0	*	0
SE	0	0	0	0	0	0	*	0	*	0	0	*	0	*	0
SSE	0	0	0	0	16562	11941	*	28503	*	7286	14693	*	21979	*	50482
S	0	0	0	80	84	2998	*	3162	*	12978	316	*	13294	*	16456
SSW	0	0	38	0	0	2584	*	2622	*	955	1880	*	2835	*	5457
SW	0	7	27	0	730	271	*	1035	*	955	896	*	1851	*	2886
WSW	0	21	0	4	1040	1449	*	2514	*	0	0	*	0	*	2514
W	0	7	17	201	195	181	*	601	*	1075	0	*	1075	*	1676
WNW	0	0	40	144	2176	1526	*	3886	*	388	0	*	388	*	4274
NW	0	0	0	11	217	14654	*	14882	*	7648	699	*	8347	*	23229
NNW	0	0	0	0	167	2484	*	2651	*	5658	27183	*	32841	*	35492
TOTAL	0	35	122	440	21171	38088	*	59856	*	36943	45667	*	82610	*	142466

TABLE 2.1-5

PEAK DAILY TOURISTS AND SEASONAL VISITORS WITHIN 30 MILES OF ST LUCIE UNIT 2

2000

Annular Sector	0-1	1-2	2-3	3-4	4-5	5-10	* Total 0-10 *	10-20	20-30	* Total 10-30 *	Total 0-30
N	0	0	0	0	0	0	* 0 *	0	0	* 0 *	0
NNE	0	0	0	0	0	0	* 0 *	0	0	* 0 *	0
NE	0	0	0	0	0	0	* 0 *	0	0	* 0 *	0
ENE	0	0	0	0	0	0	* 0 *	0	0	* 0 *	0
E	0	0	0	0	0	0	* 0 *	0	0	* 0 *	0
ESE	0	0	0	0	0	0	* 0 *	0	0	* 0 *	0
SE	0	0	0	0	0	0	* 0 *	0	0	* 0 *	0
SSE	0	0	0	0	20385	14698	* 35083 *	8968	18085	* 27053 *	62136
S	0	0	0	99	103	3690	* 3892 *	15974	389	* 16363 *	20255
SSW	0	0	47	0	0	3180	* 3227 *	1176	2313	* 3489 *	6716
SW	0	9	33	0	898	334	* 1274 *	1176	1103	* 2279 *	3553
WSW	0	27	0	4	1280	1784	* 3095 *	0	0	* 0 *	3095
W	0	9	21	247	240	223	* 740 *	1324	0	* 1324 *	2064
WNW	0	0	49	177	2678	1877	* 4781 *	478	0	* 478 *	5259
NW	0	0	0	14	268	18037	* 18319 *	9413	860	* 10273 *	28592
NNW	0	0	0	0	205	3057	* 3262 *	6965	33458	* 40423 *	43689
TOTAL	0	45	150	541	26057	46880	* 73673 *	45474	56208	*101682 *	175355

TABLE 2.1-5

Sheet 6 of 8

PEAK DAILY TOURISTS AND SEASONAL VISITORS WITHIN 30 MILES OF ST LUCIE UNIT 2

2010

Annular Sector	0-1	1-2	2-3	3-4	4-5	5-10	Total * 0-10 *	10-20	20-30	Total * 10-30 *	Total 0-30
N	0	0	0	0	0	0	* 0 *	0	0	* 0 *	0
NNE	0	0	0	0	0	0	* 0 *	0	0	* 0 *	0
NE	0	0	0	0	0	0	* 0 *	0	0	* 0 *	0
ENE	0	0	0	0	0	0	* 0 *	0	0	* 0 *	0
E	0	0	0	0	0	0	* 0 *	0	0	* 0 *	0
ESE	0	0	0	0	0	0	* 0 *	0	0	* 0 *	0
SE	0	0	0	0	0	0	* 0 *	0	0	* 0 *	0
SSE	0	0	0	0	25093	18090	* 43183 *	11039	22259	* 33298 *	76481
S	0	0	0	122	128	4542	* 4792 *	19661	479	* 20140 *	24932
SSW	0	0	58	0	0	3914	* 3972 *	1447	2849	* 4296 *	8268
SW	0	11	41	0	1105	411	* 1568 *	1447	1358	* 2805 *	4073
WSW	0	32	0	5	1576	2195	* 3808 *	0	0	* 0 *	3808
W	0	11	26	304	296	275	* 912 *	1629	0	* 1629 *	2541
WNW	0	0	60	218	3297	2311	* 5886 *	587	0	* 587 *	6473
NW	0	0	0	17	329	22201	* 22547 *	11587	1059	* 12646 *	35193
NNW	0	0	0	0	252	3762	* 4014 *	8572	41182	* 49754 *	53768
TOTAL	0	54	185	666	32076	57701	* 90682 *	55969	69186	*125155 *	215837

TABLE 2.1-5

Sheet 7 of 8

PEAK DAILY TOURISTS AND SEASONAL VISITORS WITHIN 30 MILES OF ST LUCIE UNIT 2

2020

Annular Sector	0-1	1-2	2-3	3-4	4-5	5-10	* Total 0-10 *	10-20	20-30	* Total 10-30 *	Total 0-30
N	0	0	0	0	0	0	* 0 *	0	0	* 0 *	0
NNE	0	0	0	0	0	0	* 0 *	0	0	* 0 *	0
NE	0	0	0	0	0	0	* 0 *	0	0	* 0 *	0
ENE	0	0	0	0	0	0	* 0 *	0	0	* 0 *	0
E	0	0	0	0	0	0	* 0 *	0	0	* 0 *	0
ESE	0	0	0	0	0	0	* 0 *	0	0	* 0 *	0
SE	0	0	0	0	0	0	* 0 *	0	0	* 0 *	0
SSE	0	0	0	0	30886	22268	* 53154 *	13586	27398	* 40985 *	94139
S	0	0	0	150	157	5591	* 5898 *	24200	589	* 24789 *	30687
SSW	0	0	71	0	0	4818	* 4889 *	1781	3506	* 5287 *	10176
SW	0	13	50	0	1360	506	* 1929 *	1781	1670	* 3451 *	5380
WSW	0	40	0	7	1939	2702	* 4688 *	0	0	* 0 *	4688
W	0	13	32	374	364	339	* 1122 *	2005	0	* 2005 *	3127
WNW	0	0	74	268	4057	2843	* 7242 *	723	0	* 723 *	7965
NW	0	0	0	21	405	27327	* 27753 *	14261	1303	* 15564 *	43317
NNW	0	0	0	0	310	4631	* 4941 *	10550	50692	* 61242 *	66183
TOTAL	0	66	227	820	39478	71025	*111616 *	68887	85158	*154046 *	265662

TABLE 2.1-5

PEAK DAILY TOURISTS AND SEASONAL VISITORS WITHIN 30 MILES OF ST LUCIE UNIT 2

2030

Annular Sector	0-1	1-2	2-3	3-4	4-5	5-10	* Total 0-10 *	10-20	20-30	* Total 10-30 *	Total 0-30
N	0	0	0	0	0	0	* 0 *	0	0	* 0 *	0
NNE	0	0	0	0	0	0	* 0 *	0	0	* 0 *	0
NE	0	0	0	0	0	0	* 0 *	0	0	* 0 *	0
ENE	0	0	0	0	0	0	* 0 *	0	0	* 0 *	0
E	0	0	0	0	0	0	* 0 *	0	0	* 0 *	0
ESE	0	0	0	0	0	0	* 0 *	0	0	* 0 *	0
SE	0	0	0	0	0	0	* 0 *	0	0	* 0 *	0
SSE	0	0	0	0	38014	27408	* 65422 *	16724	33723	* 50447 *	115869
S	0	0	0	185	193	6882	* 7260 *	29787	725	* 30512 *	37772
SSW	0	0	88	0	0	5930	* 6018 *	2193	4315	* 6508 *	12526
SW	0	16	62	0	1674	623	* 2375 *	2193	2056	* 4249 *	6624
WSW	0	49	0	8	2387	3325	* 5769 *	0	0	* 0 *	5769
W	0	16	39	461	448	417	* 1381 *	2468	0	* 2468 *	3849
WNW	0	0	91	330	4994	3501	* 8916 *	890	0	* 890 *	9806
NW	0	0	0	26	499	33634	* 34159 *	17554	1604	* 19158 *	53317
NNW	0	0	0	0	383	5700	* 6083 *	12986	62391	* 75377 *	81460
TOTAL	0	81	280	1010	48592	87420	*137383 *	84795	104814	*189609 *	326992

TABLE 2.1-6

TRANSIENT POPULATION: ATTENDANCE AT ATTRACTIONS AND EVENTS 1978-2030

					Number of Persons									
					1978									
		Annular Sector	Location	Time of Year	Total for Events (of more than one day)	Peak Daily	Maximum	1980	1983	1990	2000	2010	2020	2030
A.	Attractions and Events Within 10 Miles of St Lucie Unit 2													
1.	Art on the Green Festival(1)*	NW 5-10	Indian River Memorial Park, Fort Pierce	January	40000	20000		20948	21422	25688	30428	35168	39908	44600
2.	Jensen Beach Fireworks(2)	SSE 5-10	Jensen Beach Causeway	July 4th		10000		10000	10000	10000	10000	10000	10000	10000
3.	Lawnwood Stadium (St Lucie County Schools)(3)	NW 5-10	Fort Pierce	Fall Football		6000	6000	6000	6000	6000	6000	6000	6000	6000
4.	Leif Erikson Day(2)	S 5-10	Town of Jensen Beach	October		2000		2095	2142	2569	3043	3517	3991	4460
5.	Outdoor Art Festival(2)	S 5-10	Town of Jensen Beach	March	5000	2500		2619	2678	3211	3804	4396	4989	5575
6.	Sailfish Regatta(4)	S 5-10	St Lucie River	May	10000	7000		7332	7498	8991	10650	12309	13968	15610
7.	St Lucie County Civic Center(5)	NW 5-10	Fort Pierce	March	40000	20000	5700**	20948	21422	25688	30428	35168	39908	44600
8.	Sandy Shoes Festival(6)	NW 5-10	Fort Pierce & Fairgrounds	January	7900	1500***		1607	1713	1962	2318	2673	3029	3384
9.	Sea Turtle Watch(2)	SSE 5-10	Jensen Beach	June		1500		1571	1607	1927	2282	2638	2993	3345

* See Sheet 4 for sources of information.

** Maximum seating capacity. Forty thousand attended an Auto Show on a walk-through basis over two days.

*** 1977 attendance. No festival was held in 1978.

TABLE 2.1-6

Sheet 2 of 4

TRANSIENT POPULATION: ATTENDANCE AT ATTRACTIONS AND EVENTS 1978-2030

					Number of Persons									
					1978									
		Annular Sector	Location	Time of Year	Total for Events (of more than one day)	Peak Daily	Maximum	1980	1983	1990	2000	2010	2020	2030
B.	Attractions and Events Between 10 and 30 Miles of St Lucie Unit 2													
10.	Dodgertown Sports Complex(7)	NNW 20-30	Vero Beach	March		7405	10000	7541	7712	9248	10000	10000	10000	10000
11.	Jai Alai of Fort Pierce(8)	WNW 10-20	Fort Pierce	Year-Round		3200	4000	3352	3428	4000	4000	4000	4000	4000
12.	Martin County Fair(9)	S 10-20	Martin County Fair-grounds, in Stuart	March	27000	7559		7917	8096	9709	11500	13292	15083	16857
13.	Martin County High School Stadium(10)	S 10-20	Stuart	Fall Football		4500		4500	4500	4500	4500	4500	4500	4500
14.	St Lucie County Fair(11)	NW 20-30	St Lucie County Fair-grounds, in Fort Pierce	February	20800	8300		8693	8890	10660	12628	14595	16562	18509
15.	Vero Beach Senior High School Stadium(12)	NW 20-30	Vero Beach	Fall Football		8000		8000	8000	8000	8000	8000	8000	8000
C.	Attractions and Events Between 30 and 50 Miles of St Lucie Unit 2													
16.	Fish Fry, Volunteer Fire Department(13)	NW 40-50	Grant Brevard County	February	30000	15000		15711	16778	19266	22821	26375	29931	33450
17.	Horse Complex(14)	S 40-50	Palm Beach Fairgrounds	Year-Round		2000		2095	2142	2569	3043	3517	3991	4460
18.	Labor Day Rodeo and Bluegrass Convention(15)	WSW 30-40	Okeechobee City	September	12000	10000		10474	10711	12844	15214	17584	19954	22300

TABLE 2.1-6

TRANSIENT POPULATION: ATTENDANCE AT ATTRACTIONS AND EVENTS
1978-2030

		Annular Sector	Location	Time of Year	Number of Persons									
					1978									
					Total for Events (of more than one day)	Peak Daily	Maximum	1980	1983	1990	2000	2010	2020	2030
C.	Attractions and Events Between 30 and 50 Miles of St Lucie Unit 2 (Cont'd)													
19.	Lion Country Safari+(16)	S 40-50	Route 441 Palm Beach County	Year-Round	-	-	-	-	-	-	-	-	-	-
20.	Offshore Sport Fishing Tournament(17)	NNW 30-40	Sebastian Inlet and Atlantic Ocean	May-June		500		524	536	642	761	879	998	1150
21.	P.G.A. Complex(18)	SSE 30-40	Palm Beach Gardens	Year-Round	--under construction--				50000++	50000	50000	50000	50000	50000
22.	Pahokee Fireworks(19)	SW 40-50	Hoover Dike in Pahokee	July 4th		3000		3000	3000	3000	3000	3000	3000	3000
23.	Palm Beach Auto Auction(20)	S 40-50	Plam Beach Fairgrounds	Year-Round		1000		1047	1071	1284	1521	1758	1995	2230
24.	Palm Beach Fairgrounds Speedway(21)	SSE 40-50	Palm Beach Fairgrounds	Year-Round		8000		8000	8000	8000	8000	8000	8000	8000
25.	Palm Beach Kennel Club(22)	S 40-50	West Plam Beach	January-May		5800		6075	6212	7450	8824	10199	11573	12934
26.	South Florida Fair(21)	WSW 30-40	Palm Beach Fairgrounds	January-February	470752	88000		92171	94257	113027	133883	154739	175595	196240
27.	Speckled Perch Festival(15)	WSW 30-40	Okeechobee City	March		5000		5237	5356	6422	7607	8792	9977	11150
28.	West Palm Beach Auditorium(23)	SSE 40-50	West Palm Beach	Year-Round		6000	6000	6000	6000	6000	6000	6000	6000	6000
29.	West Palm Beach Jai Alai(24)	SSE 40-50	Mangonia Park Palm Beach County	September-January		9000	9000	9000	9000	9000	9000	9000	9000	9000
30.	West Palm Beach Municipal Stadium(25)	SSE 40-50	West Palm Beach			6800	7000	7000	7000	7000	7000	7000	7000	7000

\+ Attendance figures are confidential and not available for use in this report.

++ First World Championship Tournament scheduled for 1982.

TABLE 2.1-6

TRANSIENT POPULATION - ATTENDANCE AT ATTRACTIONS AND EVENTS 1978-2030

SOURCES OF INFORMATION

(1) Chairman, Art-on-the-Green Festival, Fort Pierce, Florida, Letter Dated November 17, 1978
(2) Executive Director, Jensen Beach Chamber of Commerce, Jensen Beach, Florida, Letter Dated November 17, 1978
(3) Maintenance Foreman, St Lucie County School Board, Ft Pierce, Florida, Letter Dated November 28, 1978
(4) Director, Stuart/Martin County Chamber of Commerce, Stuart, Florida, Letter Dated November 22, 1978
(5) Supervisor of Special Facilities, St Lucie County Civic Center, Ft Pierce, Florida, Letter Dated November 17, 1978
(6) Executive Secretary, Sandy Shoes Festival (1979), Fort Pierce, Florida, Letter Dated November 27, 1978
(7) Office of Eastern Division Manager, Los Angeles Dodgers Baseball Team, Dodgertown Sport and Conference Center, Vero Beach, Florida, Letter Dated November 17, 1978
(8) Associate Chief of Security, Jai Alai of Fort Pierce, Fort Pierce, Florida, Letter Dated November 17, 1978
(9) Fair Secretary, Martin County Fair Association, Stuart, Florida, Letter Dated November 20, 1978
(10) Athletic Director, Martin County High School, Stuart, Florida, Letter Dated November 28, 1978
(11) Fair Secretary, St Lucie County Fair, Fort Pierce, Florida, Letter Dated November 20, 1978
(12) Finance Officer, Indian River County Schools, Vero Beach, Florida, Letter Dated November 27, 1978
(13) Chairman, Fish Fry in Grant, Melbourne, Florida, Personal Communication, December 14, 1978
(14) Horse Complex, Palm Beach County Fairgrounds, West Palm Beach, Florida, Personal Communication, November 21, 1978
(15) Okeechobee Chamber of Commerce, Okeechobee, Florida, Letter Dated November 17, 1978
(16) Office of Public Relations, Lion County Safari, Royal Palm Beach, Florida, Letter Dated November 20, 1978
(17) Chairman, Offshore Sport Fishing Tournament, Sebastian, Florida, Letter Dated December 13, 1978
(18) Project Manager, PGA Complex, Florida Realty Building Company, West Palm Beach, Florida, Letter Dated December 11, 1978
(19) Office Manager, Pahokee Chamber of Commerce, Pahokee, Florida, Letter Dated November 20, 1978
(20) Palm Beach Auto Auction, Palm Beach County Fairgrounds, West Palm Beach, Florida, Personal Communication, December 11, 1978
(21) South Florida Fair, Palm Beach County Fairgrounds, West Palm Beach, Florida, Personal Communications, November 21 and 27, 1978
(22) Palm Beach Kennel Club - Greyhound Racing, West Palm Beach, Florida, Letter Dated November 21, 1978
(23) West Palm Beach Auditorium, West Palm Beach, Florida, Letter Dated November 22, 1978
(24) Office of Public Relations, West Palm Beach Jai Alai, West Palm Beach, Florida, Letter Dated November 21, 1978
(25) Spring Training Coordinator, Atlanta Braves, West Palm Beach Municipal Stadium, West Palm Beach, Florida, Letter Dated November 20, 1978

TABLE 2.1-7

TRANSIENT POPULATION: MAJOR INDUSTRIAL EMPLOYERS AND COLLEGES 1978-2030

	Annular Sector	Location	1978 Total Employment	1978 Peak Daily Employment	1980	1983	1990	2000	2010	2020	2030
A. Major Industrial Employers											
1. Grumman Aerospace(1)	S 10-20	Martin County Airport, Stuart	731	700	700	700	700	700	700	700	700
2. Piper Aircraft(2)	NW 10-20	Vero Beach Municipal Airport Indian River County	2887	2000	2000	2000	2000	2000	2000	2000	2000
3. Pratt & Whitney(3) Government Products Division	S 30-40	Route 770, South of Route 710 Palm Beach County	7261	6094	6094	6094	6094	6094	6094	6094	6094
			Total Enrollment	Peak Daily Enrollment							
B. Major Colleges											
4. Florida Institute of Technology(4)	SSE 5-10	Jensen Beach Campus Martin County		900	1050	1200	1200	1200	1200	1200	1200
5. Indian River Community College(5)	NW 5-10	Fort Pierce Campus St Lucie County	11200	1500	2050	2417	2818	3486	4312	5334	6599
	S 10-20	Stuart Campus, Martin County	1280	171	234	276	322	398	492	609	753
	WSW 30-40	Okeechobee Campus, Okeechobee County	320	43	59	69	80	100	123	152	188
B. Major Colleges											
	NNW 20-30	Vero Beach Campus, Indian River County	3200	428	585	691	806	997	1233	1526	1888

(1) Personal Communication, Personnel Department, Grumman Aerospace, November 30, 1978.

(2) Personal Communication, Personnel Department, Piper Aircraft Corp, December 4, 1978.

(3) Personal Communication, Employment Office, Pratt & Whitney Aircraft, November 30, 1978.

(4) Personal Communication, Student Activities Office, Florida Institute of Technology, Jensen Beach Campus, November 27, 1978.

(5) Personal Communication, Office of the Vice President, Indian River Community College, Fort Pierce Campus, November 28, 1978.

TABLE 2.1-8

TRANSIENT POPULATION: AVERAGE DAILY PASSENGERS ON MAJOR ROADS WITHIN 30 MILES OF ST LUCIE UNIT 2

1978-2030

Highways and State Roads Within 10 Miles of St Lucie Unit 2

Route	County	Station Number	Estimated Average Daily Number of Passengers(2) 1978	1980	1983	1990	2000	2010	2020	2030
SR A1A	St Lucie	114 (North Beach Causeway)	2,802	2,935	3,134	3,599	4,259	4,926	5,590	6,248
SR 605	St Lucie	268	2,505	2,624	2,802	3,217	3,808	4,404	4,997	5,586
US 1	St Lucie	121	14,357	15,038	16,058	18,440	21,823	25,240	28,642	32,016
SR 607A	St Lucie	199	6,525	6,834	7,298	8,381	9,918	11,471	13,017	14,551
SR 68	St Lucie	151	8,271	8,663	9,251	10,623	12,572	14,540	16,501	18,444
SR 611	St Lucie	274	2,172	2,275	2,429	2,790	3,301	3,818	4,333	4,844
SR 70	St Lucie	106	5,910	6,190	6,610	7,591	8,983	10,390	11,790	13,179
I-91/ Florida's Turnpike	St Lucie	Southbound	15,151	15,869	16,946	19,460	23,030	26,635	30,226	33,787
SR 709	St Lucie	279	990	1,037	1,107	1,272	1,505	1,740	1,975	2,208
I-91/ Florida's Turnpike	St Lucie	Northbound	25,541	26,752	28,568	32,805	38,822	44,901	50,954	56,956
US 1	Martin	113 (Roosevelt Bridge/Northbound)	20,922	21,911	23,399	26,862	31,778	36,767	41,731	46,647
SR A1A	Martin	144	8,516	8,920	9,525	10,938	12,944	14,971	16,989	18,991
		Highways Within 30 Miles of St Lucie Unit 2								
I-95	Indian River	Southbound	9,971	10,444	11,153	12,807	15,156	17,529	19,892	22,235
I-91/ Florida's Turnpike	Okeechobee	Southbound	15,151	15,869	16,946	19,460	23,030	26,635	30,226	33,787
I-95/ Florida's Turnpike	Palm Beach	Northbound	26,527	27,782	29,668	34,059	40,292	46,618	52,911	59,144

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(1) State of Florida, Dept of Transportation, Bureau of Planning assigns code numbers to each station where average daily traffic (ADT) counts are taken in each county.

(2) See Methodology, Section 2.1.3.8.2.

TABLE 2.1-9

TRANSIENT POPULATION: AVERAGE DAILY PASSENGERS BY RAIL AND AIR WITHIN 50 MILES OF ST LUCIE UNIT 2 1978-2030

		County	Location	1978	1980	1983	1990	2000	2010	2020	2030
A.	**Rail**										
1.	Amtrak - Seaboard Coast Line(1)	-	Sebring - West Palm Beach	389(2)	195(3)	206	240	289	338	387	436
B.	**Air**										
2.	West Palm Beach International Airport(4)	Palm Beach	West Palm Beach	4,878(2)	5,387	7,086	12,258	15,163	18,068	20,973	23,878

(1) Peak daily capacity (that is, all seats available on all six trains on the line on one day) was 2,474 in 1978 (August). Personal Communication, Route Analyst, Eastern Routes, Marketing Research, Amtrak, Washington, DC, November 22, 1978.

(2) See Methodology, Section 2.1.3.8.

(3) In May, 1979, Congress accepted a Department of Transportation plan to reduce service to Florida from three trains each day to one train. It is expected that ridership will be reduced to half the 1978 levels with this change in service. Sources: Personal Communication, Manager - Eastern Routes, Marketing Research, Amtrak, Washington, DC, May 22, 1979.

(4) Data include implanements and deplanements. Personal Communication, Director of Planning, Palm Beach International Airport, West Palm Beach, Florida, November 30, 1978.

TABLE 2.1-10

TRANSIENT POPULATION: AVERAGE DAILY PASSENGERS ON WATERWAYS WITHIN 30 MILES OF ST LUCIE 2
1978-2030

		County	Location	1978	1980	1983	1990	2000	2010	2020	2030
A.	Waterways Within 30 Miles of St Lucie 2										
1.	Intracoastal Waterway(1)	--	Jacksonville - Miami via Indian River	1,490	1,561	1,667	1,914	2,267	2,620	2,973	3,323
2.	Fort Pierce Harbor(1)	St Lucie	Fort Pierce	22	23	25	28	33	39	44	49
3.	St Lucie Canal(2)	Martin	Lake Okeechobee/Port Mayaca - Stuart	108	113	121	139	164	190	216	241
B.	Bridges Within 10 Miles of St Lucie 2										
4.	Jensen Beach Bridge(3)	Martin	Indian River at Jensen Beach	46	48	51	59	70	81	92	103
5.	Roosevelt Bridge(4)	Martin	St Lucie River in Stuart	89	93	100	114	135	157	178	198
6.	St Lucie Bridge(5)	Martin	St Lucie River, Stuart-Seawall's Point	62	65	69	80	94	109	124	138
7.	Stuart Causeway (Indian River Bridge)	Martin	Indian River, Sewall's Point - Hutchinson Island	60	63	67	77	91	106	120	134

(1) US Army Corps of Engineers, Waterborne Commerce of the United States, Part 1, 1976 Jacksonville District pp 135, 137

(2) Personal Communication, Lockmaster, St Lucie Lock & Dam, Stuart, Florida, September 14 and October 10, 1978

(3) Personal Communication, Bridgetender, Jensen Beach Bridge, Jensen Beach, Florida, September 14 and November 10, 1978

(4) Personal Communication, Engineering Department, Martin County Department of Transportation, September 14, 1978

(5) Personal Communication, Bridgetender, St Lucie Bridge, Stuart, Florida, September 14, 1978

(6) Personal Communication, Bridgetender, Stuart Causeway, Sewall's Point, Florida, September 14, 1978

TABLE 2.1-11

LOCATION BY ANNULAR SECTOR OF PARAMETERS NEAREST TO ST. LUCIE UNIT 2, NOVEMBER, 1978[a,b,c]

CATEGORY	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW
Milk Cows	0	0	0	0	0	0	0	L	L	L	L	L	14.0/ 260°	L	L	L
Milk Goats	0	0	0	0	0	0	0	L	L	5.95/ 204°	2.2/ 220°	L	L	L	L	L
Meat Animal	0	0	0	0	0	0	0	L	L	5.1/ 205°	5.2/ 209°	L	3.2/ 270°	4.5/ 290°	L	L
Vegetable Gardens	0	0	0	0	0	0	0	L	L	2.3/ 208°	2.0/ 225°	1.9/ 249°	3.5/ 273°	3.0/ 296°	L	L
Residences	0	0	0	0	0	0	0	5.0/ 151°	4.1 180°	2.3/ 202°	2.0/ 226°	1.9/ 247°	2.1/ 270°	2.8/ 292°	4.8/ 311°	5.0/ 340°

1. 0 = Ocean Areas
2. L = Land Areas: no numerical entry indicates that a ground survey of an established 22 1/2 degree radial sector showed no evidence of any activity.
3. 14.0/260° = 14.0 miles from the center of the reactor in the 260° direction, measured clockwise from north

Source: a) Letter L-76-416 to D L Ziemann, Chief Operating Reactors Branch #2, Division of Operating Reactors, USNRC, Washington, DC, from R E Uhrig, Vice President of Florida Power & Light on December 7, 1976.

b) Letter FLO-1375, to L Tsakiris, Project Manager of Ebasco Services, from C S Kent, Project Manager, Florida Power and Light, March 14, 1979.

c) Florida Power & Light, St Lucie Unit 1, Docket No 50-335, Annual Radiological Environmental Monitoring Report, 1978.

TABLE 2.1-12

Sheet 1 of 2

LAND USES AND LAND COVER WITHIN FIVE MILES OF ST LUCIE UNIT 2

Level I Land Use Classification	Acreage	Percent of Total	Level II Land Use Classification	Acreage	Percent of Total	Level III Land Use Classification	Acreage	Percent of Total
1. URBAN OR BUILT-UP LAND	3,541	7.0	11. Residential	2,300	4.6	111. Single-family Residences	2,220	4.5
						112. Multiple-family Residences	20	*
						116. Transient Lodgings	60	.1
			12. Commercial and Services	28	*	122. Retail, Commercial Services	22	*
						123. Institutional Services	6	*
			13. Industrial	14	*	131. Light Industrial	14	*
			14. Transportation, Communications, and Utilities	964	2.0	141. Highway, Principal Road	210	.4
						142. Railroad	50	.1
						143. St Lucie 1 & 2 Facilities	300	.6
						144. Transmission Lines	386	.8
						145. Utility Storage	18	*
			17. Other Urban or Built-up Land	235	.5	171. Cemetery	10	*
						172. Undeveloped Land	37	.1
						173. Recreation Facilities	188	.4
2. AGRICULTURAL LAND	541	1.1	21. Cropland and Pasture	449	.9	212. Citrus Groves	449	.9
			22. Other Agricultural Land	92	.2	221. Nurseries	9	*
						222. Old Field	83	.2
4. FOREST/MARSH COVER^{+}	10,653	21.2	41. Coniferous Forest/Freshwater Marsh	7,910	15.6	410. Pine Flatwood Forest/Freshwater Marsh	5,594	11.1
						411. Freshwater Marsh	2,316	4.6
			42. Other Forested Wetland	2,743	5.5	421. Mangrove	2,743	5.5

TABLE 2.1-12

Sheet 2 of 2

Level I Land Use Classification	Acreage	Percent of Total	Level II Land Use Classification	Acreage	Percent of Total	Level III Land Use Classification	Acreage	Percent of Total
5. WATER	34,849	69.3	51. Freshwater	1,243	2.5	510. Streams and Canals	113	.2
						511. Lakes	1,130	2.3
			52. Fresh/Salt Water	10,656	21.2	520. Estuary	10,656	21.2
			55. Salt Water	22,950	45.6	550. Open Marine Water	22,950	45.6
7. BARREN LAND	682	1.4	71. Natural Barren Land	97	.2	710. Beaches	97	.2
			74. Man-made Barren Land	585	1.2	740. Transitional Areas	390	.8
						741. Extractive	195	.4
	50,266	100%		50,266	100%		50,266	100%

[+] The forest cover is to a great extent concentrated in a transitional area which is primarily marshy but includes relatively dry sites. In addition, the Florida land use/cover classification system considers mangroves as a type of wetland - hardwood forest. To account for these considerations, the USGS categories of <u>Forest</u> and <u>Wetlands</u> were combined.

[*] Less than .1%

TABLE 2.1-13

TOTAL BEEF CATTLE AND BEEF SLAUGHTER WITHIN 0-50 MILES OF SITE[a,b]

County	Total No. of Head[c]	Total Slaughter/Yr	kg/yr (10^3)
Brevard	2,250	675	231.5
Glades	3,000	900	308.6
Highlands	1,680	504	172.8
Indian River	15,000	4,500	1,543.1
Martin	35,000	10,500	3,600.7
Okeechobee	36,400	10,920	3,744.7
Osceola*	-	-	-
Palm Beach	17,600	5,280	1,810.6
St. Lucie	26,000	7,800	2,674.8
	136,930	41,079	14,086.8

*No beef production assumed since that portion of county within 0-50 miles of site is wetland, according to USGS maps.

a) 1977 Florida and USDA official estimates from, "Florida Agricultural Statistics-Livestock Summary 1977," Florida Crop and Livestock Reporting Service, 1222 Woodward St., Orlando, Florida 32803.

b) Only those portions of county within 0-50 mile radius of site considered, excluding wetland areas.

c) Estimated from county totals assuming equal distribution of cattle throughout county.

TABLE 2.1-14

DAIRY HERDS AND MILK PRODUCTION[a,b] WITHIN 50 MILES OF ST LUCIE UNIT 2

County	Number of Dairies	Heifers Over 500 lb	Heifers Under 500 lb	No. of Milk Cows	1977 Annual Milk Production (1000 lb)
Brevard	1	85	75	300	3,000
Highlands	1	145	140	720	7,600
Indian River	3	445	310	1,830	15,900
Martin	6	800	710	2,710	25,400
Okeechobee	20	7,260	6,440	22,300	226,000
Palm Beach	6	430	590	4,140	33,900
St. Lucie	4	595	420	2,450	21,200
Total	41	9,760	8,685	34,450	333,000

(a) From "Dairy Summary 1977 - Florida Agricultural Statistics," Florida Crop and Livestock Reporting Service, 1222 Woodward Street, Orlando, Florida 32803.

(b) Estimated from county totals for 0-50 mile radius, assuming equal distribution of dairies throughout county.

TABLE 2.1-15

MILK UTILIZATION FROM DAIRY HERDS WITHIN 50 MILES OF ST. LUCIE UNIT 2[a]

1. Average Annual Milk Production per Cow = 9,666 lbs = 4,385 kgs

2. Milk Fat (average) = 3.5%

3. 1977 Annual Milk Production[b] = 330.0×10^6 lbs = 151.0×10^6 kgs

4. Milk Utilization

   (a) Used on Farm = 3.1×10^6 lbs = 1.4×10^6 kgs

      1) For milk, cream, butter = 2.0×10^6 lbs = 0.9×10^6 kgs

      2) Fed to calves = 1.1×10^6 lbs = 0.5×10^6 kgs

   (b) Milk Sold Directly to Consumers = 5.1×10^6 lbs = 2.3×10^6 kgs

   (c) Milk Sold to Plants for Manufacturing Dairy Products = 324.8×10^6 lbs = 147.3×10^6 kgs

      1) For frozen products-ice cream, ice milk, sherbert = 7.6×10^6 gal

      2) For cottage cheese -curd, creamed = 8.9×10^6 lbs = 4.0×10^6 kgs

      3) For skim milk and butter milk products = 23.2×10^6 lbs = 10.5×10^6 kgs

      4) For whole milk products = 61.0×10^6 lbs = 27.7×10^6 kgs

(a) Estimated 1977 data from "Florida Agricultural Statistics - Dairy Summary, 1977," prepared by Florida Crop and Livestock Reporting Service, 1222 Woodward Street, Orlando, Florida 32803 (July 1978)

(b) Estimated from county data.
Only accounts for those portions of county within 0-50 mile radius, assuming equal distribution of dairy herds.

TABLE 2.1-16

EGG PRODUCTION WITHIN 50 MILES OF ST LUCIE UNIT 2[(a)]

County[(b)]	Number of Layers	Number of Eggs/Day
Brevard	4,500	2,925
Glades	750	488
Highlands	750	488
Indian River	25,000	16,250
Martin	25,000	16,250
Okeechobee	16,250	10,563
Palm Beach	11,950	7,768
St. Lucie	25,000	16,250

(a) 1977 data from "Poultry Summary 1977 - Florida Agricultural Statistics", Florida Crop and Livestock Reporting Service, 1222 Woodward Street, Orlando, Florida 32803.

(b) Accounts only for those portions of county within 50 miles of plant site; assumes equal distribution of layers throughout county.

TABLE 2.1-17 Sheet 1 of 2

FLORIDA COMMERCIAL VEGETABLES PRODUCTION IN 0-50 MILE RADIUS STUDY AREA(a,b)

County	Principal Species	Production Center	Acres 1976-77	Harvested 1973-74
Brevard	Tomatoes	Fort Pierce	(1)	126
	Watermelon		(1)	36
Glades	Tomatoes	Pahokee	60	101
Highlands	Corn		(1)	(2)
	Potatoes		(1)	(2)
Indian River	Tomatoes	Fort Pierce	(1)	700
	Watermelon		(1)	200
Okeechobee	Tomatoes	Pahokee	273	754
	Watermelon		228	650
Martin	Potatoes	Stuart	7503	(2)
	Tomatoes		(1)	500
	Watermelon		(1)	200
Palm Beach	Beans	Pompano	6,070	7,816
	Cabbage	Pahokee	(1)	404
	Celery		(1)	3,476
	Corn		(1)	16,280
	Cucumbers		552	428
	Eggplant		340	328
	Escarole		(2)	1,900
	Lettuce		(2)	2,272
	Peppers		1,020	880
	Potatoes		(1)	480
	Radishes		(2)	5,320
	Spinach		(2)	520
	Squash		560	540
	Tomatoes		668	565
St Lucie	Tomatoes	Fort Pierce	745	875
	Watermelon		(1)	200

TABLE 2.1-17 Sheet 2 of 2

County	Principal Species	Production Center	Acres 1976-77	Harvested 1973-74
Other Counties(c)	Snap Beans		1,270	1,190
	Cabbage		2,900	3,340
	Celery		(2)	(2)
	Sweet Corn		(2)	(2)
	Cucumber		2,550	2,190
	Eggplant		680	540
	Green Peppers		870	1,660
	Potatoes(3)		3,650	4,950
	Squash		3,000	2,180
	Strawberries		300	370
	Tomatoes		870	1,165
	Watermelon		4,000	800

(1) Included with other counties

(2) Figures not available

(3) Winter harvest only

(a) From "Vegetable Summary 1977 - Florida Agricultural Statistics", Florida Crop and Livestock Reporting Service, Orlando, Florida 32803.

(b) Estimated from county data. Accounts only for those portions of county within 0-50 miles of site. Assumes equal distribution of vegetable crops within county.

(c) Counties throughout the state whose production was not large enough to warrant special statistics by individual county.

TABLE 2.1-18

FLORIDA COMMERCIAL VEGETABLE ACREAGE AND PRODUCTION - SOUTHEAST COUNTIES 1976-77 (a)

Crop	Acreage Planted	Acreage Harvested	Yield Per Acre	SE Production 1,000 Units	State Production 1,000 Units
Snap Beans	34,550	24,600	125	3,073	3,680
Sweet Corn	17,600	9,500	210	1,995	11,990
Cucumbers	1,850	1,700	279	474	3,802
Eggplant	1,350	1,175	760	893	1,367
Green Peppers	3,750	2,650	478	1,268	6,720
Potatoes (Winter)	7,900	7,700	184	1,434	1,602
Squash	5,600	5,300	155	822	1,893
Strawberries	100	100	1,200	120	2,127
Tomatoes	18,900	11,580	555	5,941	24,210

(a) From "Vegetable Summary 1977-Florida Agricultural Statistics", Reporting Service, 1222 Woodward Street, Orlando, Florida 32803

TABLE 2.1-19

FLORIDA COMMERCIAL VEGETABLE PRODUCTION, CROP YEAR 1976-77[(a)]

Commodity	Unit	Net Wt. lb/Unit	Acreage		Average Yield per Acre			Production
			Planted	Harvested	Units	lb	kg	1,000 Units
Beans	Bushel	30	39,600	29,500	125	3,750	1,701	3,680
Cabbage	Crate	50	17,100	16,300	453	22,650	10,274	7,385
Celery	Crate	60	10,700	10,100	578	34,680	15,731	5,833
Sweet Corn	Crate	42	63,300	50,300	238	9,996	4,534	11,990
Cucumbers	Bushel	48	16,100	15,000	253	12,144	5,509	3,802
Eggplant	Bushel	33	2,250	1,950	701	23,133	10,493	1,367
Escarole	Crate	25	6,900	6,000	513	12,825	5,817	3,080
Lettuce	Cwt.	100	11,700	9,500	151	15,100	6,849	1,430
Peppers	Bushel	25	21,100	16,800	400	10,000	4,536	6,720
Potatoes	Sack	100	30,500	30,100	206	20,600	9,344	6,207
Radishes	Carton	11.5	31,000	27,300	291	3,347	1,578	7,933
Squash	Bushel	42	12,600	12,000	158	6,636	3,010	1,893
Strawberries	Flat	10.25	1,500	1,500	1,418	14,535	6,593	2,127
Tomatoes	Carton	30	43,200	34,000	751	22,530	10,220	24,210
Watermelons	Cwt.	100	65,000	51,000	175	17,500	7,938	8,925

(a) From "Vegetable Summary 1977 - Florida Agricultural Statistics", Florida Crop and Livestock Reporting Service, 1222 Woodward Street, Orlando, Florida 31803

TABLE 2.1-20 Sheet 1 of 2

FLORIDA CITRUS ACREAGE AND PRODUCTION 1976-77(a)

County	Fruit	Harvest Unit	Unit Wt, lb	Est. Prod. 1,000 Boxes	Total Acreage
Brevard(b)	All Oranges[1]	Box	90	807	2,517
	Early & Mids	Box	90	507	1,351
	Valencias	Box	90	300	1,135
	All Grapefruit[1]	Box	85	203	636
	Seedy	Box	85	9	53
	Seedless	Box	85	194	527
	Specialty Fruit[2]	Box	90	39	201
	All Citrus	Box		1,049	3,354
Glades(b)	All Oranges[1]	Box	90	33	96
	Early & Mids	Box	90	24	59
	Valencias	Box	90	9	37
	All Grapefruit[1]	Box	85	2	5
	Seedy	Box	85	0	0
	Seedless	Box	85	2	5
	Specialty Fruit[2]	Box	90	1	12
	All Citrus	Box		36	113
Highlands(b)	All Oranges[1]	Box	90	265	847
	Early & Mids	Box	90	98	225
	Valencias	Box	90	166	603
	All Grapefruit[1]	Box	85	71	143
	Seedy	Box	85	24	57
	Seedless	Box	85	46	79
	Specialty Fruit[2]	Box	90	25	131
	All Citrus	Box		361	1,121
Indian River	All Oranges[1]	Box	90	5,120	22,947
	Early & Mids	Box	90	2,937	10,972
	Valencias	Box	90	2,183	11,572
	All Grapefruit[1]	Box	85	8,537	30,477
	Seedy	Box	85	42	350
	Seedless	Box	85	8,495	28,182
	Specialty Fruit[2]	Box	90	427	2,782
	All Citrus	Box	90	14,084	56,206
Okeechobee(b)	All Oranges[1]	Box	90	482	1,872
	Early & Mids	Box	90	284	864
	Valencias	Box	90	198	999
	All Grapefruit[1]	Box	85	170	636
	Seedy	Box	85	1	3
	Seedless	Box	85	169	632
	Specialty Fruit[2]	Box	90	31	198
	All Citrus	Box		683	370

TABLE 2.1-20 Sheet 2 of 2

County	Fruit	Harvest Unit	Unit Wt, lb	Est. Prod. 1,000 Boxes	Total Acreage
Martin	All Oranges[1]	Box	90	6,297	29,849
	Early & Mids	Box	90	3,078	11,678
	Valencias	Box	90	3,219	17,580
	All Grapefruit[1]	Box	85	1,901	5,682
	Seedy	Box	85	15	213
	Seedless	Box	85	1,886	5,340
	Specialty Fruit[2]	Box	90	288	4,733
	All Citrus	Box		8,486	40,264
Palm Beach(b)	All Oranges[1]	Box	90	1,080	4,126
	Early & Mids	Box	90	726	2,390
	Valencias	Box	90	354	1,734
	All Grapefruit[1]	Box	85	603	1,628
	Seedy	Box	85	15	119
	Seedless	Box	85	588	1,510
	Specialty Fruit[2]	Box	90	229	1,912
	All Citrus	Box		1,912	7,669
St Lucie	All Oranges[1]	Box	90	8,984	36,619
	Early & Mids	Box	90	4,668	14,997
	Valencias	Box	90	4,316	21,009
	All Grapefruit[1]	Box	85	9,306	30,050
	Seedy	Box	85	39	372
	Seedless	Box	85	9,267	27,746
	Specialty Fruit[2]	Box	90	1,072	7,243
	All Citrus	Box		19,362	73,912
State Total	All Oranges[1]	Box	90	186,800	628,567
	Early & Mids	Box	90	115,000	318,832
	Valencias	Box	90	71,800	298,236
	All Grapefruit	Box	85	51,500	137,909
	Seedy	Box	85	9,100	23,296
	Seedless	Box	85	42,400	107,944
	Specialty[2]	Box	90	13,830	85,893
	All Citrus	Box		252,130	852,369

1) Includes unidentified variety acreage

2) Includes lemons, limes, tangelos and tangerines

(a) From "Citrus Summary 1977 - Florida Agricultural Statistics", Florida Crop and Livestock Reporting Service, 1222 Woodward Street, Orlando, Florida 32803

(b) Estimated from county citrus data for 0-50 mile radius assuming equal distribution of citrus throughout county.

TABLE 2.1-21

SUGARCANE PRODUCTION WITHIN 50 MILES OF ST LUCIE UNIT 2(a)

County	Acres Harvested 1976	Acres Harvested 1977	Yield Per Acre (tons) 1976	Yield Per Acre (tons) 1977	Production (tons) 1976	Production (tons) 1977
Glades	1,120	1,120	33.2	29.5	37,170	33,040
Martin	3,000	3,000	29.0	28.0	87,000	84,000
Palm Beach	137,000	104,000	32.4	29.8	3,378,000	3,093,000
State Total	286,000	285,000	32.6	29.8	9,324,000	8,493,000

(a) From "Field Crops Summary 1977 - Florida Agricultural Statistics", Florida Crop and Livestock Reporting Service, 1222 Woodward Street, Orlando, Florida 32803.

TABLE 2.1-22 Sheet 1 of 5

FLORIDA MARINE LANDINGS: FOOD FISH, SHRIMP AND SHELLFISH MARINE LANDINGS BY COUNTY, 1976[a]

County	Fish	Weight (kg)	Shellfish, et al	Weight (kg)
Brevard	Amberjack	6,804	Clams	22,928
	Angelfish	1,242	Crab, Blue (Hard)	715,338
	Blue Runner	526	Crab, Blue (Soft)	107
	Bluefish	70,760	Crab, Stone	1,378
	Bonito	1,437	Lobster, Spiny	1,558
	Catfish, Fresh-Water	710	Oysters	11,185
	Catfish, Sea	1,374	Scallops	193,460
	Cigarfish	9	Shrimp	237,673
	Cobia	642	Squid	1,275
	Crevalle (Jacks)	3,206	Total Shellfish, et al	1,184,902
	Croaker	865		
	Dolphin	3,081		
	Drum, Black	5,369		
	Drum, Red	10,293		
	Flounder	6,031		
	Goatfish	5,107		
	Grouper and Scamp	49,031		
	Grunts	1,569		
	Jewfish	6,752		
	King Mackerel	269,194		
	King Whiting	61,418		
	Menhaden	85,278		
	Mullet, Black	283,482		
	Mullet, Silver	57,654		
	Permit	1,090		
	Pigfish	1,393		
	Pompano	41,118		
	Sand Perch (Mojarra)	803		
	Scup	762		
	Sea Bass	2,356		
	Sea Trout	46,001		
	Sharks	1,179		
	Sheepshead	24,232		
	Snapper	49,198		
	Spanish Mackerel	195,972		
	Spot	34,031		
	Swordfish	37,486		
	Tenpounder	159		
	Tilefish	9,091		
	Trigger Fish	1,402		
	Tripletail	406		
	Wahoo	405		
	Warsaw	3,797		
	Unclassified for Food	17,948		

TABLE 2.1-22 Sheet 2 of 5

County	Fish	Weight (kg)	Shellfish, et al	Weight (kg)
	Unclassified for Miscellaneous	29,778		
	Total Fish	1,430,449		
Indian River	Amberjack	321	Clams, Hard	2,922
	Angelfish	101	Crab, Blue (Hard)	4,137
	Blue Runner	1,165	Lobster, Spiny	258
	Bluefish	36,743	Oysters	452
	Bonito	306	Total Shellfish, et al	7,769
	Catfish, Sea	60		
	Cobia	1,482		
	Creville (Jack)	981		
	Croaker	15		
	Dolphin	1,005		
	Drum, Black	464		
	Drum, Red	2,805		
	Flounder	162		
	Goatfish	86		
	Grouper and Scamp	16,487		
	Jewfish	1,083		
	King Mackerel	374,212		
	King Whiting	3,043		
	Menhaden	373,970		
	Mullet, Black	105,069		
	Mullet, Silver	3,402		
	Permit	275		
	Pigfish	319		
	Pompano	49,539		
	Sea Bass	3,082		
	Sea Trout	27,850		
	Sheepshead	607		
	Snapper	28,589		
	Spanish Mackerel	79,510		
	Spot	77,787		
	Tilefish	5,582		
	Trigger Fish	236		
	Tripletail	88		
	Wahoo	49		
	Unclassified for Food	13,416		
	Total fish	1,209,890		
Martin	Amberjack	2,215	Lobster, Spiny	885
	Angelfish	327	Total Shellfish, et al	885
	Blue Runner	14,206		
	Bluefish	237,057		
	Bonito	47		
	Catfish, Fresh-Water	503		
	Catfish, Sea	5,644		

TABLE 2.1-22 Sheet 3 of 5

County	Fish	Weight (kg)	Shellfish, et al	Weight (kg)
Martin (Cont'd)	Cigarfish	546		
	Cobia	391		
	Crevalle (Jack)	15,742		
	Croaker	20,513		
	Dolphin	129		
	Drum, Black	15,965		
	Drum, Red	580		
	Eel	14		
	Flounder	665		
	Goatfish	35,648		
	Grouper and Scamp	2,597		
	Grunts	1,178		
	Herring, Thread	26,095		
	Hogfish	20		
	Jewfish	7,161		
	King Mackerel	43,413		
	King Whiting	10,783		
	Menhaden	7,636		
	Mullet, Black	102,281		
	Mullet, Silver	6,660		
	Permit	521		
	Pigfish	290		
	Pompano	37,419		
	Sand Perch	47,342		
	Scup	10		
	Sea Bass	532		
	Sea Trout	7,549		
	Shark	1,393		
	Sheepshead	45,711		
	Snapper	5,948		
	Spanish Mackerel	1,441,118		
	Spanish Sardines	7,278		
	Spot	16,477		
	Swordfish	3,037		
	Tilapia (Nile Perch)	136		
	Tilefish	1,344		
	Trigger Fish	87		
	Tripletail	604		
	Warsaw	38		
	Unclassified for Food	12,699		
	Unclassified for Miscellaneous	51,165		
	Total Fish	2,238,715		
Palm Beach	Amberjack	1,464	Crab, Blue (Hard)	953
	Blue Runner	2,300	Lobster, Spiny	16,986
	Bluefish	50,612	Total Shellfish, et al	17,939
	Bonito	295		

TABLE 2.1-22 Sheet 4 of 5

County	Fish	Weight (kg)	Shellfish, et al	Weight (kg)
Palm Beach (Cont'd)	Catfish, Fresh-Water	81		
	Catfish, Sea	78		
	Cigarfish	23		
	Cobia	249		
	Crevalle (Jack)	199		
	Croakes	560		
	Dolphin	854		
	Drum, Black	10,229		
	Drum, Red	726		
	Flounder	6		
	Goatfish	1,037		
	Grouper and Scamp	3,074		
	Grunt	363		
	Hogfish	11		
	Jewfish	35		
	King Mackerel	340,458		
	King Whiting	4,635		
	Mullet, Black	3,834		
	Mullet, Silver	1,316		
	Permit	106		
	Pigfish	11		
	Pompano	3,187		
	Sand Perch	4,458		
	Scup	20		
	Sea Bass	5		
	Sea Trout	477		
	Shark	81		
	Sheepshead	4,465		
	Snapper	23,792		
	Spanish Mackerel	933,340		
	Spot	2,337		
	Tilefish	507		
	Tripletail	24		
	Wahoo	434		
	Warsaw	34		
	Unclassified for Food	5,433		
	Unclassified for Miscellaneous	77		
	Total Fish	1,401,226		
St Lucie	Amberjack	15,895	Crab, Blue (Hard)	1,633
	Angelfish	489	Lobster, Spiny	3,110
	Barracuda	998	Total Shellfish, et al	4,743
	Blue Runner	10,795		
	Bluefish	125,705		
	Bonito	6,592		
	Cobia	2,294		
	Crevalle (Jack)	4,132		

TABLE 2.1-22 Sheet 5 of 5

County	Fish	Weight (kg)	Shellfish, et al	Weight (kg)
St Lucie (Cont'd)	Croaker	1,067		
	Dolphin	6,032		
	Drum, Black	4,534		
	Drum, Red	1,227		
	Flounder	1,167		
	Goatfish	599		
	Grouper and Scamp	32,929		
	Grunts	52		
	Hogfish	12		
	Jewfish	2,642		
	King Mackerel	1,093,989		
	King Whiting	2,744		
	Menhaden	16,815		
	Mullet, Black	63,329		
	Mullet, Silver	18,629		
	Permit	1,220		
	Pigfish	336		
	Pompano	44,037		
	Sand Perch	3,843		
	Scup	341		
	Sea Bass	694		
	Sea Trout	13,866		
	Shad	66		
	Shark	72		
	Sheepshead	7,322		
	Snapper	24,859		
	Spanish Mackerel	1,636,766		
	Spot	31,125		
	Swordfish	3,701		
	Tenpounder	48,932		
	Tilefish	770		
	Tripletail	420		
	Wahoo	937		
	Warsaw	1,111		
	Unclassified for Food	22,497		
	Unclassified for Miscellaneous	323		
	Total Fish	3,255,905		

(a) From "Summary of Florida Commercial Marine Landings, 1976", Florida Department of Natural Resources, Division of Marine Resources, Tallahassee, Florida.

TABLE 2.1-23

COMMERCIAL MARINE LANDINGS OF COUNTIES WITHIN 0-50 MILE RADIUS (10^3 kg)(a)

County	1976	1975	Percent Change
Brevard			
Fish	1,430.5	1,571.1	- 8.9
Shellfish	1,184.9	1,854.1	-36.1
Total	2,615.4	3,425.2	-23.6
Indian River			
Fish	1,209.9	1,155.5	+ 4.7
Shellfish	7.8	27.7	-71.8
Total	1,217.7	1,183.2	+ 2.9
St Lucie			
Fish	3,255.9	2,159.2	+50.8
Shellfish	4.7	7.2	-34.7
Total	3,260.6	2,166.4	+50.5
Martin			
Fish	2,238.7	1,380.7	+62.1
Shellfish	0.9	1.3	-31.8
Total	2,239.6	1,382.0	+62.1
Palm Beach(b)			
Fish	1,401.2	873.2	+60.5
Shellfish	17.9	36.2	-50.5
Total	1,419.1	909.4	+56.0
Grand Total	10,752.4	9,066.2	+18.6
Fish	9,536.2	7,139.7	+33.6
Shellfish	1,216.2	1,926.5	-36.9

(a) From "Summary of Florida Commercial Marine Landings, 1976", Florida Department of Natural Resources, Division of Marine Resources, Tallahassee, Florida.

TABLE 2.1-24

SUMMARY OF MARINE LANDINGS BY COUNTY, 1976[a]

County	Food Fish Weight (kg)	Non-Food Fish Weight (kg)	Shellfish (excluding Shrimp) Weight (kg)	Shrimp Weight (kg)	Total Weight (kg)
Brevard	1,147,852	282,597	947,229	237,673	2,615,351
Indian River	835,920	373,970	7,769	0	1,217,659
Martin	221,863	16,853	885	0	239,601
Palm Beach	1,401,123	103	17,939	0	1,419,165
St Lucie	3,239,018	16,887	4,743	0	3,260,648
Total	6,845,776	690,410	978,565	237,673	8,752,424

(a) From "Summary of Florida Commercial Marine Landings, 1976", Florida Department of Natural Resources, Division of Marine Resources, Tallahassee, Florida.

TABLE 2.1-25

J.W. CORBETT WILDLIFE MANAGEMENT AREA

HUNTING DATA (a)

Species Common Name	Number Taken Sept 9, 1977 - Jan 7, 1978	Number Taken Jan 8, 1978 - Mar 26, 1978
Deer	71	86
Dove	53	468
Duck	15	6
Hog	197	175
Quail	658	10,569
Rabbit	8	82
Raccoon	13	7
Snipe	226	661
Squirrel	50	43
Turkey	0	3

(a) From data provided by B. Lusander, J.W. Corbett Wildlife Management District, January, 1979.

TABLE 2.1-26

RECREATIONAL WATER USE WITHIN 50 MILES OF ST LUCIE UNIT 2

Recreational Activity	Average Daily per Capita Participation Rate		Average Daily Recreational Saltwater Users within 50 miles of St Lucie Unit 2							
	Residents(1)	Tourists(2)	1978	1980	1983	1990	2000	2010	2020	2030
Beach Activities (saltwater)	.1095	.3264	66,666	73,159	80,879	94,703	110,017	122,940	135,478	149,325
Fishing (saltwater)	.0403	.0221	20,423	22,227	24,574	28,777	33,430	37,357	41,172	45,374
Boating (saltwater)										
Power Boating	.0362	.0550	19,820	21,650	23,936	28,029	32,560	36,385	40,099	44,194
Sailing	.0018	.0157	1,529	1,698	1,877	2,197	2,553	2,853	3,143	3,465
Surfing	.0017	.0279	1,993	2,230	2,465	2,886	3,353	3,746	4,127	4,550
Population within 50 miles of St Lucie Unit 2 (see Section 2.1.2)										
Resident			483,765	530,764	580,742	680,081	790,040	882,845	973,061	1,072,314
Peak Daily Tourists and Seasonal Visitors			41,953	47,927	52,965	61,993	72,026	80,485	88,631	97,758

Notes:

(1) Assumes that daily usage of resident population is limited to weekends, May through October. Therefore, the annual per capita resident participation rate (e.g., 6.57 for beach activities) is divided by 60, the number of weekend days from May through October, to get the average daily per capita participation rate (e.g., 0.1095 for beach activities). Region X rates used.

(2) Assumes that tourists stay 13 days. Annual per capita rates are therefore divided by 13. Region X rates used.

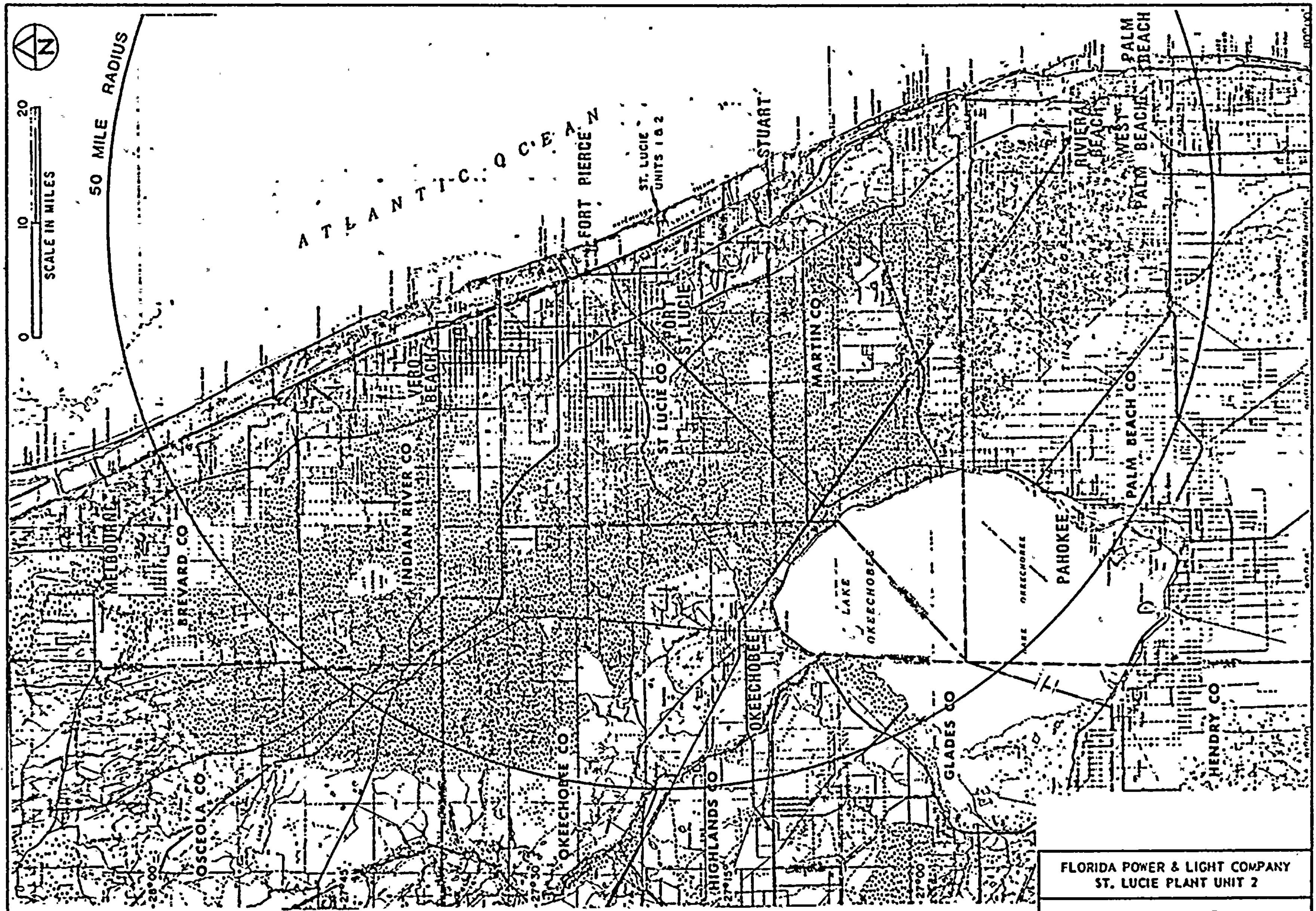
Source: Outdoor Recreation in Florida 1976. State of Florida Dept of Natural Resources, Division of Recreation and Parks, Tallahassee, Florida, May, 1976.
1977 Florida Tourist Study, An Executive Summary, Florida Department of State, Division of Tourism, Tallahassee, Florida, 1977.

TABLE 2.2-1

VEGETATIVE COMPOSITION OF FP&L PROPERTY

Vegetation Cover Type	Acres	Hectares	Percent
Mangrove Swamp	750	305	66
Coastal Beach and Dune	49	20	4
Australian Pine	9	4	1
Utility-Developed Land			
St Lucie Unit 1 and 2 Facilities	248	99	22
Disturbed Field and Shrub[1/]	52	21	5
Road and Roadside	24	10	2
Total	1132	459	100

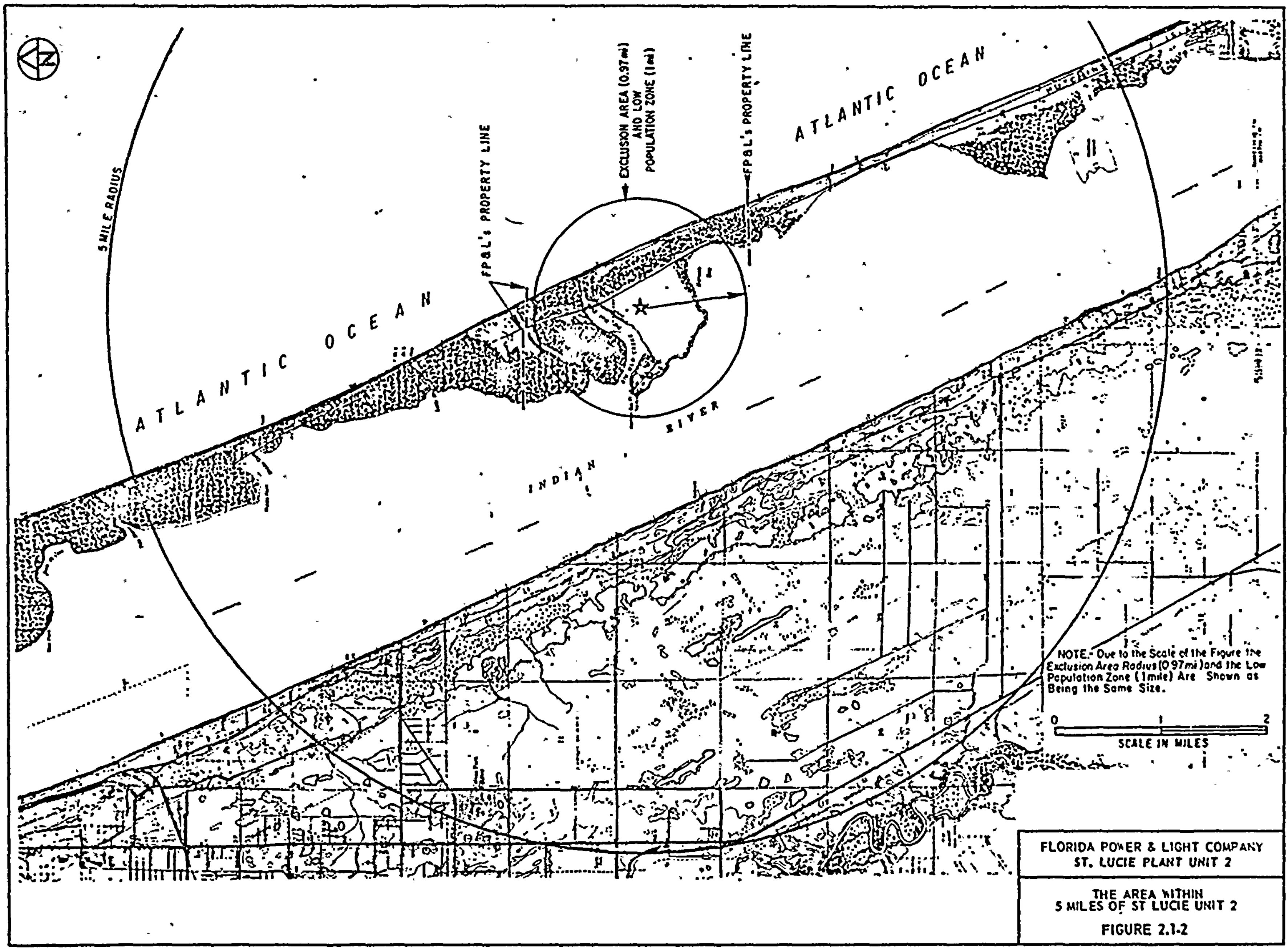
[1/] Comprises part of St Lucie Units 1 and 2 fill/borrow area.



FLORIDA POWER & LIGHT COMPANY
ST. LUCIE PLANT UNIT 2

THE REGION WITHIN
50 MILES OF ST LUCIE UNIT 2

FIGURE 2.1-1

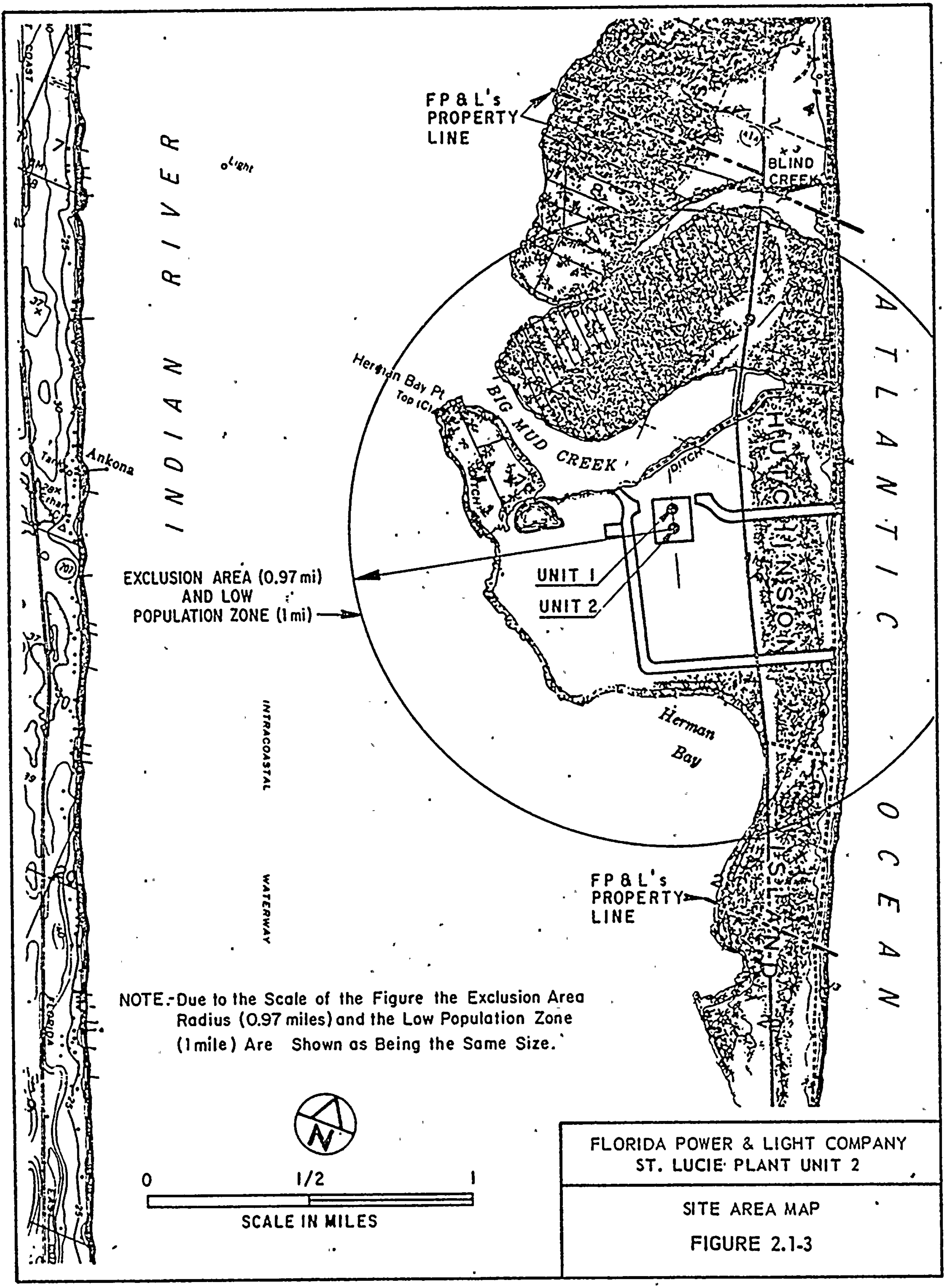


NOTE.- Due to the Scale of the Figure the Exclusion Area Radius (0.97 mi) and the Low Population Zone (1 mile) Are Shown as Being the Same Size.

FLORIDA POWER & LIGHT COMPANY
ST. LUCIE PLANT UNIT 2

THE AREA WITHIN
5 MILES OF ST LUCIE UNIT 2

FIGURE 2.1-2

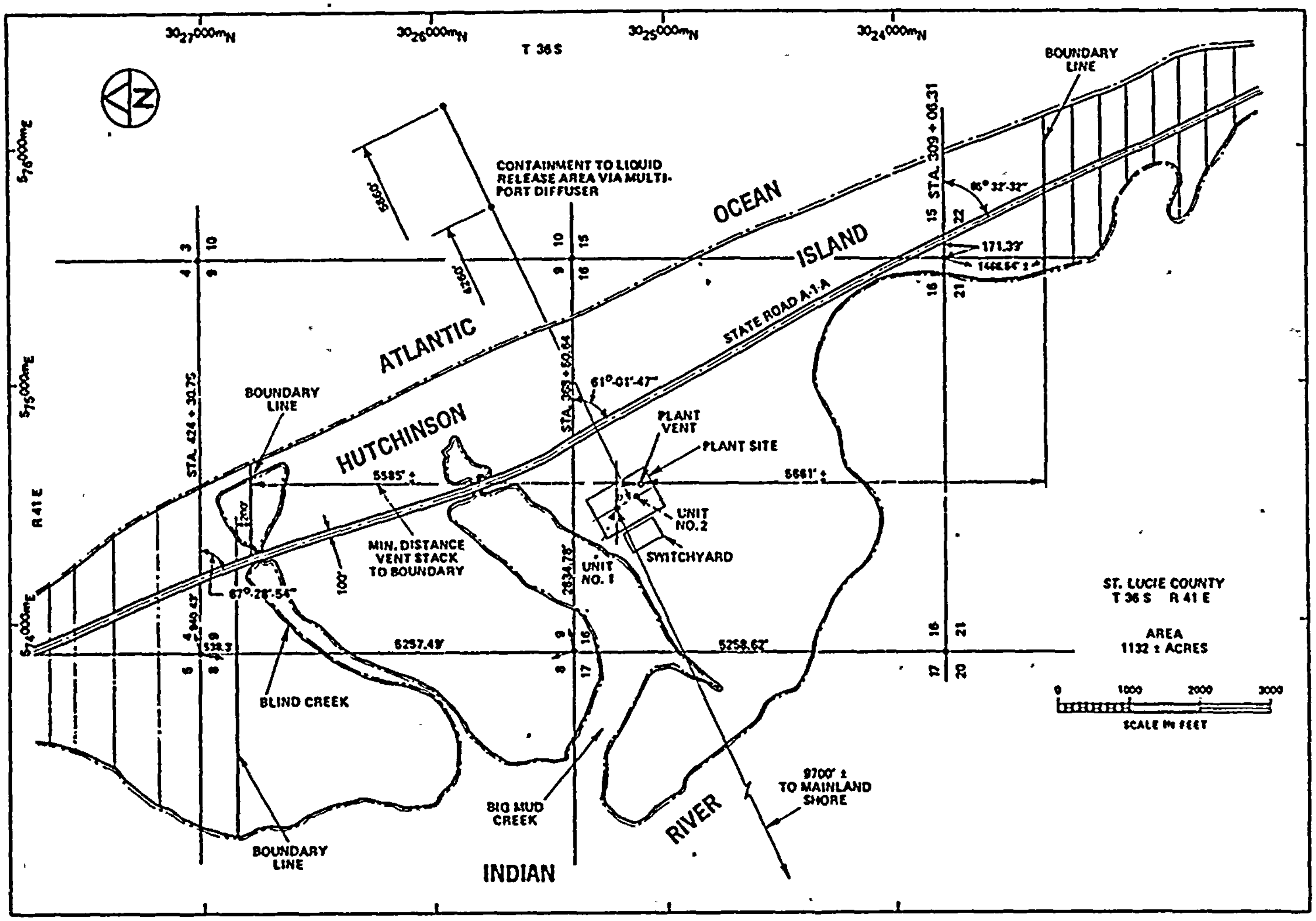


NOTE: Due to the Scale of the Figure the Exclusion Area Radius (0.97 miles) and the Low Population Zone (1 mile) Are Shown as Being the Same Size.

FLORIDA POWER & LIGHT COMPANY
ST. LUCIE PLANT UNIT 2

SITE AREA MAP

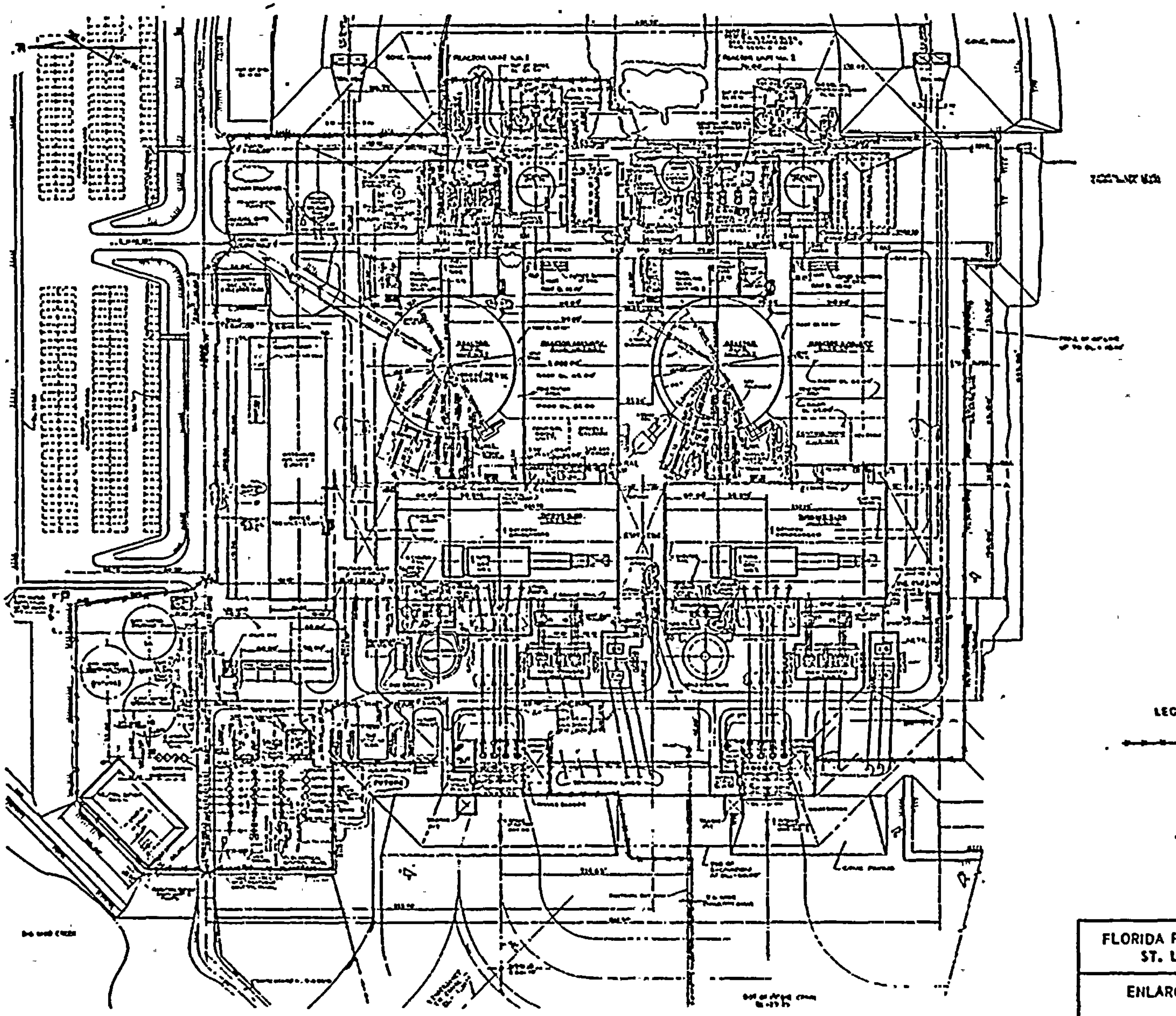
FIGURE 2.1-3



FLORIDA POWER & LIGHT COMPANY
ST. LUCIE PLANT UNIT 2

PROPERTY PLAN

FIGURE 2.1-4

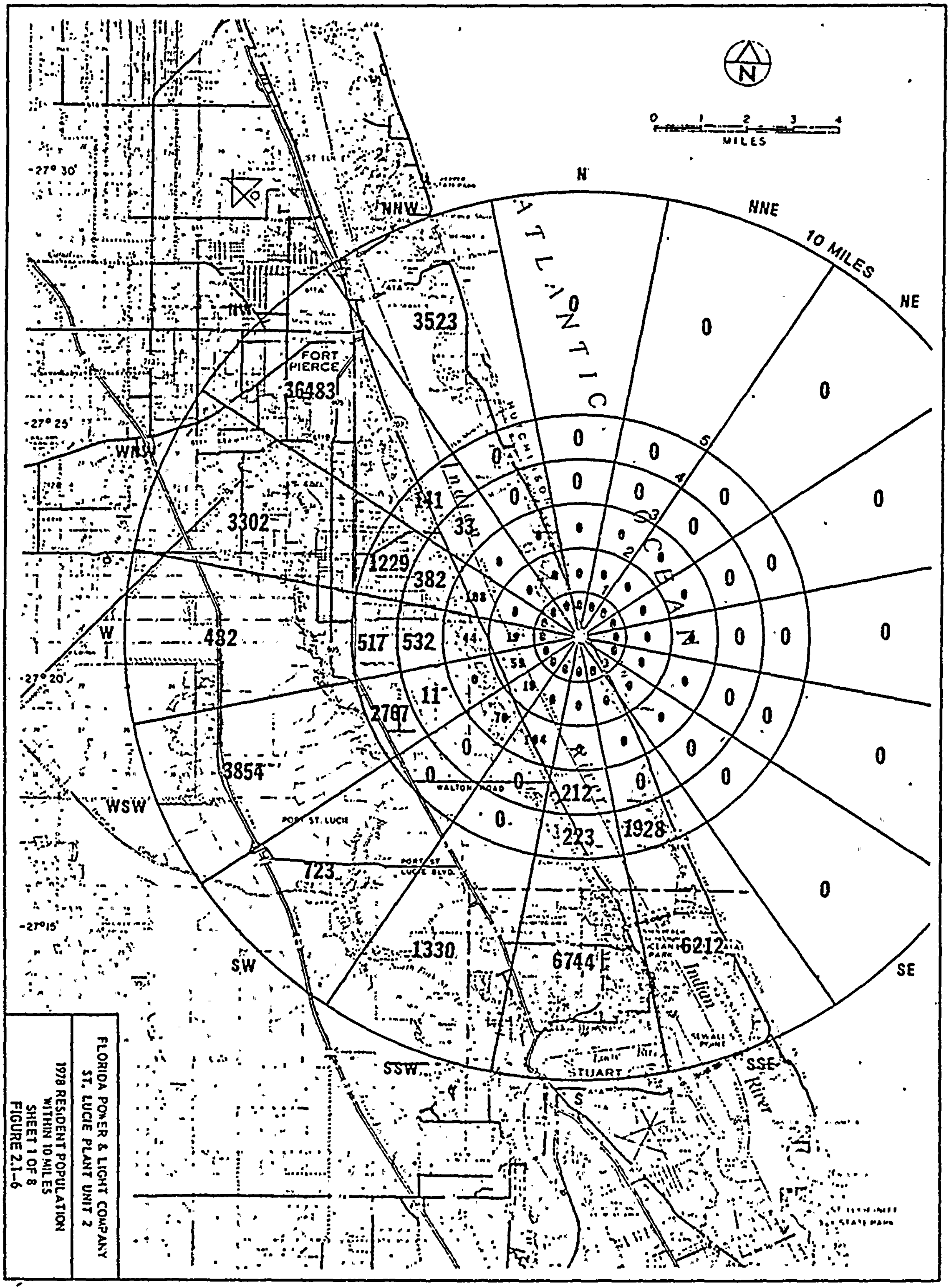


REF DWG: 2998-G-059 (REV. 3)

FLORIDA POWER & LIGHT COMPANY
ST. LUCIE PLANT UNIT 2

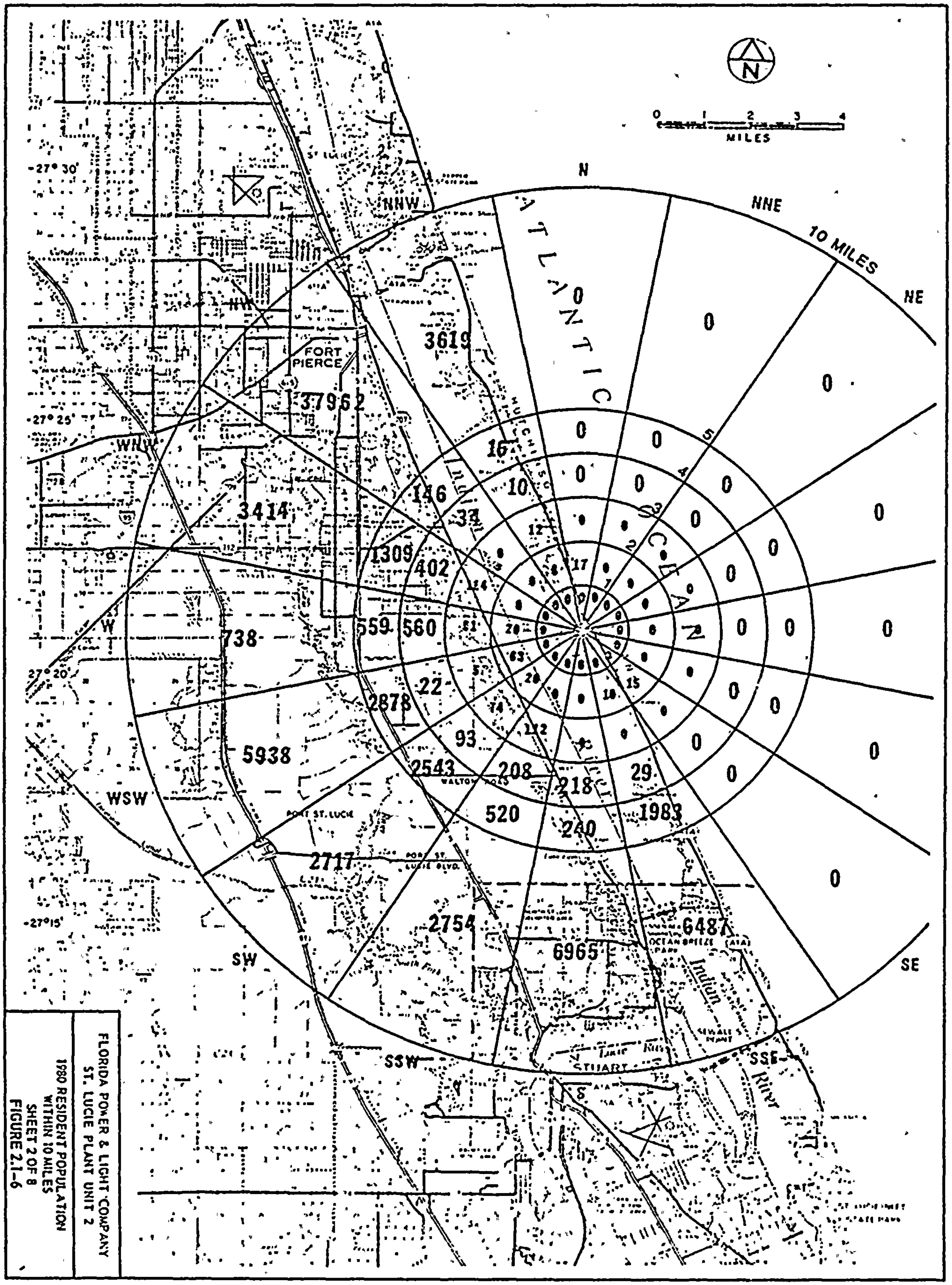
ENLARGED SITE PLOT PLAN

FIGURE 2.1-5



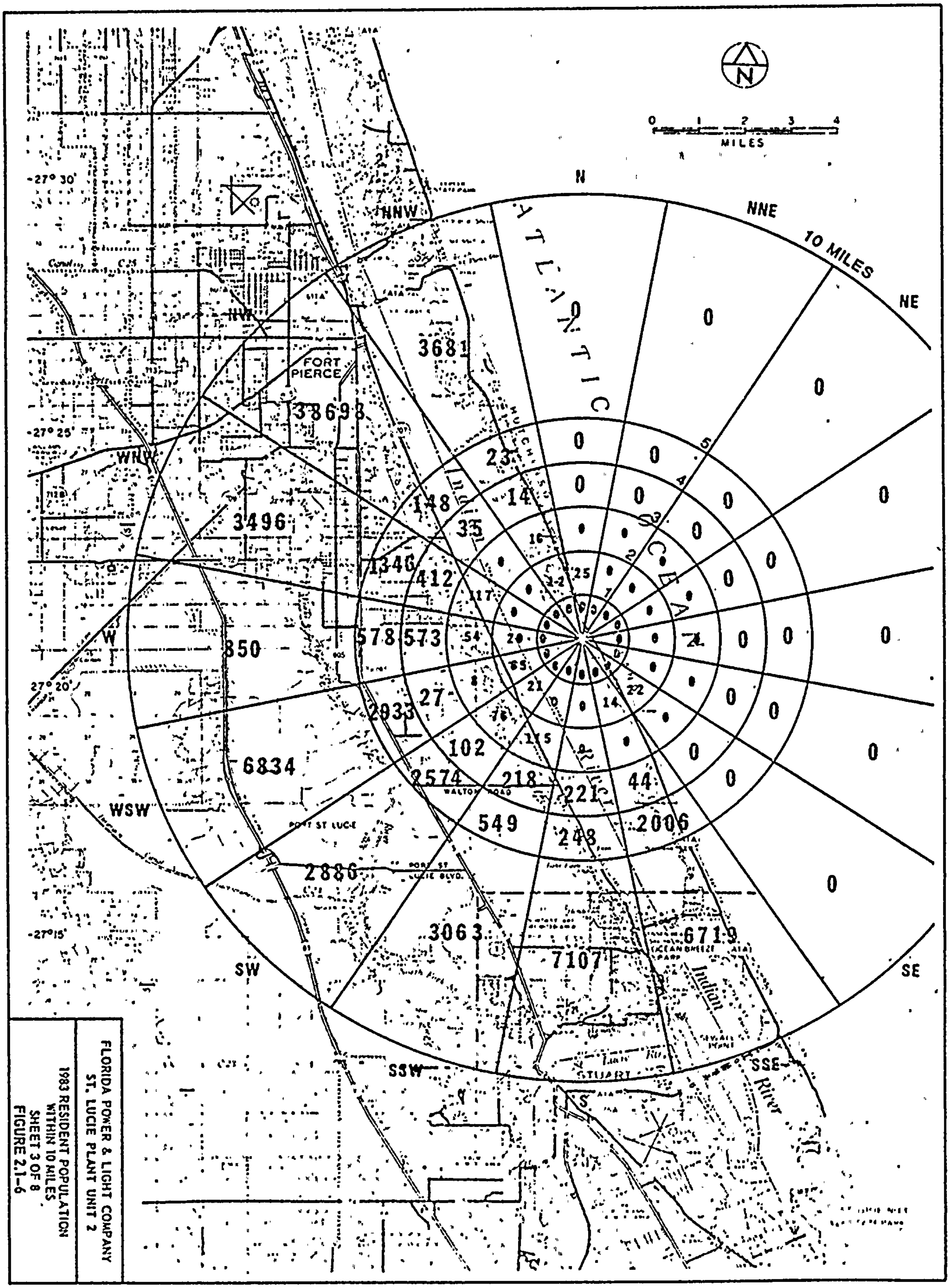
FLORIDA POWER & LIGHT COMPANY
ST. LUCIE PLANT UNIT 2

1978 RESIDENT POPULATION
WITHIN 10 MILES
SHEET 1 OF 8
FIGURE 2.1-6



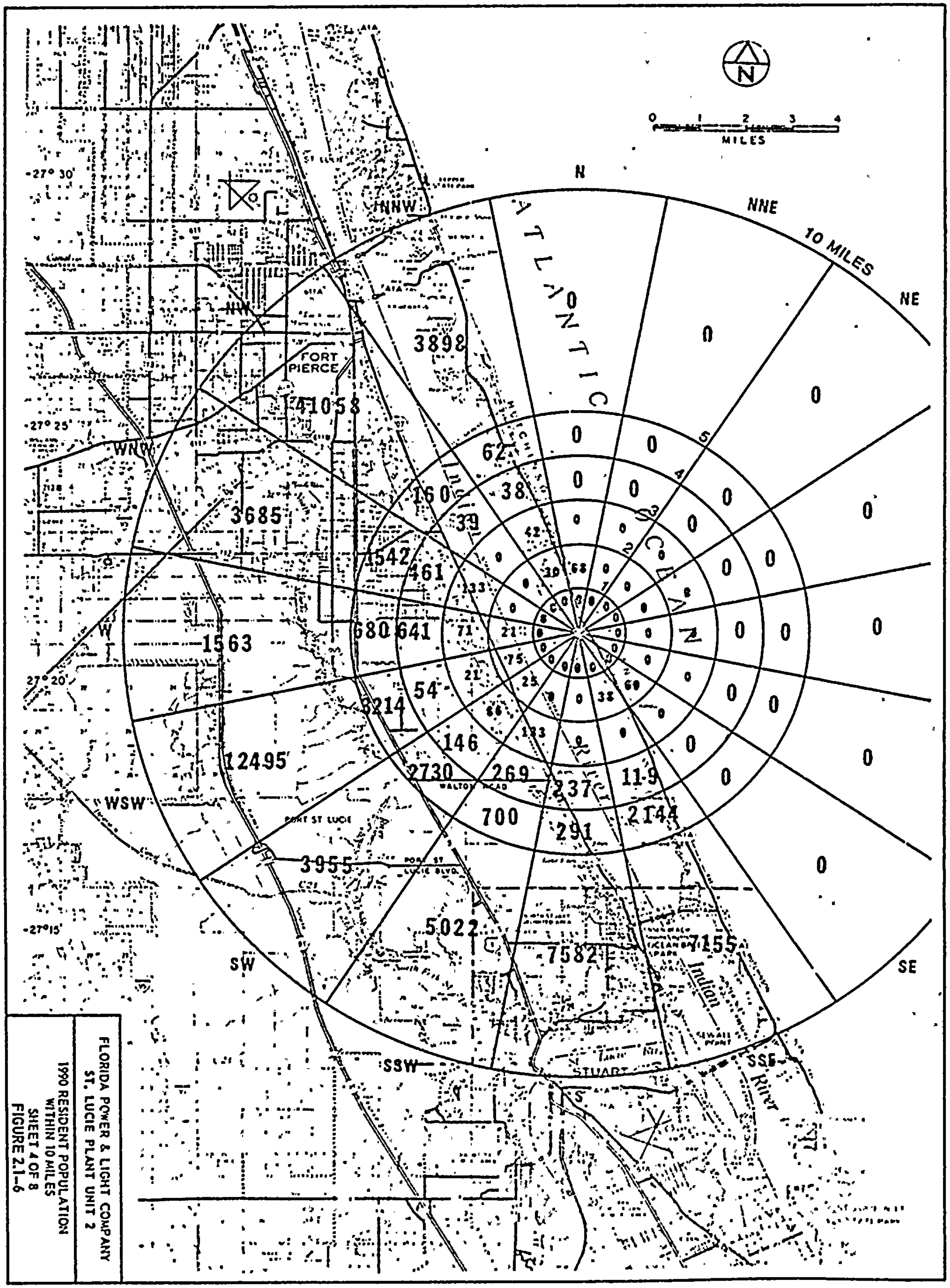
FLORIDA POWER & LIGHT COMPANY
ST. LUCIE PLANT UNIT 2

1980 RESIDENT POPULATION
WITHIN 10 MILES
SHEET 2 OF 8
FIGURE 2.1-6



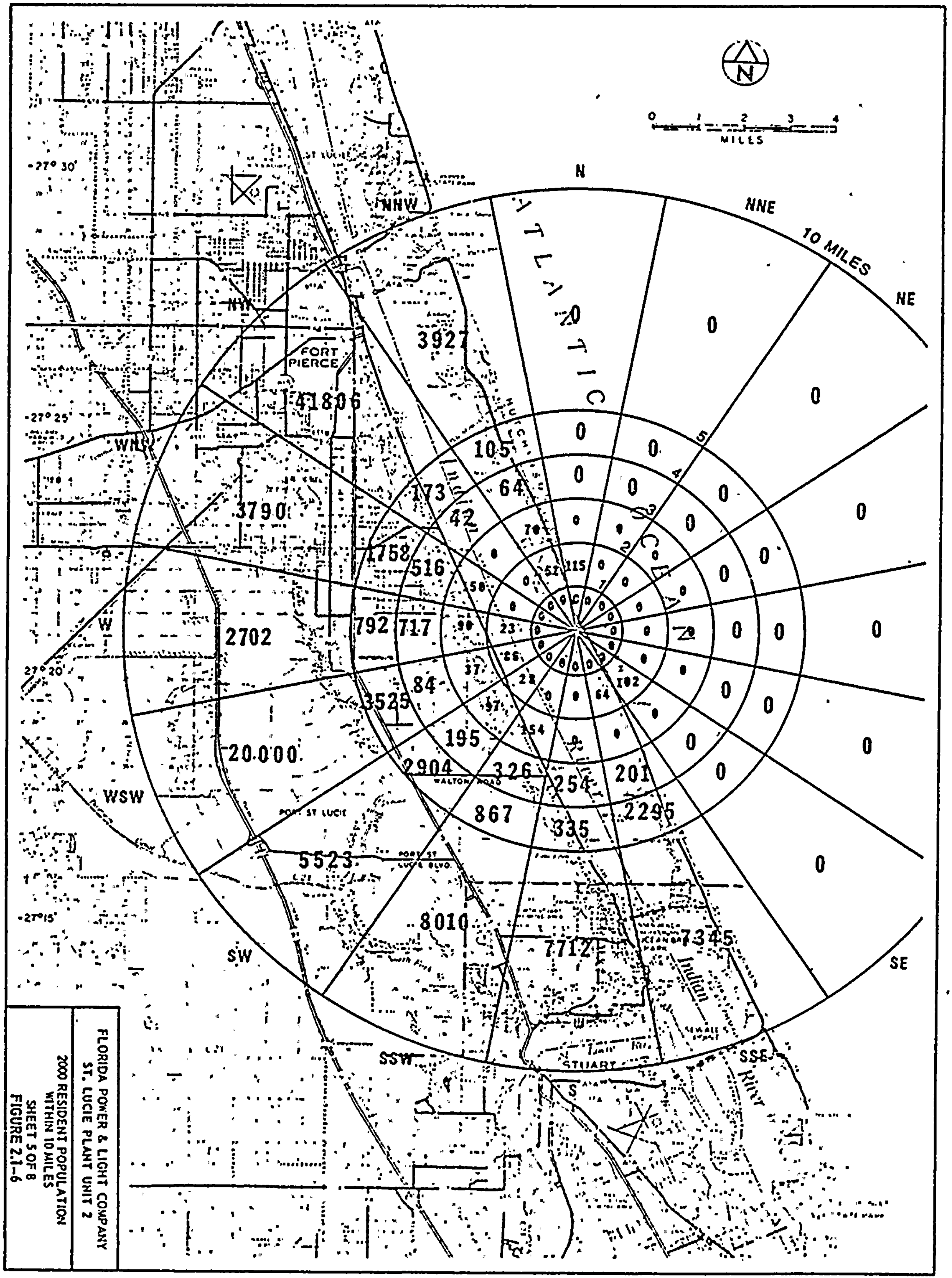
FLORIDA POWER & LIGHT COMPANY
ST. LUCIE PLANT UNIT 2

1983 RESIDENT POPULATION
WITHIN 10 MILES
SHEET 3 OF 8
FIGURE 2.1-6

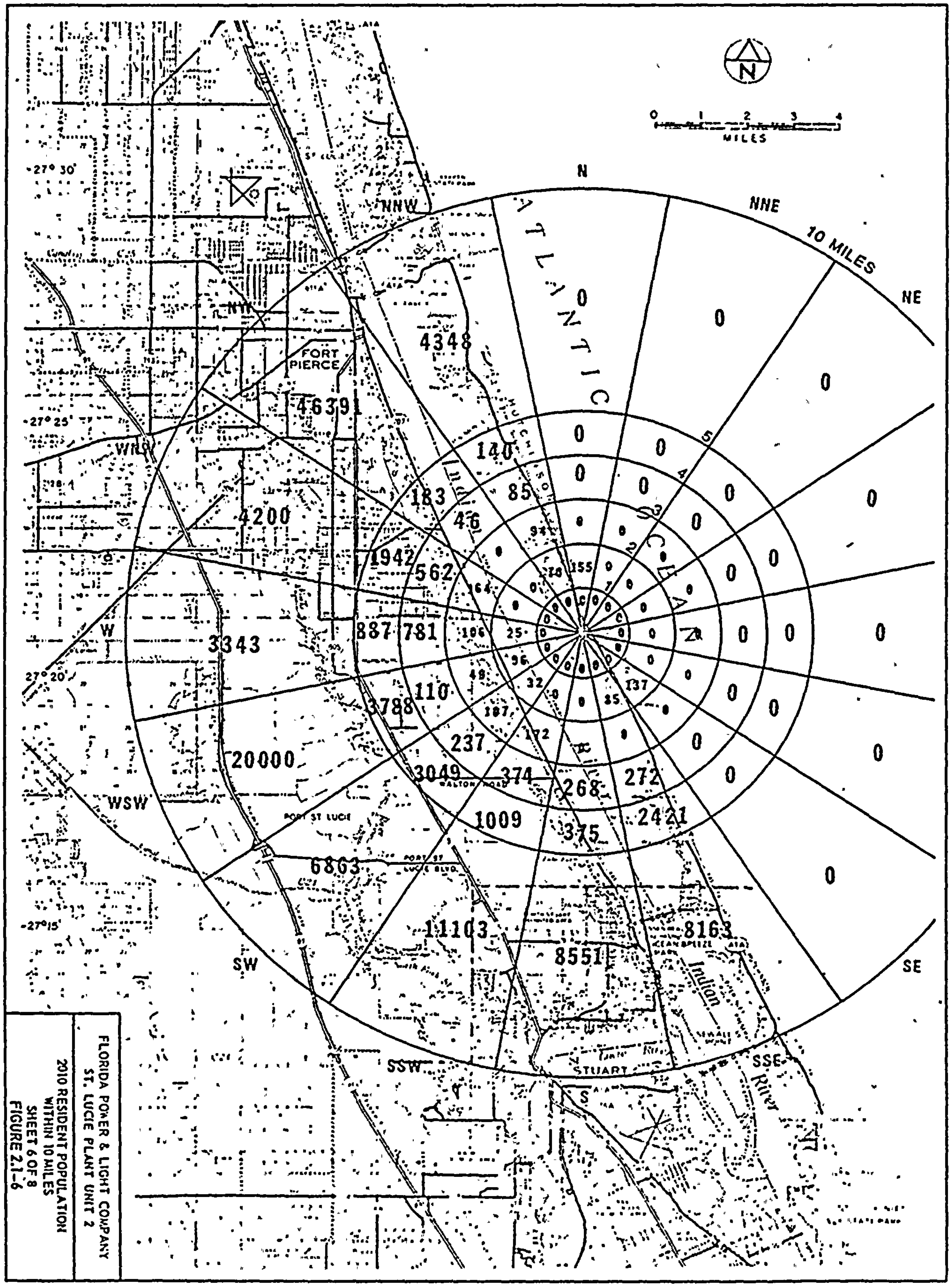


FLORIDA POWER & LIGHT COMPANY
ST. LUCIE PLANT UNIT 2

1990 RESIDENT POPULATION
WITHIN 10 MILES
SHEET 4 OF 8
FIGURE 2.1-6

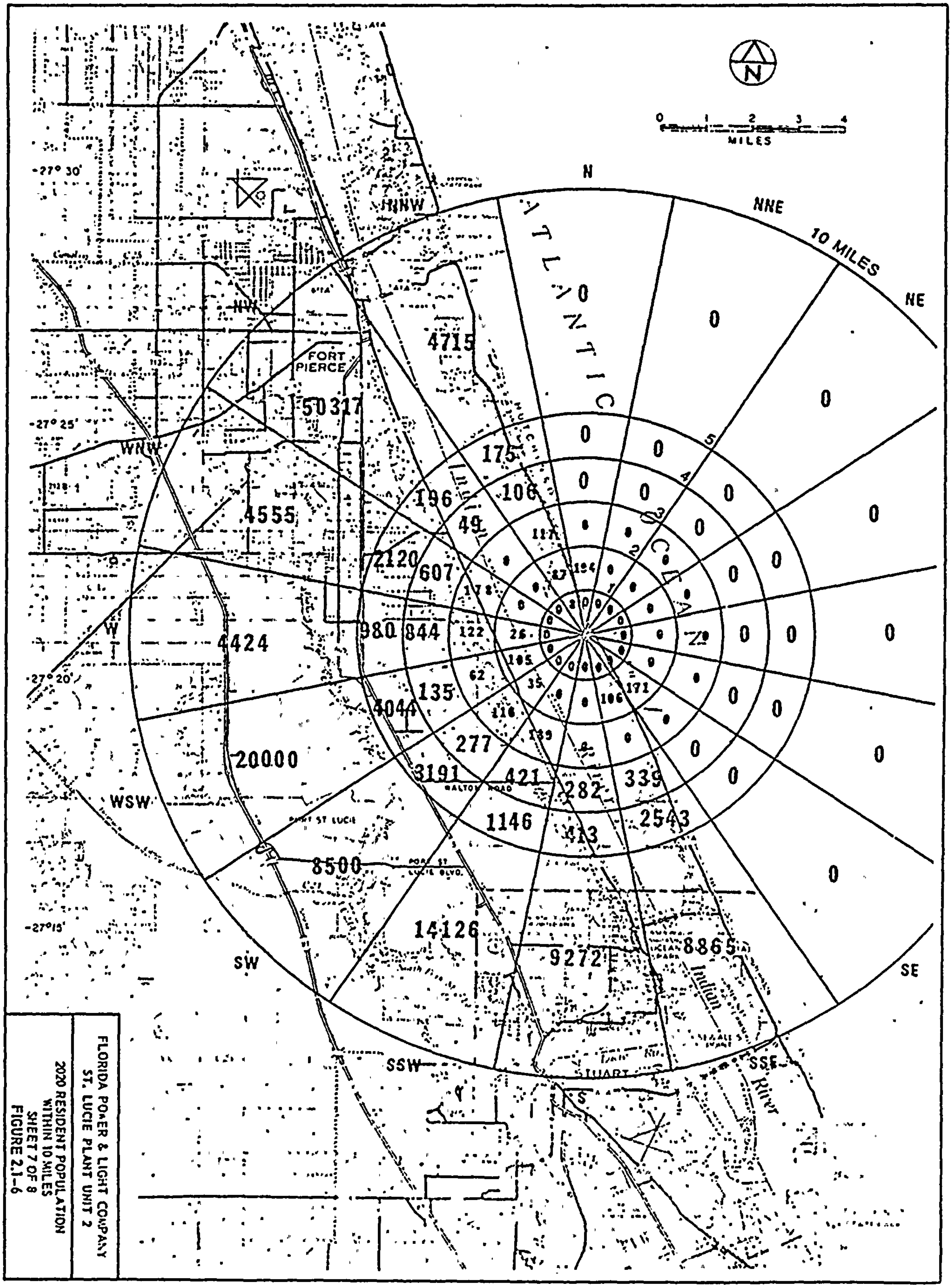


FLORIDA POWER & LIGHT COMPANY
ST. LUCIE PLANT UNIT 2
2000 RESIDENT POPULATION
WITHIN 10 MILES
SHEET 5 OF 8
FIGURE 2.1-6

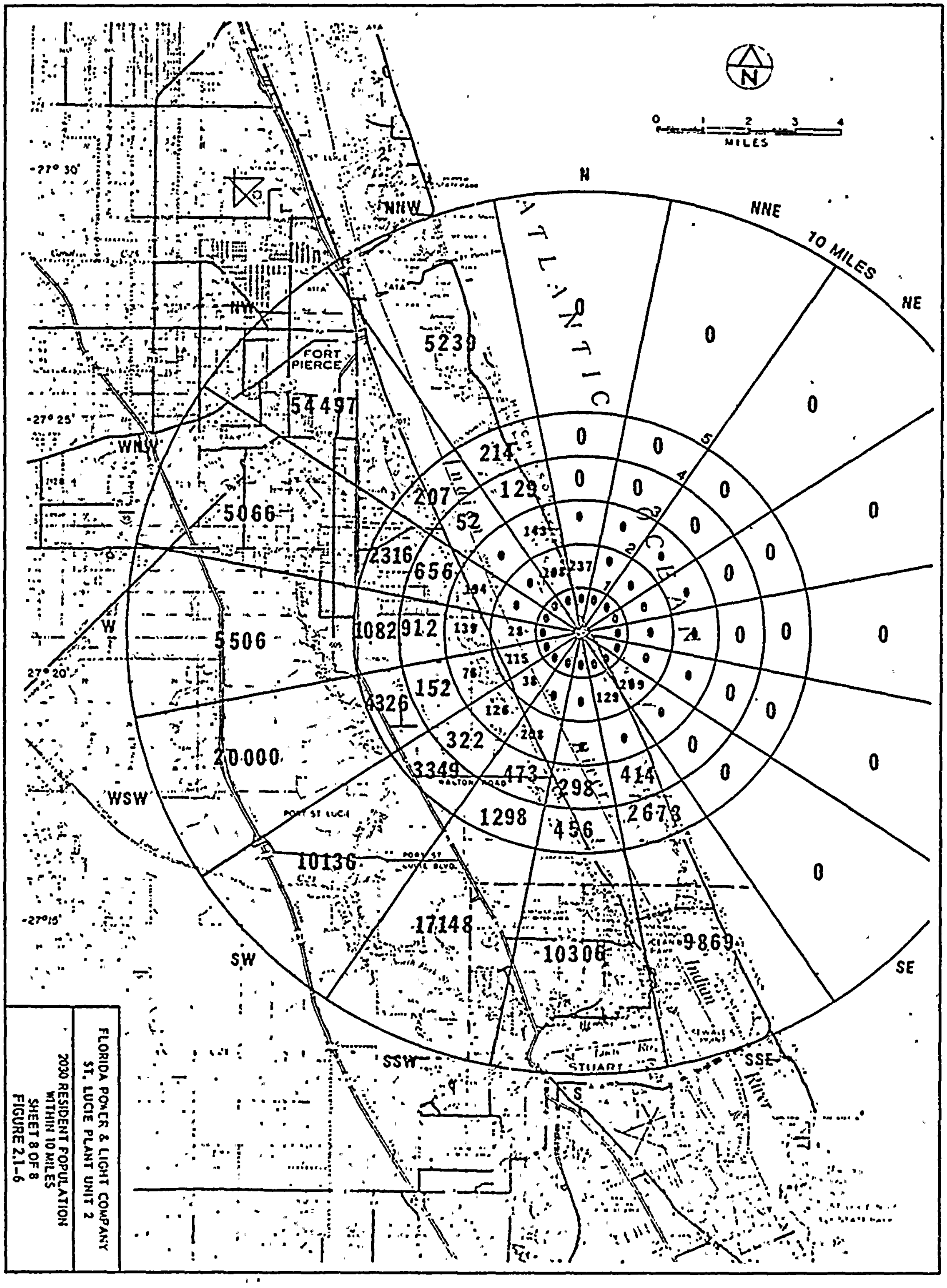


FLORIDA POWER & LIGHT COMPANY
ST. LUCIE PLANT UNIT 2

2010 RESIDENT POPULATION
WITHIN 10 MILES
SHEET 6 OF 8
FIGURE 2.1-6



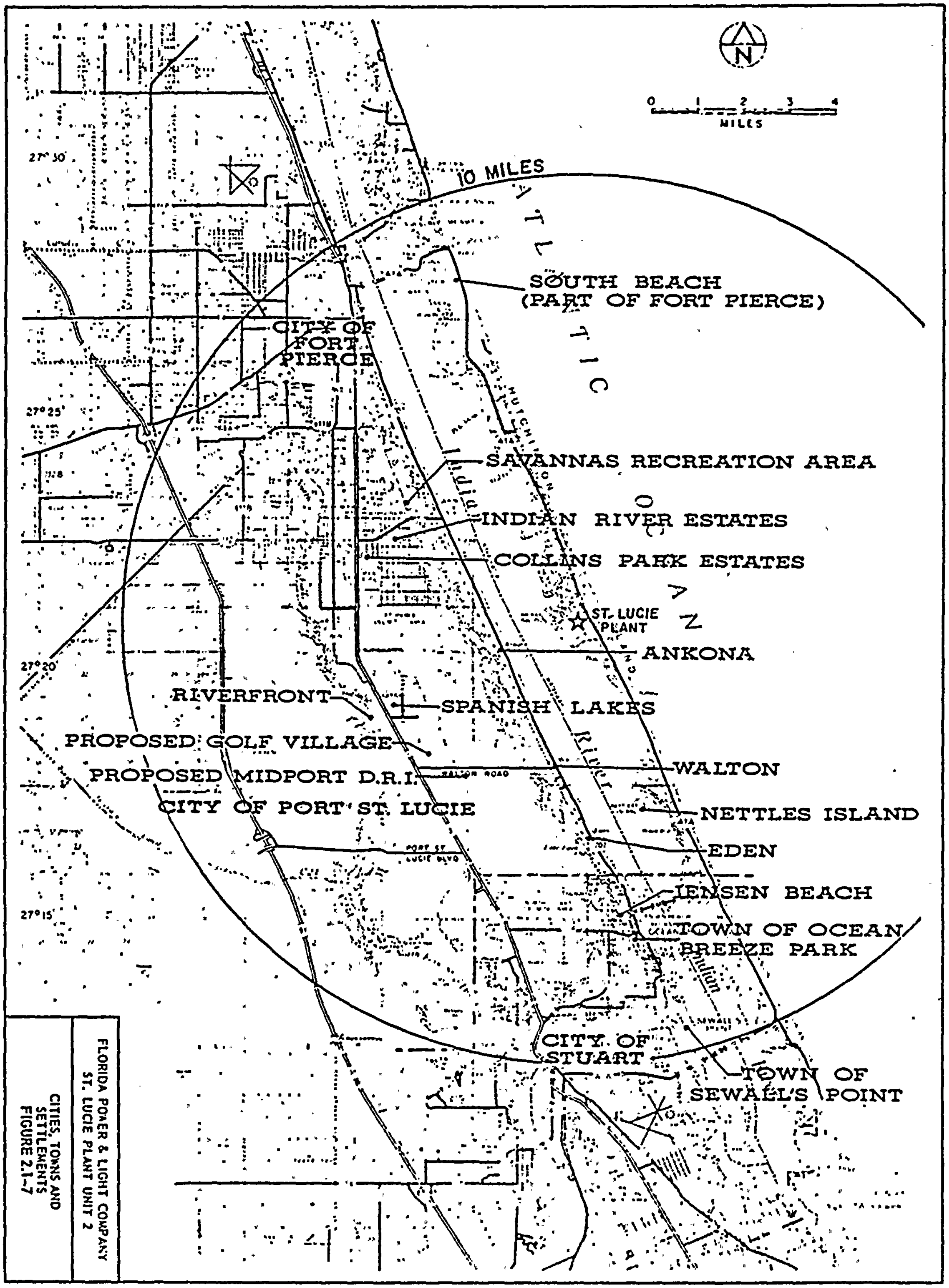
FLORIDA POWER & LIGHT COMPANY
ST. LUCIE PLANT UNIT 2
2020 RESIDENT POPULATION
WITHIN 10 MILES
SHEET 7 OF 8
FIGURE 2.1-6



FLORIDA POWER & LIGHT COMPANY
ST. LUCIE PLANT UNIT 2

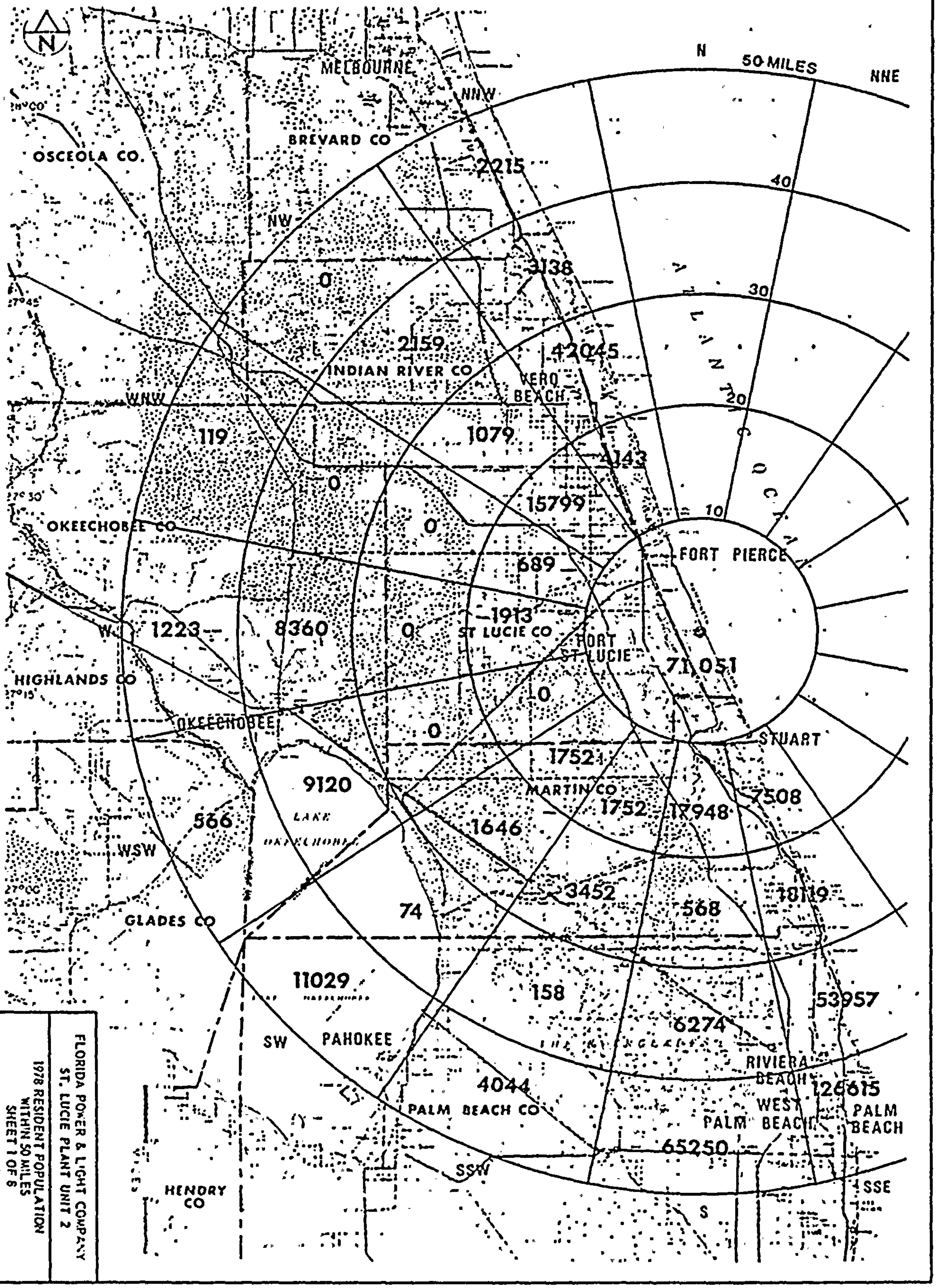
2030 RESIDENT POPULATION
WITHIN 10 MILES
SHEET 8 OF 8

FIGURE 2.1-6



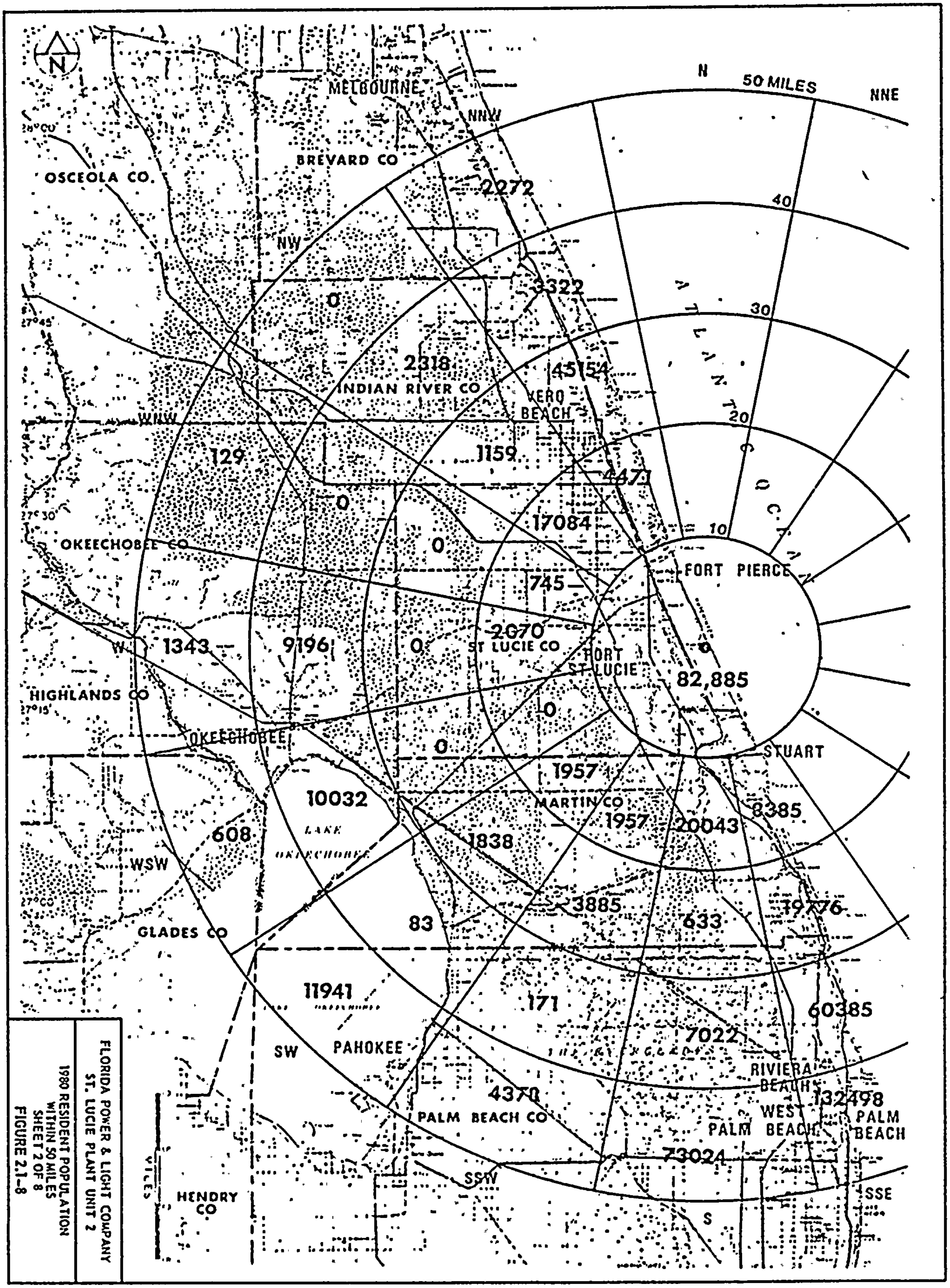
FLORIDA POWER & LIGHT COMPANY
ST. LUCIE PLANT UNIT 2

CITIES, TOWNS AND SETTLEMENTS
FIGURE 2.1-7



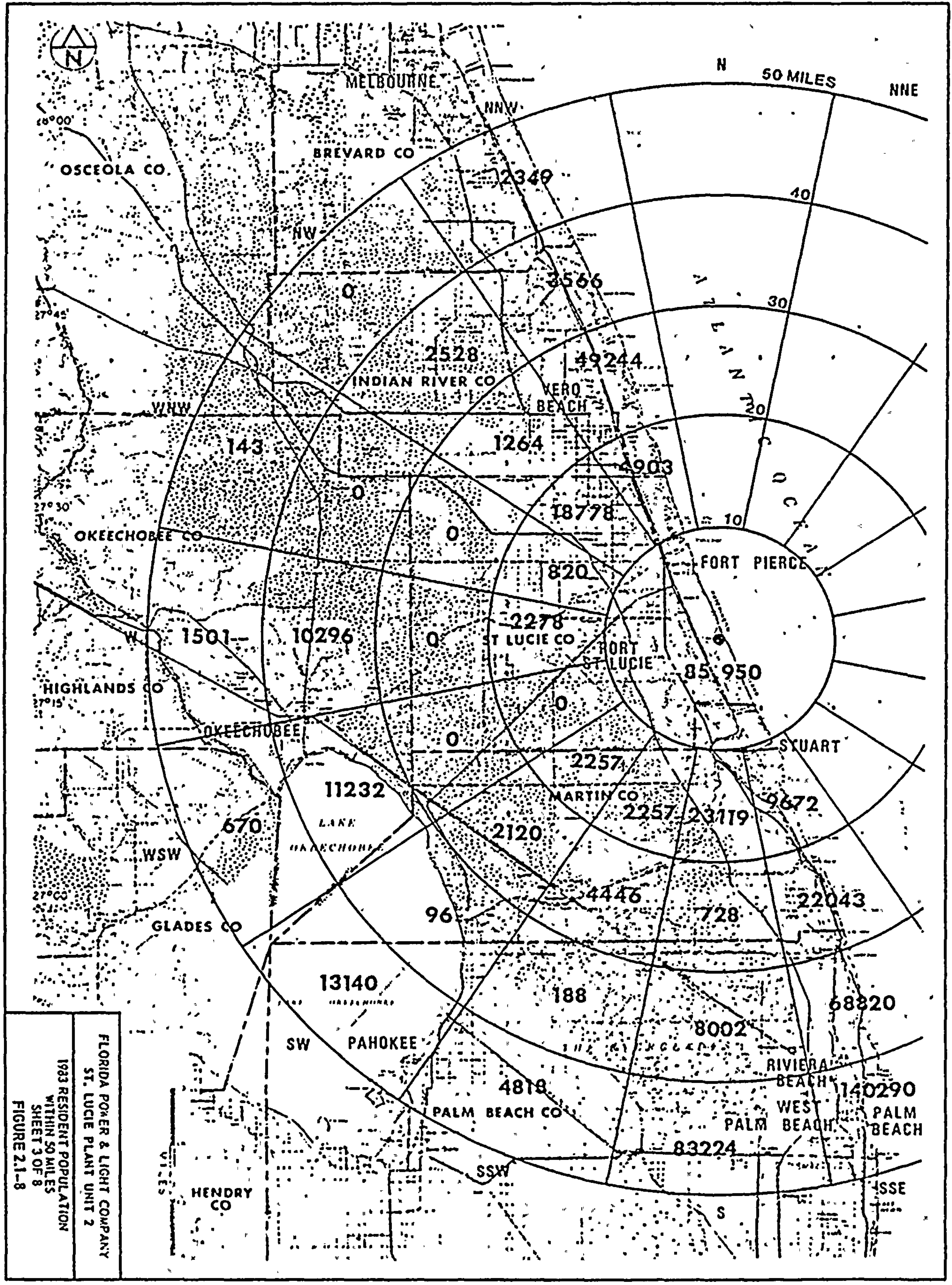
FLORIDA POWER & LIGHT COMPANY
ST. LUCIE PLANT UNIT 2

1978 RESIDENT POPULATION
WITHIN 50 MILES
SHEET 1 OF 6
FIGURE 2.1-8



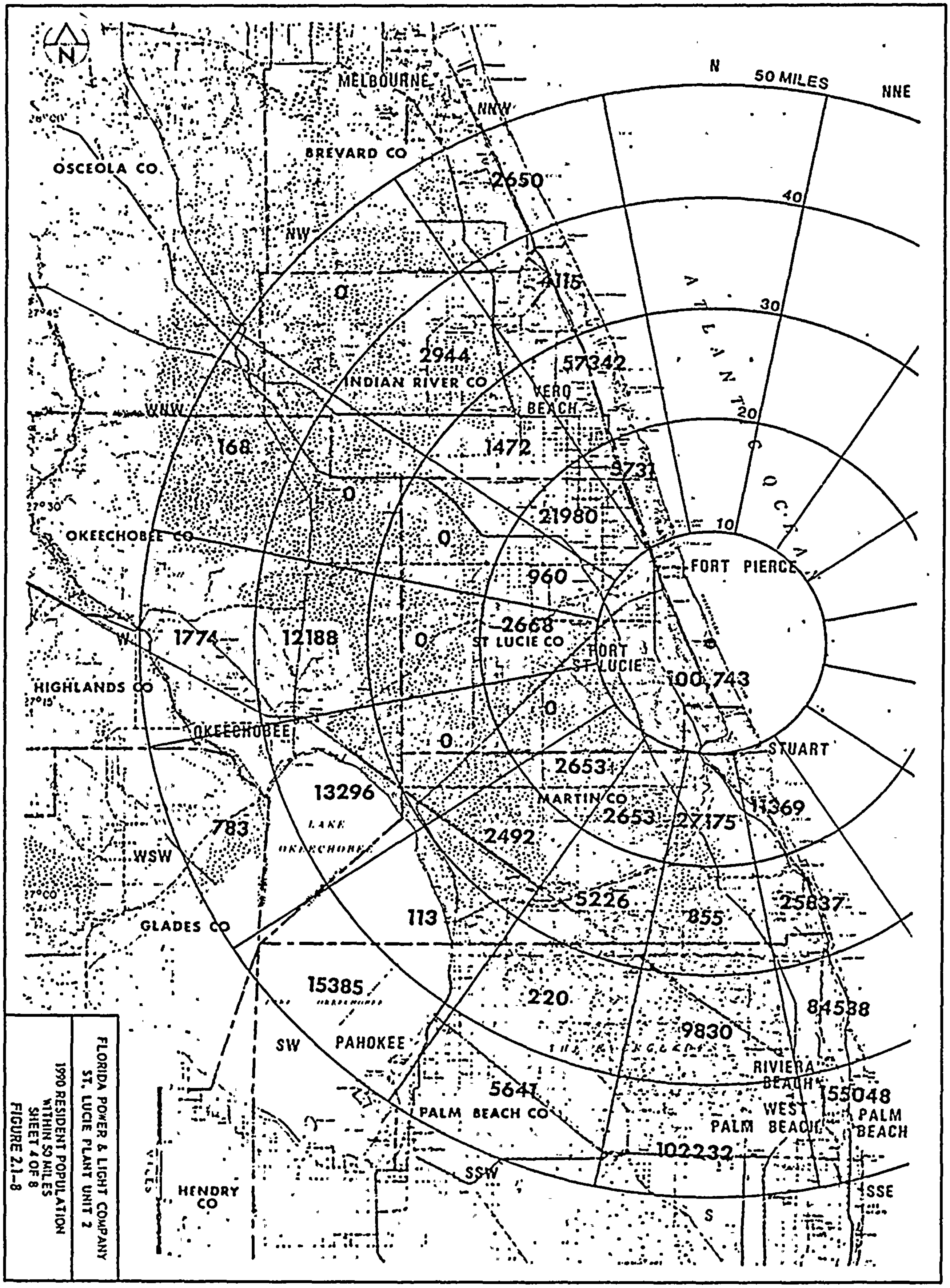
FLORIDA POWER & LIGHT COMPANY
ST. LUCIE PLANT UNIT 2

1980 RESIDENT POPULATION WITHIN 50 MILES SHEET 2 OF 8
FIGURE 2.1-8



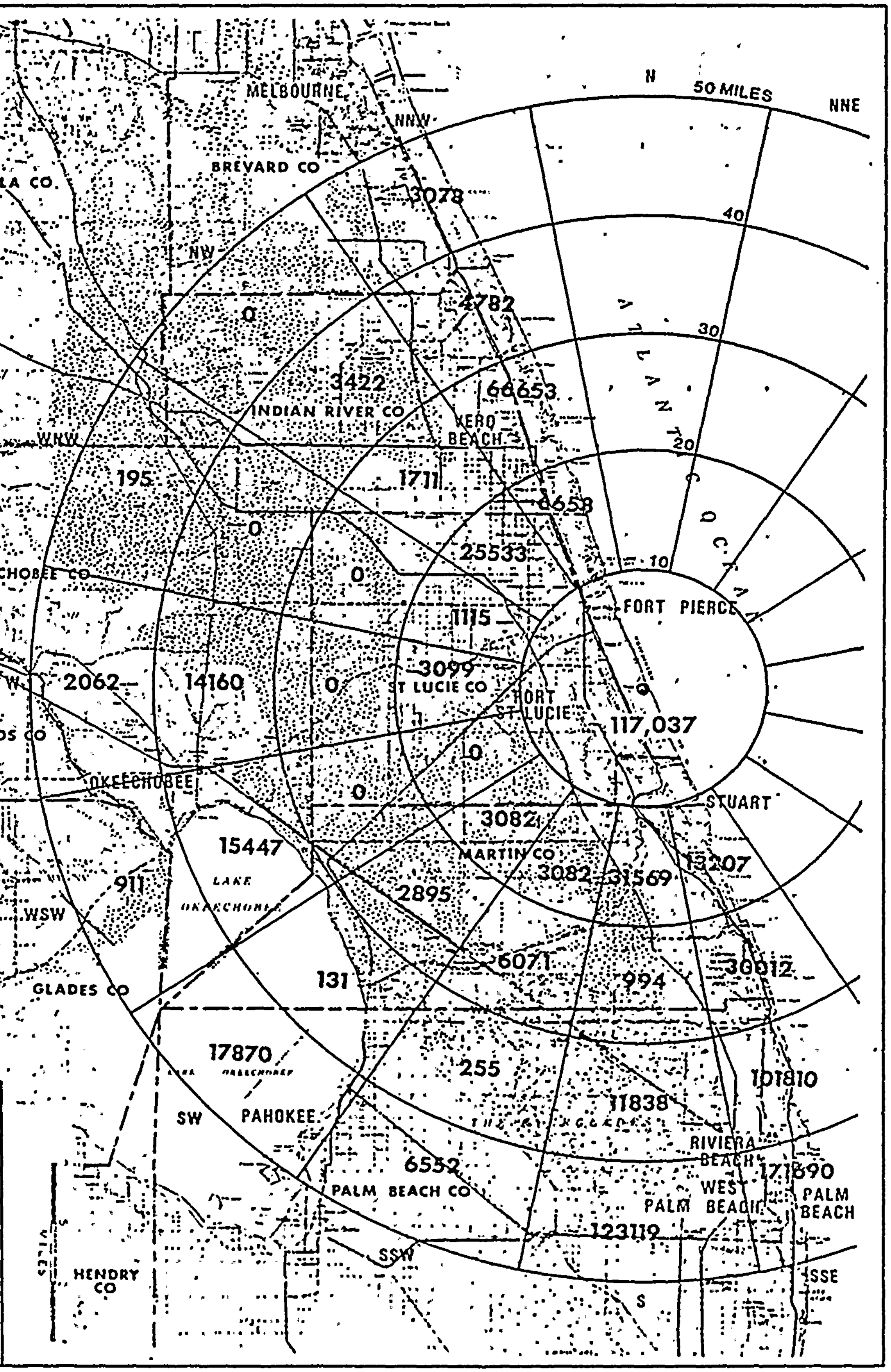
FLORIDA POWER & LIGHT COMPANY
ST. LUCIE PLANT UNIT 2

1983 RESIDENT POPULATION
WITHIN 50 MILES
SHEET 3 OF 8
FIGURE 2.1-8



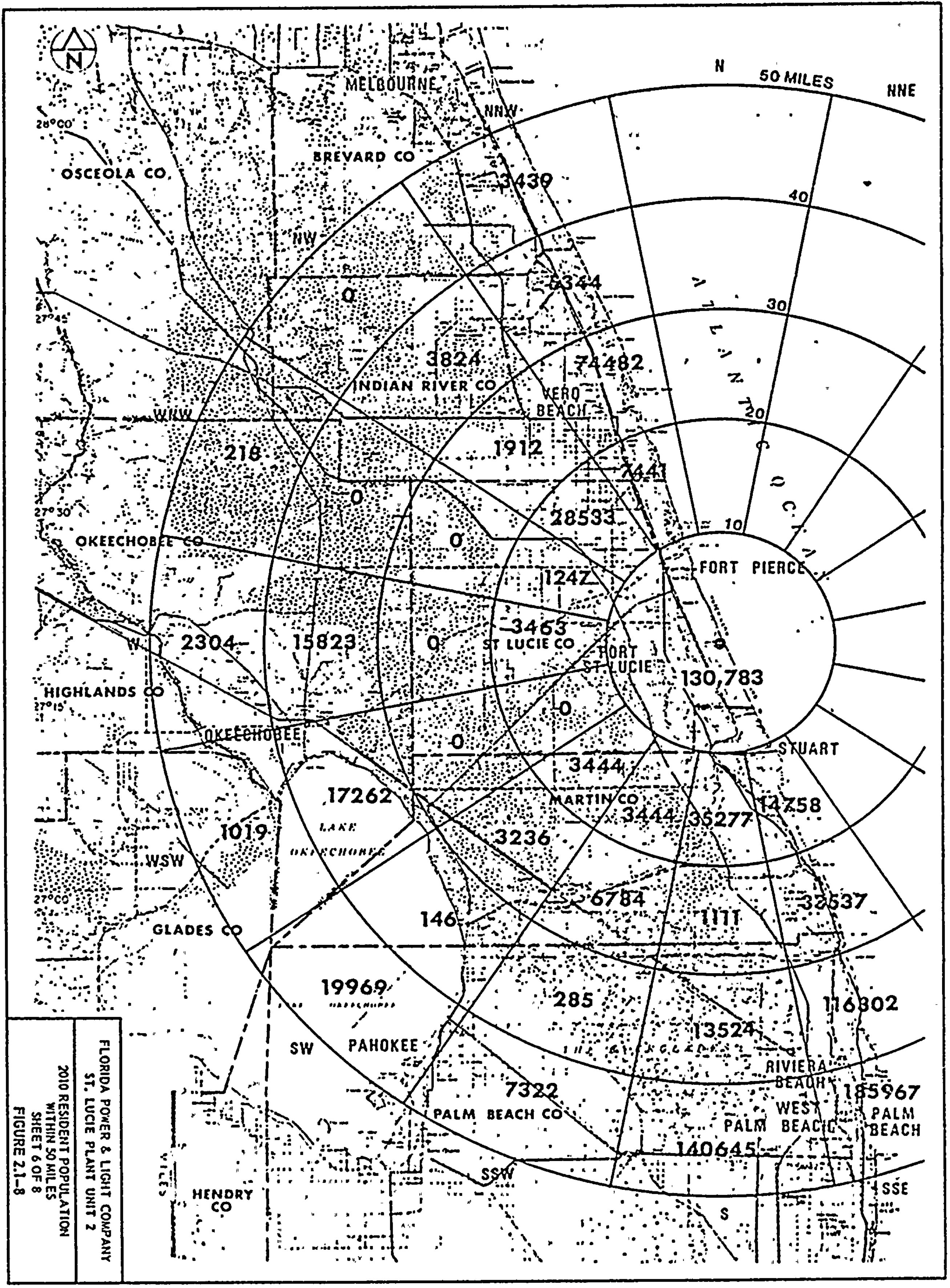
FLORIDA POWER & LIGHT COMPANY
ST. LUCIE PLANT UNIT 2

1990 RESIDENT POPULATION
WITHIN 50 MILES
SHEET 4 OF 8
FIGURE 2.1-8



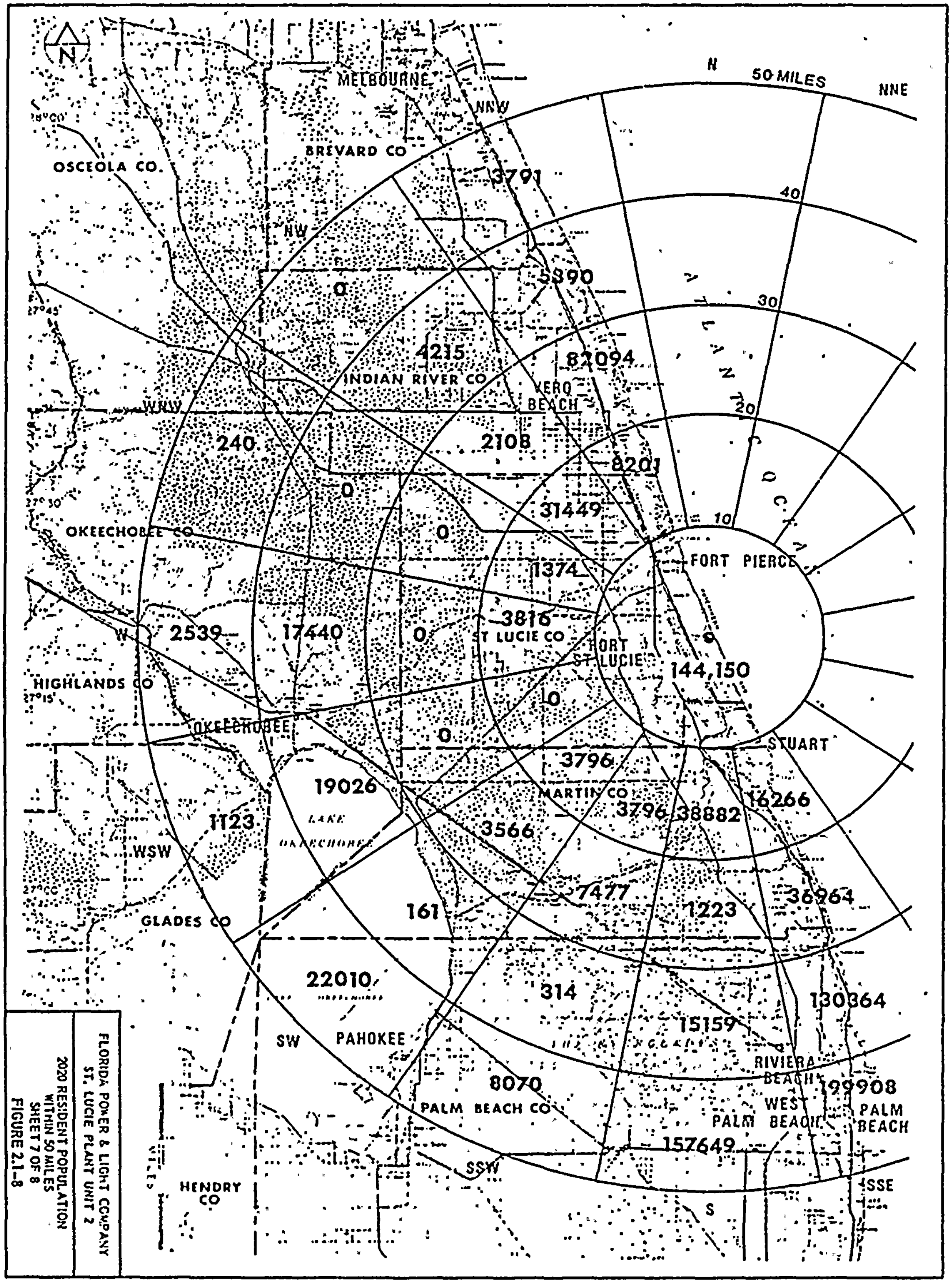
FLORIDA POWER & LIGHT COMPANY
ST. LUCIE PLANT UNIT 2

2000 RESIDENT POPULATION
WITHIN 50 MILES
SHEET 5 OF 8
FIGURE 2.1-8



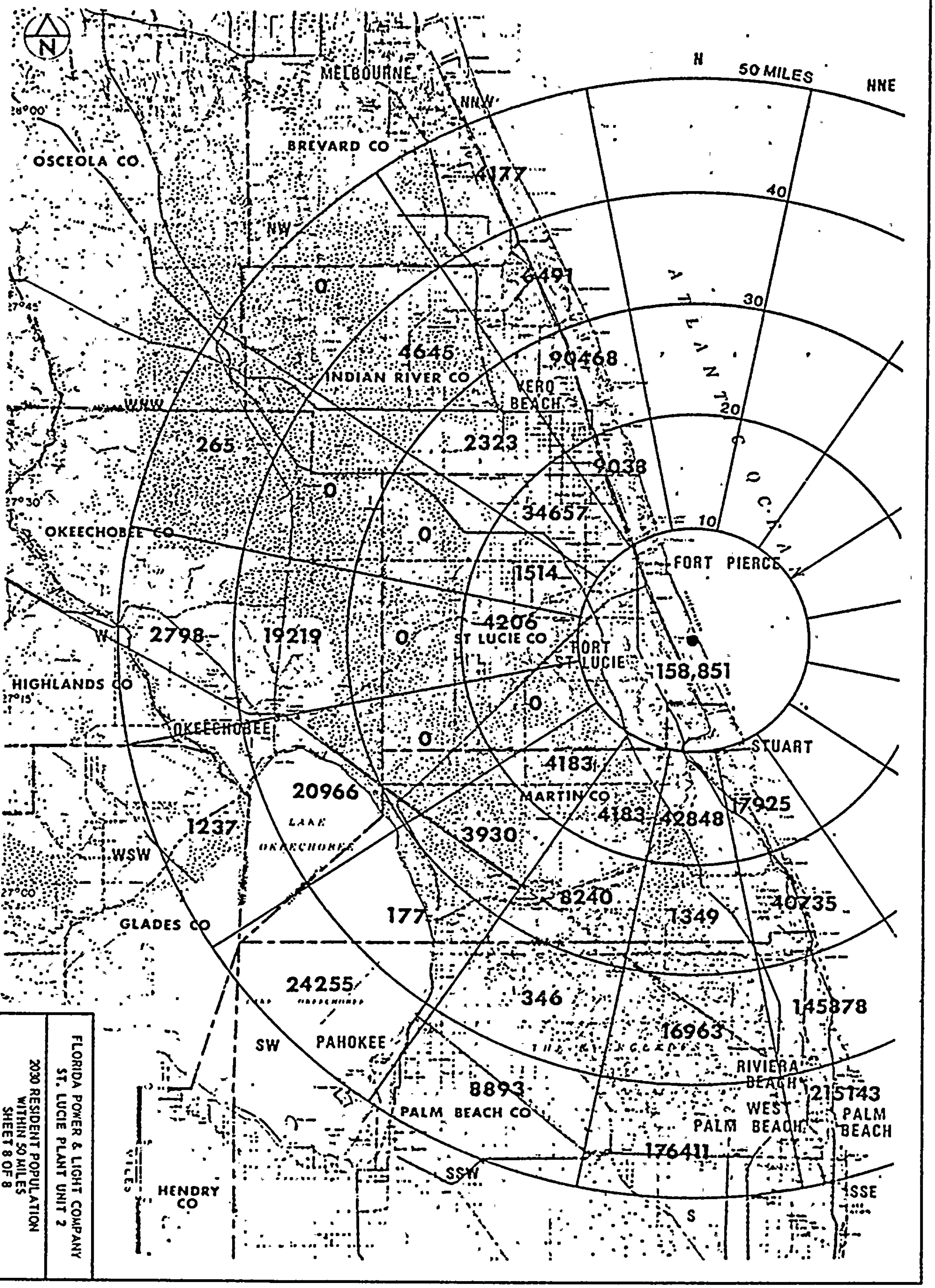
FLORIDA POWER & LIGHT COMPANY
ST. LUCIE PLANT UNIT 2

2010 RESIDENT POPULATION
WITHIN 50 MILES
SHEET 6 OF 8
FIGURE 2.1-8

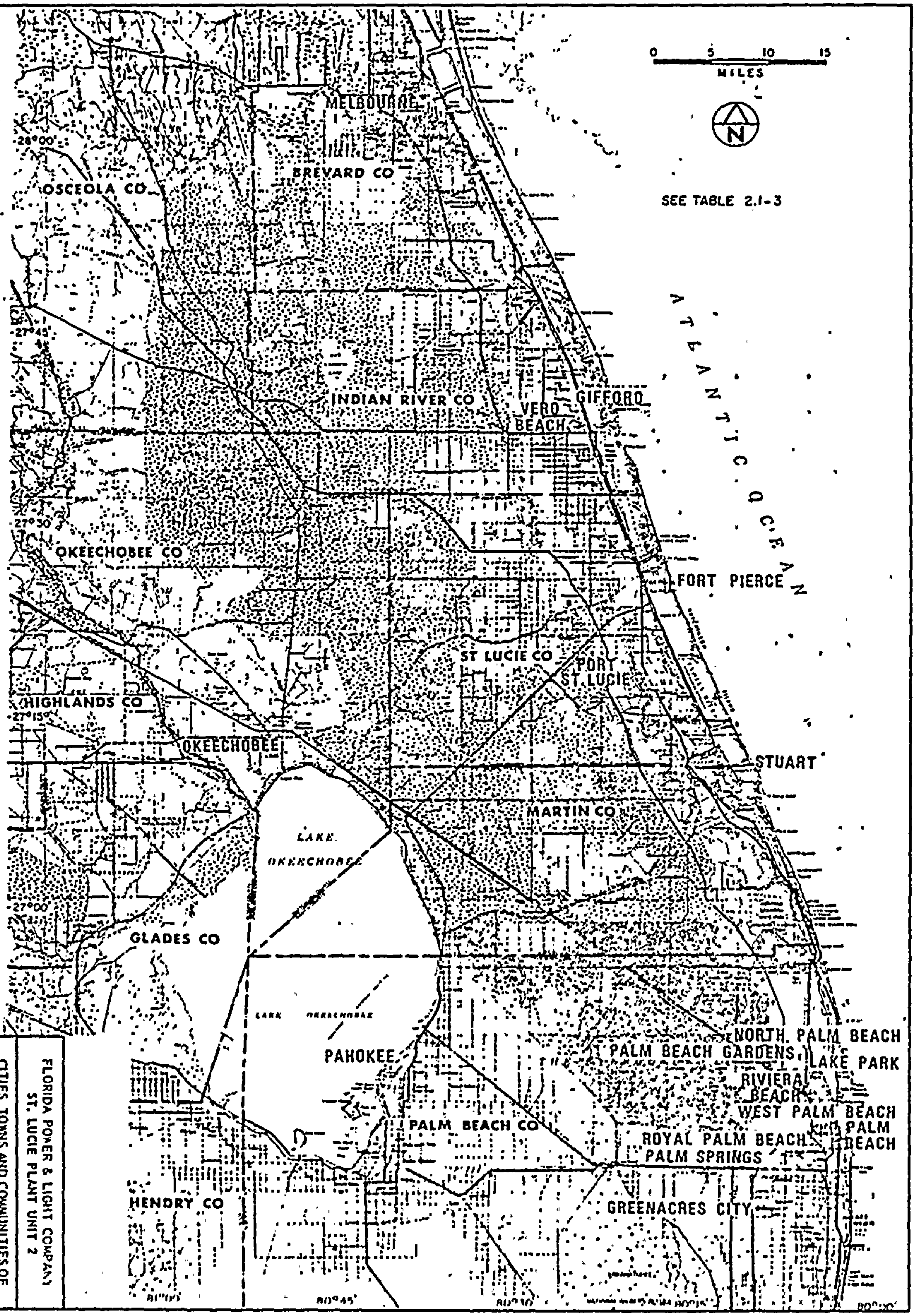


FLORIDA POWER & LIGHT COMPANY
ST. LUCIE PLANT UNIT 2

2020 RESIDENT POPULATION
WITHIN 50 MILES
SHEET 7 OF 8
FIGURE 2.1-8



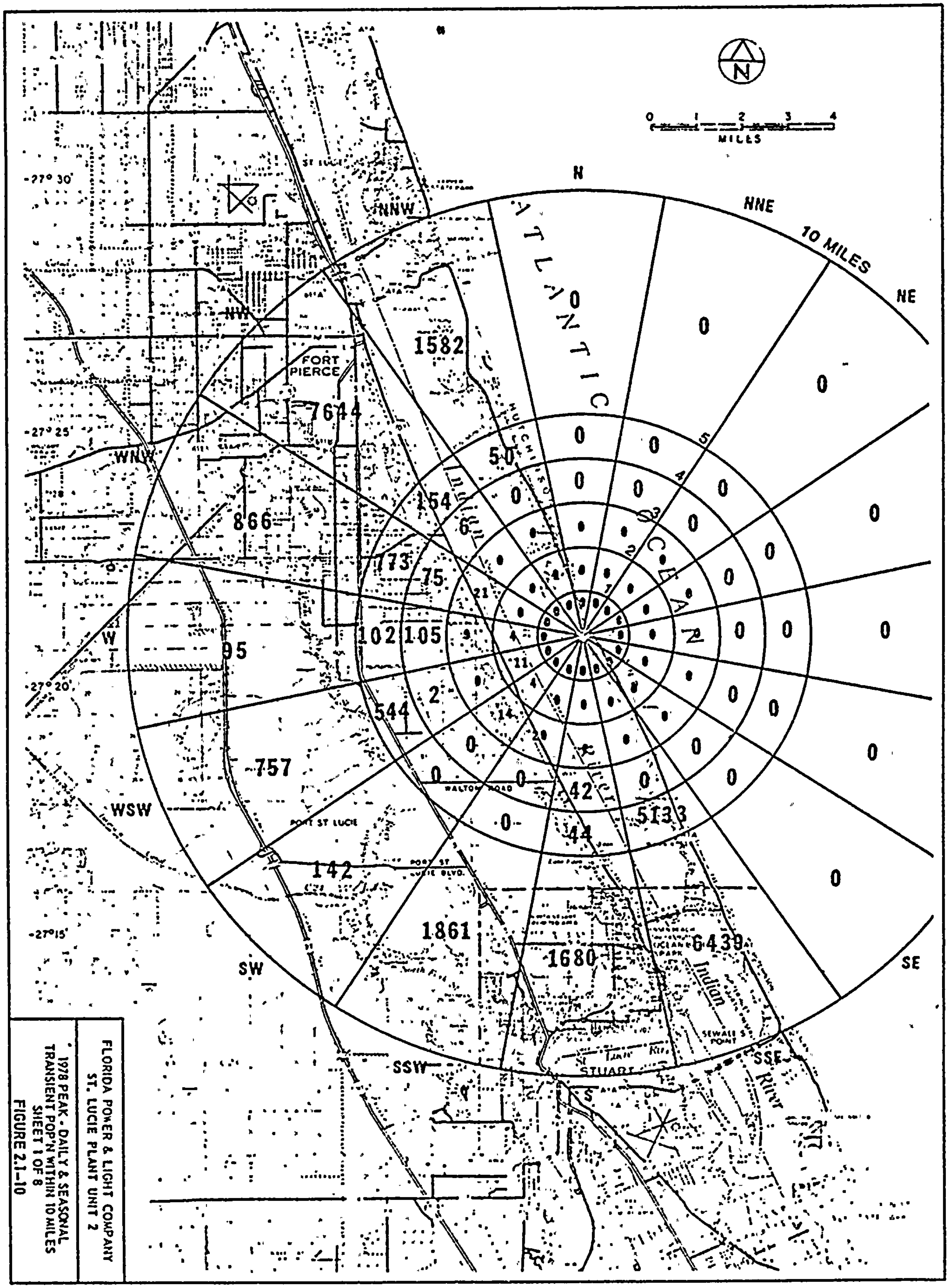
FLORIDA POWER & LIGHT COMPANY
ST. LUCIE PLANT UNIT 2
2030 RESIDENT POPULATION
WITHIN 50 MILES
SHEET 8 OF 8
FIGURE 2.1-8



FLORIDA POWER & LIGHT COMPANY
ST. LUCIE PLANT UNIT 2

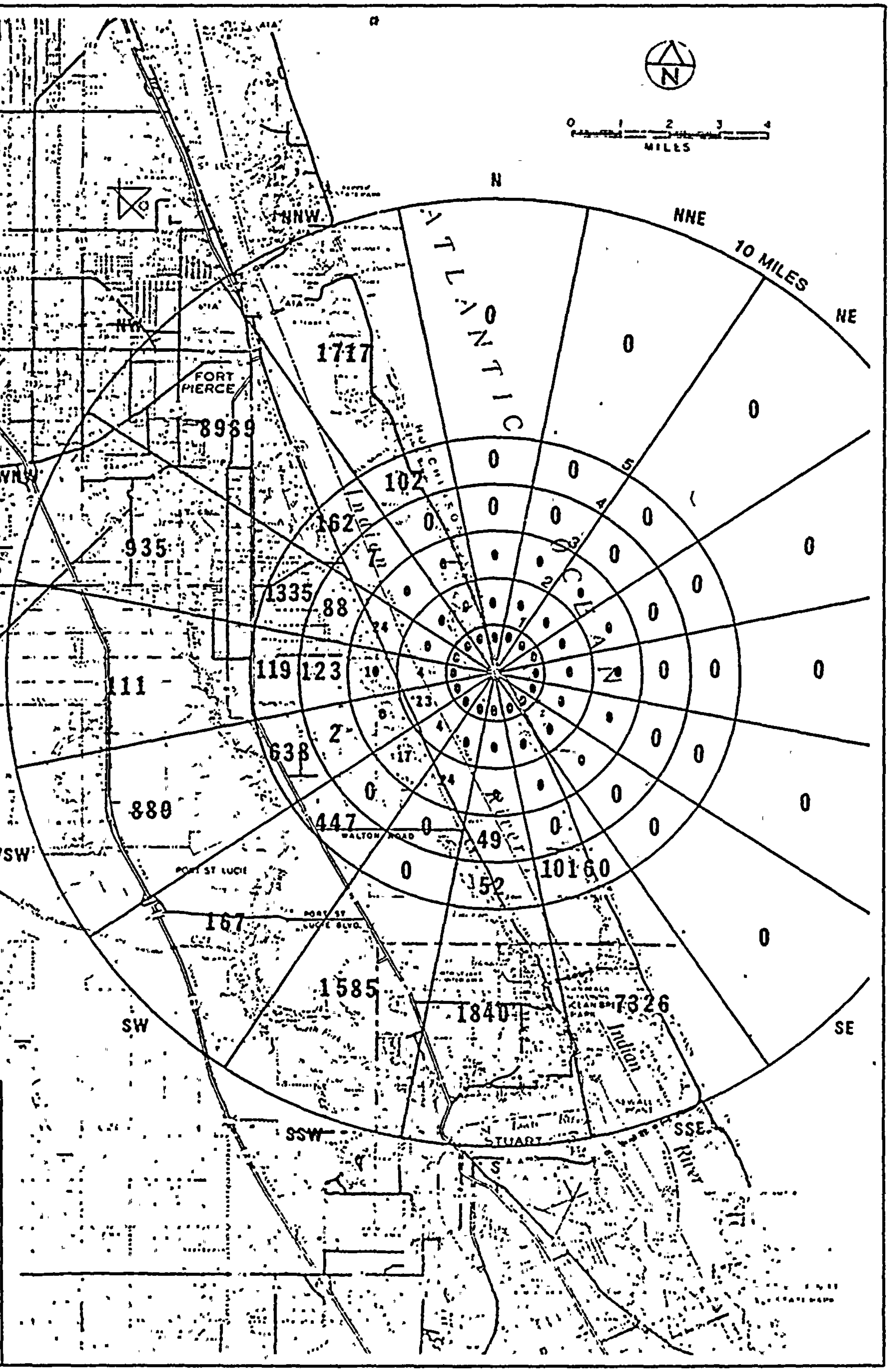
CITIES, TOWNS AND COMMUNITIES OF OVER 5000 WITHIN 50 MILES

FIGURE 2.1-9



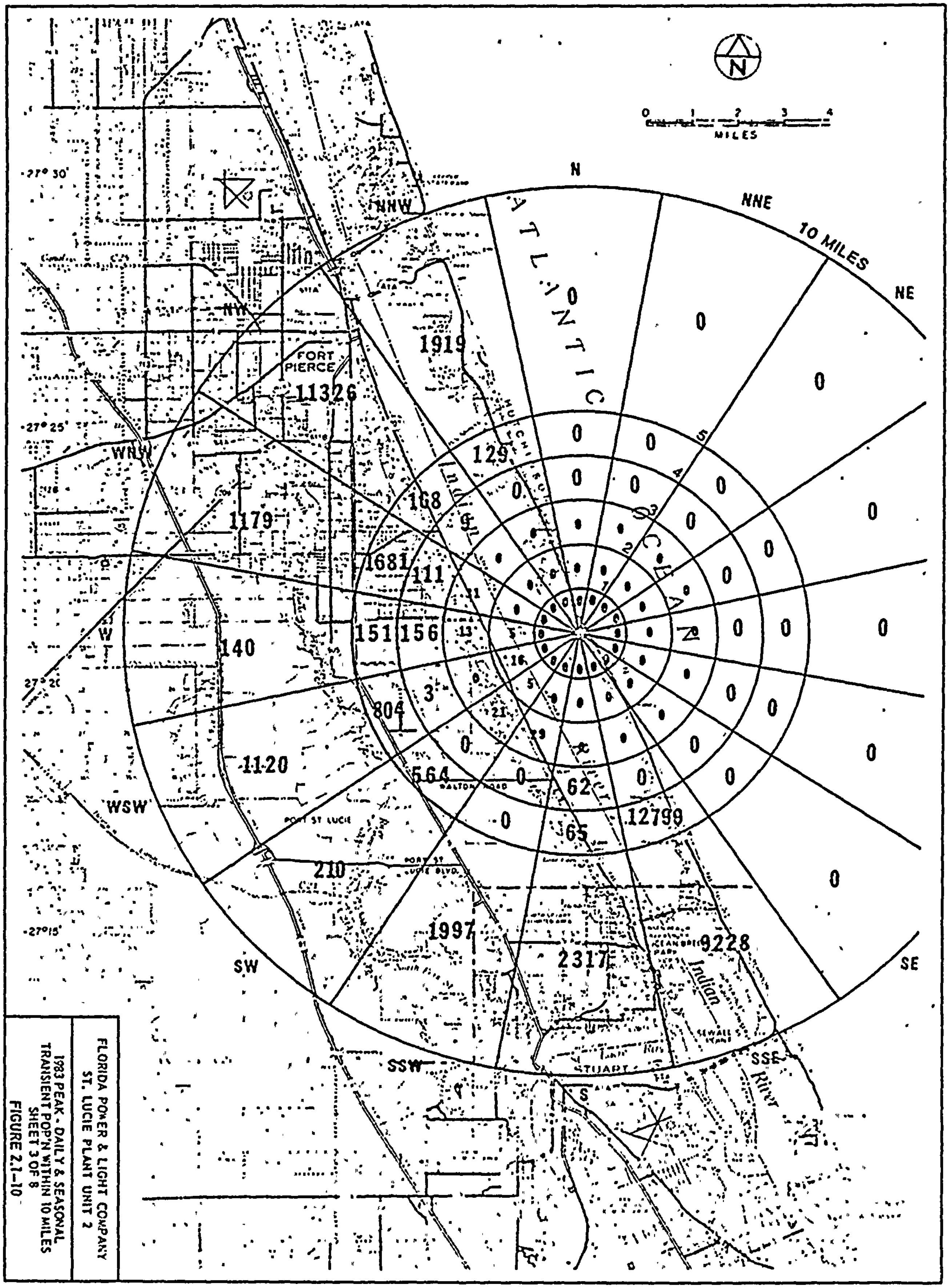
FLORIDA POWER & LIGHT COMPANY
ST. LUCIE PLANT UNIT 2

1978 PEAK - DAILY & SEASONAL
TRANSIENT POP'N WITHIN 10 MILES
SHEET 1 OF 8
FIGURE 2.1-10



FLORIDA POWER & LIGHT COMPANY
ST. LUCIE PLANT UNIT 2

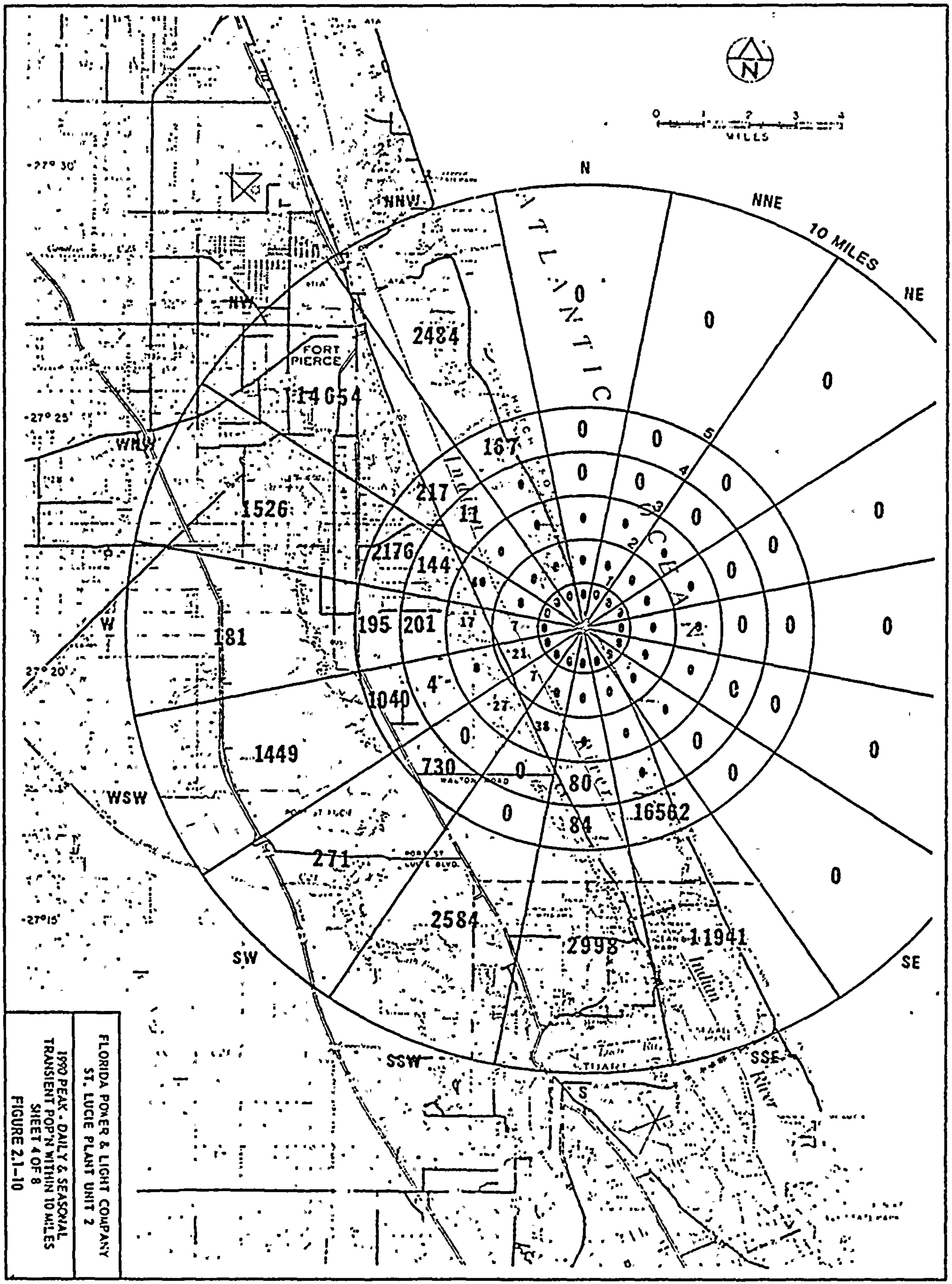
1980 PEAK - DAILY & SEASONAL
TRANSIENT POP'N WITHIN 10 MILES
SHEET 2 OF 8
FIGURE 2.1-10



FLORIDA POWER & LIGHT COMPANY
ST. LUCIE PLANT UNIT 2

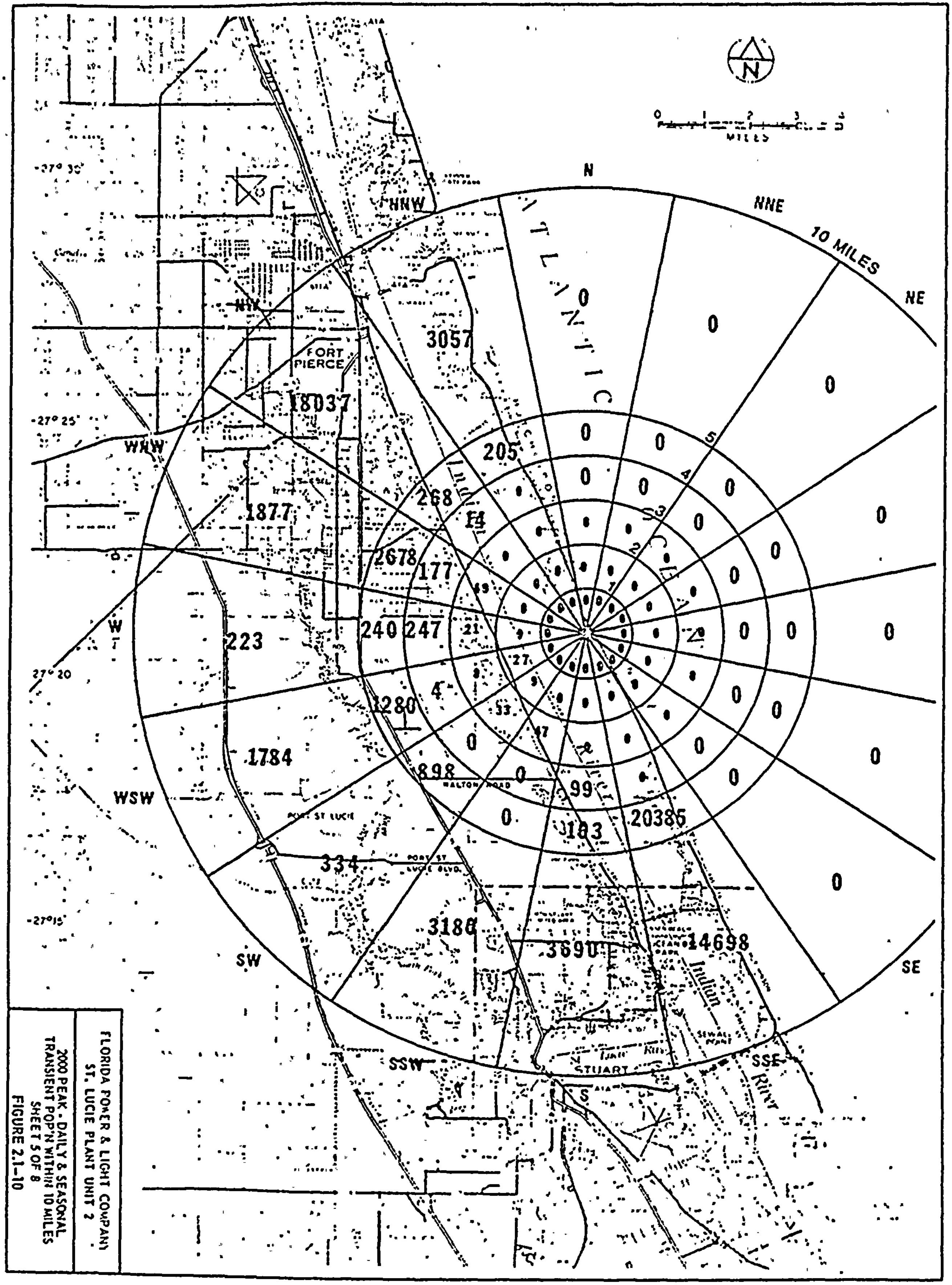
1983 PEAK - DAILY & SEASONAL
TRANSIENT POP'N WITHIN 10 MILES
SHEET 3 OF 8

FIGURE 2.1-10



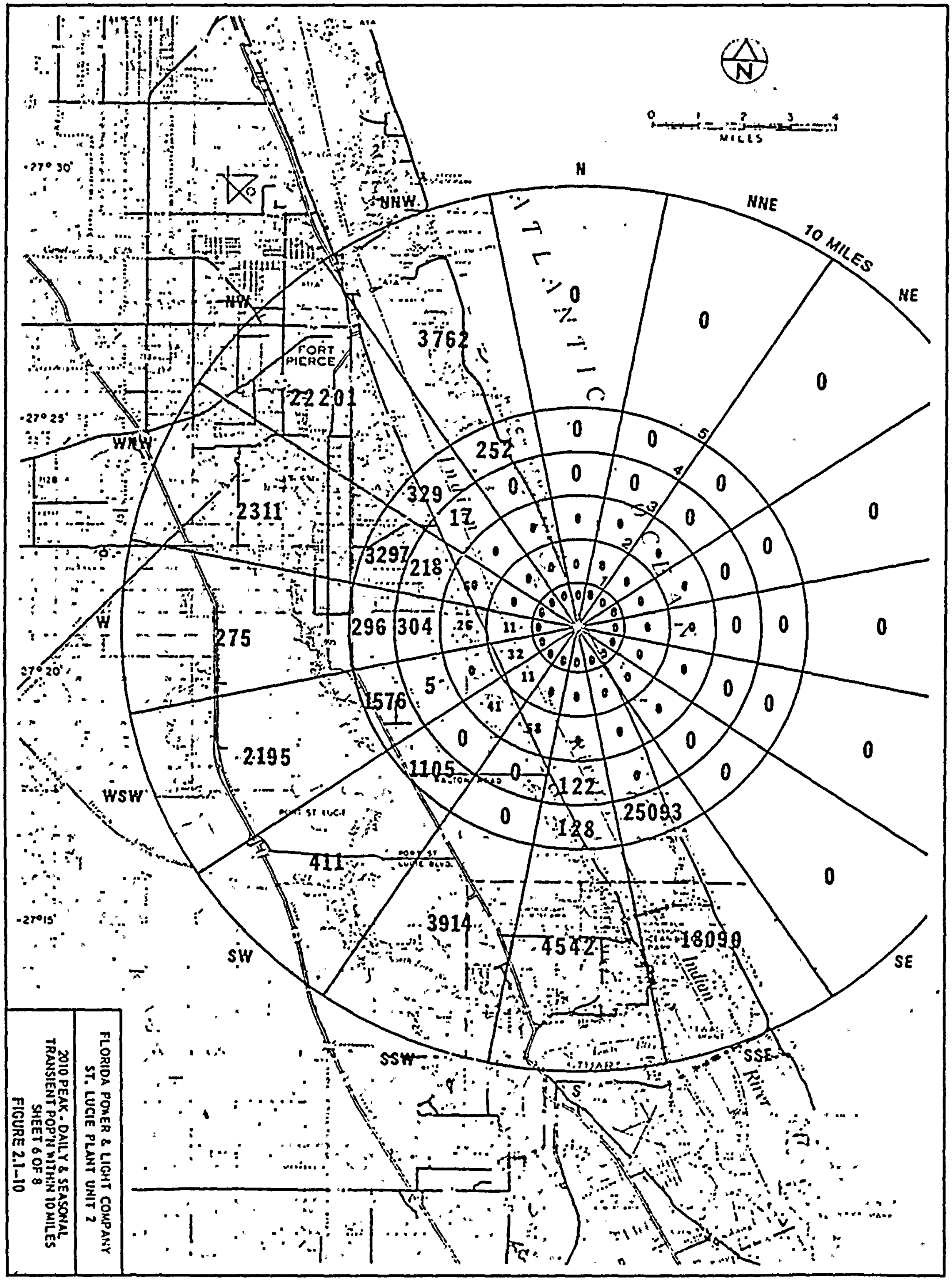
FLORIDA POWER & LIGHT COMPANY
ST. LUCIE PLANT UNIT 2

1990 PEAK - DAILY & SEASONAL
TRANSIENT POP'N WITHIN 10 MILES
SHEET 4 OF 8
FIGURE 2.1-10

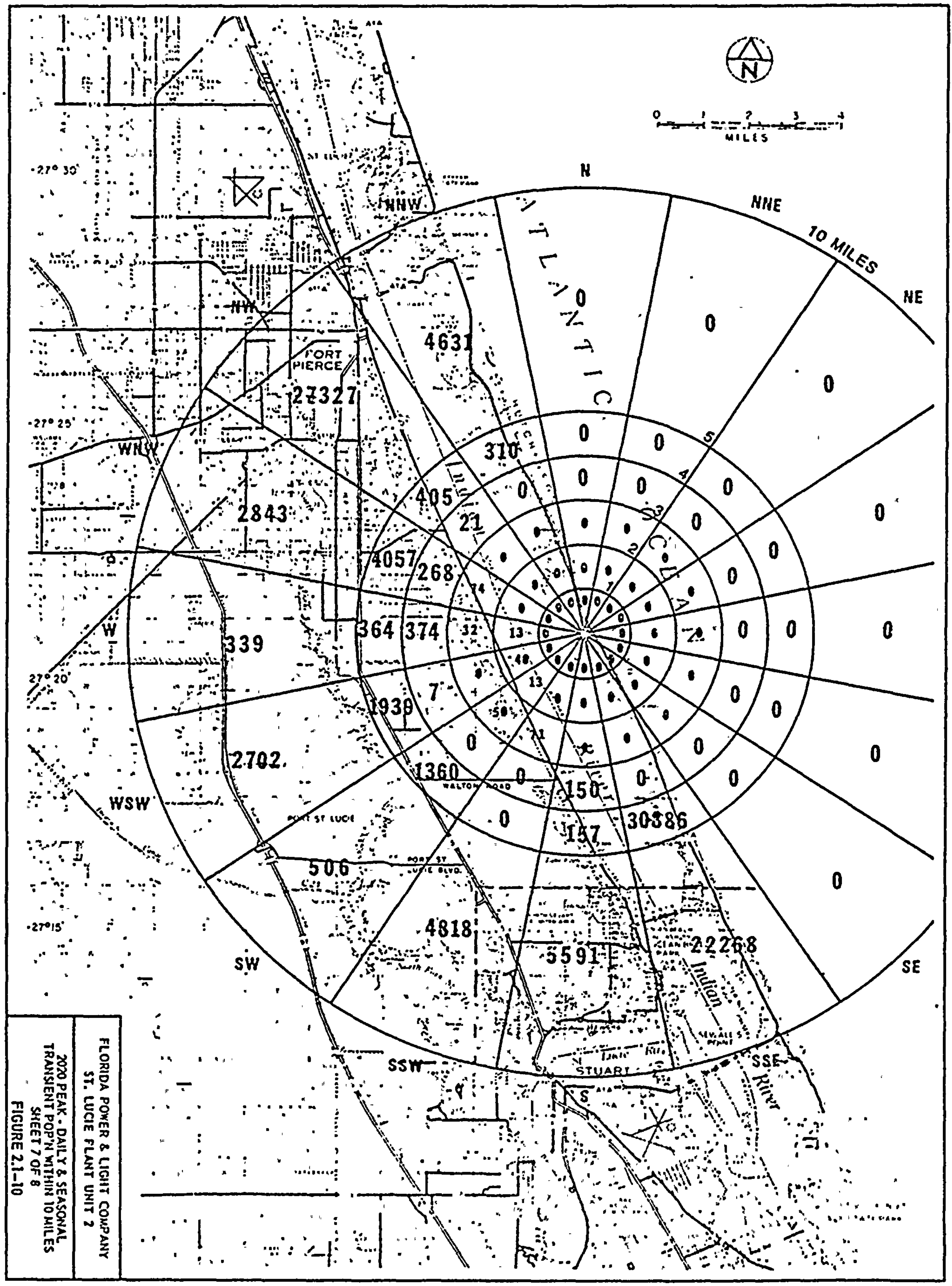


FLORIDA POWER & LIGHT COMPANY
ST. LUCIE PLANT UNIT 2

2000 PEAK - DAILY & SEASONAL
TRANSIENT POP'N WITHIN 10 MILES
SHEET 5 OF 8
FIGURE 2.1-10

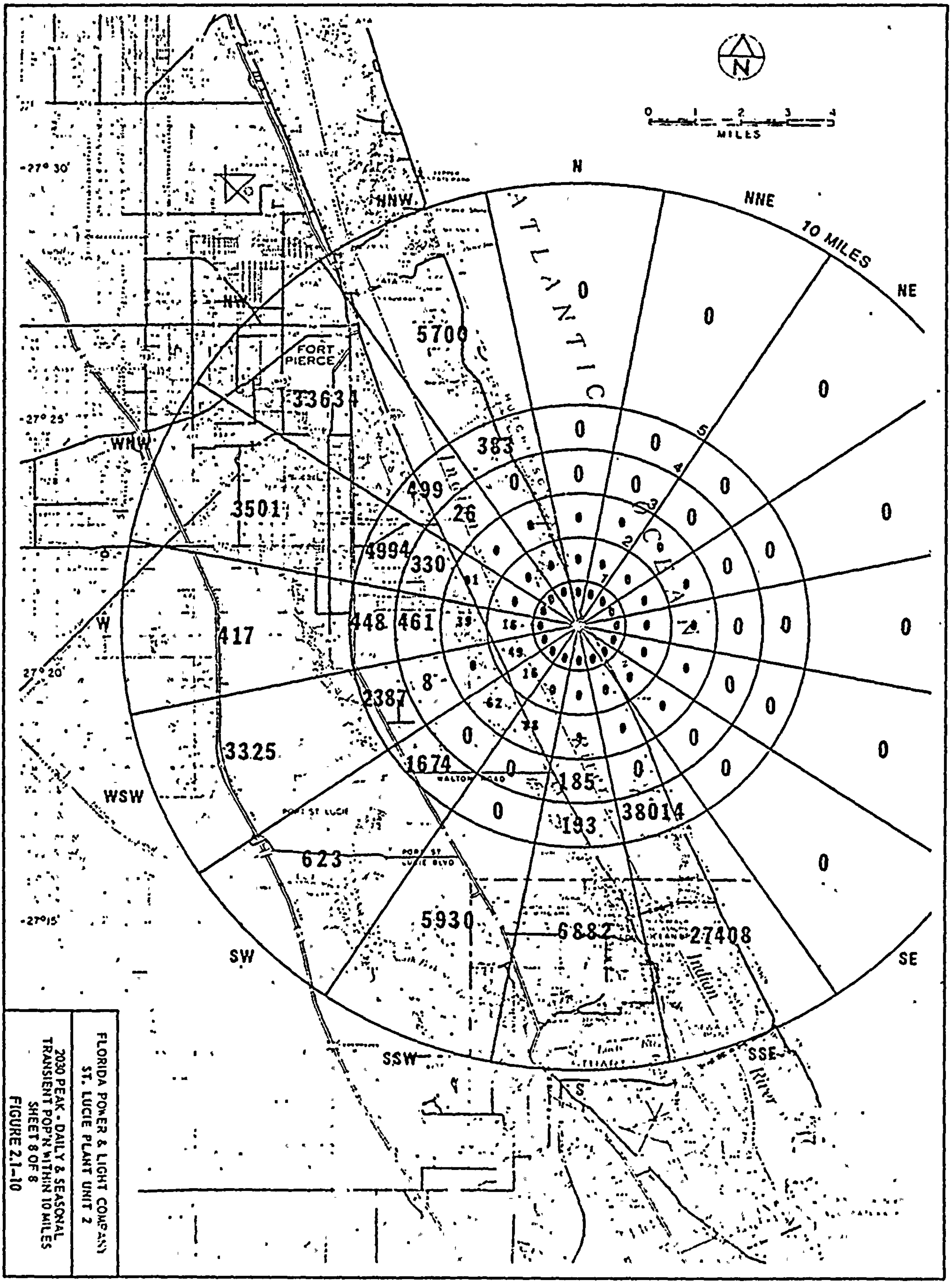


FLORIDA POWER & LIGHT COMPANY
ST. LUCIE PLANT UNIT 2
2010 PEAK - DAILY & SEASONAL TRANSIENT POP'N WITHIN 10 MILES
SHEET 6 OF 8
FIGURE 2.1-10



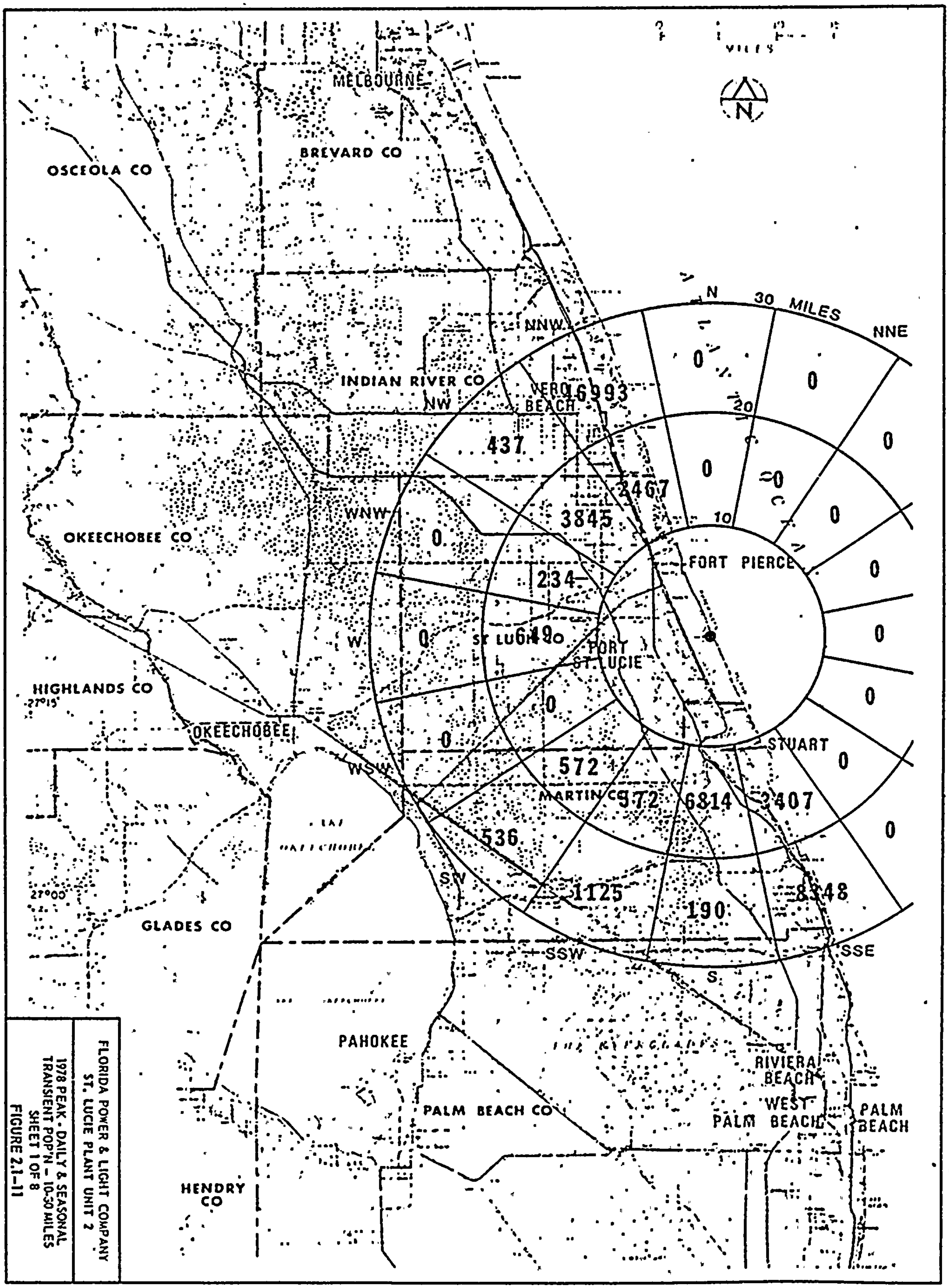
FLORIDA POWER & LIGHT COMPANY
ST. LUCIE PLANT UNIT 2

2020 PEAK - DAILY & SEASONAL
TRANSIENT POP'N WITHIN 10 MILES
SHEET 7 OF 8
FIGURE 2.1-10



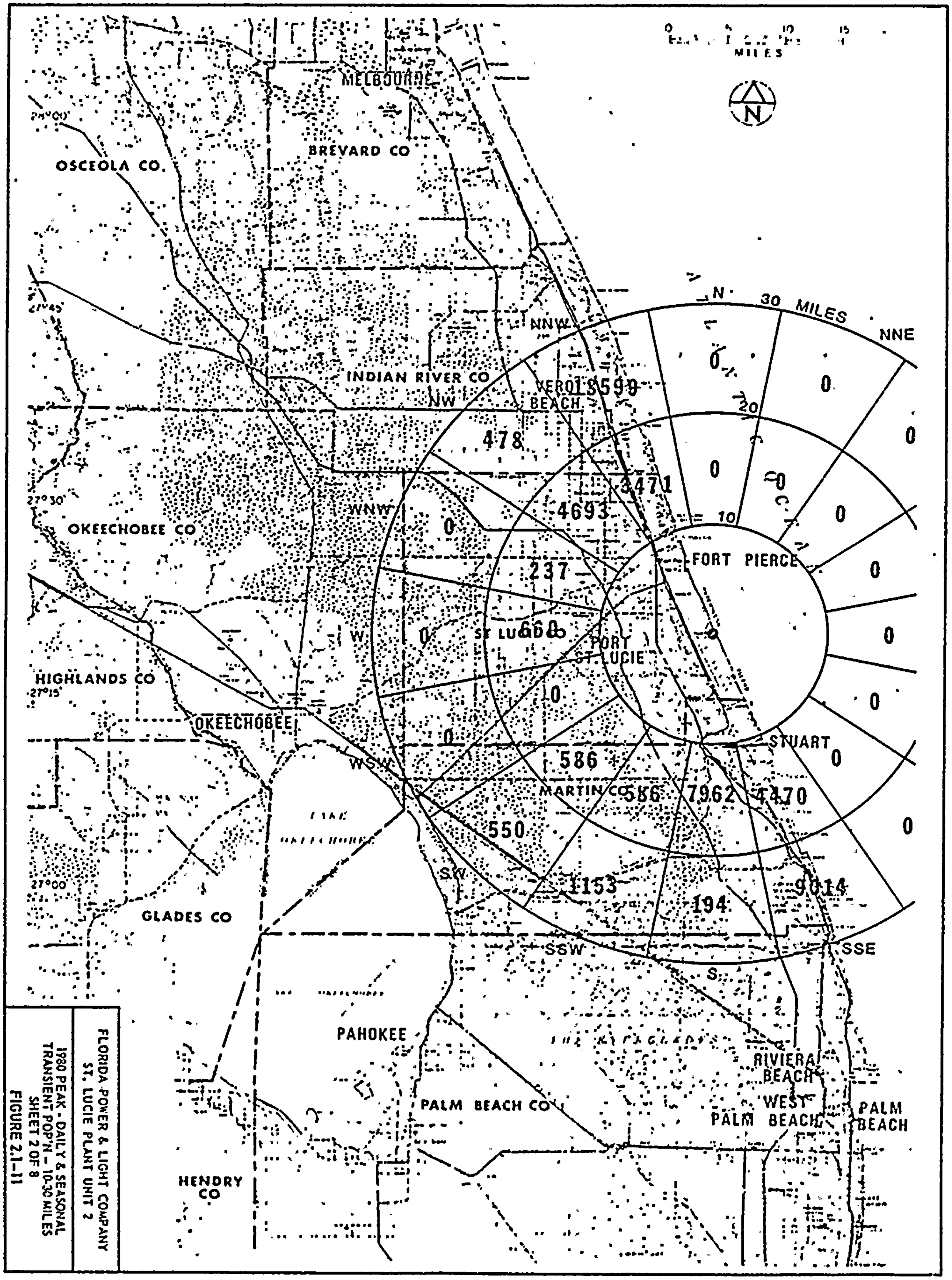
FLORIDA POWER & LIGHT COMPANY
ST. LUCIE PLANT UNIT 2

2030 PEAK - DAILY & SEASONAL
TRANSIENT POP'N WITHIN 10 MILES
SHEET 8 OF 8
FIGURE 2.1-10



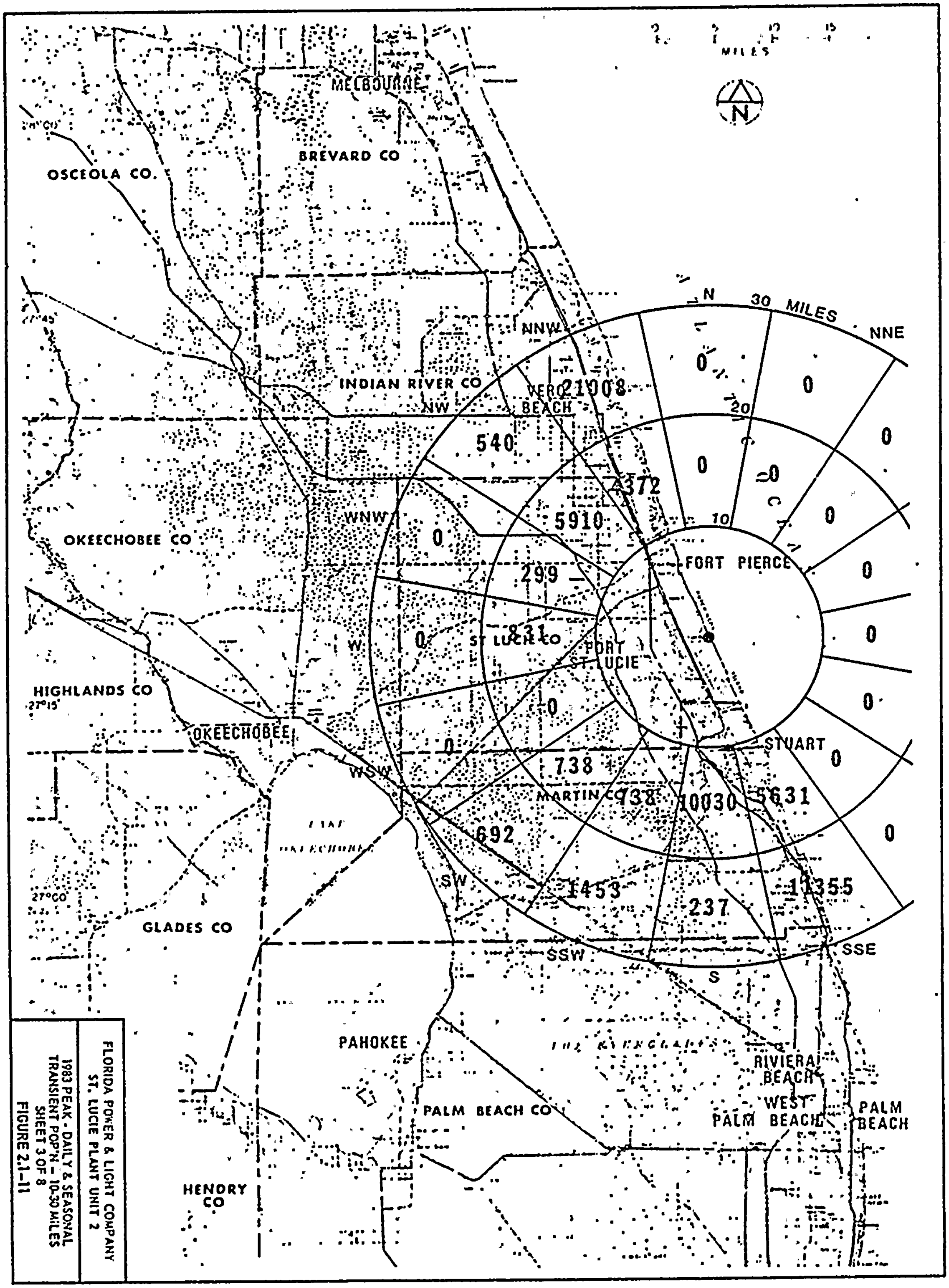
FLORIDA POWER & LIGHT COMPANY
ST. LUCIE PLANT UNIT 2

1978 PEAK - DAILY & SEASONAL
TRANSIENT POP'N – 10-30 MILES
SHEET 1 OF 8
FIGURE 2.1-11



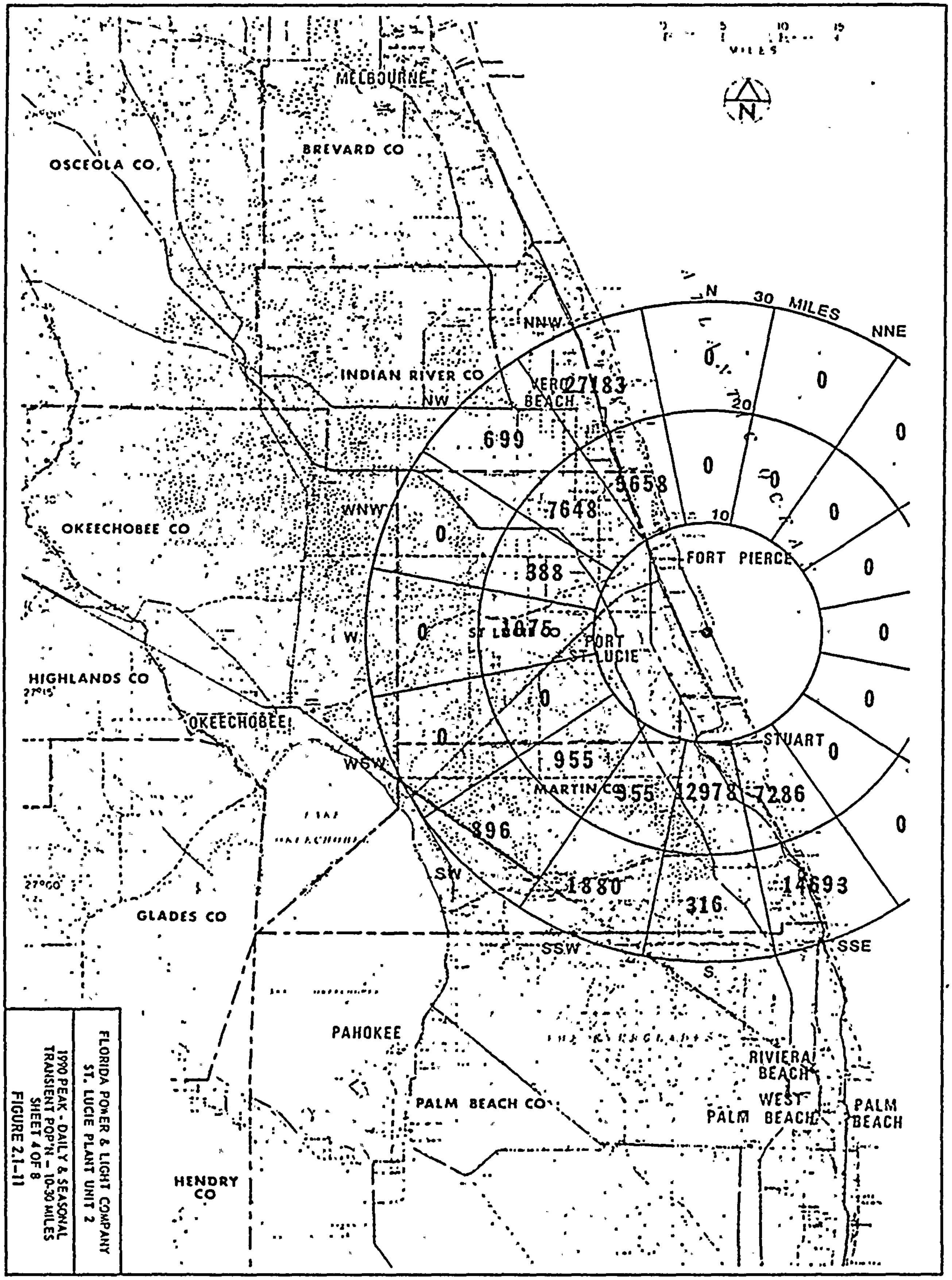
FLORIDA POWER & LIGHT COMPANY
ST. LUCIE PLANT UNIT 2

1980 PEAK - DAILY & SEASONAL
TRANSIENT POP'N – 10-30 MILES
SHEET 2 OF 8
FIGURE 2.1-11



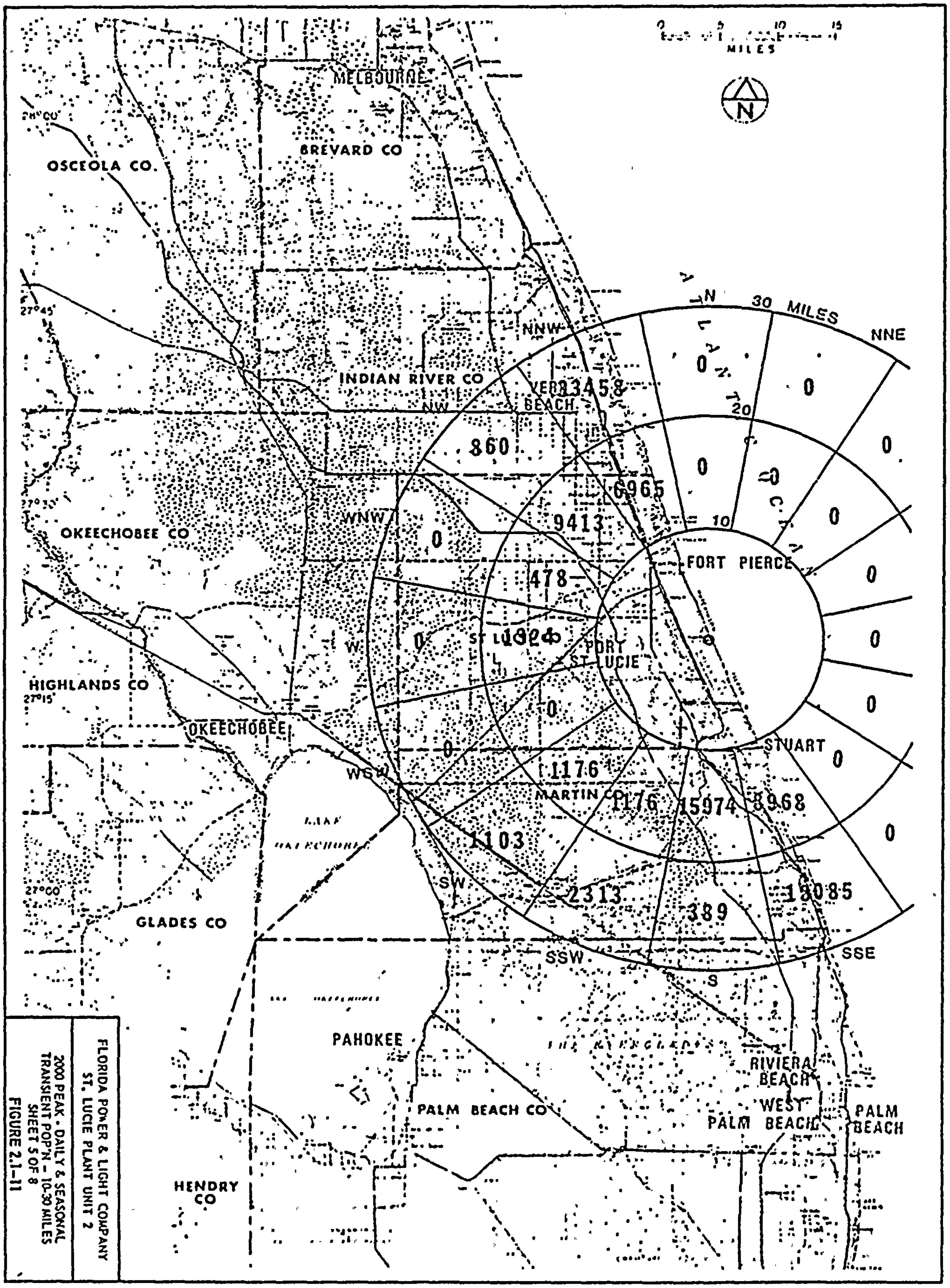
FLORIDA POWER & LIGHT COMPANY
ST. LUCIE PLANT UNIT 2

1983 PEAK - DAILY & SEASONAL TRANSIENT POP'N – 10-30 MILES
SHEET 3 OF 8
FIGURE 2.1-11



FLORIDA POWER & LIGHT COMPANY
ST. LUCIE PLANT UNIT 2

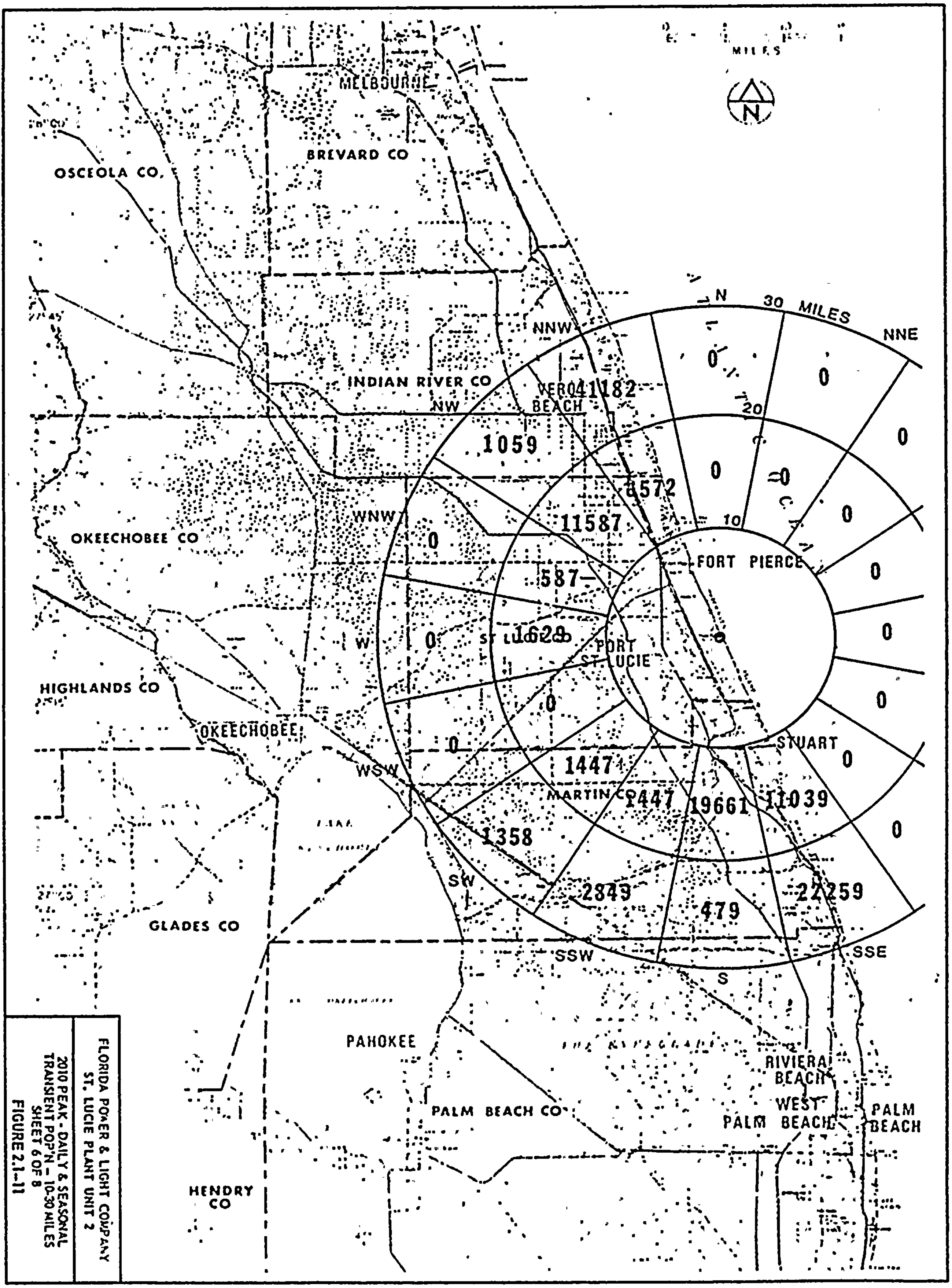
1990 PEAK - DAILY & SEASONAL TRANSIENT POP'N – 10-30 MILES
SHEET 4 OF 8
FIGURE 2.1-11



FLORIDA POWER & LIGHT COMPANY
ST. LUCIE PLANT UNIT 2

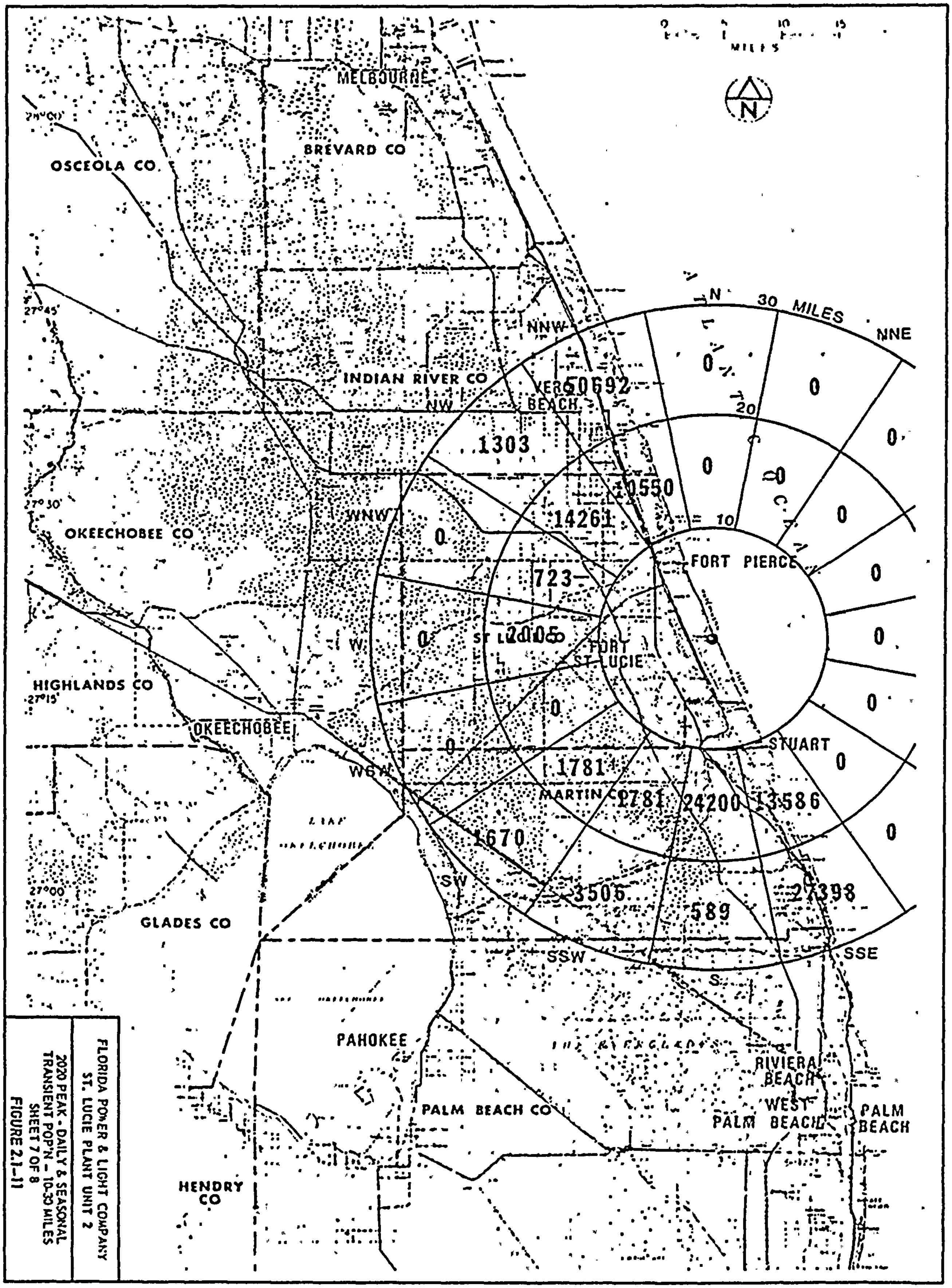
2000 PEAK - DAILY & SEASONAL TRANSIENT POP'N - 10-30 MILES
SHEET 5 OF 8

FIGURE 2.1-11



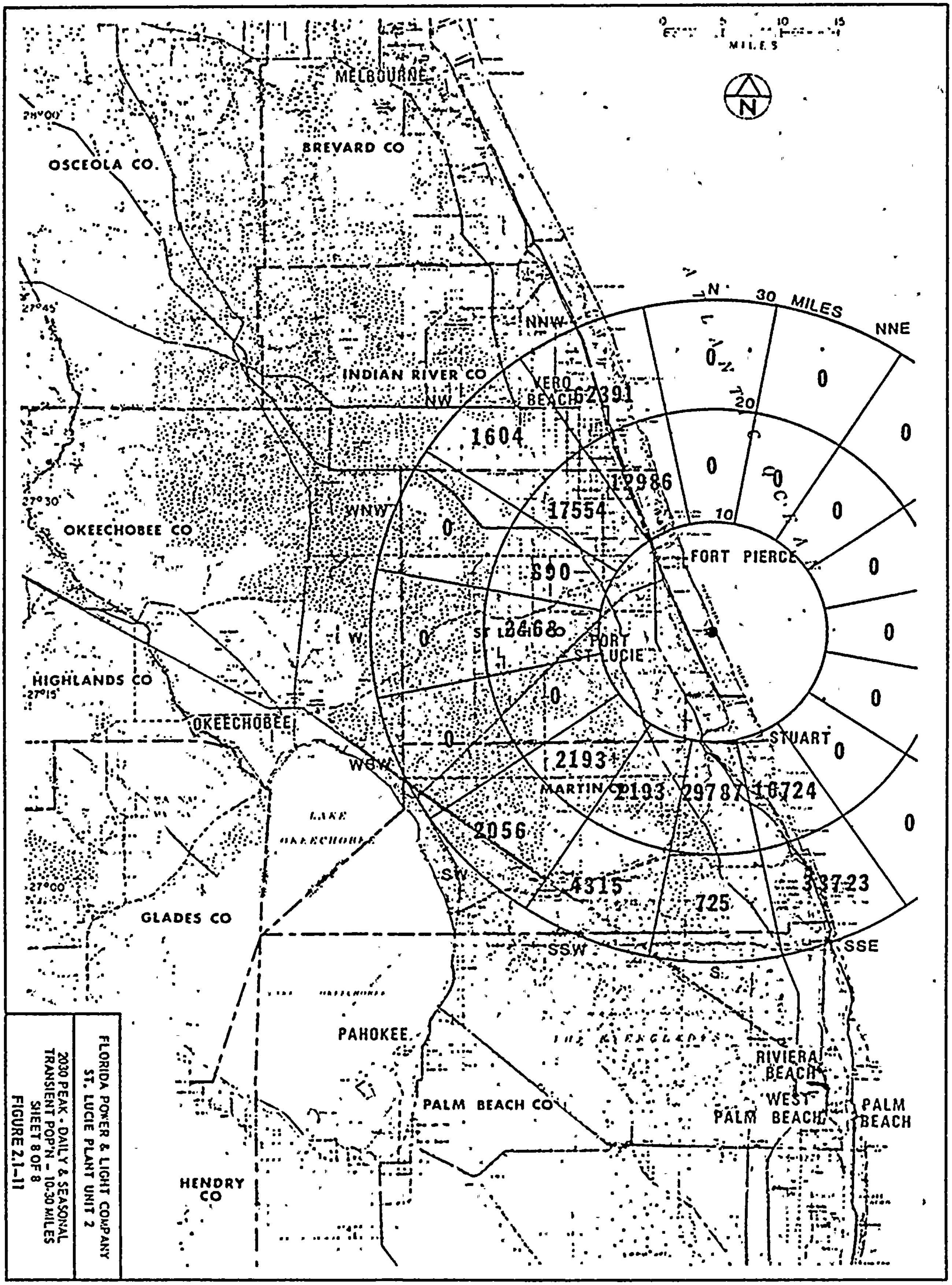
FLORIDA POWER & LIGHT COMPANY
ST. LUCIE PLANT UNIT 2

2010 PEAK - DAILY & SEASONAL
TRANSIENT POP'N - 10-30 MILES
SHEET 6 OF 8
FIGURE 2.1-11



FLORIDA POWER & LIGHT COMPANY
ST. LUCIE PLANT UNIT 2

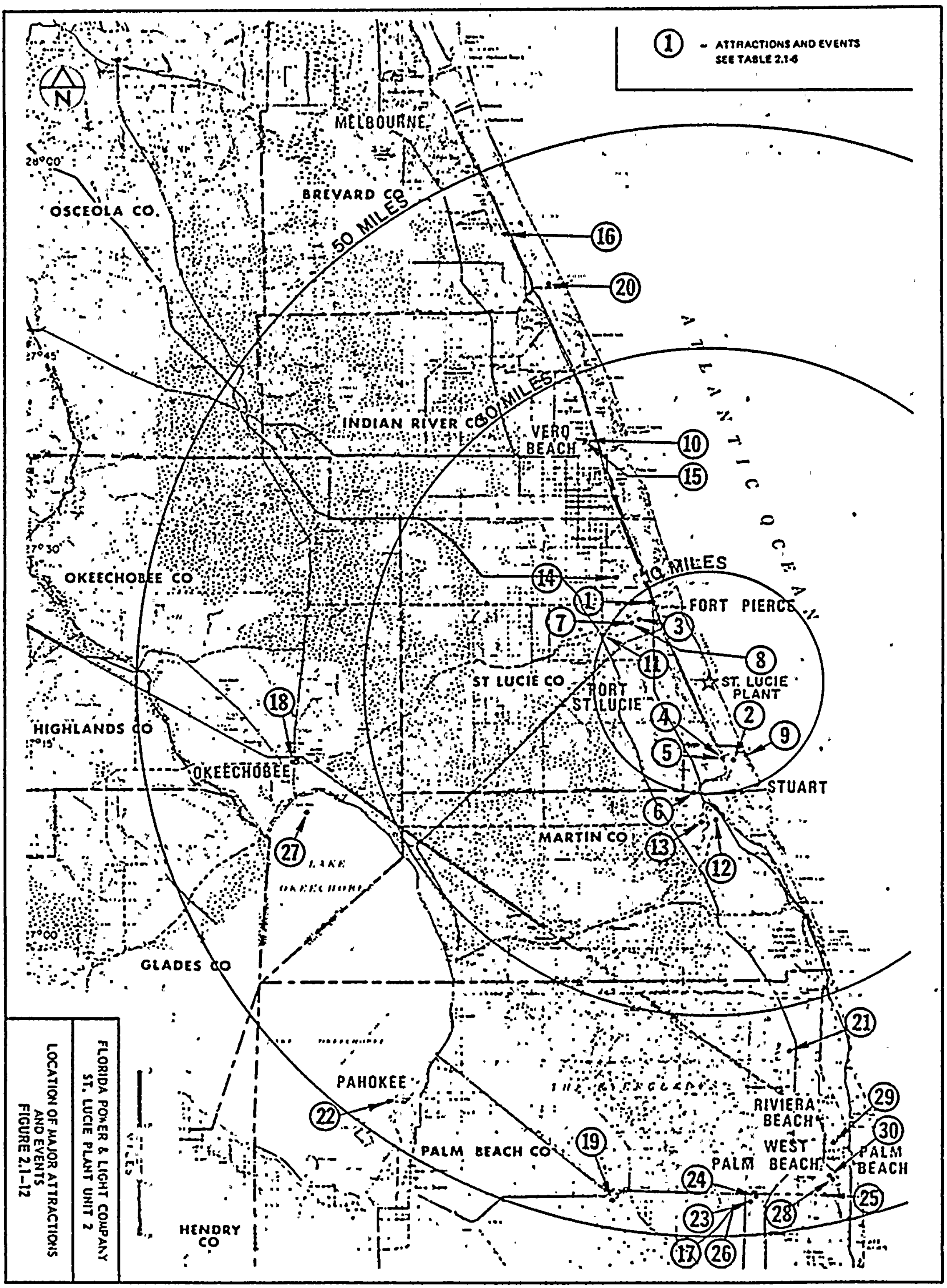
2020 PEAK - DAILY & SEASONAL
TRANSIENT POP'N - 10-30 MILES
SHEET 7 OF 8
FIGURE 2.1-11



FLORIDA POWER & LIGHT COMPANY
ST. LUCIE PLANT UNIT 2

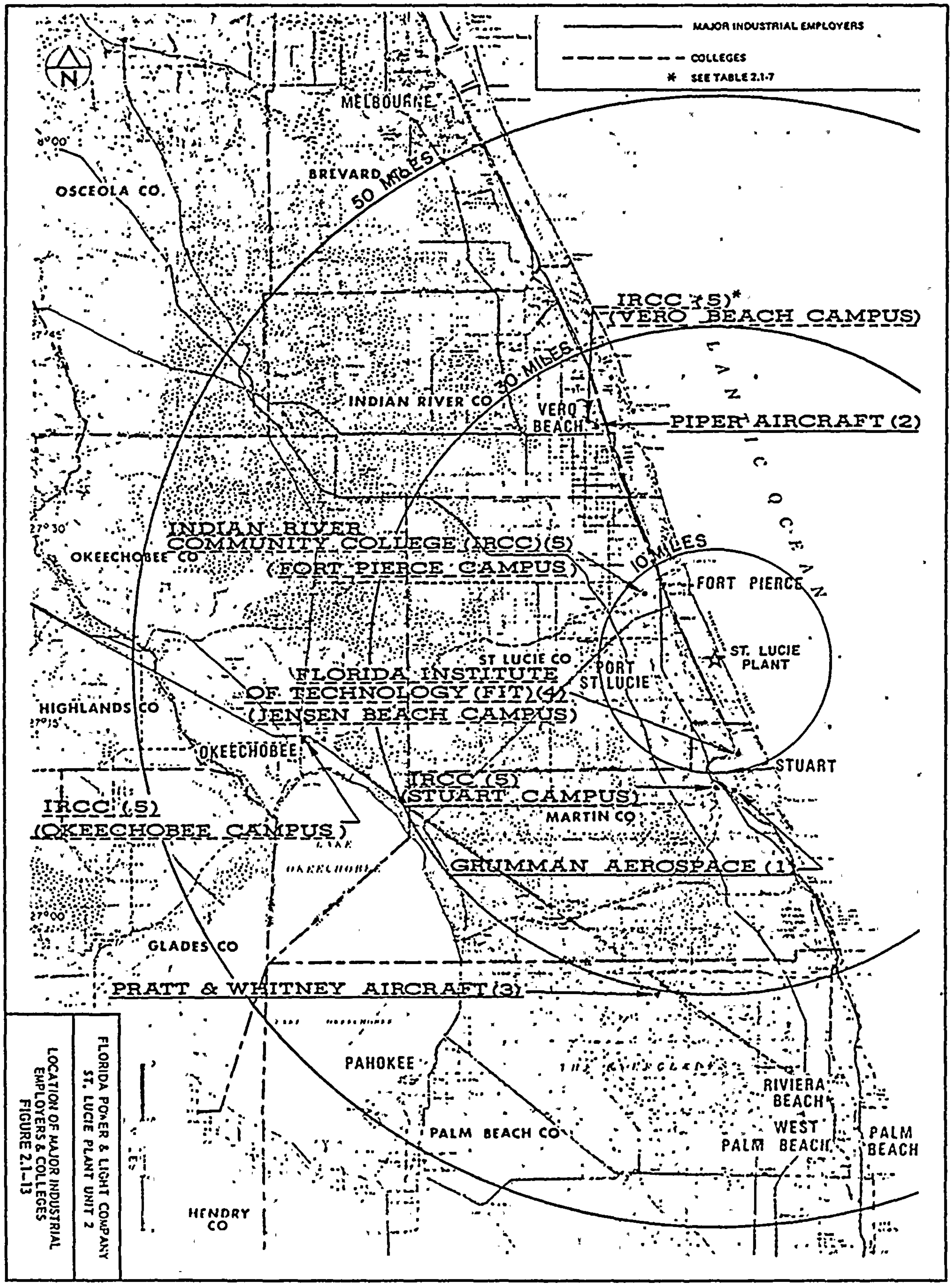
2030 PEAK - DAILY & SEASONAL
TRANSIENT POP'N – 10-30 MILES
SHEET 8 OF 8

FIGURE 2.1-11



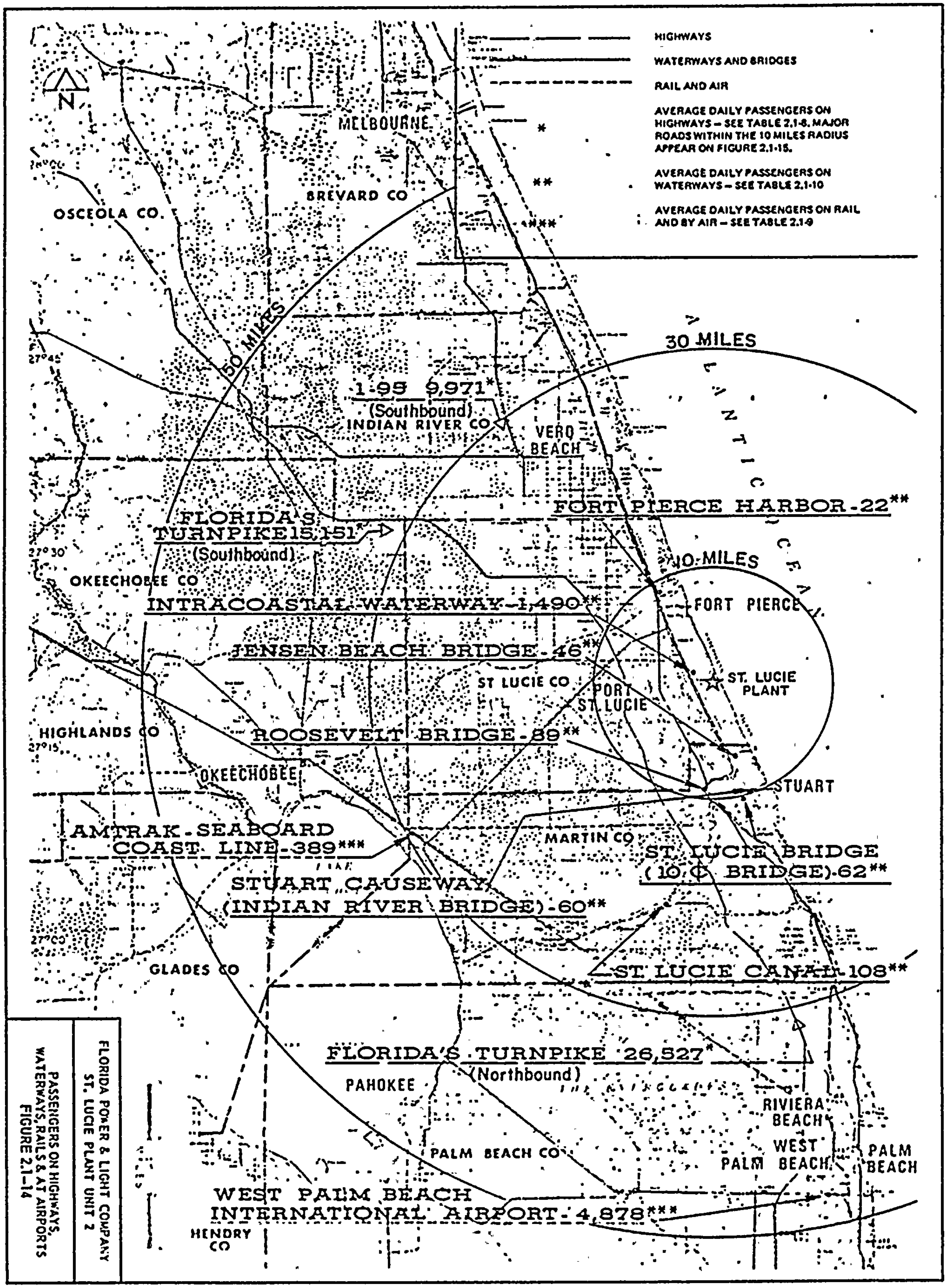
FLORIDA POWER & LIGHT COMPANY
ST. LUCIE PLANT UNIT 2

LOCATION OF MAJOR ATTRACTIONS AND EVENTS
FIGURE 2.1-12



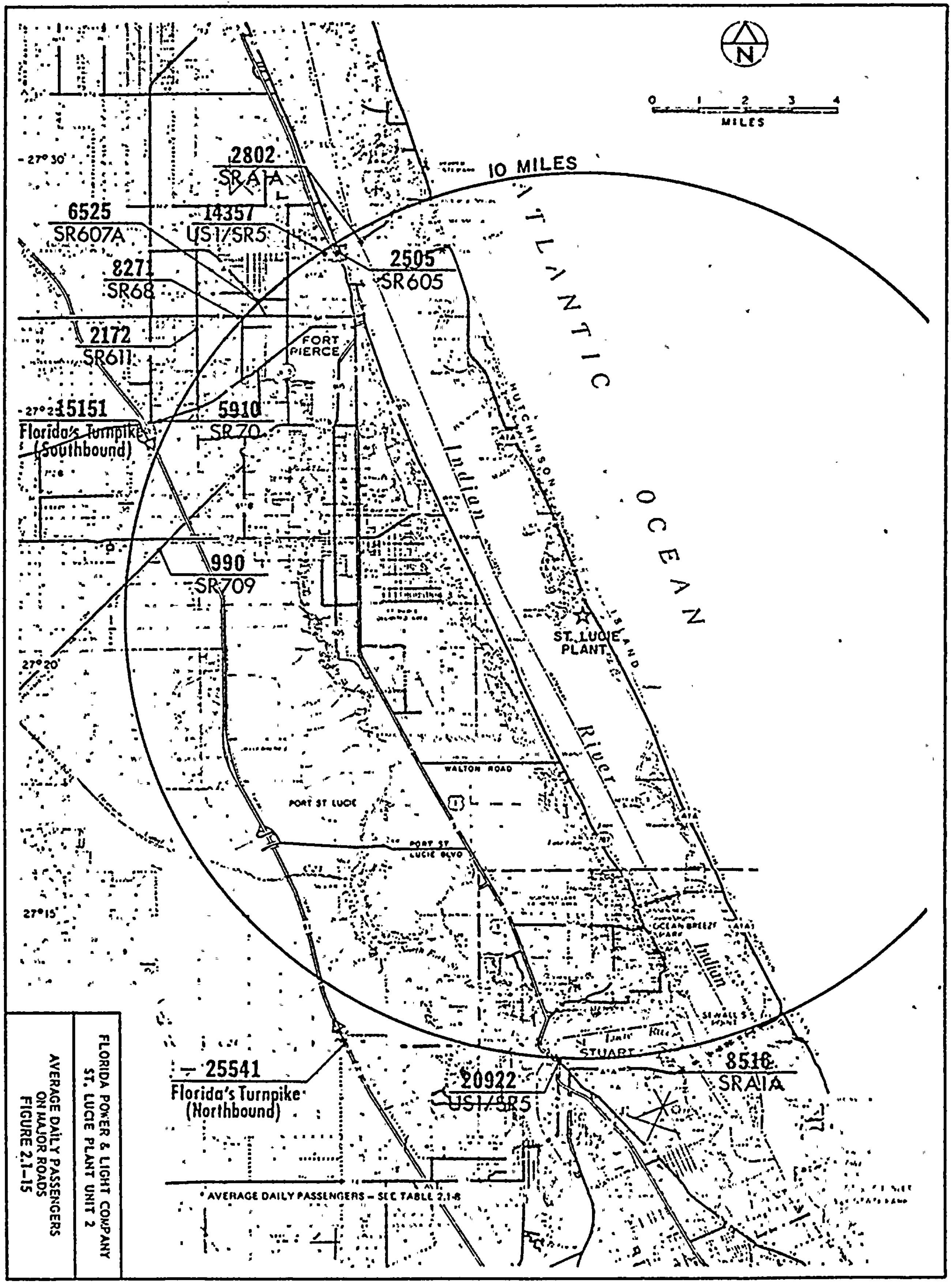
FLORIDA POWER & LIGHT COMPANY
ST. LUCIE PLANT UNIT 2

LOCATION OF MAJOR INDUSTRIAL EMPLOYERS & COLLEGES
FIGURE 2.1-13



FLORIDA POWER & LIGHT COMPANY
ST. LUCIE PLANT UNIT 2

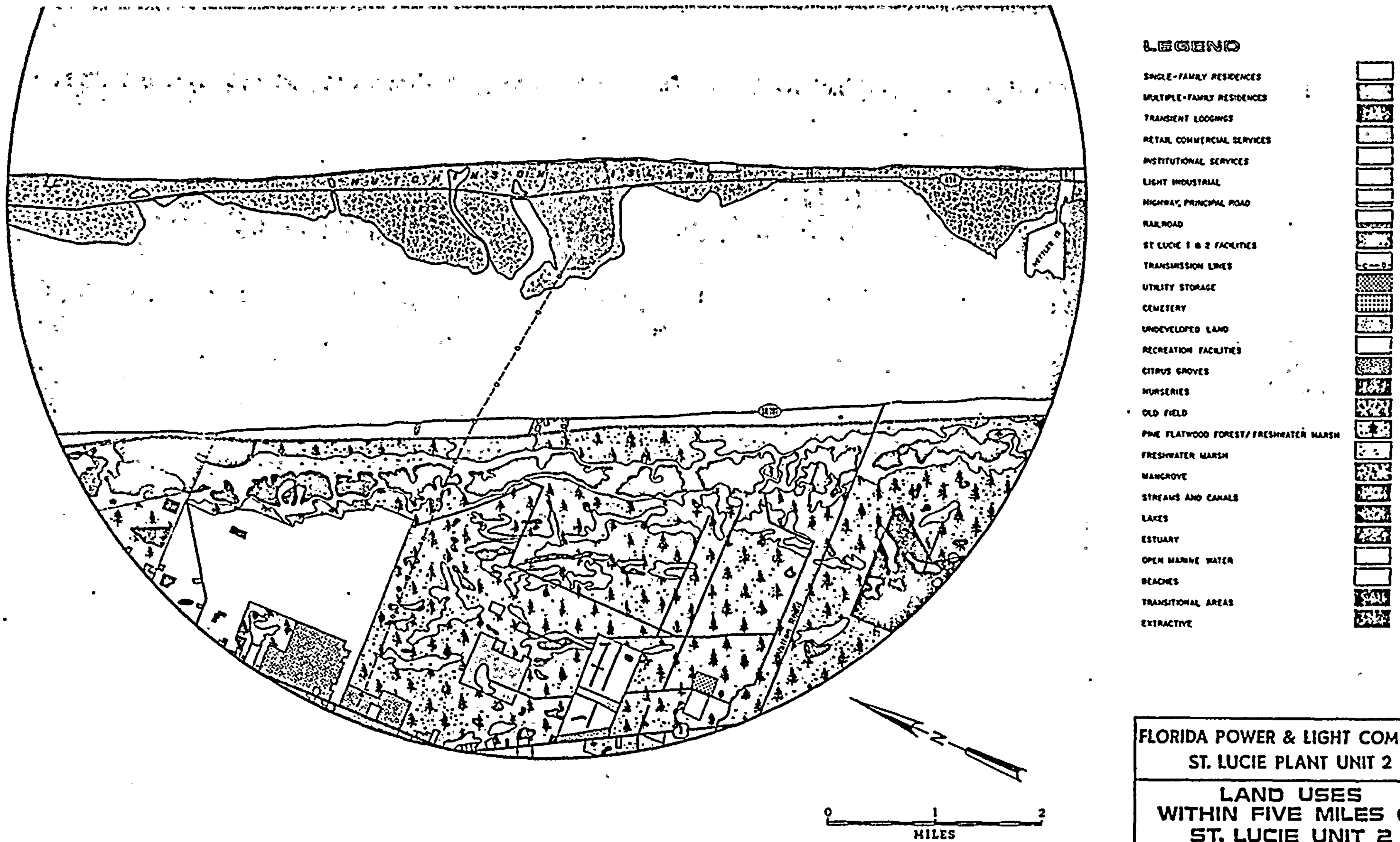
PASSENGERS ON HIGHWAYS, WATERWAYS, RAILS & AT AIRPORTS
FIGURE 2.1-14



* AVERAGE DAILY PASSENGERS – SEE TABLE 2.1-8

FLORIDA POWER & LIGHT COMPANY
ST. LUCIE PLANT UNIT 2

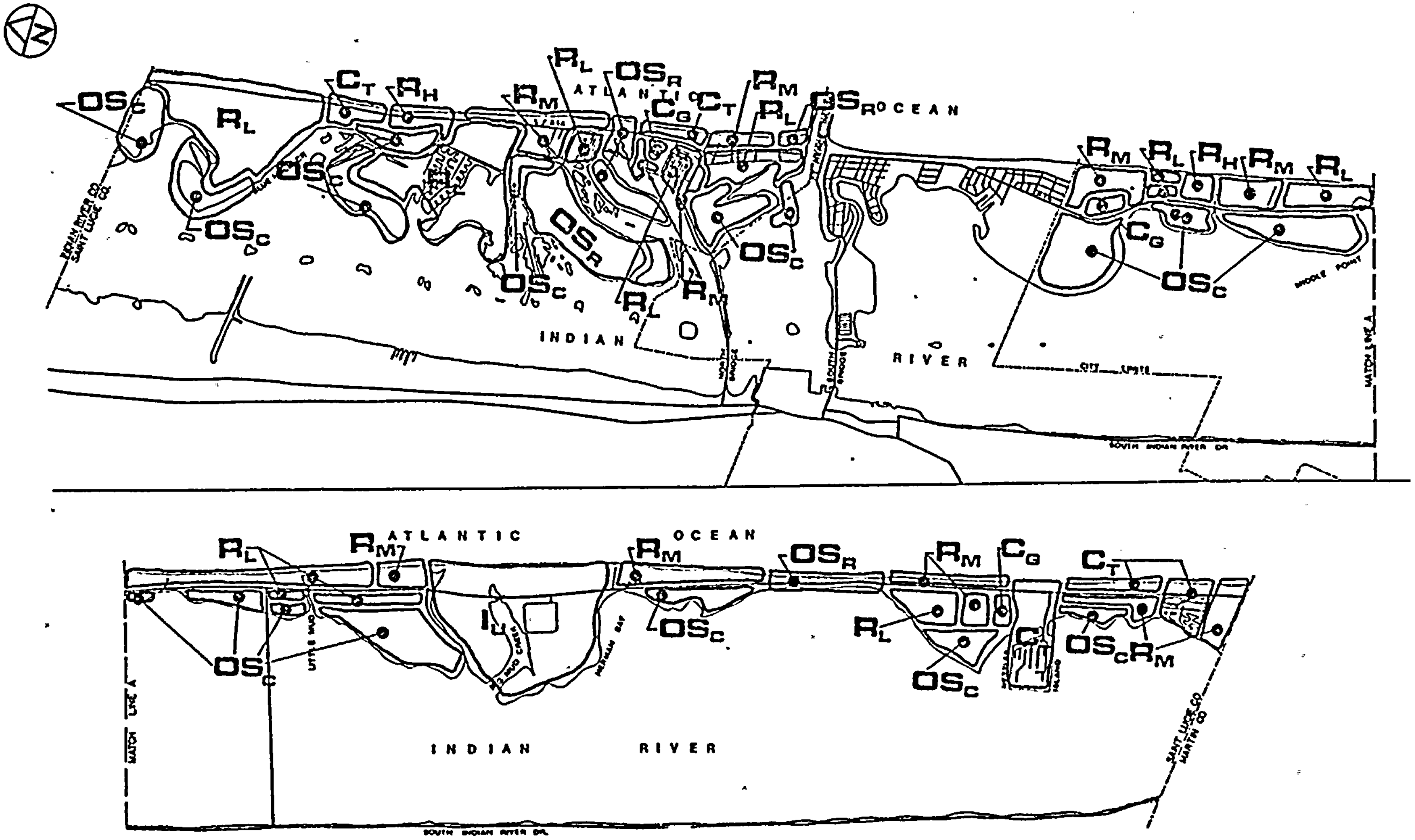
AVERAGE DAILY PASSENGERS
ON MAJOR ROADS
FIGURE 2.1-15



FLORIDA POWER & LIGHT COMPANY
ST. LUCIE PLANT UNIT 2

LAND USES
WITHIN FIVE MILES OF
ST. LUCIE UNIT 2

FIGURE 2.1-16



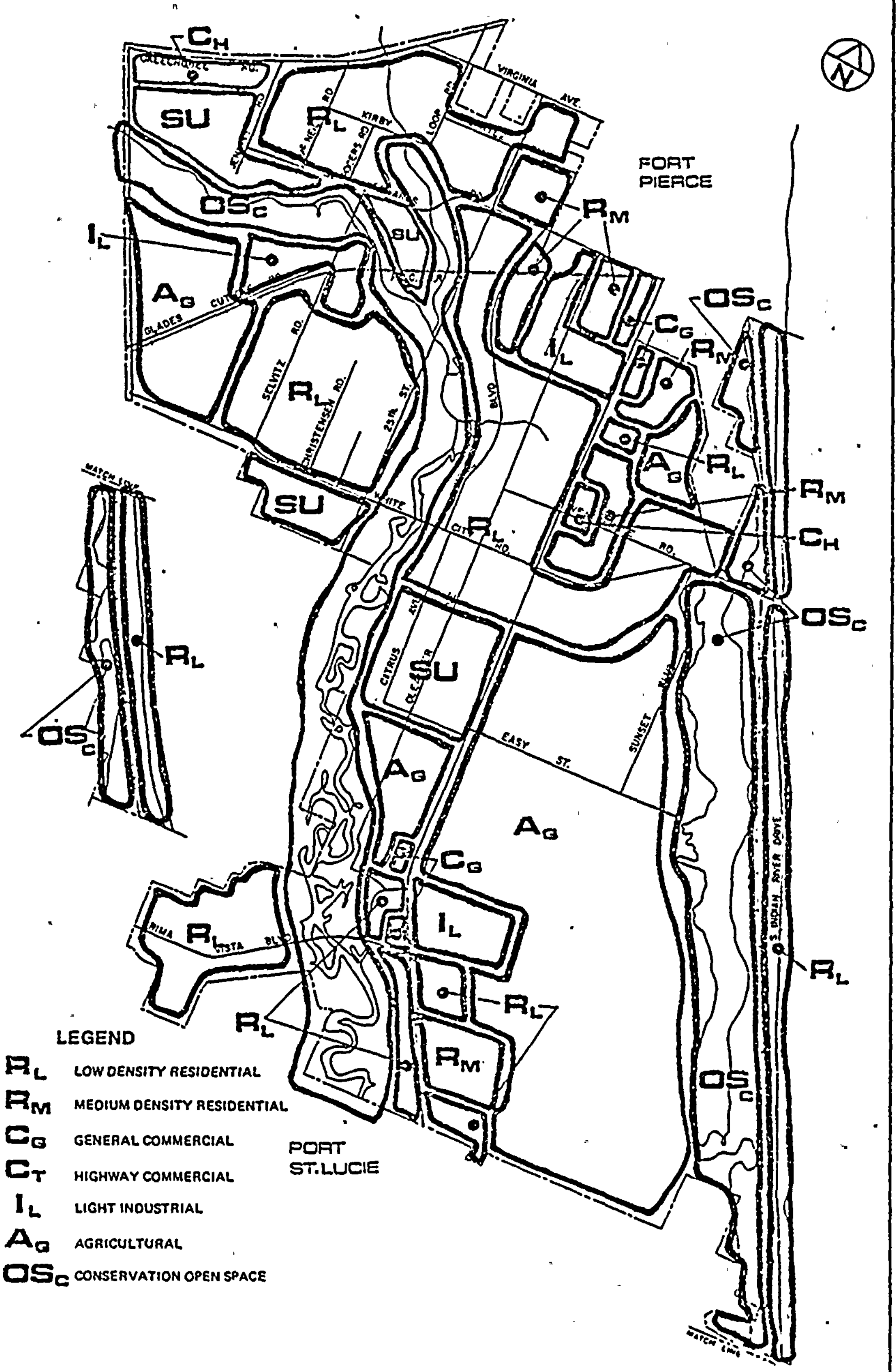
LEGEND

R_L	LOW DENSITY RESIDENTIAL		
R_M	MEDIUM DENSITY RESIDENTIAL	I_U	UTILITY INDUSTRIAL
R_H	HIGH DENSITY RESIDENTIAL	OS_C	CONSERVATION OPEN SPACE
C_G	GENERAL COMMERCIAL	OS_R	RECREATION OPEN SPACE
C_T	HOSPITALITY COMMERCIAL		

SOURCE: THE PLANNING/DESIGN GROUP, TAMPA, FLORIDA

FLORIDA POWER & LIGHT COMPANY
ST. LUCIE PLANT UNIT 2

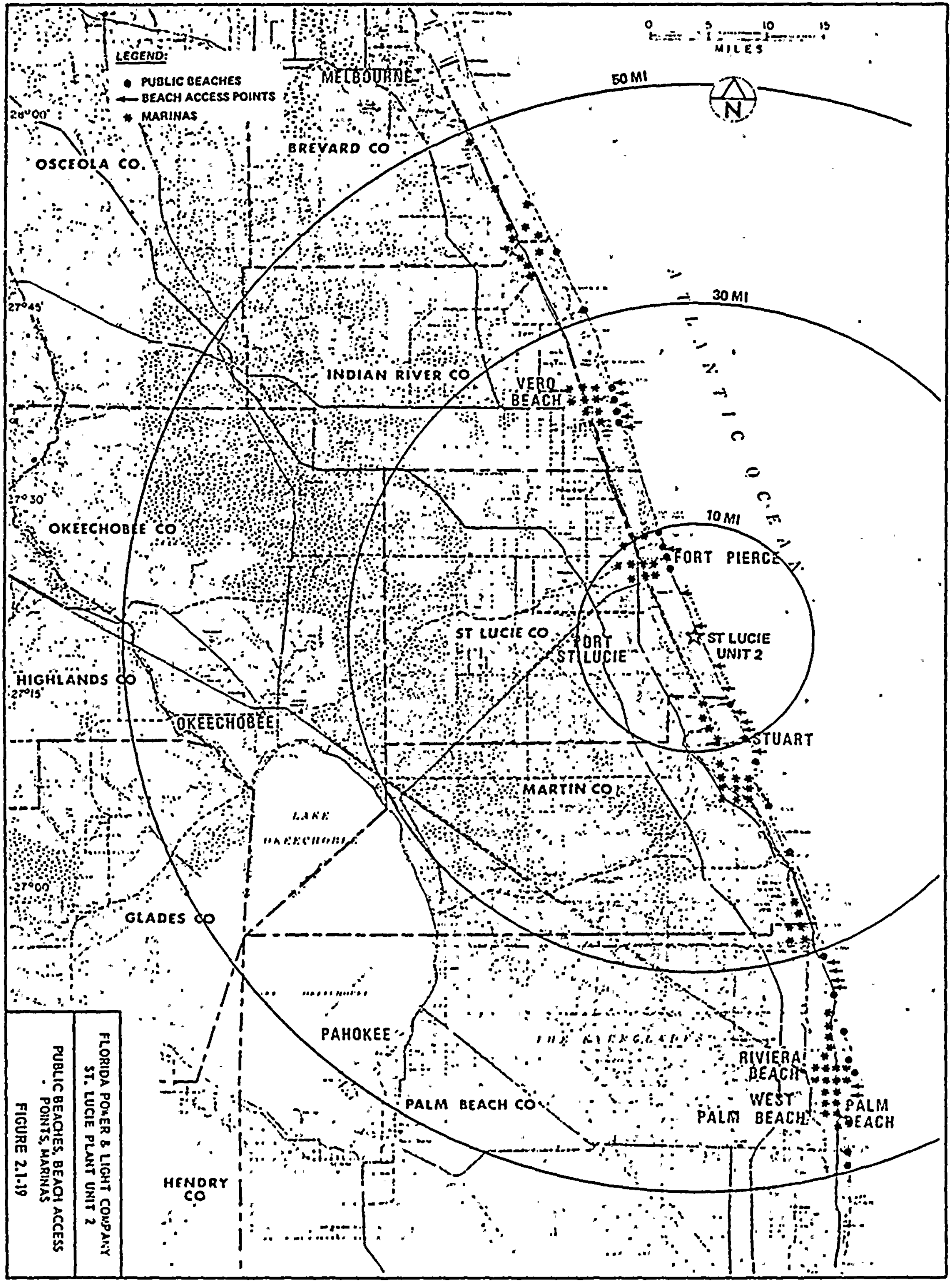
LAND USE PLAN
HUTCHINSON ISLAND PLAN
FIGURE 2.1-17



SOURCE: THE PLANNING/DESIGN GROUP, TAMPA, FLORIDA

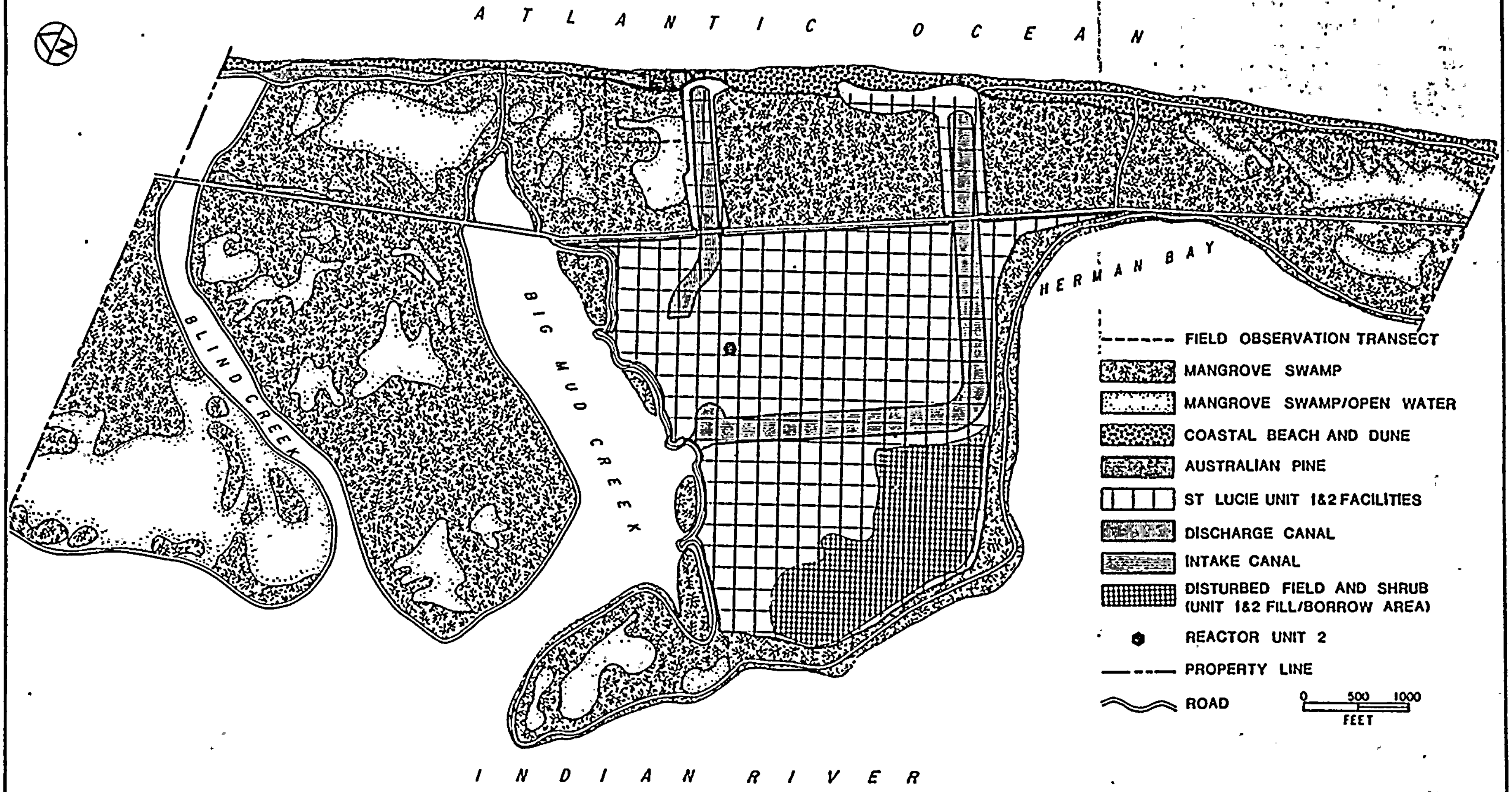
FLORIDA POWER & LIGHT COMPANY
ST. LUCIE PLANT UNIT 2

LAND USE PLAN
SAVANNAS AREA
FIGURE 2.1-18



FLORIDA POWER & LIGHT COMPANY
ST. LUCIE PLANT UNIT 2

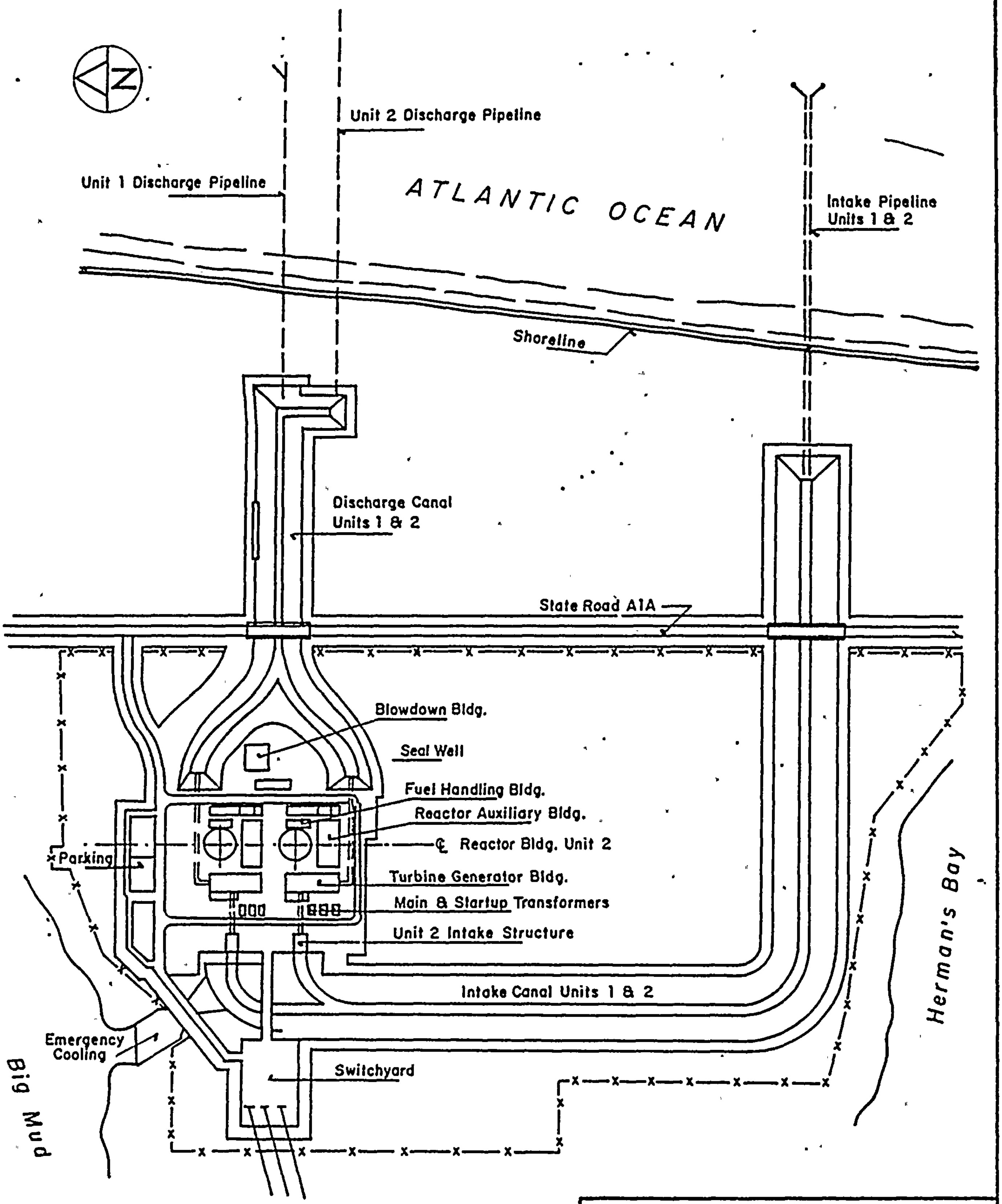
PUBLIC BEACHES, BEACH ACCESS POINTS, MARINAS
FIGURE 2.1-19



FLORIDA POWER & LIGHT COMPANY
ST. LUCIE PLANT UNIT 2

VEGETATION MAP
ST. LUCIE SITE

FIGURE 2.2-1



FLORIDA POWER & LIGHT COMPANY
ST. LUCIE PLANT UNIT 2

GENERAL PLANT LAYOUT

FIGURE 3.1-1

ATTACHMENT 2

ST. LUCIE UNIT 2 FINAL SAFETY ANALYSIS REPORT,

SECTION 2.1.2

There are no industrial, commercial, institutional, recreational or residential structures within the plant area. SR A1A traverses FP&L's property approximately 1,000 ft. east of the St Lucie Unit 2 Reactor Building.

The exclusion area and low population zones are shown on Figures 2.1-2 and 2.1-3. The radius of the exclusion area is 0.97 miles from the St Lucie Unit 2 Reactor Building. The low population zone includes that area within one mile of the St Lucie Unit 2 reactor.

2.1.1.3 Boundaries For Establishing Effluent Release Limits

The minimum boundary distance for establishing gaseous effluent release limits is that noted on Figure 2.1-4 directly north of St Lucie Unit 2 Reactor Building. Also indicated on Figure 2.1-4 are other boundary line distances from plant liquid and gaseous release points. The restricted area as defined in 10CFR20 includes the fenced-in area shown on Figure 1.2-1.

2.1.2 EXCLUSION AREA AUTHORITY AND CONTROL

2.1.2.1 Authority

As indicated and authorized by Annex J, Appendix J-3 to the St Lucie Plant Emergency Plan, FP&L controls the use of all land and water areas inside the site boundary (property) lines.

2.1.2.2 Control of Activities Unrelated to Plant Operation

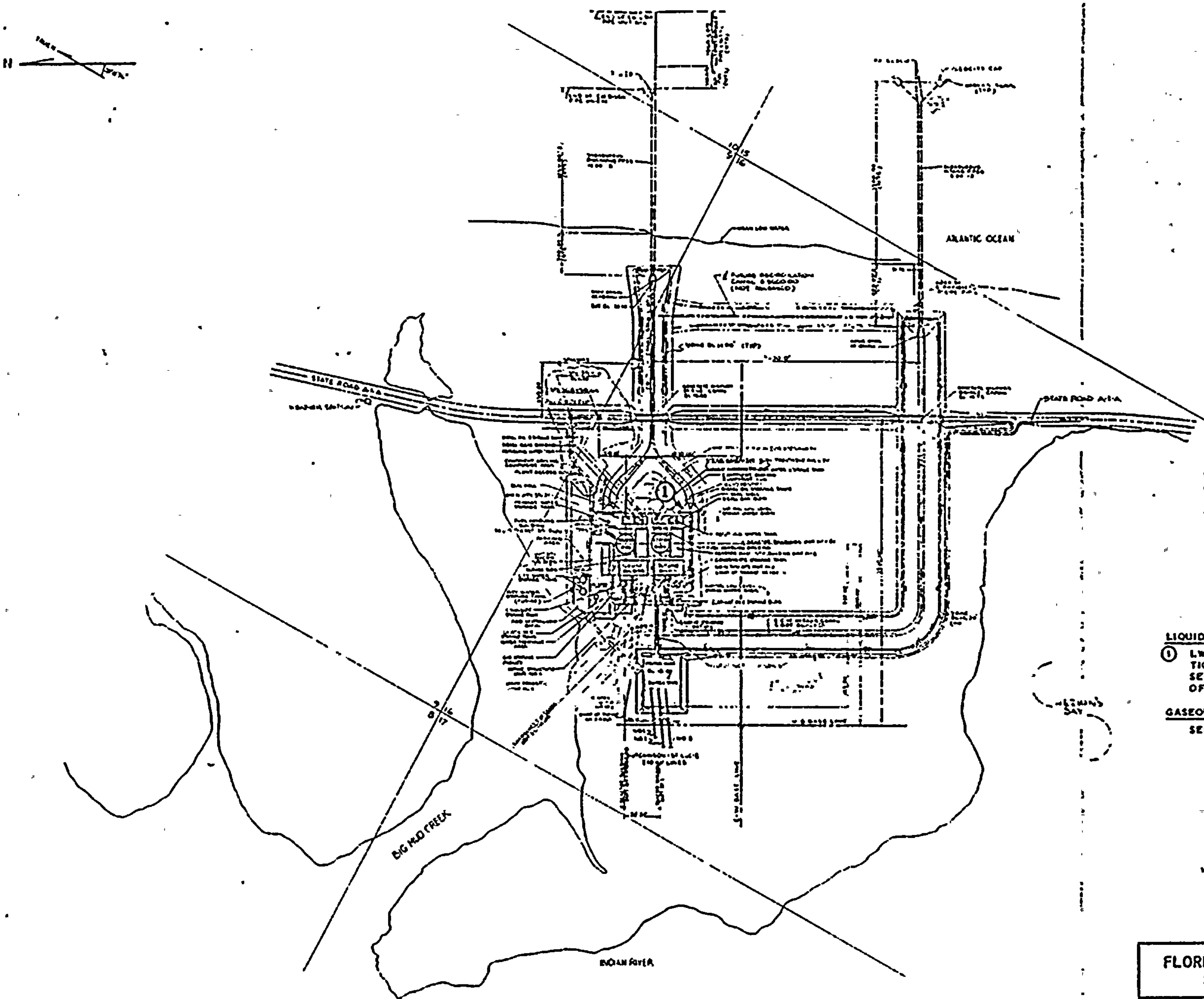
All activities conducted within the plant (restricted) areas during plant operation are related to the facility operation. The plant area is the fenced-off area surrounding St Lucie Units 1 and 2 as depicted on Figure 1.2-1. As indicated in and authorized by the St Lucie Plant Emergency Plan, formal arrangements are made to control the traffic and activities of the public on SR A1A which traverses FP&L's property east of the plant area, and on the State and Federal waters and beach adjacent to the FP&L property, if necessary in the event of an emergency to assure health and safety of the public. Specific details are enumerated in the Plant Emergency Plan (see Section 13.3).

2.1.2.3 Arrangements For Traffic Control

Formal arrangements are made for traffic control in the event of an emergency as described in the St Lucie Plant Emergency Plan in Annex D.

2.1.2.4 Abandonment or Relocation of Roads

There are no public roads subject to abandonment or relocation as a result of construction of St Lucie Unit 2.



GENERAL NOTES

1. PLANT DATUM SHALL BE MEAN LOW WATER IN ATLANTIC OCEAN EL. 0.00'
2. COORDINATES ARE BASED ON STATE PLANE COORDINATES [illegible] EAST ZONE
3. [illegible]
4. PLANT AREA GRADE EL @ [illegible]

LIQUID EFFLUENT RELEASE POINT

① LWM DISCHARGE - CENTERLINE ELEVATION - 1'-6, 27'-6 NORTH OF DISCHARGE SEALWELL CENTERLINE AND 86'-3 EAST OF ROAD CENTERLINE.

GASEOUS EFFLUENT RELEASE POINTS

SEE FIGURE 1.2-2

REF DWG: 2998-G-058 (REV 3)

FLORIDA POWER & LIGHT COMPANY
ST. LUCIE PLANT UNIT 2

SITE PLOT PLAN

FIGURE 1.2-1

ATTACHMENT 3

ST. LUCIE UNIT 2 FINAL SAFETY ANALYSIS REPORT

SECTION 2.3

2.3 METEOROLOGY

2.3.1 REGIONAL CLIMATOLOGY

2.3.1.1 General Climate

The prevailing climatology of the St. Lucie site is dominated by the presence of the Azores-Bermuda high pressure system resulting in a subtropical marine type climate for the eastern Florida coast(1). This climate is featured by a long, warm summer with abundant rainfall followed by a mild, relatively dry winter. The high frequency of onshore winds and the proximity of the warm waters of the Gulf Stream result in warm, humid conditions during most of the year. Temperatures in excess of 90 F typically occur on about 45 days each year, but summer heat is tempered by sea breezes along the coast and by frequent afternoon or early evening thundershowers in all areas. During the winter months, the area is occasionally subjected to an outbreak of cold continental air; however, the cold air mass usually moderates rapidly. Consequently, subfreezing temperatures rarely occur in the area.

Rainfall is unevenly distributed during the year. In general, the heaviest rainfall occurs during the period of June through October, coincident with the hurricane and thunderstorm season. A distinct dry period exists from November through March.

The monsoonal nature of the general circulation in the area and the proximity of the site ot the ocean result in a high percentage of easterly component (on-shore) winds. Wind speeds are fairly high, averaging over 9 mph along the coast(2).

Annual average relative humidity is approximately 73 percent in the area while the mean percentage of possible sunshine is about 65 percent(2,3).

The site area is periodically affected by the passage of tropical cyclones of various intensities; the months of September and October have the highest frequency of occurrence. Tornadoes and waterspouts have been observed throughout the year in this part of Florida.

Meteorological conditions conducive to high air pollution potential are infrequent in southeastern Florida. The warm waters of the adjacent Gulf Stream current, located a few miles offshore, inhibit the formation of strong persistent low-level inversions while instability during the day is aided by strong insolation. Along the immediate coastline and areas such as Hutchinson Island, well developed seabreeze conditions result in persistent, slightly stable, on-shore flow.

The terrain in the site area is essentially flat with elevations in the surrounding area ranging approximately from 20 to 30 ft. MSL. The topography should exert little or no influence on synoptic-scale atmospheric processes in the site area. Topographic cross-sections are not included with this document due to the lack of significant terrain variation within 50 miles of the site.

2.3.1.2 Regional Meteorological Conditions for Design and Operating Bases

a) General

Meteorological data are presented in this section for severe weather phenomena such as heavy rainfall, thunderstorms, lightning, hail, hurricanes, tornadoes and waterspouts, and high air pollution. Also presented are meteorological conditions used for design and operating basis considerations such as design basis tornado parameters.

The two U.S. National Weather Services stations which are nearest the plant site are West Palm Beach and Fort Pierce, Florida. West Palm Beach is approximately 38.5 miles SSE of the site and located on the coast. Fort Pierce is on the west bank of the Indian River approximately 6.8 miles NW of the site. These sites have similar topography and location relative to the ocean and are considered representative of the regional meteorological conditions for the St. Lucie site.

b) Precipitation

The lower east coastal division of Florida following the NOAA grouping scheme generally experiences an annual average rainfall exceeding 59 in.(4). Measurable precipitation falls on approximately 36 percent of the days of the year(2). Most of the heavy rainfall is associated with thunderstorms or passage of hurricanes.

The maximum observed rainfall for time periods of five minutes through 24 hours are listed in Table 2.3-1(5). The storm of April 17, 1942 set maximum rainfall records for all time periods from one through 24 hours. The maximum point rainfall records for time periods less than one hour generally result to strong convective activity in the form of thunderstorms.

Based on an extreme value (Gimbel) analysis of precipitation data, estimated maximum rainfalls for mean recurrence intervals of one to 100 years and for rainfall durations of one-half hour to one day are given in Table 2.3-2(6). A comparison of Tables 2.3-1 and 2.3-2 shows that the 100-year estimated amounts were exceeded at at West Palm Beach for time periods of 2, 3, 6, 12, and 24 hours, whereas the maximum observed one hour rainfall of 4.40 in. has an estimated mean recurrence interval of the order of 80 years.

The Probable Maximum Precipitation (PMP) is derived using two basic principles - storm transposition and storm maximization. It is assumed that all storms which produced the heaviest rainfall in a meteorologically homogeneous region containing the area under consideration could have passed over the area. The actual conditions during the storms are then increased to the critical meteorological conditions considered probable for the region. The critical meteorological conditions considered are based on an analysis of air mass properties (effective precipitable water, depth of inflow layer, temperatures, winds, etc.), synoptic situations prevailing during the recorded storms in the region, topographic features, season of occurrence and location of the areas involved(7,8).

In the site area, the PMP for a 10 square mile area and a rainfall duration period of six hours is 32 in.(7). This is an average rainfall rate of the order six in. per hour. Such a rainfall rate was observed for a period of one hour at Hialeah, Florida near Miami (17 miles S.) during the hurricane of 1947(9). A detailed survey of the September, 1950 hurricane indicated a precipitation amount of the order of 34 in. fell in a 24-hour period within the vicinity of Cedar Key. The peak 24-hour precipitation measured at Yankeetown during the storm (38.70 in.) is the record 24-hour rainfall for the nation(10). Additional information regarding the development of the PMP for the site is given in Subsection 2.4.3.1. The maximum point rainfall observed in the United States during a six-hour period is 32 in., recorded on July 8, 1942 at Smethport, Pennsylvania(11). In cental Florida, rainfall of 13.6 and 16.0 in. occurring over a 10 square mile area during a six-hour period were observed during October 1924 and September 1950, respectively(12). Table 2.3-3 summarizes estimated probable maximum precipitation for duration periods of 6, 12, 24, 48, and 72 hours over a 10 square-mile area(6).

Measurable snow or frozen precipitation during the winter time is unusual for Florida(10). In the immediate site area there has been no measurable snow nor frozen precipitation(1,2), therefore, the probability that the maximum winter precipitation, over a 48-hour period, be in the form of solid precipitation (other than hail) is extremely low.

c) Thunderstorms

Thunderstorms have been recorded during each month of the year. However, more than 80 percent occur during the period from May through September; July and August experience the maximum number of thunderstorm days with 16 days during an average month. On an annual average basis, there are 79 days during which thunderstorms are observed. Average monthly and annual thunderstorm days as recorded at West Palm Beach during the period 1943-1974 are listed in Table 2.3-4(2).

d) Lightning

The frequency of cloud-to-ground lightning flashes per thunderstorm day can be estimated as follows(13):

$$N_E = (0.1 + 0.35 \sin\ ) (0.4 \pm 0.2) \qquad (1)$$

where N_E is the number of flashes to earth per thunderstorm day per square kilometer and is the geographical latitude. Monthly and annual estimates of lightning strikes are presented in Table 2.3-4 based on values of N_E and the thunderstorm data for West Palm Beach. The results indicate that the annual expectancy of lightning strikes for a square kilometer area in the site vicinity is between four and 12.

e) Hail

In the period 1945-1953 the number of hailstorms recorded in all of Florida totaled only 37 cases(14). However, in the period 1955-1967, 116 cases of surface hailstorms (3/4 in. diameter or larger hail) were reported(15). On a state-wide basis, only 32 of these occurrences (27.5 percent) had hail with diameters greater than 1.5 in. The average monthly and annual distributions of these hailstorms are given in Table 2.3-4.

While the hail size distribution of the site area is not known, the one degree, latitude-longitude square in which the site is located has experienced an annual average of three hailstorms (3/4-in. or greater) as reported in the study above. However, the probability of hail at a specification is very small. The occurrence of hail is most likely during the months of March, April, and May.

f) Hurricanes

Tropical cyclones are classified according to their stage of development. Hurricanes are tropical cyclones with highest sustained wind speeds of 74 mph or higher. Tropical cyclones with sustained winds in the range of 39 to 73 mph are classified as tropical storms and as tropical depressions when wind speeds are less than 39 mph(16).

During the period 1900-1963, the Florida Peninsula has been affected by 65 tropical cyclones. Of these, 25 were classified as hurricanes, 33 as tropical storms and seven as tropical depressions(17). The monthly and annual distribution of tropical cyclones affecting the Florida Peninsula is presented in Table 2.3-5. Roughly half the storms in each category passed close enough to the St. Lucie site to affect it with strong winds and/or heavy rainfall. Hurricanes have occurred most frequently in September and October in the site area.

Hurricane paths affecting the site are generally toward the west-northwest with an average forward speed of about 12 mph. In any given year, the chances of hurricane force winds affecting the site area are 1 in 15(9). The worst hurricane in recent times in the site area occurred in August 1949. Winds at West Palm Beach reached 110 mph with gusts to 125 mph before the anemometer was blown away. The highest one-minute wind speed was estimated at 120 mph with gusts to 130 mph(9). The development of the meteorological parameters and the wind field of the probaable maximum hurricane (PMH) are provided in Subsection 2.4.5.1.

g) Tornadoes and Waterspouts

Historically, tornadoes and waterspouts have been observed during all seasons in southeastern Florida; the greatest frequency of such events occurs during spring and summer. The number reported in a specific area is heavily biased by the population density and aircraft activity in the area. Since the West Palm Beach area is well populated and served by a major airport facility, more reports would be anticipated than had the area been situated in a rural setting.

The average seasonal and annual frequency of tornadoes which have occurred in the state of Florida during the period from 1955-1967 are as follows(15):

Winter	4.5	Summer	15.1	Annual	34.9
Spring	9.0	Autumn	6.3		

In the one degree latitude-longitude square in which the site is located a total of 36 tornadoes were reported over the period 1955 - 1967(15). The technique for determining the probability of a tornado striking a point in the one degree square in which the site is located yields a level of 0.00094 per year (18); the recurrence interval is 1062 years.

This technique is based on the path width of tornadoes in the mid-west area. For the Florida region, tornado paths are narrower on the average. The total frequency for tornadoes in the site vicinity from an earlier data case(18) is 14 for the period of 1953-1962, or a mean annual frequency of 1.4. Applying the same technique for this data yields a probability of 0.00207 with a recurrence interval of 483 years.

Two independent studies have been made to determine the severity of Florida tornadoes(19). Both conclude that the severe 360 mph (Region I) tornadoes are not applicable to Florida, and that historical data does not substantiate speeds exceeding about 200 mph in Florida tornadoes. The earlier study utilized all known Florida tornado data from 1887 to 1968, whereas the current study analyzed data for the period from 1950 to 1972. The current study went beyond the earlier work in that it developed a Design Basis Tornado (DBT) for the Atlantic coast of the United States and the Atlantic coast of Florida. The results of the DBT analysis indicate that a Region III (240 mph) DBT is appropriate for the St. Lucie site. However, the parameters pertinent to the design and operation of a nuclear plant in this region are listed in Subsection 3.3.2.

Waterspout reporting in the United States has been coordinated in a systematic manner since 1952 by the National Weather Service. A total of 190 waterspouts have been reported from 1952 to 1973 along a 200 mile zone of the Florida Atlantic Coast centered at St. Lucie(20). Of these, 178 were reported to have occurred within 25 miles of the shore. Remarks are rarely given about their size and direction of motion because of their general over-water trajectory.

The monthly distribution of waterspouts occurring within 25 miles offshore and along a 200 mile zone centered at St. Lucie for the period of record, 1952 to 1973 are given in Table 2.3-7. Of this population, 82 occurred between May and October.

Of the 178 waterspouts identified in Table 2.3-7, 11 were reported to migrate to land and their worst reported damage falls into the "weak tornado" category (estimated wind speeds of 72-112 mph), as defined in the F-scale(21). An in-depth analysis of the Lower Matecumbe Key waterspout indicated a maximum estimated wind speed of 170 mph(22)

It has been indicated that errors inherent in the damage assessment technique are about 15 to 20 percent and that this estimate is probably to the conservative side(23). This tangential speed when coupled with the translational speed of the waterspout, results in a maximum horizontal velocity of less than 200 mph, well below the NRC tornado design criteria.

In order to compute the probability and recurrence interval of a waterspout at a point, estimates of waterspout diameter and path length are necessary. Since very little information was available, a conservative average waterspout width-path length of 200 ft. by four miles was assumed.

Recurrence intervals were then computed for various offshore distances along the 200 mile coastal zone. The method used is similar to the tornado evaluation(18).

The probability of a waterspout striking a given point is:

$$\text{Probability} = \frac{Z\ T}{A} \qquad (2)$$

Z = Mean Area of a Waterspout
T = Frequency of Waterspout (Annual)
A = Area Examined

The recurrence interval (in years) is defined as:

$$\text{Recurrence} = \frac{1}{\text{Probability}} \qquad (3)$$

The probability and recurrence intervals of waterspouts for various distances offshore are given in Table 2.3-6.

h) Air Pollution Potential

Based on a 35-year period of record from 1936-1970, the number of stagnation days in the Eastern United States were tabulated(24). There were approximately 155 days of atmospheric stagnation in the vicinity of the plant, of which 34 cases persisted four or more days.

A study on the potential for urban air pollution throughout the contiguous United States was made for the period from 1960-1964(25). This study indicated that the total number of forecast days of high air pollution potential in the site area was zero for this five-year period.

Between August 1, 1960, and April 3, 1970, there were no high air pollution potential days according to data given in the State of Florida Air Implementation Plan(27). Air pollution potential criteria for meteorological conditions that have the potential to develop into an episode(25, 27, and 28) were followed in the above assessment.

i) Extreme Winds

The distribution of extreme wind speeds is expressed in terms of a mean recurrence interval based on a mixed Fisher-Tippett Type II extreme value distribution(29). The mean recurrence intervals for "fastest-mile" wind speeds are shown in Table 2.3-8. These wind speeds are in reality a wind intensity in that the "fastest mile" is that wind speed associated with the passage of one mile of air. In general, the values are thought to represent an approximate one-minute wind speed; in reality, this is true only at 60 mph. Assuming that the fastest mile parameter represents a uniform data base, the extreme value analysis is performed. It can be seen from these data that the fastest mile wind speed of 120 mph has a recurrence terval of 100 years.

Wind loadings for the site are discussed in Subsection 3.3.1.

2.3.2 LOCAL METEOROLOGY

The site characteristics described in this section are based on long term West Palm Beach, Florida National Weather Service records(2) and short term onsite data collected from the St. Lucie meteorological tower between September 1, 1976 and August 31, 1978 (see Subsection 2.3.3 for collection program description).

2.3.2.1 Normal and Extreme Values of Meteorological Parameters

2.3.2.1.1 Winds

Table 2.3-9 summarizes long term monthly and annual average wind data for West Palm Beach. In general, wind speeds are in excess of seven mph and the prevailing wind direction exhibits northerly components during the winter months shifting to southerly directions during the summer. The mean annual wind speed is 9.4 mph and the prevailing direction is from the east-southeast. Local winds of higher speed and short duration occur on occasion in connection with thunderstorms or the passage of cold fronts. The peak "fastest-mile" wind speed recorded between 1959 and 1977 was 86 mph in August 1964.

Table 2.3-10 presents a summary of the lower level (32.8 ft) onsite winds recorded at the St. Lucie meteorological tower. The average annual wind speed is 6.9 mph and the prevailing direction is from the southeast. The maximum hour averaged wind speed recorded during the two year period was 30.0 mph.

Table 2.3-11 illustrates the mean diurnal variation of both the lower and the upper (190.0 ft) level winds. Offshore winds generally prevail during the night and early morning while on-shore winds are prevalent during the remainder of the day.

Tables 2.3-12 to 2.3-18 provide annual lower level wind persistence data for each of the stability classes described in Regulatory Guide 1.23 (R0)(30). Tables 2.3-19 and 2.3-20 provided persistence data for all stable classes (Pasquill #S#) and all classes combined (Pasquill All), respectively. Invalid wind speeds are presented as 99.99. In general, winds prevailing for 24-hours or more were from the east-southeast to the south-southeast.

The joint frequencies of wind speed, direction and stability for upper and lower winds are found in Tables 2.3-21 to 2.3-36.

2.3.2.1.2 Temperature and Atmospheric Water Vapor

Table 2.3-37 provides a summary of long term average temperatures and relative humidity and extreme temperatures at West Palm Beach. The mean daily maximum temperature during the warmest month, August, is 90.2 F; January, the coldest month has a mean daily minimum temperature of 55.9 F. The mean annual temperature is 74.5 F. The diurnal range, the difference between the mean daily maximum temperature (83.0 F) and the mean daily minimum temperature (66.0 F) is 17.0 F. The highest temperature on record between 1937 and 1977 is 101.0 F in July 1942; the coldest is 27.0 F in January 1977. The average annual relative humidity is 73.3 percent.

At the St. Lucie site the average temperature during the 2 year period was 72.5 F and the diurnal range was 9.8 F. The mean daily maximum and minimum temperatures during the warmest (July) and coldest months (January) were 85.5 F and 51.3 F, respectively. The highest temperature recorded onsite was 99.8 F; the lowest was 28.4 F. Average monthly relative humidities exceeded 60 percent throughout the year. The average annual relative humidity was 71.6 percent; the mean annual dewpoint was 62.6 F. Tables 2.3-38 to 2.3-51 present a summary of the onsite data.

2.3.2.1.3 Precipitation

West Palm Beach has a mean annual precipitation of 62.06 inches. A major portion of the rainfall occurs between June and October in association with "local" showers and thunderstorms. Precipitation equal to or greater than 0.01 inches occurs on an average of 131 days a year and most frequently during the rainy season. The greatest 24-hour precipitation on record between 1939 and 1977 was 15.23 inches in April 1942. Snow rarely occurs in this region, although a trace was noted in January 1977. Monthly and annual precipitation totals and greatest 24-hour rainfall totals are summarized for West Palm Beach in Table 2.3-52.

Table 2.3-53 presents a summary of onsite precipitation data. The site averaged 31.58 inches of precipitation annually with maximum monthly amounts in excess of 4 inches occurring during August and September. Rainfall frequency and duration are presented in Tables 2.3-54 to 2.3-66. Precipitation wind roses are presented monthly and for the total period in Tables 2.3-67 to 2.3-79.

2.3.2.1.4 Fog and Smog

Table 2.3-80 presents heavy fog data for West Palm Beach. On an average there are eight days a year when heavy fog occurs and these are mainly confined to the months between October and April.

Although no onsite fog or smog data is available, the west Palm Beach data is representative for the site.

2.3.2.1.5 Stability

Studies by Holzworth indicate that for the eastern coast of Florida unstable conditions (A,B,C) occur 16-25 percent of the time, neutral conditions (D) and stable conditions (E,F,G) each occur 36-45 percent of the time.

Table 2.3-81 summarizes onsite stability frequencies for the two-year period. Unstable conditions occurred 20 percent of the time, neutral conditions occurred 30 percent of the time and stable occurred 50 percent of the time. The site is, therefore, prone towards stable conditions. Table 2.3-19 shows that there were two cases during the period when stable conditions existed for a period greater than 15 hours.

2.3.2.2 Potential Influence of the Plant and Its Facilities on Local Meteorology

The site area and the surrounding five mile radius terrain is essentially flat with elevations not exceeding 25 feet. The highest elevation within a 50-mile radius is 75 feet and is located to the west-northwest of the site. Between the north-northwest and south-southeast sectors the Atlantic Ocean is the major feature. Topographic maps of the area within a radius of five and 50 miles are provided as Figures 2.3-1 and 2.3-2, respectively. Topographic cross-sections were deemed inappropriate as the peak sector average slope to 50 miles was .03 percent (75 ft./264,000 ft.).

The presence and operation of the plant is not expected to exert a modifying influence on the normal and extreme meteorological conditions in the area.

2.3.2.3 Local Meteorological Conditions for Design and Operating Bases

Local meteorological data have not been used for design and operating basis considerations other than those conditions referred to in Subsections 2.3.4 and 2.3.5.

2.3.3 ONSITE METEOROLOGICAL MEASUREMENTS PROGRAM

The onsite meteorological program was designed to provide a dispersion climatology for use in safety planning of radioactive effluent releases and as a means of determining the appropriately conservative meteorological parameters to be used in estimating the potential consequences of hypothetical accidents. Analysis of collected meteorological data permits an assessment of the diffusion parameters characteristic of the site.(30) The instrument package which complies with Regulatory Guide 1.23, (R0) is described in Subsections 2.3.3.2 through 2.3.3.4.

The parameters which are monitored are wind speed, wind direction, temperature difference in height (delta-T), dewpoint, temperature, barometric pressure and precipitation. The parameter, heights and number of sensors installed at the St. Lucie site are listed in Table 2.3-82.

2.3.3.1 Meteorological Tower

A meteorological tower was erected at the St. Lucie site on Hutchinson Island in December 1970. A 199-ft. framed tower is located on site 2400 ft. north of the reactor complex. It is situated in an area of relatively flat terrain characterized by mangrove trees in the range of eight to 10 ft. in height. Figure 2.3-3 illustrates the location of the meteorological tower relative to the rest of the site.

2.3.3.2 Instrumentation

a) Wind Speed

The wind speed sensors at the 32.8 ft. and the 190 ft. levels are Climatronics F460-WS wind speed transmitters. Each sensor consists of a sensitive three cup anemometer which drives a multi-holed light chopper in the transmitter. The rotating light chopper produces an electrical signal output from a phototransistor and a light emitting diode source. The resulting signal is shaped into a square wave whose frequency is proportional to the wind speed. This square wave signal is then sent to the translator for conversion to engineering units.

The specifications for the Climatronics Model #F460-WS wind speed anemometer are as follows:

Accuracy	± 0.15 mph or 1% whichever is greater
Threshold	0.58 mph
Range	0 to 100 mph
Distance Constant	5 feet maximum
Temperature Operating Range	-40 F to +120 F

b) Wind Direction

Climatronics F460-WD wind direction transmitters are used to measure the wind direction at the upper and lower levels. Each wind direction sensor consists of a light weight counter-balanced vane connected to a precision low-torque potentiometer located in the transmitter. The position of the vane is sensed by the potentiometer and is sent to the translator as a dc voltage.

The specifications of the Climatronics Model #F460-WD wind direction sensor are as follows:

Accuracy	± 3° of azimuth
Threshold	0.58 mph
Range	0 to 540°
Distance Constant	3.7 feet maximum
Damping Ratio	0.4
Temperature Operating Range	-40 F to +120 F

The signal conditioning equipment is the Climatronics Model 100078 analog translator. The output of the translator is 0-1.0 volt for 0-120 mph wind speed. Wind direction output is 0-1.0 volt for 0-540°.

c) Air Temperature

Two Rosemount resistance temperature sensors Model 104 MB are used for the direct measurement of ambient temperature and delta temperature. The platinum resistance temperature sensor provides an extremely predictable and repeatable resistive output with changes in temperature. The Rosemount temperature sensors are coupled with Rosemount Model 414L linear bridges to provide a millivolt output signal with an accuracy of ± 0.17 F. Differential temperature is measured between the upper and lower temperature sensors (0-0.1 volt for 0-100 F) by using a differential amplifier supplied with the control room equipment for temperature differential. The differential output range is ±15 F. The heights of each temperature sensor are given in Table 2.3-82.

The sensor consists of a precision, wire-wound resistance element, a protective enclosure, a mounting housing, and provisions for electrical connections.

The specifications of the Model 104 MB sensors are as follows:

Accuracy	±0.047 C @ 32 F
Response Time	5.5 seconds
Response Time of Probes	5.5 seconds
Range of Probes	-100 to 500 F
Resistance at 0 C (32 F)	Approx 100 ohms (Dependent on Probe)
Radiation Shield	Under test radiation intensity of 1.56 Gram calories/ cm^2min, radiation errors are less than 0.2 F.
Aspiration Rate	10 ft/sec
Operating Temp Range of Shield	-40 F to 150 F
Shield Finish	Highly reflective Dupont Polar white epoxy

d) Rain Gauge

The precipitation sensor is a Belfort tipping bucket rain gauge. This type of sensor funnels rain into a small receptacle which tilts when it has received 0.01 inch of rain and another identical receptacle moves in place ready to receive the next 0.01 inch of rain. In the process of tipping, an electrical contact is closed momentarily. A translator card is connected to this electrical contact and counts the tips by adding 0.01 volts (0.01 inches precipitation). After each 1 inch accumulation of precipitation the translator automatically resets the output to 0.0 volts.

Belfort tipping bucket rain gauge (No. 595)

Sensitivity	0.01 inches
Range	infinite
Accuracy	2% for rainfall rate of 1 in/hour or less 4% for rainfall rate of 3 in/hour 6% for rainfall rate of 6 in/hour

e) Dewpoint

Dewpoint (at the 34.65 foot level) is measured by a Foxboro Model 2711 AAG lithium chloride dew cell.. The range of the sensor is 0 to 120 F; the accuracy is ±0.5 F between 10 and 90% relative humidity. The linear output is recorded on a Bristol Model 550 dynamaster analog recorder.

f) Barometric Pressure

A Belfort microbarograph (USWB No. 355-31SW) is employed to provide a continuous strip chart record of atmospheric pressure. It is calibrated to within .005 inches (.17 mbs).

2.3.3.3 Telemetric and Data Recording System Description

The meteorological data acquisition system for the St. Lucie site is designed in accordance with the requirements listed in Regulatory Guide 1.23 (RO)(30). The data acquisition equipment is at the onsite meteorological tower. The data output of the sensing equipment is routed to a local recording station located at the base of the meteorological tower.

The six parameters were recorded on individual, single point analog recorders. The chart width is 4.8 in. for each parameter. The range for the wind speed is 0-120 mph. The chart range for wind direction is 540° to eliminate full scale wiping. The delta-T recorder has a ± 15 F chart range. The temperature recorders are 0-120 F minimum. The dewpoint is 0-120 F. Chart speeds are 1.5 in. per hour.

The following is a summary of the recorders provided in the local recording station at the base of the tower.

Laboratory Data Control
Model 2802
also Navy I. D. RO-447/GMQ29

a)	Wind Speed Recorders (2)	0-120 MPH Range
b)	Wind Direction Recorders (2)	0-540° Sweep Range
c)	Dewpoint	0-120° Range
d)	Delta-T Recorder	± 15 F Range

The telemetry system will be designed and described at a later point in time.

2.3.3.4 Data Reduction

The meteorological data for the diffusion evaluation is presently recorded on strip charts located in the recording station at the base of the meteorological tower. The data is reduced to mean hourly data and placed on computer punch cards. This present data includes:

a) Wind direction for the 32.8 and 190-foot levels of the meteorological tower.

b) Wind speed for the 32.8 and 190-foot levels.

c) Vertical temperature lapse rates between the 110.3-foot and 32.8-foot levels and between 190.5-foot and 32.8-foot levels.

d) Ambient temperature for the 34.7, 112.0 and 191.9 foot levels.

e). Dew point temperature for the 34.7 and 110.3 foot levels.

f) Precipitation at the surface.

2.3.3.5 Calibration and Maintenance

a) Wind Direction/Wind Speed Translator System

The translator cards supplying power to the wind direction and wind speed sensors are capable of supplying a "zero" and "span" or "full scale" output using an internally calibrated voltage, precision resistance or crystal frequency oscillator. Values for the "as found" and "as left" test are documented for both "zero" and "span" modes at the remote site. This procedure documents any changes made during the calibration and readings indicated by the analog system.

b) Wind Direction Sensor Calibration

The bearings in the wind direction sensor are changed every year with replacement date and sensor serial number documented. The wind vane is pointed toward a known azimuth and the reading compared with expected voltage and chart readings. Repeatability and proper 540° switching of the potentiometer is noted and documented. All values are checked for readings ±5° of known azimuth points. Calibration is performed and documentation on the "as found" and "as left" conditions recorded for analog indicator at the remote site.

c) Wind Speed Sensor Calibration

Wind speed sensor bearings are replaced every six months with sensor serial number and replacement date properly documented.

The sensor is checked by inhibiting any movement of the cups and checking for expected voltage and analog outputs. Calibration is performed after noting the "as found" condition. Documentation of "as left" condition is made for the tower site recorders.

d) Temperature System

A variable precision resistance is substituted for each temperature probe. Factory calibration curves are compared with a five-point resistance test to verify temperature bridge linearity throughout the system operating range. Values recorded by the digital and analog systems are documented for the "as found" and "as left" condition for each point calibration.

e) Delta Temperature System

A variable millivolt source is substituted into the recorder and a five-point linearity check performed against known temperature points. The calibration is documented at each point with the "as found" and "as left" values recorded. A comparison is made with the remote and control room digital and analog recorders with any changes made during the calibration documented.

f) Dew Point Temperature System

The dewprobe is disconnected and substituted with a variable millivolt supply. Probe resistance values are simulated over a five-point linearity range to compare with known expected results. Readings from the remote site analog recorder are documented in the "as found" and "as left" mode for the calibration procedure.

g) Dewcell Calibration

The old dewcell is replaced with a spare dewcell that has been cleaned and retreated with lithium chloride (LiCl). Wet and dry bulb readings are taken with a sling psychrometer to determine dew point and compared with the system dew point. Analog recorders in the remote site are compared with the sling psychrometer and values documented.

h) Microbarograph System

The readings from the microbarograph are compared with the test barometer and recorded. A calibration is performed documenting the "as found" and "as left" condition. The battery pack voltage is checked and replaced if below factory specifications of 2.9 volt dc.

i) Rain Gage System

The tipping bucket is activated several times with the correct value being verified on the analog recorder. Values are logged and documented to indicate consistency in readings.

2.3.4 SHORT TERM (ACCIDENT) DIFFUSION ESTIMATES

The objective of this subsection is to provide conservative estimates of atmospheric diffusion at both the site boundary and at the outer limits of the low population zone (LPZ) for appropriate time periods up to 30 days. The diffusion evaluations for the short-term accidents are based on the assumption of a ground-level release (i.e., no reduction in ground concentrations due to elevation of the plume). The data base used in the calculations is the same as was described in Subsection 2.3.2.

2.3.4.1 Diffusion Model for 0-2 Hours

The analytical procedure for evaluating the 0-2 hour accident period is based on a revision of the model described in Regulatory Guide 1.4 (R2)(31). The changes reflect variations in atmospheric diffusion factors that occur as a function of wind direction and variable site boundary distance. Allowances are made for meandering plumes during light winds and stable atmospheric conditions. The new approach is described in Draft Regulatory Guide 1.XXX (1978)(32).

The model is distance and direction-dependent. Variability of wind direction frequency was considered in determining the relative concentration, X/Q, values. The hourly X/Q values were determined as described in the following manner.

During neutral and stable conditions when the wind speed at the lower (10 meter) level is less than six meters per second (mps) the relative concentration is computed as:

$$\frac{X}{Q} = \frac{1}{\bar{u}\pi\Sigma_y\ \sigma_z} \qquad (4)$$

provided it is less than the greater value calculated from either

$$\frac{X}{Q} = \frac{1}{\bar{u}\ (\pi\sigma_y\ \sigma_z + cA)} \qquad (5)$$

or

$$\frac{X}{Q} = \frac{1}{\bar{u}\ (3\pi\sigma_y\,\sigma_z)} \qquad (6)$$

where:

X/Q = is relative concentration of ground level (sec/m^3)

π = is 3.14159

$\bar{u}$ = is the hourly average wind speed at the 10 meter level above plant grade (m/sec).

Σ_y = is the lateral plume spread (m) with meander and building wake effects (m) (a function of atmospheric stability, wind speed $\bar{u}$ and downwind distance from the release). For distances up to 800 meters,

$\Sigma_y = M\sigma_y$; where M is a function of atmospheric stability and wind speed(32). For distances greater than 800 meters,
$\Sigma_y = (M-1)\, \sigma_y\, (@800m) + \sigma_y$

A = is the smallest vertical plane, cross-sectional area of the building from which the effluent is released (2726 m^2)

c = building shape factor (.5)

σ_y = is the lateral plume spread (m) at a given distance and stability based on logarithmic fit of NRC curves in Reference (32).

σ_z = is the vertical plume spread (m) at a given distance and stability based on logarithmic fit of NRC curves in Reference 32.

During all other atmospheric stability and/or wind speed conditions, X/Q is the greater value calculated from Equations (5) and (6).

Plume meander was accounted for by modifying the lateral diffusion coefficient σ_y. The meander function (M)(32) is evaluated as follows:

a) For Pasquill stabilities A-C at all wind speeds or all stabilities when wind speed $>$ 6 mps; M = 1

b) For wind speed $\leq$ 2 mps; Stab D; M = 2
Stab E; M = 3
Stab F; M = 4
Stab G; M = 6

c) For 2 mps $<$ wind speed $<$ 6 mps; M is evaluated by a logarithmic interpolation from M value in b) above at 2 mps to M = 1 at 6 mps.

An hourly observation is considered to be calm if the wind speed is less than the threshold of the wind instruments. For calm conditions a wind speed is assigned equal to the vane or anemometer starting speed, whichever is higher. A wind direction is assigned in proportion to the directional distribution of non-calm winds with speeds less than 1.5 meters per second. No substitution was made for missing or invalid data.

The sector X/Q values at the exclusion boundary (.97 mile) and outer LPZ (1.0 mile) were determined for each sector. These are defined as the X/Q value which is exceeded 0.5% of the total time(32). To extract this value, value,the hourly X/Q's are sorted according to sector and magnitude. A cumulative probability distribution of X/Q values can easily be constructed as:

$$P(X/Q) = \frac{\text{rank of } X/Q}{X/Q \text{ population size}} \qquad (7)$$

P(X/Q) is the probability of being exceeded. For example the 10th largest value of a 100 value population has a probability of being exceeded of 10/100 or 10 percent. The highest of the 10 sector X/Q values is defined as the maximum sector X/Q value.

The overall 5 percent site X/Q values which are exceeded no more than five percent of the total time around the exclusion area boundary (.97 mile) and the outer LPZ (1.0 mile) were determined in a manner similar to the .5 percent sector X/Q values. All of the hourly X/Q values were sorted according to magnitude (independent of the direction) and the five percent value chosen from the list.

2.3.4.2 Diffusion Model for 0-8 Hours

The downwind centerline relative concentration of an effluent, continuously released from a point source at ground-level has been evaluated. The model used in the calculations is as follows(32):

$$X/Q = \frac{1}{u(\pi\sigma_y\sigma_z + cA)} \qquad (8)$$

where:

X/Q = relative concentration (sec/m^3)

$\bar{u}$ = average hourly wind speed (m/sec) at the 10 meter level above plant grade

$\sigma_y\sigma_z$ = the horizontal and vertical dispersion coefficients (m), corresponding to the Pasquill stabilities defined in Regulatory Guide 1.23 (RO)(30) from measurements of the vertical temperature difference

c = empirical building shape factor - 0.5 (dimensionless)

A = minimum cross sectional area of the Reactor Building (2726 m^2)

Hourly average winds less than or equal to the starting speed of the anemometer or vane (0.36 mps) were considered calm. The calms were directionally assigned in proportion to the distribution of the lowest (non-calm) wind speed class by stability class. Eight hour running average relative concentrations were calculated by wind at direction the exclusion area boundary and at the low population zone distances.

2.3.4.3 Diffusion Model for 8-24 Hours, 1-4 Days, and 4-30 Days

For the postulated 16-hour, 72-hour, and 624-hour accident periods, the following equation, from Regulatory Guide 1.4 (R2)(31) was used to calculate the relative concentrations by wind direction at 1.0-mile the low-population-zone distance:

$$X/Q_n = \frac{1}{n}\sum_{i=1}^{n}\frac{2.032}{\bar{u}_i D \sigma_{z_i}} \qquad (9)$$

where:

D = distance to point of analysis (m)

n = running-average time of 16-hours, 72-hours and 624-hours, from i = 1 to n

2.3.4.4 Results of Short Term Diffusion Estimates

Two hourly X/Q values were computed using the St. Lucie onsite data for September 1976 to August 1978. The sector X/Q values at the exclusion area boundary (EAB) (.97 mile) and the low-population zone (LPZ) (1.0 mile) were extracted from these X/Qs according to the method described in Subsection 2.3.4.1. The worst, and the worst 95th percentile X/Q values for each accident averaging period (8,16,72, and 624-hours) were determined from the rigorous analysis of all sequential meteorological combinations exhibited in the data base; the 50th percentile X/Q values for all five averaging periods and two boundary distances were computed as well. There are presented in Tables 2.3-83 to 2.3-100 for the data periods September 1976 to August 1977, September 1977 to August 1978, and September 1976 to August 1978. The maximum sector X/Q values for each averaging period, data period, and boundary distances were extracted and are presented in these tables.

The five percent overall X/Q value was determined from the two hourly X/Q values (see Subsection 2.3.4.1). The accident averaging period five percent overall X/Q's were determined from the cumulative frequency distribution of all non-zero X/Q's. The interpolation from the frequency distribution was performed for each data period and each boundary. The maximum sector X/Q's occur in the SE sector. For 1976-1977 the maximum X/Q at the LPZ and EAB was 1.1E-04; for 1977-1978 the maximum X/Q at the LPZ and EAB were 8.5E-05 and 8.7E-05, respectively; for the entire data period (1976-1978) the maximum sector X/Q value at the LPZ and EAB were 1.1E-04 and 1.2E-04, respectively. This maximum X/Q corresponds with stability class F and windspeed of .9 m sec^{-1}. A summary tabulation for the maximum of the sector X/Q values (two hours) and the worst 95th percentile X/Q values is given in Table 2.3-101.

2.3.5 LONG TERM (ROUTINE) DIFFUSION ESTIMATES

The long term diffusion characteristics for the St. Lucie site were estimated in accordance with the criteria set forth in Regulatory Guide 1.111, (R1)(33). The analysis was performed using the onsite meteorological data for a two year period, September 1976 through August 1978 (see Subsection 2.3.2).

Relative concentrations (X/Q) resulting from routine releases were calculated using a modification of the puff-advection model MESODIF developed by Start and Wendell(34,35). A ground release was asssumed. The Start and Wendell dispersion coefficients were replaced with those consistent with other NRC evaluations from Gifford(36). Building wake was incorporated to allow for initial dispersion credit in the building cavity. These calculations were made at distances of .5, 1.5, 2.5, 3.5, 4.5, 7.5, 15, 25, 35, and 45 miles.

Undepleted relative concentrations (X/Q) were also computed using a straight line plume model. The ratios between the X/Q's from each model were determined and are characterized as the terrain/recirculation correction factors.

2.3.5.1 Atmospheric Diffusion Models

2.3.5.1.1 Puff-Advection Model

Spatial variability of stability, mixing height, wind speed, and wind direction facilitate that the effluent plume from a continuous point source be approximated by the release of a series of puffs. Each puff can be modified or advected independently according to the meteorological conditions of its immediate location. Total integrated concentrations at any sampling point can be calculated from the accumulated exposure due to individual puffs as they pass over the point.

The instantaneous contribution of an individual puff to a sampling point's total integrated concentration, after Slade(37), for a ground release, is given by:

$$\frac{X}{Q}(x,y) = \frac{2}{(2\pi)^{3/2}\sigma_r^2\sigma_z} \exp\left(-\frac{1}{2}\frac{(r^2)}{\sigma_r^2}\right) \qquad (10)$$

where:

$\frac{X}{Q}(x,y)$ = The instantaneous ground level relative concentration at coordinate (x,y), (seconds/meter^3),

σ_z = the standard deviation of effluent in the vertical direction (meters),

σ_r = the standard deviation of effluent in the horizontal direction (meters),

r = the distance from the center of the puff to the coordinate (x,y) (meters)

Using Equation (10) the total integrated concentrations are calculated as:

$$TIC(x,y) = \sum_{i=1}^{n} \sum_{j=1}^{J} \sum_{k=1}^{K_i} \sum_{l=1}^{L_J} \frac{\frac{X}{Q}\, ijkl^{(x,y)}}{J\, L_j} \tag{11}$$

where:

$TIC(x,y)$ = accumulated hourly relative concentration at grid point (x,y), (seconds/meter^3),

n = number of sampling hours,

J = the number of advection steps per hour,

K_i = the number of puffs released up to hour i,

L_j = the number of samples per advection step j, and

$\frac{X}{Q}\, ijkl^{(x,y)}$ = the instantaneous relative concentration coordinate (x,y) contributed from puff k, during i, advection step j, sampling step l.

This approximation with adequate sampling frequency will converge to the continuous point source at any level of accuracy required (see Start and Wendell,(34)).

The diffusion of effluents is described by the distance and stability dependent values of σ_r and σ_z. Because the time history of a puff includes spatial and temporal variations of meteorological parameters, the value of σ_r and σ_z cannot be determined as a discrete function of stability and distance. These values are determined in a stepwise fashion according to the general form:

$$\sigma = \sigma_o + \Delta\sigma \tag{12}$$

where:

σ_o = the standard deviation before the advection step (meters),

$\Delta\sigma$ = the incremental change during the advection step just completed (meters), and

σ = the updated standard deviation following the completed advection step (meters).

Between sampling intervals, it is assumed that all meteorological conditions remain constant. Growth of the puff during this interval then is only a function of stability, total distance moved before the advection step, and distance increment moved during the advection step. $\Delta\sigma$ is specified by:

$$\Delta\sigma = s \text{ (IPAS, DIST + DIST)} - S \text{ (IPAS, DIST)} \qquad (13)$$

where:

$$S \text{ (A,B)} = 10^{(a(A)+b(A) \log (B)+c(A) (\log (B))^2)}$$

IPAS = the Pasquill stability class characteristic of the advection process,

DIST = the total distance puff has moved prior to advection step,

DIST = the distance increment moved during the advection step,

a,b,c = are coefficients dependent upon stability class, determined in a manner such that the functions S (A,B) fits the curves given by Gifford(36).

In a method similar to that of Turner(38), σ_z at any time and location is allowed to increase via Equation (12) and Equation (13) until a value of 0.80 times the mixing height has been reached. At this point, the effluent is assumed to be uniformly mixed in the vertical direction. If previous values of σ_z already exceed this limit, they are held constant (i.e., $\Delta\sigma = 0$); they are not reduced in any manner because a negative $\Delta\sigma$ would imply negative diffusion (Start and Wendell,(34)).

2.3.5.1.2 Straight-Line Airflow Model

The use of a ground-level release model in calculating the annual average atmospheric relative concentration (X/Q) values was determined by the meteorological data and the initial plant parameters. Depletion factors are computed directly from depletion curves as are the relative deposition rates(33). For long term, ground level relative concentrations, the plume is assumed to meander evenly over a 22.5 percent sector.

The hourly relative concentration values are calculated at the sector defined by the wind direction using the equation:

$$X/Q = \frac{2.032}{\sigma_z uD} \qquad (14)$$

where:

X/Q = relative ground level concentration (sec/m^3)

σ_z = vertical standard deviation of the plume (meters)

$\bar{u}$ = average wind speed (m/sec.)

D = distance from the source (meters)

However, with the wake turbulent effect considered, the equation is revised to:

$$X/Q = \frac{2.032}{\sqrt{\sigma_z^2 + \frac{cV^2}{\pi}}\ \bar{u}D} \qquad (15)$$

where:

c = building shape factor

v = vertical height of the highest adjacent building

The wake factor $(\frac{cV^2}{\pi})$ is limited, close to the source, to a factor of twice σ_z^2. So if $\sqrt{3}\ \sigma_z < \sqrt{\sigma_z^2 + \frac{cV^2}{\pi}}$ the equation is:

$$X/Q = \frac{2.032}{\sqrt{3}\ \sigma_z \bar{u} D} \qquad (16)$$

(i.e., X/Q is calculated to be the larger of Equations (15) and (16)).

The total integrated relative concentration at each sector and distance is then divided by the total number of hours in the data base.

2.3.5.1.3 Methods of Depletion and Deposition Calculation

Depleted X/Q values were computed by applying the depletion factors provided in Figure 2 of the Regulatory Guide 1.111 (R1)(33) curves to the calculated X/Q values. Relative ground deposition rates were calculated using the equation:

$$D/Q = RDep / (2 \sin (11.25)\ x\ ) \qquad (17)$$

where:

D/Q = Ground deposition rate

RDep = Relative ground deposition rate

x = Calculation distance

2.3.5.2 Terrain/Recirculation Correction Factors

There is a distinct difference in theory between the PUFF model and the straight-line trajectory Gaussian diffusion model. A continuous release is approximated by dividing the plume into a sufficient number of plume elements to represent a continuous plume in the PUFF model. Each element can be modified or advected independently in accord with the meteorological conditions (wind direction and speed, and atmospheric stability) of its immediate location. This would account for the temporal and spatial variations in the airflow in the region of the site. The straight-line trajectory Gaussian diffusion model assumes that a constant mean wind transports and diffuses plume effluents in the direction of airflow at the release point within the entire region of interest, i.e., the wind speed and atmospheric stability at the release point are assumed to determine the atmospheric dispersion characteristics in the direction of the mean wind at all distances. Spatial and temporal variations in airflow in the region of coastal sites should be incorporated(33). This is accomplished by the use of terrain/recirculation correction factors (TCF).

The terrain/recirculation correction factors (TCF) were determined as the ratio between the puff-advection estimate and the straight-line estimate in the form:

$$TCF_{(x,y)} = \frac{\left[\frac{X}{Q}\ (x,y)\right]_P}{\left[\frac{X}{Q}\ (x,y)\right]_S} \qquad (18)$$

where $TCF_{(x,y)}$ = terrain/recirculation correction factor at the point (x,y)

$\left[\frac{X}{Q}(x,y)\right]_P$ = the annual average relative concentration at point (x,y) using a puff-advection modeling scheme

$\left[\frac{X}{Q}(x,y)\right]_S$ = the annual average relative concentration at point (x,y) using a straight-line modeling scheme.

2.3.5.3 Results of Long Term Diffusion Estimates

Annual average relative concentrations (X/Q) were calculated according to Equations (10) (PUFF model) and (14) (straight-line model) on 8760 valid meteorological observation between August 1977 and August 1978 from the St. Lucie site. Terrain/recirculation factors were determined for each sector and distance according to the procedure outlined in Subsection 2.3.5.2. These correction factors are presented in Tables 2.3-102 and 2.3-103. Annual averages were computed for the 16 cardinal directions for the Exclusion Area Boundary (EAB) 0.97 miles, the Low Population Zone (LPZ), 1.0 miles, and the following distances: .5, 1.5, 2.5, 3.5, 4.5, 7.5, 15.0, 25.0, 35.0, and 45.0 miles.

The diffusion calculations were made for each year of data (Sept. 1976 to Aug. 1977 and Sept. 1977 to Aug. 1978) and the entire two year data base using the straight-line model. Depleted X/Qs and deposition rates were also computed for the same points. The results of these calculations were adjusted by the TCF values for each (x,y) point and are presented in Tables 2.3-104 to 2.3-115. The maximum annual average X/Q at the EAB was 1.6E-06. The maximum at the LPZ was 1.4E-06.

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TABLE 2.3-1

MAXIMUM RECORDED POINT RAINFALL
WEST PALM BEACH, FLORIDA

	MINUTES				HOURS				
Time Period	5	10	15	60	2	3	6	12	24
Amount (in inches)	0.74	0.90	1.17	4.40	8.35	8.77	9.90	15.16	15.23
Date	7/19/58	9/16/59	5/11/58	4/17/42	4/17/42	4/17/42	4/17/42	4/17/42	4/17/42
Period of Record	1953-1961			1941-1961					1939-1961

Reference: U.S. Dept. of Commerce, 1963, Weather Bureau Technical Paper No. 2 - Maximum Recorded U.S. Point Rainfall, Environmental Data Service.

TABLE 2.3-2

ESTIMATED RAINFALL FREQUENCY FOR THE ST. LUCIE SITE (inches)

	Return Period (Years)						
Time Interval	1	2	5	10	25	50	100
30 minutes	1.6	1.9	2.3	2.6	3.0	3.3	3.5
1 hour	2.1	2.4	3.0	3.3	3.7	4.1	4.6
2 hours	2.4	2.9	3.6	4.3	4.7	5.4	6.0
3 hours	2.7	3.3	4.1	4.8	5.5	6.1	6.8
6 hours	3.2	3.8	5.0	6.0	6.8	7.6	8.5
12 hours	3.7	4.5	6.0	7.1	8.1	9.4	10.5
24 hours	4.3	5.4	7.1	8.5	9.9	11.1	12.5

Reference: Hershfield, P.M., 1961, Rainfall Frequency Atlas of the United States for Durations of from 30 Minutes to 24 Hours and Return Periods of from 1 to 100 Years, U.S. Dept. of Commerce, Weather Bureau Technical Paper No. 40.

TABLE 2.3-3

ESTIMATED PROBABLE MAXIMUM PRECIPITATION FOR FLORIDA

Duration (hours)	Amount (inches)
6	32.0
12	38.7
24	47.1
48	51.8
72	55.7

Reference: Schriener, Personal Communication NOAA Office of Hydrology about Hydrometeorological Report No. 51 (June 1978)

TABLE 2.3-4

AVERAGE MONTHLY AND ANNUAL THUNDERSTORM STATISTICS

Month	West Palm Beach Average Number of Thunderstorm Days (1943-1974)(a)(1)	Estimated Lightning Strikes Per Km^2 Based on West Palm Beach Data(2)	State of Florida Average Number of Surface Hail Occurrences (1955-1967)(b)(3)
January	1	0.1 - 0.2	0.0
February	1	0.1 - 0.2	0.1
March	2	0.1 - 0.3	1.2
April	3	0.2 - 0.5	1.5
May	8	0.4 - 1.3	2.5
June	13	0.7 - 2.0	1.8
July	16	0.8 - 2.5	1.2
August	16	0.8 - 2.5	0.2
September	11	0.6 - 1.7	0.3
October	5	0.3 - 0.8	0.2
November	1	0.1 - 0.2	0.1
December	1	0.1 - 0.2	0.0
Annual	79	4.2 -12.4	8.9

(a) Define as day on which thunder is heard at station.
(b) 3/4-inch diameter and larger.

Reference: (1) U.S. Dept. of Commerce, 1977, Local Climatological Data - Annual Summary with Comparative Data: West Palm Beach, Florida. Environmental Data Service.

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TABLE 2.3-5

MONTHLY DISTRIBUTION OF TROPICAL CYCLONES AFFECTING THE FLORIDA PENINSULA (1900 1963)

Month	Hurricanes	Tropical Storms	Tropical Depressions	Total
January	0	0	0	0
February	0	1	0	1
March	0	0	0	0
April	0	0	0	0
May	0	1	0	1
June	2	2	2	6
July	2	3	1	6
August	3	9	2	14
September	10	5	1	16
October	7	9	1	17
November	1	2	0	3
December	0	1	0	1
Annual	25	33	7	65

<u>Reference</u>: Cry, G.W., 1965, <u>Tropical Cyclones of the North Atlantic Ocean</u>, U.S. Dept. of Commerce, Weather Bureau Technical Paper No. 55.

TABLE 2.3-6

CUMULATIVE FREQUENCY OF WATERSPOUTS OCCURRING WITHIN 100 MILES FROM ST. LUCIE FOR VARIOUS DISTANCES OFFSHORE AND THE PROBABILITY AND RECURRENCE INTERVALS BASED UPON STORM DATA RECORDS FROM 1952 TO 1973

	Distance from Land (miles)			
	0 - 2	0 - 4	0 - 8	0 - 25
Frequency	8	17	41	52
Adjusted Frequencies By Apportioning 126 of the Unknown Observations	27	58	140	178
Area Examined (square miles)	400	800	1600	5000
Probability (10^{-4})	4.60	4.94	5.97	2.40
Recurrence Interval (years)	2174	2024	1675	4167

Reference: U.S. Dept. of Commerce, 1952-1973, Storm Data, NOAA, Environmental Data Service.

TABLE 2.3-7

MONTHLY DISTRIBUTION OF WATERSPOUTS WITHIN 25 MILES OFFSHORE

Month	Total
J	6
F	5
M	8
A	4
M	14
J	16
J	51
A	19
S	30
O	17
N	7
D	1
TOTAL	178

Reference: U.S. Dept. of Commerce, 1952-1973, Storm Data, NOAA, Environmental Data Service.

TABLE 2.3-8

ONE MINUTE WIND SPEED RECURRENCE INTERVALS WEST PALM BEACH, FLORIDA

Recurrence Interval (Years)	Wind Speed (mph)
2	50
10	80
25	100
50	110
100	120

Reference: American National Standard, 1972, Building Code Requirements for Minimum Design Loads in Buildings and Other Structures, ANSI A58.1-1972.

TABLE 2.3-9

LONG TERM AVERAGE WIND SPEED AND PREVAILING DIRECTION AT WEST PALM BEACH, FLORIDA

Month	Average Speed (mph)[a]	Prevailing Direction[b]
January	9.8	NW
February	10.3	SE
March	10.7	SE
April	10.9	E
May	9.6	ESE
June	8.0	ESE
July	7.5	ESE
August	7.6	ESE
September	8.6	ENE
October	10.0	ENE
November	10.0	ENE
December	9.9	NNW
Annual	9.4	ESE

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a) Period of Record: 1942-1977
b) Period of Record: 1963-1977

Reference: U.S. Dept. of Commerce, 1977, Local Climatological Data - Annual Summary with Comparative Data: West Palm Beach, Florida, NOAA, Environmental Data Service

TABLE 2.3-10

AVERAGE WIND SPEED AND PREVAILING DIRECTION AT THE ST. LUCIE SITE

Month	Average Speed (mph)	Prevailing Direction
January	8.1	NW
February	7.6	NW
March	7.2	SE
April	7.8	ESE
May	6.7	ESE
June	6.3	SSE
July	5.8	SSE
August	6.5	ESE
September	5.1	SE
October	7.4	NE
November	6.9	N
December	7.8	WNW
Annual	6.9	SE

Period of Record: September 1976 - August 1978

TABLE 2.3-11

STATISTICS AND DIURNAL VARIATION OF METEOROLOGICAL PARAMETERS
DATA PERIOD: SEPTEMBER 1, 1976 - AUGUST 31, 1978

DATA SOURCE: ON-SITE

ST. LUCIE UNIT 2
HUTCHINSON ISLAND, FLORIDA
FLORIDA POWER AND LIGHT CO.

METEOROLOGICAL PARAMETERS (HEIGHTS IN METERS)

	WIND SPEED	WIND DIR	WIND SPEED	WIND DIR
	10.00	10.00	57.91	57.91
HOUR	M/SEC		M/SEC	
1	2.8	S	5.3	S
2	2.8	SSW	5.3	S
3	2.7	SSW	5.2	SSW
4	2.7	SW	5.2	SSW
5	2.6	WSW	5.1	SW
6	2.6	WSW	5.1	WSW
7	2.7	W	5.0	WSW
8	2.8	W	4.9	W
9	3.1	WSW	4.9	W
10	3.3	E	5.1	ENE
11	3.4	E	5.3	E
12	3.6	E	5.6	E
13	3.7	E	5.7	E
14	3.8	E	6.0	E
15	3.7	E	6.1	E
16	3.6	E	6.1	E
17	3.5	ESE	6.1	E
18	3.3	ESE	6.0	ESE
19	3.0	ESE	5.8	ESE
20	3.0	SE	5.7	ESE
21	2.9	SE	5.6	SE
22	3.0	SE	5.7	SE
23	3.0	SSE	5.5	SSE
24	2.9	S	5.4	SSE
ABSOLUTE MAX	13.4		18.6	
AVG DAILY MAX	4.8		8.1	
MEAN	3.1	SE	5.5	ESE
CLIMATIC MEAN	3.2		5.6	
AVG DAILY MIN	1.6		3.1	
ABSOLUTE MIN	0.0		0.0	
STANDARD DEV	1.4		2.5	
VALID OBS	16966	16522	17072	16907
INVALID OBS	554	998	448	613
TOTAL OBS	17520	17520	17520	17520
DATA RECOVERY	96.8	94.3	97.4	96.5

FLORIDA POWER AND LIGHT CO.
ST. LUCIE UNIT 2

DATA PERIOD (YR - JULIAN DAY) - 76245 TO 78243
THRESHOLD OF ANEMOMETER (MPH) - .58

WIND DIRECTION PERSISTENCE - PASQUILL #A#
1 SECTOR PERSISTENCE

CONSECUTIVE HOURS

SECTOR	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	>24
NNE	19	12	5	3	6	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NE	23	14	5	4	2	5	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ENE	26	6	8	1	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
E	19	3	5	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ESE	16	15	3	6	0	1	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SE	16	10	6	2	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SSE	8	13	6	5	8	3	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
S	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SSW	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SW	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WSW	7	2	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
W	8	1	2	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WNW	10	3	2	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NW	7	2	5	3	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NNW	9	5	3	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N	18	14	3	5	4	0	4	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

AVERAGE WIND SPEED (M/SEC)

CONSECUTIVE HOURS

SECTOR	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	>24
NNE	3.73	3.91	3.29	4.17	3.83	0.	3.46	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NE	3.29	3.37	3.84	3.53	3.80	3.77	5.20	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ENE	3.23	3.23	3.76	2.86	2.61	3.45	6.37	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
E	3.41	2.88	3.64	3.84	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ESE	3.24	3.30	3.54	2.99	0.	2.75	4.17	3.03	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SE	3.44	3.70	3.58	4.20	4.10	3.90	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SSE	4.00	4.26	4.40	4.51	4.81	5.26	4.66	4.64	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
S	4.77	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SSW	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SW	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
WSW	4.05	4.77	5.92	0.	0.	0.	4.58	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
W	3.70	2.23	5.36	4.29	0.	0.	3.80	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
WNW	3.58	3.48	3.46	4.60	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NW	3.83	4.40	4.11	4.08	6.11	5.08	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NNW	3.43	4.95	4.10	4.53	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
N	4.00	4.20	4.10	4.79	4.43	0.	5.27	5.96	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

TOTAL NO. OF OBSERVATIONS = 17520

Table 2.3-13

FLORIDA POWER AND LIGHT CO.
ST. LUCIE UNIT 2

DATA PERIOD (YR - JULIAN DAY) - 76245 TO 78243
THRESHOLD OF ANEMOMETER (MPH) - .58

WIND DIRECTION PERSISTENCE - PASQUILL *B*
1 SECTOR PERSISTENCE

CONSECUTIVE HOURS

SECTOR	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	>24
NNE	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NE	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ENE	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
E	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ESE	4	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SE	7	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SSE	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SSW	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SW	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WSW	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
W	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WNW	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NW	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NNW	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N	9	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

AVERAGE WIND SPEED (M/SEC)

CONSECUTIVE HOURS

SECTOR	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	>24
NNE	4.40	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NE	3.26	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ENE	2.91	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
E	3.13	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ESE	3.35	3.13	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SE	3.16	3.20	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SSE	3.58	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
S	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SSW	4.13	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SW	7.82	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
WSW	0.	8.34	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
W	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
WNW	2.01	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NW	2.01	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NNW	4.02	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
N	4.00	6.85	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

TOTAL NO. OF OBSERVATIONS = 17520

SL2-FSAR
TABLE 2.3-14

FLORIDA POWER AND LIGHT CO.
ST. LUCIE UNIT 2

DATA PERIOD (YR - JULIAN DAY) - 76245 TO 78243
THRESHOLD OF ANEMOMETER (MPH) - .58

WIND DIRECTION PERSISTENCE - PASQUILL #C#
1 SECTOR PERSISTENCE

CONSECUTIVE HOURS

SECTOR	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	>24
NNE	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NE	4	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ENE	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
E	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ESE	8	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SE	4	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SSE	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
S	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SSW	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SW	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WSW	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
W	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WNW	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NW	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NNW	4	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N	7	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

AVERAGE WIND SPEED (M/SEC)

CONSECUTIVE HOURS

SECTOR	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	>24
NNE	0.	6.56	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NE	3.97	3.58	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ENE	3.41	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
E	3.26	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ESE	2.91	3.35	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SE	3.41	2.98	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SSE	3.50	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
S	0.	5.36	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SSW	0.	3.13	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SW	4.25	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
WSW	4.36	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
W	3.58	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
WNW	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NW	0.	2.68	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NNW	3.35	4.77	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
N	5.27	3.80	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

TOTAL NO. OF OBSERVATIONS = 17520

TABLE 2.3-15

FLORIDA POWER AND LIGHT CO.
ST. LUCIE UNIT 2

DATA PERIOD (YR - JULIAN DAY) - 76245 TO 78243
THRESHOLD OF ANEMOMETER (MPH) - .58

WIND DIRECTION PERSISTENCE - PASQUILL "D"
1 SECTOR PERSISTENCE

CONSECUTIVE HOURS

SECTOR	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	>24
NNE	13	6	4	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NE	22	8	4	2	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
ENE	49	19	9	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
E	43	15	3	2	1	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ESE	60	28	13	9	0	1	1	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SE	56	18	6	2	5	2	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SSE	52	23	7	2	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
S	33	11	10	6	1	0	1	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SSW	58	25	11	12	3	5	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SW	48	19	9	4	0	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WSW	16	4	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
W	19	2	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WNW	18	5	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NW	35	14	8	4	1	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NNW	34	13	9	9	1	1	0	0	1	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0
N	18	9	6	3	3	0	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0

AVERAGE WIND SPEED (M/SEC)

CONSECUTIVE HOURS

SECTOR	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	>24
NNE	3.97	2.86	3.94	0.	0.	3.58	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NE	3.42	4.34	5.85	2.23	5.44	4.60	0.	0.	0.	0.	0.	0.	0.	5.78	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ENE	3.70	3.59	3.66	0.	3.58	6.07	0.	5.31	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
E	3.56	3.22	3.58	3.84	4.10	0.	0.	3.21	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ESE	3.14	3.27	3.55	3.29	0.	3.38	2.96	0.	0.	2.93	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SE	3.05	2.74	3.13	3.49	2.58	2.71	0.	0.	0.	3.74	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SSE	3.04	3.42	4.10	4.51	3.95	0.	0.	0.	0.	0.	3.09	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
S	3.35	4.28	3.92	4.10	5.36	0.	5.14	5.14	6.35	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SSW	3.59	3.92	4.11	3.90	3.95	5.52	3.97	4.92	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SW	3.63	3.87	4.13	3.72	0.	3.26	5.53	0.	0.	5.20	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
WSW	2.50	4.73	4.25	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
W	2.95	1.79	2.35	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
WNW	2.46	3.61	3.16	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NW	3.22	3.46	3.11	4.11	2.53	0.	3.80	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NNW	3.42	3.77	3.79	3.95	4.62	3.38	0.	0.	3.26	3.49	0.	0.	0.	0.	0.	0.	5.12	0.	0.	0.	0.	0.	0.	0.
N	3.54	4.28	4.23	4.08	4.54	0.	4.64	0.	0.	0.	4.32	4.71	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

TOTAL NO. OF OBSERVATIONS = 17520

TABLE 2.3-16

FLORIDA POWER AND LIGHT CO.
ST. LUCIE UNIT 2

DATA PERIOD (YR - JULIAN DAY) - 76245 TO 78243
THRESHOLD OF ANEMOMETER (MPH) - .58

WIND DIRECTION PERSISTENCE - PASQUILL #E#
1 SECTOR PERSISTENCE

CONSECUTIVE HOURS

SECTOR	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	>24
NNE	23	10	5	4	3	0	2	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
NE	19	18	8	5	0	4	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ENE	39	18	5	8	5	5	2	1	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
E	37	24	10	7	4	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ESE	65	37	22	15	8	3	5	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0
SE	62	38	29	6	12	6	5	4	0	1	1	1	1	1	0	1	0	0	0	0	0	0	0	0
SSE	67	41	18	9	5	1	3	3	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
S	39	18	8	9	1	3	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SSW	49	21	8	4	4	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SW	71	18	17	6	4	0	1	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WSW	54	21	5	5	0	0	1	0	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
W	38	11	8	4	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WNW	60	8	9	4	3	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NW	56	22	14	5	11	3	2	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
NNW	52	20	15	8	9	2	1	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
N	30	15	8	6	3	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

AVERAGE WIND SPEED (M/SEC)

CONSECUTIVE HOURS

SECTOR	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	>24
NNE	2.86	2.77	2.66	3.24	4.12	0.	3.63	4.22	5.99	0.	0.	5.43	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NE	2.82	3.32	3.65	3.65	0.	4.20	1.68	0.	0.	4.96	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ENE	3.13	3.10	5.14	4.20	3.20	4.99	3.69	3.38	0.	5.42	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
E	3.32	3.48	4.00	2.75	2.94	1.72	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ESE	2.72	2.90	2.64	3.22	3.08	2.41	3.69	4.27	4.43	4.51	3.17	3.06	3.93	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SE	2.29	2.57	2.52	2.70	2.83	3.77	3.01	3.82	0.	3.45	3.72	3.06	2.97	3.04	0.	2.34	0.	0.	0.	0.	0.	0.	0.	0.
SSE	2.32	2.41	2.76	3.13	2.40	1.92	3.11	2.42	2.86	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
S	3.01	2.86	3.35	3.53	2.09	4.26	2.91	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SSW	3.45	3.24	3.84	3.98	4.79	5.04	0.	2.88	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SW	2.69	2.38	2.80	3.67	4.04	0.	4.64	3.90	4.78	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
WSW	2.18	2.43	2.53	1.81	0.	0.	3.52	0.	1.34	0.	2.31	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
W	2.02	2.11	2.70	3.06	2.48	1.40	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
WNW	2.21	1.94	2.62	1.77	3.72	2.87	2.29	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NW	2.67	2.78	2.69	2.77	2.95	4.02	2.85	2.78	0.	0.	3.02	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NNW	2.76	2.95	3.54	2.82	3.18	3.51	2.74	3.43	3.31	0.	0.	0.	3.29	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
N	2.92	2.79	3.62	4.22	5.07	1.53	2.91	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

TOTAL NO. OF OBSERVATIONS = 17520

TABLE 2.3-17

FLORIDA POWER AND LIGHT CO.
ST. LUCIE UNIT 2

DATA PERIOD (YR - JULIAN DAY) - 76245 TO 78243
THRESHOLD OF ANEMOMETER (MPH) - .58

WIND DIRECTION PERSISTENCE - PASQUILL *F*
1 SECTOR PERSISTENCE

CONSECUTIVE HOURS

SECTOR	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	>24
NNE	3	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NE	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ENE	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
E	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ESE	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SE	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SSE	7	3	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
S	6	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SSW	6	3	1	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SW	10	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WSW	10	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
W	3	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WNW	9	0	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NW	13	1	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NNW	12	6	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

AVERAGE WIND SPEED (M/SEC)

CONSECUTIVE HOURS

SECTOR	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	>24
NNE	1.56	1.94	2.01	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NE	2.91	1.49	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ENE	0.	3.13	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
E	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ESE	1.79	2.23	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SE	2.91	1.04	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SSE	2.20	2.33	0.	0.	0.	0.	0.	1.84	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
S	2.11	3.13	1.34	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SSW	2.83	1.64	1.12	2.23	2.16	0.	0.	2.93	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SW	1.84	1.79	2.79	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
WSW	1.54	1.49	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
W	1.42	0.	1.79	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
WNW	1.65	0.	1.34	1.79	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NW	1.85	2.53	2.07	0.	2.61	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NNW	1.87	2.01	2.57	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
N	2.01	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

TOTAL NO. OF OBSERVATIONS = 17520

TABLE 2.-18

FLORIDA POWER AND LIGHT CO.
ST. LUCIE UNIT 2

DATA PERIOD (YR - JULIAN DAY) - 76245 TO 78243
THRESHOLD OF ANEMOMETER (MPH) - .58

WIND DIRECTION PERSISTENCE - PASQUILL #G#
1 SECTOR PERSISTENCE

CONSECUTIVE HOURS

SECTOR	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	>24
NNE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NE	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ENE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
E	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ESE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SSE	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SSW	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SW	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WSW	6	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
W	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WNW	9	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NW	13	2	2	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NNW	3	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

AVERAGE WIND SPEED (M/SEC)

CONSECUTIVE HOURS

SECTOR	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	>24
NNE	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NE	0.	2.53	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ENE	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
E	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ESE	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SE	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SSE	.45	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
S	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SSW	0.	99.99	1.90	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SW	1.79	1.34	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
WSW	1.71	1.34	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
W	1.12	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
WNW	1.42	1.34	99.99	1.43	0.	1.40	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NW	1.97	1.86	1.62	1.16	1.64	0.	99.99	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NNW	1.79	0.	0.	1.25	2.16	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
N	1.34	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

TOTAL NO. OF OBSERVATIONS = 17520

TABLE 2.3-19

FLORIDA POWER AND LIGHT CO.
ST. LUCIE UNIT 2

DATA PERIOD (YR - JULIAN DAY) - 76245 TO 78243
THRESHOLD OF ANEMOMETER (MPH) - .58

WIND DIRECTION PERSISTENCE - PASQUILL #S#
1 SECTOR PERSISTENCE

CONSECUTIVE HOURS

SECTOR	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	>24
NNE	27	8	6	7	4	0	2	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
NE	21	18	8	6	0	5	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ENE	42	20	5	8	6	5	2	1	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
E	43	25	11	7	4	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ESE	67	37	22	14	9	5	6	1	2	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0
SE	67	40	30	5	12	7	5	5	0	1	1	0	1	0	0	2	0	0	1	0	0	0	0	0
SSE	72	46	24	10	5	2	3	4	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
S	47	19	12	10	1	4	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SSW	60	22	13	7	5	2	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
SW	84	23	17	5	7	1	1	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WSW	67	29	6	6	0	0	1	0	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
W	47	12	10	5	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WNW	75	16	12	6	3	4	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NW	70	33	16	9	8	7	6	3	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
NNW	64	26	20	10	12	2	1	0	1	1	0	0	2	0	0	0	0	0	0	0	0	0	0	0
N	35	18	7	6	4	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

AVERAGE WIND SPEED (M/SEC)

CONSECUTIVE HOURS

SECTOR	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	>24
NNE	2.73	2.78	2.72	2.61	3.65	0.	3.63	4.22	5.99	0.	0.	5.43	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NE	2.65	3.26	3.79	3.20	0.	3.84	1.68	0.	0.	4.96	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ENE	3.11	2.94	5.14	3.97	3.48	4.99	3.69	3.38	0.	5.42	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
E	3.35	3.46	3.90	2.75	2.94	1.72	0.	0.	0.	4.92	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ESE	2.65	2.86	2.57	3.26	3.04	3.05	3.32	4.27	4.74	4.51	3.17	3.06	3.93	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SE	2.30	2.57	2.48	2.83	2.80	3.59	3.01	3.82	0.	3.45	3.72	0.	2.97	0.	0.	2.70	0.	0.	3.29	0.	0.	0.	0.	0.
SSE	2.27	2.34	2.56	3.01	2.40	2.30	3.11	2.27	2.86	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
S	2.86	2.68	3.07	3.41	2.09	3.98	3.13	2.48	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SSW	3.25	3.11	3.42	2.80	3.98	3.61	99.99	2.88	0.	0.	3.09	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SW	2.48	2.27	2.77	3.63	3.49	3.07	4.64	3.90	4.78	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
WSW	2.08	2.37	2.23	1.61	0.	0.	3.52	0.	1.34	0.	2.31	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
W	1.87	2.04	2.56	2.81	2.48	1.40	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
WNW	2.08	1.68	2.46	1.68	3.60	1.77	2.29	2.23	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NW	2.48	2.54	2.62	2.31	3.18	2.99	2.34	2.63	0.	0.	3.02	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NNW	2.58	2.67	3.32	2.62	3.05	3.51	2.12	0.	3.31	3.33	0.	0.	2.94	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
N	2.73	2.65	3.64	4.01	4.82	1.53	2.91	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

TOTAL NO. [illegible] OBSERVATIONS . [illegible]520

TABLE 2.3-20

FLORIDA POWER AND LIGHT CO.
ST. LUCIE UNIT 2

DATA PERIOD (YR - JULIAN DAY) - 76245 TO 78243
THRESHOLD OF ANEMOMETER (MPH) - .58

WIND DIRECTION PERSISTENCE - PASQUILL ALL
1 SECTOR PERSISTENCE

CONSECUTIVE HOURS

SECTOR	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	>24
NNE	52	17	20	12	7	7	4	3	2	2	1	2	0	0	1	0	0	0	0	0	0	0	0	0
NE	58	34	24	16	7	8	3	2	4	3	1	1	2	1	0	0	1	0	0	0	0	0	1	0
ENE	89	47	22	20	17	9	7	4	4	1	4	0	0	0	1	0	0	0	0	0	0	0	1	0
E	93	50	22	10	16	5	2	4	3	1	3	0	0	1	0	0	0	0	0	0	0	0	0	0
ESE	102	52	40	34	24	11	4	7	5	5	8	2	2	1	2	0	0	1	1	1	2	0	1	1
SE	110	62	48	16	21	11	3	11	5	2	2	1	0	1	3	1	0	1	2	0	0	0	2	2
SSE	93	75	52	23	16	13	10	7	6	1	0	4	2	0	0	0	2	0	0	0	0	0	0	1
S	78	29	19	15	9	4	3	2	4	3	0	2	0	1	0	0	0	0	0	0	0	0	0	0
SSW	115	52	28	22	10	6	3	5	2	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0
SW	96	39	33	17	12	7	2	4	3	0	2	0	0	1	0	1	0	0	0	0	0	0	0	0
WSW	87	41	13	8	11	0	0	2	1	0	2	0	0	0	0	0	1	0	0	0	0	0	0	0
W	77	21	20	5	2	3	1	0	1	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0
WNW	101	28	20	8	8	4	2	4	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NW	105	48	29	16	19	11	11	2	2	3	2	1	1	1	0	0	0	1	0	0	0	0	0	0
NNW	79	46	28	21	18	11	5	4	3	0	3	2	1	1	0	0	1	1	1	0	0	0	0	0
N	50	35	21	14	8	9	8	2	3	5	3	1	1	2	0	1	1	0	0	1	0	1	0	0

AVERAGE WIND SPEED (M/SEC)

CONSECUTIVE HOURS

SECTOR	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	>24
NNE	3.13	3.12	2.99	3.31	3.86	3.60	3.20	4.37	5.34	2.56	3.02	4.21	0.	0.	6.79	0.	0.	0.	0.	0.	0.	0.	0.	0.
NE	2.82	2.85	3.47	3.34	4.02	3.45	2.54	2.81	4.03	4.97	2.87	4.33	5.11	6.02	0.	0.	5.71	0.	0.	0.	0.	0.	5.42	0.
ENE	3.01	2.93	3.68	3.73	3.84	3.62	4.90	4.07	3.79	5.77	5.12	0.	0.	0.	1.48	0.	0.	0.	0.	0.	0.	0.	5.72	0.
E	3.19	3.17	3.73	2.88	3.53	3.37	3.86	3.85	3.92	4.92	3.22	0.	0.	2.71	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ESE	2.69	2.81	2.87	3.15	3.10	2.80	2.98	3.26	3.64	3.42	3.06	3.15	3.64	3.49	3.27	0.	0.	5.13	4.60	3.98	3.62	0.	3.07	4.11
SE	2.54	2.84	2.79	3.06	2.70	3.46	2.83	2.93	3.73	2.82	3.35	3.78	0.	3.75	2.91	3.05	0.	1.39	2.85	0.	0.	0.	4.39	3.73
SSE	2.65	2.66	3.11	3.26	3.25	3.17	3.47	4.32	3.68	5.12	0.	3.65	3.19	0.	0.	0.	3.88	0.	0.	0.	0.	0.	0.	3.92
S	3.03	3.10	3.23	3.58	2.95	5.08	4.53	4.25	4.24	4.70	0.	4.40	0.	2.89	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SSW	3.25	3.43	3.80	3.89	3.96	3.92	3.46	4.06	3.20	0.	4.75	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SW	2.88	2.80	3.33	3.13	3.46	3.29	3.52	3.40	4.31	0.	3.99	0.	0.	5.01	0.	5.02	0.	0.	0.	0.	0.	0.	0.	0.
WSW	2.19	2.82	3.07	2.39	3.30	0.	0.	1.99	4.74	0..	1.25	0.	0.	0.	0.	0.	3.30	0.	0.	0.	0.	0.	0.	0.
W	2.13	2.20	3.29	2.41	2.12	2.15	2.51	0.	3.93	0.	5.70	0.	3.32	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
WNW	2.25	2.18	2.70	2.44	2.80	2.83	2.96	2.77	3.26	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NW	2.38	2.76	2.99	2.75	3.29	2.86	2.80	2.56	3.87	3.48	3.93	2.99	3.99	3.90	0.	0.	0.	5.98	0.	0.	0.	0.	0.	0.
NNW	2.80	2.95	3.16	3.48	3.30	3.19	3.53	3.58	4.13	0.	4.67	3.52	3.29	2.62	0.	0.	4.77	5.06	3.87	0.	0.	0.	0.	0.
N	2.96	3.00	3.69	3.78	4.07	4.22	3.67	5.34	4.37	4.29	4.61	4.47	4.50	4.96	0.	6.05	4.92	0.	0.	4.98	0.	4.76	0.	0.

TOTAL NO. OF OBSERVATIONS = 17520

TABLE 2.3-21

JOINT WIND FREQUENCY DISTRIBUTION BY STABILITY CLASS
DATA PERIOD: SEPTEMBER 1, 1976 - AUGUST 31, 1978

STABILITY CLASS: PASQUILL A
DATA SOURCE: ON-SITE
WIND SENSOR HEIGHT: 10.00 METERS

ST. LUCIE UNIT 2
HUTCHINSON ISLAND, FLORIDA
FLORIDA POWER AND LIGHT CO.

WIND SECTOR	WIND SPEED CATEGORIES(METERS PER SECOND) 0.0-1.5	1.5-3.0	3.0-5.0	5.0-7.5	7.5-10.0	>10.0	TOTAL	MEAN SPEED
NNE	2 .10 .01	23 1.17 .14	135 6.86 .82	17 .86 .10	0 0.00 0.00	0 0.00 0.00	177 8.99 1.08	3.76
NE	3 .15 .02	56 2.84 .34	150 7.62 .92	21 1.07 .13	0 0.00 0.00	0 0.00 0.00	230 11.68 1.40	3.57
ENE	3 .15 .02	56 2.84 .34	103 5.23 .63	13 .66 .08	0 0.00 0.00	0 0.00 0.00	175 8.89 1.07	3.43
E	0 0.00 0.00	36 1.83 .22	88 4.47 .54	2 .10 .01	0 0.00 0.00	0 0.00 0.00	126 6.40 .77	3.36
ESE	1 .05 .01	68 3.45 .42	127 6.45 .78	7 .36 .04	0 0.00 0.00	0 0.00 0.00	203 10.31 1.24	3.28
SE	1 .05 .01	36 1.83 .22	149 7.57 .91	3 .15 .02	0 0.00 0.00	0 0.00 0.00	189 9.60 1.15	3.55
SSE	1 .05 .01	9 .46 .05	164 8.33 1.00	55 2.79 .34	1 .05 .01	0 0.00 0.00	230 11.68 1.40	4.44
S	0 0.00 0.00	1 .05 .01	11 .56 .07	7 .36 .04	0 0.00 0.00	0 0.00 0.00	19 .96 .12	4.84
SSW	1 .05 .01	1 .05 .01	0 0.00 0.00	0 0.00 0.00	0 0.00 0.00	0 0.00 0.00	2 .10 .01	2.00
SW	0 0.00 0.00	3 .15 .02	6 .30 .04	1 .05 .01	0 0.00 0.00	0 0.00 0.00	10 .51 .06	3.73
WSW	0 0.00 0.00	8 .41 .05	27 1.37 .16	11 .56 .07	0 0.00 0.00	0 0.00 0.00	46 2.34 .28	4.36
W	0 0.00 0.00	12 .61 .07	25 1.27 .15	11 .56 .07	0 0.00 0.00	0 0.00 0.00	48 2.44 .29	4.14
WNW	1 .05 .01	20 1.02 .12	36 1.83 .22	8 .41 .05	0 0.00 0.00	0 0.00 0.00	65 3.30 .40	3.53
NW	5 .25 .03	20 1.02 .12	67 3.40 .41	23 1.17 .14	0 0.00 0.00	0 0.00 0.00	115 5.84 .70	3.93
NNW	2 .10 .01	16 .81 .10	72 3.66 .44	19 .96 .12	0 0.00 0.00	0 0.00 0.00	109 5.54 .67	3.98
N	0 0.00 0.00	19 .96 .12	143 7.26 .87	63 3.20 .38	0 0.00 0.00	0 0.00 0.00	225 11.43 1.37	4.41
CALM	0 0.00 0.00						0 0.00 0.00	CALM
TOTAL	20 1.02 .12	384 19.50 2.34	1303 66.18 7.96	261 13.26 1.59	1 .05 .01	0 0.00 0.00	1969 100.00 12.02	3.81

KEY XXX NUMBER OF OCCURRENCES
XXX PERCENT OCCURRENCES THIS CLASS
XXX PERCENT OCCURRENCES ALL CLASSES

TABLE 2.3-22

JOINT WIND FREQUENCY DISTRIBUTION BY STABILITY CLASS
DATA PERIOD: SEPTEMBER 1, 1976 - AUGUST 31, 1978

STABILITY CLASS: PASQUILL B
DATA SOURCE: ON-SITE
WIND SENSOR HEIGHT: 10.00 METERS

ST. LUCIE UNIT 2
HUTCHINSON ISLAND, FLORIDA
FLORIDA POWER AND LIGHT CO.

WIND SECTOR	WIND SPEED CATEGORIES(METERS PER SECOND) 0.0-1.5	1.5-3.0	3.0-5.0	5.0-7.5	7.5-10.0	>10.0	TOTAL	MEAN SPEED
NNE	0	14	25	4	0	0	43	3.41
	0.00	2.23	3.98	.64	0.00	0.00	6.85	
	0.00	.09	.15	.02	0.00	0.00	.26	
NE	2	25	23	5	0	0	55	3.29
	.32	3.98	3.66	.80	0.00	0.00	8.76	
	.01	.15	.14	.03	0.00	0.00	.34	
ENE	0	30	29	2	0	0	61	3.16
	0.00	4.78	4.62	.32	0.00	0.00	9.71	
	0.00	.18	.18	.01	0.00	0.00	.37	
E	1	25	30	0	0	0	56	3.03
	.16	3.98	4.78	0.00	0.00	0.00	8.92	
	.01	.15	.18	0.00	0.00	0.00	.34	
ESE	0	28	54	1	0	0	83	3.19
	0.00	4.46	8.60	.16	0.00	0.00	13.22	
	0.00	.17	.33	.01	0.00	0.00	.51	
SE	0	18	48	2	0	0	68	3.46
	0.00	2.87	7.64	.32	0.00	0.00	10.83	
	0.00	.11	.29	.01	0.00	0.00	.42	
SSE	0	6	38	8	0	0	52	3.99
	0.00	.96	6.05	1.27	0.00	0.00	8.28	
	0.00	.04	.23	.05	0.00	0.00	.32	
S	0	1	6	2	0	0	9	4.08
	0.00	.16	.96	.32	0.00	0.00	1.43	
	0.00	.01	.04	.01	0.00	0.00	.05	
SSW	0	2	7	2	0	0	11	3.92
	0.00	.32	1.11	.32	0.00	0.00	1.75	
	0.00	.01	.04	.01	0.00	0.00	.07	
SW	1	3	5	3	2	0	14	4.35
	.16	.48	.80	.48	.32	0.00	2.23	
	.01	.02	.03	.02	.01	0.00	.09	
WSW	0	2	11	2	4	0	19	4.80
	0.00	.32	1.75	.32	.64	0.00	3.03	
	0.00	.01	.07	.01	.02	0.00	.12	
W	4	5	4	3	0	0	16	3.21
	.64	.80	.64	.48	0.00	0.00	2.55	
	.02	.03	.02	.02	0.00	0.00	.10	
WNW	1	9	7	0	0	0	17	2.84
	.16	1.43	1.11	0.00	0.00	0.00	2.71	
	.01	.05	.04	0.00	0.00	0.00	.10	
NW	4	7	10	1	0	0	22	2.96
	.64	1.11	1.59	.16	0.00	0.00	3.50	
	.02	.04	.06	.01	0.00	0.00	.13	
NNW	1	9	21	2	0	0	33	3.43
	.16	1.43	3.34	.32	0.00	0.00	5.25	
	.01	.05	.13	.01	0.00	0.00	.20	
N	0	9	44	15	1	0	69	4.31
	0.00	1.43	7.01	2.39	.16	0.00	10.99	
	0.00	.05	.27	.09	.01	0.00	.42	
CALM	0						0	CALM
	0.00						0.00	
	0.00						0.00	
TOTAL	14	193	362	52	7	0	628	3.51
	2.23	30.73	57.64	8.28	1.11	0.00	100.00	
	.09	1.18	2.21	.32	.04	0.00	3.83	

KEY XXX NUMBER OF OCCURRENCES
XXX PERCENT OCCURRENCES THIS CLASS
XXX PERCENT OCCURRENCES ALL CLASSES

TABLE 2.3-23

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JOINT WIND FREQUENCY DISTRIBUTION BY STABILITY CLASS
DATA PERIOD:  SEPTEMBER 1, 1976 - AUGUST 31, 1978

     STABILITY CLASS: PASQUILL C                         ST. LUCIE UNIT 2
     DATA SOURCE:  ON-SITE                               HUTCHINSON ISLAND, FLORIDA
     WIND SENSOR HEIGHT:   10.00 METERS                  FLORIDA POWER AND LIGHT CO.

WIND           WIND SPEED CATEGORIES(METERS PER SECOND)                                 MEAN
SECTOR    0.0-1.5    1.5-3.0    3.0-5.0    5.0-7.5   7.5-10.0      >10.0      TOTAL     SPEED
NNE             0          3         12          4          0          0         19      4.15
             0.00        .46       1.84        .61       0.00       0.00       2.91
             0.00        .02        .07        .02       0.00       0.00        .12
NE              1         20         19          7          0          0         47      3.38
              .15       3.07       2.91       1.07       0.00       0.00       7.21
              .01        .12        .12        .04       0.00       0.00        .29
ENE             3         22         26          5          0          0         56      3.41
              .46       3.37       3.99        .77       0.00       0.00       8.59
              .02        .13        .16        .03       0.00       0.00        .34
E               1         24         42          2          0          0         69      3.28
              .15       3.68       6.44        .31       0.00       0.00      10.58
              .01        .15        .26        .01       0.00       0.00        .42
ESE             3         43         49          1          0          0         96      3.04
              .46       6.60       7.52        .15       0.00       0.00      14.72
              .02        .26        .30        .01       0.00       0.00        .59
SE              4         17         40          1          0          0         62      3.23
              .61       2.61       6.13        .15       0.00       0.00       9.51
              .02        .10        .24        .01       0.00       0.00        .38
SSE             1         15         44          6          0          0         66      3.73
              .15       2.30.      6.75        .92       0.00       0.00      10.12
              .01        .09        .27        .04       0.00       0.00        .40
S               2          0         11          5          0          0         18      4.13
              .31       0.00       1.69        .77       0.00       0.00       2.76
              .01       0.00        .07        .03       0.00       0.00        .11
SSW             1          7          4          3          0          0         15      3.37
              .15       1.07        .61        .46       0.00       0.00       2.30
              .01        .04        .02        .02       0.00       0.00        .09
SW              1         10          8          4          0          0         23      3.55
              .15       1.53       1.23        .61       0.00       0.00       3.53
              .01        .06        .05        .02       0.00       0.00        .14
WSW             1         10          7          3          0          0         21      3.43
              .15       1.53       1.07        .46       0.00       0.00       3.22
              .01        .06        .04        .02       0.00       0.00        .13
W               0          9          7          0          1          0         17      3.35
             0.00       1.38       1.07       0.00        .15       0.00       2.61
             0.00        .05        .04       0.00        .01       0.00        .10
WNW             0          4          7          0          0          0         11      3.35
             0.00        .61       1.07       0.00       0.00       0.00       1.69
             0.00        .02        .04       0.00       0.00       0.00        .07
NW              1         16         11          2          0          0         30      3.09
              .15       2.45       1.69        .31       0.00       0.00       4.60
              .01        .10        .07        .01       0.00       0.00        .18
NNW             1          7         26          2          0          0         36      3.66
              .15       1.07       3.99        .31       0.00       0.00       5.52
              .01        .04        .16        .01       0.00       0.00        .22
N               1         10         40         10          2          0         63      4.22
              .15       1.53       6.13       1.53        .31       0.00       9.66
              .01        .06        .24        .06        .01       0.00        .38
CALM            3                                                                 3      CALM
              .46                                                               .46
              .02                                                               .02
TOTAL          24        217        353         55          3          0        652      3.46
             3.68      33.28      54.14       8.44        .46       0.00     100.00
              .15       1.33       2.16        .34        .02       0.00       3.98

     KEY  XXX NUMBER OF OCCURRENCES
          XXX PERCENT OCCURRENCES THIS CLASS
          XXX PERCENT OCCURRENCES ALL CLASSES
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TABLE 2.3-24

JOINT WIND FREQUENCY DISTRIBUTION BY STABILITY CLASS
DATA PERIOD: SEPTEMBER 1, 1976 - AUGUST 31, 1978

STABILITY CLASS: PASQUILL D
DATA SOURCE: ON-SITE
WIND SENSOR HEIGHT: 10.00 METERS

ST. LUCIE UNIT 2
HUTCHINSON ISLAND, FLORIDA
FLORIDA POWER AND LIGHT CO.

WIND SECTOR	WIND SPEED CATEGORIES(METERS PER SECOND)						TOTAL	MEAN SPEED
	0.0-1.5	1.5-3.0	3.0-5.0	5.0-7.5	7.5-10.0	>10.0		
NNE	15	47	56	16	0	0	134	3.34
	.31	.97	1.16	.33	0.00	0.00	2.77	
	.09	.29	.34	.10	0.00	0.00	.82	
NE	8	81	89	51	0	0	229	3.75
	.17	1.67	1.84	1.05	0.00	0.00	4.73	
	.05	.49	.54	.31	0.00	0.00	1.40	
ENE	12	101	167	51	0	0	331	3.60
	.25	2.09	3.45	1.05	0.00	0.00	6.84	
	.07	.62	1.02	.31	0.00	0.00	2.02	
E	9	123	168	27	0	0	327	3.38
	.19	2.54	3.47	.56	0.00	0.00	6.75	
	.05	.75	1.03	.16	0.00	0.00	2.00	
ESE	19	216	230	25	0	0	490	3.12
	.39	4.46	4.75	.52	0.00	0.00	10.12	
	.12	1.32	1.40	.15	0.00	0.00	2.99	
SE	28	181	196	10	0	0	415	2.94
	.58	3.74	4.05	.21	0.00	0.00	8.57	
	.17	1.11	1.20	.06	0.00	0.00	2.53	
SSE	15	130	229	13	0	0	387	3.28
	.31	2.68	4.73	.27	0.00	0.00	7.99	
	.09	.79	1.40	.08	0.00	0.00	2.36	
S	12	85	196	56	6	0	355	3.85
	.25	1.76	4.05	1.16	.12	0.00	7.33	
	.07	.52	1.20	.34	.04	0.00	2.17	
SSW	12	149	255	69	20	1	505	3.86
	.25	3.06	5.27	1.43	.41	.02	10.43	
	.07	.90	1.56	.42	.12	.01	3.08	
SW	18	131	150	59	9	0	367	3.63
	.37	2.71	3.10	1.22	.19	0.00	7.58	
	.11	.80	.92	.36	.05	0.00	2.24	
WSW	10	67	53	7	1	0	138	2.98
	.21	1.38	1.09	.14	.02	0.00	2.85	
	.06	.41	.32	.04	.01	0.00	.84	
W	18	73	39	11	0	0	141	2.74
	.37	1.51	.81	.23	0.00	0.00	2.91	
	.11	.45	.24	.07	0.00	0.00	.86	
WNW	23	61	45	4	0	0	133	2.69
	.48	1.26	.93	.08	0.00	0.00	2.75	
	.14	.37	.27	.02	0.00	0.00	.81	
NW	27	117	139	15	0	0	298	3.13
	.56	2.42	2.87	.31	0.00	0.00	6.15	
	.16	.71	.85	.09	0.00	0.00	1.82	
NNW	10	77	206	26	1	0	320	3.63
	.21	1.59	4.25	.54	.02	0.00	6.61	
	.06	.47	1.26	.16	.01	0.00	1.95	
N	8	46	176	26	2	0	258	3.85
	.17	.95	3.63	.54	.04	0.00	5.33	
	.05	.28	1.07	.16	.01	0.00	1.58	
CALM	14						14	CALM
	.29						.29	
	.09						.09	
TOTAL	258	1684	2394	466	39	1	4842	3.41
	5.33	34.78	49.44	9.62	.81	.02	100.00	
	1.58	10.28	14.62	2.85	.24	.01	29.57	

KEY XXX NUMBER OF OCCURRENCES
XXX PERCENT OCCURRENCES THIS CLASS
XXX PERCENT OCCURRENCES ALL CLASSES

TABLE 2.3-25

JOINT WIND FREQUENCY DISTRIBUTION BY STABILITY CLASS
DATA PERIOD: SEPTEMBER 1, 1976 - AUGUST 31, 1978

STABILITY CLASS: PASQUILL E
DATA SOURCE: ON-SITE
WIND SENSOR HEIGHT: 10.00 METERS

ST. LUCIE UNIT 2
HUTCHINSON ISLAND, FLORIDA
FLORIDA POWER AND LIGHT CO.

WIND SECTOR	WIND SPEED CATEGORIES(METERS PER SECOND) 0.0-1.5	1.5-3.0	3.0-5.0	5.0-7.5	7.5-10.0	>10.0	TOTAL	MEAN SPEED
NNE	38	98	88	30	3	0	257	3.16
	.51	1.33	1.19	.41	.04	0.00	3.48	
	.23	.60	.54	.18	.02	0.00	1.57	
NE	40	95	102	44	0	0	281	3.24
	.54	1.29	1.38	.60	0.00	0.00	3.80	
	.24	.58	.62	.27	0.00	0.00	1.72	
ENE	34	119	169	87	0	0	409	3.61
	.46	1.61	2.29	1.18	0.00	0.00	5.54	
	.21	.73	1.03	.53	0.00	0.00	2.50	
E	52	136	167	40	0	0	395	3.12
	.70	1.84	2.26	.54	0.00	0.00	5.35	
	.32	.83	1.02	.24	0.00	0.00	2.41	
ESE	82	313	272	35	1	0	703	2.91
	1.11	4.24	3.68	.47	.01	0.00	9.52	
	.50	1.91	1.66	.21	.01	0.00	4.29	
SE	138	402	300	12	0	0	852	2.65
	1.87	5.44	4.06	.16	0.00	0.00	11.54	
	.84	2.45	1.83	.07	0.00	0.00	5.20	
SSE	94	380	176	11	0	0	661	2.51
	1.27	5.14	2.38	.15	0.00	0.00	8.95	
	.57	2.32	1.07	.07	0.00	0.00	4.04	
S	42	196	173	29	2	1	443	3.01
	.57	2.65	2.34	.39	.03	.01	6.00	
	.26	1.20	1.06	.18	.01	.01	2.71	
SSW	38	164	163	31	13	3	412	3.35
	.51	2.22	2.21	.42	.18	.04	5.58	
	.23	1.00	1.00	.19	.08	.02	2.52	
SW	77	250	161	39	3	0	530	2.87
	1.04	3.38	2.18	.53	.04	0.00	7.18	
	.47	1.53	.98	.24	.02	0.00	3.24	
WSW	100	204	85	5	0	0	394	2.28
	1.35	2.76	1.15	.07	0.00	0.00	5.33	
	.61	1.25	.52	.03	0.00	0.00	2.41	
W	114	143	44	12	1	0	314	2.14
	1.54	1.94	.60	.16	.01	0.00	4.25	
	.70	.87	.27	.07	.01	0.00	1.92	
WNW	102	166	75	5	0	0	348	2.22
	1.38	2.25	1.02	.07	0.00	0.00	4.71	
	.62	1.01	.46	.03	0.00	0.00	2.12	
NW	73	248	194	9	0	0	524	2.72
	.99	3.36	2.63	.12	0.00	0.00	7.09	
	.45	1.51	1.18	.05	0.00	0.00	3.20	
NNW	48	203	205	19	0	0	475	2.97
	.65	2.75	2.78	.26	0.00	0.00	6.43	
	.29	1.24	1.25	.12	0.00	0.00	2.90	
N	64	102	124	34	0	0	324	3.03
	.87	1.38	1.68	.46	0.00	0.00	4.39	
	.39	.62	.76	.21	0.00	0.00	1.98	
CALM	64						64	CALM
	.87						.87	
	.39						.39	
TOTAL	1200	3219	2498	442	23	4	7386	2.81
	16.25	43.58	33.82	5.98	.31	.05	100.00	
	7.33	19.66	15.25	2.70	.14	.02	45.10	

KEY XXX NUMBER OF OCCURRENCES
XXX PERCENT OCCURRENCES THIS CLASS
XXX PERCENT OCCURRENCES ALL CLASSES

TABLE 2.3-26

JOINT WIND FREQUENCY DISTRIBUTION BY STABILITY CLASS
DATA PERIOD: SEPTEMBER 1, 1976 - AUGUST 31, 1978

STABILITY CLASS: PASQUILL F
DATA SOURCE: ON-SITE
WIND SENSOR HEIGHT: 10.00 METERS

ST. LUCIE UNIT 2
HUTCHINSON ISLAND, FLORIDA
FLORIDA POWER AND LIGHT CO.

WIND SECTOR	WIND SPEED CATEGORIES(METERS PER SECOND) 0.0-1.5	1.5-3.0	3.0-5.0	5.0-7.5	7.5-10.0	>10.0	TOTAL	MEAN SPEED
NNE	14	21	2	0	0	0	37	1.79
	2.05	3.08	.29	0.00	0.00	0.00	5.43	
	.09	.13	.01	0.00	0.00	0.00	.23	
NE	5	9	1	0	0	0	15	1.81
	.73	1.32	.15	0.00	0.00	0.00	2.20	
	.03	.05	.01	0.00	0.00	0.00	.09	
ENE	6	4	7	0	0	0	17	2.42
	.88	.59	1.03	0.00	0.00	0.00	2.49	
	.04	.02	.04	0.00	0.00	0.00	.10	
E	5	5	3	1	0	0	14	2.39
	.73	.73	.44	.15	0.00	0.00	2.05	
	.03	.03	.02	.01	0.00	0.00	.09	
ESE	8	10	0	0	0	0	18	1.57
	1.17	1.47	0.00	0.00	0.00	0.00	2.64	
	.05	.06	0.00	0.00	0.00	0.00	.11	
SE	10	5	1	0	0	0	16	1.70
	1.47	.73	.15	0.00	0.00	0.00	2.35	
	.06	.03	.01	0.00	0.00	0.00	.10	
SSE	11	34	2	0	0	0	47	1.95
	1.61	4.99	.29	0.00	0.00	0.00	6.89	
	.07	.21	.01	0.00	0.00	0.00	.29	
S	11	24	7	0	0	0	42	2.01
	1.61	3.52	1.03	0.00	0.00	0.00	6.16	
	.07	.15	.04	0.00	0.00	0.00	.26	
SSW	21	38	13	0	0	0	72	2.19
	3.08	5.57	1.91	0.00	0.00	0.00	10.56	
	.13	.23	.08	0.00	0.00	0.00	.44	
SW	17	32	5	0	0	0	54	1.93
	2.49	4.69	.73	0.00	0.00	0.00	7.92	
	.10	.20	.03	0.00	0.00	0.00	.33	
WSW	30	17	0	1	0	0	48	1.53
	4.40	2.49	0.00	.15	0.00	0.00	7.04	
	.18	.10	0.00	.01	0.00	0.00	.29	
W	19	20	0	0	0	0	39	1.51
	2.79	2.93	0.00	0.00	0.00	0.00	5.72	
	.12	.12	0.00	0.00	0.00	0.00	.24	
WNW	36	32	2	0	0	0	70	1.57
	5.28	4.69	.29	0.00	0.00	0.00	10.26	
	.22	.20	.01	0.00	0.00	0.00	.43	
NW	14	64	1	0	0	0	79	1.96
	2.05	9.30	.15	0.00	0.00	0.00	11.58	
	.09	.39	.01	0.00	0.00	0.00	.48	
NNW	17	52	4	1	0	0	74	2.06
	2.49	7.62	.59	.15	0.00	0.00	10.85	
	.10	.32	.02	.01	0.00	0.00	.45	
N	14	8	4	0	0	0	26	1.77
	2.05	1.17	.59	0.00	0.00	0.00	3.81	
	.09	.05	.02	0.00	0.00	0.00	.16	
CALM	14						14	CALM
	2.05						2.05	
	.09						.09	
TOTAL	252	375	52	3	0	0	682	1.84
	36.95	54.99	7.62	.44	0.00	0.00	100.00	
	1.54	2.29	.32	.02	0.00	0.00	4.16	

KEY XXX NUMBER OF OCCURRENCES
XXX PERCENT OCCURRENCES THIS CLASS
XXX PERCENT OCCURRENCES ALL CLASSES

TABLE 2.3-27

JOINT WIND FREQUENCY DISTRIBUTION BY STABILITY CLASS
DATA PERIOD: SEPTEMBER 1, 1976 - AUGUST 31, 1978

STABILITY CLASS: PASQUILL G
DATA SOURCE: ON-SITE
WIND SENSOR HEIGHT: 10.00 METERS

ST. LUCIE UNIT 2
HUTCHINSON ISLAND, FLORIDA
FLORIDA POWER AND LIGHT CO.

WIND SECTOR	WIND SPEED CATEGORIES(METERS PER SECOND)						TOTAL	MEAN SPEED
	0.0-1.5	1.5-3.0	3.0-5.0	5.0-7.5	7.5-10.0	>10.0		
NNE	2	0	0	0	0	0	2	1.10
	.92	0.00	0.00	0.00	0.00	0.00	.92	
	.01	0.00	0.00	0.00	0.00	0.00	.01	
NE	0	4	0	0	0	0	4	2.35
	0.00	1.83	0.00	0.00	0.00	0.00	1.83	
	0.00	.02	0.00	0.00	0.00	0.00	.02	
ENE	0	0	0	0	0	0	0	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
E	0	1	0	0	0	0	1	1.80
	0.00	.46	0.00	0.00	0.00	0.00	.46	
	0.00	.01	0.00	0.00	0.00	0.00	.01	
ESE	0	0	0	0	0	0	0	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
SE	0	0	0	0	0	0	0	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
SSE	2	1	0	0	0	0	3	.87
	.92	.46	0.00	0.00	0.00	0.00	1.38	
	.01	.01	0.00	0.00	0.00	0.00	.02	
S	1	2	0	0	0	0	3	1.63
	.46	.92	0.00	0.00	0.00	0.00	1.38	
	.01	.01	0.00	0.00	0.00	0.00	.02	
SSW	5	6	1	0	0	0	12	1.67
	2.29	2.75	.46	0.00	0.00	0.00	5.50	
	.03	.04	.01	0.00	0.00	0.00	.07	
SW	11	5	0	0	0	0	16	1.44
	5.05	2.29	0.00	0.00	0.00	0.00	7.34	
	.07	.03	0.00	0.00	0.00	0.00	.10	
WSW	14	9	0	0	0	0	23	1.56
	6.42	4.13	0.00	0.00	0.00	0.00	10.55	
	.09	.05	0.00	0.00	0.00	0.00	.14	
W	17	5	0	0	0	0	22	1.36
	7.80	2.29	0.00	0.00	0.00	0.00	10.09	
	.10	.03	0.00	0.00	0.00	0.00	.13	
WNW	34	12	0	0	0	0	46	1.40
	15.60	5.50	0.00	0.00	0.00	0.00	21.10	
	.21	.07	0.00	0.00	0.00	0.00	.28	
NW	18	44	1	0	0	0	63	1.76
	8.26	20.18	.46	0.00	0.00	0.00	28.90	
	.11	.27	.01	0.00	0.00	0.00	.38	
NNW	6	14	0	0	0	0	20	1.75
	2.75	6.42	0.00	0.00	0.00	0.00	9.17	
	.04	.09	0.00	0.00	0.00	0.00	.12	
N	3	0	0	0	0	0	3	1.17
	1.38	0.00	0.00	0.00	0.00	0.00	1.38	
	.02	0.00	0.00	0.00	0.00	0.00	.02	
CALM	0						0	CALM
	0.00						0.00	
	0.00						0.00	
TOTAL	113	103	2	0	0	0	218	1.58
	51.83	47.25	.92	0.00	0.00	0.00	100.00	
	.69	.63	.01	0.00	0.00	0.00	1.33	

KEY XXX NUMBER OF OCCURRENCES
XXX PERCENT OCCURRENCES THIS CLASS
XXX PERCENT OCCURRENCES ALL CLASSES

TABLE 2.3-28

JOINT WIND FREQUENCY DISTRIBUTION
DATA PERIOD: SEPTEMBER 1, 1976 - AUGUST 31, 1978

ALL WINDS
DATA SOURCE: ON-SITE
WIND SENSOR HEIGHT: 10.00 METERS

ST. LUCIE UNIT 2
HUTCHINSON ISLAND, FLORIDA
FLORIDA POWER AND LIGHT CO.

WIND SECTOR	WIND SPEED CATEGORIES(METERS PER SECOND) 0.0-1.5	1.5-3.0	3.0-5.0	5.0-7.5	7.5-10.0	>10.0	TOTAL	MEAN SPEED
NNE	71 .43	206 1.25	318 1.92	71 .43	3 .02	0 0.00	669 4.05	3.32
NE	62 .38	292 1.77	385 2.33	128 .77	0 0.00	0 0.00	867 5.25	3.43
ENE	60 .36	334 2.02	505 3.06	158 .96	0 0.00	0 0.00	1057 6.40	3.51
E	69 .42	355 2.15	510 3.09	76 .46	0 0.00	0 0.00	1010 6.11	3.25
ESE	115 .70	684 4.14	744 4.50	72 .44	1 .01	0 0.00	1616 9.78	3.04
SE	183 1.11	660 3.99	749 4.53	28 .17	0 0.00	0 0.00	1620 9.81	2.88
SSE	129 .78	579 3.50	656 3.97	93 .56	1 .01	0 0.00	1458 8.82	3.10
S	72 .44	310 1.88	407 2.46	99 .60	8 .05	1 .01	897 5.43	3.36
SSW	84 .51	372 2.25	446 2.70	105 .64	33 .20	4 .02	1044 6.32	3.48
SW	129 .78	440 2.66	336 2.03	106 .64	14 .08	0 0.00	1025 6.20	3.10
WSW	155 .94	320 1.94	186 1.13	29 .18	5 .03	0 0.00	695 4.21	2.59
W	174 1.05	267 1.62	119 .72	37 .22	2 .01	0 0.00	599 3.63	2.43
WNW	203 1.23	304 1.84	172 1.04	17 .10	0 0.00	0 0.00	696 4.21	2.34
NW	143 .87	518 3.14	424 2.57	50 .30	0 0.00	0 0.00	1135 6.87	2.85
NNW	85 .51	379 2.29	535 3.24	70 .42	1 .01	0 0.00	1070 6.48	3.22
N	91 .55	194 1.17	531 3.21	148 .90	5 .03	0 0.00	969 5.86	3.69
CALM	95 .57						95 .57	CALM
TOTAL	1920 11.62	6214 37.61	7023 42.51	1287 7.79	73 .44	5 .03	16522 100.00	3.10

NUMBER OF VALID OBSERVATIONS	16522	94.30 PCT.
NUMBER OF INVALID OBSERVATIONS	998	5.70 PCT.
TOTAL NUMBER OF OBSERVATIONS	17520	100.00 PCT.

KEY XXX NUMBER OF OCCURRENCES
XXX PERCENT OCCURRENCES

TABLE 2.3-29

JOINT WIND FREQUENCY DISTRIBUTION BY STABILITY CLASS
DATA PERIOD: SEPTEMBER 1, 1976 - AUGUST 31, 1978

STABILITY CLASS: PASQUILL A
DATA SOURCE: ON-SITE
WIND SENSOR HEIGHT: 57.91 METERS

ST. LUCIE UNIT 2
HUTCHINSON ISLAND, FLORIDA
FLORIDA POWER AND LIGHT CO.

WIND SECTOR	WIND SPEED CATEGORIES(METERS PER SECOND) 0.0-1.5	1.5-3.0	3.0-5.0	5.0-7.5	7.5-10.0	>10.0	TOTAL	MEAN SPEED
NNE	1	9	67	82	35	3	197	5.78
	.05	.46	3.39	4.15	1.77	.15	9.96	
	.01	.05	.40	.49	.21	.02	1.18	
NE	0	7	101	52	22	6	188	5.27
	0.00	.35	5.11	2.63	1.11	.30	9.50	
	0.00	.04	.60	.31	.13	.04	1.12	
ENE	0	9	81	56	13	11	170	5.42
	0.00	.46	4.10	2.83	.66	.56	8.59	
	0.00	.05	.48	.33	.08	.07	1.02	
E	1	14	71	80	13	2	181	5.19
	.05	.71	3.59	4.04	.66	.10	9.15	
	.01	.08	.42	.48	.08	.01	1.08	
ESE	0	4	73	74	26	2	179	5.61
	0.00	.20	3.69	3.74	1.31	.10	9.05	
	0.00	.02	.44	.44	.16	.01	1.07	
SE	3	3	58	94	25	0	183	5.72
	.15	.15	2.93	4.75	1.26	0.00	9.25	
	.02	.02	.35	.56	.15	0.00	1.09	
SSE	0	1	14	87	121	21	244	7.72
	0.00	.05	.71	4.40	6.12	1.06	12.34	
	0.00	.01	.08	.52	.72	.13	1.46	
S	0	0	2	1	1	1	5	6.62
	0.00	0.00	.10	.05	.05	.05	.25	
	0.00	0.00	.01	.01	.01	.01	.03	
SSW	0	0	1	1	0	0	2	4.25
	0.00	0.00	.05	.05	0.00	0.00	.10	
	0.00	0.00	.01	.01	0.00	0.00	.01	
SW	0	1	3	1	2	0	7	4.79
	0.00	.05	.15	.05	.10	0.00	.35	
	0.00	.01	.02	.01	.01	0.00	.04	
WSW	0	0	5	17	13	2	37	7.13
	0.00	0.00	.25	.86	.66	.10	1.87	
	0.00	0.00	.03	.10	.08	.01	.22	
W	0	0	10	20	14	6	50	7.24
	0.00	0.00	.51	1.01	.71	.30	2.53	
	0.00	0.00	.06	.12	.08	.04	.30	
WNW	2	5	17	31	17	6	78	6.28
	.10	.25	.86	1.57	.86	.30	3.94	
	.01	.03	.10	.19	.10	.04	.47	
NW	2	10	47	43	24	0	126	5.35
	.10	.51	2.38	2.17	1.21	0.00	6.37	
	.01	.06	.28	.26	.14	0.00	.75	
NNW	0	1	22	42	30	3	98	6.61
	0.00	.05	1.11	2.12	1.52	.15	4.95	
	0.00	.01	.13	.25	.18	.02	.59	
N	0	4	39	78	96	16	233	7.24
	0.00	.20	1.97	3.94	4.85	.81	11.78	
	0.00	.02	.23	.47	.57	.10	1.39	
CALM	0						0	CALM
	0.00						0.00	
	0.00						0.00	
TOTAL	9	68	611	759	452	79	1978	6.13
	.46	3.44	30.89	38.37	22.85	3.99	100.00	
	.05	.41	3.65	4.53	2.70	.47	11.81	

KEY XXX NUMBER OF OCCURRENCES
XXX PERCENT OCCURRENCES THIS CLASS
XXX PERCENT OCCURRENCES ALL CLASSES

TABLE 2.3-30

JOINT WIND FREQUENCY DISTRIBUTION BY STABILITY CLASS
DATA PERIOD: SEPTEMBER 1, 1976 - AUGUST 31, 1978

STABILITY CLASS: PASQUILL B
DATA SOURCE: ON-SITE
WIND SENSOR HEIGHT: 57.91 METERS

ST. LUCIE UNIT 2
HUTCHINSON ISLAND, FLORIDA
FLORIDA POWER AND LIGHT CO.

WIND SECTOR	WIND SPEED CATEGORIES(METERS PER SECOND) 0.0-1.5	1.5-3.0	3.0-5.0	5.0-7.5	7.5-10.0	>10.0	TOTAL	MEAN SPEED
NNE	0	2	24	4	10	0	40	5.42
	0.00	.32	3.81	.63	1.59	0.00	6.35	
	0.00	.01	.14	.02	.06	0.00	.24	
NE	0	8	17	5	7	2	39	4.94
	0.00	1.27	2.70	.79	1.11	.32	6.19	
	0.00	.05	.10	.03	.04	.01	.23	
ENE	0	10	24	11	9	2	56	4.84
	0.00	1.59	3.81	1.75	1.43	.32	8.89	
	0.00	.06	.14	.07	.05	.01	.33	
E	1	10	37	24	10	4	86	5.14
	.16	1.59	5.87	3.81	1.59	.63	13.65	
	.01	.06	.22	.14	.06	.02	.51	
ESE	0	2	38	18	11	1	70	5.40
	0.00	.32	6.03	2.86	1.75	.16	11.11	
	0.00	.01	.23	.11	.07	.01	.42	
SE	0	2	33	28	6	1	70	5.37
	0.00	.32	5.24	4.44	.95	.16	11.11	
	0.00	.01	.20	.17	.04	.01	.42	
SSE	0	3	7	21	18	1	50	6.69
	0.00	.48	1.11	3.33	2.86	.16	7.94	
	0.00	.02	.04	.13	.11	.01	.30	
S	0	3	1	3	0	0	7	4.41
	0.00	.48	.16	.48	0.00	0.00	1.11	
	0.00	.02	.01	.02	0.00	0.00	.04	
SSW	0	0	5	4	0	0	9	4.98
	0.00	0.00	.79	.63	0.00	0.00	1.43	
	0.00	0.00	.03	.02	0.00	0.00	.05	
SW	0	3	2	5	4	1	15	6.05
	0.00	.48	.32	.79	.63	.16	2.38	
	0.00	.02	.01	.03	.02	.01	.09	
WSW	1	1	4	2	5	4	17	7.51
	.16	.16	.63	.32	.79	.63	2.70	
	.01	.01	.02	.01	.03	.02	.10	
W	1	2	2	7	2	1	15	5.69
	.16	.32	.32	1.11	.32	.16	2.38	
	.01	.01	.01	.04	.01	.01	.09	
WNW	0	7	6	4	3	1	21	4.98
	0.00	1.11	.95	.63	.48	.16	3.33	
	0.00	.04	.04	.02	.02	.01	.13	
NW	1	9	10	5	3	0	28	4.16
	.16	1.43	1.59	.79	.48	0.00	4.44	
	.01	.05	.06	.03	.02	0.00	.17	
NNW	0	3	12	15	8	0	38	5.80
	0.00	.48	1.90	2.38	1.27	0.00	6.03	
	0.00	.02	.07	.09	.05	0.00	.23	
N	0	4	14	23	20	8	69	7.12
	0.00	.63	2.22	3.65	3.17	1.27	10.95	
	0.00	.02	.08	.14	.12	.05	.41	
CALM	0						0	CALM
	0.00						0.00	
	0.00						0.00	
TOTAL	4	69	236	179	116	26	630	5.59
	.63	10.95	37.46	28.41	18.41	4.13	100.00	
	.02	.41	1.41	1.07	.69	.16	3.76	

KEY XXX NUMBER OF OCCURRENCES
XXX PERCENT OCCURRENCES THIS CLASS
XXX PERCENT OCCURRENCES ALL CLASSES

TABLE 2.3-31

JOINT WIND FREQUENCY DISTRIBUTION BY STABILITY CLASS
DATA PERIOD: SEPTEMBER 1, 1976 - AUGUST 31, 1978

STABILITY CLASS: PASQUILL C
DATA SOURCE: ON-SITE
WIND SENSOR HEIGHT: 57.91 METERS

ST. LUCIE UNIT 2
HUTCHINSON ISLAND, FLORIDA
FLORIDA POWER AND LIGHT CO.

WIND SECTOR	WIND SPEED CATEGORIES(METERS PER SECOND)						TOTAL	MEAN SPEED
	0.0-1.5	1.5-3.0	3.0-5.0	5.0-7.5	7.5-10.0	>10.0		
NNE	0 0.00 0.00	4 .60 .02	7 1.06 .04	6 .90 .04	5 .75 .03	4 .60 .02	26 3.92 .16	6.69
NE	1 .15 .01	6 .90 .04	11 1.66 .07	9 1.36 .05	7 1.06 .04	4 .60 .02	38 5.73 .23	5.87
ENE	0 0.00 0.00	6 .90 .04	18 2.71 .11	9 1.36 .05	7 1.06 .04	5 .75 .03	45 6.79 .27	5.80
E	1 .15 .01	12 1.81 .07	35 5.28 .21	27 4.07 .16	13 1.96 .08	2 .30 .01	90 13.57 .54	5.22
ESE	0 0.00 0.00	10 1.51 .06	43 6.49 .26	23 3.47 .14	14 2.11 .08	1 .15 .01	91 13.73 .54	5.33
SE	0 0.00 0.00	4 .60 .02	31 4.68 .19	33 4.98 .20	9 1.36 .05	0 0.00 0.00	77 11.61 .46	5.38
SSE	0 0.00 0.00	3 .45 .02	10 1.51 .06	34 5.13 .20	10 1.51 .06	0 0.00 0.00	57 8.60 .34	6.12
S	0 0.00 0.00	2 .30 .01	7 1.06 .04	9 1.36 .05	3 .45 .02	0 0.00 0.00	21 3.17 .13	5.52
SSW	0 0.00 0.00	4 .60 .02	3 .45 .02	2 .30 .01	3 .45 .02	0 0.00 0.00	12 1.81 .07	4.88
SW	0 0.00 0.00	5 .75 .03	6 .90 .04	5 .75 .03	3 .45 .02	0 0.00 0.00	19 2.87 .11	4.78
WSW	0 0.00 0.00	2 .30 .01	5 .75 .03	7 1.06 .04	5 .75 .03	1 .15 .01	20 3.02 .12	6.13
W	1 .15 .01	3 .45 .02	9 1.36 .05	4 .60 .02	1 .15 .01	0 0.00 0.00	18 2.71 .11	4.10
WNW	2 .30 .01	3 .45 .02	3 .45 .02	4 .60 .02	5 .75 .03	0 0.00 0.00	17 2.56 .10	5.49
NW	2 .30 .01	5 .75 .03	10 1.51 .06	10 1.51 .06	2 .30 .01	0 0.00 0.00	29 4.37 .17	4.53
NNW	0 0.00 0.00	1 .15 .01	12 1.81 .07	19 2.87 .11	12 1.81 .07	1 .15 .01	45 6.79 .27	6.39
N	0 0.00 0.00	2 .30 .01	10 1.51 .06	15 2.26 .09	22 3.32 .13	9 1.36 .05	58 8.75 .35	7.64
CALM	0 0.00 0.00						0 0.00 0.00	CALM
TOTAL	7 1.06 .04	72 10.86 .43	220 33.18 1.31	216 32.58 1.29	121 18.25 .72	27 4.07 .16	663 100.00 3.96	5.72

KEY XXX NUMBER OF OCCURRENCES
XXX PERCENT OCCURRENCES THIS CLASS
XXX PERCENT OCCURRENCES ALL CLASSES

TABLE 2.3-32

JOINT WIND FREQUENCY DISTRIBUTION BY STABILITY CLASS
DATA PERIOD: SEPTEMBER 1, 1976 - AUGUST 31, 1978

STABILITY CLASS: PASQUILL D
DATA SOURCE: ON-SITE
WIND SENSOR HEIGHT: 57.91 METERS

ST. LUCIE UNIT 2
HUTCHINSON ISLAND, FLORIDA
FLORIDA POWER AND LIGHT CO.

WIND SECTOR	WIND SPEED CATEGORIES(METERS PER SECOND) 0.0-1.5	1.5-3.0	3.0-5.0	5.0-7.5	7.5-10.0	>10.0	TOTAL	MEAN SPEED
NNE	3	19	48	31	25	19	145	6.08
	.06	.38	.96	.62	.50	.38	2.91	
	.02	.11	.29	.19	.15	.11	.87	
NE	1	34	43	50	79	28	235	6.72
	.02	.68	.86	1.00	1.58	.56	4.71	
	.01	.20	.26	.30	.47	.17	1.40	
ENE	5	28	80	104	54	36	307	6.35
	.10	.56	1.60	2.09	1.08	.72	6.16	
	.03	.17	.48	.62	.32	.21	1.83	
E	2	45	106	128	82	28	391	6.05
	.04	.90	2.13	2.57	1.64	.56	7.84	
	.01	.27	.63	.76	.49	.17	2.33	
ESE	3	31	225	173	85	22	539	5.61
	.06	.62	4.51	3.47	1.70	.44	10.81	
	.02	.19	1.34	1.03	.51	.13	3.22	
SE	5	36	194	144	60	3	442	5.16
	.10	.72	3.89	2.89	1.20	.06	8.86	
	.03	.21	1.16	.86	.36	.02	2.64	
SSE	4	16	106	166	60	4	356	5.72
	.08	.32	2.13	3.33	1.20	.08	7.14	
	.02	.10	.63	.99	.36	.02	2.13	
S	5	31	151	153	56	8	404	5.50
	.10	.62	3.03	3.07	1.12	.16	8.10	
	.03	.19	.90	.91	.33	.05	2.41	
SSW	8	51	241	99	41	11	451	4.81
	.16	1.02	4.83	1.99	.82	.22	9.05	
	.05	.30	1.44	.59	.24	.07	2.69	
SW	7	51	176	94	33	11	372	4.87
	.14	1.02	3.53	1.89	.66	.22	7.46	
	.04	.30	1.05	.56	.20	.07	2.22	
WSW	3	33	48	43	19	6	152	5.06
	.06	.66	.96	.86	.38	.12	3.05	
	.02	.20	.29	.26	.11	.04	.91	
W	7	20	56	33	20	9	145	5.25
	.14	.40	1.12	.66	.40	.18	2.91	
	.04	.12	.33	.20	.12	.05	.87	
WNW	8	33	66	32	24	4	167	4.77
	.16	.66	1.32	.64	.48	.08	3.35	
	.05	.20	.39	.19	.14	.02	1.00	
NW	7	42	100	107	37	5	298	5.17
	.14	.84	2.01	2.15	.74	.10	5.98	
	.04	.25	.60	.64	.22	.03	1.78	
NNW	1	17	59	115	83	21	296	6.66
	.02	.34	1.18	2.31	1.66	.42	5.94	
	.01	.10	.35	.69	.50	.13	1.77	
N	3	11	43	70	104	46	277	7.53
	.06	.22	.86	1.40	2.09	.92	5.56	
	.02	.07	.26	.42	.62	.27	1.65	
CALM	9						9	CALM
	.18						.18	
	.05						.05	
TOTAL	81	498	1742	1542	862	261	4986	5.67
	1.62	9.99	34.94	30.93	17.29	5.23	100.00	
	.48	2.97	10.40	9.21	5.15	1.56	29.77	

KEY XXX NUMBER OF OCCURRENCES
XXX PERCENT OCCURRENCES THIS CLASS
XXX PERCENT OCCURRENCES ALL CLASSES

TABLE 2.3-33

JOINT WIND FREQUENCY DISTRIBUTION BY STABILITY CLASS
DATA PERIOD: SEPTEMBER 1, 1976 - AUGUST 31, 1978

STABILITY CLASS: PASQUILL E
DATA SOURCE: ON-SITE
WIND SENSOR HEIGHT: 57.91 METERS

ST. LUCIE UNIT 2
HUTCHINSON ISLAND, FLORIDA
FLORIDA POWER AND LIGHT CO.

WIND SECTOR	WIND SPEED CATEGORIES(METERS PER SECOND) 0.0-1.5	1.5-3.0	3.0-5.0	5.0-7.5	7.5-10.0	>10.0	TOTAL	MEAN SPEED
NNE	13 .17 .08	48 .64 .29	69 .92 .41	64 .85 .38	60 .80 .36	42 .56 .25	296 3.93 1.77	6.21
NE	12 .16 .07	45 .60 .27	55 .73 .33	65 .86 .39	50 .66 .30	27 .36 .16	254 3.37 1.52	5.77
ENE	7 .09 .04	52 .69 .31	57 .76 .34	100 1.33 .60	104 1.38 .62	36 .48 .21	356 4.73 2.13	6.40
E	5 .07 .03	57 .76 .34	121 1.61 .72	187 2.48 1.12	148 1.96 .88	72 .96 .43	590 7.83 3.52	6.56
ESE	12 .16 .07	77 1.02 .45	253 3.36 1.51	308 4.09 1.84	170 2.26 1.02	55 .73 .33	875 11.61 5.22	5.95
SE	11 .15 .07	84 1.11 .50	286 3.80 1.71	252 3.34 1.50	145 1.92 .87	23 .31 .14	801 10.63 4.78	5.47
SSE	12 .16 .07	58 .77 .35	219 2.91 1.31	215 2.85 1.28	63 .84 .38	5 .07 .03	572 7.59 3.42	5.13
S	25 .33 .15	69 .92 .41	191 2.54 1.14	144 1.91 .86	28 .37 .17	3 .04 .02	460 6.11 2.75	4.59
SSW	14 .19 .08	112 1.49 .67	184 2.44 1.10	103 1.37 .61	24 .32 .14	19 .25 .11	456 6.05 2.72	4.53
SW	20 .27 .12	89 1.18 .53	194 2.57 1.16	108 1.43 .64	42 .56 .25	11 .15 .07	464 6.16 2.77	4.55
WSW	17 .23 .10	82 1.09 .49	152 2.02 .91	94 1.25 .56	27 .36 .16	1 .01 .01	373 4.95 2.23	4.36
W	25 .33 .15	62 .82 .37	108 1.43 .64	78 1.04 .47	29 .38 .17	9 .12 .05	311 4.13 1.86	4.62
WNW	27 .36 .16	63 .84 .38	116 1.54 .69	109 1.45 .65	26 .35 .16	5 .07 .03	346 4.59 2.07	4.57
NW	16 .21 .10	82 1.09 .49	190 2.52 1.13	188 2.50 1.12	60 .80 .36	1 .01 .01	537 7.13 3.21	4.93
NNW	13 .17 .08	38 .50 .23	84 1.11 .50	237 3.15 1.42	95 1.26 .57	15 .20 .09	482 6.40 2.88	6.03
N	10 .13 .06	37 .49 .22	66 .88 .39	87 1.15 .52	96 1.27 .57	28 .37 .17	324 4.30 1.93	6.37
CALM	37 .49 .22						37 .49 .22	CALM
TOTAL	276 3.66 1.65	1055 14.00 6.30	2345 31.13 14.00	2339 31.05 13.97	1167 15.49 6.97	352 4.67 2.10	7534 100.00 44.98	5.38

KEY XXX NUMBER OF OCCURRENCES
XXX PERCENT OCCURRENCES THIS CLASS
XXX PERCENT OCCURRENCES ALL CLASSES

TABLE 2.3-34

JOINT WIND FREQUENCY DISTRIBUTION BY STABILITY CLASS
DATA PERIOD: SEPTEMBER 1, 1976 - AUGUST 31, 1978

STABILITY CLASS: PASQUILL F
DATA SOURCE: ON-SITE
WIND SENSOR HEIGHT: 57.91 METERS

ST. LUCIE UNIT 2
HUTCHINSON ISLAND, FLORIDA
FLORIDA POWER AND LIGHT CO.

WIND SECTOR	WIND SPEED CATEGORIES(METERS PER SECOND) 0.0-1.5	1.5-3.0	3.0-5.0	5.0-7.5	7.5-10.0	>10.0	TOTAL	MEAN SPEED
NNE	1 .14 .01	7 .98 .04	17 2.38 .10	6 .84 .04	0 0.00 0.00	0 0.00 0.00	31 4.35 .19	3.93
NE	0 0.00 0.00	3 .42 .02	9 1.26 .05	4 .56 .02	2 .28 .01	0 0.00 0.00	18 2.52 .11	4.63
ENE	4 .56 .02	3 .42 .02	7 .98 .04	3 .42 .02	6 .84 .04	0 0.00 0.00	23 3.23 .14	4.81
E	0 0.00 0.00	4 .56 .02	3 .42 .02	1 .14 .01	1 .14 .01	2 .28 .01	11 1.54 .07	5.13
ESE	2 .28 .01	5 .70 .03	7 .98 .04	3 .42 .02	1 .14 .01	1 .14 .01	19 2.66 .11	4.26
SE	0 0.00 0.00	12 1.68 .07	13 1.82 .08	15 2.10 .09	0 0.00 0.00	0 0.00 0.00	40 5.61 .24	4.27
SSE	2 .28 .01	7 .98 .04	22 3.09 .13	24 3.37 .14	0 0.00 0.00	0 0.00 0.00	55 7.71 .33	4.56
S	5 .70 .03	11 1.54 .07	17 2.38 .10	10 1.40 .06	1 .14 .01	0 0.00 0.00	44 6.17 .26	3.82
SSW	6 .84 .04	19 2.66 .11	29 4.07 .17	26 3.65 .16	0 0.00 0.00	0 0.00 0.00	80 11.22 .48	4.03
SW	4 .56 .02	8 1.12 .05	35 4.91 .21	11 1.54 .07	0 0.00 0.00	0 0.00 0.00	58 8.13 .35	3.81
WSW	2 .28 .01	7 .98 .04	25 3.51 .15	10 1.40 .06	1 .14 .01	0 0.00 0.00	45 6.31 .27	4.16
W	2 .28 .01	12 1.68 .07	15 2.10 .09	3 .42 .02	0 0.00 0.00	0 0.00 0.00	32 4.49 .19	3.24
WNW	3 .42 .02	15 2.10 .09	29 4.07 .17	7 .98 .04	0 0.00 0.00	0 0.00 0.00	54 7.57 .32	3.51
NW	4 .56 .02	14 1.96 .08	23 3.23 .14	17 2.38 .10	2 .28 .01	0 0.00 0.00	60 8.42 .36	4.09
NNW	3 .42 .02	7 .98 .04	29 4.07 .17	32 4.49 .19	3 .42 .02	0 0.00 0.00	74 10.38 .44	4.79
N	4 .56 .02	9 1.26 .05	30 4.21 .18	20 2.81 .12	1 .14 .01	0 0.00 0.00	64 8.98 .38	4.28
CALM	5 .70 .03						5 .70 .03	CALM
TOTAL	47 6.59 .28	143 20.06 .85	310 43.48 1.85	192 26.93 1.15	18 2.52 .11	3 .42 .02	713 100.00 4.26	4.12

KEY XXX NUMBER OF OCCURRENCES
XXX PERCENT OCCURRENCES THIS CLASS
XXX PERCENT OCCURRENCES ALL CLASSES

TABLE 2.3-35

JOINT WIND FREQUENCY DISTRIBUTION BY STABILITY CLASS
DATA PERIOD: SEPTEMBER 1, 1976 - AUGUST 31, 1978

STABILITY CLASS: PASQUILL G
DATA SOURCE: ON-SITE
WIND SENSOR HEIGHT: 57.91 METERS

ST. LUCIE UNIT 2
HUTCHINSON ISLAND, FLORIDA
FLORIDA POWER AND LIGHT CO.

WIND SECTOR	WIND SPEED CATEGORIES(METERS PER SECOND) 0.0-1.5	1.5-3.0	3.0-5.0	5.0-7.5	7.5-10.0	>10.0	TOTAL	MEAN SPEED
NNE	2	5	10	0	0	0	17	2.83
	.82	2.05	4.10	0.00	0.00	0.00	6.97	
	.01	.03	.06	0.00	0.00	0.00	.10	
NE	1	1	1	0	0	0	3	2.07
	.41	.41	.41	0.00	0.00	0.00	1.23	
	.01	.01	.01	0.00	0.00	0.00	.02	
ENE	0	0	0	1	3	0	4	7.57
	0.00	0.00	0.00	.41	1.23	0.00	1.64	
	0.00	0.00	0.00	.01	.02	0.00	.02	
E	1	1	0	0	0	0	2	1.55
	.41	.41	0.00	0.00	0.00	0.00	.82	
	.01	.01	0.00	0.00	0.00	0.00	.01	
ESE	2	3	1	1	0	0	7	2.47
	.82	1.23	.41	.41	0.00	0.00	2.87	
	.01	.02	.01	.01	0.00	0.00	.04	
SE	0	1	0	0	0	0	1	2.20
	0.00	.41	0.00	0.00	0.00	0.00	.41	
	0.00	.01	0.00	0.00	0.00	0.00	.01	
SSE	0	2	9	0	0	0	11	3.78
	0.00	.82	3.69	0.00	0.00	0.00	4.51	
	0.00	.01	.05	0.00	0.00	0.00	.07	
S	1	4	9	1	0	0	15	3.25
	.41	1.64	3.69	.41	0.00	0.00	6.15	
	.01	.02	.05	.01	0.00	0.00	.09	
SSW	3	7	4	2	1	0	17	3.05
	1.23	2.87	1.64	.82	.41	0.00	6.97	
	.02	.04	.02	.01	.01	0.00	.10	
SW	4	12	7	1	2	0	26	3.03
	1.64	4.92	2.87	.41	.82	0.00	10.66	
	.02	.07	.04	.01	.01	0.00	.16	
WSW	1	9	16	4	0	0	30	3.49
	.41	3.69	6.56	1.64	0.00	0.00	12.30	
	.01	.05	.10	.02	0.00	0.00	.18	
W	1	10	8	4	0	0	23	3.47
	.41	4.10	3.28	1.64	0.00	0.00	9.43	
	.01	.06	.05	.02	0.00	0.00	.14	
WNW	1	3	4	0	0	0	8	3.14
	.41	1.23	1.64	0.00	0.00	0.00	3.28	
	.01	.02	.02	0.00	0.00	0.00	.05	
NW	1	10	7	0	0	0	18	2.77
	.41	4.10	2.87	0.00	0.00	0.00	7.38	
	.01	.05	.04	0.00	0.00	0.00	.11	
NNW	0	4	15	10	0	0	29	4.68
	0.00	1.64	6.15	4.10	0.00	0.00	11.89	
	0.00	.02	.09	.06	0.00	0.00	.17	
N	1	2	23	7	0	0	33	4.08
	.41	.82	9.43	2.87	0.00	0.00	13.52	
	.01	.01	.14	.04	0.00	0.00	.20	
CALM	0						0	CALM
	0.00						0.00	
	0.00						0.00	
TOTAL	19	74	114	31	6	0	244	3.52
	7.79	30.33	46.72	12.70	2.46	0.00	100.00	
	.11	.44	.68	.19	.04	0.00	1.46	

KEY XXX NUMBER OF OCCURRENCES
XXX PERCENT OCCURRENCES THIS CLASS
XXX PERCENT OCCURRENCES ALL CLASSES

TABLE 2.3-36

JOINT WIND FREQUENCY DISTRIBUTION
DATA PERIOD: SEPTEMBER 1, 1976 - AUGUST 31, 1978

ALL WINDS
DATA SOURCE: ON-SITE
WIND SENSOR HEIGHT: 57.91 METERS

ST. LUCIE UNIT 2
HUTCHINSON ISLAND, FLORIDA
FLORIDA POWER AND LIGHT CO.

WIND SECTOR	WIND SPEED CATEGORIES(METERS PER SECOND) 0.0-1.5	1.5-3.0	3.0-5.0	5.0-7.5	7.5-10.0	>10.0	TOTAL	MEAN SPEED
NNE	20 .12	94 .56	242 1.43	193 1.14	136 .80	68 .40	753 4.45	5.88
NE	16 .09	106 .63	237 1.40	185 1.09	167 .99	67 .40	778 4.60	5.84
ENE	16 .09	108 .64	273 1.61	286 1.69	196 1.16	90 .53	969 5.73	6.04
E	11 .07	145 .86	375 2.22	449 2.66	292 1.73	110 .65	1382 8.17	6.07
ESE	19 .11	134 .79	650 3.84	601 3.55	310 1.83	82 .49	1796 10.62	5.72
SE	19 .11	143 .85	623 3.68	580 3.43	251 1.48	27 .16	1643 9.72	5.39
SSE	18 .11	91 .54	390 2.31	550 3.25	274 1.62	31 .18	1354 8.01	5.82
S	36 .21	124 .73	381 2.25	323 1.91	90 .53	12 .07	966 5.71	4.94
SSW	33 .20	196 1.16	478 2.83	240 1.42	69 .41	30 .18	1046 6.19	4.58
SW	36 .21	171 1.01	427 2.53	225 1.33	87 .51	23 .14	969 5.73	4.61
WSW	24 .14	138 .82	256 1.51	179 1.06	70 .41	14 .08	681 4.03	4.74
W	37 .22	110 .65	211 1.25	150 .89	66 .39	25 .15	599 3.54	4.88
WNW	44 .26	130 .77	241 1.43	187 1.11	75 .44	16 .09	693 4.10	4.74
NW	33 .20	173 1.02	387 2.29	373 2.21	128 .76	6 .04	1100 6.51	4.93
NNW	17 .10	72 .43	234 1.38	471 2.79	232 1.37	40 .24	1066 6.31	6.14
N	19 .11	69 .41	225 1.33	300 1.77	339 2.01	107 .63	1059 6.26	6.78
CALM	53 .31						53 .31	CALM
TOTAL	451 2.67	2004 11.85	5630 33.30	5292 31.30	2782 16.45	748 4.42	16907 100.00	5.49

NUMBER OF VALID OBSERVATIONS	16907	96.50 PCT.
NUMBER OF INVALID OBSERVATIONS	613	3.50 PCT.
TOTAL NUMBER OF OBSERVATIONS	17520	100.00 PCT.

KEY XXX NUMBER OF OCCURRENCES

TABLE 2.3-37

LONG-TERM AVERAGE AND EXTREME TEMPERATURES AND AVERAGE RELATIVE HUMIDITY AT WEST PALM BEACH, FLORIDA

	Averages (°F)[a]			Extreme (°F)[b]		Average Relative
Month	Daily Max	Daily Min	Mean	Highest	Lowest	Humidity %
January	75.0	55.9	65.5	89	27	73.5
February	76.0	56.2	66.1	90	34	71.0
March	79.3	60.2	69.8	94	31	69.5
April	82.9	64.9	73.9	99	45	66.5
May	86.1	68.9	77.5	96	53	70.0
June	88.3	72.7	80.5	98	62	77.3
July	89.6	74.1	81.9	101	66	77.0
August	90.2	74.4	82.3	98	65	76.8
September	88.3	74.7	81.5	97	66	78.5
October	84.3	70.1	77.5	93	46	74.5
November	79.5	62.5	71.0	91	36	72.3
December	76.1	57.4	66.8	90	30	71.8
Annual	83.0	66.0	74.5	101	27	73.3

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a) period of record: 1941-1970
b) period of record: 1937-1977

Reference: U.S. Dept. of Commerce, 1977, Local Climatological Data - Annual Summary with Comparative Data: West Palm Beach, Florida, NOAA, Environmental Data Service.

TABLE 2.3-38

AVERAGE AND EXTREME TEMPERATURES AND AVERAGE RELATIVE HUMIDITY AT THE ST. LUCIE SITE

	Average (^{o}F)			Extreme (^{o}F)		
Month	Daily Max	Daily Min	Mean	Highest	Lowest	Average Relative Humidity %
January	65.1	51.3	58.1	80.1	28.4	65.1
February	66.9	53.4	60.3	82.0	37.6	69.6
March	74.3	64.2	69.3	88.9	47.8	72.2
April	76.6	67.8	72.3	90.5	57.7	67.4
May	80.2	72.7	76.5	86.0	61.5	73.2
June	84.2	76.3	80.2	90.7	71.8	77.6
July	85.5	77.4	81.3	89.8	71.4	78.2
August	84.9	77.7	81.3	90.0	72.5	75.2
September	84.2	75.9	80.1	89.6	70.5	74.8
October	79.7	70.5	75.2	88.2	57.0	67.5
November	75.4	65.3	70.3	99.9	50.0	70.7
December	71.4	59.2	65.3	82.8	41.9	68.3
Annual	77.4	67.6	72.5	99.8	28.4	71.6

Period of record: September 1976 - August 1978

TABLE 2.3-39

STATISTICS AND DIURNAL VARIATION OF METEOROLOGICAL PARAMETERS
DATA PERIOD: SEPTEMBER 1976 AND 1977

DATA SOURCE: ON-SITE

ST. LUCIE UNIT 2
HUTCHINSON ISLAND, FLORIDA
FLORIDA POWER AND LIGHT CO.

METEOROLOGICAL PARAMETERS (HEIGHTS IN METERS)

	REL HUMID	DRY BULB	DEW POINT	DRY BULB
	10.56	10.56	10.56	58.49
HOUR	PCT	DEG C	DEG C	DEG C
1	78.4	25.9	21.9	25.9
2	79.6	25.7	21.9	25.7
3	80.7	25.5	22.0	25.6
4	80.7	25.3	21.7	25.4
5	81.1	25.1	21.6	25.3
6	81.7	25.0	21.6	25.2
7	81.5	25.1	21.7	25.3
8	77.0	26.2	21.9	26.0
9	72.0	27.2	21.8	26.9
10	69.0	27.8	21.8	27.5
11	67.8	28.1	21.8	27.8
12	66.5	28.4	21.7	27.9
13	67.2	28.4	21.8	27.8
14	67.6	28.4	22.0	27.7
15	68.7	28.2	22.0	27.5
16	70.4	27.7	21.9	27.1
17	72.1	27.4	22.0	26.9
18	73.5	27.0	21.9	26.6
19	75.0	26.5	21.8	26.4
20	75.5	26.2	21.8	26.2
21	76.7	26.1	21.8	26.2
22	77.0	26.1	21.8	26.2
23	76.8	26.0	21.7	26.1
24	77.7	26.0	21.8	26.0
ABSOLUTE MAX	100.0	32.0	24.4	31.2
AVG DAILY MAX	85.5	29.0	22.8	29.4
MEAN	74.8	26.6	21.8	26.5
CLIMATIC MEAN	74.3	26.7	21.7	26.5
AVG DAILY MIN	63.1	24.4	20.5	24.6
ABSOLUTE MIN	38.6	21.4	14.4	21.7
STANDARD DEV	8.8	1.8	1.2	1.5
VALID OBS	1347	1350	1353	1352
INVALID OBS	93	90	87	88
TOTAL OBS	1440	1440	1440	1440
DATA RECOVERY	93.5	93.8	94.0	93.9

TABLE 2.3-40

STATISTICS AND DIURNAL VARIATION OF METEOROLOGICAL PARAMETERS
DATA PERIOD: OCTOBER 1976 AND 1977

DATA SOURCE: ON-SITE

ST. LUCIE UNIT 2
HUTCHINSON ISLAND, FLORIDA,
FLORIDA POWER AND LIGHT CO.

METEOROLOGICAL PARAMETERS (HEIGHTS IN METERS)

	REL HUMID	DRY BULB	DEW POINT	DRY BULB
	10.56	10.56	10.56	58.49
HOUR	PCT	DEG C	DEG C	DEG C
1	71.2	23.3	17.8	23.6
2	72.2	23.1	17.8	23.4
3	73.4	22.9	17.8	23.2
4	74.2	22.7	17.8	23.0
5	74.7	22.5	17.7	22.8
6	76.3	22.2	17.8	22.5
7	75.9	22.2	17.6	22.5
8	71.7	22.9	17.4	22.8
9	68.0	24.0	17.7	23.6
10	64.3	24.9	17.6	24.3
11	61.1	25.5	17.5	25.2
12	60.8	25.8	17.6	25.4
13	61.2	25.8	17.8	25.3
14	60.1	26.1	17.7	25.3
15	60.1	26.1	17.7	25.3
16	60.4	25.7	17.4	25.1
17	62.0	25.3	17.4	24.8
18	64.5	24.7	17.5	24.6
19	66.2	24.3	17.6	24.4
20	66.5	24.2	17.6	24.3
21	67.4	24.0	17.6	24.2
22	68.5	23.8	17.7	24.0
23	69.7	23.7	17.8	23.9
24	70.4	23.4	17.7	23.6
ABSOLUTE MAX	98.7	31.2	25.0	37.7
AVG DAILY MAX	79.9	26.5	19.3	26.1
MEAN	67.5	24.1	17.6	24.1
CLIMATIC MEAN	67.3	24.0	17.3	23.9
AVG DAILY MIN	54.7	21.4	15.3	21.7
ABSOLUTE MIN	35.9	13.9	4.4	13.8
STANDARD DEV	12.3	2.8	3.6	2.7
VALID OBS	1376	1376	1376	1376
INVALID OBS	112	112	112	112
TOTAL OBS	1488	1488	1488	1488
DATA RECOVERY	92.5	92.5	92.5	92.5

TABLE 2.3-41

STATISTICS AND DIURNAL VARIATION OF METEOROLOGICAL PARAMETERS

DATA PERIOD: NOVEMBER 1976 AND 1977

DATA SOURCE: ON-SITE

ST. LUCIE UNIT 2
HUTCHINSON ISLAND, FLORIDA
FLORIDA POWER AND LIGHT CO.

METEOROLOGICAL PARAMETERS (HEIGHTS IN METERS)

	REL HUMID	DRY BULB	DEW POINT	DRY BULB
	10.56	10.56	10.56	58.49
HOUR	PCT	DEG C	DEG C	DEG C
1	73.3	20.6	15.5	20.9
2	74.1	20.4	15.5	20.8
3	74.3	20.2	15.3	20.5
4	74.8	19.9	15.1	20.3
5	75.2	19.6	15.0	20.0
6	75.9	19.4	14.9	19.9
7	76.5	19.3	14.9	19.8
8	75.6	19.7	15.1	19.9
9	73.4	20.5	15.5	20.3
10	70.5	21.9	15.9	21.6
11	67.3	22.8	16.1	22.4
12	66.6	23.2	16.3	22.7
13	65.8	23.4	16.6	22.9
14	64.6	23.5	16.1	22.9
15	64.3	23.5	16.1	23.0
16	64.4	23.4	16.2	23.0
17	65.4	22.9	15.9	22.7
18	68.2	22.1	15.8	22.2
19	69.0	21.8	15.8	22.0
20	70.2	21.6	15.9	21.9
21	71.2	21.4	15.9	21.7
22	70.8	21.3	15.7	21.6
23	72.0	21.2	15.8	21.5
24	72.3	20.7	15.6	21.1
ABSOLUTE MAX	100.0	37.7	37.2	37.7
AVG DAILY MAX	82.3	24.1	18.0	23.7
MEAN	70.7	21.4	15.7	21.5
CLIMATIC MEAN	70.1	21.3	15.6	21.3
AVG DAILY MIN	57.9	18.5	13.3	18.9
ABSOLUTE MIN	28.2	10.0	.6	9.9
STANDARD DEV	13.1	3.8	4.5	3.8
VALID OBS	1384	1393	1384	1393
INVALID OBS	56	47	56	47
TOTAL OBS	1440	1440	1440	1440
DATA RECOVERY	96.1	96.7	96.1	96.7

TABLE 2.3-42

STATISTICS AND DIURNAL VARIATION OF METEOROLOGICAL PARAMETERS
DATA PERIOD: DECEMBER 1976 AND 1977

DATA SOURCE: ON-SITE

ST. LUCIE UNIT 2
HUTCHINSON ISLAND, FLORIDA
FLORIDA POWER AND LIGHT CO.

METEOROLOGICAL PARAMETERS (HEIGHTS IN METERS)

	REL HUMID	DRY BULB	DEW POINT	DRY BULB
	10.56	10.56	10.56	58.49
HOUR	PCT	DEG C	DEG C	DEG C
1	71.3	17.4	12.1	17.9
2	71.8	17.3	12.1	17.7
3	72.5	17.1	12.0	17.6
4	73.0	17.1	12.2	17.6
5	73.2	17.0	12.1	17.5
6	73.8	16.8	12.0	17.4
7	74.1	16.7	12.0	17.4
8	74.1	16.8	12.0	17.4
9	71.3	17.6	12.3	17.9
10	68.2	19.0	12.8	18.8
11	65.6	19.9	13.2	19.5
12	63.8	20.5	13.3	20.1
13	62.1	20.9	13.2	20.4
14	61.0	21.0	13.1	20.5
15	60.7	20.9	12.8	20.4
16	61.6	20.6	12.9	20.3
17	63.1	20.1	12.7	19.9
18	65.4	19.3	12.4	19.5
19	66.9	18.8	12.3	19.2
20	67.5	18.5	12.3	18.9
21	68.8	18.2	12.3	18.7
22	69.2	18.1	12.3	18.6
23	70.1	18.0	12.3	18.5
24	71.2	17.7	12.3	18.2
ABSOLUTE MAX	97.5	28.2	22.2	28.1
AVG DAILY MAX	80.2	21.9	15.4	21.6
MEAN	68.3	18.6	12.5	18.8
CLIMATIC MEAN	68.3	18.5	12.2	18.6
AVG DAILY MIN	56.4	15.1	9.1	15.5
ABSOLUTE MIN	34.1	5.5	-3.4	5.8
STANDARD DEV	14.0	4.7	6.1	4.6
VALID OBS	1464	1467	1464	1467
INVALID OBS	24	21	24	21
TOTAL OBS	1488	1488	1488	1488
DATA RECOVERY	98.4	98.6	98.4	98.6

TABLE 2.3-43

STATISTICS AND DIURNAL VARIATION OF METEOROLOGICAL PARAMETERS
DATA PERIOD: JANUARY 1977 AND 1978

DATA SOURCE: ON-SITE

ST. LUCIE UNIT 2
HUTCHINSON ISLAND, FLORIDA
FLORIDA POWER AND LIGHT CO.

METEOROLOGICAL PARAMETERS (HEIGHTS IN METERS)

	REL HUMID	DRY BULB	DEW POINT	DRY BULB
	10.56	10.56	10.56	58.49
HOUR	PCT	DEG C	DEG C	DEG C
1	70.4	13.5	8.1	14.1
2	71.6	13.0	8.0	13.6
3	71.9	12.8	7.9	13.4
4	72.3	12.7	7.7	13.2
5	72.0	12.5	7.4	12.9
6	72.4	12.4	7.4	12.9
7	72.3	12.3	7.4	12.8
8	71.6	12.3	7.2	12.8
9	68.6	13.3	7.7	13.4
10	63.9	14.7	7.8	14.2
11	60.9	15.9	8.3	15.3
12	59.0	16.7	8.5	16.0
13	57.3	17.2	8.6	16.5
14	56.1	17.5	8.4	16.7
15	56.6	17.6	8.6	16.9
16	56.9	17.4	8.5	16.9
17	57.3	17.1	8.4	16.7
18	59.2	16.4	8.3	16.4
19	61.0	15.8	8.2	16.1
20	62.1	15.4	8.0	15.7
21	65.4	14.8	8.2	15.2
22	67.1	14.2	8.1	14.7
23	67.8	14.0	8.0	14.4
24	68.9	13.5	7.8	14.0
ABSOLUTE MAX	100.0	26.7	20.0	26.4
AVG DAILY MAX	80.2	18.4	11.6	18.0
MEAN	65.1	14.7	8.0	14.8
CLIMATIC MEAN	66.1	14.5	8.2	14.5
AVG DAILY MIN	51.9	10.7	4.8	11.1
ABSOLUTE MIN	26.0	-2.0	-6.3	-1.9
STANDARD DEV	14.7	5.6	6.7	5.7
VALID OBS	1443	1449	1443	1434
INVALID OBS	45	39	45	54
TOTAL OBS	1488	1488	1488	1488
DATA RECOVERY	97.0	97.4	97.0	96.4

TABLE 2.3-44

STATISTICS AND DIURNAL VARIATION OF METEOROLOGICAL PARAMETERS
DATA PERIOD: FEBRUARY 1977 AND 1978

DATA SOURCE: ON-SITE

ST. LUCIE UNIT 2
HUTCHINSON ISLAND, FLORIDA
FLORIDA POWER AND LIGHT CO.

METEOROLOGICAL PARAMETERS (HEIGHTS IN METERS)

	REL HUMID	DRY BULB	DEW POINT	DRY BULB
	10.56	10.56	10.56	58.49
HOUR	PCT	DEG C	DEG C	DEG C
1	75.4	14.5	10.1	15.0
2	75.4	14.3	9.9	14.8
3	76.4	14.1	9.9	14.5
4	76.3	13.9	9.7	14.3
5	77.6	13.7	9.7	14.1
6	78.0	13.5	9.7	13.9
7	78.3	13.4	9.7	13.8
8	77.5	13.7	9.8	14.0
9	73.2	14.7	9.9	14.5
10	67.4	16.2	10.0	15.7
11	64.1	17.3	10.2	16.7
12	62.3	17.9	10.3	17.2
13	61.0	18.4	10.5	17.7
14	61.1	18.4	10.5	17.7
15	60.7	18.6	10.6	17.8
16	61.2	18.6	10.7	17.8
17	62.3	18.2	10.6	17.6
18	64.4	17.4	10.4	17.3
19	66.3	16.7	10.1	16.8
20	67.7	16.4	10.2	16.6
21	69.6	16.0	10.3	16.3
22	69.9	15.8	10.2	16.1
23	70.8	15.4	10.0	15.9
24	73.3	14.9	10.1	15.4
ABSOLUTE MAX	100.0	27.8	21.1	26.9
AVG DAILY MAX	85.0	19.4	13.0	19.0
MEAN	69.6	15.9	10.1	15.9
CLIMATIC MEAN	69.3	15.7	9.8	15.7
AVG DAILY MIN	53.6	11.9	6.6	12.3
ABSOLUTE MIN	23.2	3.1	-6.7	3.1
STANDARD DEV	15.1	4.6	5.6	4.5
VALID OBS	1340	1341	1340	1341
INVALID OBS	4	3	4	3
TOTAL OBS	1344	1344	1344	1344
DATA RECOVERY	99.7	99.8	99.7	99.8

TABLE 2.3-45

STATISTICS AND DIURNAL VARIATION OF METEOROLOGICAL PARAMETERS

DATA PERIOD: MARCH 1977 AND 1978

DATA SOURCE: ON-SITE

ST. LUCIE UNIT 2
HUTCHINSON ISLAND, FLORIDA
FLORIDA POWER AND LIGHT CO.

METEOROLOGICAL PARAMETERS (HEIGHTS IN METERS)

	REL HUMID	DRY BULB	DEW POINT	DRY BULB
	10.56	10.56	10.56	58.49
HOUR	PCT	DEG C	DEG C	DEG C
1	76.0	19.7	15.3	19.9
2	76.9	19.5	15.2	19.6
3	78.0	19.2	15.2	19.3
4	79.3	18.9	15.2	19.1
5	79.6	18.8	15.1	19.0
6	79.2	18.7	15.0	18.9
7	79.0	18.7	14.9	18.8
8	77.4	19.2	15.0	19.1
9	72.7	20.3	15.1	19.9
10	67.7	21.3	15.1	20.7
11	64.7	22.0	15.1	21.3
12	63.4	22.5	15.2	21.7
13	65.2	22.7	15.9	21.8
14	64.3	22.8	15.6	21.7
15	64.2	22.9	15.8	21.8
16	64.8	22.7	15.7	21.8
17	66.2	22.2	15.6	21.4
18	69.1	21.6	15.6	21.1
19	72.1	20.9	15.6	20.9
20	73.1	20.7	15.6	20.8
21	73.6	20.5	15.6	20.7
22	74.1	20.4	15.6	20.5
23	74.4	20.3	15.5	20.4
24	75.2	20.1	15.5	20.2
ABSOLUTE MAX	98.1	31.6	30.0	30.7
AVG DAILY MAX	84.5	23.5	17.6	22.8
MEAN	72.2	20.7	15.4	20.4
CLIMATIC MEAN	71.8	20.7	15.4	20.4
AVG DAILY MIN	59.1	17.9	13.3	18.0
ABSOLUTE MIN	42.1	8.2	2.8	7.8
STANDARD DEV	12.9	3.7	4.4	3.6
VALID OBS	1467	1467	1471	1467
INVALID OBS	21	21	17	21
TOTAL OBS	1488	1488	1488	1488
DATA RECOVERY	98.6	98.6	98.9	98.6

TABLE 2.3-46

STATISTICS AND DIURNAL VARIATION OF METEOROLOGICAL PARAMETERS
DATA PERIOD: APRIL 1977 AND 1978

DATA SOURCE: ON-SITE

ST. LUCIE UNIT 2
HUTCHINSON ISLAND, FLORIDA
FLORIDA POWER AND LIGHT CO.

METEOROLOGICAL PARAMETERS (HEIGHTS IN METERS)

	REL HUMID	DRY BULB	DEW POINT	DRY BULB
	10.56	10.56	10.56	58.49
HOUR	PCT	DEG C	DEG C	DEG C
1	71.2	21.5	16.0	21.5
2	72.0	21.2	15.9	21.2
3	72.2	20.9	15.7	20.9
4	72.8	20.7	15.6	20.8
5	73.1	20.6	15.5	20.7
6	73.9	20.5	15.6	20.6
7	73.8	21.0	16.0	21.0
8	69.3	22.1	16.2	21.6
9	65.1	23.1	16.1	22.2
10	62.5	23.7	16.1	22.7
11	61.1	24.1	16.1	22.9
12	60.2	24.4	16.2	23.1
13	60.7	24.3	16.2	22.9
14	60.6	24.5	16.4	23.0
15	61.6	24.4	16.5	23.0
16	62.3	24.1	16.4	23.0
17	64.2	23.7	16.5	22.8
18	65.9	23.2	16.5	22.6
19	68.2	22.5	16.3	22.3
20	69.4	22.2	16.3	22.2
21	69.9	22.3	16.5	22.3
22	69.0	22.3	16.3	22.2
23	69.2	22.0	16.1	22.0
24	69.6	21.8	16.0	21.8
ABSOLUTE MAX	93.8	32.5	21.7	30.6
AVG DAILY MAX	79.0	24.8	17.6	23.6
MEAN	67.4	22.5	16.1	22.1
CLIMATIC MEAN	67.7	22.4	15.8	21.9
AVG DAILY MIN	56.4	19.9	14.1	20.1
ABSOLUTE MIN	33.3	14.3	6.7	14.2
STANDARD DEV	11.3	2.3	3.0	2.0
VALID OBS	1409	1410	1409	1271
INVALID OBS	31	30	31	169
TOTAL OBS	1440	1440	1440	1440
DATA RECOVERY	97.8	97.9	97.8	88.3

TABLE 2.3-47

STATISTICS AND DIURNAL VARIATION OF METEOROLOGICAL PARAMETERS
DATA PERIOD: MAY 1977 AND 1978

DATA SOURCE: ON-SITE

ST. LUCIE UNIT 2
HUTCHINSON ISLAND, FLORIDA
FLORIDA POWER AND LIGHT CO.

METEOROLOGICAL PARAMETERS (HEIGHTS IN METERS)

	REL HUMID	DRY BULB	DEW POINT	DRY BULB
	10.56	10.56	10.56	58.49
HOUR	PCT	DEG C	DEG C	DEG C
1	75.7	23.8	19.3	23.8
2	76.4	23.7	19.2	23.6
3	77.3	23.5	19.2	23.5
4	78.4	23.3	19.3	23.3
5	79.4	23.2	19.3	23.2
6	80.1	23.0	19.4	23.1
7	78.9	23.6	19.6	23.5
8	75.3	24.5	19.8	24.1
9	71.2	25.2	19.6	24.7
10	68.5	25.9	19.6	25.3
11	67.8	26.0	19.5	25.3
12	68.4	26.1	19.7	25.2
13	68.1	26.2	19.8	25.2
14	68.4	26.1	19.8	25.1
15	69.2	25.9	19.8	25.1
16	70.2	25.8	19.9	25.0
17	70.4	25.6	19.7	25.0
18	70.7	25.3	19.5	24.8
19	71.4	25.0	19.4	24.7
20	72.5	24.7	19.3	24.6
21	73.7	24.5	19.5	24.4
22	74.4	24.4	19.5	24.2
23	75.4	24.2	19.6	24.1
24	75.9	24.0	19.5	24.0
ABSOLUTE MAX	98.1	30.0	23.9	29.4
AVG DAILY MAX	84.1	26.8	21.0	26.1
MEAN	73.2	24.7	19.5	24.4
CLIMATIC MEAN	73.5	24.7	19.5	24.4
AVG DAILY MIN	63.0	22.6	18.0	22.6
ABSOLUTE MIN	27.8	16.4	5.9	16.4
STANDARD DEV	12.2	1.8	3.0	1.7
VALID OBS	1414	1416	1414	1416
INVALID OBS	74	72	74	72
TOTAL OBS	1488	1488	1488	1488
DATA RECOVERY	95.0	95.2	95.0	95.2

TABLE 2.3-48

STATISTICS AND DIURNAL VARIATION OF METEOROLOGICAL PARAMETERS
DATA PERIOD: JUNE 1977 AND 1978

DATA SOURCE: ON-SITE

ST. LUCIE UNIT 2
HUTCHINSON ISLAND, FLORIDA
FLORIDA POWER AND LIGHT CO.

METEOROLOGICAL PARAMETERS (HEIGHTS IN METERS)

	REL HUMID	DRY BULB	DEW POINT	DRY BULB
	10.56	10.56	10.56	58.49
HOUR	PCT	DEG C	DEG C	DEG C
1	81.1	25.7	22.2	25.6
2	82.1	25.5	22.3	25.4
3	83.0	25.3	22.2	25.2
4	83.6	25.1	22.2	25.1
5	84.3	25.1	22.2	25.1
6	84.8	25.1	22.3	25.1
7	82.8	25.7	22.6	25.6
8	78.6	26.7	22.7	26.4
9	75.1	27.5	22.7	27.1
10	72.1	28.0	22.6	27.7
11	71.6	28.2	22.7	27.8
12	72.2	28.3	22.9	27.7
13	72.4	28.4	23.0	27.6
14	71.3	28.6	23.0	27.7
15	72.4	28.3	22.9	27.6
16	73.9	27.9	22.9	27.4
17	75.3	27.5	22.8	27.0
18	75.7	27.2	22.6	26.8
19	76.1	26.9	22.4	26.6
20	76.8	26.6	22.3	26.4
21	77.7	26.4	22.3	26.2
22	78.7	26.2	22.3	26.0
23	79.4	26.1	22.3	26.0
24	80.5	25.9	22.4	25.8
ABSOLUTE MAX	98.2	32.6	26.7	33.2
AVG DAILY MAX	87.9	29.0	23.8	28.6
MEAN	77.6	26.7	22.5	26.5
CLIMATIC MEAN	77.5	26.8	22.5	26.5
AVG DAILY MIN	67.0	24.6	21.2	24.5
ABSOLUTE MIN	42.5	22.1	17.2	22.1
STANDARD DEV	8.4	1.8	1.4	1.7
VALID OBS	1333	1333	1334	1333
INVALID OBS	155	155	154	155
TOTAL OBS	1488	1488	1488	1488
DATA RECOVERY	89.6	89.6	89.7	89.6

TABLE 2.3-49

STATISTICS AND DIURNAL VARIATION OF METEOROLOGICAL PARAMETERS
DATA PERIOD: JULY 1977 AND 1978

DATA SOURCE: ON-SITE

ST. LUCIE UNIT 2
HUTCHINSON ISLAND, FLORIDA
FLORIDA POWER AND LIGHT CO.

METEOROLOGICAL PARAMETERS (HEIGHTS IN METERS)

	REL HUMID	DRY BULB	DEW POINT	DRY BULB
	10.56	10.56	10.56	58.49
HOUR	PCT	DEG C	DEG C	DEG C
1	83.1	26.4	23.3	26.3
2	83.2	26.3	23.3	26.2
3	83.4	26.2	23.3	26.0
4	84.1	26.1	23.3	26.0
5	84.5	26.0	23.3	26.0
6	84.6	26.1	23.4	26.1
7	82.8	26.6	23.5	26.8
8	78.5	27.7	23.7	27.5
9	75.4	28.4	23.7	28.2
10	72.5	28.9	23.6	28.6
11	71.6	28.9	23.4	28.6
12	72.3	28.9	23.5	28.4
13	71.9	29.1	23.6	28.3
14	71.8	29.2	23.7	28.3
15	72.3	28.9	23.6	28.3
16	73.6	28.7	23.6	28.3
17	74.0	28.7	23.7	28.3
18	75.2	28.2	23.5	27.8
19	77.2	27.6	23.3	27.3
20	78.7	27.2	23.2	27.0
21	79.5	27.0	23.2	26.8
22	80.6	26.8	23.3	26.7
23	82.0	26.7	23.4	26.6
24	82.8	26.5	23.4	26.5
ABSOLUTE MAX	100.0	32.1	26.7	31.4
AVG DAILY MAX	89.0	29.7	24.6	29.3
MEAN	78.1	27.5	23.4	27.3
CLIMATIC MEAN	78.2	27.4	23.4	27.2
AVG DAILY MIN	67.3	25.2	22.2	25.1
ABSOLUTE MIN	55.1	21.9	20.0	22.2
STANDARD DEV	7.7	1.7	1.0	1.5
VALID OBS	1465	1467	1465	1467
INVALID OBS	23	21	23	21
TOTAL OBS	1488	1488	1488	1488
DATA RECOVERY	98.5	98.6	98.5	98.6

TABLE 2.3-50

STATISTICS AND DIURNAL VARIATION OF METEOROLOGICAL PARAMETERS
DATA PERIOD: AUGUST 1977 AND 1978

DATA SOURCE: ON-SITE

ST. LUCIE UNIT 2
HUTCHINSON ISLAND, FLORIDA
FLORIDA POWER AND LIGHT CO.

METEOROLOGICAL PARAMETERS (HEIGHTS IN METERS)

	REL HUMID	DRY BULB	DEW POINT	DRY BULB
	10.56	10.56	10.56	58.49
HOUR	PCT	DEG C	DEG C	DEG C
1	78.9	26.5	22.6	26.6
2	79.6	26.3	22.6	26.5
3	79.4	26.3	22.5	26.5
4	80.0	26.2	22.5	26.4
5	80.2	26.1	22.5	26.3
6	80.3	26.1	22.5	26.3
7	79.6	26.4	22.6	26.5
8	76.1	27.3	22.8	27.0
9	72.8	28.0	22.7	27.5
10	70.2	28.4	22.6	27.9
11	69.5	28.6	22.6	28.0
12	69.5	28.6	22.6	27.9
13	69.8	28.7	22.8	27.9
14	69.3	28.9	22.8	28.1
15	70.1	28.8	22.9	28.1
16	70.3	28.7	22.9	28.1
17	71.5	28.4	22.9	27.9
18	73.3	27.8	22.6	27.4
19	74.8	27.3	22.5	27.2
20	76.5	26.9	22.5	27.0
21	76.9	26.9	22.5	27.0
22	77.0	26.9	22.6	27.0
23	77.4	26.8	22.6	26.9
24	78.1	26.7	22.6	26.8
ABSOLUTE MAX	100.0	32.2	25.6	31.4
AVG DAILY MAX	84.3	29.4	23.6	28.5
MEAN	75.2	27.4	22.6	27.2
CLIMATIC MEAN	75.2	27.4	22.5	27.1
AVG DAILY MIN	56.1	25.4	21.5	25.6
ABSOLUTE MIN	45.6	22.5	18.3	22.8
STANDARD DEV	8.2	1.5	1.4	1.2
VALID OBS	1407	1407	1407	1407
INVALID OBS	81	81	81	81
TOTAL OBS	1488	1488	1488	1488
DATA RECOVERY	94.6	94.6	94.6	94.6

TABLE 2.3-51

STATISTICS AND DIURNAL VARIATION OF METEOROLOGICAL PARAMETERS
DATA PERIOD: SEPTEMBER 1, 1976 - AUGUST 31, 1978

DATA SOURCE: ON-SITE

ST. LUCIE UNIT 2
HUTCHINSON ISLAND, FLORIDA
FLORIDA POWER AND LIGHT CO.

METEOROLOGICAL PARAMETERS (HEIGHTS IN METERS)

	REL HUMID	DRY BULB	DEW POINT	DRY BULB
	10.56	10.56	10.56	58.49
HOUR	PCT	DEG C	DEG C	DEG C
1	75.5	21.5	17.0	21.7
2	76.2	21.3	16.9	21.5
3	76.9	21.1	16.9	21.3
4	77.4	20.9	16.8	21.2
5	77.9	20.8	16.8	21.0
6	78.4	20.7	16.8	21.0
7	77.9	20.9	16.9	21.1
8	75.2	21.6	17.0	21.6
9	71.5	22.4	17.0	22.2
10	68.0	23.3	17.1	22.9
11	66.0	23.9	17.2	23.4
12	65.4	24.2	17.3	23.6
13	65.1	24.4	17.4	23.6
14	64.6	24.5	17.3	23.7
15	65.0	24.5	17.4	23.7
16	65.8	24.2	17.4	23.6
17	66.9	23.9	17.3	23.4
18	68.8	23.3	17.2	23.1
19	70.3	22.8	17.1	22.8
20	71.5	22.5	17.1	22.6
21	72.5	22.3	17.1	22.5
22	73.0	22.2	17.1	22.3
23	73.7	22.0	17.1	22.1
24	74.7	21.7	17.0	21.9
ABSOLUTE MAX	100.0	37.7	37.2	37.7
AVG DAILY MAX	83.5	25.2	19.0	24.6
MEAN	71.6	22.5	17.1	22.4
CLIMATIC MEAN	71.6	22.5	17.0	22.3
AVG DAILY MIN	59.7	19.8	15.0	20.0
ABSOLUTE MIN	23.2	-2.0	-8.3	-1.9
STANDARD DEV	12.5	5.4	6.3	5.3
VALID OBS	16801	16828	16812	16676
INVALID OBS	719	692	708	844
TOTAL OBS	17520	17520	17520	17520
DATA RECOVERY	95.9	96.1	96.0	95.2

TABLE 2.3-52

PRECIPITATION DATA AT WEST PALM BEACH, FLORIDA

Month	Mean Total[a] (inches)	Greatest 24-Hour[b] (inches)
January	2.60	6.36
February	2.60	4.70
March	3.32	4.88
April	3.51	15.23
May	5.17	7.04
June	8.14	9.21
July	6.52	5.83
August	6.91	5.89
September	9.85	8.71
October	8.75	9.58
November	2.48	5.52
December	2.21	5.26
Annual	62.06	15.23

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a) period of record: 1941-1970
b) period of record: 1939-1977

Reference: U.S. Dept. of Commerce, 1977, Local Climatological Data - Annual Summary with Comparative Data: West Palm Beach, Florida, NOAA, Environmental Data Service.

TABLE 2.3-53

PRECIPITATION DATA AT THE ST. LUCIE SITE

Month	Mean Total (inches)
January	2.65
February	1.00
March	1.74
April	2.77
May	2.07
June	1.37
July	3.27
August	4.19
September	4.11
October	2.78
November	2.78
December	2.93
Annual	31.58

period of record: September 1976 - August 1978

TABLE 2.3-54

FREQUENCY DISTRIBUTION OF PRECIPITATION
DATA PERIOD: SEPTEMBER 1976 AND 1977

DATA SOURCE: ON-SITE

ST. LUCIE UNIT 2
HUTCHINSON ISLAND, FLORIDA
FLORIDA POWER AND LIGHT CO.

PRECIPITATION CLASS INTERVAL (INCHES)	FREQUENCY DISTRIBUTION OF PRECIPITATION 1 HOUR DURATION		FREQUENCY DISTRIBUTION OF PRECIPITATION 2 HOUR DURATION		FREQUENCY DISTRIBUTION OF PRECIPITATION 3 HOUR DURATION		FREQUENCY DISTRIBUTION OF PRECIPITATION 6 HOUR DURATION		FREQUENCY DISTRIBUTION OF PRECIPITATION 12 HOUR DURATION		FREQUENCY DISTRIBUTION OF PRECIPITATION 24 HOUR DURATION	
	NO.	PCT.	NO.	PCT.	NO.	PCT.	NO.	PCT.	NO.	PCT.	NO.	PCT.
.0 TO .1	21	52.50	2	16.67	0	0.00	0	0.00	0	0.00	0	0.00
.1 TO .2	8	20.00	3	25.00	1	20.00	0	0.00	0	0.00	0	0.00
.2 TO .3	4	10.00	2	16.67	1	20.00	0	0.00	0	0.00	0	0.00
.3 TO .4	1	2.50	2	16.67	1	20.00	0	0.00	0	0.00	0	0.00
.4 TO .5	1	2.50	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
.5 TO .6	3	7.50	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
.6 TO .7	1	2.50	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
.7 TO .8	0	0.00	2	16.67	0	0.00	0	0.00	0	0.00	0	0.00
.8 TO .9	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
.9 TO 1.0	0	0.00	0	0.00	1	20.00	0	0.00	0	0.00	0	0.00
1.0 TO 1.1	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
1.1 TO 1.2	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
1.2 TO 1.3	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
1.3 TO 1.4	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
1.4 TO 1.5	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
1.5 TO 1.6	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
1.6 TO 1.7	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
1.7 TO 1.8	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
1.8 TO 1.9	1	2.50	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
1.9 TO 2.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
2.0 TO 2.2	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
2.2 TO 2.4	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
2.4 TO 2.6	0	0.00	1	8.33	1	20.00	0	0.00	0	0.00	0	0.00
2.6 TO 2.8	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
2.8 TO 3.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
3.0 TO 3.2	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
3.2 TO 3.4	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
3.4 TO 3.6	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
3.6 TO 3.8	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
3.8 TO 4.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
4.0 TO 4.5	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
4.5 TO 5.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
5.0 TO 5.5	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
5.5 TO 6.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
6.0 TO 6.5	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
6.5 TO 7.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
7.0 TO 7.5	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
7.5 TO 8.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
8.0 TO 9.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
9.0 TO 10.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
10.0 TO 11.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
11.0 TO 12.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
GT 12.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
TOTAL	40	100.00	12	100.00	5	100.00	0	0.00	0	0.00	0	0.00
MAXIMUM AMT.	1.86		2.43		2.51		0.00		0.00		0.00	

TOTAL PRECIPITATION FOR DATA PERIOD 8.22 INCHES

	NO.	PCT.
OBSERVATIONS WITH NO PRECIPITATION	1400	97.22
OBSERVATIONS WITH PRECIPITATION GE 0.01 INCH	40	2.78
TOTAL VALID OBSERVATIONS	1440	100.00

	NO.	PCT.
VALID OBSERVATIONS	1440	100.00
INVALID OBSERVATIONS	0	0.00
TOTAL OBSERVATIONS	1440	100.00

TABLE 2.3-55

FREQUENCY DISTRIBUTION OF PRECIPITATION
DATA PERIOD: OCTOBER 1976 AND 1977

DATA SOURCE: ON-SITE

ST. LUCIE UNIT 2
HUTCHINSON ISLAND, FLORIDA
FLORIDA POWER AND LIGHT CO.

PRECIPITATION CLASS INTERVAL (INCHES)	FREQUENCY DISTRIBUTION OF PRECIPITATION 1 HOUR DURATION NO.	PCT.	FREQUENCY DISTRIBUTION OF PRECIPITATION 2 HOUR DURATION NO.	PCT.	FREQUENCY DISTRIBUTION OF PRECIPITATION 3 HOUR DURATION NO.	PCT.	FREQUENCY DISTRIBUTION OF PRECIPITATION 6 HOUR DURATION NO.	PCT.	FREQUENCY DISTRIBUTION OF PRECIPITATION 12 HOUR DURATION NO.	PCT.	FREQUENCY DISTRIBUTION OF PRECIPITATION 24 HOUR DURATION NO.	PCT.
.0 TO .1	43	78.18	5	26.32	2	22.22	0	0.00	0	0.00	0	0.00
.1 TO .2	4	7.27	6	31.58	3	33.33	1	50.00	0	0.00	0	0.00
.2 TO .3	3	5.45	1	5.26	0	0.00	0	0.00	0	0.00	0	0.00
.3 TO .4	0	0.00	2	10.53	0	0.00	0	0.00	0	0.00	0	0.00
.4 TO .5	3	5.45	1	5.26	0	0.00	0	0.00	0	0.00	0	0.00
.5 TO .6	1	1.82	2	10.53	2	22.22	0	0.00	0	0.00	0	0.00
.6 TO .7	1	1.82	2	10.53	0	0.00	0	0.00	0	0.00	0	0.00
.7 TO .8	0	0.00	0	0.00	2	22.22	0	0.00	0	0.00	0	0.00
.8 TO .9	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
.9 TO 1.0	0	0.00	0	0.00	0	0.00	1	50.00	0	0.00	0	0.00
1.0 TO 1.1	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
1.1 TO 1.2	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
1.2 TO 1.3	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
1.3 TO 1.4	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
1.4 TO 1.5	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
1.5 TO 1.6	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
1.6 TO 1.7	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
1.7 TO 1.8	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
1.8 TO 1.9	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
1.9 TO 2.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
2.0 TO 2.2	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
2.2 TO 2.4	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
2.4 TO 2.6	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
2.6 TO 2.8	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
2.8 TO 3.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
3.0 TO 3.2	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
3.2 TO 3.4	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
3.4 TO 3.6	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
3.6 TO 3.8	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
3.8 TO 4.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
4.0 TO 4.5	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
4.5 TO 5.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
5.0 TO 5.5	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
5.5 TO 6.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
6.0 TO 6.5	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
6.5 TO 7.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
7.0 TO 7.5	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
7.5 TO 8.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
8.0 TO 9.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
9.0 TO 10.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
10.0 TO 11.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
11.0 TO 12.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
GT 12.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
TOTAL	55	100.00	19	100.00	9	100.00	2	100.00	0	0.00	0	0.00
MAXIMUM AMT.	.61		.70		.74		.93		0.00		0.00	

TOTAL PRECIPITATION FOR DATA PERIOD 5.55 INCHES

	NO.	PCT.
OBSERVATIONS WITH NO PRECIPITATION	1433	96.30
OBSERVATIONS WITH PRECIPITATION GE 0.01 INCH	55	3.70
TOTAL VALID OBSERVATIONS	1488	100.00

	NO.	PCT.
VALID OBSERVATIONS	1488	100.00
INVALID OBSERVATIONS	0	0.00
TOTAL OBSERVATIONS	1488	100.00

TABLE 2.3-56

FREQUENCY DISTRIBUTION OF PRECIPITATION
DATA PERIOD: NOVEMBER 1976 AND 1977

DATA SOURCE: ON-SITE

ST. LUCIE UNIT 2
HUTCHINSON ISLAND, FLORIDA
FLORIDA POWER AND LIGHT CO.

PRECIPITATION CLASS INTERVAL (INCHES)	FREQUENCY DISTRIBUTION OF PRECIPITATION 1 HOUR DURATION		FREQUENCY DISTRIBUTION OF PRECIPITATION 2 HOUR DURATION		FREQUENCY DISTRIBUTION OF PRECIPITATION 3 HOUR DURATION		FREQUENCY DISTRIBUTION OF PRECIPITATION 6 HOUR DURATION		FREQUENCY DISTRIBUTION OF PRECIPITATION 12 HOUR DURATION		FREQUENCY DISTRIBUTION OF PRECIPITATION 24 HOUR DURATION	
	NO.	PCT.	NO.	PCT.	NO.	PCT.	NO.	PCT.	NO.	PCT.	NO.	PCT.
.0 TO .1	35	71.43	11	50.00	3	30.00	0	0.00	0	0.00	0	0.00
.1 TO .2	6	12.24	4	18.18	2	20.00	1	25.00	0	0.00	0	0.00
.2 TO .3	3	6.12	2	9.09	0	0.00	0	0.00	0	0.00	0	0.00
.3 TO .4	1	2.04	1	4.55	1	10.00	0	0.00	0	0.00	0	0.00
.4 TO .5	2	4.08	1	4.55	0	0.00	0	0.00	0	0.00	0	0.00
.5 TO .6	0	0.00	0	0.00	0	0.00	1	25.00	0	0.00	0	0.00
.6 TO .7	0	0.00	1	4.55	1	10.00	0	0.00	0	0.00	0	0.00
.7 TO .8	1	2.04	0	0.00	1	10.00	0	0.00	0	0.00	0	0.00
.8 TO .9	1	2.04	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
.9 TO 1.0	0	0.00	1	4.55	0	0.00	0	0.00	0	0.00	0	0.00
1.0 TO 1.1	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
1.1 TO 1.2	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
1.2 TO 1.3	0	0.00	1	4.55	1	10.00	0	0.00	0	0.00	0	0.00
1.3 TO 1.4	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
1.4 TO 1.5	0	0.00	0	0.00	1	10.00	0	0.00	0	0.00	0	0.00
1.5 TO 1.6	0	0.00	0	0.00	0	0.00	1	25.00	0	0.00	0	0.00
1.6 TO 1.7	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
1.7 TO 1.8	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
1.8 TO 1.9	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
1.9 TO 2.0	0	0.00	0	0.00	0	0.00	1	25.00	0	0.00	0	0.00
2.0 TO 2.2	0	0.00	0	0.00	0	0.00	0	0.00	1	100.00	0	0.00
2.2 TO 2.4	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
2.4 TO 2.6	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
2.6 TO 2.8	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
2.8 TO 3.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
3.0 TO 3.2	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
3.2 TO 3.4	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
3.4 TO 3.6	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
3.6 TO 3.8	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
3.8 TO 4.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
4.0 TO 4.5	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
4.5 TO 5.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
5.0 TO 5.5	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
5.5 TO 6.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
6.0 TO 6.5	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
6.5 TO 7.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
7.0 TO 7.5	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
7.5 TO 8.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
8.0 TO 9.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
9.0 TO 10.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
10.0 TO 11.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
11.0 TO 12.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
GT 12.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
TOTAL	49	100.00	22	100.00	10	100.00	4	100.00	1	100.00	0	0.00
MAXIMUM AMT.	.85		1.24		1.42		1.98		2.12		0.00	

TOTAL PRECIPITATION FOR DATA PERIOD 5.56 INCHES

	NO.	PCT.
OBSERVATIONS WITH NO PRECIPITATION	1391	96.60
OBSERVATIONS WITH PRECIPITATION GE 0.01 INCH	49	3.40
TOTAL VALID OBSERVATIONS	1440	100.00

	NO.	PCT.
VALID OBSERVATIONS	1440	100.00
INVALID OBSERVATIONS	0	0.00
TOTAL OBSERVATIONS	1440	100.00

TABLE 2.3-57

FREQUENCY DISTRIBUTION OF PRECIPITATION
DATA PERIOD: DECEMBER 1976 AND 1977

DATA SOURCE: ON-SITE

ST. LUCIE UNIT 2, [illegible]
HUTCHINSON ISLAND, FLORIDA
FLORIDA POWER AND LIGHT CO.

PRECIPITATION CLASS INTERVAL (INCHES)	FREQUENCY DISTRIBUTION OF PRECIPITATION 1 HOUR DURATION		FREQUENCY DISTRIBUTION OF PRECIPITATION 2 HOUR DURATION		FREQUENCY DISTRIBUTION OF PRECIPITATION 3 HOUR DURATION		FREQUENCY DISTRIBUTION OF PRECIPITATION 6 HOUR DURATION		FREQUENCY DISTRIBUTION OF PRECIPITATION 12 HOUR DURATION		FREQUENCY DISTRIBUTION OF PRECIPITATION 24 HOUR DURATION	
	NO.	PCT.	NO.	PCT.	NO.	PCT.	NO.	PCT.	NO.	PCT.	NO.	PCT.
.0 TO .1	54	79.41	13	56.52	5	33.33	0	0.00	0	0.00	0	0.00
.1 TO .2	7	10.29	5	21.74	5	33.33	1	25.00	0	0.00	0	0.00
.2 TO .3	3	4.41	1	4.35	2	13.33	1	25.00	0	0.00	0	0.00
.3 TO .4	2	2.94	2	8.70	1	6.67	2	50.00	0	0.00	0	0.00
.4 TO .5	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
.5 TO .6	0	0.00	1	4.35	0	0.00	0	0.00	0	0.00	0	0.00
.6 TO .7	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
.7 TO .8	0	0.00	0	0.00	1	6.67	0	0.00	0	0.00	0	0.00
.8 TO .9	1	1.47	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
.9 TO 1.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
1.0 TO 1.1	1	1.47	1	4.35	1	6.67	0	0.00	0	0.00	0	0.00
1.1 TO 1.2	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
1.2 TO 1.3	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
1.3 TO 1.4	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
1.4 TO 1.5	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
1.5 TO 1.6	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
1.6 TO 1.7	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
1.7 TO 1.8	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
1.8 TO 1.9	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
1.9 TO 2.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
2.0 TO 2.2	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
2.2 TO 2.4	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
2.4 TO 2.6	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
2.6 TO 2.8	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
2.8 TO 3.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
3.0 TO 3.2	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
3.2 TO 3.4	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
3.4 TO 3.6	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
3.6 TO 3.8	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
3.8 TO 4.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
4.0 TO 4.5	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
4.5 TO 5.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
5.0 TO 5.5	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
5.5 TO 6.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
6.0 TO 6.5	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
6.5 TO 7.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
7.0 TO 7.5	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
7.5 TO 8.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
8.0 TO 9.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
9.0 TO 10.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
10.0 TO 11.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
11.0 TO 12.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
GT 12.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
TOTAL	68	100.00	23	100.00	15	100.00	4	100.00	0	100.00	0	0.00
MAXIMUM AMT.	1.05		1.09		1.10		1.35		0.00		0.00	

TOTAL PRECIPITATION FOR DATA PERIOD 5.85 INCHES

	NO.	PCT.
OBSERVATIONS WITH NO PRECIPITATION	1420	95.43
OBSERVATIONS WITH PRECIPITATION GE 0.01 INCH	68	4.57
TOTAL VALID OBSERVATIONS	1488	100.00

	NO.	PCT.
VALID OBSERVATIONS	1488	100.00
INVALID OBSERVATIONS	0	0.00
TOTAL OBSERVATIONS	1488	100.00

TABLE 2.3-58

FREQUENCY DISTRIBUTION OF PRECIPITATION
DATA PERIOD: JANUARY 1977 AND 1978

DATA SOURCE: ON-SITE

ST. LUCIE UNIT 2
HUTCHINSON ISLAND, FLORIDA
FLORIDA POWER AND LIGHT CO.

PRECIPITATION CLASS INTERVAL (INCHES)	FREQUENCY DISTRIBUTION OF PRECIPITATION 1 HOUR DURATION		FREQUENCY DISTRIBUTION OF PRECIPITATION 2 HOUR DURATION		FREQUENCY DISTRIBUTION OF PRECIPITATION 3 HOUR DURATION		FREQUENCY DISTRIBUTION OF PRECIPITATION 6 HOUR DURATION		FREQUENCY DISTRIBUTION OF PRECIPITATION 12 HOUR DURATION		FREQUENCY DISTRIBUTION OF PRECIPITATION 24 HOUR DURATION	
	NO.	PCT.	NO.	PCT.	NO.	PCT.	NO.	PCT.	NO.	PCT.	NO.	PCT.
.0 TO .1	46	79.31	11	52.38	3	30.00	0	0.00	0	0.00	0	0.00
.1 TO .2	8	13.79	5	23.81	4	40.00	0	0.00	0	0.00	0	0.00
.2 TO .3	2	3.45	3	14.29	0	0.00	1	100.00	0	0.00	0	0.00
.3 TO .4	0	0.00	0	0.00	2	20.00	0	0.00	0	0.00	0	0.00
.4 TO .5	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
.5 TO .6	1	1.72	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
.6 TO .7	0	0.00	1	4.76	0	0.00	0	0.00	0	0.00	0	0.00
.7 TO .8	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
.8 TO .9	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
.9 TO 1.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
1.0 TO 1.1	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
1.1 TO 1.2	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
1.2 TO 1.3	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
1.3 TO 1.4	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
1.4 TO 1.5	1	1.72	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
1.5 TO 1.6	0	0.00	1	4.76	0	0.00	0	0.00	0	0.00	0	0.00
1.6 TO 1.7	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
1.7 TO 1.8	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
1.8 TO 1.9	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
1.9 TO 2.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
2.0 TO 2.2	0	0.00	0	0.00	1	10.00	0	0.00	0	0.00	0	0.00
2.2 TO 2.4	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
2.4 TO 2.6	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
2.6 TO 2.8	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
2.8 TO 3.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
3.0 TO 3.2	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
3.2 TO 3.4	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
3.4 TO 3.6	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
3.6 TO 3.8	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
3.8 TO 4.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
4.0 TO 4.5	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
4.5 TO 5.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
5.0 TO 5.5	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
5.5 TO 6.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
6.0 TO 6.5	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
6.5 TO 7.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
7.0 TO 7.5	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
7.5 TO 8.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
8.0 TO 9.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
9.0 TO 10.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
10.0 TO 11.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
11.0 TO 12.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
GT 12.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
TOTAL	58	100.00	21	100.00	10	100.00	1	100.00	0	0.00	0	0.00
MAXIMUM AMT.	1.41		1.56		2.16		.25		0.00		0.00	

TOTAL PRECIPITATION FOR DATA PERIOD 5.30 INCHES

	NO.	PCT.
OBSERVATIONS WITH NO PRECIPITATION	1429	96.10
OBSERVATIONS WITH PRECIPITATION GE 0.01 INCH	58	3.90
TOTAL VALID OBSERVATIONS	1487	100.00

	NO.	PCT.
VALID OBSERVATIONS	1487	99.93
INVALID OBSERVATIONS	1	.07
TOTAL OBSERVATIONS	1488	100.00

TABLE 2.3-59

FREQUENCY DISTRIBUTION OF PRECIPITATION
DATA PERIOD: FEBRUARY 1977 AND 1978

DATA SOURCE: ON-SITE

ST. LUCIE UNIT 2
HUTCHINSON ISLAND, FLORIDA
FLORIDA POWER AND LIGHT CO.

PRECIPITATION CLASS INTERVAL (INCHES)	FREQUENCY DISTRIBUTION OF PRECIPITATION 1 HOUR DURATION		FREQUENCY DISTRIBUTION OF PRECIPITATION 2 HOUR DURATION		FREQUENCY DISTRIBUTION OF PRECIPITATION 3 HOUR DURATION		FREQUENCY DISTRIBUTION OF PRECIPITATION 6 HOUR DURATION		FREQUENCY DISTRIBUTION OF PRECIPITATION 12 HOUR DURATION		FREQUENCY DISTRIBUTION OF PRECIPITATION 24 HOUR DURATION	
	NO.	PCT.	NO.	PCT.	NO.	PCT.	NO.	PCT.	NO.	PCT.	NO.	PCT.
.0 TO .1	41	89.13	11	64.71	5	55.56	0	0.00	0	0.00	0	0.00
.1 TO .2	3	6.52	5	29.41	2	22.22	1	33.33	0	0.00	0	0.00
.2 TO .3	2	4.35	0	0.00	1	11.11	1	33.33	0	0.00	0	0.00
.3 TO .4	0	0.00	1	5.88	1	11.11	1	33.33	1	100.00	0	0.00
.4 TO .5	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
.5 TO .6	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
.6 TO .7	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
.7 TO .8	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
.8 TO .9	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
.9 TO 1.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
1.0 TO 1.1	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
1.1 TO 1.2	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
1.2 TO 1.3	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
1.3 TO 1.4	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
1.4 TO 1.5	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
1.5 TO 1.6	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
1.6 TO 1.7	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
1.7 TO 1.8	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
1.8 TO 1.9	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
1.9 TO 2.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
2.0 TO 2.2	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
2.2 TO 2.4	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
2.4 TO 2.6	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
2.6 TO 2.8	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
2.8 TO 3.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
3.0 TO 3.2	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
3.2 TO 3.4	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
3.4 TO 3.6	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
3.6 TO 3.8	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
3.8 TO 4.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
4.0 TO 4.5	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
4.5 TO 5.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
5.0 TO 5.5	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
5.5 TO 6.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
6.0 TO 6.5	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
6.5 TO 7.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
7.0 TO 7.5	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
7.5 TO 8.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
8.0 TO 9.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
9.0 TO 10.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
10.0 TO 11.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
11.0 TO 12.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
GT 12.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
TOTAL	46	100.00	17	100.00	9	100.00	3	100.00	1	100.00	0	0.00
MAXIMUM AMT.	.26		.34		.38		.39		.38		0.00	

TOTAL PRECIPITATION FOR DATA PERIOD 2.00 INCHES

	NO.	PCT.
OBSERVATIONS WITH NO PRECIPITATION	1297	96.57
OBSERVATIONS WITH PRECIPITATION GE 0.01 INCH	46	3.43
TOTAL VALID OBSERVATIONS	1343	100.00

	NO.	PCT.
VALID OBSERVATIONS	1343	99.93
INVALID OBSERVATIONS	1	.07
TOTAL OBSERVATIONS	1344	100.00

TABLE 2.3-60

FREQUENCY DISTRIBUTION OF PRECIPITATION
DATA PERIOD: MARCH 1977 AND 1978

DATA SOURCE: ON-SITE

ST. LUCIE UNIT 2
HUTCHINSON ISLAND, FLORIDA
FLORIDA POWER AND LIGHT CO.

PRECIPITATION CLASS INTERVAL (INCHES)	FREQUENCY DISTRIBUTION OF PRECIPITATION 1 HOUR DURATION		FREQUENCY DISTRIBUTION OF PRECIPITATION 2 HOUR DURATION		FREQUENCY DISTRIBUTION OF PRECIPITATION 3 HOUR DURATION		FREQUENCY DISTRIBUTION OF PRECIPITATION 6 HOUR DURATION		FREQUENCY DISTRIBUTION OF PRECIPITATION 12 HOUR DURATION		FREQUENCY DISTRIBUTION OF PRECIPITATION 24 HOUR DURATION	
	NO.	PCT.	NO.	PCT.	NO.	PCT.	NO.	PCT.	NO.	PCT.	NO.	PCT.
.0 TO .1	17	62.96	5	50.00	0	0.00	0	0.00	0	0.00	0	0.00
.1 TO .2	1	3.70	0	0.00	1	33.33	0	0.00	0	0.00	0	0.00
.2 TO .3	5	18.52	1	10.00	0	0.00	0	0.00	0	0.00	0	0.00
.3 TO .4	1	3.70	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
.4 TO .5	2	7.41	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
.5 TO .6	1	3.70	2	20.00	0	0.00	0	0.00	0	0.00	0	0.00
.6 TO .7	0	0.00	1	10.00	0	0.00	0	0.00	0	0.00	0	0.00
.7 TO .8	0	0.00	1	10.00	0	0.00	0	0.00	0	0.00	0	0.00
.8 TO .9	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
.9 TO 1.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
1.0 TO 1.1	0	0.00	0	0.00	1	33.33	0	0.00	0	0.00	0	0.00
1.1 TO 1.2	0	0.00	0	0.00	1	33.33	1	100.00	0	0.00	0	0.00
1.2 TO 1.3	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
1.3 TO 1.4	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
1.4 TO 1.5	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
1.5 TO 1.6	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
1.6 TO 1.7	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
1.7 TO 1.8	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
1.8 TO 1.9	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
1.9 TO 2.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
2.0 TO 2.2	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
2.2 TO 2.4	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
2.4 TO 2.6	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
2.6 TO 2.8	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
2.8 TO 3.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
3.0 TO 3.2	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
3.2 TO 3.4	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
3.4 TO 3.6	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
3.6 TO 3.8	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
3.8 TO 4.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
4.0 TO 4.5	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
4.5 TO 5.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
5.0 TO 5.5	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
5.5 TO 6.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
6.0 TO 6.5	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
6.5 TO 7.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
7.0 TO 7.5	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
7.5 TO 8.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
8.0 TO 9.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
9.0 TO 10.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
10.0 TO 11.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
11.0 TO 12.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
GT 12.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
TOTAL	27	100.00	10	100.00	3	100.00	1	100.00	0	0.00	0	0.00
MAXIMUM AMT.	.56		.77		1.11		1.13		0.00		0.00	

TOTAL PRECIPITATION FOR DATA PERIOD 3.48 INCHES

	NO.	PCT.
OBSERVATIONS WITH NO PRECIPITATION	1461	98.19
OBSERVATIONS WITH PRECIPITATION GE 0.01 INCH	27	1.81
TOTAL VALID OBSERVATIONS	1488	100.00

	NO.	PCT.
VALID OBSERVATIONS	1488	100.00
INVALID OBSERVATIONS	0	0.00
TOTAL OBSERVATIONS	1488	100.00

TABLE 2.3-61

FREQUENCY DISTRIBUTION OF PRECIPITATION
DATA PERIOD: APRIL 1977 AND 1978

DATA SOURCE: ON-SITE

ST. LUCIE UNIT 2
HUTCHINSON ISLAND, FLORIDA
FLORIDA POWER AND LIGHT CO.

PRECIPITATION CLASS INTERVAL (INCHES)	FREQUENCY DISTRIBUTION OF PRECIPITATION 1 HOUR DURATION		FREQUENCY DISTRIBUTION OF PRECIPITATION 2 HOUR DURATION		FREQUENCY DISTRIBUTION OF PRECIPITATION 3 HOUR DURATION		FREQUENCY DISTRIBUTION OF PRECIPITATION 6 HOUR DURATION		FREQUENCY DISTRIBUTION OF PRECIPITATION 12 HOUR DURATION		FREQUENCY DISTRIBUTION OF PRECIPITATION 24 HOUR DURATION	
	NO.	PCT.	NO.	PCT.	NO.	PCT.	NO.	PCT.	NO.	PCT.	NO.	PCT.
.0 TO .1	15	46.88	3	27.27	0	0.00	0	0.00	0	0.00	0	0.00
.1 TO .2	6	18.75	2	18.18	1	20.00	0	0.00	0	0.00	0	0.00
.2 TO .3	1	3.13	1	9.09	0	0.00	0	0.00	0	0.00	0	0.00
.3 TO .4	7	21.88	0	0.00	1	20.00	0	0.00	0	0.00	0	0.00
.4 TO .5	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
.5 TO .6	2	6.25	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
.6 TO .7	1	3.13	3	27.27	0	0.00	0	0.00	0	0.00	0	0.00
.7 TO .8	0	0.00	1	9.09	0	0.00	0	0.00	0	0.00	0	0.00
.8 TO .9	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
.9 TO 1.0	0	0.00	0	0.00	2	40.00	0	0.00	0	0.00	0	0.00
1.0 TO 1.1	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
1.1 TO 1.2	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
1.2 TO 1.3	0	0.00	1	9.09	0	0.00	0	0.00	0	0.00	0	0.00
1.3 TO 1.4	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
1.4 TO 1.5	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
1.5 TO 1.6	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
1.6 TO 1.7	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
1.7 TO 1.8	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
1.8 TO 1.9	0	0.00	0	0.00	1	20.00	0	0.00	0	0.00	0	0.00
1.9 TO 2.0	0	0.00	0	0.00	0	0.00	1	50.00	0	0.00	0	0.00
2.0 TO 2.2	0	0.00	0	0.00	0	0.00	1	50.00	0	0.00	0	0.00
2.2 TO 2.4	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
2.4 TO 2.6	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
2.6 TO 2.8	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
2.8 TO 3.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
3.0 TO 3.2	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
3.2 TO 3.4	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
3.4 TO 3.6	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
3.6 TO 3.8	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
3.8 TO 4.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
4.0 TO 4.5	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
4.5 TO 5.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
5.0 TO 5.5	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
5.5 TO 6.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
6.0 TO 6.5	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
6.5 TO 7.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
7.0 TO 7.5	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
7.5 TO 8.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
8.0 TO 9.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
9.0 TO 10.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
10.0 TO 11.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
11.0 TO 12.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
GT 12.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
TOTAL	32	100.00	11	100.00	5	100.00	2	100.00	0	0.00	0	0.00
MAXIMUM AMT.	.70		1.23		1.83		2.03		0.00		0.00	

TOTAL PRECIPITATION FOR DATA PERIOD 5.53 INCHES

	NO.	PCT.
OBSERVATIONS WITH NO PRECIPITATION	1408	97.78
OBSERVATIONS WITH PRECIPITATION GE 0.01 INCH	32	2.22

	NO.	PCT.
VALID OBSERVATIONS	1440	100.00
INVALID OBSERVATIONS	0	0.00

TABLE 2.3-62

FREQUENCY DISTRIBUTION OF PRECIPITATION
DATA PERIOD: MAY 1977 AND 1978

DATA SOURCE: ON-SITE

ST. LUCIE UNIT 2
HUTCHINSON ISLAND, FLORIDA
FLORIDA POWER AND LIGHT CO.

PRECIPITATION CLASS INTERVAL (INCHES)	FREQUENCY DISTRIBUTION OF PRECIPITATION 1 HOUR DURATION		FREQUENCY DISTRIBUTION OF PRECIPITATION 2 HOUR DURATION		FREQUENCY DISTRIBUTION OF PRECIPITATION 3 HOUR DURATION		FREQUENCY DISTRIBUTION OF PRECIPITATION 6 HOUR DURATION		FREQUENCY DISTRIBUTION OF PRECIPITATION 12 HOUR DURATION		FREQUENCY DISTRIBUTION OF PRECIPITATION 24 HOUR DURATION	
	NO.	PCT.	NO.	PCT.	NO.	PCT.	NO.	PCT.	NO.	PCT.	NO.	PCT.
.0 TO .1	14	56.00	3	30.00	0	0.00	0	0.00	0	0.00	0	0.00
.1 TO .2	3	12.00	1	10.00	1	50.00	0	0.00	0	0.00	0	0.00
.2 TO .3	3	12.00	1	10.00	0	0.00	0	0.00	0	0.00	0	0.00
.3 TO .4	1	4.00	1	10.00	0	0.00	0	0.00	0	0.00	0	0.00
.4 TO .5	2	8.00	1	10.00	0	0.00	0	0.00	0	0.00	0	0.00
.5 TO .6	2	8.00	1	10.00	0	0.00	0	0.00	0	0.00	0	0.00
.6 TO .7	0	0.00	1	10.00	0	0.00	0	0.00	0	0.00	0	0.00
.7 TO .8	0	0.00	1	10.00	0	0.00	0	0.00	0	0.00	0	0.00
.8 TO .9	0	0.00	0	0.00	1	50.00	0	0.00	0	0.00	0	0.00
.9 TO 1.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
1.0 TO 1.1	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
1.1 TO 1.2	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
1.2 TO 1.3	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
1.3 TO 1.4	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
1.4 TO 1.5	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
1.5 TO 1.6	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
1.6 TO 1.7	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
1.7 TO 1.8	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
1.8 TO 1.9	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
1.9 TO 2.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
2.0 TO 2.2	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
2.2 TO 2.4	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
2.4 TO 2.6	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
2.6 TO 2.8	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
2.8 TO 3.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
3.0 TO 3.2	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
3.2 TO 3.4	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
3.4 TO 3.6	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
3.6 TO 3.8	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
3.8 TO 4.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
4.0 TO 4.5	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
4.5 TO 5.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
5.0 TO 5.5	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
5.5 TO 6.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
6.0 TO 6.5	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
6.5 TO 7.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
7.0 TO 7.5	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
7.5 TO 8.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
8.0 TO 9.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
9.0 TO 10.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
10.0 TO 11.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
11.0 TO 12.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
GT 12.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
TOTAL	25	100.00	10	100.00	2	100.00	0	0.00	0	0.00	0	0.00
MAXIMUM AMT.	.57		.80		.84		0.00		0.00		0.00	

TOTAL PRECIPITATION FOR DATA PERIOD 4.13 INCHES

	NO.	PCT.
OBSERVATIONS WITH NO PRECIPITATION	1462	98.32
OBSERVATIONS WITH PRECIPITATION GE 0.01 INCH	25	1.68

	NO.	PCT.
VALID OBSERVATIONS	1487	99.93
INVALID OBSERVATIONS	1	.07
TOTAL OBSERVATIONS	1488	100.00

TABLE 2.3-63

FREQUENCY DISTRIBUTION OF PRECIPITATION
DATA PERIOD: JUNE 1977 AND 1978

DATA SOURCE: ON-SITE

ST. LUCIE UNIT 2
HUTCHINSON ISLAND, FLORIDA
FLORIDA POWER AND LIGHT CO.

PRECIPITATION CLASS INTERVAL (INCHES)	FREQUENCY DISTRIBUTION OF PRECIPITATION 1 HOUR DURATION NO.	PCT.	FREQUENCY DISTRIBUTION OF PRECIPITATION 2 HOUR DURATION NO.	PCT.	FREQUENCY DISTRIBUTION OF PRECIPITATION 3 HOUR DURATION NO.	PCT.	FREQUENCY DISTRIBUTION OF PRECIPITATION 6 HOUR DURATION NO.	PCT.	FREQUENCY DISTRIBUTION OF PRECIPITATION 12 HOUR DURATION NO.	PCT.	FREQUENCY DISTRIBUTION OF PRECIPITATION 24 HOUR DURATION NO.	PCT.
.0 TO .1	17	60.71	4	36.36	2	50.00	0	0.00	0	0.00	0	0.00
.1 TO .2	7	25.00	2	18.18	0	0.00	0	0.00	0	0.00	0	0.00
.2 TO .3	3	10.71	2	18.18	0	0.00	0	0.00	0	0.00	0	0.00
.3 TO .4	1	3.57	2	18.18	2	50.00	0	0.00	0	0.00	0	0.00
.4 TO .5	0	0.00	1	9.09	0	0.00	0	0.00	0	0.00	0	0.00
.5 TO .6	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
.6 TO .7	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
.7 TO .8	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
.8 TO .9	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
.9 TO 1.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
1.0 TO 1.1	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
1.1 TO 1.2	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
1.2 TO 1.3	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
1.3 TO 1.4	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
1.4 TO 1.5	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
1.5 TO 1.6	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
1.6 TO 1.7	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
1.7 TO 1.8	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
1.8 TO 1.9	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
1.9 TO 2.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
2.0 TO 2.2	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
2.2 TO 2.4	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
2.4 TO 2.6	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
2.6 TO 2.8	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
2.8 TO 3.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
3.0 TO 3.2	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
3.2 TO 3.4	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
3.4 TO 3.6	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
3.6 TO 3.8	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
3.8 TO 4.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
4.0 TO 4.5	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
4.5 TO 5.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
5.0 TO 5.5	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
5.5 TO 6.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
6.0 TO 6.5	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
6.5 TO 7.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
7.0 TO 7.5	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
7.5 TO 8.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
8.0 TO 9.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
9.0 TO 10.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
10.0 TO 11.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
11.0 TO 12.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
GT 12.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
TOTAL	28	100.00	11	100.00	4	100.00	0	0.00	0	0.00	0	0.00
MAXIMUM AMT.		.38		.41		.37		0.00		0.00		0.00

TOTAL PRECIPITATION FOR DATA PERIOD 2.73 INCHES

	NO.	PCT.
OBSERVATIONS WITH NO PRECIPITATION	1460	98.12
OBSERVATIONS WITH PRECIPITATION GE 0.01 INCH	28	1.88
TOTAL V[illegible]D OBSERVATIONS	1488	100.00

	NO.	PCT.
VALID OBSERVATIONS	1488	100.00
INVALID OBSERVATIONS	0	0.00
[illegible]AL OBSERVATIONS	148[illegible]	100.00

TABLE 2.3-64

FREQUENCY DISTRIBUTION OF PRECIPITATION
DATA PERIOD: JULY 1977 AND 1978

DATA SOURCE: ON-SITE

ST. LUCIE UNIT 2
HUTCHINSON ISLAND, FLORIDA
FLORIDA POWER AND LIGHT CO.

PRECIPITATION CLASS INTERVAL (INCHES)	FREQUENCY DISTRIBUTION OF PRECIPITATION 1 HOUR DURATION		FREQUENCY DISTRIBUTION OF PRECIPITATION 2 HOUR DURATION		FREQUENCY DISTRIBUTION OF PRECIPITATION 3 HOUR DURATION		FREQUENCY DISTRIBUTION OF PRECIPITATION 6 HOUR DURATION		FREQUENCY DISTRIBUTION OF PRECIPITATION 12 HOUR DURATION		FREQUENCY DISTRIBUTION OF PRECIPITATION 24 HOUR DURATION	
	NO.	PCT.	NO.	PCT.	NO.	PCT.	NO.	PCT.	NO.	PCT.	NO.	PCT.
.0 TO .1	26	63.41	5	35.71	0	0.00	0	0.00	0	0.00	0	0.00
.1 TO .2	6	14.63	1	7.14	0	0.00	0	0.00	0	0.00	0	0.00
.2 TO .3	2	4.88	2	14.29	1	25.00	0	0.00	0	0.00	0	0.00
.3 TO .4	1	2.44	1	7.14	0	0.00	0	0.00	0	0.00	0	0.00
.4 TO .5	3	7.32	1	7.14	0	0.00	0	0.00	0	0.00	0	0.00
.5 TO .6	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
.6 TO .7	2	4.88	2	14.29	0	0.00	0	0.00	0	0.00	0	0.00
.7 TO .8	0	0.00	0	0.00	1	25.00	0	0.00	0	0.00	0	0.00
.8 TO .9	0	0.00	1	7.14	0	0.00	0	0.00	0	0.00	0	0.00
.9 TO 1.0	0	0.00	0	0.00	1	25.00	0	0.00	0	0.00	0	0.00
1.0 TO 1.1	1	2.44	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
1.1 TO 1.2	0	0.00	1	7.14	0	0.00	0	0.00	0	0.00	0	0.00
1.2 TO 1.3	0	0.00	0	0.00	1	25.00	0	0.00	0	0.00	0	0.00
1.3 TO 1.4	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
1.4 TO 1.5	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
1.5 TO 1.6	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
1.6 TO 1.7	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
1.7 TO 1.8	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
1.8 TO 1.9	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
1.9 TO 2.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
2.0 TO 2.2	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
2.2 TO 2.4	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
2.4 TO 2.6	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
2.6 TO 2.8	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
2.8 TO 3.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
3.0 TO 3.2	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
3.2 TO 3.4	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
3.4 TO 3.6	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
3.6 TO 3.8	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
3.8 TO 4.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
4.0 TO 4.5	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
4.5 TO 5.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
5.0 TO 5.5	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
5.5 TO 6.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
6.0 TO 6.5	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
6.5 TO 7.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
7.0 TO 7.5	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
7.5 TO 8.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
8.0 TO 9.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
9.0 TO 10.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
10.0 TO 11.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
11.0 TO 12.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
GT 12.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
TOTAL	41	100.00	14	100.00	4	100.00	0	0.00	0	0.00	0	0.00
MAXIMUM AMT.	1.07		1.19		1.24		0.00		0.00		0.00	

TOTAL PRECIPITATION FOR DATA PERIOD 6.54 INCHES

	NO.	PCT.
OBSERVATIONS WITH NO PRECIPITATION	1447	97.24
OBSERVATIONS WITH PRECIPITATION GE 0.01 INCH	41	2.76
TOTAL VALID OBSERVATIONS	1488	100.00

	NO.	PCT.
VALID OBSERVATIONS	1488	100.00
INVALID OBSERVATIONS	0	0.00
TOTAL OBSERVATIONS	1488	100.00

TABLE 2.3-65

FREQUENCY DISTRIBUTION OF PRECIPITATION
DATA PERIOD: AUGUST 1977 AND 1978

DATA SOURCE: ON-SITE

ST. LUCIE UNIT 2
HUTCHINSON ISLAND, FLORIDA
FLORIDA POWER AND LIGHT CO.

PRECIPITATION CLASS INTERVAL (INCHES)	FREQUENCY DISTRIBUTION OF PRECIPITATION 1 HOUR DURATION		FREQUENCY DISTRIBUTION OF PRECIPITATION 2 HOUR DURATION		FREQUENCY DISTRIBUTION OF PRECIPITATION 3 HOUR DURATION		FREQUENCY DISTRIBUTION OF PRECIPITATION 6 HOUR DURATION		FREQUENCY DISTRIBUTION OF PRECIPITATION 12 HOUR DURATION		FREQUENCY DISTRIBUTION OF PRECIPITATION 24 HOUR DURATION	
	NO.	PCT.	NO.	PCT.	NO.	PCT.	NO.	PCT.	NO.	PCT.	NO.	PCT.
.0 TO .1	49	74.24	9	56.25	0	0.00	0	0.00	0	0.00	0	0.00
.1 TO .2	8	12.12	2	12.50	1	25.00	0	0.00	0	0.00	0	0.00
.2 TO .3	4	6.06	1	6.25	1	25.00	0	0.00	0	0.00	0	0.00
.3 TO .4	1	1.52	1	6.25	0	0.00	0	0.00	0	0.00	0	0.00
.4 TO .5	2	3.03	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
.5 TO .6	0	0.00	1	6.25	1	25.00	0	0.00	0	0.00	0	0.00
.6 TO .7	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
.7 TO .8	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
.8 TO .9	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
.9 TO 1.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
1.0 TO 1.1	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
1.1 TO 1.2	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
1.2 TO 1.3	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
1.3 TO 1.4	1	1.52	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
1.4 TO 1.5	0	0.00	1	6.25	1	25.00	0	0.00	0	0.00	0	0.00
1.5 TO 1.6	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
1.6 TO 1.7	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
1.7 TO 1.8	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
1.8 TO 1.9	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
1.9 TO 2.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
2.0 TO 2.2	1	1.52	1	6.25	0	0.00	0	0.00	0	0.00	0	0.00
2.2 TO 2.4	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
2.4 TO 2.6	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
2.6 TO 2.8	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
2.8 TO 3.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
3.0 TO 3.2	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
3.2 TO 3.4	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
3.4 TO 3.6	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
3.6 TO 3.8	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
3.8 TO 4.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
4.0 TO 4.5	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
4.5 TO 5.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
5.0 TO 5.5	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
5.5 TO 6.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
6.0 TO 6.5	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
6.5 TO 7.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
7.0 TO 7.5	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
7.5 TO 8.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
8.0 TO 9.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
9.0 TO 10.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
10.0 TO 11.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
11.0 TO 12.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
GT 12.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
TOTAL	66	100.00	16	100.00	4	100.00	0	0.00	0	0.00	0	0.00
MAXIMUM AMT.	2.07		2.16		1.43		0.00		0.00		0.00	

TOTAL PRECIPITATION FOR DATA PERIOD 8.27 INCHES

	NO.	PCT.
OBSERVATIONS WITH NO PRECIPITATION	1231	94.91
OBSERVATIONS WITH PRECIPITATION GE 0.01 INCH	66	5.09
TOTAL VA[illegible] OBSERVATIONS	1297	100.00

	NO.	PCT.
VALID OBSERVATIONS	1297	87.16
INVALID OBSERVATIONS	191	12.84
TO[illegible] OBSERVATIONS	1488	[illegible]00.00

TABLE 2.3-66

FREQUENCY DISTRIBUTION OF PRECIPITATION
DATA PERIOD: SEPTEMBER 1, 1976 - AUGUST 31, 1978

DATA SOURCE SOURCE: ON-SITE

ST. LUCIE UNIT 2
HUTCHINSON ISLAND, FLORIDA
FLORIDA POWER AND LIGHT CO.

PRECIPITATION CLASS INTERVAL (INCHES)	FREQUENCY DISTRIBUTION OF PRECIPITATION 1 HOUR DURATION		FREQUENCY DISTRIBUTION OF PRECIPITATION 2 HOUR DURATION		FREQUENCY DISTRIBUTION OF PRECIPITATION 3 HOUR DURATION		FREQUENCY DISTRIBUTION OF PRECIPITATION 6 HOUR DURATION		FREQUENCY DISTRIBUTION OF PRECIPITATION 12 HOUR DURATION		FREQUENCY DISTRIBUTION OF PRECIPITATION 24 HOUR DURATION	
	NO.	PCT.	NO.	PCT.	NO.	PCT.	NO.	PCT.	NO.	PCT.	NO.	PCT.
.0 TO .1	378	70.65	82	44.09	20	25.00	0	0.00	0	0.00	0	0.00
.1 TO .2	67	12.52	36	19.35	21	26.25	4	23.53	0	0.00	0	0.00
.2 TO .3	35	6.54	17	9.14	6	7.50	3	17.65	0	0.00	0	0.00
.3 TO .4	16	2.99	13	6.99	9	11.25	3	17.65	1	50.00	0	0.00
.4 TO .5	15	2.80	5	2.69	0	0.00	0	0.00	0	0.00	0	0.00
.5 TO .6	10	1.87	7	3.76	3	3.75	1	5.88	0	0.00	0	0.00
.6 TO .7	5	.93	11	5.91	1	1.25	0	0.00	0	0.00	0	0.00
.7 TO .8	1	.19	5	2.69	5	6.25	0	0.00	0	0.00	0	0.00
.8 TO .9	2	.37	1	.54	1	1.25	0	0.00	0	0.00	0	0.00
.9 TO 1.0	0	0.00	1	.54	4	5.00	1	5.88	0	0.00	0	0.00
1.0 TO 1.1	2	.37	1	.54	2	2.50	0	0.00	0	0.00	0	0.00
1.1 TO 1.2	0	0.00	1	.54	1	1.25	1	5.88	0	0.00	0	0.00
1.2 TO 1.3	0	0.00	2	1.08	2	2.50	0	0.00	0	0.00	0	0.00
1.3 TO 1.4	1	.19	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
1.4 TO 1.5	1	.19	1	.54	2	2.50	0	0.00	0	0.00	0	0.00
1.5 TO 1.6	0	0.00	1	.54	0	0.00	1	5.88	0	0.00	0	0.00
1.6 TO 1.7	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
1.7 TO 1.8	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
1.8 TO 1.9	1	.19	0	0.00	1	1.25	0	0.00	0	0.00	0	0.00
1.9 TO 2.0	0	0.00	0	0.00	0	0.00	2	11.76	0	0.00	0	0.00
2.0 TO 2.2	1	.19	1	.54	1	1.25	1	5.88	1	50.00	0	0.00
2.2 TO 2.4	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
2.4 TO 2.6	0	0.00	1	.54	1	1.25	0	0.00	0	0.00	0	0.00
2.6 TO 2.8	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
2.8 TO 3.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
3.0 TO 3.2	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
3.2 TO 3.4	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
3.4 TO 3.6	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
3.6 TO 3.8	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
3.8 TO 4.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
4.0 TO 4.5	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
4.5 TO 5.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
5.0 TO 5.5	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
5.5 TO 6.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
6.0 TO 6.5	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
6.5 TO 7.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
7.0 TO 7.5	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
7.5 TO 8.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
8.0 TO 9.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
9.0 TO 10.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
10.0 TO 11.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
11.0 TO 12.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
GT 12.0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
TOTAL	535	100.00	186	100.00	80	100.00	17	100.00	2	100.00	0	0.00
MAXIMUM AMT.	2.07		2.43		2.51		2.03		2.12		0.00	

TOTAL PRECIPITATION FOR DATA PERIOD 63.16 INCHES

	NO.	PCT.
OBSERVATIONS WITH NO PRECIPITATION	16791	96.91
OBSERVATIONS WITH PRECIPITATION GE 0.01 INCH	535	3.09
TOTAL VALID OBSERVATIONS	17326	100.00

	NO.	PCT.
VALID OBSERVATIONS	17326	98.89
INVALID OBSERVATIONS	194	1.11
TOTAL OBSERVATIONS	17520	100.00

TABLE 2.3-67

JOINT WIND FREQUENCY DISTRIBUTION
DATA PERIOD: SEPTEMBER 1976 AND 1977

PRECIPITATION WIND ROSE
DATA SOURCE: ON-SITE
WIND SENSOR HEIGHT: 10.00 METERS

ST. LUCIE UNIT 2
HUTCHINSON ISLAND, FLORIDA
FLORIDA POWER AND LIGHT CO.

WIND SECTOR	WIND SPEED CATEGORIES(METERS PER SECOND) 0.0-1.5	1.5-3.0	3.0-5.0	5.0-7.5	7.5-10.0	>10.0	TOTAL	MEAN SPEED
NNE	0	0	0	0	0	0	0	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
NE	0	0	0	0	0	0	0	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
ENE	0	1	1	0	0	0	2	2.65
	0.00	2.94	2.94	0.00	0.00	0.00	5.88	
E	0	0	2	0	0	0	2	4.50
	0.00	0.00	5.88	0.00	0.00	0.00	5.88	
ESE	1	1	1	0	0	0	3	2.37
	2.94	2.94	2.94	0.00	0.00	0.00	8.82	
SE	0	2	1	0	0	0	3	2.83
	0.00	5.88	2.94	0.00	0.00	0.00	8.82	
SSE	0	0	3	3	0	0	6	4.95
	0.00	0.00	8.82	8.82	0.00	0.00	17.65	
S	0	4	0	2	0	0	6	3.30
	0.00	11.76	0.00	5.88	0.00	0.00	17.65	
SSW	1	1	1	0	0	0	3	2.23
	2.94	2.94	2.94	0.00	0.00	0.00	8.82	
SW	0	0	0	0	0	0	0	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
WSW	0	0	0	0	0	0	0	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
W	0	1	0	0	0	0	1	2.70
	0.00	2.94	0.00	0.00	0.00	0.00	2.94	
WNW	4	0	0	0	0	0	4	1.10
	11.76	0.00	0.00	0.00	0.00	0.00	11.76	
NW	1	1	0	0	0	0	2	1.80
	2.94	2.94	0.00	0.00	0.00	0.00	5.88	
NNW	1	0	0	0	0	0	1	.90
	2.94	0.00	0.00	0.00	0.00	0.00	2.94	
N	0	1	0	0	0	0	1	2.70
	0.00	2.94	0.00	0.00	0.00	0.00	2.94	
CALM	0						0	CALM
	0.00						0.00	
TOTAL	8	12	9	5	0	0	34	2.95
	23.53	35.29	26.47	14.71	0.00	0.00	100.00	

NUMBER OF VALID OBSERVATIONS WITH PRECIPITATION	34	2.36 PCT.
NUMBER OF VALID OBSERVATIONS WITHOUT PRECIPITATION	1116	77.50 PCT.
NUMBER OF INVALID OBSERVATIONS	290	20.14 PCT.
TOTAL NUMBER OF OBSERVATIONS	1440	100.00 PCT.
TOTAL AMOUNT OF PRECIPITATION FOR DATA PERIOD		6.63 INCHES

KEY XXX NUMBER OF OCCURRENCES
     XXX PERCENT OCCURRENCES

TABLE 2.3-68

JOINT WIND FREQUENCY DISTRIBUTION
DATA PERIOD: OCTOBER 1976 AND 1977

PRECIPITATION WIND ROSE
DATA SOURCE: ON-SITE
WIND SENSOR HEIGHT: 10.00 METERS

ST. LUCIE UNIT 2
HUTCHINSON ISLAND, FLORIDA
FLORIDA POWER AND LIGHT CO.

WIND SECTOR	WIND SPEED CATEGORIES(METERS PER SECOND) 0.0-1.5	1.5-3.0	3.0-5.0	5.0-7.5	7.5-10.0	>10.0	TOTAL	MEAN SPEED
NNE	0 0.00	2 4.17	4 8.33	2 4.17	0 0.00	0 0.00	8 16.67	4.07
NE	0 0.00	0 0.00	1 2.08	2 4.17	0 0.00	0 0.00	3 6.25	5.70
ENE	0 0.00	0 0.00	3 6.25	10 20.83	0 0.00	0 0.00	13 27.08	5.47
E	0 0.00	0 0.00	4 8.33	4 8.33	0 0.00	0 0.00	8 16.67	4.99
ESE	0 0.00	0 0.00	4 8.33	0 0.00	0 0.00	0 0.00	4 8.33	3.92
SE	0 0.00	1 2.08	1 2.08	0 0.00	0 0.00	0 0.00	2 4.17	3.35
SSE	0 0.00	2 4.17	1 2.08	0 0.00	0 0.00	0 0.00	3 6.25	2.67
S	0 0.00	1 2.08	0 0.00	0 0.00	0 0.00	0 0.00	1 2.08	2.70
SSW	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0.00
SW	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0.00
WSW	0 0.00	1 2.08	0 0.00	0 0.00	0 0.00	0 0.00	1 2.08	2.70
W	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0.00
WNW	0 0.00	0 0.00	1 2.08	0 0.00	0 0.00	0 0.00	1 2.08	3.10
NW	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0.00
NNW	0 0.00	4 8.33	0 0.00	0 0.00	0 0.00	0 0.00	4 8.33	2.35
N	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0.00
CALM	0 0.00						0 0.00	CALM
TOTAL	0 0.00	11 22.92	19 39.58	18 37.50	0 0.00	0 0.00	48 100.00	4.35

NUMBER OF VALID OBSERVATIONS WITH PRECIPITATION	48	3.23 PCT.
NUMBER OF VALID OBSERVATIONS WITHOUT PRECIPITATION	1364	91.67 PCT.
NUMBER OF INVALID OBSERVATIONS	76	5.11 PCT.
TOTAL NUMBER OF OBSERVATIONS	1488	100.00 PCT.
TOTAL AMOUNT OF PRECIPITATION FOR DATA PERIOD		4.94 INCHES

KEY XXX NUMBER OF OCCURRENCES

TABLE 2.3-69

JOINT WIND FREQUENCY DISTRIBUTION
DATA PERIOD: NOVEMBER 1976 AND 1977

PRECIPITATION WIND ROSE
DATA SOURCE: ON-SITE
WIND SENSOR HEIGHT: 10.00 METERS

ST. LUCIE UNIT 2
HUTCHINSON ISLAND, FLORIDA
FLORIDA POWER AND LIGHT CO.

WIND SECTOR	WIND SPEED CATEGORIES(METERS PER SECOND) 0.0-1.5	1.5-3.0	3.0-5.0	5.0-7.5	7.5-10.0	>10.0	TOTAL	MEAN SPEED
NNE	0 0.00	0 0.00	1 2.04	0 0.00	0 0.00	0 0.00	1 2.04	4.90
NE	0 0.00	1 2.04	1 2.04	1 2.04	0 0.00	0 0.00	3 6.12	4.03
ENE	0 0.00	0 0.00	4 8.16	2 4.08	0 0.00	0 0.00	6 12.24	4.77
E	0 0.00	0 0.00	2 4.08	6 12.24	0 0.00	0 0.00	8 16.33	5.54
ESE	0 0.00	0 0.00	1 2.04	3 6.12	0 0.00	0 0.00	4 8.16	5.37
SE	0 0.00	8 16.33	0 0.00	0 0.00	0 0.00	0 0.00	8 16.33	2.29
SSE	0 0.00	2 4.08	1 2.04	0 0.00	0 0.00	0 0.00	3 6.12	3.00
S	0 0.00	2 4.08	6 12.24	2 4.08	0 0.00	0 0.00	10 20.41	3.85
SSW	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0.00
SW	1 2.04	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	1 2.04	.90
WSW	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0.00
W	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0.00
WNW	1 2.04	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	1 2.04	1.30
NW	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0.00
NNW	0 0.00	1 2.04	1 2.04	0 0.00	0 0.00	0 0.00	2 4.08	2.90
N	2 4.08	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	2 4.08	1.10
CALM	0 0.00						0 0.00	CALM
TOTAL	4 8.16	14 28.57	17 34.69	14 28.57	0 0.00	0 0.00	49 100.00	3.82

NUMBER OF VALID OBSERVATIONS WITH PRECIPITATION	49	3.40 PCT.
NUMBER OF VALID OBSERVATIONS WITHOUT PRECIPITATION	1334	92.64 PCT.
NUMBER OF INVALID OBSERVATIONS	57	3.96 PCT.
TOTAL NUMBER OF OBSERVATIONS	1440	100.00 PCT.
TOTAL AMOUNT OF PRECIPITATION FOR DATA PERIOD		5.56 INCHES

KEY XXX NUMBER OF OCCURRENCES
XXX PERCENT OCCURRENCES

TABLE 2.3-70

JOINT WIND FREQUENCY DISTRIBUTION
DATA PERIOD: DECEMBER 1976 AND 1977

PRECIPITATION WIND ROSE
DATA SOURCE: ON-SITE
WIND SENSOR HEIGHT: 10.00 METERS

ST. LUCIE UNIT 2
HUTCHINSON ISLAND, FLORIDA
FLORIDA POWER AND LIGHT CO.

WIND SECTOR	WIND SPEED CATEGORIES(METERS PER SECOND) 0.0-1.5	1.5-3.0	3.0-5.0	5.0-7.5	7.5-10.0	>10.0	TOTAL	MEAN SPEED
NNE	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0.00
NE	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0.00
ENE	0 0.00	0 0.00	3 5.88	2 3.92	0 0.00	0 0.00	5 9.80	5.02
E	0 0.00	0 0.00	1 1.96	2 3.92	0 0.00	0 0.00	3 5.88	5.10
ESE	0 0.00	0 0.00	2 3.92	0 0.00	0 0.00	0 0.00	2 3.92	4.70
SE	1 1.96	0 0.00	7 13.73	0 0.00	0 0.00	0 0.00	8 15.69	3.85
SSE	0 0.00	1 1.96	0 0.00	1 1.96	0 0.00	0 0.00	2 3.92	4.25
S	1 1.96	1 1.96	3 5.88	0 0.00	0 0.00	0 0.00	5 9.80	3.12
SSW	0 0.00	2 3.92	1 1.96	0 0.00	0 0.00	0 0.00	3 5.88	2.67
SW	0 0.00	1 1.96	3 5.88	2 3.92	0 0.00	0 0.00	6 11.76	4.33
WSW	0 0.00	1 1.96	0 0.00	0 0.00	0 0.00	0 0.00	1 1.96	1.80
W	3 5.88	1 1.96	0 0.00	1 1.96	0 0.00	0 0.00	5 9.80	2.56
WNW	1 1.96	0 0.00	1 1.96	0 0.00	0 0.00	0 0.00	2 3.92	2.45
NW	0 0.00	3 5.88	1 1.96	0 0.00	0 0.00	0 0.00	4 7.84	2.35
NNW	1 1.96	1 1.96	2 3.92	0 0.00	0 0.00	0 0.00	4 7.84	3.00
N	0 0.00	1 1.96	0 0.00	0 0.00	0 0.00	0 0.00	1 1.96	2.20
CALM	0 0.00						0 0.00	CALM
TOTAL	7 13.73	12 23.53	24 47.06	8 15.69	0 0.00	0 0.00	51 100.00	3.56

NUMBER OF VALID OBSERVATIONS WITH PRECIPITATION	51	3.43 PCT.
NUMBER OF VALID OBSERVATIONS WITHOUT PRECIPITATION	1233	82.86 PCT.
NUMBER OF INVALID OBSERVATIONS	204	13.71 PCT.
TOTAL NUMBER OF OBSERVATIONS	1488	100.00 PCT.
TOTAL AMOUNT OF PRECIPITATION FOR DATA PERIOD		4.43 INCHES

KEY XXX NUMBER OF OCCURRENCES
XXX PERCENT OCCURRENCES

TABLE 2.3-71

JOINT WIND FREQUENCY DISTRIBUTION
DATA PERIOD: JANUARY 1977 AND 1978

PRECIPITATION WIND ROSE
DATA SOURCE: ON-SITE
WIND SENSOR HEIGHT: 10.00 METERS

ST. LUCIE UNIT 2
HUTCHINSON ISLAND, FLORIDA
FLORIDA POWER AND LIGHT CO.

WIND SECTOR	WIND SPEED CATEGORIES(METERS PER SECOND) 0.0-1.5	1.5-3.0	3.0-5.0	5.0-7.5	7.5-10.0	->10.0	TOTAL	MEAN SPEED
NNE	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0.00
NE	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0.00
ENE	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0.00
E	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0.00
ESE	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0.00
SE	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0.00
SSE	0 0.00	0 0.00	1 1.96	1 1.96	0 0.00	0 0.00	2 3.92	4.95
S	0 0.00	0 0.00	4 7.84	2 3.92	0 0.00	0 0.00	6 11.76	5.02
SSW	0 0.00	0 0.00	2 3.92	4 7.84	2 3.92	1 1.96	9 17.65	7.20
SW	0 0.00	0 0.00	1 1.96	3 5.88	0 0.00	0 0.00	4 7.84	6.07
WSW	0 0.00	2 3.92	6 11.76	0 0.00	0 0.00	0 0.00	8 15.69	3.75
W	3 5.88	1 1.96	0 0.00	0 0.00	0 0.00	0 0.00	4 7.84	1.32
WNW	1 1.96	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	1 1.96	.90
NW	5 9.80	1 1.96	2 3.92	0 0.00	0 0.00	0 0.00	8 15.69	1.76
NNW	0 0.00	4 7.84	5 9.80	0 0.00	0 0.00	0 0.00	9 17.65	3.29
N	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0.00
CALM	0 0.00						0 0.00	CALM
TOTAL	9 17.65	8 15.69	21 41.18	10 19.61	2 3.92	1 1.96	51 100.00	4.10

NUMBER OF VALID OBSERVATIONS WITH PRECIPITATION	51	3.43 PCT.
NUMBER OF VALID OBSERVATIONS WITHOUT PRECIPITATION	1402	94.22 PCT.
NUMBER OF INVALID OBSERVATIONS	35	2.35 PCT.
TOTAL NUMBER OF OBSERVATIONS	1488	100.00 PCT.
TOTAL AMOUNT OF PRECIPITATION FOR DATA PERIOD		2.87 INCHES

KEY XXX NUMBER OF OCCURRENCES
XXX PERCENT OCCURRENCES

TABLE 2.3-72

JOINT WIND FREQUENCY DISTRIBUTION
DATA PERIOD: FEBRUARY 1977 AND 1978

PRECIPITATION WIND ROSE
DATA SOURCE: ON-SITE
WIND SENSOR HEIGHT: 10.00 METERS

ST. LUCIE UNIT 2
HUTCHINSON ISLAND, FLORIDA
FLORIDA POWER AND LIGHT CO.

WIND SECTOR	WIND SPEED CATEGORIES(METERS PER SECOND) 0.0-1.5	1.5-3.0	3.0-5.0	5.0-7.5	7.5-10.0	>10.0	TOTAL	MEAN SPEED
NNE	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0.00
NE	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0.00
ENE	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0.00
E	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0.00
ESE	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0.00
SE	0 0.00	0 0.00	1 2.22	0 0.00	0 0.00	0 0.00	1 2.22	3.10
SSE	0 0.00	3 6.67	4 8.89	0 0.00	0 0.00	0 0.00	7 15.56	3.07
S	0 0.00	0 0.00	2 4.44	2 4.44	0 0.00	0 0.00	4 8.89	5.15
SSW	0 0.00	2 4.44	5 11.11	0 0.00	0 0.00	0 0.00	7 15.56	3.40
SW	2 4.44	1 2.22	1 2.22	0 0.00	0 0.00	0 0.00	4 8.89	2.22
WSW	1 2.22	1 2.22	0 0.00	0 0.00	0 0.00	0 0.00	2 4.44	1.55
W	0 0.00	3 6.67	3 6.67	0 0.00	0 0.00	0 0.00	6 13.33	3.15
WNW	1 2.22	3 6.67	0 0.00	0 0.00	0 0.00	0 0.00	4 8.89	1.67
NW	0 0.00	2 4.44	0 0.00	0 0.00	0 0.00	0 0.00	2 4.44	2.25
NNW	0 0.00	4 8.89	4 8.89	0 0.00	0 0.00	0 0.00	8 17.78	2.69
N	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0.00
CALM	0 0.00						0 0.00	CALM
TOTAL	4 8.89	19 42.22	20 44.44	2 4.44	0 0.00	0 0.00	45 100.00	2.95

NUMBER OF VALID OBSERVATIONS WITH PRECIPITATION	45	3.35 PCT.
NUMBER OF VALID OBSERVATIONS WITHOUT PRECIPITATION	1280	95.24 PCT.
NUMBER OF INVALID OBSERVATIONS	19	1.41 PCT.
TOTAL NUMBER OF OBSERVATIONS	1344	100.00 PCT.
TOTAL AMOUNT OF PRECIPITATION FOR DATA PERIOD		1.99 INCHES

KEY XXX NUMBER OF OCCURRENCES

TABLE 2.3-73

JOINT WIND FREQUENCY DISTRIBUTION
DATA PERIOD: MARCH 1977 AND 1978

PRECIPITATION WIND ROSE
DATA SOURCE: ON-SITE
WIND SENSOR HEIGHT: 10.00 METERS

ST. LUCIE UNIT 2
HUTCHINSON ISLAND, FLORIDA
FLORIDA POWER AND LIGHT CO.

WIND SECTOR	WIND SPEED CATEGORIES(METERS PER SECOND) 0.0-1.5	1.5-3.0	3.0-5.0	5.0-7.5	7.5-10.0	>10.0	TOTAL	MEAN SPEED
NNE	0 0.00	1 3.70	0 0.00	0 0.00	0 0.00	0 0.00	1 3.70	1.80
NE	1 3.70	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	1 3.70	1.30
ENE	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0.00
E	0 0.00	1 3.70	0 0.00	0 0.00	0 0.00	0 0.00	1 3.70	2.70
ESE	0 0.00	1 3.70	0 0.00	0 0.00	0 0.00	0 0.00	1 3.70	2.70
SE	0 0.00	4 14.81	1 3.70	0 0.00	0 0.00	0 0.00	5 18.52	2.78
SSE	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0.00
S	0 0.00	1 3.70	0 0.00	0 0.00	0 0.00	0 0.00	1 3.70	2.20
SSW	0 0.00	2 7.41	0 0.00	1 3.70	0 0.00	0 0.00	3 11.11	3.43
SW	0 0.00	0 0.00	0 0.00	2 7.41	0 0.00	0 0.00	2 7.41	6.75
WSW	0 0.00	0 0.00	2 7.41	0 0.00	0 0.00	0 0.00	2 7.41	4.50
W	0 0.00	0 0.00	0 0.00	1 3.70	0 0.00	0 0.00	1 3.70	6.30
WNW	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0.00
NW	1 3.70	2 7.41	0 0.00	0 0.00	0 0.00	0 0.00	3 11.11	1.90
NNW	1 3.70	1 3.70	2 7.41	1 3.70	0 0.00	0 0.00	5 18.52	3.24
N	0 0.00	1 3.70	0 0.00	0 0.00	0 0.00	0 0.00	1 3.70	2.70
CALM	0 0.00						0 0.00	CALM
TOTAL	3 11.11	14 51.85	5 18.52	5 18.52	0 0.00	0 0.00	27 100.00	3.27

NUMBER OF VALID OBSERVATIONS WITH PRECIPITATION	27	1.81 PCT.
NUMBER OF VALID OBSERVATIONS WITHOUT PRECIPITATION	1400	94.09 PCT.
NUMBER OF INVALID OBSERVATIONS	61	4.10 PCT.
TOTAL NUMBER OF OBSERVATIONS	1488	100.00 PCT.
TOTAL AMOUNT OF PRECIPITATION FOR DATA PERIOD		3.48 INCHES

KEY XXX NUMBER OF OCCURRENCES
     XXX PERCENT OCCURRENCES

TABLE 2.3-74

JOINT WIND FREQUENCY DISTRIBUTION
DATA PERIOD: APRIL 1977 AND 1978

PRECIPITATION WIND ROSE
DATA SOURCE: ON-SITE
WIND SENSOR HEIGHT: 10.00 METERS

ST. LUCIE UNIT 2
HUTCHINSON ISLAND, FLORIDA
FLORIDA POWER AND LIGHT CO.

WIND SECTOR	WIND SPEED CATEGORIES(METERS PER SECOND) 0.0-1.5	1.5-3.0	3.0-5.0	5.0-7.5	7.5-10.0	>10.0	TOTAL	MEAN SPEED
NNE	0	0	0	0	0	0	0	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
NE	0	0	0	2	0	0	2	6.75
	0.00	0.00	0.00	8.00	0.00	0.00	8.00	
ENE	0	0	1	1	0	0	2	5.40
	0.00	0.00	4.00	4.00	0.00	0.00	8.00	
E	0	0	0	3	0	0	3	6.43
	0.00	0.00	0.00	12.00	0.00	0.00	12.00	
ESE	0	2	3	3	0	0	8	4.15
	0.00	8.00	12.00	12.00	0.00	0.00	32.00	
SE	0	0	0	0	0	0	0	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
SSE	0	3	2	1	0	0	6	3.37
	0.00	12.00	8.00	4.00	0.00	0.00	24.00	
S	0	0	3	0	0	0	3	3.73
	0.00	0.00	12.00	0.00	0.00	0.00	12.00	
SSW	0	0	0	0	0	0	0	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
SW	0	0	0	0	0	0	0	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
WSW	0	0	0	0	0	0	0	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
W	0	0	0	0	0	0	0	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
WNW	0	0	0	1	0	0	1	5.40
	0.00	0.00	0.00	4.00	0.00	0.00	4.00	
NW	0	0	0	0	0	0	0	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
NNW	0	0	0	0	0	0	0	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
N	0	0	0	0	0	0	0	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
CALM	0						0	CALM
	0.00						0.00	
TOTAL	0	5	9	11	0	0	25	4.54
	0.00	20.00	36.00	44.00	0.00	0.00	100.00	

NUMBER OF VALID OBSERVATIONS WITH PRECIPITATION	25	1.74 PCT.
NUMBER OF VALID OBSERVATIONS WITHOUT PRECIPITATION	1311	91.04 PCT.
NUMBER OF INVALID OBSERVATIONS	104	7.22 PCT.
TOTAL NUMBER OF OBSERVATIONS	1440	100.00 PCT.
TOTAL AMOUNT OF PRECIPITATION FOR DATA PERIOD		5.05 INCHES

KEY XXX NUMBER OF OCCURRENCES
XXX PERCENT OCCURRENCES

TABLE 2.3-75

JOINT WIND FREQUENCY DISTRIBUTION
DATA PERIOD: MAY 1977 AND 1978

PRECIPITATION WIND ROSE
DATA SOURCE: ON-SITE
WIND SENSOR HEIGHT: 10.00 METERS

ST. LUCIE UNIT 2
HUTCHINSON ISLAND, FLORIDA
FLORIDA POWER AND LIGHT CO.

WIND SECTOR	WIND SPEED CATEGORIES(METERS PER SECOND) 0.0-1.5	1.5-3.0	3.0-5.0	5.0-7.5	7.5-10.0	>10.0	TOTAL	MEAN SPEED
NNE	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0.00
NE	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0.00
ENE	0 0.00	0 0.00	3 12.50	0 0.00	0 0.00	0 0.00	3 12.50	3.73
E	0 0.00	2 8.33	0 0.00	0 0.00	0 0.00	0 0.00	2 8.33	2.00
ESE	0 0.00	0 0.00	1 4.17	0 0.00	0 0.00	0 0.00	1 4.17	3.60
SE	0 0.00	4 16.67	1 4.17	0 0.00	0 0.00	0 0.00	5 20.83	2.42
SSE	1 4.17	2 8.33	2 8.33	0 0.00	0 0.00	0 0.00	5 20.83	2.86
S	0 0.00	0 0.00	1 4.17	0 0.00	0 0.00	0 0.00	1 4.17	3.10
SSW	0 0.00	0 0.00	1 4.17	1 4.17	0 0.00	0 0.00	2 8.33	5.40
SW	0 0.00	0 0.00	1 4.17	1 4.17	0 0.00	0 0.00	2 8.33	5.80
WSW	0 0.00	1 4.17	0 0.00	0 0.00	0 0.00	0 0.00	1 4.17	2.70
W	0 0.00	1 4.17	0 0.00	0 0.00	0 0.00	0 0.00	1 4.17	2.20
WNW	0 0.00	1 4.17	0 0.00	0 0.00	0 0.00	0 0.00	1 4.17	2.70
NW	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0.00
NNW	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0.00
N	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0.00
CALM	0 0.00						0 0.00	CALM
TOTAL	1 4.17	11 45.83	10 41.67	2 8.33	0 0.00	0 0.00	24 100.00	3.26

NUMBER OF VALID OBSERVATIONS WITH PRECIPITATION	24	1.61	PCT.
NUMBER OF VALID OBSERVATIONS WITHOUT PRECIPITATION	1427	95.90	PCT.
NUMBER OF INVALID OBSERVATIONS	37	2.49	PCT.
TOTAL NUMBER OF OBSERVATIONS	1488	100.00	PCT.
TOTAL AMOUNT OF PRECIPITATION FOR DATA PERIOD		4.07	INCHES

KEY XXX NUMBER OF OCCURRENCES
XXX PERCENT OCCURRENCES

TABLE 2.3-76

JOINT WIND FREQUENCY DISTRIBUTION
DATA PERIOD: JUNE 1977 AND 1978

PRECIPITATION WIND ROSE
DATA SOURCE: ON-SITE
WIND SENSOR HEIGHT: 10.00 METERS

ST. LUCIE UNIT 2
HUTCHINSON ISLAND, FLORIDA
FLORIDA POWER AND LIGHT CO.

WIND SECTOR	WIND SPEED CATEGORIES(METERS PER SECOND) 0.0-1.5	1.5-3.0	3.0-5.0	5.0-7.5	7.5-10.0	>10.0	TOTAL	MEAN SPEED
NNE	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0.00
NE	0 0.00	0 0.00	1 3.57	0 0.00	0 0.00	0 0.00	1 3.57	3.10
ENE	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0.00
E	0 0.00	0 0.00	0 0.00	1 3.57	0 0.00	0 0.00	1 3.57	5.40
ESE	0 0.00	1 3.57	0 0.00	0 0.00	0 0.00	0 0.00	1 3.57	2.70
SE	0 0.00	1 3.57	1 3.57	0 0.00	0 0.00	0 0.00	2 7.14	2.90
SSE	0 0.00	2 7.14	2 7.14	0 0.00	0 0.00	0 0.00	4 14.29	3.13
S	0 0.00	1 3.57	2 7.14	0 0.00	0 0.00	0 0.00	3 10.71	3.43
SSW	0 0.00	2 7.14	4 14.29	0 0.00	0 0.00	0 0.00	6 21.43	3.35
SW	0 0.00	2 7.14	0 0.00	0 0.00	1 3.57	0 0.00	3 10.71	5.07
WSW	0 0.00	2 7.14	0 0.00	0 0.00	0 0.00	0 0.00	2 7.14	2.25
W	1 3.57	1 3.57	0 0.00	0 0.00	0 0.00	0 0.00	2 7.14	1.35
WNW	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0.00
NW	1 3.57	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	1 3.57	1.30
NNW	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0.00
N	0 0.00	0 0.00	1 3.57	0 0.00	0 0.00	0 0.00	1 3.57	3.10
CALM	1 3.57						1 3.57	CALM
TOTAL	3 10.71	12 42.86	11 39.29	1 3.57	1 3.57	0 0.00	28 100.00	3.10

NUMBER OF VALID OBSERVATIONS WITH PRECIPITATION	28	1.88 PCT.
NUMBER OF VALID OBSERVATIONS WITHOUT PRECIPITATION	1409	94.69 PCT.
NUMBER OF INVALID OBSERVATIONS	51	3.43 PCT.
TOTAL NUMBER OF OBSERVATIONS	1488	100.00 PCT.
TOTAL AMOUNT OF PRECIPITATION FOR DATA PERIOD		2.73 INCHES

KEY XXX NUMBER OF OCCURRENCES
XXX PERCENT OCCURRENCES

JOINT WIND FREQUENCY DISTRIBUTION
DATA PERIOD: JULY 1977 AND 1978

PRECIPITATION WIND ROSE
DATA SOURCE: ON-SITE
WIND SENSOR HEIGHT: 10.00 METERS

ST. LUCIE UNIT 2
HUTCHINSON ISLAND, FLORIDA
FLORIDA POWER AND LIGHT CO.

WIND SECTOR	WIND SPEED CATEGORIES(METERS PER SECOND) 0.0-1.5	1.5-3.0	3.0-5.0	5.0-7.5	7.5-10.0	>10.0	TOTAL	MEAN SPEED
NNE	0 0.00	0 0.00	3 7.32	0 0.00	0 0.00	0 0.00	3 7.32	4.20
NE	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0.00
ENE	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0.00
E	0 0.00	2 4.88	0 0.00	0 0.00	0 0.00	0 0.00	2 4.88	2.25
ESE	1 2.44	1 2.44	2 4.88	1 2.44	0 0.00	0 0.00	5 12.20	3.32
SE	2 4.88	3 7.32	0 0.00	0 0.00	0 0.00	0 0.00	5 12.20	1.88
SSE	0 0.00	0 0.00	1 2.44	0 0.00	0 0.00	0 0.00	1 2.44	4.00
S	0 0.00	2 4.88	1 2.44	0 0.00	0 0.00	0 0.00	3 7.32	2.83
SSW	0 0.00	0 0.00	1 2.44	2 4.88	0 0.00	0 0.00	3 7.32	5.97
SW	0 0.00	1 2.44	4 9.76	2 4.88	0 0.00	0 0.00	7 17.07	4.10
WSW	0 0.00	2 4.88	1 2.44	0 0.00	0 0.00	0 0.00	3 7.32	3.00
W	0 0.00	1 2.44	1 2.44	1 2.44	0 0.00	0 0.00	3 7.32	4.03
WNW	0 0.00	1 2.44	0 0.00	0 0.00	0 0.00	0 0.00	1 2.44	2.70
NW	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0.00
NNW	1 2.44	1 2.44	1 2.44	1 2.44	0 0.00	0 0.00	4 9.76	3.15
N	0 0.00	1 2.44	0 0.00	0 0.00	0 0.00	0 0.00	1 2.44	1.80
CALM	0 0.00						0 0.00	CALM
TOTAL	4 9.76	15 36.59	15 36.59	7 17.07	0 0.00	0 0.00	41 100.00	3.42

NUMBER OF VALID OBSERVATIONS WITH PRECIPITATION	41	2.76 PCT.
NUMBER OF VALID OBSERVATIONS WITHOUT PRECIPITATION	1419	95.36 PCT.
NUMBER OF INVALID OBSERVATIONS	28	1.88 PCT.
TOTAL NUMBER OF OBSERVATIONS	1488	100.00 PCT.
TOTAL AMOUNT OF PRECIPITATION FOR DATA PERIOD		6.54 INCHES

KEY XXX NUMBER OF OCCURRENCES
XXX PERCENT OCCURRENCES

TABLE 2.3-78

JOINT WIND FREQUENCY DISTRIBUTION
DATA PERIOD: AUGUST 1977 AND 1978

PRECIPITATION WIND ROSE
DATA SOURCE: ON-SITE
WIND SENSOR HEIGHT: 10.00 METERS

ST. LUCIE UNIT 2
HUTCHINSON ISLAND, FLORIDA
FLORIDA POWER AND LIGHT CO.

WIND SECTOR	WIND SPEED CATEGORIES(METERS PER SECOND) 0.0-1.5	1.5-3.0	3.0-5.0	5.0-7.5	7.5-10.0	>10.0	TOTAL	MEAN SPEED
NNE	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0.00
NE	1 1.54	0 0.00	1 1.54	0 0.00	0 0.00	0 0.00	2 3.08	2.45
ENE	0 0.00	0 0.00	3 4.62	0 0.00	0 0.00	0 0.00	3 4.62	3.60
E	0 0.00	0 0.00	9 13.85	1 1.54	0 0.00	0 0.00	10 15.38	3.85
ESE	1 1.54	10 15.38	4 6.15	3 4.62	1 1.54	0 0.00	19 29.23	3.61
SE	0 0.00	3 4.62	2 3.08	0 0.00	0 0.00	0 0.00	5 7.69	3.06
SSE	0 0.00	3 4.62	3 4.62	0 0.00	0 0.00	0 0.00	6 9.23	3.12
S	0 0.00	0 0.00	3 4.62	1 1.54	0 0.00	0 0.00	4 6.15	4.60
SSW	0 0.00	1 1.54	1 1.54	0 0.00	0 0.00	0 0.00	2 3.08	2.90
SW	1 1.54	3 4.62	1 1.54	0 0.00	0 0.00	0 0.00	5 7.69	2.14
WSW	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0.00
W	1 1.54	3 4.62	0 0.00	0 0.00	0 0.00	0 0.00	4 6.15	1.90
WNW	0 0.00	0 0.00	1 1.54	0 0.00	0 0.00	0 0.00	1 1.54	3.60
NW	0 0.00	0 0.00	1 1.54	0 0.00	0 0.00	0 0.00	1 1.54	4.50
NNW	1 1.54	1 1.54	0 0.00	0 0.00	0 0.00	0 0.00	2 3.08	1.55
N	1 1.54	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	1 1.54	.90
CALM	0 0.00						0 0.00	CALM
TOTAL	6 9.23	24 36.92	29 44.62	5 7.69	1 1.54	0 0.00	65 100.00	3.25

NUMBER OF VALID OBSERVATIONS WITH PRECIPITATION	65	4.37 PCT.
NUMBER OF VALID OBSERVATIONS WITHOUT PRECIPITATION	1196	80.38 PCT.
NUMBER OF INVALID OBSERVATIONS	227	15.26 PCT.
TOTAL NUMBER OF OBSERVATIONS	1488	100.00 PCT.
TOTAL AMOUNT OF PRECIPITATION FOR DATA PERIOD		8.15 INCHES

KEY XXX NUMBER OF OCCURRENCES
XXX PERCENT OCCURRENCES

TABLE 2.3-79

JOINT WIND FREQUENCY DISTRIBUTION
DATA PERIOD: SEPTEMBER 1, 1976 - AUGUST 31, 1978

PRECIPITATION WIND ROSE
DATA SOURCE: ON-SITE
WIND SENSOR HEIGHT: 10.00 METERS

ST. LUCIE UNIT 2
HUTCHINSON ISLAND, FLORIDA
FLORIDA POWER AND LIGHT CO.

WIND SECTOR	WIND SPEED CATEGORIES(METERS PER SECOND) 0.0-1.5	1.5-3.0	3.0-5.0	5.0-7.5	7.5-10.0	>10.0	TOTAL	MEAN SPEED
NNE	0	3	8	2	0	0	13	3.99
	0.00	.61	1.64	.41	0.00	0.00	2.66	
NE	2	1	4	5	0	0	12	4.33
	.41	.20	.82	1.02	0.00	0.00	2.46	
ENE	0	1	18	15	0	0	34	4.79
	0.00	.20	3.69	3.07	0.00	0.00	6.97	
E	0	5	18	17	0	0	40	4.57
	0.00	1.02	3.69	3.48	0.00	0.00	8.20	
ESE	3	16	18	10	1	0	48	3.77
	.61	3.28	3.69	2.05	.20	0.00	9.84	
SE	3	26	15	0	0	0	44	2.82
	.61	5.33	3.07	0.00	0.00	0.00	9.02	
SSE	1	18	20	6	0	0	45	3.47
	.20	3.69	4.10	1.23	0.00	0.00	9.22	
S	1	12	25	9	0	0	47	3.85
	.20	2.46	5.12	1.84	0.00	0.00	9.63	
SSW	1	10	16	8	2	1	38	4.43
	.20	2.05	3.28	1.64	.41	.20	7.79	
SW	4	8	11	10	1	0	34	4.11
	.82	1.64	2.25	2.05	.20	0.00	6.97	
WSW	1	10	9	0	0	0	20	3.14
	.20	2.05	1.84	0.00	0.00	0.00	4.10	
W	8	12	4	3	0	0	27	2.61
	1.64	2.46	.82	.61	0.00	0.00	5.53	
WNW	8	5	3	1	0	0	17	2.10
	1.64	1.02	.61	.20	0.00	0.00	3.48	
NW	8	9	4	0	0	0	21	2.05
	1.64	1.84	.82	0.00	0.00	0.00	4.30	
NNW	5	17	15	2	0	0	39	2.85
	1.02	3.48	3.07	.41	0.00	0.00	7.99	
N	3	4	1	0	0	0	8	1.95
	.61	.82	.20	0.00	0.00	0.00	1.64	
CALM	1						1	CALM
	.20						.20	
TOTAL	49	157	189	88	4	1	488	3.56
	10.04	32.17	38.73	18.03	.82	.20	100.00	

NUMBER OF VALID OBSERVATIONS WITH PRECIPITATION	488	2.79 PCT.
NUMBER OF VALID OBSERVATIONS WITHOUT PRECIPITATION	15843	90.43 PCT.
NUMBER OF INVALID OBSERVATIONS	1189	6.79 PCT.
TOTAL NUMBER OF OBSERVATIONS	17520	100.00 PCT.
TOTAL AMOUNT OF PRECIPITATION FOR DATA PERIOD		56.44 INCHES

KEY XXX NUMBER OF OCCURRENCES
XXX PERCENT OCCURRENCES

TABLE 2.3-80

MEAN NUMBER OF DAYS WITH HEAVY FOG AND VISIBILITY LESS THAN ½ MILE AT WEST PALM BEACH, FLORIDA

Month	Mean No. of Days
January	2
February	1
March	1
April	1
May	*
June	*
July	*
August	*
September	*
October	*
November	1
December	1
Annual	8

Note: * = less than ½

period of record: 1943-1977

Reference: U.S. Dept. of Commerce, 1977, Local Climatological Data - Annual Summary with Comparative Data: West Palm Beach, Florida, NOAA, Environmental Data Service

TABLE 2.3-81

STABILITY FREQUENCY AT THE ST. LUCIE SITE

Class	% Frequency
A	12.02
B	3.83
C	3.98
D	29.57
E	45.10
F	4.16
G	1.33

period of record: September 1976 - August 1978

TABLE 2.3-82

METEROLOGICAL SENSOR HEIGHTS ON THE ST. LUCIE, FLORIDA TOWER

Parameter	Heights (feet)		
	lower	upper	
Wind Speed	32.8	190.0	
Wind Direction	32.8	190.0	
	lower	middle	upper
Ambient Temperature	34.65	112.00	191.90
Delta Temperature	32.90	110.25	190.50
Dew Point	32.90		110.25
Precipitation	Surface		

TABLE 2.3-83

MAXIMUM χ/Q VALUES AT THE EXCLUSION BOUNDARY

INTERMITTENT AVERAGING PERIODS
DATA PERIOD: 9/1/76 to 8/31/77

DATA SOURCE: ON-SITE DATA
SENSOR HEIGHT: 10 METERS

ST. LUCIE, FLORIDA
FLORIDA POWER AND LIGHT CO.

RELATIVE CONCENTRATIONS (SEC/CUBIC METER)

AFFECTED SECTOR	DISTANCE (KM)	AVERAGING PERIOD (HOURS) 2	8	16	72	624
NNE	1.56	2.3E-04	8.7E-05	2.0E-05	6.6E-06	2.6E-06
NE	1.56	4.4E-04	8.5E-05	1.6E-05	6.9E-06	2.6E-06
ENE	1.56	2.6E-04	1.5E-04	3.0E-05	1.2E-05	3.4E-06
E	1.56	4.4E-04	1.2E-04	1.8E-05	7.4E-06	2.3E-06
ESE	1.56	2.6E-04	2.1E-04	3.6E-05	1.1E-05	3.5E-06
SE	1.56	4.4E-04	2.2E-04	4.1E-05	1.5E-05	4.9E-06
SSE	1.56	4.4E-04	1.9E-04	2.8E-05	1.1E-05	4.4E-06
S	1.56	4.4E-04	8.7E-05	1.9E-05	7.0E-06	2.6E-06
SSW	1.56	2.6E-04	7.6E-05	1.3E-05	5.9E-06	1.3E-06
SW	1.56	1.4E-04	5.5E-05	1.2E-05	3.7E-06	1.2E-06
WSW	1.56	2.3E-04	6.4E-05	1.8E-05	4.4E-06	1.7E-06
W	1.56	2.3E-04	1.0E-05	1.9E-05	8.7E-06	2.4E-06
WNW	1.56	2.3E-04	8.5E-05	2.1E-05	7.5E-06	3.0E-06
NW	1.56	4.4E-04	7.8E-05	2.2E-05	1.3E-05	3.4E-06
NNW	1.56	4.6E-04	2.1E-04	3.1E-05	6.9E-06	2.8E-06
N	1.56	2.3E-04	9.5E-05	1.8E-05	6.1E-06	2.0E-06

TABLE 2.3-84

MAXIMUM χ/Q VALUES AT THE EXCLUSION BOUNDARY

INTERMITTENT AVERAGING PERIODS
DATA PERIOD: 9/1/77 to 8/31/78

DATA SOURCE: ON-SITE DATA
SENSOR HEIGHT: 10 METERS

ST. LUCIE, FLORIDA
FLORIDA POWER AND LIGHT CO.

RELATIVE CONCENTRATIONS (SEC/CUBIC METER)

AFFECTED SECTOR	DISTANCE (KM)	AVERAGING PERIOD (HOURS) 2	8	16	72	624
NNE	1.56	2.3E-04	1.4E-04	2.1E-05	5.9E-06	2.3E-06
NE	1.56	2.3E-04	1.2E-04	1.9E-05	6.8E-06	2.5E-06
ENE	1.56	2.3E-04	1.6E-04	3.1E-05	7.5E-06	2.2E-06
E	1.56	2.3E-04	1.0E-04	2.3E-05	6.2E-06	1.9E-06
ESE	1.56	2.3E-04	2.4E-04	3.5E-05	8.7E-06	3.2E-06
SE	1.56	2.1E-04	2.1E-04	3.2E-05	8.8E-06	4.0E-06
SSE	1.56	2.3E-04	5.8E-05	1.4E-05	5.6E-06	2.6E-06
S	1.56	2.3E-04	6.5E-05	1.2E-05	5.4E-06	1.1E-06
SSW	1.56	4.4E-04	8.1E-05	1.8E-05	5.7E-06	1.2E-06
SW	1.56	2.3E-04	1.2E-04	1.8E-05	7.8E-06	1.4E-06
WSW	1.56	2.3E-04	4.6E-05	8.8E-06	5.0E-06	1.6E-06
W	1.56	2.3E-04	4.7E-05	1.1E-05	5.1E-06	1.6E-06
WNW	1.56	4.4E-04	6.7E-05	1.4E-05	8.1E-06	2.9E-06
NW	1.56	2.3E-04	1.0E-04	2.3E-05	1.2E-05	2.9E-06
NNW	1.56	4.4E-04	1.2E-04	2.4E-05	1.0E-05	2.9E-06
N	1.56	2.1E-04	9.1E-05	1.5E-05	6.8E-06	1.6E-06

TABLE 2.3-85

MAXIMUM χ/Q VALUES AT THE EXCLUSION BOUNDARY

INTERMITTENT AVERAGING PERIODS
DATA PERIOD: 9/1/76 to 8/31/78

DATA SOURCE: ON-SITE DATA
SENSOR HEIGHT: 10 METERS

ST. LUCIE, FLORIDA
FLORIDA POWER AND LIGHT CO.

RELATIVE CONCENTRATIONS (SEC/CUBIC METER)

AFFECTED SECTOR	DISTANCE (KM)	AVERAGING PERIOD (HOURS)				
		2	8	16	72	624
NNE	1.56	2.3E-04	1.4E-04	2.1E-05	6.6E-06	2.6E-06
NE	1.56	4.4E-04	1.2E-04	1.9E-05	6.9E-06	2.7E-06
ENE	1.56	2.6E-04	1.6E-04	3.1E-05	1.2E-05	3.4E-06
E	1.56	4.4E-04	1.2E-04	2.3E-05	7.4E-06	2.2E-06
ESE	1.56	2.6E-04	2.6E-04	4.2E-05	1.3E-05	3.6E-06
SE	1.56	4.4E-04	2.2E-04	4.1E-05	1.5E-05	4.9E-06
SSE	1.56	4.4E-04	1.9E-04	2.8E-05	1.1E-05	4.4E-06
S	1.56	4.4E-04	8.7E-05	1.9E-05	7.0E-06	2.6E-06
SSW	1.56	4.4E-04	8.1E-05	1.8E-05	5.9E-06	1.3E-06
SW	1.56	2.3E-04	1.2E-04	1.8E-05	7.8E-06	1.4E-06
WSW	1.56	2.3E-04	6.5E-05	1.8E-05	5.0E-06	1.8E-06
W	1.56	2.3E-04	1.0E-04	1.9E-05	8.7E-06	2.4E-06
WNW	1.56	4.4E-04	8.5E-05	2.1E-05	8.1E-06	3.4E-06
NW	1.56	4.4E-04	1.0E-04	2.3E-05	1.3E-05	3.4E-06
NNW	1.56	4.6E-04	2.1E-04	3.1E-05	1.0E-05	2.9E-06
N	1.56	2.3E-04	9.5E-05	1.8E-05	6.8E-06	2.0E-06

TABLE 2.3-86

MAXIMUM χ/Q VALUES AT THE LOW POPULATION ZONE

INTERMITTENT AVERAGING PERIODS
DATA PERIOD: 9/1/76 to 8/31/77

DATA SOURCE. ON-SITE DATA
SENSOR HEIGHT. 10 METERS

ST. LUCIE, FLORIDA
FLORIDA POWER AND LIGHT CO.

RELATIVE CONCENTRATIONS (SEC/CUBIC METER)

AVERAGING PERIOD (HOURS)

AFFECTED SECTOR	DISTANCE (KM)	2	8	16	72	624
NNE	1.61	2.3E-04	8.1E-05	1.9E-05	6.3E-06	2.5E-06
NE	1.61	2.2E-04	7.8E-05	1.5E-05	6.6E-06	2.5E-06
ENE	1.61	2.2E-04	1.4E-04	2.8E-05	1.1E-05	3.2E-06
E	1.61	2.2E-04	1.2E-04	1.7E-05	7.1E-05	2.2E-06
ESE	1.61	2.2E-04	2.0E-04	3.4E-05	1.0E-05	3.3E-06
SE	1.61	2.0E-04	2.1E-04	3.9E-05	1.4E-05	4.6E-06
SSE	1.61	2.2E-04	1.9E-04	2.7E-05	1.1E-05	4.2E-06
S	1.61	2.2E-04	8.4E-05	1.8E-05	6.7E-06	2.5E-06
SSW	1.61	4.2E-04	7.3E-05	1.2E-05	5.6E-06	1.2E-06
SW	1.61	2.2E-04	4.6E-05	1.1E-05	3.5E-06	1.1E-06
WSW	1.61	2.2E-04	6.1E-05	1.7E-05	4.2E-06	1.6E-06
W	1.61	2.2E-04	1.0E-04	1.8E-05	8.3E-06	2.3E-06
WNW	1.61	4.2E-04	8.1E-05	1.9E-05	7.1E-06	2.8E-06
NW	1.61	2.2E-04	7.7E-05	2.1E-05	1.3E-05	3.2E-06
NNW	1.61	4.3E-04	2.0E-04	2.9E-05	6.7E-05	2.6E-06
N	1.61	2.0E-04	9.1E-05	1.7E-05	5.8E-06	1.9E-06

TABLE 2.3-87

MAXIMUM χ/Q VALUES AT THE LOW POPULATION ZONE

INTERMITTENT AVERAGING PERIODS
DATA PERIOD: 9/1/77 to 8/31/78

DATA SOURCE: ON-SITE DATA
SENSOR HEIGHT: 10 METERS

ST. LUCIE, FLORIDA
FLORIDA POWER AND LIGHT CO.

RELATIVE CONCENTRATIONS (SEC/CUBIC METER)

AVERAGING PERIOD (HOURS)

AFFECTED SECTOR	DISTANCE (KM)	2	8	16	72	624
NNE	1.61	2.3E-04	1.3E-04	2.0E-05	5.6E-06	2.2E-06
NE	1.61	4.2E-04	1.1E-04	1.8E-05	6.5E-06	2.4E-06
ENE	1.61	2.5E-04	1.5E-04	2.9E-05	6.8E-06	2.1E-06
E	1.61	4.2E-04	1.0E-04	2.2E-05	5.9E-06	1.8E-06
ESE	1.61	2.5E-04	2.3E-04	3.3E-05	8.0E-06	3.0E-06
SE	1.61	4.2E-04	2.0E-04	3.0E-05	8.2E-06	3.8E-06
SSE	1.61	4.2E-04	5.8E-05	1.4E-05	5.6E-06	2.5E-06
S	1.61	4.2E-04	6.3E-05	1.1E-05	5.2E-06	1.1E-06
SSW	1.61	4.2E-04	7.8E-05	1.7E-05	5.4E-06	1.1E-06
SW	1.61	2.5E-04	1.1E-04	1.7E-05	7.4E-06	1.3E-06
WSW	1.61	1.3E-04	4.4E-05	8.3E-06	4.8E-06	1.5E-06
W	1.61	2.6E-04	4.7E-05	1.0E-05	4.9E-06	1.5E-06
WNW	1.61	2.2E-04	6.4E-05	1.3E-05	7.7E-06	2.7E-06
NW	1.61	4.2E-04	9.9E-05	2.2E-05	1.2E-05	2.7E-06
NNW	1.61	4.5E-04	1.1E-04	2.2E-05	9.7E-06	2.7E-06
N	1.61	2.2E-04	8.7E-05	1.4E-05	6.5E-06	1.5E-06

TABLE 2.3-88

MAXIMUM χ/Q VALUES AT THE LOW POPULATION ZONE

INTERMITTENT AVERAGING PERIODS
DATA PERIOD: 9/1/76 to 8/31/78

DATA SOURCE: ON-SITE DATA
SENSOR HEIGHT: 10 METERS

ST. LUCIE, FLORIDA
FLORIDA POWER AND LIGHT CO.

RELATIVE CONCENTRATIONS (SEC/CUBIC METER)

AFFECTED SECTOR	DISTANCE (KM)	AVERAGING PERIOD (HOURS) 2	8	16	72	624
NNE	1.61	2.3E-04	1.3E-04	2.0E-05	6.3E-06	2.5E-06
NE	1.61	4.2E-04	1.1E-04	1.8E-05	6.6E-06	2.6E-06
ENE	1.61	2.5E-04	1.5E-04	2.9E-05	1.1E-05	3.2E-06
E	1.61	4.2E-04	1.2E-04	2.2E-05	7.1E-06	2.1E-06
ESE	1.61	2.5E-04	2.5E-04	4.0E-05	1.2E-05	3.4E-06
SE	1.61	4.2E-04	2.1E-04	3.9E-05	1.4E-05	4.6E-06
SSE	1.61	4.2E-04	1.9E-04	2.7E-05	1.1E-05	4.2E-06
S	1.61	4.2E-04	8.4E-05	1.8E-05	6.7E-06	2.5E-06
SSW	1.61	4.2E-04	7.8E-05	1.7E-05	5.6E-06	1.2E-06
SW	1.61	2.2E-04	1.1E-04	1.7E-05	7.4E-06	1.3E-06
WSW	1.61	2.2E-04	6.2E-05	1.7E-05	4.8E-06	1.7E-06
W	1.61	2.2E-04	1.0E-04	1.8E-05	8.3E-06	2.3E-06
WNW	1.61	4.2E-04	8.1E-05	1.9E-05	7.7E-06	3.2E-06
NW	1.61	4.2E-04	9.9E-05	2.2E-05	1.3E-05	3.2E-06
NNW	1.61	4.5E-04	2.0E-04	2.9E-05	9.7E-06	2.7E-06
N	1.61	2.2E-04	9.1E-05	1.7E-05	6.5E-06	1.9E-06

TABLE 2.3-89

SECTOR X/Q AND 5 PERCENTILE X/Q VALUES AT THE EXCLUSION BOUNDARY

INTERMITTENT AVERAGING PERIODS
DATA PERIOD: 9/1/76 to 8/31/77

DATA SOURCE: ON-SITE DATA
SENSOR HEIGHT: 10 METERS

ST. LUCIE, FLORIDA
FLORIDA POWER AND LIGHT CO.

RELATIVE CONCENTRATIONS (SEC/CUBIC METER)

AFFECTED SECTOR	DISTANCE (KM)	AVERAGE PERIOD (HOURS) 2	8	16	72	624
NNE	1.56	5.9E-05	3.9E-05	8.7E-06	3.8E-06	1.9E-06
NE	1.56	5.9E-05	4.1E-05	9.0E-06	4.7E-06	2.0E-06
ENE	1.56	6.9E-05	5.3E-05	1.7E-05	5.1E-06	2.5E-06
E	1.56	6.9E-05	5.3E-05	1.1E-05	4.3E-06	1.5E-06
ESE	1.56	8.7E-05	7.9E-05	1.4E-05	5.7E-06	2.8E-06
SE	1.56	1.1E-04	7.0E-05	1.6E-05	7.3E-06	3.1E-06
SSE	1.56	6.9E-05	5.3E-05	1.2E-05	6.3E-06	3.0E-06
S	1.56	4.6E-05	3.3E-05	8.1E-06	3.4E-06	2.0E-06
SSW	1.56	3.5E-05	3.5E-05	8.3E-06	3.2E-06	1.1E-06
SW	1.56	3.5E-05	2.5E-05	6.6E-06	2.3E-06	9.5E-07
WSW	1.56	3.5E-05	2.3E-05	5.8E-06	2.6E-06	1.2E-06
W	1.56	3.5E-05	2.8E-05	7.8E-06	3.7E-06	1.2E-06
WNW	1.56	4.6E-05	3.4E-05	9.5E-06	5.0E-06	2.5E-06
NW	1.56	4.8E-05	3.9E-05	1.1E-05	5.4E-06	2.7E-06
NNW	1.56	4.6E-05	3.6E-05	8.9E-06	4.7E-06	2.4E-06
N	1.56	4.6E-05	3.8E-05	8.2E-06	3.5E-06	1.4E-06

TABLE 2.3-90

SECTOR χ/Q AND 5 PERCENTILE χ/Q VALUES AT THE EXCLUSION BOUNDARY

INTERMITTENT AVERAGING PERIODS
DATA PERIOD: 9/1/77 to 8/31/78

DATA SOURCE: ON-SITE DATA
SENSOR HEIGHT: 10 METERS

ST. LUCIE, FLORIDA
FLORIDA POWER AND LIGHT CO.

RELATIVE CONCENTRATIONS (SEC/CUBIC METER)

AFFECTED SECTOR	DISTANCE (KM)	AVERAGING PERIOD (HOURS) 2	8	16	72	624
NNE	1.56	5.9E-05	3.5E-05	9.0E-06	3.5E-06	1.5E-06
NE	1.56	6.6E-05	4.0E-05	8.8E-06	4.0E-06	1.7E-06
ENE	1.56	8.7E-05	5.3E-06	9.5E-06	3.9E-06	1.5E-06
E	1.56	6.6E-05	4.1E-05	9.2E-06	3.6E-06	1.4E-06
ESE	1.56	8.7E-05	5.6E-05	1.1E-05	5.6E-06	2.6E-06
SE	1.56	8.7E-05	5.3E-05	1.1E-05	5.8E-06	3.0E-06
SSE	1.56	5.9E-05	3.4E-05	8.0E-06	3.5E-06	1.7E-06
S	1.56	4.6E-05	2.8E-05	6.0E-06	2.5E-06	1.1E-06
SSW	1.56	5.7E-05	3.4E-05	7.4E-06	3.1E-06	9.8E-07
SW	1.56	4.2E-05	2.3E-05	6.0E-06	2.3E-06	1.1E-06
WSW	1.56	3.5E-05	2.2E-05	5.4E-06	2.6E-06	1.3E-06
W	1.56	3.5E-05	2.1E-05	5.3E-06	2.4E-06	1.3E-06
WNW	1.56	4.6E-05	3.3E-05	9.4E-06	4.8E-06	2.3E-06
NW	1.56	6.4E-05	3.5E-05	9.4E-06	5.2E-06	2.4E-06
NNW	1.56	6.4E-05	3.6E-05	9.1E-06	4.7E-06	2.4E-06
N	1.56	4.6E-05	2.7E-05	7.0E-06	3.2E-06	1.4E-06

TABLE 2.3-91

SECTOR χ/Q AND 5 PERCENTILE χ/Q VALUES AT THE EXCLUSION BOUNDARY

INTERMITTENT AVERAGING PERIODS
DATA PERIOD: 9/1/76 to 8/31/78

DATA SOURCE: ON-SITE DATA
SENSOR HEIGHT: 10 METERS

ST. LUCIE, FLORIDA
FLORIDA POWER AND LIGHT CO.

RELATIVE CONCENTRATIONS (SEC/CUBIC METER)

AFFECTED SECTOR	DISTANCE (KM)	AVERAGING PERIOD (HOURS) 2	8	16	72	624
NNE	1.56	5.9E-05	3.7E-05	9.1E-06	3.6E-06	1.8E-06
NE	1.56	6.6E-05	4.0E-05	8.9E-06	4.2E-06	2.0E-06
ENE	1.56	6.9E-05	5.4E-05	1.1E-05	4.8E-06	2.1E-06
E	1.56	6.9E-05	4.8E-05	1.0E-05	4.0E-06	1.4E-06
ESE	1.56	8.7E-05	6.8E-05	1.3E-05	5.6E-05	2.7E-06
SE	1.56	1.2E-04	6.2E-05	1.3E-05	6.3E-06	3.0E-06
SSE	1.56	6.6E-05	4.3E-05	9.7E-06	4.8E-06	2.7E-06
S	1.56	4.6E-05	2.9E-05	7.0E-06	3.0E-06	1.6E-06
SSW	1.56	4.6E-05	3.4E-05	7.9E-06	3.1E-06	1.0E-06
SW	1.56	3.5E-05	2.4E-05	6.3E-06	2.3E-06	1.0E-06
WSW	1.56	3.5E-05	2.3E-05	5.5E-06	2.6E-06	1.3E-06
W	1.56	3.5E-05	2.5E-05	6.4E-06	2.9E-06	1.3E-06
WNW	1.56	4.6E-05	3.4E-05	9.4E-06	4.9E-06	2.6E-06
NW	1.56	4.8E-05	3.9E-05	1.0E-05	5.3E-06	2.6E-06
NNW	1.56	5.9E-05	3.6E-05	8.9E-06	4.7E-06	2.5E-06
N	1.56	4.6E-05	3.3E-05	7.4E-06	3.3E-06	1.4E-06

TABLE 2.3-92

SECTOR χ/Q AND 5 PERCENTILE χ/Q VALUES AT THE LOW POPULATION ZONE

INTERMITTENT AVERAGING PERIODS
DATA PERIOD: 9/1/76 to 8/31/77

DATA SOURCE: ON-SITE DATA
SENSOR HEIGHT: 10 METERS

ST. LUCIE, FLORIDA
FLORIDA POWER AND LIGHT CO.

RELATIVE CONCENTRATIONS (SEC/CUBIC METER)

AVERAGING PERIOD (HOURS)

AFFECTED SECTOR	DISTANCE (KM)	2	8	16	72	624
NNE	1.61	5.7E-05	3.7E-05	7.8E-06	3.6E-06	1.6E-06
NE	1.61	5.7E-05	3.9E-05	8.6E-06	4.4E-06	1.7E-06
ENE	1.61	6.7E-05	5.1E-05	1.5E-05	4.6E-06	2.4E-06
E	1.61	6.7E-05	5.2E-05	1.1E-05	4.0E-06	1.5E-06
ESE	1.61	8.5E-05	7.7E-05	1.3E-05	5.4E-06	2.7E-06
SE	1.61	1.1E-04	6.9E-05	1.5E-05	6.7E-06	3.1E-06
SSE	1.61	6.7E-05	5.1E-05	1.2E-05	6.2E-06	3.0E-06
S	1.61	4.5E-05	3.3E-05	7.6E-06	3.2E-06	1.5E-06
SSW	1.61	3.4E-05	3.3E-05	7.8E-06	3.0E-06	1.0E-06
SW	1.61	3.4E-05	2.5E-05	6.3E-06	2.2E-06	9.4E-07
WSW	1.61	3.4E-05	2.2E-05	5.7E-06	2.5E-06	1.1E-06
W	1.61	3.4E-05	2.7E-05	7.2E-06	3.7E-06	1.2E-06
WNW	1.61	4.5E-05	3.2E-05	8.7E-06	4.8E-06	2.3E-06
NW	1.61	4.6E-05	3.5E-05	1.1E-05	5.2E-06	2.2E-06
NNW	1.61	4.5E-05	3.5E-05	8.5E-06	4.3E-06	2.1E-06
N	1.61	4.5E-05	3.7E-05	8.0E-06	3.4E-06	1.4E-06

TABLE 2.3-93

SECTOR χ/Q AND 5 PERCENTILE χ/Q VALUES AT THE LOW POPULATION ZONE

INTERMITTENT AVERAGING PERIODS
DATA PERIOD: 9/1/77 to 8/31/78

DATA SOURCE: ON-SITE DATA
SENSOR HEIGHT: 10 METERS

ST. LUCIE, FLORIDA
FLORIDA POWER AND LIGHT CO.

RELATIVE CONCENTRATIONS (SEC/CUBIC METER)

		AVERAGING PERIOD (HOURS)				
AFFECTED SECTOR	DISTANCE (KM)	2	8	16	72	624
NNE	1.61	5.7E-05	3.4E-06	8.1E-06	3.3E-06	1.3E-06
NE	1.61	6.4E-05	3.8E-06	8.4E-06	3.7E-06	1.4E-06
ENE	1.61	8.5E-05	5.1E-06	8.6E-06	3.5E-06	1.4E-06
E	1.61	6.4E-05	4.1E-06	8.9E-06	3.3E-06	1.4E-06
ESE	1.61	8.5E-05	5.4E-06	1.0E-05	5.3E-06	2.5E-06
SE	1.61	8.5E-05	5.2E-06	1.0E-05	5.3E-06	3.0E-06
SSE	1.61	5.7E-05	3.2E-06	7.8E-06	3.4E-06	1.7E-06
S	1.61	4.5E-05	2.8E-06	5.6E-06	2.3E-06	8.2E-07
SSW	1.61	5.5E-05	3.2E-06	6.9E-06	2.9E-06	9.3E-07
SW	1.61	4.0E-05	2.3E-06	2.3E-06	2.2E-06	1.1E-06
WSW	1.61	3.4E-05	2.1E-06	5.3E-06	2.5E-06	1.2E-06
W	1.61	3.4E-05	2.0E-06	4.9E-06	2.4E-06	1.3E-06
WNW	1.61	4.5E-05	3.1E-06	8.6E-06	4.6E-06	2.1E-06
NW	1.61	6.1E-05	3.1E-06	9.0E-06	5.0E-06	2.1E-06
NNW	1.61	6.1E-05	3.5E-06	8.7E-06	4.3E-06	2.1E-06
N	1.61	4.5E-05	2.6E-06	6.8E-06	3.1E-06	1.4E-06

TABLE 2.3-94

SECTOR χ/Q AND 5 PERCENTILE χ/Q VALUES AT THE LOW POPULATION ZONE

INTERMITTENT AVERAGING PERIODS
DATA PERIOD: 9/1/76 to 8/31/78

DATA SOURCE: ON-SITE DATA
SENSOR HEIGHT: 10 METERS

ST. LUCIE, FLORIDA
FLORIDA POWER AND LIGHT CO.

RELATIVE CONCENTRATIONS (SEC/CUBIC METER)

AFFECTED SECTOR	DISTANCE (KM)	AVERAGING PERIOD (HOURS) 2	8	16.	72	624
NNE	1.61	5.7E-05	3.6E-05	8.2E-06	3.4E-06	1.5E-06
NE	1.61	6.4E-05	3.8E-05	8.5E-06	3.9E-06	1.7E-06
ENE	1.61	6.7E-05	5.2E-05	1.0E-05	4.3E-06	2.0E-06
E	1.61	6.7E-05	4.7E-05	9.7E-06	3.7E-06	1.4E-06
ESE	1.61	8.5E-05	6.6E-05	1.2E-05	5.3E-06	2.6E-06
SE	1.61	1.1E-04	6.1E-05	1.2E-05	5.8E-06	3.0E-06
SSE	1.61	6.4E-05	4.1E-05	9.4E-06	4.7E-06	2.7E-06
S	1.61	4.5E-05	2.9E-05	6.6E-06	2.8E-06	1.2E-06
SSW	1.61	4.5E-05	3.2E-05	7.4E-06	2.9E-06	9.5E-07
SW	1.61	3.4E-05	2.4E-05	6.0E-06	2.2E-06	9.9E-07
WSW	1.61	3.4E-05	2.2E-05	5.4E-06	2.5E-06	1.2E-06
W	1.61	3.4E-05	2.4E-05	5.9E-06	2.9E-06	1.3E-06
WNW	1.61	4.5E-05	3.2E-05	8.6E-06	4.7E-06	2.4E-06
NW	1.61	4.7E-05	3.5E-05	9.6E-06	5.1E-06	2.3E-06
NNW	1.61	5.7E-05	3.5E-05	8.5E-06	4.3E-06	2.2E-06
N	1.61	4.5E-05	3.2E-05	7.2E-06	3.2E-06	1.4E-06

TABLE 2.3-95

50 PERCENTILE χ/Q VALUES AT THE EXCLUSION BOUNDARY

INTERMITTENT AVERAGING PERIODS
DATA PERIOD: 9/1/76 to 8/31/77

DATA SOURCE: ON-SITE DATA
SENSOR HEIGHT: 10 METERS

ST. LUCIE, FLORIDA
FLORIDA POWER AND LIGHT CO.

RELATIVE CONCENTRATIONS (SEC/CUBIC METER)

AFFECTED	DISTANCE	AVERAGING PERIOD (HOURS)				
SECTOR	(KM)	2	8	16	72	624
NNE	1.56	2.4E-05	8.5E-06	2.2E-06	1.1E-06	9.6E-07
NE	1.56	2.5E-05	9.8E-06	2.7E-06	1.3E-06	9.5E-07
ENE	1.56	3.0E-05	1.1E-05	2.7E-06	1.2E-06	1.0E-06
E	1.56	3.5E-05	1.3E-05	3.0E-06	1.3E-06	1.0E-06
ESE	1.56	3.4E-05	1.4E-05	3.1E-06	1.4E-06	1.2E-06
SE	1.56	2.8E-05	1.3E-05	3.2E-06	1.6E-06	1.0E-06
SSE	1.56	2.6E-05	1.3E-05	3.2E-06	1.3E-06	9.6E-07
S	1.56	1.2E-05	7.3E-06	2.1E-06	9.9E-07	7.1E-07
SSW	1.56	2.1E-05	6.9E-06	1.6E-06	6.1E-07	4.8E-07
SW	1.56	1.9E-05	6.8E-06	1.5E-06	6.3E-07	4.8E-07
WSW	1.56	1.9E-05	5.7E-06	1.5E-06	7.3E-07	5.9E-07
W	1.56	2.1E-05	5.8E-06	1.5E-06	6.0E-07	5.6E-07
WNW	1.56	2.4E-05	9.2E-06	2.4E-06	1.2E-06	1.2E-06
NW	1.56	2.6E-05	1.0E-05	2.6E-06	1.4E-06	1.2E-06
NNW	1.56	2.1E-05	8.8E-06	2.3E-06	1.3E-06	1.0E-06
N	1.56	2.8E-05	7.8E-06	1.8E-06	9.0E-07	6.9E-07

TABLE 2.3-96

50 PERCENTILE χ/Q VALUES AT THE EXCLUSION BOUNDARY

INTERMITTENT AVERAGING PERIODS
DATA PERIOD: 9/1/77 to 8/31/78

DATA SOURCE: ON-SITE DATA
SENSOR HEIGHT: 10 METERS

ST. LUCIE, FLORIDA
FLORIDA POWER AND LIGHT CO.

RELATIVE CONCENTRATIONS (SEC/CUBIC METER)

AFFECTED SECTOR	DISTANCE (KM)	AVERAGING PERIOD (HOURS) 2	8	16	72	624
NNE	1.56	2.2E-05	7.7E-06	2.0E-06	1.1E-06	1.0E-06
NE	1.56	2.9E-05	1.0E-05	2.6E-06	1.3E-06	1.1E-06
ENE	1.56	3.0E-05	1.0E-05	2.4E-06	1.1E-06	9.7E-07
E	1.56	2.9E-05	8.9E-06	2.1E-06	8.7E-07	8.4E-07
ESE	1.56	3.0E-05	1.0E-05	2.3E-06	1.1E-06	8.9E-07
SE	1.56	2.6E-05	9.2E-06	2.5E-06	1.2E-06	8.7E-07
SSE	1.56	2.4E-05	7.1E-06	1.8E-06	9.3E-07	6.8E-07
S	1.56	4.6E-05	6.2E-06	1.4E-06	6.8E-07	6.0E-07
SSW	1.56	2.0E-05	4.9E-06	1.2E-06	5.3E-07	5.6E-07
SW	1.56	1.2E-05	3.7E-06	1.0E-06	5.1E-07	5.5E-07
WSW	1.56	1.8E-05	5.5E-06	1.6E-06	8.2E-07	7.8E-07
W	1.56	2.1E-05	4.8E-06	1.4E-06	7.4E-07	5.9E-07
WNW	1.56	2.4E-05	7.4E-06	2.1E-06	1.1E-06	9.0E-07
NW	1.56	2.5E-05	9.1E-06	2.4E-06	1.3E-06	1.3E-06
NNW	1.56	2.6E-05	8.5E-06	2.3E-06	1.2E-06	1.1E-06
N	1.56	2.3E-05	6.7E-06	1.7E-06	8.5E-07	7.9E-07

TABLE 2.3-97

50 PERCENTILE χ/Q VALUES AT THE EXCLUSION BOUNDARY

INTERMITTENT AVERAGING PERIODS
DATA PERIOD: 9/1/76 to 8/31/78

DATA SOURCE: ON-SITE DATA
SENSOR HEIGHT: 10 METERS

ST. LUCIE, FLORIDA
FLORIDA POWER AND LIGHT CO.

RELATIVE CONCENTRATIONS (SEC/CUBIC METER)

AFFECTED SECTOR	DISTANCE (KM)	AVERAGING PERIOD (HOURS) 2	8	16	72	624
NNE	1.56	2.4E-05	8.1E-06	2.1E-06	1.1E-06	1.0E-06
NE	1.56	2.6E-05	9.9E-06	2.6E-06	1.3E-06	1.0E-06
ENE	1.56	3.0E-05	1.1E-05	2.5E-06	1.1E-06	9.7E-07
E	1.56	3.0E-05	1.1E-05	2.5E-06	1.1E-06	8.9E-07
ESE	1.56	3.0E-05	1.2E-05	2.7E-06	1.2E-06	9.9E-07
SE	1.56	2.8E-05	1.1E-05	2.8E-06	1.4E-06	8.5E-07
SSE	1.56	2.5E-05	9.9E-06	2.5E-06	1.1E-06	6.8E-07
S	1.56	1.4E-05	6.7E-06	1.7E-06	8.0E-07	6.2E-07
SSW	1.56	2.1E-05	6.1E-06	1.4E-06	5.6E-07	5.2E-07
SW	1.56	1.6E-05	4.8E-06	1.2E-06	5.7E-07	5.1E-07
WSW	1.56	1.8E-05	5.6E-06	1.6E-06	7.7E-07	6.4E-07
W	1.56	2.1E-05	5.3E-06	1.4E-06	6.8E-07	6.0E-07
WNW	1.56	2.4E-05	8.3E-06	2.2E-06	1.2E-06	1.1E-06
NW	1.56	2.6E-05	9.5E-06	2.5E-06	1.4E-06	1.3E-06
NNW	1.56	2.5E-05	8.6E-06	2.3E-06	1.3E-06	1.1E-06
N	1.56	2.5E-05	7.1E-06	1.8E-06	8.6E-07	7.6E-07

TABLE 2.3-98

50 PERCENTILE χ/Q VALUES AT THE LOW POPULATION ZONE

INTERMITTENT AVERAGING PERIODS
DATA PERIOD: 9/1/76 to 8/31/77

DATA SOURCE: ON-SITE DATA .
SENSOR HEIGHT: 10 METERS

ST. LUCIE, FLORIDA
FLORIDA POWER AND LIGHT CO.

RELATIVE CONCENTRATIONS (SEC/CUBIC METER)

AVERAGING PERIOD (HOURS)

AFFECTED SECTOR	DISTANCE (KM)	2	8	16	72	624
NNE	1.61	2.3E-05	7.7E-06	2.1E-06	1.1E-06	8.9E-07
NE	1.61	2.4E-05	8.8E-06	2.6E-06	1.2E-06	9.4E-07
ENE	1.61	2.9E-05	9.3E-06	2.7E-06	1.2E-06	9.4E-07
E	1.61	3.4E-05	1.1E-05	2.9E-06	1.2E-06	9.6E-07
ESE	1.61	3.4E-05	1.1E-05	3.0E-06	1.4E-06	1.2E-06
SE	1.61	2.8E-05	1.1E-05	3.2E-06	1.5E-06	9.4E-07
SSE	1.61	2.5E-05	1.1E-05	3.1E-06	1.3E-06	9.3E-07
S	1.61	1.2E-05	6.5E-06	2.0E-06	9.3E-07	6.6E-07
SSW	1.61	2.0E-05	6.1E-06	1.6E-06	5.9E-07	4.6E-07
SW	1.61	1.8E-05	6.4E-06	1.5E-06	6.1E-07	4.7E-07
WSW	1.61	1.8E-05	5.2E-06	1.6E-06	7.0E-07	5.6E-07
W	1.61	2.0E-05	5.4E-06	1.5E-06	5.6E-07	5.3E-07
WNW	1.61	2.3E-05	8.2E-06	2.3E-06	1.1E-06	1.2E-06
NW	1.61	2.5E-05	8.9E-06	2.5E-06	1.3E-06	1.1E-06
NNW	1.61	2.0E-05	7.8E-06	2.2E-06	1.2E-06	1.0E-06
N	1.61	2.7E-05	6.9E-06	1.7E-06	8.8E-07	6.6E-07

TABLE 2.3-99

50 PERCENTILE χ/Q VALUES AT THE LOW POPULATION ZONE

INTERMITTENT AVERAGING PERIODS
DATE PERIOD: 9/1/77 to 8/31/78

DATA SOURCE: ON-SOURCE DATA
SENSOR HEIGHT: 10 METERS

ST. LUCIE, FLORIDA
FLORIDA POWER AND LIGHT CO.

RELATIVE CONCENTRATIONS (SEC/CUBIC METER)

AVERAGING PERIOD (HOURS)

AFFECTED SECTOR	DISTANCE (KM)	2	8	16	72	624
NNE	1.61	2.1E-05	6.9E-06	1.9E-06	1.1E-06	9.3E-07
NE	1.61	2.8E-05	9.0E-06	2.5E-06	1.2E-06	1.1E-06
ENE	1.61	2.9E-05	8.5E-06	2.4E-06	1.1E-06	9.1E-07
E	1.61	2.8E-05	7.4E-06	2.0E-06	7.9E-07	8.0E-07
ESE	1.61	2.9E-05	8.2E-06	2.2E-06	1.1E-06	8.5E-07
SE	1.61	2.5E-05	8.1E-06	2.5E-06	1.1E-06	8.2E-07
SSE	1.61	2.3E-05	6.2E-06	1.7E-06	9.3E-07	6.6E-07
S	1.61	4.5E-05	5.6E-06	1.3E-06	6.4E-07	5.6E-07
SSW	1.61	1.8E-05	4.3E-06	1.2E-06	5.1E-07	5.4E-07
SW	1.61	1.1E-05	3.5E-06	1.0E-06	4.9E-07	5.4E-07
WSW	1.61	1.7E-05	5.0E-06	1.5E-06	7.9E-07	7.4E-07
W	1.61	2.0E-05	4.4E-06	1.4E-06	7.0E-07	5.6E-07
WNW	1.61	2.3E-05	6.6E-06	2.0E-06	1.0E-06	9.0E-07
NW	1.61	2.4E-05	8.1E-06	2.3E-06	1.2E-06	1.2E-06
NNW	1.61	2.5E-05	7.5E-06	2.2E-06	1.1E-06	1.1E-06
N	1.61	2.3E-05	5.9E-06	1.6E-06	8.3E-07	7.6E-07

TABLE 2.3-100

50 PERCENTILE χ/Q VALUES AT THE LOW POPULATION ZONE

INTERMITTENT AVERAGING PERIODS
DATA PERIOD: 9/1/76 to 8/31/78

DATA SOURCE: ON-SITE DATA
SENSOR HEIGHT: 10 METERS

ST. LUCIE, FLORIDA
FLORIDA POWER AND LIGHT CO.

RELATIVE CONCENTRATIONS (SEC/CUBIC METER)

AFFECTED SECTOR	DISTANCE (KM)	AVERAGING PERIOD (HOURS) 2	8	16	72	624
NNE	1.61	2.6E-06	7.3E-06	2.0E-06	1.1E-06	9.3E-07
NE	1.61	3.1E-06	8.9E-06	2.5E-06	1.2E-06	9.9E-07
ENE	1.61	4.5E-06	9.3E-06	2.5E-06	1.1E-06	9.1E-07
E	1.61	4.5E-06	9.2E-06	2.4E-06	1.0E-06	8.5E-07
ESE	1.61	4.5E-06	9.8E-06	2.6E-06	1.2E-06	9.5E-07
SE	1.61	3.5E-06	9.7E-06	2.8E-06	1.3E-06	8.0E-07
SSE	1.61	2.8E-06	8.7E-06	2.4E-06	1.1E-06	6.6E-07
S	1.61	1.2E-06	6.0E-06	1.6E-06	7.5E-07	5.8E-07
SSW	1.61	1.8E-06	5.4E-06	1.4E-06	5.4E-07	5.0E-07
SW	1.61	1.4E-06	4.5E-06	1.2E-06	5.5E-07	5.0E-07
WSW	1.61	1.9E-06	5.1E-06	1.5E-06	7.4E-07	6.1E-07
W	1.61	1.8E-05	4.9E-06	1.4E-06	6.4E-07	5.7E-07
WNW	1.61	2.6E-06	7.4E-06	2.1E-06	1.1E-06	1.1E-06
NW	1.61	3.1E-06	8.5E-06	2.4E-06	1.3E-06	1.2E-06
NNW	1.61	2.2E-06	7.6E-06	2.2E-06	1.2E-06	1.1E-06
N	1.61	2.2E-06	6.3E-06	1.7E-06	8.4E-07	7.3E-07

TABLE 2.3-101

Maximum Sector X/Q Values and Maximum 5 Percentile X/Q for Various Averaging Periods for the St. Lucie Site

	Averaging Period (Hours)				
September 1, 1976 to August 31, 1977	2	8	16	72	624
Maximum Sector X/Q Value					
at EAB[1]	1.1E-04	7.9E-05	1.7E-05	7.3E-06	3.1E-06
Sectors	SE	ESE	ENE	SE	SE
at LPZ[2]	1.1E-04	7.7E-05	1.5E-05	6.7E-05	3.1E-06
Sectors	SE	ESE	ENE,SE	SE	SE
September 1, 1977 to August 31, 1978					
Maximum Sector X/Q Value					
at EAB[1]	8.7E-05	5.6E-05	1.1E-05	5.8E-06	3.0E-06
Sectors	ENE,ESE,SE	ESE	ESE,SE	SE	SE
at LPZ[2]	8.5E-05	5.4E-06	1.0E-05	5.3E-06	3.0E-06
Sectors	ENE,ESE,SE	ESE	ESE,SE	ESE,SE	SE
September 1, 1976 to August 31, 1978					
Maximum Sector X/Q Value					
at EAB[1]	1.2E-04	6.8E-05	1.3E-05	6.3E-06	3.0E-06
Sectors	SE	ESE	ESE,SE	SE	SE
at LPZ[2]	1.1E-04	6.6E-05	1.2E-05	5.8E-06	3.0E-06
Sectors	SE	ESE	ESE,SE	SE	SE

[1] EAB = Exclusion Area Boundary

[2] LPZ = Low Population Zone

TABLE 2.3-102

FLORIDA POWER AND LIGHT CO.
ST. LUCIE UNIT 2
HUTCHINSON ISLAND, FLORIDA

TERRAIN CORRECTION FACTORS (PUFF / STRAIGHT LINE)
PERIOD OF RECORD : 8/29/77 TO 8/31/78

BASE DISTANCE IN MILES / KILOMETERS

AFID SECT	DESIGN DIST MI	.50 .80	1.50 2.41	2.50 4.02	3.50 5.63	4.50 7.24	7.50 12.07	15.00 24.13	25.00 40.22	35.00 56.32	45.00 72.40
NNE	0.	1.7E+00	1.4E+00	1.4E+00	1.3E+00	1.4E+00	1.3E+00	1.0E+00	6.6E-01	4.0E-01	2.3E-01
NE	0.	1.7E+00	1.4E+00	1.3E+00	1.2E+00	1.1E+00	1.0E+00	7.8E-01	3.8E-01	2.2E-01	1.3E-01
ENE	0.	1.3E+00	1.1E+00	1.0E+00	9.7E-01	8.9E-01	9.1E-01	5.8E-01	3.1E-01	1.8E-01	1.0E-01
E	0.	1.5E+00	1.2E+00	1.1E+00	1.1E+00	1.1E+00	1.0E+00	6.9E-01	3.8E-01	1.6E-01	5.6E-02
ESE	0.	1.6E+00	1.3E+00	1.2E+00	1.1E+00	9.6E-01	1.0E+00	5.7E-01	3.0E-01	1.6E-01	8.6E-02
SE	0.	1.7E+00	1.4E+00	1.4E+00	1.3E+00	1.3E+00	1.1E+00	1.0E+00	7.0E-01	4.0E-01	2.2E-01
SSE	0.	1.8E+00	1.3E+00	1.3E+00	1.2E+00	1.2E+00	1.1E+00	8.9E-01	5.7E-01	3.7E-01	2.3E-01
S	0.	1.5E+00	1.1E+00	1.1E+00	1.1E+00	1.0E+00	9.0E-01	6.5E-01	3.9E-01	2.1E-01	1.0E-01
SSW	0.	1.4E+00	1.2E+00	1.2E+00	1.1E+00	1.1E+00	9.4E-01	7.1E-01	4.2E-01	2.8E-01	1.8E-01
SW	0.	1.6E+00	1.2E+00	1.2E+00	1.1E+00	1.2E+00	1.1E+00	8.9E-01	4.5E-01	2.1E-01	9.1E-02
WSW	0.	1.4E+00	1.2E+00	1.1E+00	1.1E+00	1.0E+00	9.0E-01	7.1E-01	5.4E-01	3.6E-01	2.4E-01
W	0.	1.5E+00	1.2E+00	1.1E+00	1.1E+00	1.1E+00	9.9E-01	7.6E-01	3.8E-01	2.0E-01	9.9E-02
WNW	0.	1.6E+00	1.2E+00	1.1E+00	1.1E+00	1.0E+00	1.0E+00	8.7E-01	5.4E-01	3.0E-01	1.6E-01
NW	0.	1.5E+00	1.2E+00	1.1E+00	1.0E+00	9.8E-01	9.3E-01	7.2E-01	5.4E-01	3.5E-01	2.0E-01
NNW	0.	1.7E+00	1.3E+00	1.2E+00	1.1E+00	1.1E+00	9.8E-01	7.7E-01	4.5E-01	1.9E-01	6.9E-02
N	0.	1.7E+00	1.3E+00	1.3E+00	1.3E+00	1.2E+00	1.2E+00	1.1E+00	7.9E-01	4.2E-01	1.8E-01

TABLE 2.3-103

FLORIDA POWER AND LIGHT CO.
ST. LUCIE UNIT 2
HUTCHINSON ISLAND, FLORIDA

TERRAIN CORRECTION FACTORS (PUFF / STRAIGHT LINE)
PERIOD OF RECORD : 9/29/77 TO 8/31/78

BASE DISTANCE IN MILES / KILOMETERS

AFFD SECT	DESIGN DIST MI	.97	1.00
		1.56	1.61
NNE	0.	1.5E+00	1.5E+00
NE	0.	1.5E+00	1.5E+00
ENE	0.	1.2E+00	1.2E+00
E	0.	1.4E+00	1.4E+00
ESE	0.	1.4E+00	1.4E+00
SE	0.	1.6E+00	1.5E+00
SSE	0.	1.5E+00	1.5E+00
S	0.	1.2E+00	1.2E+00
SSW	0.	1.4E+00	1.4E+00
SW	0.	1.4E+00	1.4E+00
WSW	0.	1.3E+00	1.3E+00
W	0.	1.3E+00	1.3E+00
WNW	0.	1.4E+00	1.3E+00
NW	0.	1.3E+00	1.2E+00
NNW	0.	1.4E+00	1.3E+00
N	0.	1.4E+00	1.5E+00

TABLE 2.3-104

TERRAIN / RECIRCULATION ADJUSTED
FLORIDA POWER AND LIGHT CO.
ST. LUCIE UNIT 2
HUTCHINSON ISLAND, FLORIDA

AVERAGE ANNUAL RELATIVE CONCENTRATION (SEC./CUBIC METER)
PERIOD OF RECORD : 9/ 1/76 TO 8/31/78

BASE DISTANCE IN MILES / KILOMETERS

AFTD SECT	DESIGN DIST MI	.50 .80	1.50 2.41	2.50 4.02	3.50 5.63	4.50 7.24	7.50 12.07	15.00 24.13	25.00 40.22	35.00 56.32	45.00 72.40
NNE	0.	3.5E-06	5.8E-07	2.6E-07	1.6E-07	1.1E-07	5.0E-08	1.5E-08	5.1E-09	2.0E-09	8.2E-10
NE	0.	3.8E-06	6.6E-07	2.9E-07	1.6E-07	1.1E-07	4.7E-08	1.4E-08	3.4E-09	1.3E-09	5.7E-10
ENE	0.	2.6E-06	4.6E-07	2.2E-07	1.3E-07	8.0E-08	4.0E-08	9.8E-09	2.8E-09	1.0E-09	4.3E-10
E	0.	2.9E-06	4.8E-07	2.2E-07	1.3E-07	9.2E-08	4.2E-08	1.1E-08	3.0E-09	8.3E-10	2.1E-10
ESE	0.	3.6E-06	6.0E-07	2.8E-07	1.5E-07	9.6E-08	5.0E-08	1.1E-08	3.0E-09	1.1E-09	4.1E-10
SE	0.	4.3E-06	7.1E-07	3.3E-07	1.9E-07	1.4E-07	5.9E-08	2.1E-08	7.0E-09	2.8E-09	1.1E-09
SSE	0.	3.5E-06	5.3E-07	2.6E-07	1.5E-07	9.9E-08	4.4E-08	1.4E-08	4.7E-09	2.0E-09	8.9E-10
S	0.	2.1E-06	3.2E-07	1.5E-07	8.9E-08	6.0E-08	2.5E-08	7.2E-09	2.2E-09	7.5E-10	2.6E-10
SSW	0.	1.7E-06	2.9E-07	1.3E-07	8.0E-08	5.2E-08	2.3E-08	6.6E-09	2.0E-09	8.6E-10	4.2E-10
SW	0.	1.8E-06	2.9E-07	1.3E-07	7.5E-08	5.5E-08	2.3E-08	7.6E-09	2.0E-09	5.9E-10	1.9E-10
WSW	0.	2.1E-06	3.4E-07	1.5E-07	9.0E-08	6.0E-08	2.5E-08	7.9E-09	2.9E-09	1.3E-09	5.9E-10
W	0.	2.3E-06	3.7E-07	1.5E-07	9.2E-08	6.6E-08	2.9E-08	8.4E-09	2.2E-09	7.1E-10	2.6E-10
WNW	0.	4.2E-06	6.7E-07	2.9E-07	1.7E-07	1.1E-07	5.5E-08	1.7E-08	5.4E-09	2.0E-09	7.4E-10
NW	0.	4.5E-06	7.6E-07	3.3E-07	1.9E-07	1.3E-07	5.6E-08	1.7E-08	6.5E-09	2.7E-09	1.1E-09
NNW	0.	4.5E-06	7.1E-07	3.1E-07	1.8E-07	1.2E-07	5.4E-08	1.6E-08	4.9E-09	1.3E-09	3.5E-10
N	0.	2.8E-06	4.6E-07	2.0E-07	1.3E-07	8.5E-08	4.2E-08	1.4E-08	5.2E-09	1.8E-09	5.5E-10

NUMBER OF VALID OBSERVATIONS = 17135
NUMBER OF INVALID OBSERVATIONS = 385
NUMBER OF CALMS LOWER LEVEL = 95
NUMBER OF CALMS UPPER LEVEL = 0

TABLE 2.3-105

TERRAIN / RECIRCULATION ADJUSTED
FLORIDA POWER AND LIGHT CO.
ST. LUCIE UNIT 2
HUTCHINSON ISLAND, FLORIDA

AVERAGE ANNUAL RELATIVE CONCENTRATION DEPLETED (SEC/CUBIC METER)
PERIOD OF RECORD : 9/ 1/76 TO 8/31/78

BASE DISTANCE IN MILES / KILOMETERS

AFTD SECT	DESIGN DIST MI	.50 .80	1.50 2.41	2.50 4.02	3.50 5.63	4.50 7.24	7.50 12.07	15.00 24.13	25.00 40.22	35.00 56.32	45.00 72.40
NNE	0.	3.1E-06	4.8E-07	2.2E-07	1.2E-07	8.4E-08	3.5E-08	9.6E-09	2.8E-09	1.0E-09	3.9E-10
NE	0.	3.6E-06	5.5E-07	2.3E-07	1.3E-07	8.2E-08	3.3E-08	8.6E-09	1.9E-09	6.5E-10	2.6E-10
ENE	0.	2.5E-06	3.9E-07	1.8E-07	9.6E-08	6.0E-08	2.8E-08	6.3E-09	1.5E-09	5.2E-10	2.0E-10
E	0.	2.6E-06	4.1E-07	1.7E-07	9.7E-08	6.9E-08	2.9E-08	6.6E-09	1.7E-09	4.1E-10	1.0E-10
ESE	0.	3.3E-06	5.1E-07	2.2E-07	1.2E-07	7.2E-08	3.5E-08	6.9E-09	1.6E-09	5.3E-10	2.0E-10
SE	0.	4.0E-06	6.0E-07	2.6E-07	1.6E-07	1.0E-07	4.1E-08	1.2E-08	4.0E-09	1.4E-09	5.1E-10
SSE	0.	3.2E-06	4.6E-07	2.1E-07	1.1E-07	7.4E-08	3.1E-08	8.8E-09	2.6E-09	1.0E-09	4.1E-10
S	0.	1.9E-06	2.6E-07	1.2E-07	6.8E-08	4.6E-08	1.8E-08	4.4E-09	1.2E-09	3.7E-10	1.2E-10
SSW	0.	1.6E-06	2.5E-07	1.1E-07	6.1E-08	4.0E-08	1.6E-08	4.1E-09	1.1E-09	4.4E-10	2.0E-10
SW	0.	1.6E-06	2.4E-07	1.0E-07	5.8E-08	4.2E-08	1.6E-08	4.7E-09	1.1E-09	3.0E-10	8.7E-11
WSW	0.	1.9E-06	2.9E-07	1.2E-07	6.9E-08	4.5E-08	1.7E-08	4.6E-09	1.6E-09	6.2E-10	2.8E-10
W	0.	2.1E-06	3.2E-07	1.2E-07	7.1E-08	5.0E-08	2.0E-08	5.2E-09	1.2E-09	3.5E-10	1.2E-10
WNW	0.	3.8E-06	5.7E-07	2.3E-07	1.3E-07	8.4E-08	3.8E-08	1.0E-08	3.0E-09	9.8E-10	3.4E-10
NW	0.	4.0E-06	6.4E-07	2.6E-07	1.5E-07	9.4E-08	3.9E-08	1.0E-08	3.5E-09	1.3E-09	5.1E-10
NNW	0.	4.2E-06	6.0E-07	2.4E-07	1.5E-07	9.3E-08	3.7E-08	1.0E-08	2.6E-09	6.6E-10	1.7E-10
N	0.	2.5E-06	3.8E-07	1.6E-07	1.0E-07	6.3E-08	2.8E-08	8.6E-09	2.9E-09	8.8E-10	2.5E-10

NUMBER OF VALID OBSERVATIONS = 17135
NUMBER OF INVALID OBSERVATIONS = 385
NUMBER OF CALMS LOWER LEVEL = 95
NUMBER OF CALMS UPPER LEVEL = 0

TABLE 2.3-106

TERRAIN / RECIRCULATION ADJUSTED
FLORIDA POWER AND LIGHT CO.
ST. LUCIE UNIT 2
HUTCHINSON ISLAND, FLORIDA

AVERAGE ANNUAL RELATIVE DEPOSITION RATE (SQUARE METER -1)
PERIOD OF RECORD : 9/ 1/76 TO 8/31/78

BASE DISTANCE IN MILES / KILOMETERS

AFTD SECT	DESIGN DIST	.50	1.50	2.50	3.50	4.50	7.50	15.00	25.00	35.00	45.00
	MI	.80	2.41	4.02	5.63	7.24	12.07	24.13	40.22	56.32	72.40
NNE	0.	1.9E-08	2.7E-09	1.1E-09	5.8E-10	3.9E-10	1.5E-10	3.5E-11	8.6E-12	2.9E-12	1.0E-12
NE	0.	1.9E-08	2.5E-09	9.9E-10	4.9E-10	3.1E-10	1.1E-10	2.5E-11	4.9E-12	1.5E-12	5.5E-13
ENE	0.	9.9E-09	1.3E-09	5.5E-10	2.9E-10	1.7E-10	7.1E-11	1.3E-11	2.7E-12	8.4E-13	3.0E-13
E	0.	9.4E-09	1.2E-09	5.0E-10	2.7E-10	1.8E-10	6.8E-11	1.3E-11	2.7E-12	6.2E-13	1.3E-13
ESE	0.	1.2E-08	1.6E-09	6.4E-10	3.2E-10	1.8E-10	7.9E-11	1.3E-11	2.7E-12	7.7E-13	2.6E-13
SE	0.	2.1E-08	2.8E-09	1.2E-09	6.1E-10	3.8E-10	1.4E-10	3.7E-11	9.8E-12	3.0E-12	1.0E-12
SSE	0.	2.1E-08	2.5E-09	1.0E-09	5.6E-10	3.5E-10	1.3E-10	3.1E-11	8.0E-12	2.7E-12	1.0E-12
S	0.	1.5E-08	1.9E-09	7.9E-10	4.3E-10	2.7E-10	9.9E-11	2.0E-11	4.7E-12	1.3E-12	4.0E-13
SSW	0.	1.0E-08	1.5E-09	6.2E-10	3.3E-10	2.0E-10	7.2E-11	1.6E-11	3.6E-12	1.3E-12	5.3E-13
SW	0.	1.4E-08	1.9E-09	7.5E-10	4.0E-10	2.8E-10	9.9E-11	2.4E-11	4.9E-12	1.2E-12	3.2E-13
WSW	0.	1.6E-08	2.2E-09	8.6E-10	4.7E-10	3.0E-10	1.1E-10	2.4E-11	7.0E-12	2.6E-12	1.0E-12
W	0.	1.5E-08	2.1E-09	7.9E-10	4.2E-10	2.9E-10	1.1E-10	2.3E-11	4.6E-12	1.3E-12	4.0E-13
WNW	0.	2.7E-08	3.5E-09	1.3E-09	7.2E-10	4.5E-10	1.9E-10	4.5E-11	1.1E-11	3.3E-12	1.0E-12
NW	0.	2.5E-08	3.4E-09	1.3E-09	6.9E-10	4.1E-10	1.6E-10	3.6E-11	1.1E-11	3.5E-12	1.3E-12
NNW	0.	2.7E-08	3.3E-09	1.3E-09	7.0E-10	4.4E-10	1.6E-10	3.6E-11	8.0E-12	1.9E-12	4.2E-13
N	0.	1.5E-08	2.0E-09	8.2E-10	4.7E-10	2.9E-10	1.2E-10	3.1E-11	8.7E-12	2.4E-12	6.3E-13

NUMBER OF VALID OBSERVATIONS = 17135
NUMBER OF INVALID OBSERVATIONS = 385
NUMBER OF CALMS LOWER LEVEL = 95
NUMBER OF CALMS UPPER LEVEL = 0

TABLE 2.3-107

TERRAIN / RECIRCULATION ADJUSTED
FLORIDA POWER AND LIGHT CO.
ST. LUCIE UNIT 2
HUTCHINSON ISLAND, FLORIDA

AVERAGE ANNUAL RELATIVE CONCENTRATION (SEC./CUBIC METER)
PERIOD OF RECORD : 9/ 1/76 TO 8/31/77

BASE DISTANCE IN MILES / KILOMETERS

AFFD SECT	DESIGN DIST MI	.50	1.50	2.50	3.50	4.50	7.50	15.00	25.00	35.00	45.00
		.80	2.41	4.02	5.63	7.24	12.07	24.13	40.22	56.32	72.40
NNE	0.	3.1E-06	5.4E-07	2.4E-07	1.4E-07	1.0E-07	4.7E-08	1.4E-08	4.8E-09	1.9E-09	7.8E-10
NE	0.	3.8E-06	6.5E-07	2.9E-07	1.5E-07	1.1E-07	4.6E-08	1.3E-08	3.3E-09	1.2E-09	5.5E-10
ENE	0.	2.8E-06	4.8E-07	2.2E-07	1.3E-07	8.2E-08	4.1E-08	1.0E-08	2.8E-09	1.1E-09	4.4E-10
E	0.	3.0E-06	5.3E-07	2.4E-07	1.4E-07	1.0E-07	4.6E-08	1.2E-08	3.3E-09	9.1E-10	2.4E-10
ESE	0.	3.8E-06	6.2E-07	2.9E-07	1.6E-07	1.1E-07	5.2E-08	1.1E-08	3.3E-09	1.1E-09	4.4E-10
SE	0.	4.3E-06	7.2E-07	3.3E-07	1.9E-07	1.4E-07	5.9E-08	2.1E-08	7.7E-09	2.8E-09	1.1E-09
SSE	0.	4.2E-06	6.3E-07	3.0E-07	1.7E-07	1.2E-07	5.2E-08	1.7E-08	5.6E-09	2.4E-09	1.1E-09
S	0.	2.2E-06	3.2E-07	1.5E-07	9.2E-08	6.3E-08	2.6E-08	7.2E-09	2.2E-09	7.7E-10	2.7E-10
SSW	0.	1.6E-06	2.8E-07	1.3E-07	7.5E-08	4.9E-08	2.1E-08	6.1E-09	1.8E-09	7.8E-10	3.8E-10
SW	0.	1.6E-06	2.6E-07	1.2E-07	6.8E-08	5.1E-08	2.1E-08	6.8E-09	1.7E-09	5.3E-10	1.6E-10
WSW	0.	1.9E-06	3.1E-07	1.3E-07	7.9E-08	5.4E-08	2.2E-08	6.7E-09	2.5E-09	1.1E-09	5.2E-10
W	0.	2.3E-06	3.9E-07	1.7E-07	9.5E-08	6.9E-08	3.0E-08	8.4E-09	2.2E-09	7.5E-10	2.7E-10
WNW	0.	4.4E-06	7.0E-07	3.0E-07	1.7E-07	1.1E-07	5.7E-08	1.8E-08	5.9E-09	2.0E-09	7.9E-10
NW	0.	4.5E-06	7.6E-07	3.3E-07	1.9E-07	1.3E-07	5.6E-08	1.7E-08	6.5E-09	2.7E-09	1.1E-09
NNW	0.	4.2E-06	6.6E-07	2.9E-07	1.7E-07	1.2E-07	5.1E-08	1.5E-08	4.5E-09	1.3E-09	3.4E-10
N	0.	2.7E-06	4.5E-07	2.0E-07	1.3E-07	8.5E-08	4.2E-08	1.4E-08	5.2E-09	1.8E-09	5.5E-10

NUMBER OF VALID OBSERVATIONS = 8459
NUMBER OF INVALID OBSERVATIONS = 301
NUMBER OF CALMS LOWER LEVEL = 46
NUMBER OF CALMS UPPER LEVEL = 0

TABLE 2.3-108

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TERRAIN / RECIRCULATION ADJUSTED
      FLORIDA POWER AND LIGHT CO.
      ST. LUCIE UNIT 2
    . HUTCHINSON ISLAND, FLORIDA


 AVERAGE ANNUAL RELATIVE CONCENTRATION  DEPLETED  (SEC/CUBIC METER)
   PERIOD OF RECORD :  9/ 1/76   TO  8/31/77


                      BASE DISTANCE IN MILES / KILOMETERS

AFTD  DESIGN
SECT   DIST      .50     1.50     2.50     3.50     4.50     7.50    15.00    25.00    35.00    45.00
        MI       .80     2.41     4.02     5.63     7.24    12.07    24.13    40.22    56.32    72.40

NNE   0.       3.0E-06 4.5E-07 1.9E-07 1.1E-07 7.9E-08 3.3E-08 9.0E-09 2.7E-09 9.7E-10 3.7E-10

NE    0.       3.4E-06 5.4E-07 2.2E-07 1.2E-07 7.9E-08 3.2E-08 8.6E-09 1.8E-09 6.3E-10 2.5E-10

ENE   0.       2.5E-06 4.0E-07 1.8E-07 9.7E-08 6.2E-08 2.8E-08 6.3E-09 1.5E-09 5.2E-10 2.0E-10

E     0.       2.7E-06 4.4E-07 1.8E-07 1.1E-07 7.6E-08 3.1E-08 6.9E-09 1.8E-09 4.5E-10 1.1E-10

ESE   0.       3.5E-06 5.3E-07 2.3E-07 1.3E-07 7.6E-08 3.6E-08 7.5E-09 1.7E-09 5.6E-10 2.1E-10

SE    0.       4.0E-06 6.1E-07 2.8E-07 1.6E-07 1.0E-07 4.1E-08 1.4E-08 4.1E-09 1.4E-09 5.1E-10

SSE   0.       3.9E-06 5.3E-07 2.4E-07 1.3E-07 8.7E-08 3.6E-08 1.1E-08 3.1E-09 1.2E-09 5.0E-10

S     0.       1.9E-06 2.7E-07 1.2E-07 7.0E-08 4.7E-08 1.8E-08 4.4E-09 1.2E-09 4.0E-10 1.3E-10

SSW   0.       1.4E-06 2.3E-07 1.0E-07 5.8E-08 3.6E-08 1.4E-08 3.8E-09 1.0E-09 3.9E-10 1.8E-10

SW    0.       1.5E-06 2.2E-07 9.4E-08 5.4E-08 3.7E-08 1.5E-08 4.2E-09 9.3E-10 2.7E-10 7.8E-11

WSW   0.       1.7E-06 2.6E-07 1.1E-07 6.2E-08 4.0E-08 1.5E-08 4.1E-09 1.4E-09 5.5E-10 2.4E-10

W     0.       2.1E-06 3.4E-07 1.3E-07 7.4E-08 5.2E-08 2.1E-08 5.4E-09 1.2E-09 3.7E-10 1.3E-10

WNW   0.       3.9E-06 5.9E-07 2.5E-07 1.4E-07 8.8E-08 4.0E-08 1.1E-08 3.2E-09 1.0E-09 3.7E-10

NW    0.       4.0E-06 6.4E-07 2.6E-07 1.5E-07 9.4E-08 4.0E-08 1.0E-08 3.5E-09 1.4E-09 5.1E-10

NNW   0.       3.9E-06 5.6E-07 2.3E-07 1.4E-07 8.8E-08 3.5E-08 9.2E-09 2.5E-09 6.5E-10 1.6E-10

N     0.       2.5E-06 3.8E-07 1.6E-07 9.9E-08 6.3E-08 2.6E-08 8.7E-09 2.9E-09 8.8E-10 2.5E-10


NUMBER OF VALID OBSERVATIONS   =        8459
NUMBER OF INVALID OBSERVATIONS =         301
NUMBER OF CALMS LOWER LEVEL =       46
NUMBER OF CALMS UPPER LEVEL =        0
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TABLE 2.3-109

TERRAIN / RECIRCULATION ADJUSTED
FLORIDA POWER AND LIGHT CO.
ST. LUCIE UNIT 2
HUTCHINSON ISLAND, FLORIDA

AVERAGE ANNUAL RELATIVE DEPOSITION RATE (SQUARE METER -1)
PERIOD OF RECORD : 9/ 1/76 TO 8/31/77

BASE DISTANCE IN MILES / KILOMETERS

AFTD SECT	DESIGN DIST MI	.50 .80	1.50 2.41	2.50 4.02	3.50 5.63	4.50 7.24	7.50 12.07	15.00 24.13	25.00 40.22	35.00 56.32	45.00 72.40
NNE	0.	1.9E-08	2.5E-09	1.0E-09	5.6E-10	3.8E-10	1.4E-10	3.4E-11	8.6E-12	2.8E-12	9.8E-13
NE	0.	2.1E-08	2.7E-09	1.1E-09	5.4E-10	3.4E-10	1.2E-10	2.7E-11	5.3E-12	1.6E-12	6.1E-13
ENE	0.	1.1E-08	1.5E-09	5.9E-10	3.1E-10	1.9E-10	7.7E-11	1.4E-11	3.0E-12	9.1E-13	3.3E-13
E	0.	8.2E-09	1.1E-09	4.3E-10	2.3E-10	1.6E-10	5.9E-11	1.1E-11	2.4E-12	5.4E-13	1.2E-13
ESE	0.	1.1E-08	1.5E-09	6.0E-10	3.0E-10	1.7E-10	7.4E-11	1.2E-11	2.5E-12	7.2E-13	2.4E-13
SE	0.	1.9E-08	2.7E-09	1.1E-09	5.7E-10	3.7E-10	1.4E-10	3.5E-11	9.1E-12	2.8E-12	9.8E-13
SSE	0.	2.3E-08	2.7E-09	1.1E-09	6.1E-10	3.8E-10	1.4E-10	3.4E-11	8.6E-12	3.0E-12	1.1E-12
S	0.	1.0E-08	2.2E-09	9.2E-10	5.0E-10	3.1E-10	1.1E-10	2.4E-11	5.5E-12	1.6E-12	4.7E-13
SSW	0.	9.5E-09	1.3E-09	5.5E-10	3.0E-10	1.8E-10	6.5E-11	1.4E-11	3.2E-12	1.1E-12	4.0E-13
SW	0.	1.2E-08	1.5E-09	6.2E-10	3.3E-10	2.3E-10	8.2E-11	1.9E-11	3.9E-12	9.9E-13	2.6E-13
WSW	0.	1.4E-08	2.0E-09	8.1E-10	4.4E-10	2.8E-10	9.9E-11	2.2E-11	6.4E-12	2.4E-12	9.7E-13
W	0.	1.5E-08	2.1E-09	8.1E-10	4.3E-10	3.0E-10	1.1E-10	2.4E-11	4.6E-12	1.3E-12	4.1E-13
WNW	0.	3.0E-08	3.8E-09	1.4E-09	7.9E-10	4.9E-10	2.1E-10	4.9E-11	1.2E-11	3.6E-12	1.1E-12
NW	0.	2.5E-08	3.4E-09	1.3E-09	7.0E-10	4.2E-10	1.7E-10	3.7E-11	1.1E-11	3.9E-12	1.3E-12
NNW	0.	2.7E-08	3.3E-09	1.3E-09	7.1E-10	4.5E-10	1.7E-10	3.7E-11	8.5E-12	1.9E-12	4.3E-13
N	0.	1.3E-08	1.9E-09	7.2E-10	4.1E-10	2.6E-10	1.0E-10	2.6E-11	7.6E-12	2.1E-12	5.6E-13

NUMBER OF VALID OBSERVATIONS = 8459
NUMBER OF INVALID OBSERVATIONS = 301
NUMBER OF CALMS LOWER LEVEL = 46
NUMBER OF CALMS UPPER LEVEL = 0

TABLE 2.3-110

TERRAIN / RECIRCULATION ADJUSTED
FLORIDA POWER AND LIGHT CO.
ST. LUCIE UNIT 2
HUTCHINSON ISLAND, FLORIDA

AVERAGE ANNUAL RELATIVE CONCENTRATION (SEC./CUBIC METER)
PERIOD OF RECORD : 9/ 1/77 TO 8/31/78

BASE DISTANCE IN MILES / KILOMETERS

AFTD SECT	DESIGN DIST MI	.50 .80	1.50 2.41	2.50 4.02	3.50 5.63	4.50 7.24	7.50 12.07	15.00 24.13	25.00 40.22	35.00 56.32	45.00 72.40
NNE	0.	3.7E-06	6.1E-07	2.9E-07	1.7E-07	1.2E-07	5.4E-08	1.6E-08	5.4E-09	2.1E-09	8.9E-10
NE	0.	3.9E-06	6.0E-07	3.0E-07	1.6E-07	1.1E-07	4.9E-08	1.4E-08	3.6E-09	1.3E-09	5.8E-10
ENE	0.	2.6E-06	4.4E-07	2.1E-07	1.2E-07	7.7E-08	3.8E-08	9.8E-09	2.7E-09	1.0E-09	4.2E-10
E	0.	2.6E-06	4.3E-07	1.9E-07	1.2E-07	8.4E-08	3.8E-08	9.7E-09	2.7E-09	7.5E-10	1.9E-10
ESE	0.	3.5E-06	5.7E-07	2.7E-07	1.5E-07	9.2E-08	4.8E-08	1.1E-08	2.9E-09	1.0E-09	4.0E-10
SE	0.	4.3E-06	6.9E-07	3.3E-07	1.9E-07	1.3E-07	5.8E-08	2.1E-08	7.0E-09	2.7E-09	1.1E-09
SSE	0.	2.8E-06	4.4E-07	2.1E-07	1.2E-07	8.1E-08	3.6E-08	1.2E-08	3.9E-09	1.6E-09	7.3E-10
S	0.	1.9E-06	3.1E-07	1.4E-07	8.6E-08	5.9E-08	2.5E-08	7.2E-09	2.2E-09	7.5E-10	2.6E-10
SSW	0.	1.7E-06	2.9E-07	1.4E-07	8.3E-08	5.5E-08	2.4E-08	7.0E-09	2.1E-09	9.1E-10	4.4E-10
SW	0.	2.1E-06	3.1E-07	1.4E-07	8.2E-08	6.0E-08	2.5E-08	8.3E-09	2.1E-09	6.5E-10	2.1E-10
WSW	0.	2.3E-06	3.8E-07	1.6E-07	9.9E-08	6.6E-08	2.8E-08	8.6E-09	3.2E-09	1.4E-09	6.6E-10
W	0.	2.3E-06	3.6E-07	1.5E-07	8.8E-08	6.4E-08	2.7E-08	7.6E-09	2.0E-09	6.7E-10	2.5E-10
WNW	0.	4.1E-06	6.6E-07	2.8E-07	1.6E-07	1.1E-07	5.3E-08	1.7E-08	5.2E-09	1.9E-09	7.1E-10
NW	0.	4.6E-06	7.8E-07	3.3E-07	1.9E-07	1.3E-07	5.6E-08	1.7E-08	6.5E-09	2.7E-09	1.1E-09
NNW	0.	4.9E-06	7.6E-07	3.3E-07	1.9E-07	1.3E-07	5.7E-08	1.7E-08	4.9E-09	1.4E-09	3.7E-10
N	0.	2.8E-06	4.6E-07	2.1E-07	1.3E-07	8.5E-08	4.2E-08	1.4E-08	5.1E-09	1.8E-09	5.3E-10

NUMBER OF VALID OBSERVATIONS = 8676
NUMBER OF INVALID OBSERVATIONS = 84
NUMBER OF CALMS LOWER LEVEL = 49
NUMBER OF CALMS UPPER LEVEL = 0

TERRAIN / RECIRCULATION ADJUSTED
FLORIDA POWER AND LIGHT CO.
ST. LUCIE UNIT 2
HUTCHINSON ISLAND, FLORIDA

AVERAGE ANNUAL RELATIVE CONCENTRATION DEPLETED (SEC/CUBIC METER)
PERIOD OF RECORD : 9/ 1/77 TO 8/31/78

BASE DISTANCE IN MILES / KILOMETERS

AFFD SECT	DESIGN DIST MI	.50 .80	1.50 2.41	2.50 4.02	3.50 5.63	4.50 7.24	7.50 12.07	15.00 24.13	25.00 40.22	35.00 56.32	45.00 72.40
NNE	0.	3.5E-06	5.2E-07	2.3E-07	1.3E-07	8.9E-08	3.8E-08	1.0E-08	3.0E-09	1.1E-09	4.1E-10
NE	0.	3.6E-06	5.8E-07	2.3E-07	1.3E-07	8.4E-08	3.4E-08	8.6E-09	1.9E-09	6.7E-10	2.8E-10
ENE	0.	2.4E-06	3.7E-07	1.7E-07	9.2E-08	5.8E-08	2.7E-08	5.8E-09	1.5E-09	5.0E-10	1.9E-10
E	0.	2.4E-06	3.7E-07	1.6E-07	8.7E-08	6.3E-08	2.6E-08	6.0E-09	1.5E-09	3.8E-10	9.0E-11
ESE	0.	3.3E-06	4.8E-07	2.1E-07	1.2E-07	6.9E-08	3.3E-08	6.9E-09	1.6E-09	5.2E-10	1.9E-10
SE	0.	4.0E-06	6.0E-07	2.6E-07	1.4E-07	1.0E-07	4.0E-08	1.2E-08	3.9E-09	1.4E-09	5.1E-10
SSE	0.	2.7E-06	3.8E-07	1.7E-07	9.3E-08	6.0E-08	2.6E-08	7.2E-09	2.1E-09	8.2E-10	3.4E-10
S	0.	1.8E-06	2.5E-07	1.2E-07	6.7E-08	4.5E-08	1.7E-08	4.3E-09	1.2E-09	3.7E-10	1.2E-10
SSW	0.	1.6E-06	2.6E-07	1.1E-07	6.4E-08	4.1E-08	1.6E-08	4.3E-09	1.2E-09	4.7E-10	2.0E-10
SW	0.	1.9E-06	2.6E-07	1.1E-07	6.4E-08	4.6E-08	1.8E-08	5.1E-09	1.2E-09	3.4E-10	1.0E-10
WSW	0.	2.1E-06	3.2E-07	1.3E-07	7.7E-08	5.0E-08	1.9E-08	5.1E-09	1.7E-09	6.9E-10	3.1E-10
W	0.	1.9E-06	2.1E-07	1.2E-07	6.8E-08	4.7E-08	1.9E-08	4.9E-09	1.1E-09	3.3E-10	1.1E-10
WNW	0.	3.8E-06	5.6E-07	2.2E-07	1.3E-07	8.2E-08	3.6E-08	1.0E-08	2.8E-09	9.5E-10	3.3E-10
NW	0.	4.2E-06	6.5E-07	2.6E-07	1.5E-07	9.4E-08	3.9E-08	1.0E-08	3.5E-09	1.3E-09	5.1E-10
NNW	0.	4.4E-06	6.5E-07	2.7E-07	1.5E-07	9.9E-08	4.0E-08	1.1E-08	2.8E-09	7.0E-10	1.7E-10
N	0.	2.7E-06	4.0E-07	1.6E-07	1.0E-07	6.3E-08	2.8E-08	8.6E-09	2.8E-09	8.8E-10	2.5E-10

NUMBER OF VALID OBSERVATIONS = 8676
NUMBER OF INVALID OBSERVATIONS = 84
NUMBER OF CALMS LOWER LEVEL = 49
NUMBER OF CALMS UPPER LEVEL = 0

TABLE 2.3-112

TERRAIN / RECIRCULATION ADJUSTED
FLORIDA POWER AND LIGHT CO.
ST. LUCIE UNIT 2
HUTCHINSON ISLAND, FLORIDA

AVERAGE ANNUAL RELATIVE DEPOSITION RATE (SQUARE METER -1)
PERIOD OF RECORD : 9/ 1/77 TO 8/31/78

BASE DISTANCE IN MILES / KILOMETERS

AFFD SECT	DESIGN DIST MI	.50 .80	1.50 2.41	2.50 4.02	3.50 5.63	4.50 7.24	7.50 12.07	15.00 24.13	25.00 40.22	35.00 56.32	45.00 72.40
NNE	0.	2.1E-08	2.7E-09	1.1E-09	5.9E-10	4.1E-10	1.5E-10	3.6E-11	9.3E-12	3.0E-12	1.1E-12
NE	0.	1.7E-08	2.3E-09	9.1E-10	4.5E-10	2.8E-10	1.0E-10	2.3E-11	4.5E-12	1.3E-12	5.1E-13
ENE	0.	9.0E-09	1.2E-09	5.0E-10	2.6E-10	1.5E-10	6.4E-11	1.2E-11	2.5E-12	7.7E-13	2.8E-13
E	0.	1.1E-08	1.5E-09	5.6E-10	3.0E-10	2.1E-10	7.7E-11	1.5E-11	3.1E-12	7.0E-13	1.5E-13
ESE	0.	1.3E-08	1.6E-09	6.8E-10	3.4E-10	2.0E-10	8.4E-11	1.4E-11	2.8E-12	8.0E-13	2.7E-13
SE	0.	2.2E-08	3.0E-09	1.2E-09	6.5E-10	4.1E-10	1.5E-10	4.0E-11	1.1E-11	3.2E-12	1.1E-12
SSE	0.	1.8E-08	2.2E-09	9.5E-10	5.0E-10	3.1E-10	1.2E-10	2.8E-11	6.9E-12	2.5E-12	9.3E-13
S	0.	1.3E-08	1.5E-09	6.6E-10	3.6E-10	2.3E-10	8.0E-11	1.7E-11	3.9E-12	1.1E-12	3.3E-13
SSW	0.	1.2E-08	1.7E-09	6.8E-10	3.6E-10	2.2E-10	8.0E-11	1.7E-11	4.0E-12	1.4E-12	5.9E-13
SW	0.	1.6E-08	2.1E-09	8.8E-10	4.7E-10	3.3E-10	1.2E-10	2.7E-11	5.3E-12	1.4E-12	3.7E-13
WSW	0.	1.7E-08	2.4E-09	9.2E-10	5.0E-10	3.2E-10	1.2E-10	2.6E-11	7.5E-12	2.7E-12	1.1E-12
W	0.	1.5E-08	2.0E-09	7.7E-10	4.1E-10	2.8E-10	9.9E-11	2.3E-11	4.6E-12	1.2E-12	3.9E-13
WNW	0.	2.5E-08	3.2E-09	1.2E-09	6.6E-10	4.1E-10	1.7E-10	4.1E-11	1.0E-11	2.9E-12	9.6E-13
NW	0.	2.4E-08	3.3E-09	1.2E-09	6.8E-10	4.1E-10	1.6E-10	3.5E-11	1.0E-11	3.5E-12	1.3E-12
NNW	0.	2.7E-08	3.3E-09	1.3E-09	6.9E-10	4.4E-10	1.6E-10	3.6E-11	8.0E-12	1.9E-12	4.2E-13
N	0.	1.7E-08	2.2E-09	9.2E-10	5.2E-10	3.3E-10	1.3E-10	3.4E-11	9.5E-12	2.7E-12	7.2E-13

NUMBER OF VALID OBSERVATIONS = 8676
NUMBER OF INVALID OBSERVATIONS = 84
NUMBER OF CALMS LOWER LEVEL = 49

TABLE 2.3-113

TERRAIN / RECIRCULATION ADJUSTED
FLORIDA POWER AND LIGHT CO.
ST. LUCIE UNIT 2
HUTCHINSON ISLAND, FLORIDA

AVERAGE ANNUAL RELATIVE CONCENTRATION (SEC./CUBIC METER)

PERIOD OF RECORD		9/ 1/76 TO 8/31/77		9/ 1/77 TO 8/31/78		9/ 1/76 TO 8/31/78	
		BASE DISTANCE IN MILES / KILOMETERS					
AFFD SECT	DESIGN DIST MI	.97 1.56	1.00 1.61	.97 1.56	1.00 1.61	.97 1.56	1.00 1.61
NNE	0.	1.1E-06	1.0E-06	1.2E-06	1.2E-06	1.2E-06	1.1E-06
NE	0.	1.3E-06	1.2E-06	1.4E-06	1.3E-06	1.3E-06	1.3E-06
ENE	0.	9.6E-07	9.1E-07	8.9E-07	8.4E-07	9.3E-07	8.8E-07
E	0.	1.1E-06	1.0E-06	9.1E-07	8.7E-07	9.9E-07	9.5E-07
ESE	0.	1.3E-06	1.2E-06	1.2E-06	1.1E-06	1.2E-06	1.2E-06
SE	0.	1.5E-06	1.4E-06	1.4E-06	1.4E-06	1.5E-06	1.4E-06
SSE	0.	1.4E-06	1.3E-06	9.4E-07	8.8E-07	1.1E-06	1.1E-06
S	0.	6.8E-07	6.4E-07	6.3E-07	5.9E-07	6.5E-07	6.2E-07
SSW	0.	5.7E-07	5.4E-07	6.2E-07	5.9E-07	6.0E-07	5.7E-07
SW	0.	5.5E-07	5.2E-07	6.6E-07	6.3E-07	6.1E-07	5.7E-07
WSW	0.	6.2E-07	5.9E-07	7.7E-07	7.5E-07	7.1E-07	6.7E-07
W	0.	7.9E-07	7.6E-07	7.5E-07	7.1E-07	7.7E-07	7.4E-07
WNW	0.	1.5E-06	1.3E-06	1.4E-06	1.3E-06	1.4E-06	1.3E-06
NW	0.	1.6E-06	1.4E-06	1.6E-06	1.4E-06	1.6E-06	1.4E-06
NNW	0.	1.4E-06	1.3E-06	1.5E-06	1.5E-06	1.4E-06	1.3E-06
N	0.	9.0E-07	8.9E-07	9.4E-07	9.2E-07	9.3E-07	9.0E-07

NUMBER OF VALID OBSERVATIONS =	8459	8676	17135
NUMBER OF INVALID OBSERVATIONS =	301	84	385
NUMBER OF CALMS LOWER LEVEL =	46	49	95
NUMBER OF CALMS UPPER LEVEL =	0	0	0

TABLE 2.3-114

TERRAIN / RECIRCULATION ADJUSTED
FLORIDA POWER AND LIGHT CO.
ST. LUCIE UNIT 2
HUTCHINSON ISLAND, FLORIDA

AVERAGE ANNUAL RELATIVE CONCENTRATION DEPLETED (SEC/CUBIC METER)

PERIOD OF RECORD 9/ 1/76 TO 8/31/77 9/ 1/77 TO 8/31/78 9/ 1/76 TO 8/31/78

BASE DISTANCE IN MILES / KILOMETERS

AFTD SECT	DESIGN DIST MI	9/ 1/76 TO 8/31/77		9/ 1/77 TO 8/31/78		9/ 1/76 TO 8/31/78	
		.97 1.56	1.00 1.61	.97 1.56	1.00 1.61	.97 1.56	1.00 1.61
NNE	0.	9.5E-07	8.9E-07	1.1E-06	1.0E-06	1.0E-06	9.7E-07
NE	0.	1.1E-06	1.1E-06	1.2E-06	1.1E-06	1.1E-06	1.1E-06
ENE	0.	8.4E-07	8.0E-07	7.8E-07	7.4E-07	8.1E-07	7.7E-07
E	0.	9.4E-07	8.9E-07	7.9E-07	7.6E-07	8.7E-07	8.3E-07
ESE	0.	1.1E-06	1.0E-06	1.0E-06	9.7E-07	1.1E-06	1.0E-06
SE	0.	1.3E-06	1.2E-06	1.3E-06	1.2E-06	1.3E-06	1.2E-06
SSE	0.	1.2E-06	1.1E-06	8.2E-07	7.6E-07	1.0E-06	9.4E-07
S	0.	6.0E-07	5.6E-07	5.5E-07	5.2E-07	5.7E-07	5.4E-07
SSW	0.	5.1E-07	4.8E-07	5.3E-07	5.2E-07	5.2E-07	5.0E-07
SW	0.	4.8E-07	4.6E-07	5.8E-07	5.6E-07	5.3E-07	5.0E-07
WSW	0.	5.4E-07	5.2E-07	6.8E-07	6.4E-07	6.2E-07	5.9E-07
W	0.	6.9E-07	6.6E-07	6.5E-07	6.3E-07	6.7E-07	6.4E-07
WNW	0.	1.3E-06	1.2E-06	1.3E-06	1.1E-06	1.3E-06	1.2E-06
NW	0.	1.3E-06	1.2E-06	1.4E-06	1.2E-06	1.3E-06	1.2E-06
NNW	0.	1.2E-06	1.1E-06	1.4E-06	1.3E-06	1.3E-06	1.2E-06
N	0.	7.9E-07	7.7E-07	8.3E-07	8.0E-07	8.2E-07	7.9E-07

NUMBER OF VALID OBSERVATIONS =	8459	8678	17135
NUMBER OF INVALID OBSERVATIONS =	301	84	385
NUMBER OF CALMS LOWER LEVEL =	46	49	95
NUMBER OF CALMS UPPER LEVEL =	0	0	0

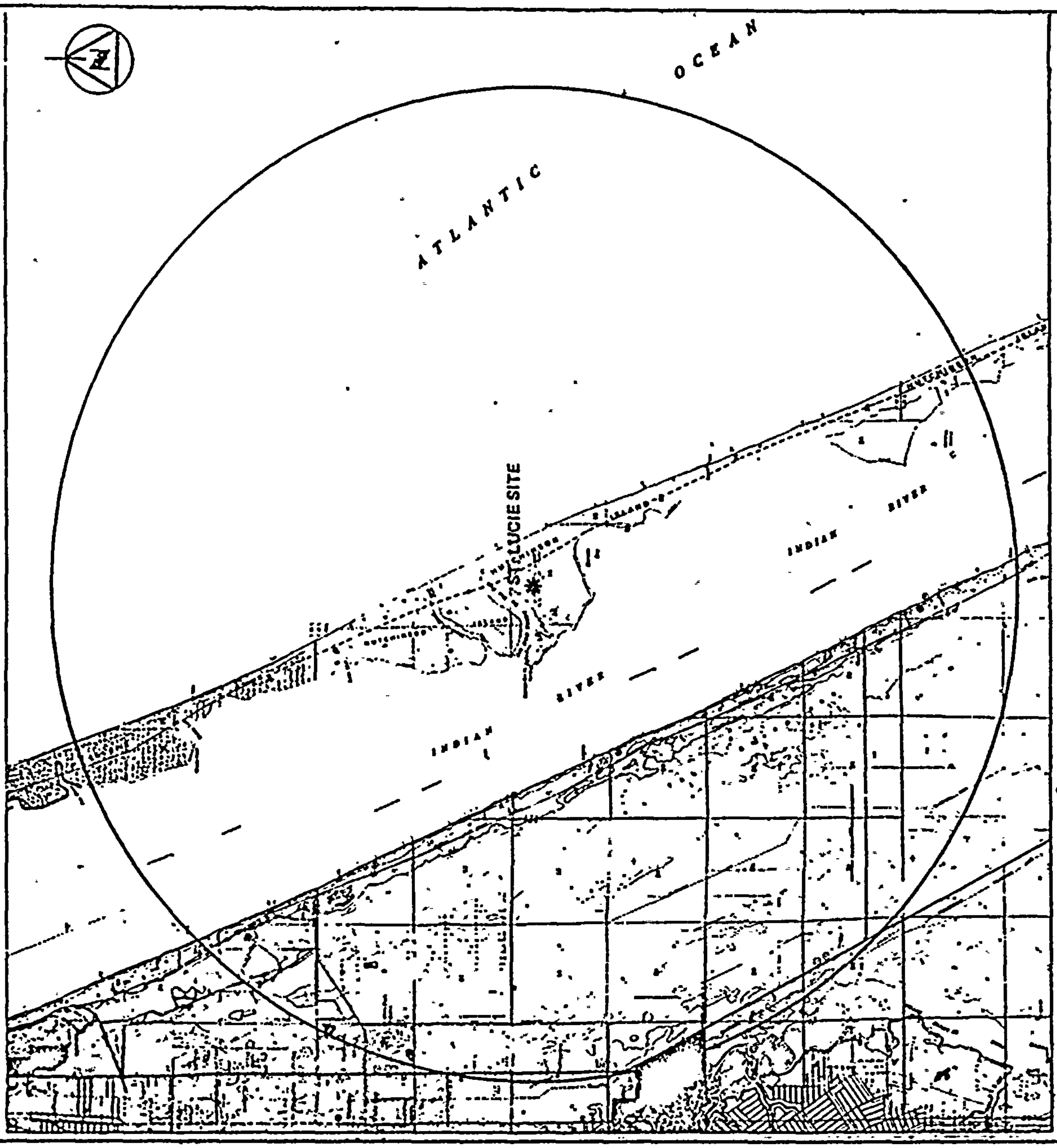
TABLE 2.3-115

TERRAIN / RECIRCULATION ADJUSTED
FLORIDA POWER AND LIGHT CO.
ST. LUCIE UNIT 2
HUTCHINSON ISLAND, FLORIDA

AVERAGE ANNUAL RELATIVE DEPOSITION RATE (SQUARE METER -1)

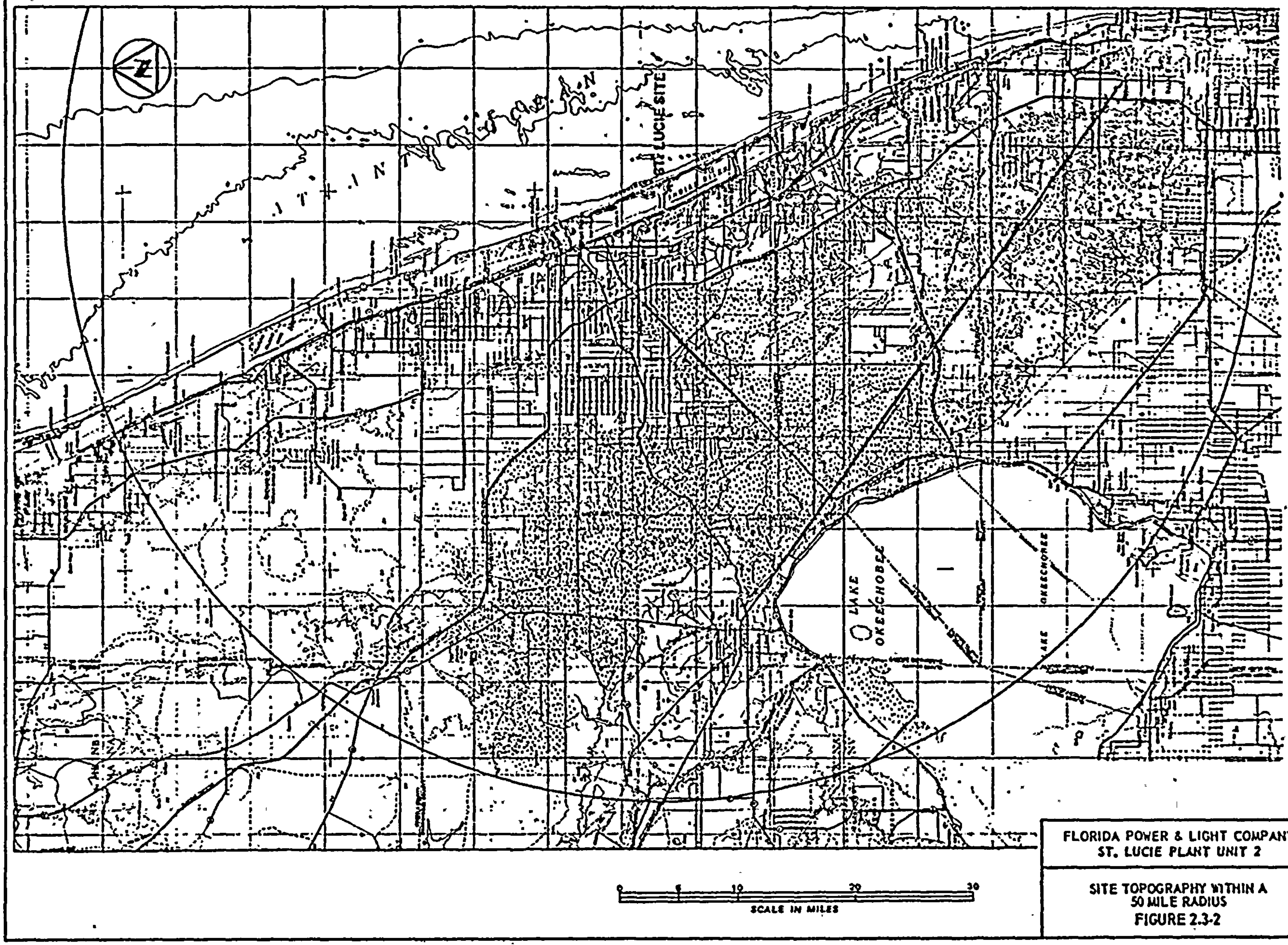
PERIOD OF RECORD		9/ 1/76 TO 8/31/77		9/ 1/77 TO 8/31/78		9/ 1/76 TO 8/31/78	
		BASE DISTANCE IN MILES / KILOMETERS					
AFTD SECT	DESIGN DIST MI	.97 1.56	1.00 1.61	.97 1.56	1.00 1.61	.97 1.56	1.00 1.61
NNE	0.	5.7E-09	5.5E-09	6.1E-09	5.8E-09	6.0E-09	5.6E-09
NE	0.	6.0E-09	5.7E-09	5.1E-09	4.8E-09	5.6E-09	5.3E-09
ENE	0.	3.3E-09	3.2E-09	2.7E-09	2.6E-09	3.1E-09	2.8E-09
E	0.	2.5E-09	2.4E-09	3.3E-09	3.1E-09	2.9E-09	2.7E-09
ESE	0.	3.3E-09	3.2E-09	3.8E-09	3.6E-09	3.6E-09	3.4E-09
SE	0.	5.9E-09	5.6E-09	6.7E-09	6.4E-09	6.4E-09	6.0E-09
SSE	0.	6.4E-09	6.0E-09	5.4E-09	5.0E-09	6.0E-09	5.6E-09
S	0.	5.0E-09	4.7E-09	3.5E-09	3.4E-09	4.3E-09	4.0E-09
SSW	0.	3.0E-09	2.9E-09	3.8E-09	3.5E-09	3.4E-09	3.3E-09
SW	0.	3.5E-09	3.3E-09	5.1E-09	4.7E-09	4.4E-09	4.0E-09
WSW	0.	4.5E-09	4.3E-09	5.2E-09	4.9E-09	4.8E-09	4.7E-09
W	0.	4.8E-09	4.6E-09	4.5E-09	4.3E-09	4.7E-09	4.4E-09
WNW	0.	8.9E-09	8.2E-09	7.5E-09	6.8E-09	8.2E-09	7.5E-09
NW	0.	7.5E-09	6.9E-09	7.4E-09	6.6E-09	7.5E-09	6.7E-09
NNW	0.	7.6E-09	7.0E-09	7.5E-09	6.8E-09	7.6E-09	6.8E-09
N	0.	4.0E-09	3.8E-09	5.2E-09	4.9E-09	4.6E-09	4.4E-09

	9/ 1/76 TO 8/31/77	9/ 1/77 TO 8/31/78	9/ 1/76 TO 8/31/78
NUMBER OF VALID OBSERVATIONS =	8459	8676	17135
NUMBER OF INVALID OBSERVATIONS =	301	84	385
NUMBER OF CALMS LOWER LEVEL =	46	49	95
NUMBER OF CALMS UPPER LEVEL =	0	0	0



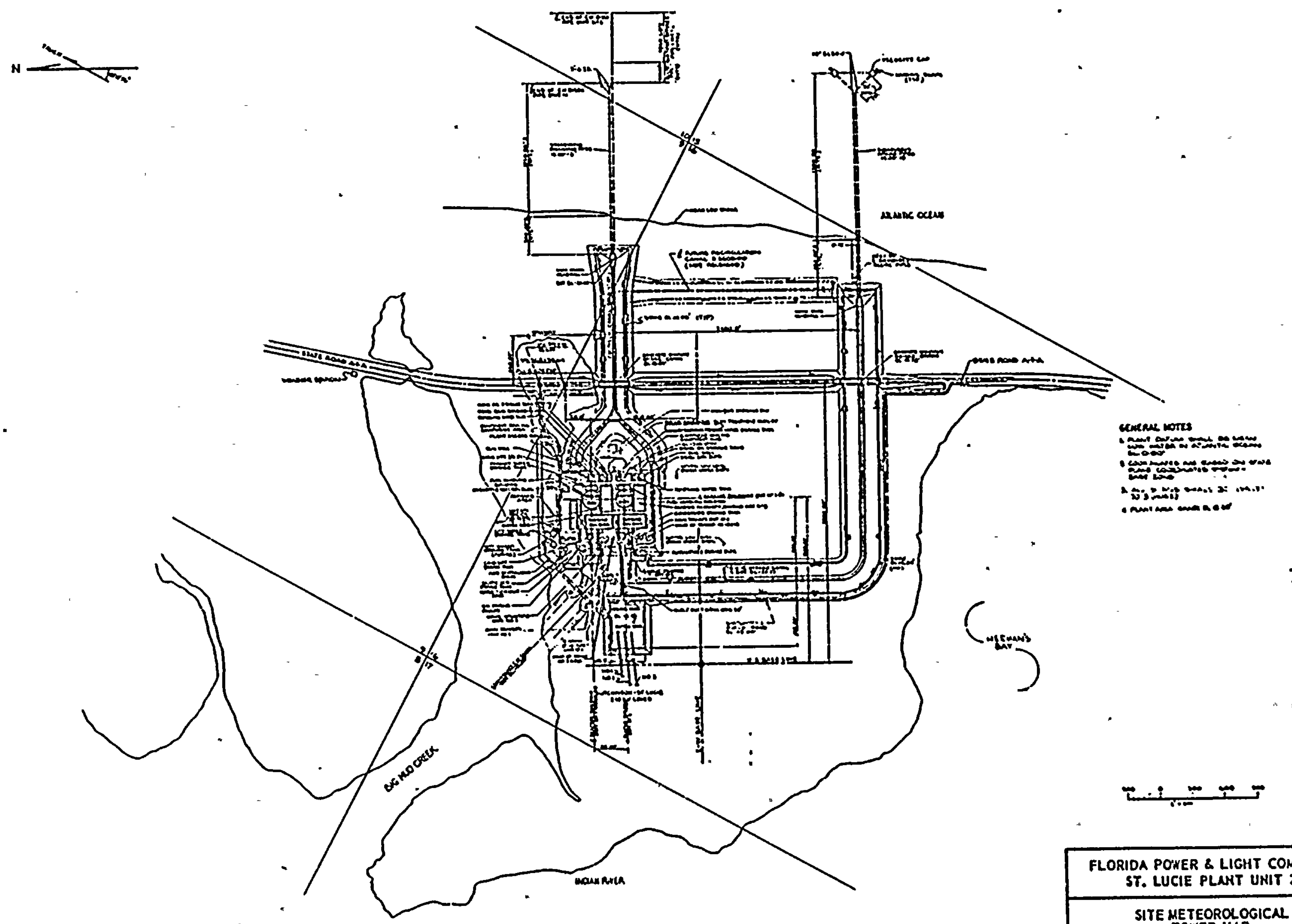
FLORIDA POWER & LIGHT COMPANY
ST. LUCIE PLANT UNIT 2

SITE TOPOGRAPHY WITHIN A
5 MILE RADIUS
FIGURE 2.3-1



FLORIDA POWER & LIGHT COMPANY
ST. LUCIE PLANT UNIT 2

SITE TOPOGRAPHY WITHIN A 50 MILE RADIUS
FIGURE 2.3-2



REF DWG: 2998-G-058 (REV 3)

FLORIDA POWER & LIGHT COMPANY
ST. LUCIE PLANT UNIT 2

SITE METEOROLOGICAL
TOWER MAP

FIGURE 2.3-3

ATTACHMENT 4

ST. LUCIE UNIT 2 ENVIRONMENTAL REPORT - OPERATING LICENSE,

SECTION 2.2

2.2 ECOLOGY

2.2.1 TERRESTRIAL VEGETATION AND WILDLIFE

2.2.1.1 Site Description

2.2.1.1.1 Soils

Soils belonging to the Palm Beach - Canaveral Association occupy the eastern side of Hutchinson Island. These are characterized as sandy, nearly level to sloping, and excessively to moderately well drained. The nearly level swamp soils of the west side of the island are poorly drained and subject to frequent flooding(1).

2.2.1.1.2 Vegetation

Vegetation cover types identified from color infra-red aerial photographs (November 1978; scale, approximately 1:9700) and field inspection of FP&L property are depicted in Figure 2.2-1, as are field observation stations. Corresponding acreages are presented in Table 2.2-1. Two thirds of the 1132 acre site, or approximately 750 acres, are mangrove swamp. The remaining land is coastal beach and dune (49 acres), Australian pine (9 acres) and 300 acres associated with the operation of St Lucie Units 1 and 2 which are cleared of vegetation except for isolated pockets of scrub vegetation. Fifty-two acres of the 300 acres originally cleared have not been utilized recently, and currently support disturbed field and shrub vegetation.

a) Mangrove Swamp

Swamps in the site and vicinity are a mosaic of dense mangrove thickets and areas of open water (Figure 2.2-1). The red mangrove, Rhizophora mangle, predominates. Of 43 systematically located stations in which mangrove were observed, R. mangle occurred in 42, white mangrove (Laguncularia racemosa) in 12, and black mangrove (Avicennia germinans) in seven stations. Laguncularia racemosa and A. germinans were more often observed along canal edges. Canopy height in the closed stands has attained 15 to 20 feet. Trunk diameters of red mangroves are generally less than five inches, while a few black mangroves with diameters as great as 15 inches have been observed.

Mangrove swamps cover approximately 2,700 acres within a five mile radius of the St Lucie site. Their occurrence on Hutchinson Island and absence on the mainland (Figure 2.1-16) reflects the ability of the three mangrove species to survive inundation by water of variable to high salinity. In Florida, mangrove swamps attain their best development in the Ten Thousand Island and Cape Sable regions where the warmer climate renders conditions more favorable than on Hutchinson Island(2).

The observed relative abundance of R. mangle onsite may reflect sucessional processes or external physical factors(3). Generally, mangrove species distribution exhibits a deep water to shallow water trend of R. mangle - A. germinans - L. racemosa/Conocarpus erecta (buttonwood)(2). Rhizophora mangle, however, also typically dominates colonization of newly available habitat such as occurred in the Everglades after Hurricane Donna(4). Past efforts to curb mosquito populations on Hutchinson Island through ditching, diking and flooding of swamps, may have eliminated all three species from some areas and consequently favored re-establishment by R. mangle.

Red mangrove stands on the site exhibited no obvious signs of defoliation or disease. Although tidal exchange is prevented or greatly reduced by encircling dikes, standing water is brackish to saline. No evidence was observed of invasion by freshwater flora.

A small area (2-4 acres) near the eastern edge of the mangrove swamp north of the discharge canal is elevated above surrounding terrain. Plant species observed there are noted in Table 2.2-2, Stations 3, 4 and 5. The presence of cabbage palm (Sabal palmetto) and the tropical hardwoods white stopper (Eugenia axillaris) and mastic Mastichodendron foetedissium) suggest that this area is an isolated stand of hammock forest.

Nielson and Nielson(7) reported the occurrence of a wide band of hammock forest at a site along SR AlA, four miles north of Fort Pierce (approximately 13 miles north of the St Lucie site). Hammock forest at the study site was transitional between beach and dune vegetation and mangrove swamp, and was briefly described as a "dense forest dominated by oaks and palms." Davis(8), however, states that the change from dune vegation to mangrove on offshore bars such as Hutchinson Island is typically abrupt, with little or no transitional hammock forest. An example of this sharp zonation can also be discerned in Table 2.2-2. Station 10, comprised entirely of red mangrove growing in approximately two inches of water, may be contrasted to Station 11, 60 feet seaward, where sandy soils, Australian pine and sea grape (Coccoloba uvifera prevail.

b) Coastal Beach Dune

Much of the area depicted in Figure 2.2-1 as beach and dune vegetation is saw palmetto (Serenoa repens). Saw palmetto and Australian pine (Casuarina sp.), both abundant on sandy soils of the site, tend to prevent establishment of other plant species.

Cover/abundance values of dune plants were recorded along meter-wide transects in the vicinity of the intake and discharge canals. Measurements obtained from the area replanted after construction of St Lucie Unit 1, and from the area to be cleared for installation of a second discharge pipeline, are presented in Tables 2.2-3 and 2.2-4, respectively. Coccoloba uvifera, Yucca aloifolia, Myrsine guianensis, Lantana involucrata and Crotalaria pumila are all species of tropical affinity which probably range not much further north of the St Lucie site(5).

c) Disturbed Field and Shrub

The approximately 52 acres of disturbed field/shrub depicted in Figure 2.2-1 consist of a few dense stands of Brazilian pepper (Schinus terebinthifolius), and open field. The latter is characterized by invading shrubs such as black mangrove, false willow (Baccharis angustifolia) and Brazilian pepper. Roughly half of the ground surface is bare soil, perhaps due to frequent flooding, compacted soil and poor drainage. Common herbaceous plants include grasses, sedges and rushes.

2.2.1.1.3 Wildlife

The following description of terrestrial animal use of the site and vicinity is restricted in area to Hutchinson Island and its adjacent waters.

a) Mammals

Over 20 species of mammals have been observed on Hutchinson Island (Table 2.2-5). Mammals most common near the site are the Virginia opossum, eastern mole, marsh rabbit, old field mouse and raccoon. Because the site vicinity contains limited upland area and few habitat types, opportunities for greater species occurrence do not exist. Relative biological isolation from the mainland is also a barrier to the introduction of additional species to the island. Disturbed field/shrub habitat depicted in Figure 2.2-1 likely supports the cotton rat, old field mouse and possibly the least shrew. If this area is allowed to succeed to shrub and hammock forest, species composition may shift toward cotton mouse, wood rat, and gray squirrel.

b) Birds

From 150 to 200 species of birds conceivably occupy the site and vicinity at some time each year (Table 2.2-6), based on data from the St Lucie Unit 2 Environmental Report - Construction Permit (Table 2.2-3), a winter field visit (first week February 1979), and recent Christmas bird counts(9)(10) near Ft Pierce, Florida, approximately 13 miles to the north. Limited available habitat types and upland land area reduce species occurrence near the site.

Several important species were observed in the site area during the 1979 winter field visit, including raptors and waterbirds (see Section 2.2.1.2.2). Mangrove stands immediately north of the discharge canal and Big Mud Creek were prominent roosting and feeding areas for wading birds. Mallards and blue-winged teal were seen at the plant island area in canals and in temporary bodies of water. The intake and discharge canals and offshore areas were visited by feeding royal terns, ring-billed gulls and several shorebird species. Bird species common to the mangrove stands and associated roads were ground doves, yellow-throated warblers, common yellowthroats, and blue-gray gnatcatchers. Osprey were frequently seen over waters adjacent to the site and American kestrels were common in all upland habitat types. One Cooper's hawk was sighted about three miles south of the site.

c) Sea Turtles

Three species of sea turtles, loggerhead (Caretta caretta), green turtle (Chelonia mydas) and leatherback turtle (Dermochelys coriacea) nest on Hutchinson Island. The current status of these species is discussed in Section 2.2.1.2.2.

d) Domestic Livestock

Occurrence of domestic livestock within a five mile radius of the site is discussed in Section 2.1.3.

2.2.1.2 Species of Special Importance and Their Relation to the Environment

Important species are defined as those potentially affected by the proposed action and which are of recreational or commercial value, threatened or endangered, critical to the survival of species considered important for the previous reasons, or critical to the functioning of terrestrial systems.

2.2.1.2.1 Flora

a) Protected Flora

Verbena maritima is proposed for listing by the U S Fish and Wildlife Service as threatened[11], and occurs on sandy, open, disturbed habitat throughout the area east of SR AIA.in the vicinity of the site and surrounding area. Two species classified by the State as threatened[12], Acrostichum aurium and Sabal palmetto, occur in several locations along mangrove swamp edge, onsite.

Many of the plants included on the Official Florida List occur in South Florida[12]; some of these can survive on Hutchinson Island and might occur onsite. Annona glabra and Scaevola plumieri, both threatened, occupy mangrove swamp or beach/dune habitat, respectively. Tillandsia fasciculata is endangered and occurs along mangrove swamp edge and hammock forest. Myrcianthes fragrans var Simpsonii is proposed for Federal status as threatened, and is also found associated with hammock flora. These species were not encountered while performing site vegetation mapping studies.

b) Mangroves

Mangroves are a critical component of an ecosystem which provides habitat for an abundance of organisms including rare fauna. Mangrove swamps are also important for their moderating influence on storm impact. Leaf litter and algae production in an established mangrove swamp support a detritus based food web comprised of a diverse number of species[2]. Primary consumers of detrital matter are in turn a major food source for marine fishes, wading birds and waterfowl. Environmental factors which regulate mangrove primary productivity relate to tidal exchange and water chemistry, as summarized below (M R Carter, et al, 1973, cited in(3)).

Tidal Factors:

1) Oxygen transport to root system.

2) Removal of salt and toxic sulfides from soil water.

3) Tidal interaction with surface water particulate load affecting sediment deposition or erosion.

4) Vertical motion of the groundwater table possibly transporting detrital based nutrients to mangrove root zone.

Water Chemistry Factors:

1) Total salt content determines pressure gradient between soil solution and plant, thus affecting leaf transpiration.

2) Possible compensatory effect of high soil macronutrient content on root absorption of nutrients (which is impeded by seawater salinity).

3) Input of allochthonous macronutrients contained in wet season surface runoff.

c) Beach and Dune Flora

Beach and dune vegetation retard wind erosion. Stabilized dunes in turn diminish effects of wave action on areas further inland. Sea oats, *Uniola paniculata*, are an especially effective soil-binder. The tropical affinity of some dune species also renders them of special interest to botanists and naturalists.

2.2.1.2.2 Vertebrate Fauna

a) Endangered and Threatened Species

Vertebrates of special importance can be classified in terms of their level of scarcity, and sport or recreational value. Species scarcity is officially determined by the Federal government(11) and the State of Florida. Endangered species on the Federal list which occur on Hutchinson Island are the peregrine falcon (*Falco peregrinus*), bald eagle (*Haliaeetus leucocephalus*), brown pelican (*Pelecanus occidentalis*), West Indian manatee (*Trichechus manatus*), leatherback turtle and green turtle. Of these, only the leatherback turtle and green turtle are known to breed on the island. The loggerhead turtle is classified as threatened by the Federal government and also breeds on Hutchinson Island.

Several of the other species winter and migrate through the Hutchinson Island area and may be common wildlife components of the region (such as the brown pelican). The wood stork (Mycteria americana) is common in the site area during the winter and has additionally been classified endangered by the State of Florida(13).

b) Marine Turtles

Sea turtles spend their entire life in the ocean except for brief excursions to the nesting beaches by the females. In general, nesting takes place on summer nights when the female crawls up the beach and digs a nest chamber. Over a hundred eggs are laid and covered with sand. Eggs hatch after approximately two months, at which time hatchings surface from the nest and crawl to the sea (usually during the night).

The beach along Hutchinson Island is a major nesting site for loggerhead turtles (Caretta caretta) and one of the few locations where the green turtle (Chelonia mydas) and leatherback turtle (Dermochelys coriacea) nest in Florida. Worldwide populations of marine turtles are declining. In the U.S. this decline has largely been attributed to a reduction in available and suitable nesting beaches due to costal development and usage(14). To aid in the protection of these species, they have been listed under the Endangered Species Act of 1973 with the loggerhead turtles classified as threatened and the Florida population of green turtles and the leatherback turtle listed as endangered. Loggerhead turtles dominate the turtle nesting on the island(15,16).

Loggerhead Turtles

Loggerhead turtles represent the predominant nesting activity on Hutchinson Island. The nesting season is generally between late April and late August, with the maximum nesting activity occurring in June or July depending on ocean temperatures. Adult females may nest several times during the summer, with up to seven nests recorded for a single female. The nesting interval is approximately two weeks. Individual females are thought to breed in a two or three year cycle(17).

The total number of nests on Hutchinson Island was estimated by plotting number of nests for each of nine, 0.75 mile, sample regions (Figure 2.2-2) against distance along the beach and calculating the ratio of counted nests to beach length in the sample regions compared with total nests to total beach length. The results of the surveys were 4661 nests in 1971, 4234 in 1973, 4813 in 1975 and 2872 in 1977. Previous estimates for total nest density ranged from 3550(15) to 6067(16) for 1971 and 5359(16) in 1973. The discrepancy in estimates is largely caused by different treatments of weighted ratios and by various authors' consideration of the nine sample areas as representative of the rest of the island.

Beach characteristics including slope, width, erosion, silhouette, lighting, dune height and human activity are thought to influence the site specificity of nesting turtles(16). Coincident with the trend of increasing north-to-south beach stability and width is a trend of increased nesting activity. This characteristic was observed in all surveys (Figure 2.2-3). A positive correlation exists between nesting activity and topographical suitability of the beach(18). At the present time these factors appear to influence the distribution of turtle nesting activity along the beach.

Since 1973, there has been an overall increase in the ratio of unsuccessful to successful nesting crawls. In the years studied, the percentage of unsuccessful nests in the nine sample regions was 30.4, 41.7, and 46.8 percent in 1973, 1975 and 1977, respectively. This general trend may reflect effects of development and of increased human activity on the island which deters crawling turtles from completing nests(16,17).

Emerging hatchlings are easily disoriented by bright lights and will often crawl toward lights rather than toward the ocean. This misdirection increases their exposure to predators and desiccation, and thousands of hatchlings have been killed on the roadways near nesting beaches. Heavy predation by raccoons reduces the effective reproductive rate of the turtles. Nest losses recorded during the four Hutchinson Island surveys have been locally as high as 82 percent (Figure 2.2-4). Predation destroyed 28 percent of the nests in 1971, 44 percent in 1973, 21 percent in 1975 and 39 percent in 1977. Lower predation rates in sample areas 6, 7 and 8 may be related to human activity and raccoon habitat loss to development. The highest predation rates were at the northern and southern portions of the island.

The total recruitment of loggerhead turtle hatchlings from the Hutchinson Island rookery is estimated using an average of 120 eggs per nest, the annual nest predation rate observed and a hatching rate of 64 percent of the eggs per nest(16). Hatchling production for the years surveyed is estimated at 257,734 in 1971, 183,941 in 1973, 292,014 in 1975 and 134,547 in 1977. Mortality due to disorientation of hatchlings and predation by birds and mammals further reduce recruitment.

The world status of adult loggerhead turtle populations is poorly known, although considered to be declining(14). An estimated 25,000 to 50,000 adult turtles constitute the Florida population(14,19). Population decline has been largely attributed to nesting habitat destruction, predation and commercial exploitation(14).

St Lucie County ranked third in density of turtle tracks per mile and fourth in total tracks during a statewide aerial survey of nesting beaches in 1977. An estimate of 8254 nesting females was made for the State of Florida(19). Using the same data base, the Hutchinson Island population of nesting females totaled 670 for the same period. Hutchinson Island, therefore, represents about eight percent of the total Florida nesting population.

Green Turtles

Green turtles have life history requirements similar to loggerheads; however green turtles are herbivorous and occupy a more southerly range. Compared to loggerhead turtles, green turtles are uncommon on Hutchinson Island. The numbers of their nests observed in the beach surveys were 22 in 1971, 26 in 1973, 43 in 1975 and five in 1977.

Green turtles produce about 100 eggs per nest. Using the predation and hatchability factors applied to loggerhead turtles, Hutchinson Island had a potential of 1014 hatchlings in 1971, 932 in 1973, 2174 in 1975 and 195 in 1977. In 1956, the House of Refuge Museum became active in nest transplanting, hatching, rearing and releasing green turtles. This effort has been aided by the FP&L beach surveys which locate nests for transplanting. The result of this program has been the near elimination of the predation factor in egg mortality and consequent potential for survival of the Florida green turtle population.

The population of green turtles is estimated to be between 100,000 and 400,000 worldwide. The Florida population is estimated to be less than 50 adult females(14). Assuming a two or three year breeding cycle, the 8-15 green turtles estimated to nest on Hutchinson Island(16) represent a major portion of the Florida population.

Leatherback Turtles

Leatherback turtles nest only incidentally in Florida. Hutchinson Island beach surveys have identified no more than six nests per year.

c) Game Animals

Several game species are common to this area. Marsh rabbits and gray squirrels, both upland game species, are present. Waterfowl such as blue-winged teal, mallards, American coots, and common gallinules were seen in the site vicinity during the 1979 winter survey.

2.2.1.3 Pre-existing Environmental Stresses

Trenches and dikes created in the past, for mosquito control, probably still affect mangrove swamp structure and function by partially controlling water flow. Examination of factors regulating mangrove primary productivity, tabulated in Section 2.2.1.2.1 b, indicates that all of the processes listed would be influenced by channelizing water movement and blocking tidal exchange. Tidal flow in an undisturbed system permits nutrient transport to coastal marine communities and access for marine fauna. Diking effectively prevents this nutrient flow and biotic movement, presumably decreasing species diversity and ecosystem productivity.

The site is periodically exposed to hurricanes and cold spells. The former may limit maximum tree height and favor periodic re-establishment of R.

mangle - dominated forest(3). Cold spells cause defoliation(3) and may be a possible cause of perturbation on Hutchinson Island, which is near the northern range of mangrove distribution(2).

2.2.2 AQUATIC ECOLOGY

The biological communities in the inshore and nearshore marine environments of Hutchinson Island have been sampled in two different field programs. St Lucie Unit 1 preoperational (baseline) monitoring was conducted by the Florida Department of Natural Resources, September 1971 - September 1973. St Lucie Unit 1 operational monitoring, conducted by Applied Biology Inc, was initiated in March 1976 and is the St Lucie Unit 2 preoperational monitoring program. Currently available data from this program consists of results through December 1978. To provide consistency between the two sampling programs, stations sampled during St Lucie Unit 1 operational monitoring coincided with stations occupied during St Lucie Unit 2 preoperational monitoring (Figure 2.4-6).

The Applied Biology data(20-22), resulting from an extensive sampling program, which included detailed taxomic identification and statistical analyses, have been used to describe the salient features of spatial and temporal distributions of the biotic assemblages near the St Lucie site. Where appropriate, comparisons with results from the St Lucie Unit 1 preoperational monitoring are also presented.

2.2.2.1 Phytoplankton

The phytoplankton data resulting from St Lucie Unit 1 baseline and operational monitoring are summarized in Table 2.2-7. Significant results of statistical tests performed on phytoplankton data collected at the offshore stations during the operational monitoring (within years, 1976-1978), are presented in Table 2.2-8. Table 2.2-9 presents similar information from tests conducted on the pooled data set from these years. Figure 2.2-5 presents a time series of mean (off-shore stations 0-5) cell densities for the three year period. Mean cell densities for all stations and years in surface and bottom samples are presented in Figures 2.2-6 and 2.2-7, respectively.

Phytoplankton communities are classified into major taxonomic groups which are primarily based on photosynthetic pigments in addition to morphological features. Major groups found at St Lucie include Bacillariophyta (diatoms) Chlorophyta (green algae), Chrysophyceae (yellow-brown algae and silicoflagellates), Cryptophyta, Cyanophyta (blue-green algae), Euglenophyta, Haptophyceae (including coccolithophores), Prasinophyceae, Pyrrophyta (dinoflagellates), unidentified phytoflagellates, and Xanthophyta. Complete species lists are found in Appendix 2.2A.

Chlorophyll *a* is the primary photosynthetic pigment and is found in all phytoplankters. Concentrations of chlorophyll *a*, with additional information of available light, may be used to estimate productivity values(23). Phaeopigments, the product of chlorophyll catabolism, result upon death of the organism. Variations in cell density, chlorophyll *a*, phaeopigments and the physical attributes of the water at the time of sampling were used to examine the temporal and spatial fluctuations of phytoplankton populations off St Lucie.

2.2.2.1.1 Species Succession

Diatoms dominated the phytoplankton communities in all years of study. During the baseline monitoring, species of Nitzschia and Bellerochea, Thalassionema nitzschoides, and Skeletonema costatum were abundant throughout the study period. Diatoms constituted 57.5 percent, 42.2 percent, and 59.3 percent mean relative abundance in the operational monitoring years 1976, 1977, 1978, respectively, with Skeletonema costatum the dominant species in 1976 and 1977, and codominant with Nitzschia delicatissima in 1978. During the baseline study, blue-green algae dominated the communities collected at Station 3 in November 1971 and at Station 1 in November 1972. This phenomenon was not observed during the operational monitoring. The relative abundance of diatoms was consistently high during periods of peak abundance (54.2 percent in October 1976, 74.6 percent in November 1977, and 64.3 percent in November 1978). Dinoflagellates, which reached 50 percent relative abundance at Stations 3, 4, and 5 in July 1971, never represented more than 32 percent (and generally less than five percent) of the total community (pooled data from all stations) sampled during the operational monitoring.

The secondary components of the phytoplankton assemblages collected in 1976-1978 showed consistent patterns. The density of phytoflagellates, which were second in total abundance, peaked during the warmer months. The inverse relationship in peak occurrence of diatoms and phytoflagellates was noted by Smayda$^{(28)}$, and was attributed to group-specific temperatures required for optimum growth. The green algae exhibited slightly increased relative importance in May 1976, June 1977 and July 1978, but were not numerically dominant throughout the sampling years. The Pyrrophyta, Cryptophyta, Prasinophyceae, and Cyanophyta showed generally higher relative abundances in 1977 and 1978, as compared to 1976, but represented minor components of the phytoplankton community throughout the monitoring program.

2.2.2.1.2 Temporal Variations

Phytoplankton densities in the marine environment off Hutchinson Island are characterized by seasonal and annual fluctuations. Because of the ephemeral and transitory nature of phytoplankton, differences between years and seasons reflect the natural variability resulting from the dynamics of the nearshore environment and the inherent patchiness of phytoplankton distributions. The extreme disparity between cell densities recorded in the baseline studies and those observed during the operational monitoring (Table 2.2-7) are thought to reflect differences in sampling techniques. The chorophyll a concentrations from the two programs were measured by similar techniques and reflected consistent values from the two periods of sampling.

a) Among Years

Analysis of variance in cell densities from the three years of operational monitoring samples (Table 2.2-9) indicated that surface and bottom densities were greater in 1976, than in 1977 or 1978.

Although cell densities from 1977 surface samples were comparable to 1978 surface samples, cell densities from 1978 bottom samples were significantly greater than densities found in samples collected from bottom waters in 1977. Concentrations of chlorophyll a (surface and bottom) were greater in 1976 than in 1977 and concentrations from bottom samples collected in 1978 were significantly greater than concentrations in bottom samples collected in 1977. Chlorophyll a concentrations collected in surface and bottom samples from 1976 and 1978 were not significantly different. Phaeopigment concentrations in the 1976 bottom samples were also significantly greater than those found in the 1977 and 1978 bottom samples. Phaeopigment concentrations from 1976 surface samples were significantly greater than bottom samples collected in 1978. Because chlorophyll a is ubiquitous, and because phaeopigments are the ultimate form of degraded chlorophyll, consistent trends in cell density and these two pigments are not unusual.

Productivity estimates, calculated from the concentration of chlorophyll a and light transmittance data as proposed by Ryther and Yentsch(23), showed a mean value of 0.49, 0.33, and 0.42 g C/m^2/day in 1976, 1977, and 1978, respectively. Although this method of estimating productivity has a precision of ± 25 percent(24) the calculated mean annual productivity estimates (179 g C/m^2 in 1976, 121 g C/m^2 in 1977, and 156 g C/m^2 in 1978) all fall within the range of values expected from a nearshore environment(25). The apparent higher productivity in 1976 may have resulted because only productivity estimates from March through November were used. Samples were not taken in January and February 1976 and these months tend to have low productivity rates (App. Table 2.2-4).

These variations in cell density, pigment concentration and productivity estimates among the years of study are similar to population changes observed in subtropical ecosystems which are not adjacent to power plants(26,27). Changes in these parameters over time are considered to reflect the natural variability within phytoplankton populations.

b) Within Years

Phytoplankton populations observed in 1971-72, 1976, 1977, and 1978 all exhibited peak periods of abundance in late fall (October-November). Secondary peaks were observed in the baseline year of sampling, in 1976 and 1978. The secondary peaks varied in the month of occurrence - January 1972, March 1976, and May 1978. These variations in month of peak occurrence and unimodal versus bimodal abundance have also been observed in other subtropical environments, e.g., Tampa Bay(26) and Indian River(27).

2.2.2.1.3 Spatial Variations

Differences in cell densities between depths and among stations were observed throughout the sampling program. Cell densities measured in bottom samples were generally greater than surface densities at all stations, during all sampling periods. Concentrations of chlorophyll a and other pigments (App. Table 2.2-2 and 2.2-3) exhibited the same pattern. This trend was most pronounced in the case of phaeopigment, reflecting the continuous rain of dead phytoplankton to the bottom and subsequent resuspension of the material induced by bottom currents, a finding also reported by Roman(29) for Buzzard's Bay, Massachusetts.

Stations which exhibited significantly different concentrations of chlorophyll a and cell densities changed from year to year and varied between surface and bottom samples. Generally, nearshore stations (0 and 1) exhibited increased all density and chlorophyll a concentrations as compared to offshore stations (2-5), particularly the shoal station (3) (Table 2.2-8).

Although data analyzed for the three year period showed enhanced cell densities and concentrations of pigments at Stations 0 and 1 (Table 2.2-9), significant changes in the density of diatoms, the predominant component of the phytoplankton community, were not observed. However, some changes in the densities of some minor components were found to be significant in the 1978 data. Significant differences in the densities of prasinophytes, cryptophytes and unidentified phytoflagellates were found when these data from the control and/or discharge station samples were compared to data from offshore stations(22) samples. However, when the densities of the same taxa in samples from the discharge and control stations were compared no significant differences were found. Therefore, the differences in densities of the minor species could not be directly attributed to plant operation and are considered to reflect natural differences between the nearshore and offshore stations.

2.2.2.1.4 Factors Associated With Temporal and Spatial Variations

Results presented above suggest that phytoplankton are most abundant at the nearshore stations. These increases may be caused by increased availability of nutrients and light throughout the water column, characteristics associated with nearshore environments. The physical attributes of water masses are known to effect the growth of phytoplankton. However, it is unlikely that any single physical parameter caused the increased abundance of phytoplankton observed at the nearshore stations. Therefore, multiple regression analyses were used in an attempt to explain the variance in phytoplankton densities and chlorophyll a concentrations vis-a-vis physical parameters of sample water (Table 2.2-8). Analysis of the 1976 and 1977 data (Mar 1976 - Dec 1977), variance in temperature (T), nitrate (NO_3) and ammonia (NH_3) accounted for 26.7 percent of the variance in offshore cell densities whereas, for the same period, variance in T, NO_3, nitrite (NO_2) and silicates (SiO_2) explained 47 percent of the variance in offshore chlorophyll a concentrations. In 1978, 50 percent of the variance in surface cell densities could be explained by variance in T, salinity (S), dissolved oxygen (DO), NO_3, NO_2 and NH_3; variance in T, DO, NO_3, NO_2, NH_3 and SiO_2 accounted for 55 percent of the variation in surface chlorophyll a concentrations. Bottom densities of cells in 1978 were correlated with T, DO, NO_3, NO_2, NH_3 and orthophosphate (PO_4), explaining 47 percent of the variation, whereas basically the same variables (T, S, NO_3 and PO_4) explained only 29 percent of the variance in chlorophyll a concentrations in bottom samples.

It is clear that the above variables bear some relationship to phytoplankton productivity. Nearshore stations generally have higher phytoplankton densities. Standing crop in the canals is consistently higher than that observed offshore. Therefore abundances at Stations 1 (near the St Lucie Unit 1 discharge) could be increased due in large part to discharge of phytoplankton from the canals.

2.2.2.2 Zooplankton

Results from the baseline and St Lucie Unit 2 preoperational monitoring sampling programs are summarized in Table 2.2-10. Data collected during the three years of monitoring have been analyzed and the results of the among and within year analyses for the three year period are presented in Table 2.2-11. Figure 2.2-8 is a time series of mean (Stations 0-5) zooplankton densities for this period. Appendix 2.2A provides the raw data and tables verifying statistical results used in the summary tables.

The zooplankton collected off Hutchinson Island were primarily composed of neritic (nearshore) forms. The neritic taxa, which prefer relatively warm waters and reduced salinities, normally extend only a limited distance offshore. Conversely, oceanic (open water) forms, which are characteristically holoplanktonic, are independent of their proximity to land and bottom substrates. Oceanic forms occurred rarely and in relatively low abundance in samples from Hutchinson Island waters. The species numerically dominating those oceanic forms collected included siphonophores, euphausids, salps, and certain chaetognaths.

The neritic holoplanktonic forms found most frequently were calanoid copepods (Paracalanus aculeatus, Acartia spinata, Labidocera aestiva, and Temora turbinata), chaetognaths, polychaetes, and the sergestid shrimp Lucifer faxoni. Cyclopoid copepods were also present and occurred throughout the sampling period. Meroplanktonic forms, which made significant contributions to the neritic community were decapod, echinoderm, gastropod, pelecypod, polychaete larvae and barnacle nauplii. Those organisms considered benthic in nature included nematodes, gammarid and caprellid amphipods and harpacticoid copepods.

2.2.2.2.1 Temporal Variations

Population estimates of sampled zooplankton were based on calculations of density (individuals/m^3) and measurement of biomass (ash-free dry weight/m^3). Density estimates are available from both sampling programs, however, biomass was not measured during the baseline monitoring period. These population estimates differed in their degree of annual fluctuation. Zooplankton biomass estimates from surface and bottom samples exhibited no significant differences between years. However, over the three year operational monitoring, zooplankton densities were significantly greater in 1977 and 1978 than in 1976, in both surface and bottom samples. The range of densities over both sampling programs (17-51, 529 zooplankters/m^3) including the maximum density collected (August 1978; 51,529 zooplankters/m^3) appear normal for nearshore, subtropical water bodies(30,31).

A seasonal pattern of peak zooplankton densities in spring and late summer/fall was apparent in all years of study. The specific month of maximum densities fluctuated, occurring in May 1972, September 1976, March 1977 and August 1978. Secondary peaks were observed in January 1972, July 1977 and October 1978. The lack of a secondary peak in the 1976 data may have been due to the initiation date of sampling. Periods of maximum biomass were observed in July 1976, July 1977 and August 1978. A disparity between the periods of maximum density and maximum biomass is not uncommon and may reflect maturation of the zooplankton population or seasonal influx of larger forms. Periods of seasonal density minima also fluctuated between years and were observed in November 1971, May 1976, December 1977 November 1978. Depressed populations occurring in the spring may reflect heavy grazing pressure exerted by fish larvae while late winter is commonly a period of reduced zooplankton productivity.

2.2.2.2.2 Spatial Variations

Zooplankton density and biomass values were generally greater in bottom samples than surface samples at all stations through all years. Because all samples were collected during the day, this observed trend may be the result of the negative phototactic response of zooplankton. In 1978 (Table 2.2-11), Station 1 surface samples contained significantly greater numbers of zooplankton than samples from Station 3. Surface biomass was significantly greater at the discharge station (Station 1) than at Stations 0, 2, 3 and 4. Pooling data from all three years of sampling confirmed that increased densities and biomass occurred at the discharge station over the three year period (Table 2.2-11).

2.2.2.2.3 Factors Affecting Temporal and Spatial Variations

Correlation analyses showed significant covariance in zooplankton abundance (and biomass) with some water quality parameters (Table 2.2-11). In the data collected from March 1976 - December 1977, significant positive correlation was observed between zooplankton abundance and temperature in surface and bottom samples. The consistently positive correlation with temperature resulted from the pattern of seasonal increases in zooplankton abundance which paralleled increases in ambient water temperatures. Significant negative correlations of bottom zooplankton densities and surface biomass with dissolved oxygen, observed in data from March 1976 through December 1977, may reflect the inverse relationship between temperature and dissolved oxygen rather than a significant effet of dissolved oxygen on zooplankton distribution.

Multiple regression analysis indicated that temperature, salinity, and dissolved oxygen accounted for 34 percent and 42 percent of the variation in surface and bottom zooplankton densities, respectively (Table 2.2-11). Similarly, 17 percent and 14 percent of the variation in surface and bottom biomass was explained by the variance in these parameters. These results complement results from the correlation analyses.

These results reflect the physiological response of zooplankton to ambient water quality. However, because water quality parameters were not significantly different among stations (Section 2.4), these factors cannot totally account for the patchy distribution of zooplankton within the the water column and the observed interstation differences in density and biomass.

As discussed previously, all zooplankton samples were collected during the day. However, diurnal vertical migration of zooplankton to the surface at night, and to the bottom at dawn, is commonly observed. The increased bottom densities of zooplankton observed during the operational monitoring sampling program may reflect this phenomenon. Further, phytoplankton abundances were also consistently greater in bottom samples and the parallel occurrence of zooplankters may reflect their feeding habits.

Similarly, the significantly increased densities of zooplankton found at Station 1 suggest redistribution of zooplankton. However, it is not clear whether the increased zooplankton densities are due to increased productivities or result from migration into an area of higher food levels (Section 2.2.2.1), or both.

2.2.2.3 Macrophytes

Sampling of the macrophytic community off the St Lucie plant was part of the St Lucie Unit 2 preoperational monitoring program, initiated March 1976. Data resulting from this sampling program (through December 1978) are summarized in Table 2.2-12. No macrophyte data were collected during baseline monitoring, which was summarized in the St Lucie Unit 2 Environmental Report - Construction Permit.

Few macroalgae were collected in the St Lucie plant area because of the lack of suitably stable substrates. Macroalgae are primarily epilithic and epiphytic, i.e., growing on rock substrates or other plant life(32,33). A limited number of large shell fragments found in the trough area (Stations 2, 4, and 5) may provide adequate attachment sites for the holdfast, which fixes the algae to the substrate. However, the scarcity of large rocks or extensive solid substrates in the area minimizes algal abundance. Because the abundance of the collected flora was limited no quantative analyses were performed on the data.

Rhodophytes, including <u>Gracilaria</u> spp, <u>Hypnea</u> spp, and <u>Chondria</u> spp dominated the collections all three years, representing 46 percent and 65 percent of the species collected in 1977 and 1978, respectively. This is consistent with the observed increase in abundance of red algae in tropical areas(32). Phaeophytes, chlorophytes, and cyanophytes were poorly represented (in number of taxa and density) in collections made off Hutchinson Island.

2.2.2.3.1 Temporal Variations

a) Among years

Approximately 25 species of macroalgae were collected in 1976 and 1977. More than 88 species were collected in 1978. The marked increase in the number of taxa represented is explained by a large influx of drifting algal communities which washed onshore in summer 1978. Drifting algal communities generally contain more algal species than do fixed communities(34). Although the influx of large quantities of drifting algae could not definitely be associated with storm activity, such influxes are not uncommon in the Hutchinson Island area(35).

b) Within years

Seasonal variations were consistent within each sampling year, with the density and diversity of algal species increasing in the summer and early fall. September was the month of peak abundance in 1976 and 1977. More species were found in September 1978 (54 species) than in 1976 and 1977, but June was the month of peak abundance and diversity in 1978, when 64 species were collected. The algal community was least diverse in winter and early spring (March) in all years.

2.2.2.3.2 Spatial Variations

Differences among stations within years were minor. In 1976 and 1977, there was a tendency toward higher densities and diversity at shell hash stations (Stations 2-5). It is difficult to assess the source of algae collected in dredged samples (i.e., whether they were growing on the substrate or had just drifted over it when sampled), but many of these organisms require hard substrates, and it is suggested that increased densities at shell hash stations were a result of habitat availability. In 1978, more taxa were collected at nearshore stations. In this case, seasonal winds and water currents appear to have caused algae to drift onshore from more permanent sources offshore.

The temporal and spatial oscillations in the macroalgal community off Hutchinson Island observed over the period of operational monitoring appear to be the result of seasonal life history patterns and dispersion by physical forces.

2.2.2.4 Macroinvertebrates

Several factors determine the structure and composition of benthic macroinvertebrate communities. Water depth, chemical quality of water and sediment (e.g., levels of dissolved oxygen concentrations of organic materials) water currents, and food availability from overlying water masses are determinants of density and diversity of benthic communities. In particular, investigators have observed significant correlations between substrate characteristics (median grain size, porosity) and composition of the benthos(36,37). Therefore, variations in sediments are described before examining spatial and temporal variations evidenced by biological populations resident on or within the substrate.

2.2.2.4.1 Sediment Samples

Sediment characteristics (mean particle size, particle class size distribution, and sorting coefficient) can be used to define three distinct zones in the oceanic area off Hutchinson Island. This zonation was apparent throughout the sampling period of baseline (1971-1973) and operational (1976-1978) monitoring. The zones, which corresponded to distance offshore were defined as: beach terrace, including Station 1 throughout the three year study and Station 0 in 1977 and 1978; offshore trough, including Stations 2, 4 and 5 throughout the study period and Station 0 during 1976; and the shoal area, represented by Station 3. The movement of the control station from the offshore trough area to the beach terrace facilitated comparisons to the discharge station, which is located on the beach terrace.

Beach terrace sediments are composed of fine to very fine, moderately well sorted, gray, nonbiogenic (quartz) sand. Some temporal and spatial variations were observed during the baseline study by Gallagher(38), but the sediments remained relatively homogeneous. Textural changes at Station 1 occurred during 1976, and may have been caused by installation of the plant discharge pipeline for St Lucie Unit 1. These observations are discussed in Section 4.1. Samples collected in 1977 and 1978 reflected baseline conditions.

Offshore trough sediments consisted of poorly sorted, very coarse particles. The sediment type is termed "shell hash" because it is composed almost entirely of broken mollusc shells. Trough sediments were porous, characteristically exhibiting large variations in mean particle size and sorting coefficient. A significant quantity of gravel-size particles (>2.0 millimeters) was typical. Differences in substrate among stations and years could be attributed to changes in the gravel fractions which occurred at Station 5. Samples collected through 1978 indicated that the mean particle sizes of the sediment at the three trough stations remained unchanged from baseline observations.

The substratum at the offshore bar, Pierce Shoal, is well sorted medium sand, composed of calcareous material. Significant textural changes were rarely observed in these sediments. The shoal is formed by strong hydrological processes that continuously sort substrate particles. Continuity through years was the outstanding feature of sediment samples analyzed from this station.

2.2.2.4.2 Benthic Grab Samples

During baseline monitoring, benthic grab specimen analysis was limited to arthropods and lancelets. Therefore, comparisons with data from the operational monitoring programs are limited to these taxa. Results from Mann-Whitney U-Tests (nonparametric test of two samples; Appendix 2.2A) comparing pooled samples (1971-1973 versus 1976-1978) are summarized in Table 2.2-13. No significant differences in lancelet density were observed among stations between the two periods of study. However, significantly greater arthropod densities were observed at Stations 1, 2, 3 and 5 during the period of St Lucie Unit 2 preoperational monitoring. Similarly, diversity in species of arthropods was higher at Stations 1, 2, 4 and 5 in 1976-1978, compared to the baseline.

Descriptive results of the three years of St Lucie Unit 2 preoperational monitoring are summarized in Table 2.2-14. Results from statistical tests applied to grab data are presented in Table 2.2-15. Figures 2.2-9 and 2.2-10 present time series (three years) of density and diversity of macroinvertebrates collected by grab at Stations 0 and 1, and Stations 2-5, respectively.

a) Temporal Variations

The number of taxa and density (individual/meter^2) of organism varied at all stations throughout the year. Generally, variations in organism density were not attributable to seasonal fluctuations of any individual species or group of taxa, but resulted from cumulative fluctuations in large numbers of taxa. This observation is supported by the highly significant correlation found between the number of taxa and density at all stations through the three year period. The single exception to this correlation was observed at Station 3 in spring 1978. Annual maximum density, which occurred at this station, could be accounted for by a large population increase of a single species of mollusc, Crassinella duplinana.

Within year variations in the benthic communities could not be attributed to substrate characteristics, which were homogeneous (within stations). Attempts to correlate seasonal variations and density and species richness (number of taxa represented) with water temperature also yielded variable results. Independent correlation analyses (Spearmen ranks; Appendix 2.2A) of these two community descriptors against ambient water temperature were conducted on the pooled data for March 1976 - December 1978. (The pooled data included all stations except the control station which was moved from the trough area to the beach terrace in March 1977, necessitating its exclusion from the three year comparison). Significant correlation of species richness with temperature and density with temperature were observed at Stations 2, 3 and 4. The lack of significant correlation among these variables at Stations 1 and 5 may be due to the overlap of temperate and tropical patterns of spawning and larval recruitment which results in a continuous supply of young organisms throughout the year, regardless of water temperature.

The Kruskal-Wallis test (nonparametric test between two samples; Appendix 2.2A) was used to examine changes in grab efficiency, number of taxa and number of individuals collected at each station over the three year period. Although no significant changes were observed in the sediments at the beach terrace stations, grab efficiency decreased over the three years. A similar decrease was noted at Station 5; however, this change could partially be explained by the decrease in gravel fraction and increase in medium sand.

Decreases in both the number of taxa and number of individuals collected were observed at the control station. However, these changes were the direct result of moving the control from the trough area to the less rich beach terrace area. (The purpose of this move was to provide a control to compare with the discharge station, also located on the beach terrace). Significant increases in taxa richness were observed at Stations 2 and 4 through the operational monitoring. Samples from Station 5 exhibited significant increases in both species richness and density. These stations (Stations 2, 4 and 5) contained the more diverse communities found in the site area, and annual variations may simply reflect natural population variability.

Rarefaction curves(39), which plot the number of taxa collected against the number of individuals collected, were also used to examine changes through years at individual stations (Appendix 2.2A). These figures suggest that Stations 3 and 4 were most similar within the three years of study, while variability in the benthic community at Station 5 was indicated by greater discrepancy in these plots among years. Stations 0, 1 and 2 exhibited intermediate year to year continuity. These observations corroborate the results of Kruskal-Wallis tests among year comparisons and suggest that the site area was characteristically variable and exhibited few apparent long term changes.

b) Spatial Variations

The Morisita Index(40) of community similarity was used to make interstation comparisons. This index compares the abundance of shared taxa among stations and the total density and diversity of organisms among stations and establishes a factor of interstation faunal similarity. Although the degree of interstation similarity (as derived from grab sample data) fluctuated through the years, the same basic groupings which corresponded to the substrate groupings prevailed throughout the period of operational monitoring.

Substrate at the deeper water, offshore trough stations (Stations 2, 4, and 5), consisted of heterogeneous, porous, shell hash sediments which are well oxygenated and provided microhabitats capable of supporting highly diverse fauna. Biomass levels, densities, and number of represented taxa were consistently higher at these stations than nearshore or shoal stations. Annelid species (worms) dominated (over 50 percent) other groups. Sipunculids, molluscs, and arthropods generally represented less than 17 percent of the groups at these stations. Echinoderms and lancelets generally comprised an even smaller percentage, usually less than six percent.

The tightly packed, homogeneous sands, found at the nearshore beach terrace stations (Stations 0 and 1) limited the number of species which could successfully exploit the environment. The sands are transitory and continually perturbed by surface water action. Consequently, community parameters describing the benthic fauna collected here were low in comparison to the remaining stations. Annelids dominated the species collected, but to a lesser extent than that observed at the trough station (approximately 40 percent). Arthropods were secondarily dominant at both beach terrace stations, with a large component of nemerteans represented at Station 1.

The homogeneous, well sorted sands, characteristic of the shoal station, contained no hard shells, but good porosity provided sufficient supplies of oxygen and food to support a comparatively diverse macroinvertebrate community. Molluscs were the major group of individuals collected (approximately 70 percent). This high dominance was primarily due to the recruitment of juvenile C. duplinana in 1976 and 1977. Annelids and arthropods were the second and third most frequently collected groups, respectively, at this station.

2.2.2.4.3 Trawl Samples

Data from trawl collections made during the St Lucie Unit 2 preoperational monitoring program are summarized in Table 2.2-16. Results of statistical analyses of the pooled data (1976-1978) are presented in Table 2.2-17 and utilized in the following discussion. Total numbers of macroinvertebrates collected by trawling through the three year period of study are presented in Figure 2.2-11.

a) Temporal Variations

Community descriptors derived from the trawl data exhibited little fluctuation through the period of St Lucie Unit 2 preoperational monitoring. The site area exhibited slightly increased species richness (number of taxa collected) over the three years when data from all stations were pooled (156, 164 and 182 taxa were collected in 1976, 1977, and 1978, respectively). These variations, in all probability, reflect the difference in sampling effort among years (ten months in 1976 versus 12 months in 1977 and 1978) and natural variation within benthic populations.

Similarly, no significant differences in species richness were observed through the three years of study at individual stations, when data were compared by Kruskal-Wallis tests. Mann-Whitney U-Tests applied to the same data indicated a slight increase in the number of species in samples collected at the control station in 1978. In this year, 50 percent of the organisms collected were trawled in the month of August. This increase in the number of individuals and the number of taxa collected was the direct result of the large influx of drift algal communities with associated macroinvertebrates (Section 2.2.2.3). Whittaker dominance-diversity graphs(41), which plot the number of individuals versus the rank of individual species (based on species abundance), indicate that Stations 1 and 2 were consistently dominated by a few species throughout the study period, and that Station 5, where species were more equitably distributed, showed consistent patterns of dominance through the three year period. The control station, characteristically more diverse with increased equitability (relative distribution or dominance), exhibited an increase in the dominance-diversity patterns, resulting from the influx of drifting algal communities. Station 4, generally dominated by only a few species, exhibited greater diversity in 1978 than in 1976 and in 1977.

Maximum species richness was generally observed during summer months (July-September). Water temperatures peaked in late summer and early fall when associated abundant food sources (phytoplankton, zooplankton, and infauna) could support an increased epifaunal population and allochthonous populations of invertebrates associated with drift algae wash ashore (2.2.2.3.1.a). However, two exceptions to this tendency were noted. Species richness was maximal in November 1978 at Station 5. No obvious cause for this variation was evident. In 1977, a drop in the number of taxa was observed at the discharge station (Station 1) during August and September. No comparable reduction was observed at the control station (Station 0) in the same year. The reduced collections at Station 1 might have resulted from the St Lucie Unit 1 discharge; however, this pattern was not observed in 1978, when St Lucie Unit 1 was on line for a comparable period.

McCloskey's Index(42) ranks species by dominance (the number of individuals within each species) and was used to compare species dominance among years. Results from the index indicated that dominant species were not constant from year to year at the shell hash stations 2, 4, and 5 (Table 2.2-17). The reverse was true at Station 0, 1, and 3, where Trachypeneaus constrictus consistently was the dominant species collected. Some commercially important invertebrates were collected by trawl in limited numbers. These organisms, their abundance and commercial importance, are discussed in Section 2.2.2.7.

b) Spatial Variation

Station differences were noted in all years. Collections made at Station 5 consistently contained the greatest number of taxa while Stations 0, 1, 2, and 4 showed intermediate levels of species richness. The shoal station (Station 3) exhibited the lowest numbers of taxa in all years. In 1978, a marked change in epifaunal abundance was observed at Station 3. In May and June, a large number of juvenile sand dollars, Mellita quinquiesperforata, were collected. This change was considered to reflect the natural process of species migration across the shoal(22). Station grouping, derived from Morisita indices applied to the trawl data, generally confirmed groupings determined from the grab data. However, changes in species abundance collected in trawls caused changes in the degree of similarities within groups between years. The influx of M. quinquiesperforata at Station 3 in 1978 made this station more similar to Station 4 than in previous years. Increased species diversity at the control station in 1978 created a dissimilarity between the beach terrace stations, which had previously shown great similarity. These changes may have resulted from the influx of drift algae (2.2.2.3.1.a) and have been attributed to natural changes in the benthic community.

2.2.2.4.4 Summary

The benthic community sampled off Hutchinson Island exhibited consistent seasonal trends and station differences throughout the period of operational monitoring. Although no correlation of density and water temperature was evident in the trawl data, the grab data reflected the seasonal effects of bottom water temperatures on infaunal abundance. Station differences, observed in both trawl and grab data, were attributed to variations in substrate characteristics and were consistent through the three years of study. Variations in the number of taxa and individuals collected, and changes in species dominance, are considered to reflect the natural variation of the benthic fauna.

2.2.2.5 Fish and Shellfish

Fish collected in the St Lucie plant area include migratory species (which spend only portions of their lives off the southeast coast of Florida) and resident species. The Atlantic Ocean off southeast Florida is a transition zone (temperate/tropical), where ranges of temperate and tropical species overlap. Many of the fish species which are important to the commercial and sport fisheries have been found off Hutchinson Island.(20-22,43) Life histories of these species have been presented in the St Lucie Unit 2 Environmental Report - Construction Permit. The role played by St Lucie County and Martin County in Florida commercial and sport fisheries is described in Section 2.2.2.7.

Results from the baseline monitoring program have been discussed in Section 2.7 of the St Lucie Unit 2 Environmental Report - Construction Permit and are summarized in Table 2.2-18. Forty-two hours of sampling effort (33 and 9 hours of offshore trawl and beach seine sampling, respectively) collected 75 species of fish. Over 250 species of fish were collected during the three years of St Lucie Unit 2 preoperational monitoring. Sampling methods included beach seining, offshore gill nets, and bottom trawls. The results from each sampling method are presented and incorporated into a summary description of the fish populations found in the St Lucie plant area.

2.2.2.5.1 Beach Seine

Three areas of the nearshore environment were sampled by beach seine: Station 6, north of the discharge; Station 7, between the intake and discharge canals; and Station 8, south of the intake canal. Results of the three year beach seine St Lucie Unit 2 preoperational monitoring sampling program are summarized in Table 2.2-19.

a) Temporal Variation

The number of fish collected by beach seine over the three year sampling program fluctuated, with 1,211 finfish collected in ten months of sampling in 1976, and 819 and 1,203 finfish in 12 months of sampling in 1977 and 1978, respectively. The only shellfish collected were speckled crabs which were collected in small numbers (77, 51 and 54 speckled crabs in 1976, 1977 and 1978, respectively). Largest catches from beach seines occurred in September of 1976 and 1977, whereas in 1978 catches were largest in July. The variation and number of fish collected in peak periods of abundance are thought to result from natural variations in fish populations and the chance occurrence of schooling species in the sampled area.

Certain species were consistently dominant from year to year in beach seine samples. However, relative abundances changed among years. Anchovy and herring accounted for over 55 percent of all fish collected in 1976, but only 28 percent and 29 percent of fish collected in 1977 and 1978, respectively. No single species dominated in 1977 or 1978, and codominance of herring, kingfish, and sand drum occurred in 1977, with codominance of the same species plus spot occurring in 1978. Anchovy and herring are schooling species and, therefore, exhibit patchy spatial distributions. Observed changes in relative abundance of these species are thought to be the function of natural variations and schooling behavior, which affects ease of capture.

b) Spatial Variation

Interstation comparisons showed that samples from the northern station (Station 6) contained more fish than samples from the south stations (Stations 7 and 8) in 1976 and 1977. Analysis of variance showed this difference to be statistically significant in 1977. No significant differences were observed among stations in 1978. Combining all three years, 45.1 percent of the total catch was seined at the north station, while mid and south stations comprised 29.0 percent and 25.9 percent of the catch, respectively. The increased abundance at the north station may have been a sampling artifact, resulting from a smoother bottom at this station, facilitating efficiency in sampling.

2.2.2.5.2 Offshore Gill Nets

Results of offshore gill net samples collected during the three years of St Lucie Unit 2 preoperational monitoring are summarized in Table 2.2-20.

a) Temporal Variation

Annual trends in seasonal abundance and species dominance were consistent during the three years of operational monitoring. Seasonal peaks in abundance regularly occurred in the late fall (October/November). However, a secondary peak was observed in January 1977, attributable to a large influx of bluefish into the site area. Spanish mackerel and bluefish (92 percent of annual catch were captured in January) collectively accounted for over 60 percent of all fish captured by gill net in 1977. Although landings data are not yet available, increased commercial activity, particularly increased mackerel catches, was observed in 1977(21). In 1976 and 1978, jacks, including Atlantic bumper, blue runner, and crevalle jack, dominated the gill net samples, constituting 66.7 percent and 71.0 percent, respectively of all fish collected with this sampling gear. Spanish mackerel, bluefish, and jacks school in large groups, and are caught, are usually captured in large numbers.(20-22) Shellfish were rarely captured with this gear.

b) Spatial Variation

Differences in numbers of fish captured by gill nets at different stations were noted throughout the study period. In general, nearshore stations (Stations 0 and 1) yielded higher fish captures with this gear type. Differences in numbers of fish captured among stations were statistically significant in 1978. In this year, catches at the control station (Station 0) were significantly greater than catches from Stations 3 and 4 and catches at the discharge station (Station 1) were significantly greater than all other stations except the control station. The dominant species captured by this gear (bluefish, Spanish mackerel, and jacks) are piscivores and may be attracted to nearshore areas in search of forage species.

2.2.2.5.3 Bottom Trawls

Table 2.2-21 summarizes results of trawl samples collected during St Lucie Unit 2 preoperational monitoring.

a) Temporal Variation

Between year fluctuations in fish populations sampled by trawl were observed over the three year study period. A slight increase in numbers of fish captured by this gear was noted. Periods of peak abundance were inconsistent and occurred in May 1976, November 1977, and September through November 1978.

Bottom trawling selects for bottom fish. Predominant fish collected by this gear included flatfish, cusk eels, drum, and sand perch. Relative abundances were similar in the three years, with the exception of an increased representation of sea trout in 1977 (29.6 percent relative abundance). However, this increased relative abundance was the result of a single catch of 606 individuals in November. No single species dominated in either the 1976 of 1978 collections although anchovy appeared in large numbers in 1978 (18.3 percent relative abundance). This observation is partially explained by the schooling behavior of anchovy, resulting in large catches when they are collected.

Numbers Versus Biomass

Species which were dominant numerically were not those which dominated samples by weight. For example, in 1978, anchovy were most abundant numerically (18.3 percent relative abundance) with flatfish, sea robin, and scorpionfish and grunts, represented by 12.0 percent 11.7 percent, and 10.5 percent of individuals captured, respectively. By biomass (weight), the following figures were derived: sea catfish (16.8 percent biomass), pigfish (14.2 percent), and snook (10.6 percent). This observation, that the species representing greatest numerical abundance did not coincide with the species accounting for the greatest biomass, was consistent among years, indicating that the majority of fish collected were small organisms.

b) Spatial Variations

Spatial variations were evident in the consistently higher numbers of fish captured at Stations 0, 1 and 5. However, interstation differences were never statistically significant when tested by analysis of variance.

2.2.2.5.4 Summary

The fish community observed off Hutchinson Island as a whole exhibited continuity through the years of operational monitoring. Although the relative abundance of major species collected by each gear type fluctuated among years, species collected (with each gear type) were consistent through the three years. The variation in numbers of fish collected exhibited no single trend of increased/decreased fish abundance. Therefore, variations are considered to reflect the natural variability of the fish species in time and space, and their susceptibility to capture in samples.

The community can be characterized by its association with three relatively distinct environments: the surf zone, the open bottom zone, and the neritic zone which are described by results from beach seine, bottom trawl and offshore gill net gear types, respectively.

The surf zone is characterized by highly turbulent water with a substrate of shifting sand. Few fish were habitual residents in the area: these included the bottom feeding carnivores; drum, threadfin and pompano, which feed on burrowing macroinvertebrates. Other species which were occasionally captured in the area included herring, anchovy, and jacks, are considered to be transients.

The open bottom zone, composed of porous shell hash (see Section 2.2.2.4.1) lacked extensive vegetation, but provided more stable substrate and supported a relatively abundant benthic community. These organisms, in turn, supported a diverse group of bottom feeding fish, including flat fishes (flounder, sole, and tonguefish), sea robins, and cusk eels.

The neritic zone, the open coastal waters beyond the surf zone and above the open bottom zone, supported the majority of fish species found in the St Lucie area. The waters off Hutchinson Island are subject to intrusion of Indian River estuarine waters, and influxes from the oceanic waters of the Florida Current, resulting in a high diversity of fish species, including species which are important components of commercial and sport fisheries.

2.2.2.6 Ichthyoplankton

Currently available data from the St Lucie Unit 2 preoperational monitoring ichthyoplankton sampling program formed the basis of the following description of ichthyoplankton assemblages found off Hutchinson Island[20-22]. These data are summarized in Tables 2.2-22 and 2.2-23 for fish eggs and larvae, respectively. Figure 2.2-12 presents mean density of fish eggs and larvae (Stations 0-5) as a continuous time series over the three year period of study.

2.2.2.6.1 Fish Eggs

Egg densities ranged from $0-88/m^3$, $0-98/m^3$, $0-169/m^3$ in 1976, 1977, and 1978, respectively. Erratic variations in egg abundance are in part related to the range overlap of temperate and tropical species which spawn at different times and temperatures. However, peak abundances consistently occurred in the spring and early summer months.

When egg density data were pooled by season, significant interstation differences in egg densities were observed. In 1977, pooled data indicated that egg densities at the control station (Station 0) were greater than densities at offshore stations (2 and 5 which exhibited significantly greater densities than samples at stns. 1, 3 and 4) in the summer months (Appendix 2.2A). During the winter of 1978, significantly increased densities were found at Station 1. The control station is farther south than other stations, and the difference in egg densities could be the result of different circulation patterns which occur at this station. The increased abundance in egg densities (1978) collected at the discharge station may reflect increased spawning in the warmer discharge water or may have been coincidental(22).

Egg densities were not well correlated with physical parameters measured in this monitoring program (Appendix 2.2A). In 1976 and 1977, a significant negative correlation was found between egg densities and temperature. Maximal egg abundance occurred in March 1976 and February 1977. Because egg densities were apparently independent of plant operating mode(20,21), this correlation was considered to reflect the seasonal trend of increased egg densities in the cooler months of the year. There was no significant correlation between temperature and egg density in 1978, when maximum egg densities were observed in the spring and early summer. A significant positive correlation between egg density and dissolved oxygen was observed in all three years. However, the correlation was considered coincidental because dissolved oxygen concentrations were not limiting at any time during the three years of study(20-22). In 1977, a negative correlation between egg density and turbidity was observed, but could not be explained. In 1978, egg densities were correlated positively with salinity. However, a stepwise regression model applied to the 1978 data, using the physical parameters of salinity, dissolved oxygen, and temperature as independent variables, explained little of the variation in egg densities (19 percent) and, therefore, had low predictive value (Appendix 2.2A).

2.2.2.6.2 Fish Larvae

Table 2.2.23 summarizes fish larvae collections from the three year St Lucie Unit 2 preoperational monitoring program(20-22). Larval densities fluctuated through each individual year, ranging from $0-7.9/m^3$, $0-8.6/m^3$, and $0-11.0/m^3$ in 1976, 1977, and 1978, respectively. The mean densities were $0.64/m^3$, $0.70/m^3$ (arithmetic) and $0.42/m^3$ (geometric) over the same years. Larval densities were greater in samples collected in 1977 than in those collected in 1976 and 1978, despite the decreased densities of eggs collected in 1977 (Figure 2.2-12). The increased abundance resulted from increases in a large number of taxa and could not be attributed to a single family group. Clupeiform larvae, including larval herring and anchovy, dominated the collections in all three years and accounted for 29.8 percent, 64.9 percent and 61.6 percent relative abundance in 1976, 1977, and 1978, respectively. The second most abundant family was Gerreidae in all years. This family includes mojarra larvae and accounted for 19.5 percent, 6.3 percent, and 7.6 percent relative abundance in the collection made in 1976, 1977, and 1978, respectively.

Interstation differences which occurred in the three years were inconsistent, and no trend was evident. In 1976, no single oceanic station or group of stations (nearshore versus offshore) had significantly greater densities of fish larvae. Observed differences between stations were attributed to the patchy distribution of fish larvae(20). In 1977, interstation differences in larval abundance were observed when data were pooled by season. In the winter months (December 1976-February 1977), larval densities at Station 0 were greater than larval abundances found at Stations 2 and 3, which are offshore the discharge. During the fall (September through November 1977), collections made at Station 1 (the discharge station) showed higher densities of larvae than all other stations. These differences could not be attributed to plant operation, and probably reflected the patchy spatial distribution of fish larvae.

In 1978, samples from Station 1 again exhibited higher densities of larvae than samples from all other stations. When 1978 data were pooled by season, the observed difference could be attributed to significant differences between stations during the spring sampling period, indicating that significantly higher densities of larval at Station 1 were found only during the spring. Significant differences in larval densities between stations were not noted in any other season. The increased abundance of fish larvae at Station 1 may have been coincidental, may reflect aggregation resulting from circulation patterns (onshore movement) or may have been related to higher food densities (phytoplankton and zooplankton), also found at Station 1(22).

Variation in densities of fish larvae did not consistently correlate with any physical parameters during the period of study. The 1976 data exhibited a positive correlation of larval density with temperature. However, because temperature differences were not significant between stations, operation of the plant could not explain the correlation. Peak larval densities occurred in April and September 1976. Therefore, the correlation probably reflected seasonal increased in larvae which paralleled increased water temperatures. A significant positive correlation of dissolved oxygen and larval densities was evident in results from larval sampling in 1976 and 1978. However, a significant negative correlation with larval densities was observed in 1977. Dissolved oxygen concentrations were not limiting at any time in the site area, and the significant correlations of larval density with dissolved oxygen concentrations were probably coincidental rather than suggestive of a significant relationship. A stepwise regression model of $\log_n$ larval density (1978 data) with dissolved oxygen and turbidity as independent variables could account for only six percent of the variance in larval densities (Appendix 2.2A).

2.2.2.7 Commercial, Threatened and Endangered, and Rare Species found Offshore Hutchinson Island

2.2.2.7.1 Commercial Species

Florida landing data for finfish and shellfish are summarized in Table 2.2-24. The most current summary report available is based on 1976 landing data(47).

In 1976, the dominant commercial finfish species landed in St Lucie and Martin counties were bluefish, king mackerel and Spanish mackerel. These three species accounted for 88 percent of the total catch from St Lucie County (50 percent Spanich mackerel, 34 percent king mackerel and four percent bluefish) and 77 percent of the total commercial catch in Martin County (64 percent Spanish mackerel, 11 percent bluefish and two percent king mackerel). Remaining commercial fish species accounted for five percent or less of total commercial landings.

Spanish mackerel landings from St Lucie and Martin counties represented 39 percent of the total Spanish mackerel landings in the state and 71 percent of the Spanish mackerel catch on the east Florida coast. Bluefish catch in the St Lucie and Martin counties accounted for 42 percent of the total Florida bluefish and 58 percent of the east Florida coast bluefish landings. King mackerel catches landed in these two counties represented 52 and 33 percent of total east Florida coast and total Florida landings, respectively. The exvessel prices of total St Lucie and Martin (1976) catches amounted to $123,339, $1,126,028, $1,231,154, for bluefish, Spanish and king mackerel, respectively.

Life histories of these three species were presented in the St Lucie Unit 2 Environmental Report - Construction Permit, Section 2.7.5.9. All three migratory species overwinter in the southeast Florida area. The northward migration of the Spanish mackerel occurs in the early spring, slightly before the migration of king mackerel. Similarly, bluefish populations peak during winter, before moving northward. The months of peak abundance of these fish as evidenced in commercial fisheries data (winter, early spring) corresponded to peaks in operational monitoring gill net sampling.

The role of St Lucie and Martin counties offshore waters in commercial shellfish catches is minor compared to its importance as major commercial and sport finfishing grounds. Florida shrimp landings are predominantly found along the Atlantic coast as far south as St Lucie inlet and the northwest coast to the Ochlockonee River (white and brown shrimp; Penaeus fluviatilis and P. aztecus), the Tortugas offshore grounds and the Sarasota-Tarpon Springs areas (predominantly pink shrimp; P. duorarum)(48,49). Consequently, commercial shrimp landings from St Lucie and Martin counties are neglible (Table 2.2-24). Blue crab and spiney lobster were also captured commercially, although the total catch of both species in St Lucie and Martin counties was less than 0.3 percent of the total Florida catch of these species.

2.2.2.7.2 Endangered and Threatened Species

Marine turtles are the only organisms collected off Hutchinson Island which have been listed by U S Fish and Wildlife Service(50) as "threatened" or "endangered," and are discussed in Section 2.2.1.

2.2.2.7.3 Rare Species

A single fish species, the striped croaker (Bairdiella santaelucíae), collected off Hutchinson Island has been designated "rare" by the Florida Committee on Rare and Endangered Plants and Animals(51). The preferred habitat of the striped croaker, in and beyond the surf between Sebastian and Ft Pierce inlets, is just north of the St Lucie site. Over the three years of operational monitoring, 230 specimens have been impinged, all of which were juveniles. In April 1978, three individuals were collected in trawls at the two nearshore stations. However, no specimens have been collected in beach seine sampling. It has been suggested(22) that the St Lucie area is at the southern extreme of the species' range and that the impinged juveniles reflect organisms already lost to the preferred habitat, displaced through longshore currents.

2.2.2.8 Preexisting Stress

Offshore effects of St Lucie Unit 1 operation are observable in samples collected from Station 1 (discharge station) when compared with samples collected at other stations. However, discernible changes are limited to the phytoplankton and zooplankton populations. Observed effects include modification in the relative abundances of minor taxonomic groups of phytoplankton, and increased density of phytoplankton and zooplankton. Differences in the relative abundance of phytoplankton between intake and discharge stations vary in the degree of change through the year. Further, species whose relative abundance increase or decrease change seasonally.

The observed increases in phytoplankton and zooplankton densities at the discharge may result from increased productivity due to increased temperature (phytoplankton) and increased food availability (zooplankton). Additionally, passive displacement of plankton-rich intake canal water (See Section 5.1.3) may also partially explain the increased densities observed at the discharge station.

These changes do not indicate that operation of St Lucie Unit 1 is stressing the offshore environment. The observed changes in species' relative abundance are limited to samples collected at the discharge station and the remaining offshore stations appear unaffected by plant operation. Similarly, increased productivity, which is not necessarily an adverse effect, has been observed only at the discharge station.

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TABLE 2.2-1

VEGETATIVE COMPOSITION OF FP&L PROPERTY

Vegetation Cover Type	Acres	Hectares	Percent
Mangrove Swamp	750	305	66
Coastal Beach and Dune	49	20	4
Australian Pine	9	4	1
Utility-Developed Land			
St Lucie Unit 1 and 2 Facilities	248	99	22
Disturbed Field and Shrub[1/]	52	21	5
Road and Roadside	24	10	2
Total	1132	459	100

[1/] Comprises part of St Lucie Units 1 and 2 fill/borrow area.

TABLE 2.2-2

COVER/ABUNDANCE ESTIMATES FOR PLANT SPECIES OCCURRING IN MANGROVE SWAMP HABITAT

	STATION[1]												
	1	2	3	4	5	6	7	8	9	10	11	12	13
Water depth (inches)	16	2	0	0	0	2	2	2	2	2	----beach------		
Species[2]	Cover/Abundance[3]												
Laguncularia racemosa (white mangrove)	4		2										
Rhizophora mangle (red mangrove)	1	5	4			5	4	7	6	7	1		
Avicennia germinans (black mangrove)		2											
Acrostichum aurium (leather fern)			2		2								
Casuarina sp (Australian pine)			2	4							4	6	4
Sabal palmetto (cabbage palm)			3	4	6								
Schinus terebinthifolius (Brazilian pepper)			3										
Ficus aurea (strangler fig)			3	3	1								
Forestiera segregata (Florida privet)				3									
Eugenia axillaris (White stopper)				3									
Tillandsia usneoides (Spanish moss)				1									
Mastichodendron foetedissium (wild mastic)				1									
Randia aculeata (White indigo berry)				2									
Calophyllum inophyllum					2						1		
Coccoloba diversifolia (tie tongue)					2								
Coccoloba uvifera (sea grape)					2								
Sesuvium portulacastrum													2

---

[1] Stations approximately 60 feet apart, 33 feet in diameter, and located along a transect in the swamp immediately north of discharge canal.

[2] Nomenclature of Long and Lakela(5); voucher specimens collected for all species except *Sabal palmetto*, and identified at the University of Miami.

[3] 1 = solitary, cover less than 6 percent; 2 = few, cover less than 6 percent; 3 = numerous, cover less than 6 percent; 4 = 6-25 percent cover; 5 = 26-50 percent cover; 6 = 51-75 percent cover; 7 = 76-100 percent cover (Mueller - Dombois and Ellenberg(6)). All observations recorded January 30, 1979.

TABLE 2.2-3

COVER/ABUNDANCE ESTIMATES FOR DUNE FLORA: AREA OF UNIT 1 DISCHARGE PIPELINE

Species[3]	STATION[1]																											
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
	COVER/ABUNDANCE[2]																											
Uniola paniculata (sea oats)	4	5	7	7	7	4				6	7	7	5	3														
Panicum rhizomatum (panic grass)						7	7	4																				2
Cassuarina sp (Australian pine)								4	6	3													1	5				
Coccoloba uvifera (sea grape)								1							1					2	3	4	1	1	1			
Cenchrus incertus (burgrass)																	2	2		5	4		2	2	1	5		
Borrichia frutescens (sea daisy)																			2	2			2					
Juncus sp (rush)																					1							
Chamaesyce mesembryanthemifolia (spurge)																							1					
Bare Sand	7	5	3	2	2	2	3	7	4	4	2	2	7	2	2	7	7	7	7	4	7	6	7	7	7	7	7	7

[1] Stations located contiguously along transect perpendicular to coastline. Stations 1-9 occur on the east side of the foredune; transect terminated at FP&L fenceline (road) on west side of foredune. Each station one meter (3.3 feet) square.

[2] See scale presented in Table 2.2-2.

[3] Observations recorded January 30, 1979. Voucher specimens identified at the University of Miami. Nomenclature follows Long and Lakela(5).

TABLE 2.2-4

COVER/ABUNDANCE ESTIMATES FOR DUNE FLORA: AREA OF UNIT 2 DISCHARGE PIPELINE

	STATION[1]																	
Species[3]	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
	COVER/ABUNDANCE[2]																	
Opuntia sp (prickly pear)	4																	
Uniola paniculata (sea oats)	1																	
Yucca aloifolia (Spanish bayonet)	1	3	4	6	5	7	5											
Helianthus debilis var debilis (sunflower)		2	1															
Croton punctatus			3															
Serenoa repens (saw palmetto)							6	7	7	7	7	7	7	7	7	7	7	
Cassuarina sp (Australian pine)																		5
Bare Sand	2	7	5	4	5	2	2	2	2	2	2	2	2	2	2	2	2	2

Additional species recorded from other shore transects:

Batis maritima (batis), *Vitex trifolia*, *Myrsine guianensis*, *Lantana involucrata* (lantana), *Crotalaria pumila* (rattle box)

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[1] Stations located contiguously along transect perpendicular to coastline. Stations 1-9 occur on the east side of the foredune; transect terminated at FP&L fenceline (road) on west side of foredune. Each station one meter (3.3 feet) square.

[2] See scale presented in Table 2.2-2.

[3] Observations recorded January 30, 1979 Voucher specimens identified at University of Miami. Nomenclature of Long and Lakela (5).

TABLE 2.2-5

MAMMALS OF HUTCHINSON ISLAND

(Abundance proportional to number of "X's")

Species	Abundance, Location Hutch. Island	 Indian River	Habitat
Virginia opossum (Didelphis virginiana)	XXX		Varied types
Short-tailed shrew (Blarina brevicauda)	X		Varied types
Least shrew (Crypotis florida)	X		Fields, wetlands
Eastern mole (Scalopus aquaticus)	XX		Fields, sandy soils
Mississippi myotis (Myotis austroriparius)	XX	XX	Open water, field
Big brown bat (Eptesicus fuscus)	XX	XX	Open fields, buildings
Yellow bat (Dasypterus floridanus)	X	X	Woods
Evening bat (Nycticeus humeralis)	X	X	Trees, woodlands
Florida freetail bat (Tadarida cynocephala)	X	X	Buildings, open areas
Marsh rabbit (Sylvilagus palustris)	XX		Wetlands
Gray squirrel (Sciurus carolinensis)	X		Woods
Rice rat (Oryzomys palustris)	X		Wetlands
Old field mouse (Peromyscus polionotus)	XXX		Sandy fields
Cotton mouse (Peromyscus gossypinus)	XX		Woods
Cotton rat (Sigmodon hispidus)	XX		Fields, shrublands
Wood rat (Neotoma floridana)	X		Woods palmetto
Brown rat (Rattus rattus)	X		Dwellings
Porpoise (Stenella frontalis)		X	Ocean, estuaries
Gray fox (Urocyon cinereoargenteus)	X		Open woods
Raccoon (Procyon lotor)	XXX		Varied types
Mink (Mustela frenata)	X		Wetlands
Spotted skunk (Spilogale ambarvalis)	X		Fields, shrubs, open woods
River otter (Lutra canadensis)	X	X	River borders
Bobcat (Lynx rufus)	X		Forests, swamps
Manatee (Trichechus manatus)		X	Rivers
White-tailed deer (Odocoileus virginianus)	X	X	Varied types

Source: St Lucie Unit 2 Environmental Report - Construction Permit, 1973.

TABLE 2.2-6

LOCAL BIRD SPECIES

Below is a list of bird species that inhabit Hutchinson Island and the site vicinity. Species abundance and seasonal use of the area are indicated as follows:

R = Resident species
1 = Spring
2 = Summer
3 = Fall
4 = Winter

Abundance is given by:

r = Rare:	May not be found in site vicinity each year
o = Occasional:	Present in small numbers each season, hard to detect.
u = Uncommon:	Present in relatively small numbers in appropriate habitat types
c = Common:	Consistently observed; present in substantial numbers
a = Abundant:	Easily observed; present in large numbers.

Species	Abundance and Seasonal Occurrence
Common loon	u-3,4
Horned grebe	u-3,4
Pied-billed grebe	u-R
White pelican	u-4
Brown pelican	(c-a)-R
Gannet	r-4
Double-crested cormorant	c-R
Anhinga	(u-c)-R
Magnificant frigatebird	o-1,2,3,4
Great blue heron	c-R
Green heron	c-R
Little blue heron	(u-c)-R
Cattle egret	(c-a)-R
Reddish egret	o-R
Great egret	(c-a)-R
Snowy egret	c-R
Louisiana heron	c-R
Black-crowned night heron	u-R
Yellow-crowned night heron	u-R
Least bittern	u-4
Wood stork	c-R
Glossy ibis	u-R
White ibis	c-R
Brant	r-4
Snow goose	r-4

TABLE 2.2-6

Species	Abundance and Seasonal Occurrence
Mallard	u-3,4
Black duck	u-3,4
Pintail	u-3,4
Mottled duck	u-R
Green-winged teal	u-1,3,4;
Blue-winged teal	u-1,3,4;o-2
Gadwall	u-3,4
American wigeon	o-1,3;c,4
Northern shoveller	u-1,3,4;
Wood duck	u-R
Ringed-necked duck	u-4
Lesser scaup	(u-c)-4
Hooded merganser	u-4
Red-breasted merganser	c-4
Turkey vulture	c-R
Black vulture	c-R
Swallow-tailed kite	r-2
Coper's hawk	u-R
Red-tailed hawk	u-R
Red-shouldered hawk	u-R
Broad-winged hawk	r-3,4
Bald eagle	u-1,3,4
Marsh hawk	u-1,c-3,4
Osprey	u-1,2;c-3,4
Peregrine falcon	o-4,1,3
Merlin	o-4,1,3
American kestrel	c-3,4
Bobwhite	c-R
Virginia rail	u-1,3-4
Sora rail	c-1,3,4
King rail	r-1,3,4
Clapper rail	u-R
Purple gallinule	o-R
Common gallinule	c-R
American coot	c-1,3,4,r-2
Semipalmated plover	u-1,3,4
Piping plover	r-1,3,4
Wilson's plover	u-1,2,3; o-4
Killdeer	c-R
Black-bellied plover	u-1,3,4
Ruddy turnstone	u-2, c-3,4,1
American woodcock	o-3,4
Common snipe	u-3,4
Spotted sandpiper	u-3,4
Willet	u-1,2,3; c-4
Greater yellowlegs	u-1,4;c-3
Lesser yellowlegs	u-1,4,c-3

TABLE 2.2-6

Sheet 3 of 5

Species	Abundance and Seasonal Occurrence
Least sandpiper	u-1,3,4
Dunlin	c-1,3,4
Short-billed dowitcher	c-3,4,1
Semipalmated sandpiper	c-1,3,u-4
Western sandpiper	c-1,3,4
Sanderling	(u-c)-3,4,1
Avocet	(r-o)-3,4
Great black-backed gull	(r-o)-4
Herring gull	c-1,3,4
Ring-billed gull	(c-a)-1,3,4
Laughing gull	(c-a)-R
Bonaparte's gull	(r-u)-1;c-3,4
Forster's tern	c-1,3,4
Common tern	(r-u)-3,4
Royal tern	c-R
Sandwich tern	u-c4,3,1,2
Caspian tern	u-c4,1,2,3,4
Black tern	c-3,u-1
Black skimmer	(u-c)-R
Mourning dove	c-R
Ground dove	c-R
Yellow-billed cuckoo	u-1,2,3
Smooth-billed ani	u-R
Barn owl	(r-u)-R
Screech owl	(u-c)-R
Great-horned owl	u-R
Short-eared owl	r-3
Barred owl	u-R
Chuck-wills widow	u-1,2;o-3,4
Common nighthawk	u-1,2
Ruby-throated hummingbird	u-1,3,4;r,2
Belted kingfisher	u-1,2;c-3,4
Common flicker	u-R
Pileated woodpecker	u-R
Red-bellied woodpecker	c-R
Red-headed woodpecker	r-R
Yellow-bellied sapsucker	u-3,4,1
Downy woodpecker	u-1,3,4;r-2
Eastern kingbird	(u-c)-1,3
Gray kingbird	r-1,2
Great crested flycatcher	u-1,2;o-3,4
Eastern phoebe	u-1;(u-c)-3,4
Tree swallow	o-1;a-3,4
Barn swallow	c-1,3
Purple martin	o-1,2,3
Blue jay	c-R
Scrub jay	r-R
Common crow	u-R

Sheet 4 of 5

TABLE 2.2-6

Species	Abundance and Seasonal Occurrence
Fish crow	a-R
House wren	u-4,1,3
Carolina wren	u-R
Long-billed marsh wren	u-4,1,3
Mockingbird	c-R
Catbird	c-1,3,4
Brown thrasher	(u-c)-R
Robin	c-4
Hermit thrush	u-4
Swainson's thrush	u-1,3
Gray-checked thrush	u-1,3
Veery	u-1,3
Eastern bluebird	(r-u)-4
Blue-gray gnatcatcher	(u-c)-1,3,4
Ruby-crowned kinglet	u-4
Cedar waxwing	o-3,4,1
Loggerhead shrike	u-1,2,3,4
Starling	c-R
White-eyed vireo	(u-c)-R
Solitary vireo	(r-o)-4,3,1
Black-whiskered vireo	(r-o)-1,2
Red-eyed vireo	c-1,3
Black-and-white warbler	u-1,3;c,4
Worm-eating warbler	(o-u)-1,3
Orange-crowned warbler	o-3,u-4
Cape May warbler	c-1,u-3
Yellow-rumped warbler	c-3,4
Parula warbler	(r-o)-4,c-1
Yellow warbler	o-1,3
Black-throated blue warbler	c-1,3
Yellow-throated warbler	o-3,c-4,o-1
Blackpoll warbler	c-1,r-3
Pine warbler	u-R
Prairie warbler	u-R
Palm	o-1,c-3,4
Ovenbird	u-1,3,o-4
Northern waterthrush	o-1,3,4
Common yellowthroat	c-1,3,4
American redstart	c-1,3;r,4
House sparrow	c-R
Bobolink	u-1,3
Eastern meadowlark	u-R
Red-winged blackbird	c-R
Northern oriole	o-4
Rusty blackbird	r-3,4
Boat-tailed grackle	c-R
Common grackle	c-R
Brown-headed cowbird	(u-c)-3,4
Cardinal	c-R

TABLE 2.2-6

Species	Abundance and Seasonal Occurrence
Rose-breasted grosbeak	u-1,3
Indigo bunting	(o-u)-1,3,4
Painted bunting	(o-u)-1,3,4
Pine siskin	r-4
American goldfinch	u-3,4
Rufous-sided towhee	u-R
Savannah sparrow	c-1,3,4
Sharp-tailed sparrow	(r-o)-3,4
Seaside sparrow	(r-o)-3,4
Chipping sparrow	(o-u)-3,4
Field sparrow	r-3,4
White-throated sparrow	r-4
Lincoln's sparrow	r-1,3,4
Swamp sparrow	u-3,4
Song sparrow	o,1;u-3,4

Sources: Modified from St Lucie Unit 2 Environmental Report - Construction Permit, 1973.
References 9 and 10.
Reviewed by Dr. H.W. Kale II, Florida Audubon Society, 1979.

TABLE 2.2-7

SUMMARIZED RESULTS OF PHYTOPLANKTON SAMPLES FROM BASELINE[1] AND ST LUCIE UNIT 1 OPERATIONAL MONITORING PROGRAMS

	Baseline Monitoring Sep 1971 - Nov 1972[1]	Mar-Oct 1976[2]	Jan-Dec 1977[2]	Jan-Nov 1978[2]
Range of Cell Densities	1.0-30,533 cells/liter	282×10^3-9844×10^3 cells/liter	86×10^3-9723×10^3 cells/liter	99×10^3-$24{,}249 \times 10^3$ cells/liter
Range of Chlorophyll - a Concentrations	0.08-7.7 mg/m^3	0.4-8.97 mg/m^3	0.21-12.2 mg/m^3	0.13-11.26 mg/m^3
Range of Phaeopigment Concentrations		0.0-3.41 mg/m^3	0.01-1.13 mg/m^3	0.0-1.19 mg/m
Primary Peak Period of Abundance (Secondary)	October	October (March)	November	November (May)
Taxa Observed	Bacillariophyta Chlorophyta Chrysophyta Pyrrophyta	Bacillariophyta Chlorophyta Chrysophyta Cryptophyta Cyanophyta Euglenophyta Haptophyceae Prasinophycease Pyrrophyta Xanthophyta Unidentified phytoflagellates	Bacillariophyta Chlorophyta Chrysophyta Cryptophyta Cyanophyta Euglenophyta Haptophyceae Prasinophycease Pyrrophyta Unidentified phytoflagellates	Bacillariophyta Chlorophyta Chrysophyta Cryptophyta Cyanophyta Euglenophyta Haptophyceae Prasinophycease Pyrrophyta Xanthophyta Unidentified phytoflagellates
Dominant Taxa (Mean Annual Relative Abundance	Diatoms	Diatoms (57.5%) Unidentified Phytoflagellates (32.9%)	Diatoms (42.2%) Unidentified Phytoflagellates (38.3%)	Diatoms (59.3%) Unidentified Phytoflagellates (25.0%)
Dominant Organisms	Nitzschia spp. Chaetoceros sp. Bellerochea sp. Thalassionema nitzchioides Skeletonema costatum	Skeletonema costatum	Skeletonema costatum	Skeletonema costatum Nitzschia delicatissima
Range of Productivity Estimates (Annual Rate)		0.14-1.39 g C/m^2/day (179 g C/m^2/year)	0.10-0.70 g C/m^2/day (121 g C/m^2/year)	0.04-2.24 g C/m^2/day (153 g C/m^2/year)
Peak Period of Productivity		July	September	May
Period of Minimum Productivity		May	May	July

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[1] Adapted from: Fla Dept Nat Res, Prelim Repts, Feb 1972, Jun 1972, Dec 1972 and Apr 1973.

[2] Adapted from: Applied Biology, Inc. Annual Rept of Biological Monitoring: St Lucie, 1977; 1978; 1979.

TABLE 2.2-8

Sheet 1 of 2

RESULTS OF SIGNIFICANT STATISTICAL TESTS PERFORMED ON PHYTOPLANKTON DATA FROM ST LUCIE UNIT 1 OPERATIONAL MONITORING (MARCH 1976 - DECEMBER 1978)

	Mar-Oct 1976	Jan-Dec 1977	Jan-Nov 1978
ANOVA	Months: Cell Density Surface: Oct > all other months excluding March Bottom: Oct > all other months, May > March Chlorophyll a Surface & Bottom: Oct > all other months Productivity July May	Months: Cell Density, Conc Chlorophyll a, Surface & Bottom: Nov > all other months Productivity Sept > May	Months: Tests not performed
	Stations: Chlorophyll a Surface: Station 1 > Station 3	Stations: Chlorophyll a Surface: Station 1 > Stations 3 & 4	Stations: Cell Density Surface: Stations 0 & 1 > Stations 3 & 4
			Phaeopigment Surface: Station 1 > Station 5
		Cell Density Bottom: Station 1 > Stations 2 & 3	Cell Density Bottom: Station 1 > Stations 3, 4 & 5
			Chlorophyll a Bottom: Station 1 > Station 3
		Chlorophyll a & Phaeopigment Bottom: Station 0 > Station 3	Phaeopigment: Bottom: Station 1 > Stations 2, 3 & 4

TABLE 2.2-8

Sheet 2 of 2

	Mar-Oct 1976	Jan-Dec 1977	Jan-Nov 1976
CORRELATION	Chlorophyll a: + with Cell Density Cell Density & Chlorophyll a: + with temperature	Chlorophyll a: (March 1976-Dec 1977) + with Cell Density Bottom: Cell Density, Chlorophyll a & Phaeopigment (March 1976-Dec 1977): + with Phosphate - with Salinity Surface: Chlorophyll a (March 1976-Dec 1977): - with Salinity	Chlorophyll a: + with Cell Density
REGRESSION		Cell Density: Temperature, NO_2 & NH_3 account for 26.7% variance Chlorophyll a: Temperature, NO_3 & NO_2 & Silicate account for 47% variance	Cell Density: Surface: Temperature, Salinity, Dissolved O_2, NO_3, NO_2 & NH_3 account for 50% variance Bottom: Temperature Dissolved O_2, NO_3, NO_2, NH_3 & Phosphates account for 47% variancel Chlorophyll a: Surface: Temperature, Dissolved O_2, NO_3, NO_2, NH_3 & Silicate account for 57% variance Bottom: Temperature, Salinity, NO_2 & Phosphates account for 29% variance

TABLE 2.2-9

RESULTS OF SIGNIFICANT ANOVA PERFORMED ON ST LUCIE UNIT 1 OPERATIONAL PHYTOPLANKTON DATA (POOLED DATA INCLUDING MARCH 1976 - DECEMBER 1978)

Years	Surface Cell Density:	1976 > 1978, 1977
	Bottom Cell Density:	1976 > 1978 > 1977
	Surface Chlorophyll a:	1976 > 1977
	Bottom Chlorophyll a:	1976, 1978 > 1977
	Surface Phaeopigment:	1976 > 1978
	Bottom Phaeopigment:	1976 > 1977, 1978
Stations	Surface Cell Density:	Station 1 > Stations 3 & 4
	Bottom Cell Density:	Station 0 > Station 3 Station 1 > Stations 3 & 4
	Surface & Bottom Chlorophyll a:	Station 1 > Station 3
	Surface Phaeopigment:	Station 1 > Stations 0, 2, 3, 4 & 5

TABLE 2.2-10

SUMMARIZED RESULTS OF ZOOPLANKTON SAMPLES FROM BASELINE AND ST LUCIE UNIT 1 OPERATIONAL MONITORING PROGRAMS

	Baseline Monitoring[1] Sep 1971 - Nov 1972	Mar-Oct 1976[2]	Jan-Dec 1977[2]	Jan-Nov 1978[2]
Represented Taxa		Annelida Arthropoda (primarily Crustacea) Bryozoa Chatognatha Chordata Coelenterata Echinodermata Mollusca Nematoda Protozoa Rotifera	Annelida Arthropoda (primarily Crustacea) Bryozoa Chatognatha Chordata Coelenterata Echinodermata Mollusca Nematoda Choronida Protozoa	Annelida Arthropoda (primarily Crustacea) Bryozoa Chatognatha Chordata Coelenterata Echinodermata Mollusca Nematoda Nemertina Phoronida Platyhelminthes Protozoa
Dominant Taxa (Annual mean relative abundance)	Copepods	Copepods (57.9%)	Copepods (63 %)	Copepods (62.6%)
Range of Densities	244-12,023 Zooplankters/m^3	31-20,206 zooplankters/m^3	17-28,913 zooplankters/m^3	110-51,529 zooplankters/m^3
Primary Period of Maximum Abundance (Secondary Peak)	May (January)	September	March (July)	August (October)
Period of Minimum Abundance	November 1971	May	December	November
Range of Biomass		0.04-167.5 mg/m^3	0.85-223.5 mg/m^3	0.98-95.5 mg/m^3
Period of Maximum Biomass		July	July	August
Period of Minimum Biomass		June	October	May

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[1] Adapted from: Fla Dept Nat Res, Prelim Repts, Feb '72, Jun '72, Dec '72 and Apr '73.

[2] Adapted from: Applied Biology, Inc. Annual Rept of Biological Monitoring: St Lucie, 1977; 1978; 1979.

TABLE 2.2-11

RESULTS OF SIGNIFICANT STATISTICAL TESTS PERFORMED ON ZOOPLANKTON OPERATIONAL MONITORING DATA
(March 1976 - December 1978)

	Within Years			Among Years
	1976	1977	1978	1976-1978
ANOVA	Months Density: Sept > other months	Months Density March & July > Jan, May, Oct, Dec	Months Not tested	
			Stations Surface Density: Station 1 > Station 3 Surface Biomass: Station 1 > Stations 0, 2, 3 & 4	Stations Surface Density: Station 1 > Stations 0, 2, 3 & 4 Surface Biomass: Station 1 > Stations 0, 2, 3 & 4 Bottom Biomass: Station 2 > Station 0
				Years, Bottom Surface Density: 1977, 1978 > 1976
CORRELATION		Density (Surface & Bottom, Mar 1976-1977: + with temperature Density (Bottom, Mar 1976-1977): - with dissolved oxygen Biomass (Surface, Mar 1976-1977): + with temperature - with dissolved oxygen		
REGRESSION		Surface Density (Biomass): 10.3% (10.6%) variance accounted for by temperature, dissolved O_2 and salinity	Surface Density (Biomass): 34% (17%) variance accounted for by temperature, dissolved O_2 and salinity	
		Bottom Density (Biomass): 8.2% (0.7%) variance accounted for by temperature, dissolved O_2 and salinity.	Bottom Density (Biomass): 42% (14%) variance accounted for by temperature, dissolved O_2 and salinity (temperature, salinity)	

TABLE 2.2-12

SUMMARIZED RESULTS OF MACROPHYTE OPERATIONAL MONITORING SAMPLES (MARCH 1976 - DECEMBER 1978)

	1976[1]	1977[2]	1978[3]
Numbers of Species Collected	23	28	88
Dominant Taxa	Rhodophyta	Rhodophyta (46% relative abundance)	Rhodophyta (65% relative abundance)
Period of Maximum Diversity	September	September	June (2° September)
Period of Minimum Diversity	March	March	March
Station Differences	-	-	Diversity nearshore diversity offshore

[1,2,3] Adapted from Applied Biology Inc.St Lucie Plant Operational Monitoring Reports, 1977; 1978; 1979

TABLE 2.2-13

MANN-WHITNEY U-TEST COMPARISONS BETWEEN 1971-1973[1] AND 1977-1978 GRAB DATA ST LUCIE PLANT

Parameter	Station 1	2	3	4	5
Lancelet density (no./m^2)	NS[2]	NS	NS	NS	NS
Arthropod density (no./m^2)	*increase	*increase	*increase	NS	*increase
Arthropod diversity ($\bar{d}$)	*increase	*increase	NS	*increase	*increase

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[1] Futch and Dwinell, 1977; Camp et al., 1977.

[2] NS = Not significant.
*Significant at p=0.05.

TABLE 2.2-14

SUMMARIZED RESULTS OF ST LUCIE UNIT 1 OPERATIONAL MONITORING DATA: MACROINVERTEBRATE GRAB SAMPLES[1]

	1976[2]	1977[3]	1978[3]
Range of Number of Taxa Collected (Annual $\bar{X}$ per Station)	24.5-113.5	34.7-152.2	25.0-153.0
Range of Density: Organisms/m^2 (Annual $\bar{X}$ per Station)	556-16140 organisms/m^2	979-17463 organisms/m^2	616-19784 organisms/m^2
Range of Biomass: g/m^2 (Annual $\bar{X}$ per Station)	2.02-30.77 g/m^2	3.88-68.68 g/m^2	1.05-45.45 g/m^2
Range of Diversity Values (Annual $\bar{X}$ per Station)	3.305-4.821	3.473-5.489	3.602-5.331
Equitability (Annual $\bar{X}$ per station)	0.299-0.801	0.400-0.735	0.415-0.888
Quarter of Maximum Density	3rd	1st	2nd
Quarter of Maximum Species Richness	3rd	3rd	3rd
Quarter of Maximum Diversity	4th	1st	2nd
Quarter of Maximum Biomass	1st	4th	3rd

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[1] Adapted from Applied Biology. St Lucie Unit 1, Operational Monitoring: Annual Reports, 1977; 1978; 1979.

[2] 10 month sampling effort

[3] 12 month sampling effort

TABLE 2.2-15

RESULTS OF STATISTICAL TESTS APPLIED TO UNIT 1 OPERATIONAL MONITORING DATA: MACROINVERTEBRATE GRAB SAMPLES[1]

(Pooled data, 1976 - 1978)

Test	Results			
Kruskal - Wallis[2]	Grab Efficiency: Significant decrease at Stations 0, 1 & 5			
	Number of Taxa Collected: Significant decrease at Station 0 Significant increase at Stations 2, 4 & 5			
	Number of Organisms Collected: Decrease at Station 0 Increase at Station 5			
		1976	1977	1978
Morisita Index[2]	Stations Most Similar	2, 4 & 5	2 & 4	2 & 4
Rarefaction Curve[2]	Stations 3 & 4: Most consistent among years Station 5: Most divurgent among years			
Spearman Ranks[2]	Number of Taxa: + Correlation with Density (All Stations)			
	Number of Taxa: + Correlation with Temperature (Stations 2, 3 & 4; Pooled Stations excluding Control).			
	Density: + Correlation with Temperature (Stations 2, 3 & 4; Pooled Stations excluding Control).			

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[1] Adapted from Applied Biology. St Lucie Unit 1, Operational Monitoring: Annual Reports, 1977; 1978; 1979.

[2] Description of statistical tests are found in Appendix 2.2A.

TABLE 2.2-16

SUMMARIZED RESULTS OF UNIT 1 OPERATIONAL MONITORING DATA: MACROINVERTEBRATE TRAWL SAMPLES[1]

	1976[2]	1977[3]	1978[3]
Number of Organisms Collected	9040	5923	18,804
Number of Taxa Collected	156	164	182
Period of Maximum Species Richness	August	Summer	July-September
Station of Maximum Species Richness	Stations 0 & 5	Station 5	Stations 0 & 5
Station of Minimum Species Richness	Station 3	Station 3	Station 3
Dominant Taxa	Stations 0, 1, 3: *Trachypenaeus constrictus*	Stations 0, 1, 3: *Trachypenaeus constrictus*	Stations 0, 1, 3: *Trachypenaeus constrictus*
	Stations 2, 4, 5: Molluscs	Stations 2, 4, 5: Molluscs	Stations 2, 4, 5: Molluscs

---

[1] Adapted from Applied Biology Inc., St Lucie Unit 1, Operational Monitoring: Annual Reports, 1977; 1978; 1979.

[2] 10 month sampling effort

[3] 12 month sampling effort

TABLE 2.2-17

RESULTS OF STATISTICAL TESTS APPLIED TO UNIT 1 OPERATIONAL MONITORING DATA: MACROINVERTEBRATE TRAWL SAMPLES[1]

Test	Results
Kruskal - Wallis[2]	Years not significantly different in number of taxa collected at each individual Station.
Mann-Whitney U-Test[2]	In 1978: Increase in species' richness at Station 0 Species' richness at Station 0, Station 1
	1977-1978 Comparison: Increased similarity between Stations 3 & 4 Decreased similarity between Stations 0 & 1
Whittaker Diversity[2]	Stations 1, 2, 3 & 4: Dominated by a few species Stations 0 & 5: More equitable dominance - distribution
	1978: Increased diversity at Stations 0 & 4 No change at Stations 1, 2 & 5

---

[1] Adapted from Applied Biology Inc. St Lucie Unit 1, Operational Monitoring: Annual Reports, 1977; 1978; 1979.

[2] Descriptions of nonparametric statistical tests are found in Appendix 2.2A.

TABLE 2.2-18

SUMMARIZED RESULTS OF FISH SAMPLING CONDUCTED FOR BASELINE MONITORING (September 1971 - July 1973)[1]

	Beach Seine	Offshore Trawl			Total
		Stations 2, 4 and 5	Station 1	Station 3	
Sampling Effort	9 hours	33 hours			42 hours
Period of Peak Abundance					September to November
Number of Species Collected (% species caught only at this area)	35 (71%)	30 (42%)	29 (38%)	13 (15%)	
Dominant Fish	Florida pompano Gulf kingfish Sand drum Sardines	Leopard sea-robin Lizardfish	Anchovy Lizardfish	Flounder Snakefish	

---

[1] Adapted from Futch and Dwinnell; Reference 43.

TABLE 2.2-19

SUMMARIZED RESULTS OF BEACH SEINE SAMPLING ST LUCIE UNIT 1 OPERATIONAL MONITORING (MARCH 1976 - DECEMBER 1978)[1]

		1976[2]		1977[3]		1978[3]	
Number of fish collected		1,211		819		1,203	
Period of Maximum Abundance		September		September		July	
Dominant Fish:	Relative Abundance (% Annual Catch)	Anchovy:	13.1%	Anchovy:	7.3%	Anchovy:	0.0%
		Atlantic bumper:	2.3%	Atlantic bumper:	5.4%	Atlantic bumper:	0.1%
		Other jacks:	6.0%	Other jacks:	5.1%	Other jacks:	1.9%
		Florida pompano	3.6%	Florida pompano	2.7%	Florida pompano	2.2%
		Herring:	42.1%	Herring:	20.9%	Herring:	28.3%
		Kingfish:	8.9%	Kingfish:	21.0%	Kingfish:	14.3%
		Mojarra:	0.7%	Mojarra:	9.9%	Mojarra:	23.3%
		Sand drum:	8.7%	Sand drum:	21.1%	Sand drum:	16.1%
		Spot:	8.3%	Spot:	0.0%	Spot:	12.2%
Station Differences		north > south > mid Stn 6 > Stn 8 > Stn 7		Stn 6 > Stn 8*		mid > south > north Stn 7 > Stn 8 > Stn 6	

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[1] Adapted from Applied Biology Inc. St. Lucie Unit 1 Operational Monitoring Reports, 1977; 1978; 1979

[2] 10 month sampling

[3] 12 month sampling

* Significance at = 0.05.

TABLE 2.2-20

SUMMARIZED RESULTS OF OFFSHORE GILL NET SAMPLING
ST LUCIE UNIT 1, OPERATIONAL MONITORING (MARCH 1976 - DECEMBER 1978)[1]

		1976[2]		1977[3]		1978[3]	
Number of fish collected		1,734		1,223		874	
Primary Period of Maximum Abundance		October		October		November	
Dominant Fish:	Relative Abundance (% Annual Catch)	Bluefish:	5.2%	Bluefish:	27.1%	Bluefish:	1.4%
		Jacks:	66.8%	Jacks:	23.4%	Jacks:	70.8%
		Atlantic bumper:	32.2%	Atlantic bumper:	17.2%	Atlantic bumper	55.1%
		Blue runner:	15.7%	Blue runner:	5.8%	Blue runner:	10.4%
		Crevalle jack:	18.9%	Crevalle jack:	0.4%	Crevalle jack:	5.3%
		Spanish mackerel:	10.3%	Spanish mackerel:	33.3%	Spanish mackerel:	7.0%
Station Differences (Results of ANOVA)		Stns 0 & 1 > Stns 2-5		NS		Stn 0 > Stns 3 & 4* Stn 1 > Stns 2-5*	

---

[1] Adapted from Applied Biology Inc, St Lucie Unit 1 Operational Monitoring Reports, 1977; 1978; 1979

[2] 10 month sampling

[3] 12 month sampling

* Significance at = 0.05

NS indicates no significant differences among stations.

TABLE 2.2-21

SUMMARIZED RESULTS OF FISH TRAWL SAMPLING ST LUCIE UNIT 1 OPERATIONAL MONITORING (MARCH 1976 - DECEMBER 1978)[1]

	1976[2]		1977[3]		1978[3]	
Number of fish collected	656		2,048		2,513	
Period of Maximum Abundance	May		November		September - November	
Dominant Fish: Relative Abundance (% Annual Catch)	Anchovy:	2.7%	Anchovy:	1.1%	Anchovy:	18.3%
	Cusk eel:	11.0%	Cusk eel:	2.3%	Cusk eel:	8.0%
	Flatfish (flounder, sole, tonguefish):	19.6%	Flatfish (flounder, sole, tonguefish):	10.7%	Flatfish (flounder, sole, tonguefish):	12.0%
	Grunt:	9.3%	Grunt:	8.7%	Grunt	10.5%
	Sant perch:	13.1%	Sand perch:	6.9%	Sand perch:	3.4%
	Sea robin and scorpion fish:	19.6%	Sea robin and scorpion fish:	8.3%	Sea robin and scorpion fish:	11.7%
	Sea trout:	0.0%	Sea trout:	29.6%	Sea trout:	7.0%
	Other croaker:	2.0%	Other croaker:	12.2%	Other croaker:	4.5%
Station Differences (Results of ANOVA)	NS		NS		NS	

---

[1] Adapted from Applied Biology Inc, St Lucie Unit 1 Operational Monitoring Reports, 1977; 1978; 1979

[2] 10 month sampling

[3] 12 month sampling

NS indicates no significant differences among stations.

TABLE 2.2-22

SUMMARIZED RESULTS OF FISH EGG DATA FROM ICHTHYOPLANKTON MONITORING PROGRAM, MARCH 1976 - DECEMBER 1978 (APPLIED BIOLOGY, 1977, 1978 AND 1979)

	1976	1977	1978
Number of Samples Collected	450	400	370
Period of Peak Abundance	March and June	February and April	Spring and Early Summer
Range of Densities	0-87.8 eggs/m^3	0-98.3 eggs/m^3	0-168.5 eggs/m^3
Significant Statistical Tests (at = 0.05)			
ANOVA	Stations: NS	Stations: NS Pooled Data: Stn 0 > Other Stations (Summer)	Stations: NS Pooled Data: Stn 1 > Other (Winter)
Correlation	Negative with T Positive with DO	Negative with T Positive with DO Negative with Turbidity	- Positive with DO Positive with Salinity
Regression			Salinity, Temperature DO and Ind; Egg Density as Dep, $r^2 = .19$

NS indicates no significant differences.

TABLE 2.2-23

SUMMARIZED RESULTS OF LARVAL DATA FROM ICHTHYOPLANKTON MONITORING PROGRAM, MARCH 1976 - DECEMBER 1978

	1976	1977	1978
Period of Peak Abundance	September and April	January and July	Spring and Early Summer
Range of Densities	0-7.9 larval/m^3	0-8.6 larval/m^3	0-11.0 larval/m^3
Dominant Organisms	Clupiforme; $\bar{X}$ = 29.8% Gerreidae; $\bar{X}$ = 19.5%	Clupiforme; $\bar{X}$ = 64.9% Gerreidae; $\bar{X}$ = 6.3%	Clupiforme; $\bar{X}$ = 61.6% Gerreidae; $\bar{X}$ = 7.6%
Significant Statistical Tests (at = 0.05)			
ANOVA	Stations: NS*	Stations: NS* Pooled Data, Stations: Winter: Stn 0 > 2&3 Fall: Stn 1 > 2&4	Stations: Stn 1 > 0,2-5 All Others, Pooled Data, Spring: Stn 1 > 0,2-5
Correlation	Positive with DO	Negative with DO	Positive with DO
	Positive with DO	Positive with Turbidity	
Regression			DO and Turbidity as ind; larval dens. as dep: r^2 = .06

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* NS indicates no significant differences

TABLE 2.2-24

FLORIDA COMMERCIAL FISHERIES DATA

Finfish	East Fla Coast[2]	West Fla Coast[2]	St Lucie Co[2]	% of St Lucie County Landings	Martin County[2]	% of Martin County Landings	% East Fla Coast Catch Landed in St Lucie & Martin Counties	% Total Fla Catch Landed in St Lucie & Martin Counties	Price/Kg[3]
Black mullet	877,314	7,614,637	63,461	2	102,495	5	19	2	$0.36
Bluefish	627,188	239,816	125,705	4	237,057	11	58	42	0.34
Goatfish	43,691	-	600	.01	35,723	2	95	95	0.82
King mackerel	2,191,314	1,273,435	1,093,989	34	43,413	2	52	33	0.99
Mojarra	57,120	60,986	3,851	0.1	47,441	2	90	43	0.29
Pompano	201,938	430,842	44,129	0.1	37,497	2	40	13	2.99
Sheepshead	105,398	118,807	7,337	0.2	45,806	2	50	24	0.33
Spanish mackerel	4,358,440	3,537,654	1,636,766	50	1,441,118	64	71	39	0.40
Shellfish									
Blue crab	1,829,155	5,476,565	1,636	34	-		0.1	0.1	0.37
Shrimp	1,267,356	11,444,997	-	-	-		-	-	
Spiney lobster	448,752	1,981,030	3,116	66	886	100	0.8	0.2	3.53

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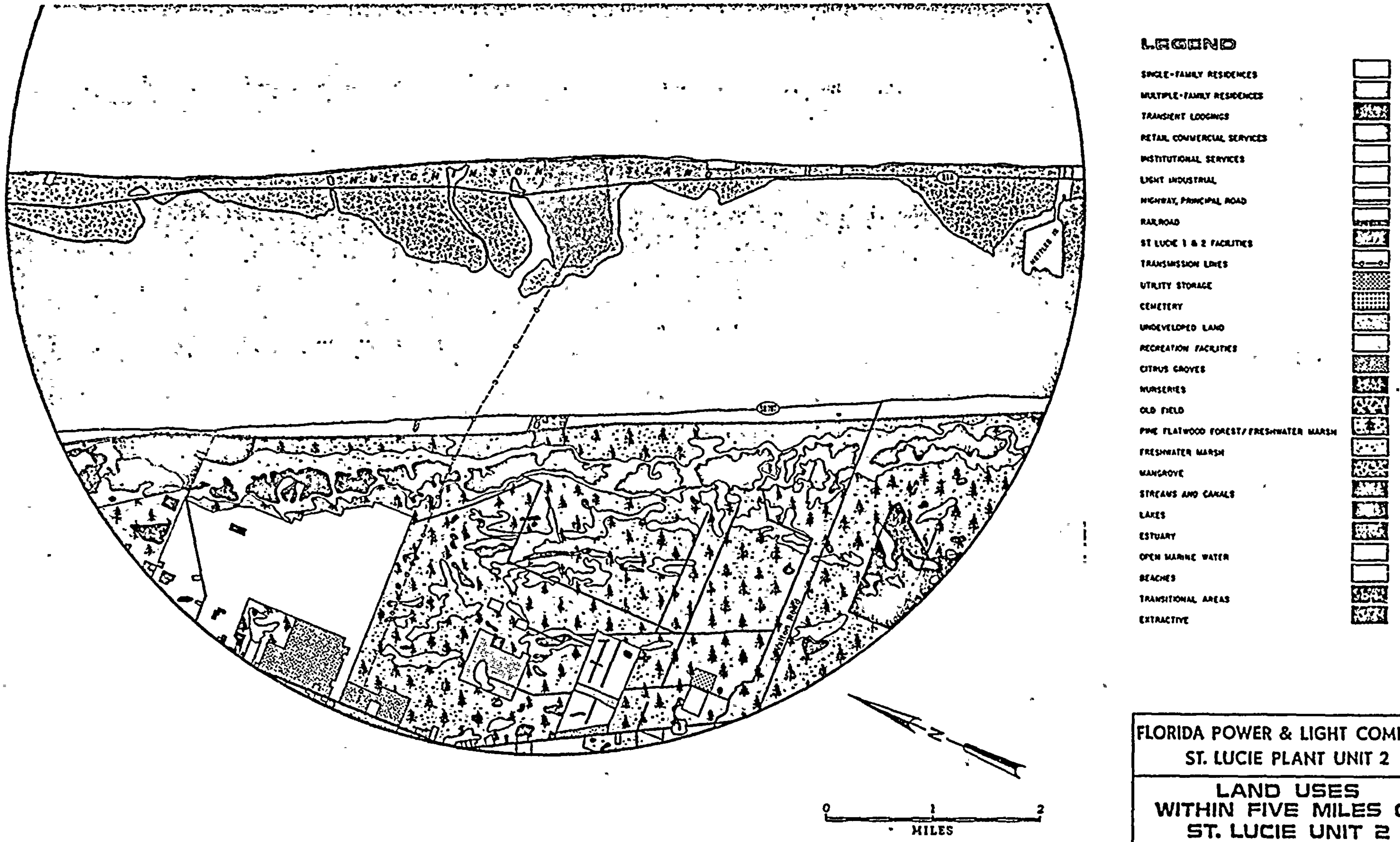
[1] Adapted from: Florida Landings, Annual Summary, 1976
NOAA, NMFS, 1978

[2] Kilograms

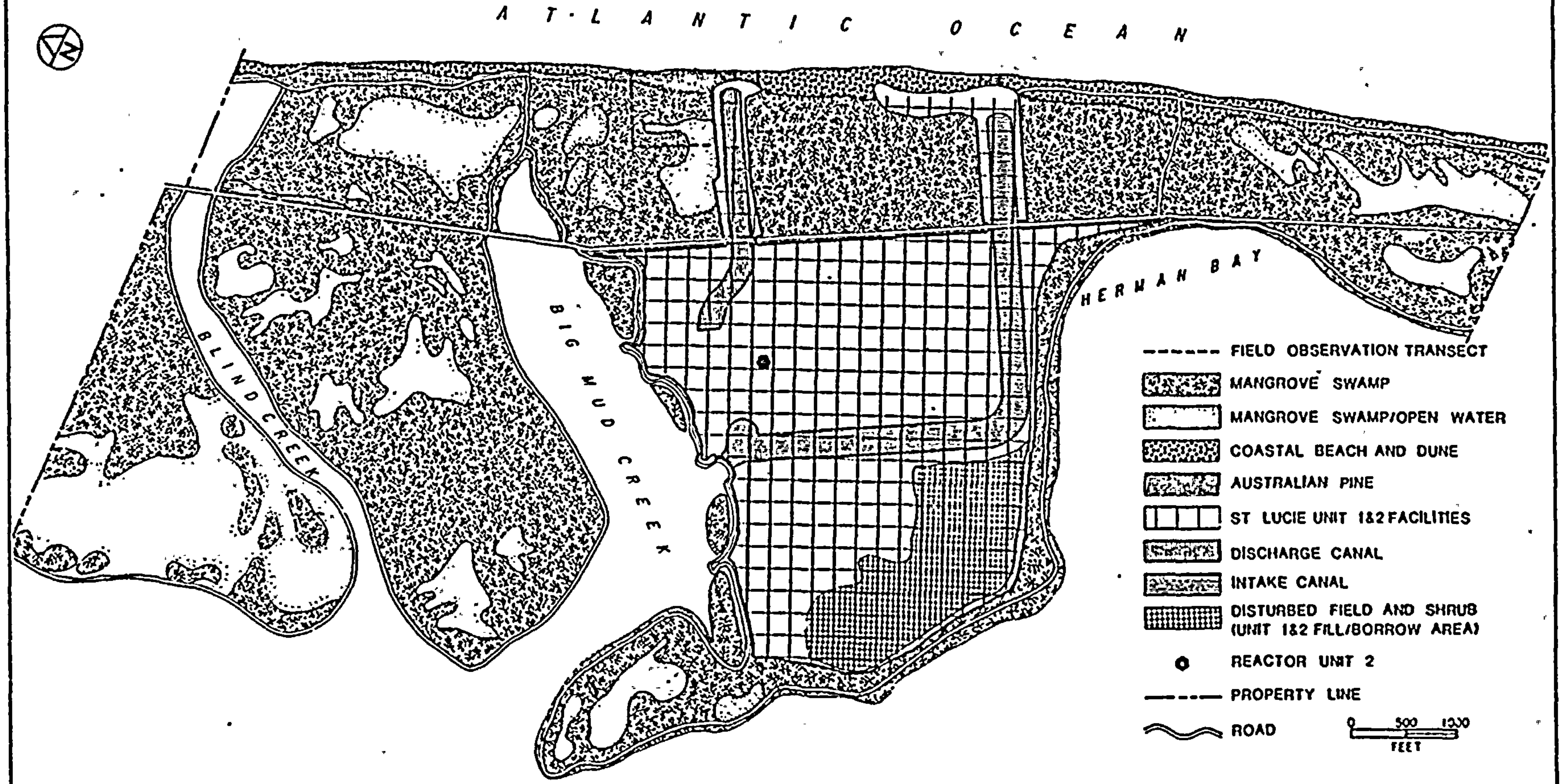
[3] Exvessel Price



FLORIDA POWER & LIGHT COMPANY
ST. LUCIE PLANT UNIT 2

LAND USES WITHIN FIVE MILES OF ST. LUCIE UNIT 2

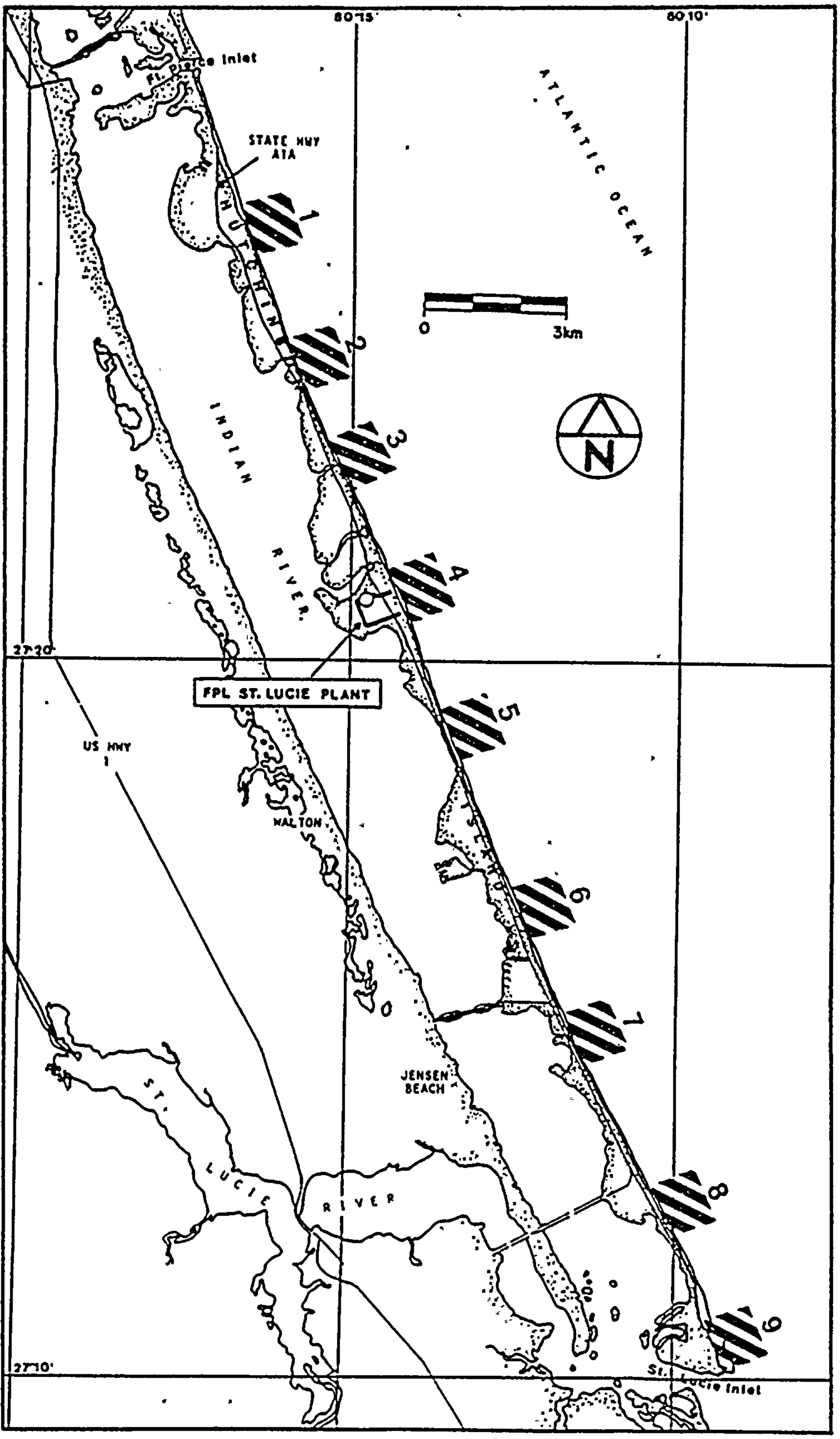
FIGURE 2.1-16



FLORIDA POWER & LIGHT COMPANY
ST. LUCIE PLANT UNIT 2

VEGETATION MAP
ST. LUCIE SITE

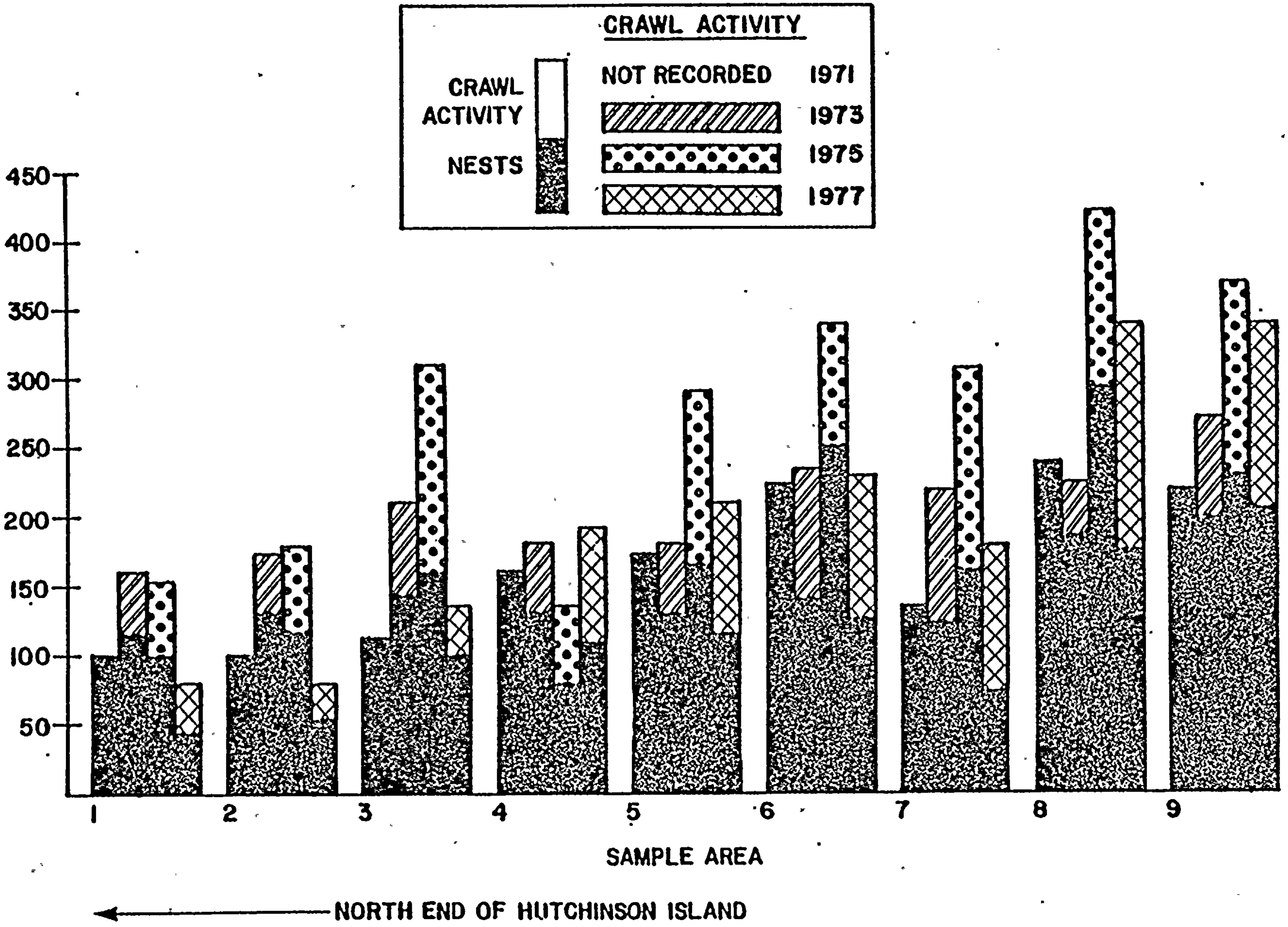
FIGURE 2.2-1



FLORIDA POWER & LIGHT COMPANY
ST. LUCIE PLANT UNIT 2

LOCATIONS OF TURTLE SAMPLE AREAS

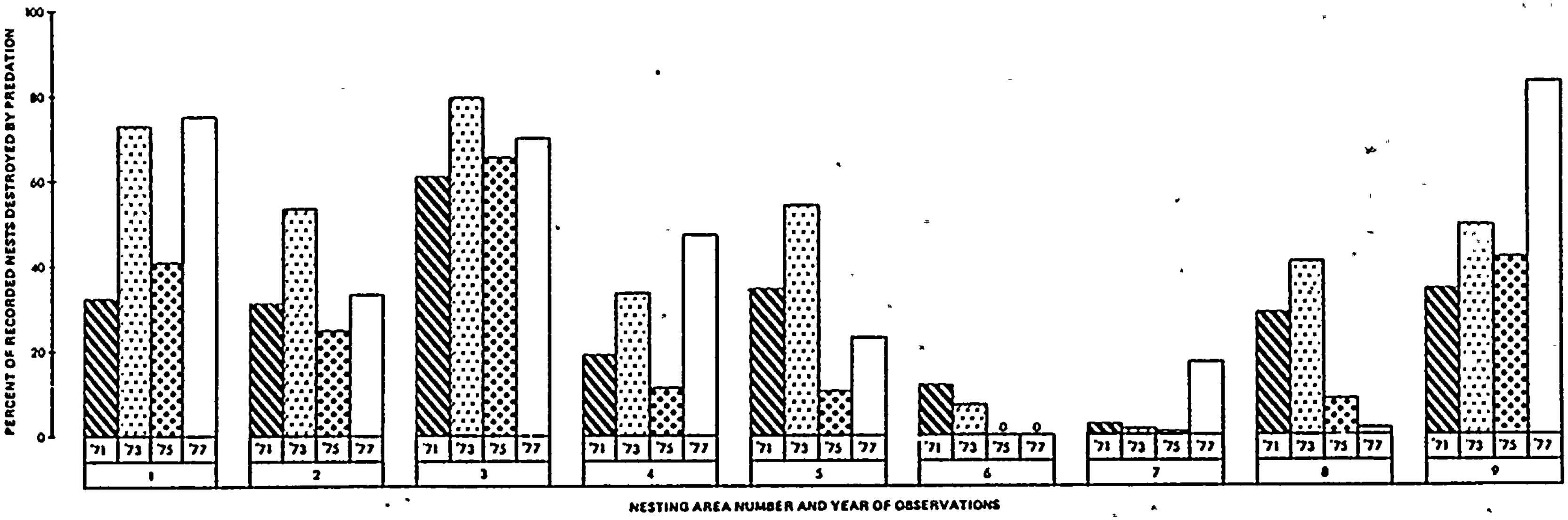
FIGURE 2.2-2



FLORIDA POWER & LIGHT COMPANY
ST. LUCIE PLANT UNIT 2

NUMBER OF LOGGERHEAD TURTLE NESTS AND CRAWLS

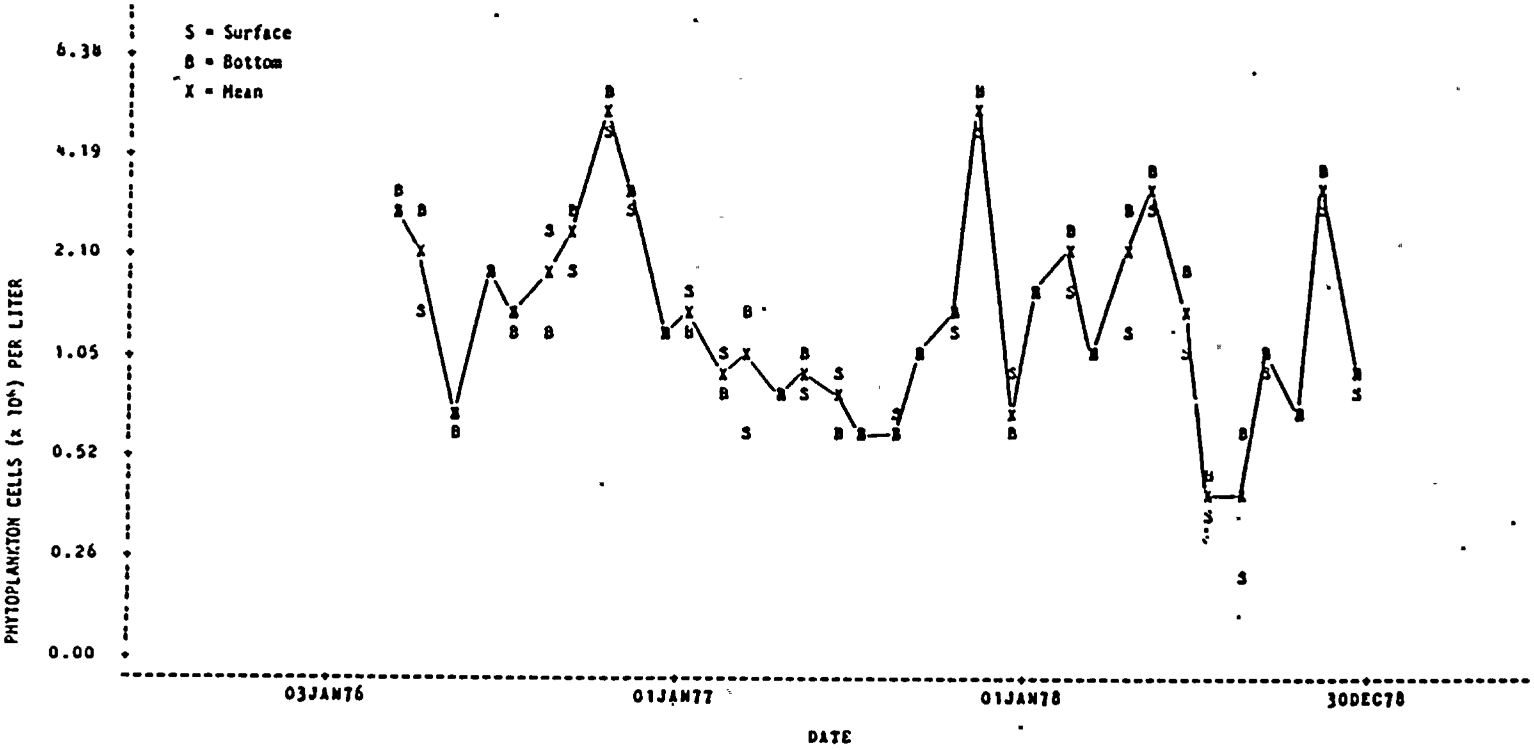
FIGURE 2.2-3



FLORIDA POWER & LIGHT COMPANY
ST. LUCIE PLANT UNIT 2

PERCENTAGE OF MARINE TURTLE NESTS
DESTROYED BY PREDATION

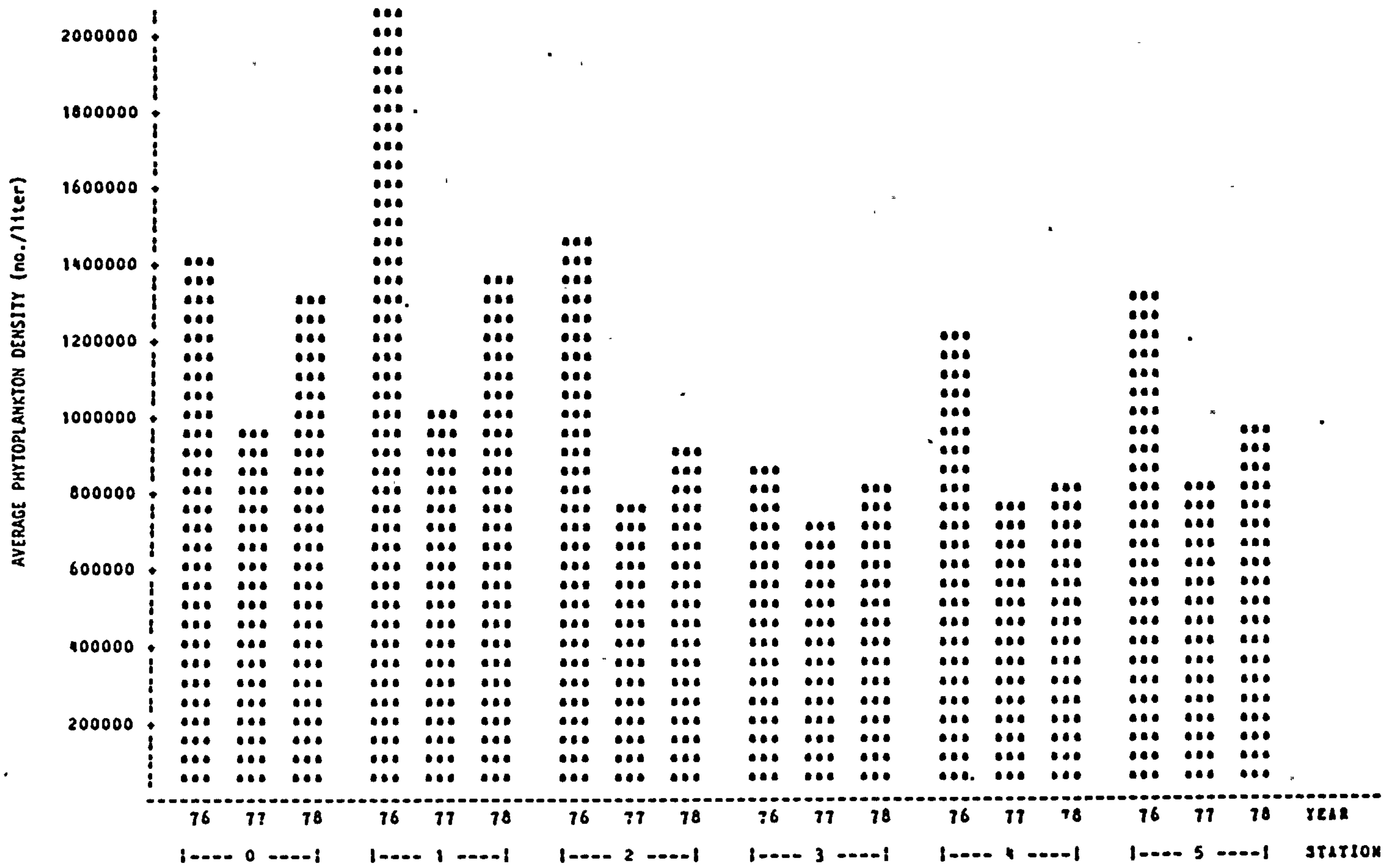
FIGURE 2.2-4



FLORIDA POWER & LIGHT COMPANY
ST. LUCIE PLANT UNIT 2

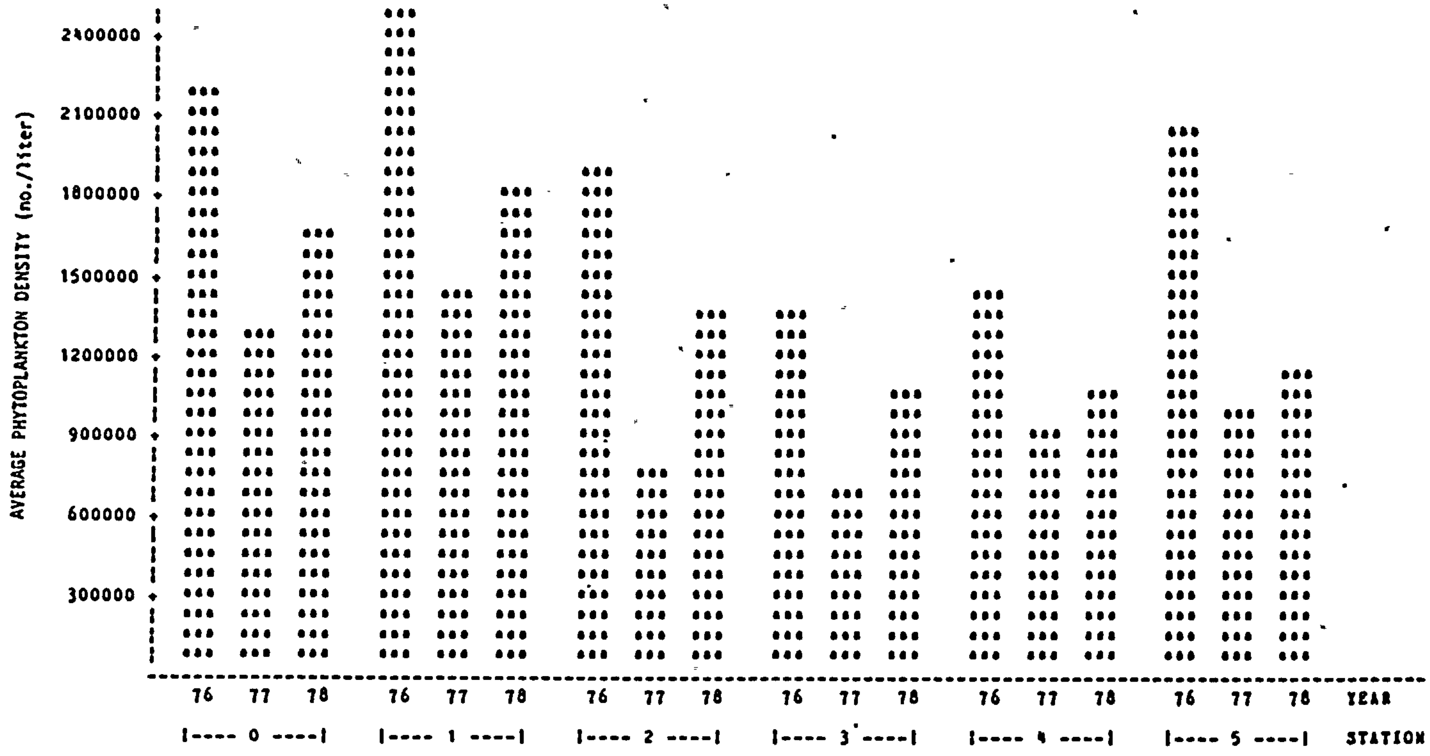
AVG. MONTHLY PHTOPLANKTON DENSITY & MEAN OF SURFACE & BOTTOM OFFSHORE STATIONS

FIGURE 2.2-5



FLORIDA POWER & LIGHT COMPANY
ST. LUCIE PLANT UNIT 2

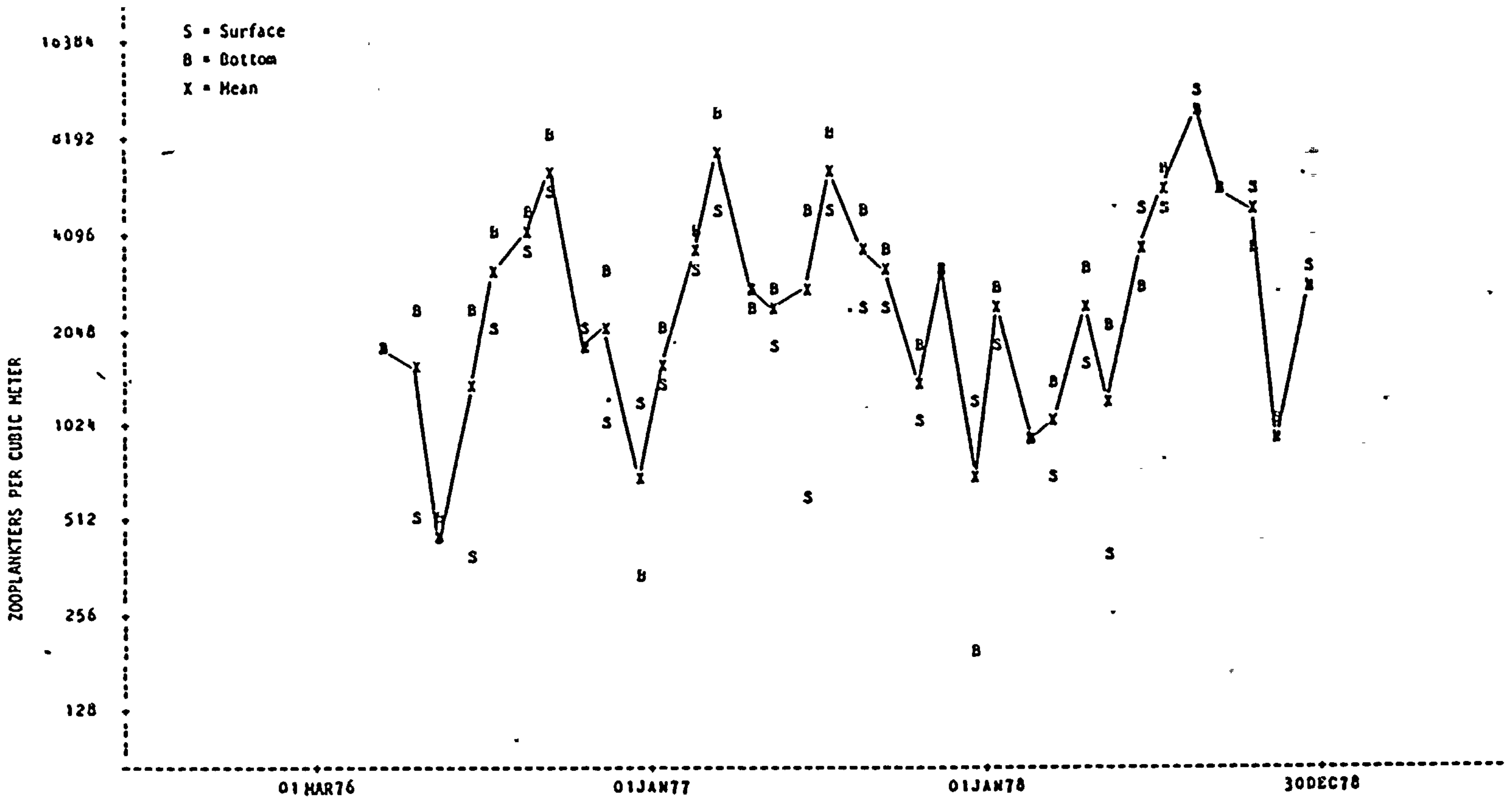
COMPARISON OF ANNUAL MEAN
PHYTOPLANKTON DENSITY AT
OFFSHORE SURFACE STATIONS
FIGURE 2.2-6



FLORIDA POWER & LIGHT COMPANY
ST. LUCIE PLANT UNIT 2

COMPARISON OF ANNUAL MEAN PHYTOPLANKTON DENSITY AT OFFSHORE BOTTOM STATIONS

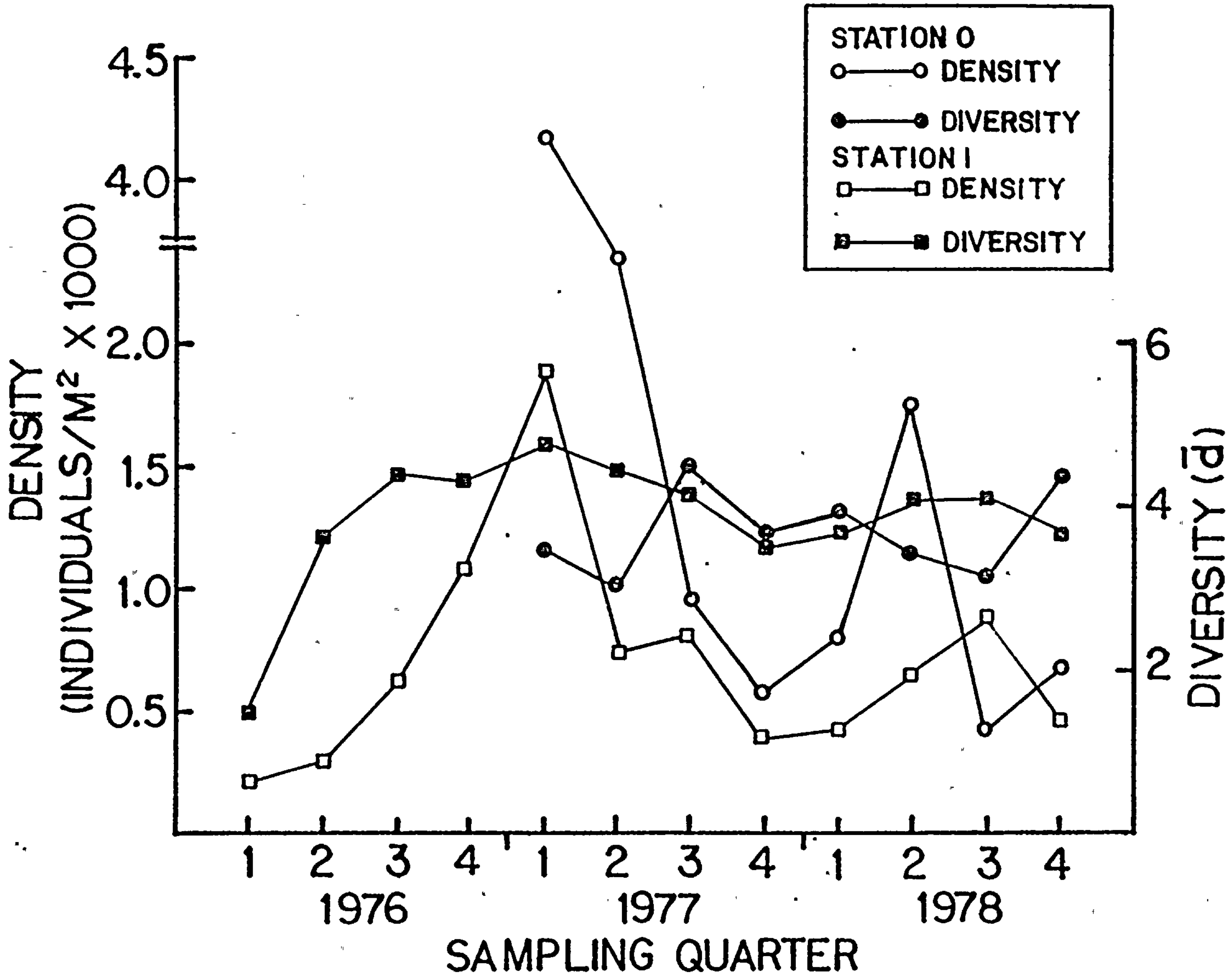
FIGURE 2.2-7



FLORIDA POWER & LIGHT COMPANY
ST. LUCIE PLANT UNIT 2

AVG. ZOOPLANKTON DENSITY AT OFFSHORE STATIONS

FIGURE 2.2-8

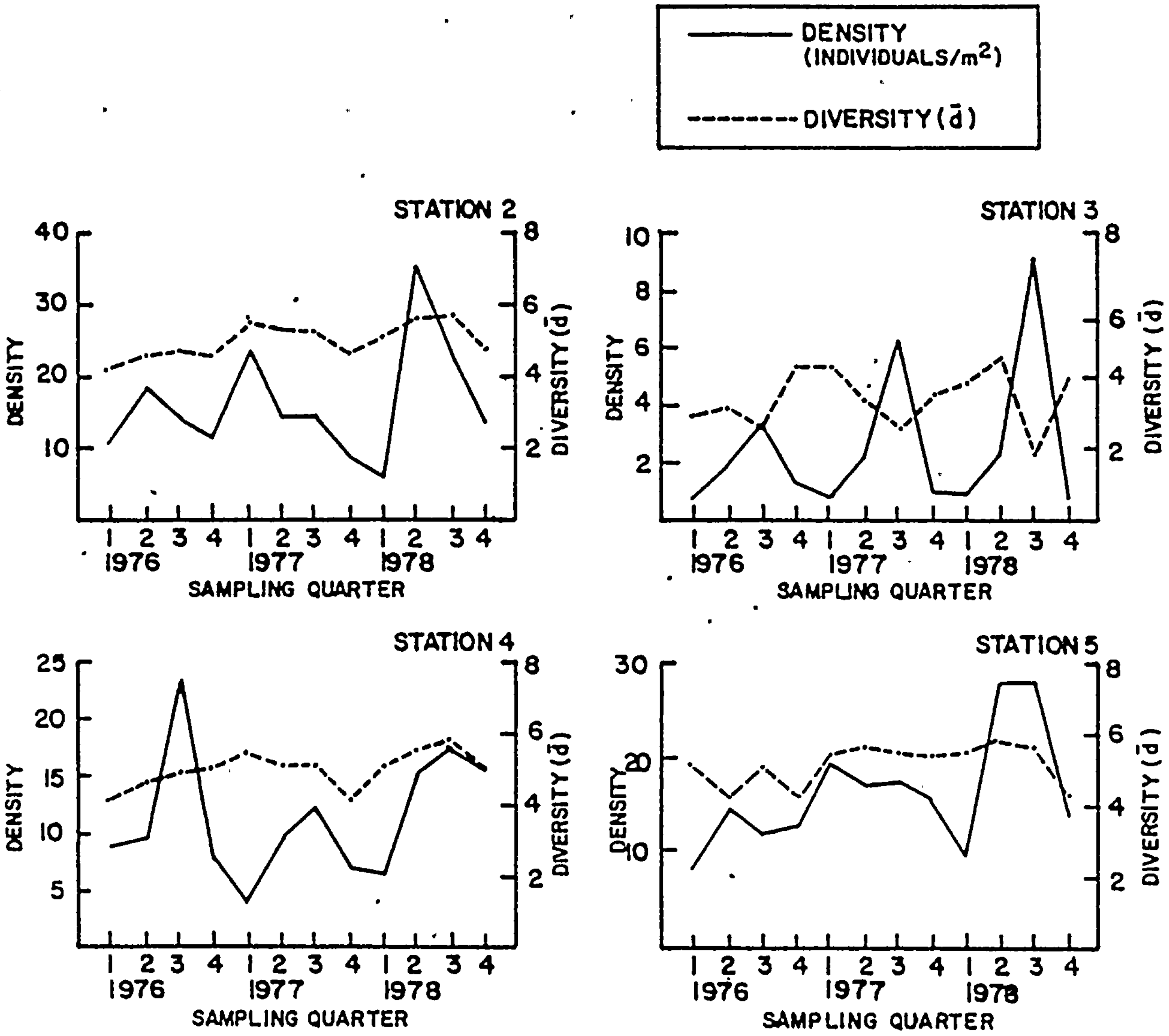


NOTE: STATION 0 WAS RELOCATED IN MARCH 1977 – PRIOR DATA ARE NOT INCLUDED.

FLORIDA POWER & LIGHT COMPANY
ST. LUCIE PLANT UNIT 2

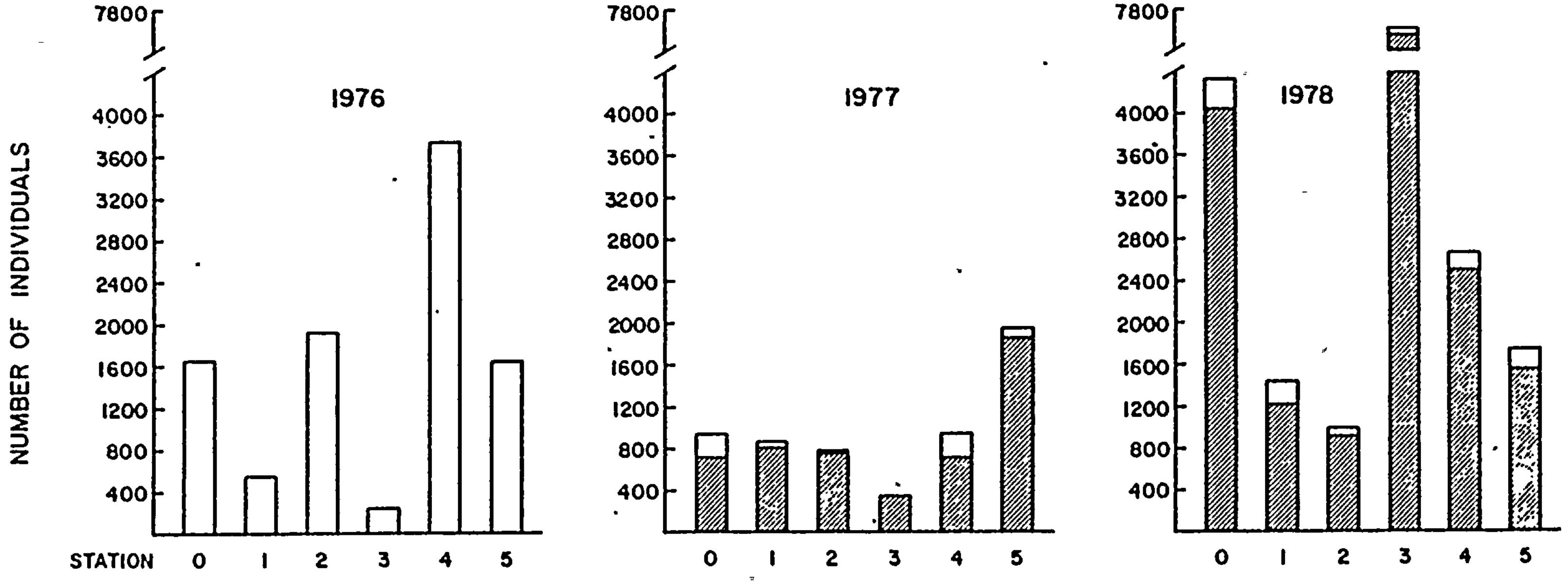
DENSITY & DIVERSITY OF BENTHIC MACROINVERTEBRATES COLLECTED BY GRABS AT STATIONS 0 & 1

FIGURE 2.2-9



FLORIDA POWER & LIGHT COMPANY
ST. LUCIE PLANT UNIT 2

DENSITY & DIVERSITY OF BENTHIC MACROINVERTEBRATES COLLECTED BY GRABS AT STATIONS 2,3,4 & 5
FIGURE 2.2–10

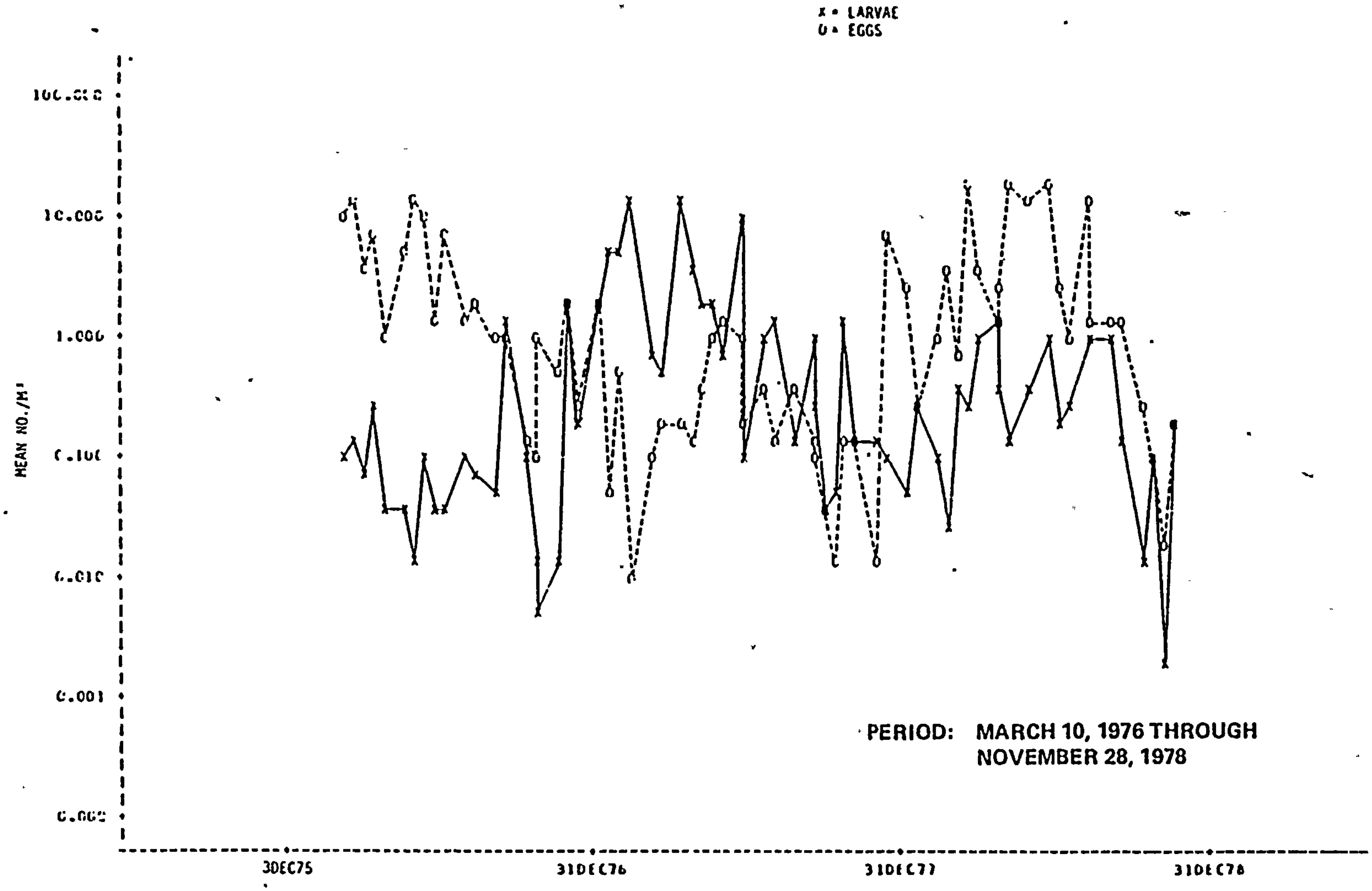


NOTE: 1. 1976: MARCH THROUGH DECEMBER
2. 1977: ALL MONTHS (MARCH THROUGH DECEMBER ARE SHADED FOR COMPARISON WITH 1976)

FLORIDA POWER & LIGHT COMPANY
ST. LUCIE PLANT UNIT 2

TOTAL NO. OF MACROINVERTEBRATES COLLECTED BY OTTER TRAWL AT EACH OFFSHORE STATION

FIGURE 2.2-11

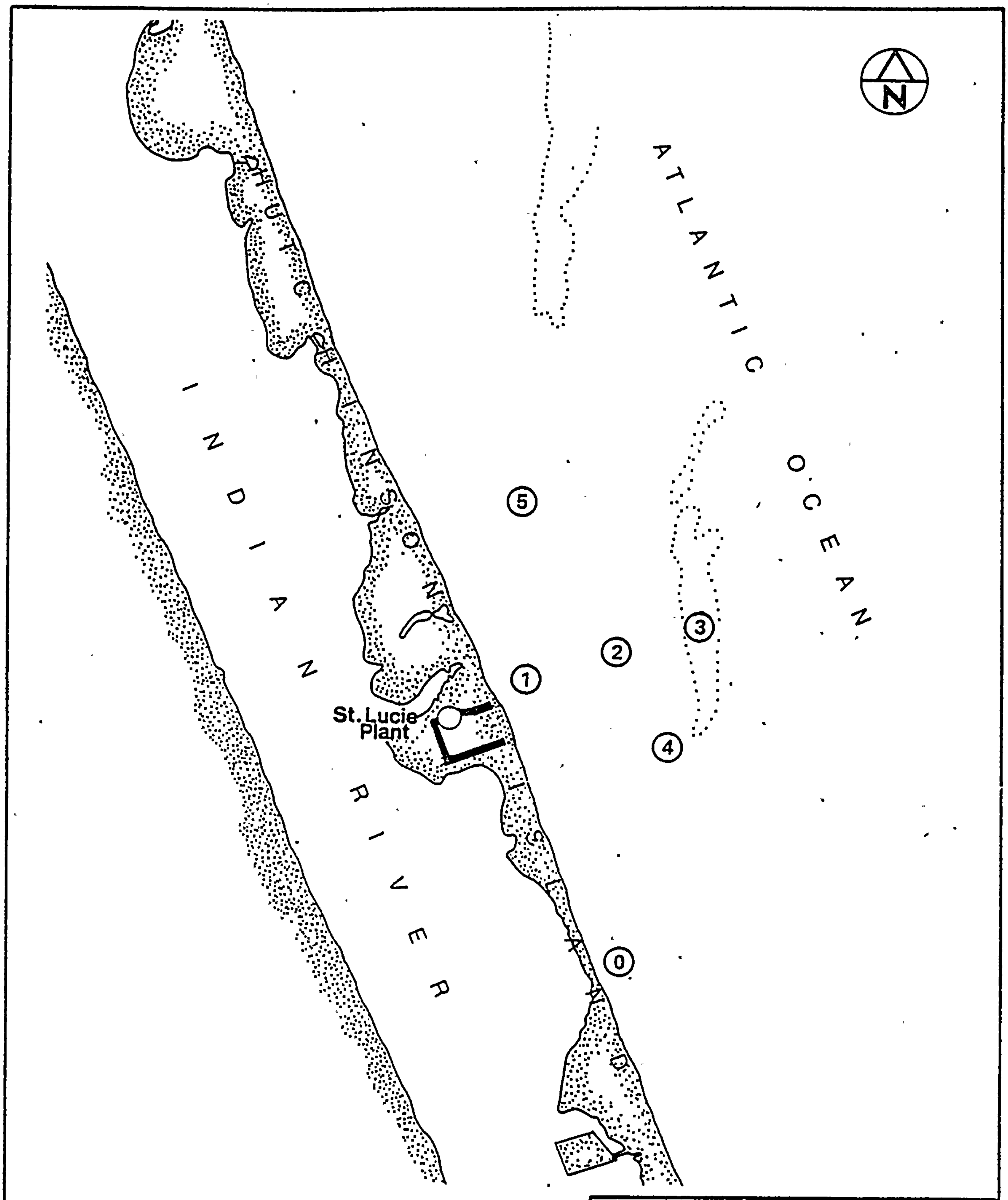


PERIOD: MARCH 10, 1976 THROUGH NOVEMBER 28, 1978

FLORIDA POWER & LIGHT COMPANY
ST. LUCIE PLANT UNIT 2

MEAN FISH EGG & LARVAL DENSITIES (NUMBER/M^3), STATIONS 0 THROUGH 5

FIGURE 2.2–12



FLORIDA POWER & LIGHT COMPANY
ST. LUCIE PLANT UNIT 2

LOCATION OF OFFSHORE SAMPLING STATIONS

FIGURE 2.4-6

ATTACHMENT 5

ST. LUCIE UNIT 2 ENVIRONMENTAL REPORT - OPERATING LICENSE, SECTION 2.4

2.4 HYDROLOGY

2.4.1 INTRODUCTION

The Atlantic Ocean, to the east of the site (Figure 2.1-1), will provide most of the water required for plant operation. In addition, the St Lucie plant dissipates waste heat and discharges liquid wastes, after treatment, to that body of water (see Sections 3.4, 3.5, 3.6 and 3.7). This section describes surface water hydrology, ground water hydrology and surface water quality characteristics.

2.4.2 SURFACE WATER HYDROLOGY

2.4.2.1 Bathymetry

As shown in Figure 2.1-1, the Hutchinson Island shoreline and nearshore bathymetry to -30 ft Mean Low Water (MLW) are oriented along a NNW-SSE (340° - 160°) line. The nearshore ocean bottom slopes at a one on 80 gradient to about -35 ft MLW for approximately 0.5 miles before rising to Pierce Shoal (-21 ft MLW).

A slight trough with depths of nearly -50 ft MLW separates Pierce Shoal from the northward extension of St Lucie Shoal, which is five miles seaward of the coastline. Across the coastal shelf to the -120 MLW contour, the overall slope is gentle, approximately one on 600. At about 12 miles offshore, the sea floor slope increases to one to 100, reaching the -600 ft MLW contour approximately 18 miles east of Hutchinson Island. Bathymetric profiles across the coastal shelf off Hutchinson Island are shown in Figure 2.4-1.

2.4.2.2 Ocean Tides

Tidal analyses by the National Ocean Survey for several locations near the St Lucie plant are referenced to the nearest primary control station which is Miami, Florida. Published datums(1) are referred to local Mean Low Water (MLW), although all datums can be reduced to the National Geodetic Vertical Datum which is accepted as Mean Sea Level (MSL). A time series of semi-diurnal high and low tides is shown in Figure 2.4-2.

At Miami Beach, the mean range between high and low tides is 2.5 feet, and the spring range (average semi-monthly new and full moon tide) is 3.0 feet. Tide ranges increase northward to 2.8 and 3.3 feet, respectively, at Palm Beach and 3.5 and 4.1 feet at Cape Canavarel(1).

For tides monitored at Vero Beach (the temporary subordinate station nearest the St Lucie site), mean tidal range is 3.4 feet. A short interval record for October, 1972, indicates that the mean range is 3.0 feet at Seminole Shores, about 11 miles south of the plant site (unpublished records of the National Ocean Survey). The largest astronomical tide range should be approximately 5.0 feet based on maximum-mean ratio of solar and lunar tractive forces of 13 to nine(2).

A tide monitoring program was undertaken at the site by Florida Power & Light Company from May 1976 to May 1977. For the full year of measurements, a mean tidal range of 3.28 feet was determined. A comparison of these site specific measurements to corresponding predicted tides resulted in a standard deviation between 0.3 and 0.4 feet. This difference in tidal range reflects meteorological factors.

2.4.2.3 Surface Currents

Surface water circulation in the nearshore region of the St Lucie site is of the combined wind driven and rotary tidal current type. The Florida Current, a branch of the Gulf Stream System, is found offshore, beyond the 300 foot contour(3). The rotary tidal current continuously changes direction through 360 degrees during a 12.4 hour cycle. However, near a shoreline boundary the rotary characteristic is deformed into an elliptical pattern with an ebb and flood flow alongshore.

Wind driven currents are directly related to wind direction and intensity, although near the shoreline the surface current is deflected into a longshore direction depending on the angle of the wind to the shoreline. Because of the variability of local winds at the site, current patterns will change frequently with changes in weather patterns.

To describe currents at the St Lucie site, a monitoring program was conducted from September, 1973 to May 1975 (See Section 6.1.1). Current speed and direction were measured in 32 feet of water about 2000 feet from shore in the area of the discharge location. Current data were analyzed for the frequency distribution of current speed and direction(4).

Directional frequency distribution of the nearshore current shows a bimodal annual distribution with a prevailing flow oriented 335 degrees and a secondary flow toward 165 degrees. These directions are nearly parallel to the coastline. As shown in Tables 2.4-1 and 2.4-2, respectively, the prevailing direction is within the 300-360 degree sector about 49 percent of the time at the surface and 32 percent near the bottom. In the secondary 120-180 degree sector, the respective occurrence frequencies are nearly 23 and 24 percent. Onshore flow within the 210-270 degree sector occurs less than eight percent of the time. Seasonal differences in the bimodal distribution of current direction are represented by the July and October profiles shown as Figure 2.4-3.

Average current speed is 0.74 fps near the surface and decreases to 0.54 fps close to the bottom. About 33 percent of bottom currents are less than 0.4 fps, which is the upper limit for tidal currents in open waters off Florida (Tables 2.4-3 and 2.4-4). The 50th percentile speed near the bottom is 0.4 fps, which suggests that at least half of all nearshore flows are caused by wind driven currents. Current speed ranged from near zero to more than 1.6 fps. Approximately ten percent of all current speeds measured exceeded 1.0 fps at the surface and less than three percent exceeded 1.6 fps.

Summertime flow appears to be weaker than during other seasons as indicated by the modal frequency of lower current speed during July, in comparison to October (Figure 2.4-4). When wind speed is light, the wind driven current becomes negligible, and the semidiurnal tidal current becomes more apparent.

Additional current data acquired at the St Lucie site in March - April, 1977, confirmed the prevailing longshore flow that was recognized in the earlier monitoring program. However, lower current speeds for onshore flow indicate that the earlier measurements may include a wave motion component. The current rose in Figure 2.4-5 shows current direction and speed distribution monitored for ten days in 1977.

2.4.3 GROUNDWATER

The groundwater regime of the St Lucie site and surrounding region has been described in Section 2.5 of the St Lucie Unit 2 Environmental Report - Construction Permit. The Final Environmental Statement Related to Construction of St Lucie Plant Unit 2 discusses groundwater at the site.

2.4.4 SURFACE WATER QUALITY

Worth and Hollinger(5), and Applied Biology Inc,(6,7,8) have reported surface water quality data from the St Lucie site. The majority of the data presented are from Atlantic Ocean coastal waters off Hutchinson Island, near the St Lucie site. Details of the water quality sampling programs are noted in Section 6.1.4. Figure 2.4-6 shows the locations of water quality sampling Stations 0 through 5.

A number of physical and chemical parameters are reported, including temperature, salinity, dissolved oxygen, and dissolved inorganic nutrients (nitrogen, phosphorus, and silicon). The physical and chemical data obtained in these studies from the six offshore stations sampled by Applied Biology(6,7,8), are summarized in Table 2.4-5. The ranges of concentrations of several water quality parameters investigated for the Indian River in the summer of 1974 are presented in Table 2.4-6.

2.4.4.1 Temperature

Sea water temperatures reported in these studies range from about 15 to 32°C. The mean temperature for all stations and depths reported is about 25°C. Figure 2.4-7 illustrates the seasonal variation in temperature from September, 1971 through 1978, at Station 2 which is representative of the offshore stations. Additional daily monitoring of temperature at a location near Station 1 has been performed by FP&L, and is reported by Worth and Hollinger(5), and Applied Biology(6,7,8).

2.4.4.2 Salinity

The average salinity of the Atlantic Ocean off Hutchinson Island is about 35.5 parts per thousand(ppt). A range from 33.0 to 38.5 ppt has been reported(5); however, most values fall between 34.0 and 36.0 ppt. In general, salinity is low during fall and winter, and increases to a seasonal maximum during the summer. Data reported by the US Coast and Geodetic Survey for the Atlantic Ocean at Canova Beach, Florida, 50 miles north of the plant site, indicated that mean salinity values are highest in May at 36.6 ppt, and lowest in November at 35.4 ppt. The wider range in values observed at the plant site are probably due to the effects of the Fort Pierce and St Lucie Inlets, intrusions of Gulf Stream water, and current effects created by the Gulf Stream(5).

2.4.4.3 Dissolved Oxygen

Typical dissolved oxygen levels in the area range between five and eight mg/l. Almost all observations fall in the range of four to eight mg/l, although extremes of 3.2 and 10.3 mg/l have been observed. Table 2.4-7 illustrates the distribution of dissolved oxygen values for the six offshore stations. About 50 percent of the values observed range between six and seven mg/l. Of all values reported, 5.9 percent were below five mg/l, and 1.7 percent were above eight mg/l. The mean seasonal distribution of dissolved oxygen for all stations is presented in Figure 2.4-8. The monthly means vary from 5.9 mg/l in August, to 6.9 mg/l in February. All months, with the exception of August, have mean dissolved oxygen levels in excess of six mg/l.

The very low dissolved oxygen concentrations (less than four mg/l) observed in July, August and September 1972 coincided with decreased water temperature, increased phosphate levels and low phytoplankton density. These phenomena are characteristic of an upwelling of deep waters, which are typically relatively cool, nutrient rich, and oxygen depleted (see Section 2.7 of the St Lucie Unit 2 Environmental Report - Construction Permit).

2.4.4.4 Nutrients

Nutrient levels are generally low. Total dissolved inorganic nitrogen (the sum of nitrate, nitrite, and ammonia) averages from about 0.03 to 0.1 mg/l as N. Dissolved silica averages 0.2 to 0.3 mg/l as Si. The values reported for dissolved phosphate show considerable disparity. Values reported by Worth and Hollinger(5) for the period 1971-1973 average about 0.15 mg/l as P. However, in the more recent data(6,7,8) for 1976, 1977 and 1978, phosphate levels rarely exceed 0.01 mg/l as P (Table 2.4-5).

Nutrient concentrations measured at the St Lucie site show no clear seasonal patterns. Nitrate and nitrite tend to peak in spring and fall. Ammonia peaks occur in summer or fall. Silica levels tend to peak in summer. No seasonal trends in phosphate levels are apparent. In general, no statistically significant variation between stations was observed for the chemical parameters measured, indicating that the coastal area investigated is well mixed.

Significant temporal variation was observed. Worth and Hollinger(5) attribute this variation to the tidal exchange between the estuarine, nutrient rich water of the Indian River and the generally low nutrient coastal water. Intrusion of Gulf Stream water was also observed during summer months.

2.4.4.5 Conclusions

The water quality of the nearshore coastal environment at the plant site reflects the interrelation of physical, chemical, and biological effects. Water circulation patterns, including tidal effects, rainfall, flows from the St Lucie and Fort Pierce inlets, upwellings, and possible Gulf Stream intrusions, appear to have a dominant effect on water quality at the St Lucie site.

Nutrient concentrations in coastal environments show considerable variation from site to site. Table 2.4-8 illustrates the range in nutrient values for coastal waters in surveys reported by Riley and Skirrow(9), Sverdrup, et al(10) and Raymont(11). With the exception of the high phosphorus levels (~0.15 mg P/l) reported by Worth and Hollinger(5) for the period 1971-73, the nutrient values typically observed at the site are generally low and are well within the ranges reported for coastal oceans (see Table 2.4-5). Atypically high nutrient values were observed in isolated instances.

SECTION 2.4: REFERENCES

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2. Neumann, G and W J Pierson, Jr, 1966. Principles of Physical Oceanography. Prentice-Hall, Englewood Cliffs, N.J. pp. 545.

3. National Ocean Survey, 1975. Tidal Current Tables, Atlantic Coast of North America. National Oceanic and Atmospheric Administration, U.S. Department of Commerce.

4. Envirosphere Company, 1976, St Lucie Plant Site Ocean Current Analysis For Florida Power & Light Company.

5. Worth, D F and M L Hollinger, 1977. Nearshore Marine Ecology at Hutchinson Island, Florida: 1971-1974 III, Physical and Chemical Environment. Fla. Mar. Res. Publ. No. 23. Florida Dept. of Natural Resources. St. Petersburg, Fla.

6. Applied Biology Inc. 1977, Ecological Monitoring at the Florida Power and Light Co. St. Lucie Plant. Annual Report 1976, Vol. 1 and 2. Florida Power & Light Co., Miami, Fla.

7. Applied Biology Inc, 1978. Ecological Monitoring at the Florida Power and Light Co. St. Lucie Plant. Annual Report 1977, Vol. 1 and 2. Florida Power & Light Co., Miami, Fla.

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9. Riley, J P and G Skirrow, 1965. Chemical Oceanography, Vol 1. Academic Press, London and New York. 712 pp.

10. Sverdrup, H U, M W Johnson, and R H Fleming, 1942. The Oceans, Their Physics, Chemistry, and General Biology. Prentice-Hall, Englewood Cliffs, N.J. 1087 pp.

11. Raymont, J E G, 1963, Plankton and Productivity in the Oceans. Pergamon Press, Oxford, London. 660 pp.

TABLE 2.4-1

FREQUENCY DISTRIBUTION OF SURFACE CURRENT DIRECTION MONTHLY AND ANNUAL AVERAGES WITHIN 30 DEGREE SECTORS (PERCENT)

Month - 1974	000-030	030-060	060-090	090-120	120-150	150-180	180-210	210-240	240-270	270-300	300-330	330-360
Jan	12.6	6.2	3.4	4.2	0.9	3.0	4.5	2.2	4.0	5.7	18.5	32.7
Feb	1.7	1.3	1.2	2.6	6.0	11.1	4.7	1.9	1.7	6.1	27.8	33.8
Mar	3.9	1.6	1.5	4.0	10.6	16.8	9.6	2.2	0.9	3.4	12.4	33.1
Apr	3.7	1.0	1.3	2.2	9.0	15.0	5.5	1.8	2.1	7.4	24.7	26.4
May	4.7	1.5	1.4	1.1	5.1	7.4	1.9	1.9	1.9	7.5	27.8	37.9
Jun						- Data Missing -						
Jul	4.1	0.6	0.9	3.9	8.3	13.2	4.4	0.8	1.1	5.3	17.8	39.5
Aug	5.4	2.0	1.5	5.8	16.9	14.0	5.1	2.1	2.1	4.0	19.0	21.7
Sep	5.7	2.6	2.0	4.2	12.8	20.8	5.8	3.6	3.0	4.8	12.3	22.6
Oct*	4.3	3.4	3.1	6.6	16.7	22.8	10.5	6.4	6.0	5.4	8.1	6.5
Nov	4.2	3.3	1.8	2.7	11.4	18.1	7.9	3.4	2.4	3.3	14.3	27.4
Dec	4.3	2.3	1.5	2.2	8.8	19.2	15.2	3.4	0.6	4.3	11.5	26.6
Annual Average	5.0	2.2	1.9	3.3	9.0	13.9	6.5	2.3	2.0	5.2	18.6	30.2

Annual average based on ten months data. *1973 measurements not included in annual average.

TABLE 2.4-2

FREQUENCY DISTRIBUTION OF BOTTOM CURRENT DIRECTION MONTHLY AND ANNUAL AVERAGES WITHIN 30 DEGREE SECTORS (PERCENT)

Month - 1974	000-030	030-060	060-090	090-120	120-150	150-180	180-210	210-240	240-270	270-300	300-330	330-360
Jan	4.8	1.7	2.4	5.0	2.6	2.6	6.4	2.6	7.2	16.9	30.1	17.8
Feb*	1.0	3.2	1.2	1.3	2.2	18.7	33.1	1.7	1.3	2.2	4.3	29.9
Mar	3.0	6.0	1.6	7.2	8.3	9.0	6.6	4.0	4.9	10.2	18.2	21.0
Apr	5.3	2.8	1.6	4.7	7.4	14.8	11.0	3.0	1.4	7.9	16.5	23.5
May	3.8	2.0	2.9	8.2	14.0	11.1	7.1	5.5	6.1	16.8	17.0	5.5
Jun	- Data Missing -											
Jul	5.9	3.0	2.8	3.4	5.4	6.7	8.1	2.5	4.9	16.9	19.6	20.9
Aug	2.9	5.6	7.3	10.8	11.4	11.2	10.0	6.3	6.6	8.9	8.9	10.2
Sep	2.5	3.6	2.8	6.0	9.8	18.3	9.8	5.8	6.8	7.4	15.1	12.1
Oct	2.3	1.7	2.4	5.3	15.6	21.2	10.8	3.0	3.1	7.6	16.5	10.4
Nov	3.1	2.0	3.0	5.2	15.4	21.2	5.2	2.9	1.5	4.1	14.3	22.1
Dec	10.9	3.3	3.6	6.3	9.2	20.5	18.2	1.1	1.0	3.0	7.0	16.1
Annual Average	4.5	3.8	3.0	6.2	9.9	13.7	9.3	3.7	4.4	10.0	16.3	16.0

Annual average based on ten months data. *1975 measurements not included in annual average.

TABLE 2.4-3

FREQUENCY DISTRIBUTION OF SURFACE CURRENT SPEED MONTHLY AND ANNUAL AVERAGES WITHIN 0.1 FPS INCREMENTS (PERCENT)

Month 1974	0.0-0.1	0.1-0.2	0.2-0.3	0.3-0.4	0.4-0.5	0.5-0.6	0.6-0.7	0.7-0.8	0.8-0.9	0.9-1.0	1.0-1.1	1.1-1.2	1.2-1.3	1.3-1.4	1.4-1.5	1.5-1.6	1.6
Jan	0.1	0.7	2.8	4.4	13.8	9.9	15.7	16.6	14.3	6.9	7.7	4.0	0.7	1.0	0.4	0.2	0.9
Feb	0.4	1.4	1.7	3.3	12.3	6.9	13.5	16.3	12.9	11.0	10.4	5.3	1.5	1.2	0.4	0.15	1.4
Mar	0.4	1.1	0.8	3.3	11.0	8.8	14.7	12.1	13.3	7.3	10.7	6.7	3.3	2.3	0.8	0.7	2.5
Apr	0.2	2.5	2.1	1.3	8.0	7.3	11.7	12.5	13.6	11.8	9.2	7.4	3.0	3.1	1.4	0.6	4.3
May	0.6	1.4	2.3	2.3	4.8	7.5	7.2	9.5	21.0	12.3	8.3	8.0	4.9	2.5	1.8	0.5	4.7
Jun							- Data Missing -										
Jul	1.7	1.3	5.1	4.0	11.3	8.4	11.4	14.2	14.9	8.8	7.4	5.5	2.8	0.9	0.8	0.5	1.3
Aug	1.7	1.4	3.7	4.5	9.7	13.0	14.1	13.5	10.8	9.4	6.7	4.8	2.8	1.7	1.5	0.6	1.3
Sep	0.2	1.6	3.0	3.3	4.5	13.7	11.4	17.3	13.6	10.7	8.4	5.1	3.4	0.8	1.1	0.4	1.4
Oct							- Data Missing -										
Nov	1.1	3.4	4.2	3.6	11.8	9.8	11.1	6.2	18.6	7.6	8.3	6.0	3.6	1.7	0.7	1.0	1.1
Dec	0.0	1.5	1.8	3.1	13.2	7.7	14.7	10.7	23.3	5.1	9.0	3.5	1.4	1.8	0.7	0.5	2.0
Annual Average	0.64	1.63	2.87	3.31	10.04	9.3	12.55	12.89	15.63	9.09	8.63	5.63	2.74	1.7	0.97	0.52	2.3

TABLE 2.4-4

FREQUENCY DISTRIBUTION OF BOTTOM CURRENT SPEED MONTHLY AND ANNUAL AVERAGES WITHIN 0.1 FPS INCREMENTS (PERCENT)

Month 1974	0.1-0.1	0.1-0.2	0.2-0.3	0.3-0.4	0.4-0.5	0.5-0.6	0.6-0.7	0.7-0.8	0.8-0.9	0.9-1.0	1.0-1.1	1.1-1.2	1.2-1.3	1.3-1.4	1.4-1.5	1.5-1.6	1.6
Jan	2.7	3.2	10.1	9.9	26.4	19.5	15.4	9.4	2.5	0.7	0.4						
Feb							- Data Missing -										
Mar	0.9	5.0	4.1	10.5	20.7	9.0	19.5	11.5	9.7	4.1	3.9	1.1					0.1
Apr	3.7	12.3	12.0	7.7	19.4	16.1	13.9	7.7	3.3	1.9	0.4	0.3	0.5				0.6
May	0.5	14.8	15.7	4.2	4.6	25.0	6.5	18.1	6.9	3.7							
Jun							- Data Missing -										
Jul	9.3	14.1	21.0	13.4	16.7	10.7	6.2	4.6	2.8	0.8	0.6						
Aug	3.8	3.3	24.6	13.6	22.2	18.0	7.7	3.6	1.4	1.0	0.4	0.3	0.08	0.06			
Sep	0.2	7.3	26.4	11.9	27.8	13.4	6.5	5.2	0.9	0.7							
Oct	0.7	4.0	11.4	8.4	19.0	12.0	12.8	7.6	12.2	4.6	2.6	3.1	0.6	0.3	0.1		0.4
Nov	0.1	1.3	11.4	9.2	25.7	11.6	13.9	5.0	13.6	4.6	2.1	1.2		0.1			
Dec	0.1	0.4	5.6	8.9	34.6	12.4	18.7	10.5	6.0	1.7	0.7	0.5					
Annual Average	2.2	6.6	14.2	9.8	21.7	14.8	12.1	13.3	5.9	2.5	1.1	0.7	0.1	0.05			0.5

TABLE 2.4-5

ST. LUCIE PLANT SITE - WATER QUALITY MONITORING DATA

	Worth and Hollinger(5)					Applied Biology Inc(6,7,8)#						
	1971 - 1974					1976 - 1978						
	Surface		Bottom		Range Reported	Surface		Mid-Depth		Bottom		Range Reported
Parameter	N	Mean	N	Mean		N	Mean	N	Mean	N	Mean	
Temperature, °C	199	25.5	199	24.9	19-32	204	24.3	144	23.7	204	23.8	14.6-30.8
Salinity, ppt	193	35.6	193	35.8	33.0-38.5	199	35.6	135	35.8	198	35.8	33.0-36.6
Dissolved Oxygen, mg/l	184	6.4	182	6.2	3.2-10.3	198	6.5	144	6.6	198	6.4	4.4-8.6
NO_3-N, mg/l as N	96*	0.018*	97*	0.013*	<.01-.651	126	0.013	126	0.013	126	0.014	<0.001-0.28
NH_3-N, mg/l as N	91*	0.013*	91*	0.013*	<.01-.121	204	0.064	203	0.067	204	0.067	<0.01-0.57
NO_2-N, mg/l as N	96*	0.002*	97*	0.008*	<.001-.060	204	0.001	203	0.001	204	0.001	<0.001-0.007
PO_4-P, mg/l as P	156	0.117	158	0.111	<.01-.186	174	<0.01	174	<0.01	174	0.01	<0.01-0.17
SiO_2-Si, mg/l as Si	156	0.203	159	0.204	<.05-0.91	174	0.19	174	0.19	174	0.21	<0.02-0.99
Total Particulate, mg/l	176	6.65	176	10.17	0.2-69.0	-	-	-	-	-	-	-
Total Organic Carbon, mg/l	-	-	-	-	-	204	6.5	204	5.8	204	6.7	0.6-35.5
Turbidity, FTU	-	-	-	-	-	144	-	144	-	144	-	0.0-26.8

* September, 1971 to August, 1973 only

\# During the course of the monitoring program conducted by Applied Biology, Inc, methods of analysis for NO_3, PO_4, and SiO_2 were modified. Data reported here include only data obtained using the more sensitive and accurate methods incorporated for NO_3 in April, 1977, and for PO_4 and SiO_2 in August, 1976.

TABLE 2.4-6

INDIAN RIVER WATER QUALITY DATA-SUMMER, 1974(5)

A. Nutrients, Range of Values Reported

	St. Lucie Inlet	Link Port to Jensen Beach
NH_3-N, mg/l as N	ND* - 0.221	ND - 0.046
NO_3-N, mg/l as N	ND - 0.154	0.001 - 0.270
PO_4-P, mg/l as P	0.046 - 0.329	0.050 - 0.198
SiO_2-Si, mg/l as Si	0.003 - 7.28	0.255 - 6.78

B. Salinity, Range in 0/00

	Ebb Tide		Flood Tide	
	Surface	2m Depth	Surface	2m Depth
Indian R. - North	20-32	20-35	15-33	22-35
Indian R. - South	24-35	27-35	24-35	24-35
Taylor Creek	3-12	24-33	7-14	26-31
Fort Pierce Inlet	22-36	25-36	24-36	26-36

* ND = not detectable

TABLE 2.4-7

DISTRIBUTION OF MEASURED DISSOLVED OXYGEN DATA(5,6,7,8)

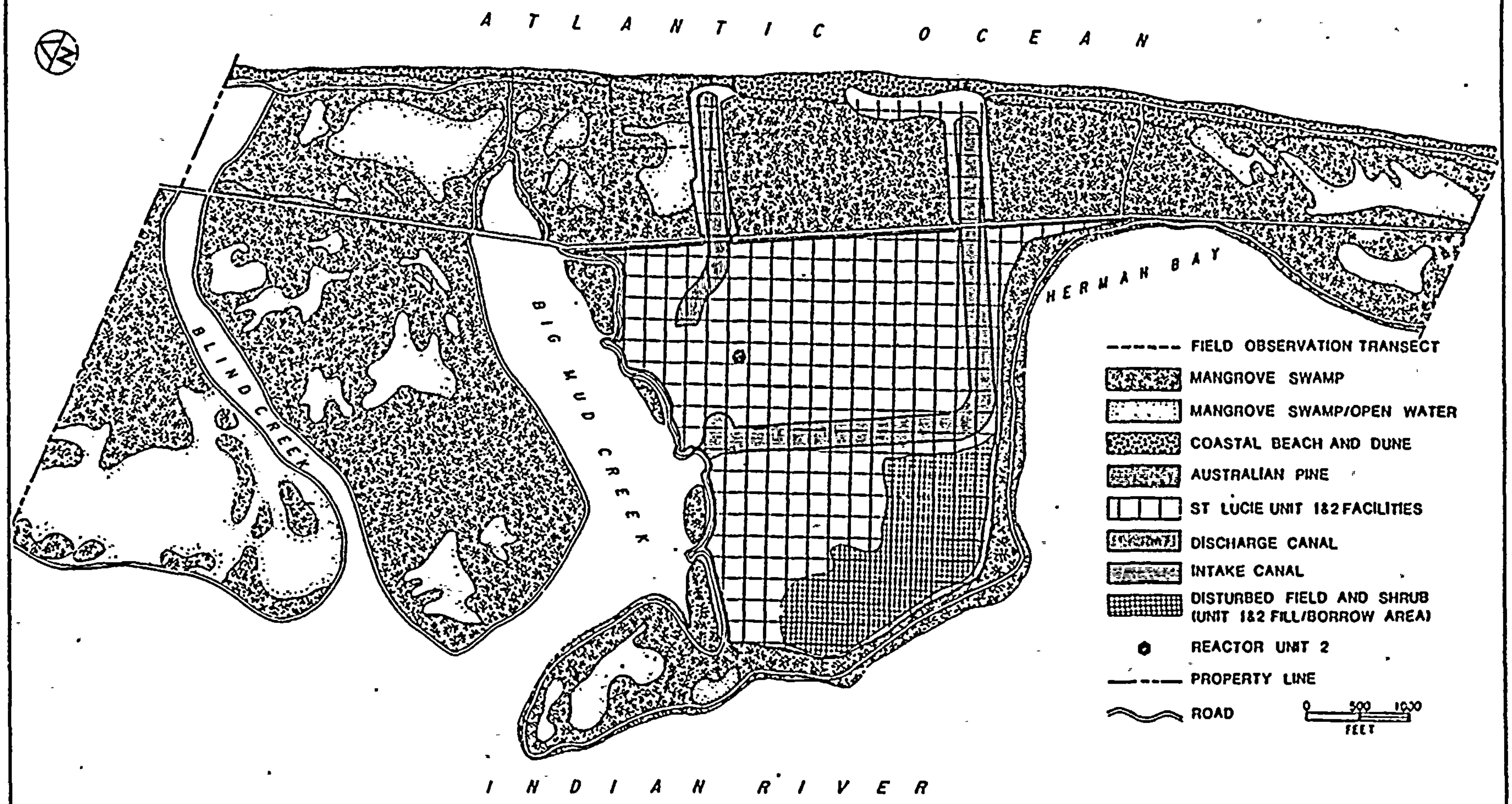
Station	No. Values Reported	Dissolved Oxygen, mg/l <5	5-6	6-7	7-8	>8
0	87	3.4%	24.1%	46.0%	26.4%	-
1	181	4.4%	29.3%	45.3%	20.4%	0.5%
2	182	3.3%	25.8%	49.4%	20.9%	0.5%
3	177	4.0%	19.2%	53.6%	21.5%	1.7%
4*	130	6.1%	20.0%	44.6%	25.4%	3.8%
5*	127	6.3%	20.5%	43.3%	27.6%	2.4%
Total	884	4.5%	23.4%	47.5%	23.1%	1.5%

* No values reported for these stations September, 1973 to August, 1974.

TABLE 2.4-8

REPORTED RANGES OF NUTRIENT IN COASTAL OCEAN AREAS

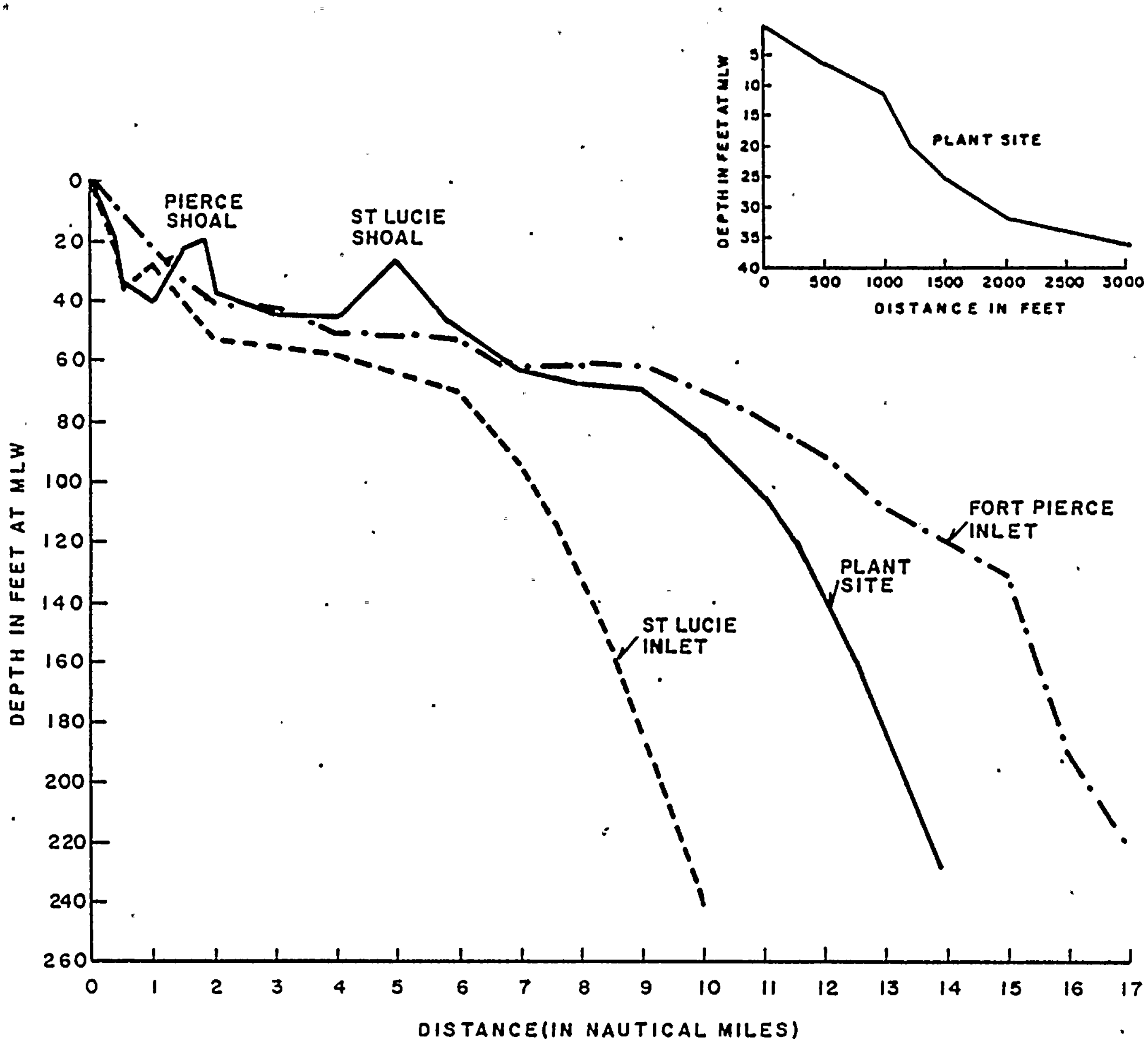
	Riley and Skirrow, 1965(9)	Sverdrup, et al., 1942(10)	Raymont, 1963(11)
PO_4-P, mg/l as P	0-0.035	0.0015-0.062	0-0.060
NO_3-N, mg/l as N	0.070-0.350	0.007-0.378	<0.005-0.300
NH_3-N, mg/l as N	0-0.055	~0-0.031	0.007-0.200
NO_2-N, mg/l as N	–	~0-0.011	0-0.015
SiO_2-Si, mg/l as Si	0.010-1.68	0.014-1.68	0.010-1.50



FLORIDA POWER & LIGHT COMPANY
ST. LUCIE PLANT UNIT 2

VEGETATION MAP
ST. LUCIE SITE

FIGURE 2.2-1

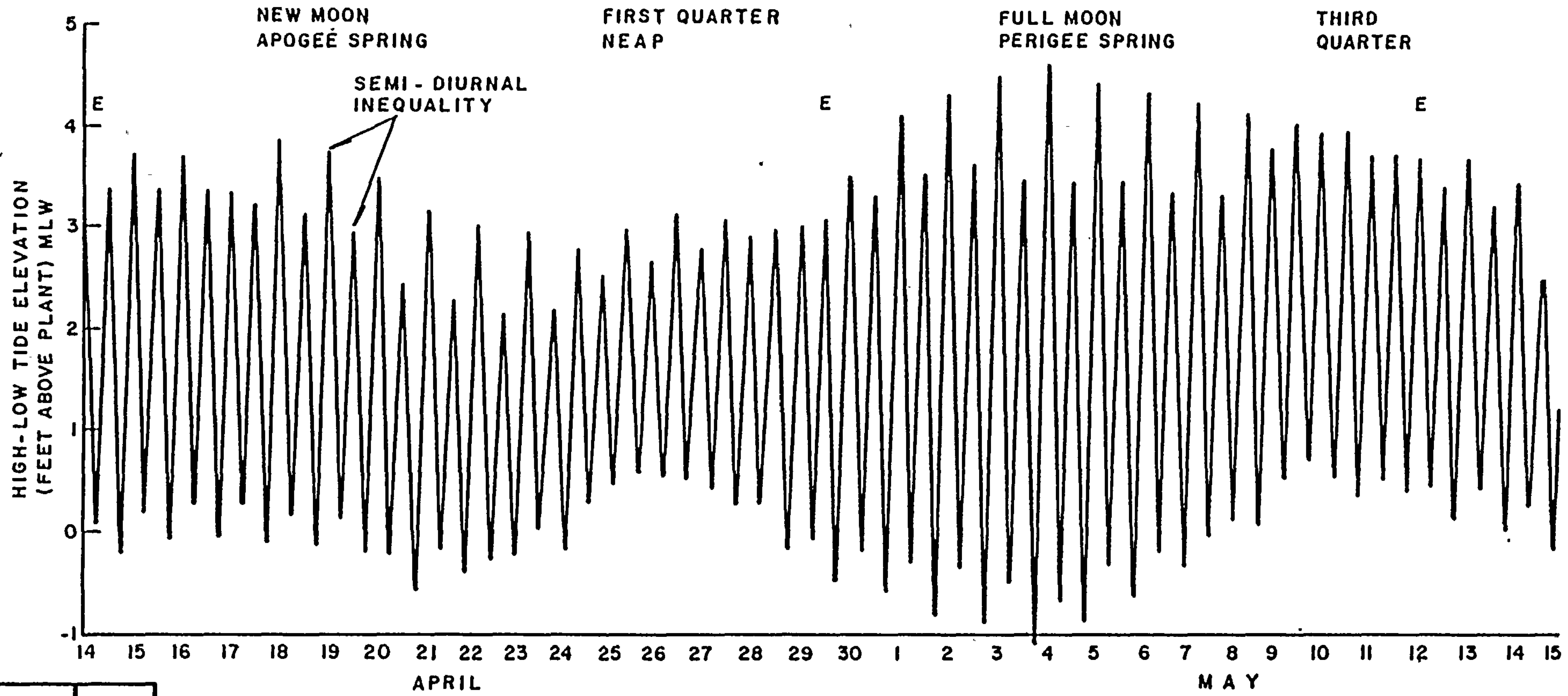


ORIENTATION FROM SHORLINE IS 070°

FLORIDA POWER & LIGHT COMPANY
ST. LUCIE PLANT UNIT 2

BATHYMETRIC PROFILES OFFSHORE
HUTCHINSON ISLAND

FIGURE 2.4-1



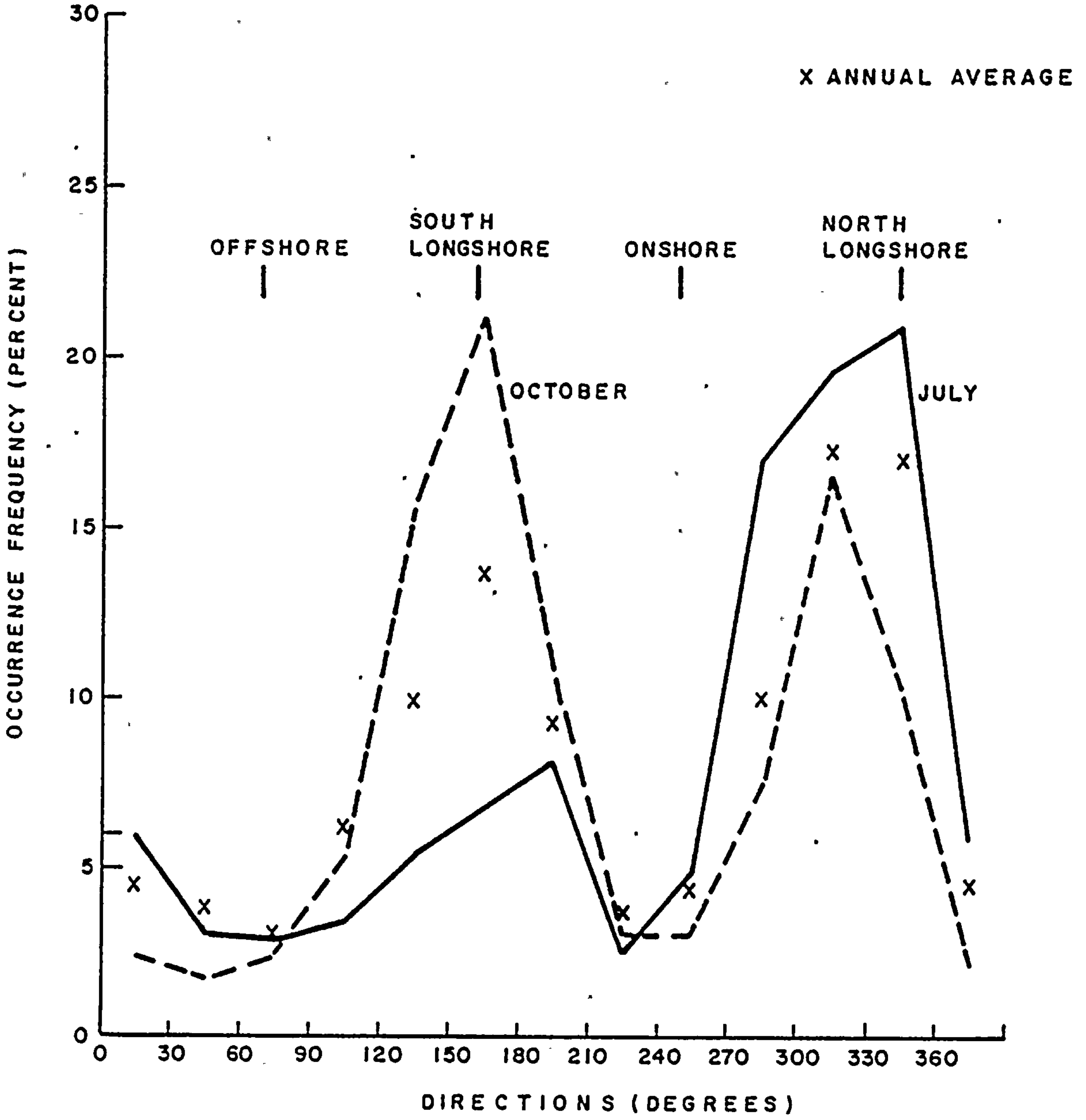
LEGEND:

HIGH-LOW TIDE ELEVATIONS MEASURED AT ST LUCIE SITE 14 APRIL - 15 MAY, 1977. ELEVATIONS RELATIVE TO PLANT DATUM

FLORIDA POWER & LIGHT COMPANY
ST. LUCIE PLANT UNIT 2

HIGH- AND LOW-TIDE ELEVATIONS
AT ST LUCIE SITE

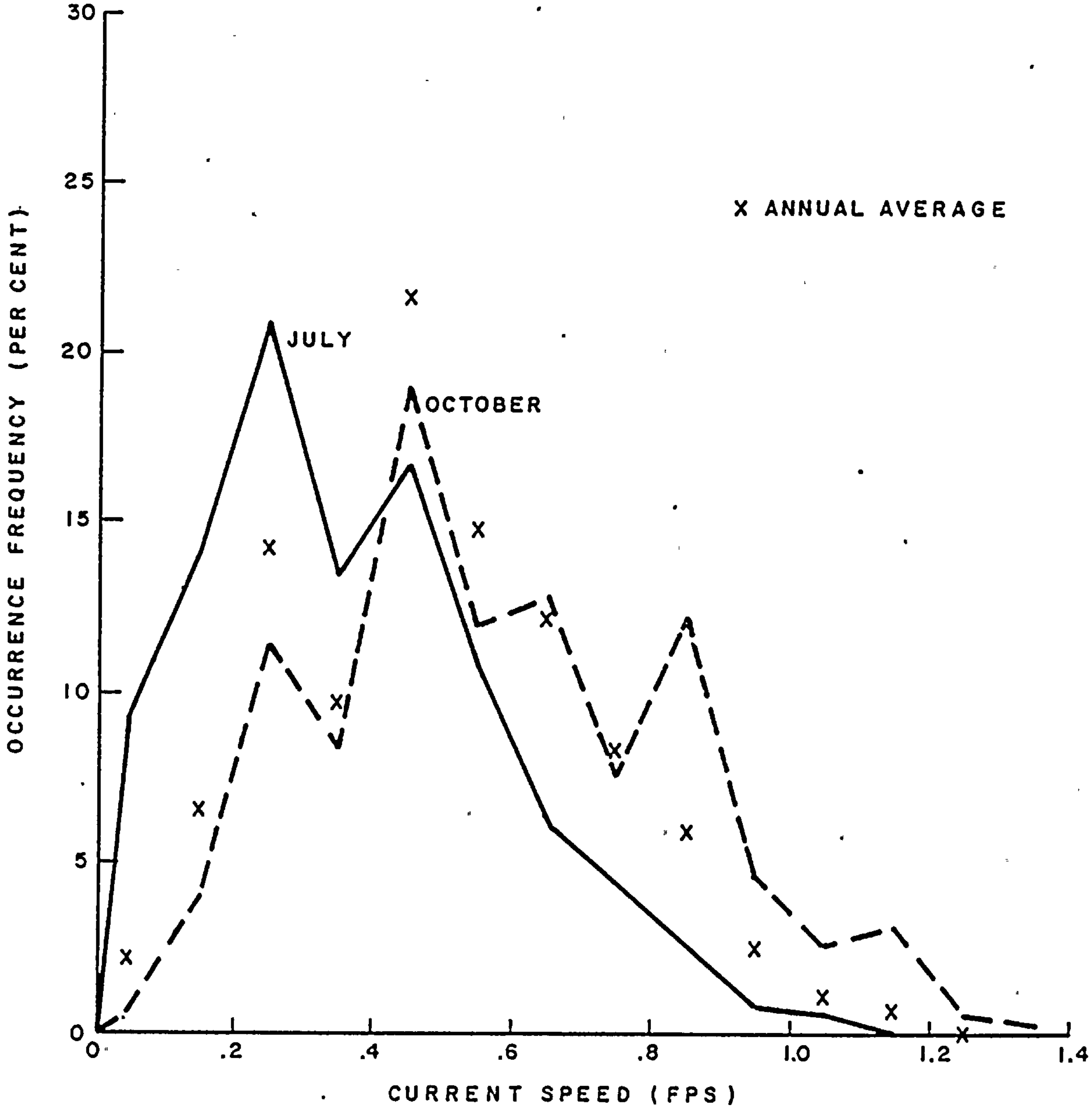
FIGURE 2.4-2



FLORIDA POWER & LIGHT COMPANY
ST. LUCIE PLANT UNIT 2

FREQUENCY OCCURRENCE OF NEARSHORE CURRENT DIRECTION

FIGURE 2.4-3



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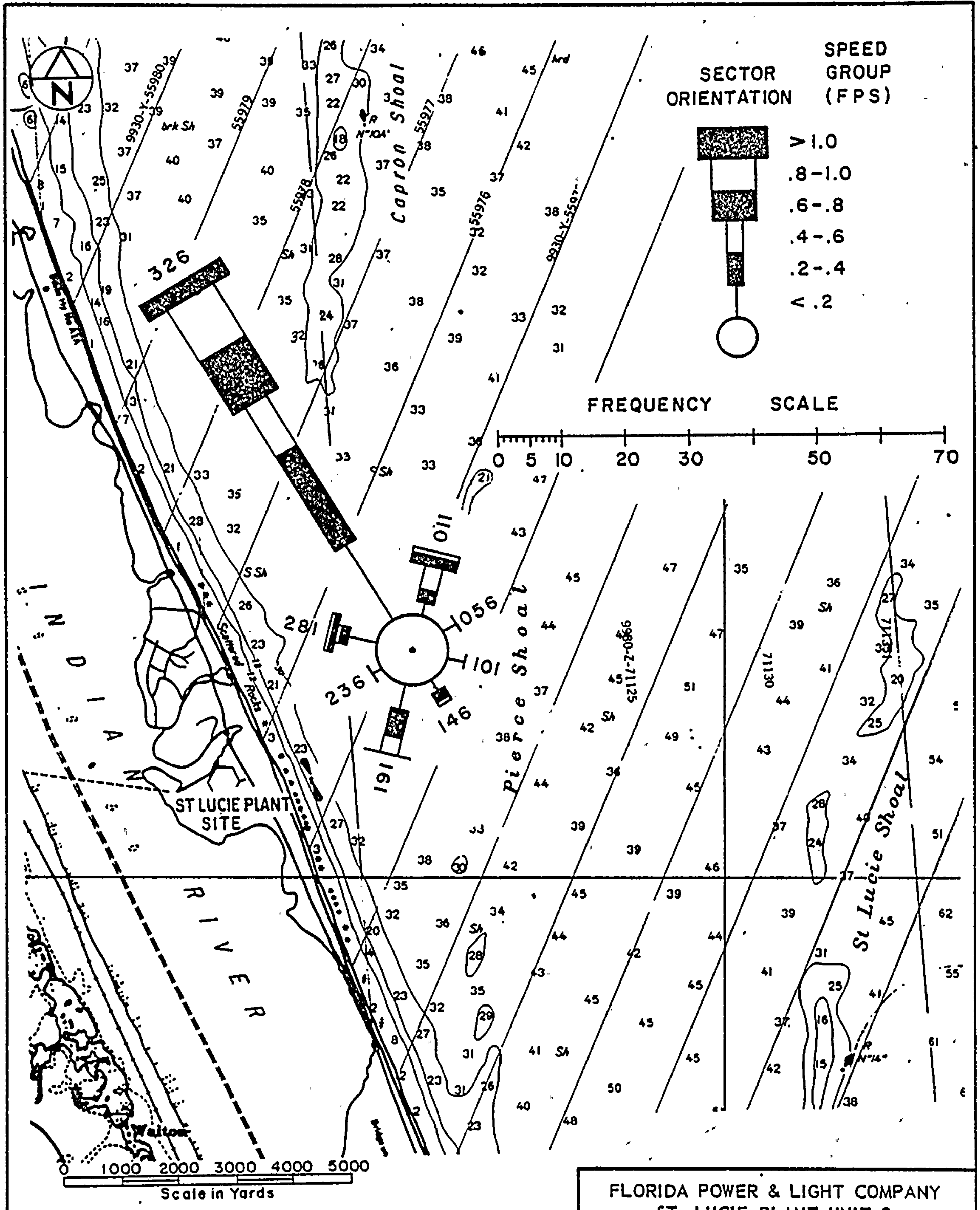
ST. LUCIE PLANT UNIT 2

FREQUENCY OCCURRENCE OF NEARSHORE CURRENT SPEED

FIGURE 2.4-4

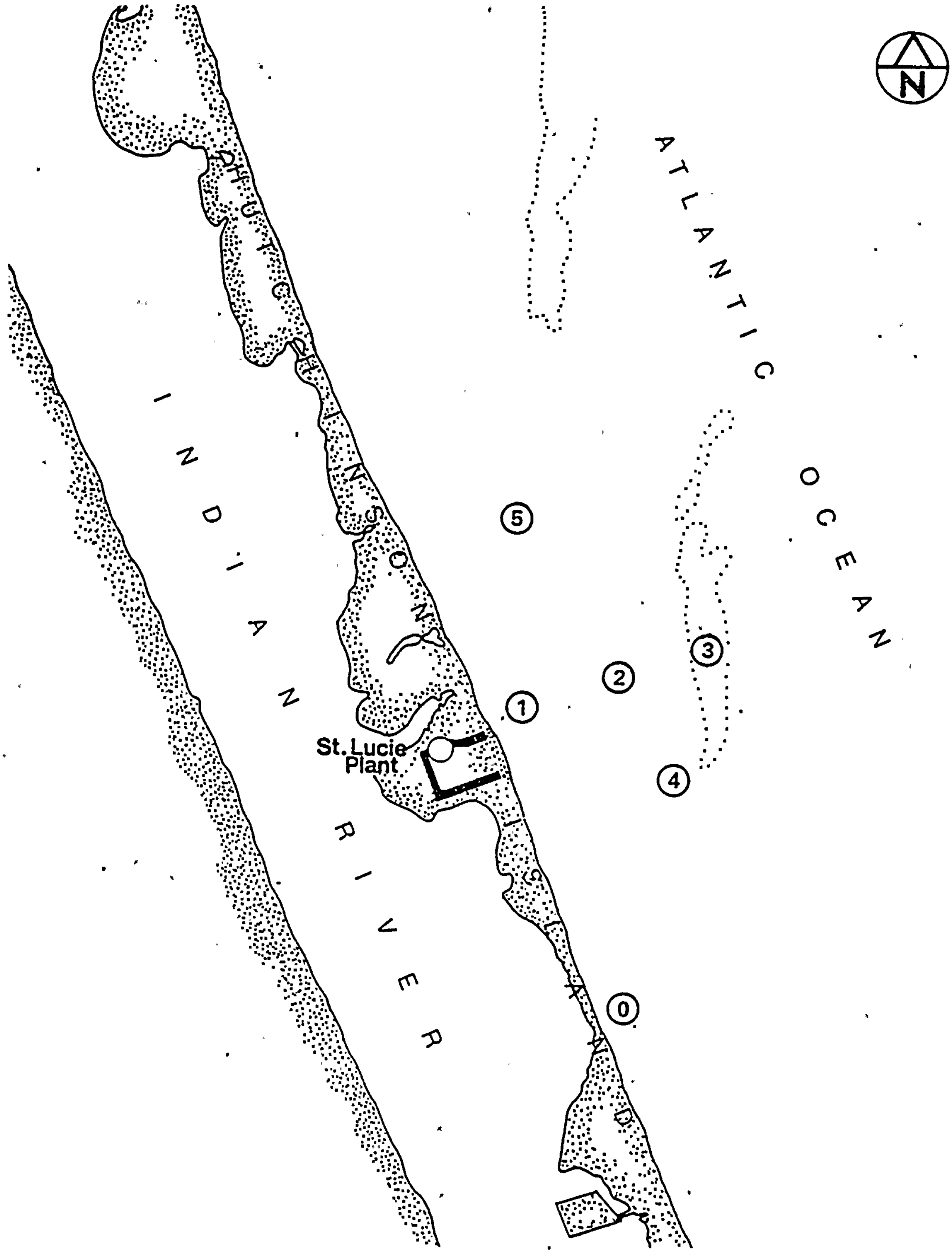


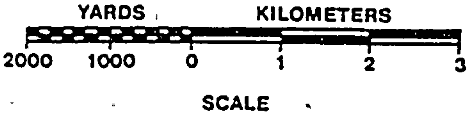
SOUNDINGS IN FEET AT MEAN LOW WATER

FLORIDA POWER & LIGHT COMPANY
ST. LUCIE PLANT UNIT 2

CURRENT ROSE – ALL MEASUREMENTS
MARCH 25 – APRIL 4, 1977

FIGURE 2.4-5





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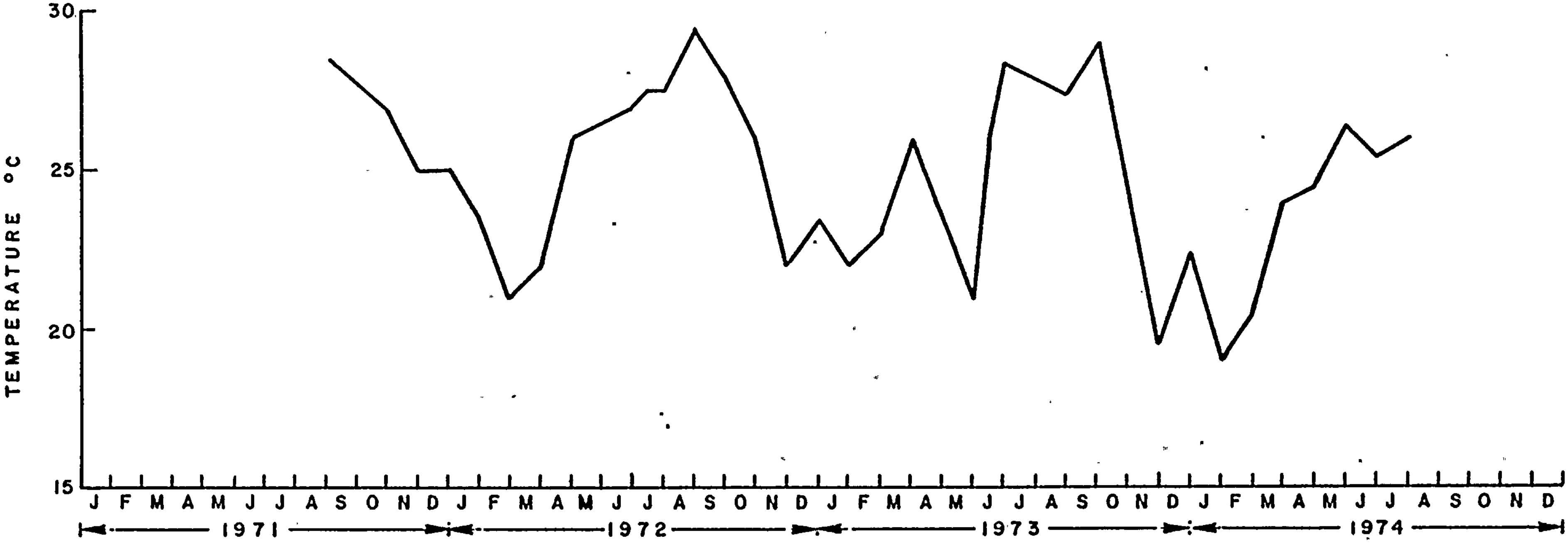
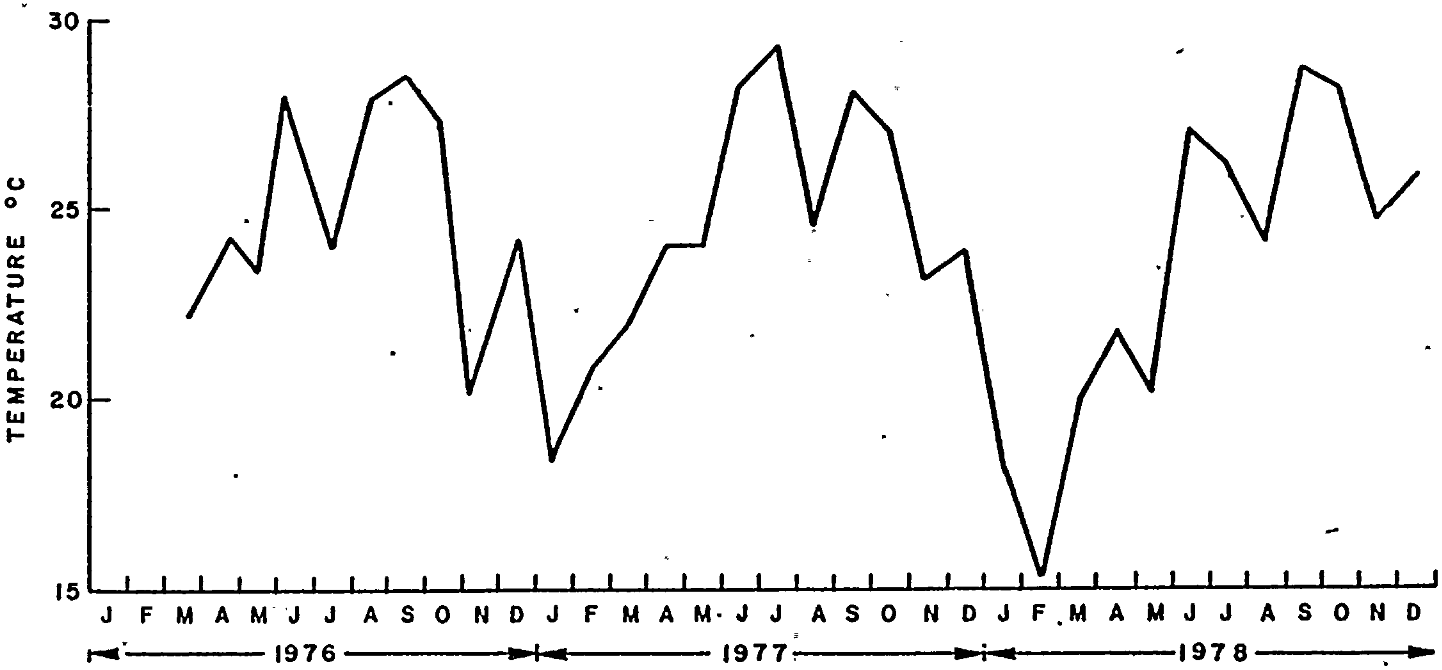
ST. LUCIE PLANT UNIT 2

LOCATION OF OFFSHORE SAMPLING STATIONS

FIGURE 2.4-6





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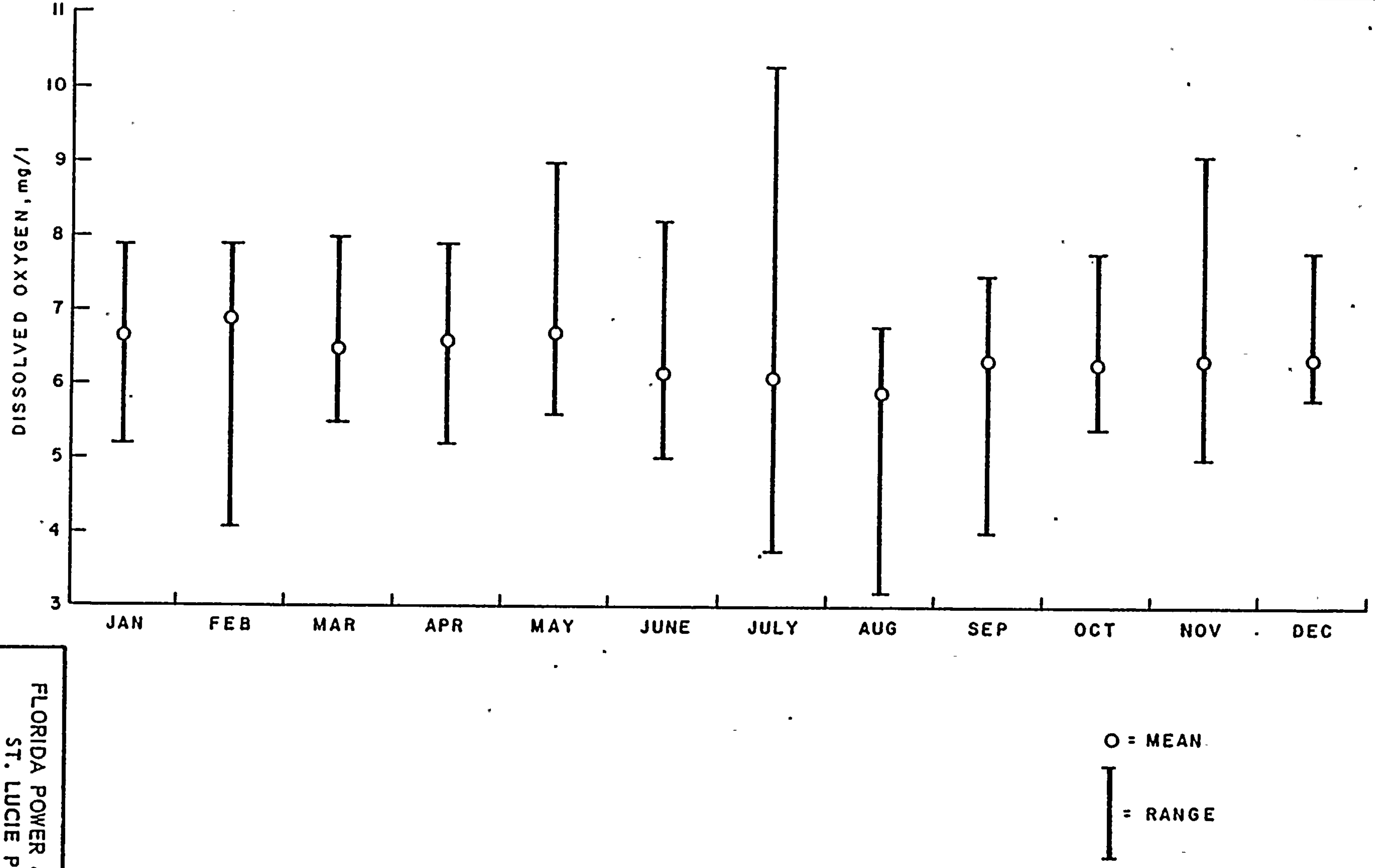
ST. LUCIE PLANT UNIT 2

STATION 2 – SURFACE WATER
TEMPERATURE

FIGURE 2.4-7



FLORIDA POWER & LIGHT COMPANY
ST. LUCIE PLANT UNIT 2

DISSOLVED OXYGEN VALUES BY MONTH
STATIONS 1 THROUGH 5, POOLED

FIGURE 2.4-8

ATTACHMENT 6

ST. LUCIE UNIT 2 ENVIRONMENTAL REPORT - OPERATING LICENSE, SECTIONS 3.3 AND 3.4

3.3 PLANT WATER USES

3.3.1 INTRODUCTION

This section describes St Lucie Unit 2 minimum, average and maximum plant water uses. Table 3.3-1 lists all plant water use systems, their respective water sources and flow characteristics. Figure 3.3-1 illustrates St Lucie Unit 2 station water uses on average daily and maximum bases. For purposes of overall plant water balance, storm water drainage flows are also included. In the following subsections, individual plant water systems with their respective sources are identified. Makeup quantities and discharge flow rates for each system are also estimated (Table 3.3-2).

3.3.2 WATER SOURCES

The St Lucie Unit 2 heat dissipation system including circulating water, and intake cooling water systems utilizes Atlantic Ocean water on a once through basis. The screen wash and sodium hypochlorite generator systems also withdraw ocean water. Ocean water quality near the plant site is presented and discussed in Section 2.4.

The Fort Pierce Municipal Water Supply System provides makeup to the St Lucie site. This makeup is stored in two city water storage tanks. The following St Lucie Unit 2 systems receive water from this source:

- water treatment (i.e., nuclear steam supply system and other primary and secondary system uses);
- service water;
- potable and sanitary; and
- fire protection.

Water quality of the Fort Pierce Municipal System is presented in Section 3.6.

3.3.3 HEAT DISSIPATION SYSTEM

The St Lucie Unit 2 heat dissipation system, consisting of the circulating water system and the intake cooling water system, is described in Section 3.4.

3.3.4 WATER TREATMENT SYSTEM

The St Lucie site water treatment system supplies high quality makeup water to St Lucie Unit 2. The water treatment system consists of four carbon filters in parallel, followed by two parallel demineralizer trains with a treatment capacity of 375 gpm each train. During normal plant operation, St Lucie Unit 2 requires a total of approximately 140 gpm for primary and secondary plant water makeup, as shown on Figure 3.3-1. The quantity and quality of wastewater generated from the water treatment system are discussed in Section 3.6.2.

3.3.5 POTABLE AND SANITARY WATER SYSTEMS

St Lucie Unit 2 potable and sanitary water is supplied by St Lucie site service water system. The sanitary waste is described in Section 3.7.

Based on approximately 170 people per 24 hour period during a normal operating day, and 50 gallons per capita per day, potable and sanitary water requirements are estimated at 8,500 gallons per day, and an average daily flow of approximately six gpm. Maximum intermittent potable and sanitary flows for St Lucie 2 are estimated to be approximately 95 gpm.

3.3.6 SODIUM HYPOCHLORITE GENERATOR SYSTEM

The sodium hypochlorite generation system is described in Section 3.6.5.

3.3.7 TRAVELLING SCREEN WASH SYSTEM

Two travelling screen wash pumps (one standby) are installed in the St Lucie Unit 2 intake structure. Each pump is sized at 1060 gpm capacity. Normal screen washing requires one pump operation for two hours per day, resulting in an average daily flow of 90 gpm.

3.3.8 PLANT SERVICE WATER USES

Water from the St Lucie service water system serves as the makeup source for periodic equipment and floor washdowns in plant areas. Maximum intermittent flow is estimated at 150 gpm while average daily flow is estimated at approximately six gpm.

3.3.9 FIRE PROTECTION SYSTEM

Water from the St Lucie site service water system is used as makeup to the fire protection system. Two 2500 gpm electric motor driven pumps and one 500 gpm portable gasoline engine pump withdraw water from the on-site city water storage tanks for fire protection purposes.

3.3.10 INTERNAL RECYCLING OF WATER

Whenever possible, treated water is recycled to reduce consumptive water use at St Lucie Unit 2. Examples of potential reuse include:

- reuse of liquid waste management system effluent
- reuse of steam generator blowdown for secondary water uses.

TABLE 3.3-1

PLANT WATER USE SYSTEMS AND WATER SOURCES

Plant System	Water Source	Flow Characteristics
Circulating Water	Atlantic Ocean	Continuous
Intake Cooling Water	Atlantic Ocean	Continuous
Water Treatment	City Water Storage Tanks	Continuous/ Intermittent
Potable and Sanitary	City Water Storage Tanks	Intermittent
Sodium Hypochlorite Generation	Atlantic Ocean	Intermittent
Travelling Screen Wash	Atlantic Ocean	Intermittent
Plant Service Water	City Water Storage Tanks	Intermittent
Fire Protection	City Water Storage Tanks	Intermittent

TABLE 3.3-2

PLANT WATER USE FLOWRATES (GPM)

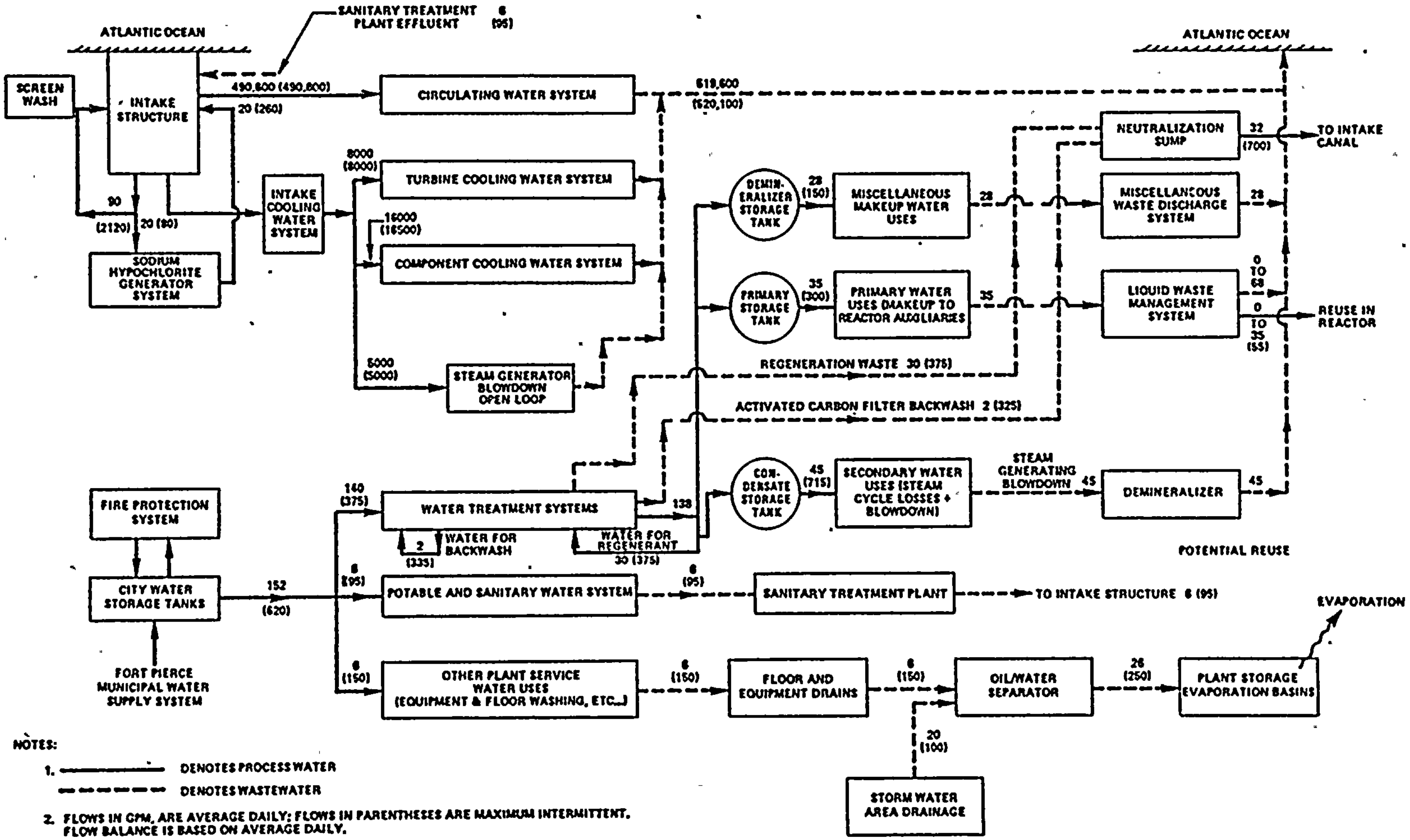
Plant System	Average Daily	Shutdown	Maximum
Circulating Water	490,600	0	490,600
Intake Cooling Water	29,000	29,500	29,500
Water Treatment	140	375	375
Potable and Sanitary	6	95	95
Sodium Hypochlorite Generator	20	0	80
Travelling Screen Wash	90	0	2,120
Plant Service Water	6	-	150
Fire Protection	-	-	5,500
TOTAL	519,862	29,970	528,420

Notes:

(1) Average daily flowrate was estimated on a continuous basis for maintaining normal plant operation.

(2) Shutdown flowrate corresponds to minimum plant water use.

(3) Maximum flowrate estimated on an intermittent basis (except circulating water flow) corresponds to maximum plant water use.



NOTES:

1. ——— DENOTES PROCESS WATER
- - - - - DENOTES WASTEWATER
2. FLOWS IN GPM, ARE AVERAGE DAILY; FLOWS IN PARENTHESES ARE MAXIMUM INTERMITTENT. FLOW BALANCE IS BASED ON AVERAGE DAILY.
3. AVERAGE DAILY STORM WATER FLOWS BASED ON AVERAGE YEARLY RAINFALL OF 61.7 INCHES/YEAR WHILE MAXIMUM FLOWS ARE BASED ON THE 10 YEAR - 24 HOUR RAINFALL EVENT.

FLORIDA POWER & LIGHT COMPANY
ST. LUCIE PLANT UNIT 2

PLANT WATER USE
FLOW DIAGRAM
FIGURE 3.3-1

3.4 HEAT DISSIPATION SYSTEM

3.4.1 INTRODUCTION

Heat from St Lucie Unit 2 is dissipated through two major systems: (i) the circulating water system (CWS), and (ii) the intake cooling water system (ICW). The total heat rejected during normal operation from St Lucie Unit 2 is about 6.38 x 10^9 Btu/hr. A flow diagram of these systems is shown in Figure 3.4-1.

The CWS withdraws water from the Atlantic Ocean to condense turbine exhaust steam into water for reuse in the power production cycle. Following its use in the condenser, the circulating water is returned to the ocean. The ICW supplies ocean water to the heat exchangers (HX) of the turbine closed cooling water system, the component cooling water system and steam generator blowdown cooling system. An emergency water supply has been installed to provide an alternate cooling water source, should the CWS be impaired. The source of emergency water is Big Mud Creek.

With the exception of the St Lucie Unit 2 discharge pipeline/diffuser and its separate headwall, other major portions of the intake and discharge facilities of the CWS were installed for St Lucie Unit 1 and have operated since 1976. For the sake of clarity, the CWS, which includes components shared between St Lucie Units 1 and 2, is described below, as well as the St Lucie Unit 2 ICW.

3.4.2 CIRCULATING WATER SYSTEM

The CWS is designed for a maximum calculated heat rejection rate of 6.17 x 10^9 Btu/hr. The maximum temperature rise of the circulating water through the condenser is approximately 25°F at a circulating water flow of 490,600 gpm. There is negligible consumptive water use from this system. No diluents are added to the circulating water system.

The major components of the CWS, as shown in Figure 3.4-2, include two intake pipelines and canal, four 25 percent capacity circulating water pumps, a pumphouse and condenser, a discharge canal, and ocean discharge pipeline and diffuser. The intake pipelines, intake canal and discharge canal are shared with St Lucie Unit 1.

Water is withdrawn from the Atlantic Ocean at a rate of approximately 519,600 gpm (1159 cfs) of which 490,600 gpm pass through the main condenser and the remaining 29,000 gpm serve the ICW.

3.4.2.1 Intake

There are two ocean intake pipes located 1,200 ft offshore and about 2,300 ft south of the discharge pipeline. Maximum expected intake water temperature is 87°F. Each pipe has a velocity cap to minimize fish entrapment (St Lucie Unit 2 Environmental Report - Construction Permit Section 3.4). The top of the velocity cap is approximately eight ft below the water surface at mean low water. A vertical section to prevent sanding is provided. Horizontal entrance velocities are less than one fps. As water passes under the velocity caps, flow becomes vertical (downward) and velocity increases to 2.9 fps. Flow then becomes horizontal as water enters the intake pipes, and velocity increases to approximately ten fps.

From the ocean intake point, water at a rate of approximately 1,039,200 gpm or 2320 cfs (519,600 gpm per unit) flows through two buried 12 ft diameter pipelines to the intake canal. The 300 ft wide intake canal begins 450 ft west of the shoreline and carries the cooling water some 5,000 ft to the plant intake structures. The water velocity in the canal varies with the tide level. The maximum velocity is about 1.1 fps and the minimum velocity is about 0.9 fps.

There are two plant intake structures, one for each unit. The St Lucie Unit 2 intake structure consists of four bays, each containing a coarse screen, a travelling screen and a circulating water pump. The approach velocity to each bay is about one fps.

The four coarse screens consist of a fixed rack with three inch spacing to hold up large pieces of trash. The rack is cleaned with a manually operated rake that is lowered over the rack with the aid of a monorail hoist.

The four travelling screens consist of a continuous belt of baskets fitted with copper mesh screen with a clear opening of 3/8 inch. The basket speed is variable from 2.4 to ten fpm. The travelling screens are normally operated in the automatic mode wherein a differential water level across the screen initiates operation. Debris is cleaned and collected for disposal as described in Section 3.7. Based on St Lucie Unit 1 operating experience, it is expected that the travelling screen duty will be light due to the design of the capped ocean intake.

During normal plant operation, it is anticipated that all four circulating water pumps are utilized. Each pump is sized to provide 25 percent of required design cooling water flow of 490,600 gpm with sufficient head (44 ft) to overcome system losses. CWS pumps are serviced during normal plant outage.

If one of the pumps requires service while the plant is operating the circulating water flow is reduced to 394,600 gpm (880 cfs). Residence time under this plant operating condition is presented in Subsection 3.4.2.4.

Also located in the plant intake structure are three intake cooling water pumps each with a design capacity of 14,500 gpm. The ICW is described in Section 3.4.3.

Sodium hypochlorite solution is used for controlling biofouling in the CWS. Provision and schedules for controlling biofouling and slime formation are discussed in Section 3.6.5.

3.4.2.2 Condenser and Yard Piping

Cooling water entering the plant intake structure is delivered to four six foot diameter concrete pipes at a velocity of about ten fps. These intake pipes are installed below grade and carry the flow to the concrete condenser intake block within the turbine building. From the intake block four seven foot diameter cast iron pipes are turned upward and connected to four separate inlet waterboxes. The condenser is a single-pass type with two shells, each containing two sections, tubed with titanium condenser tubes.

Water flowing through the condenser undergoes a heat transfer process to result in a temperature rise of about 25°F across the condenser under normal plant operation. Under abnormal operation condition (e.g., three pump operation at full load coincident with high tide level and heavy marine fouling), temperature rise could exceed 25°F. The thermal impact under such a condition is discussed in Section 5.1.

The heated water is then discharged into dual buried 700-foot tunnels and piping conduits, each eight feet in diameter, which connect to the discharge canal seal well.

3.4.2.3 Discharge

The St Lucie Unit 2 discharge system consists of a discharge canal with headwall, a discharge pipeline and an ocean diffuser. Of these components, the discharge canal is the only facility that is shared with St Lucie Unit 1. Each of these components is discussed in the following subsections.

3.4.2.3.1 Discharge Canal

The discharge canal is approximately 200 feet wide and 2200 feet long, extending to a point 300 feet west of the shoreline of Hutchinson Island. The canal is trapezoidal in cross section with a 3:1 (horizontal to vertical) slope on both sides. The canal dike is at El+19 feet MLW, sufficiently high to contain the flow within the canal proper. An open spillway at El+15.5 MLW is provided on the northern dike for emergency release of cooling water.

The existing canal collects a combined discharge of about 1,039,200 gpm (2320 cfs) from St Lucie Units 1 and 2 condensers and carries this discharge seaward at about 0.8 fps to two terminating headwalls. Each headwall structure is connected to an ocean discharge pipeline. (One headwall for the existing St Lucie Unit 1 and the other for St Lucie Unit 2 diffuser).

3.4.2.3.2 Discharge Pipeline

The St Lucie Unit 1 discharge pipeline extends about 1200 feet from the shore and terminates in a two port wye nozzle, each of which is 7.5 ft in diameter. St Lucie Unit 1 has been in operation since 1976.

The St Lucie Unit 2 discharge pipeline extends about 3375 feet from the headwall to the ocean and is buried at least five feet below the ocean floor, as shown in Figure 3.4-3. The pipeline has an inside diameter of about 16.0 feet, resulting in an average velocity of about 5.7 feet per second at design conditions. The St Lucie Unit 2 pipeline is sized to compensate for potential increased headlosses due to marine fouling.

The last 1416 feet of the buried pipeline are the diffuser section. The heated water is dispersed into the ocean through high-velocity jets. The following subsection describes the design and function of the diffuser.

3.4.2.3.3 Diffuser

The multiport diffuser consists of 58 ports. Each port issues a water jet of 16 in. in diameter, spaced at 24 feet between centers (see Figure 3.4-4).

To minimize plume interference, the jet ports are oriented at a horizontal angle of 25 degrees in an alternating manner on either side of the manifold, thus making the jets on the same side 48 feet apart, and directing jet flow away from shore. Ocean depths at the proximal and distal discharge points are about 30 and 40 feet below MLW, respectively. Jet velocity of discharge water at each port averages about 13 feet per second. This high velocity, in addition to its submergence, produces a relatively high degree of entrainment of ambient water and thus enhances the diluting characteristics of the plume. As seen in Section 5.1, this is an effective method for diluting heat with minimal environmental effect.

3.4.2.4 System Velocities and Residence Times

Flow velocities at selected locations within the St Lucie Unit 2 CWS for three pump and four pump operations have been calculated. The calculation is based on high tide level. The results are summarized in Table 3.4-1. The corresponding residence times for the St Lucie Unit 2 CWS components have been calculated and tabulated in Table 3.4-2. The total system residence time was estimated to be 9740 seconds (2 hours, 42.3 minutes) for four pump operation, and 11120 seconds (3 hours 5.3 minutes) for three pump operation.

3.4.2.5 Rates of Temperature Change

The rate of temperature change in the CWS discharge is a function of the rate of change power output. The nuclear steam supply system (NSSS) has the capability of accepting a step load change of ten percent and a ramp load change of five percent per minute. The maximum rate of decrease in power output, under normal conditions, is expected to be five percent per minute. This results in a decrease of discharge water temperature at a rate of approximately 1.0°F per minute for four pump operation.

3.4.3 INTAKE COOLING WATER SYSTEM

The ICW consists of three pumps, associated piping and valves. At any given time two pumps (with the remaining one standby), each with a capacity of 14,500 gpm, are in operation to supply ocean water to the heat exchangers of the component cooling water system (CCW), steam generator blowdown cooling system (SGBDCS) and turbine cooling water system (TCW). Total heat rejected from the ICW during normal and shutdown conditions are approximately 2.07 and 3.06 x 10^8 Btu/hr, respectively.

The CCW cools the NSSS related systems. Under normal operating conditions, the ICW flow rate to CCWHX is 16000 gpm. This results in a temperature rise of 11°F. The heated water is returned to the discharge canal and eventually to the ocean.

The TCW cools turbine-generator related systems. Under normal operating conditions, the ICW flow rate to the TCWHX is 8000 gpm. This results in a temperature rise of 13°F. The heated water is returned to the discharge canal.

The SGBDCS, which consists of an open blowdown cooling system (OBDCS) and a closed blowdown cooling system (CBDCS), cools the blowdown from the steam generators. Under normal operting conditions, the ICW flow rate to the OBDCHX is 5000 gpm. The cooling water undergoes a temperature rise of 55°F and is returned to the discharge canal.

The ICW is hypochlorinated to control biofouling in the same manner as the CWS.

3.4.4 EMERGENCY WATER SUPPLY

The requirements and design basis of the emergency water supply were presented in St Lucie Unit 2 Environmental Report - Construction permit Section 3.4.3 and Final Environmental Statement. The primary source of emergency cooling water is the Atlantic Ocean and the secondary source is Big Mud Creek. The emergency water which provides for two units was installed during construction of St Lucie Unit 1. The following description represents the changes:

a) A seismically qualified concrete barrier wall, instead of a sheet piling barrier, was erected to separate the intake canal and the emergency canal connecting the Big Mud Creek.

b) Two valved openings penetrating the concrete barrier are used instead of nine pipe stubs with pneumatic plugs. Each opening provides sufficient flow for St Lucie Units 1 and 2. The valves will be actuated to open (either locally or remotely from control room) in the event emergency cooling water from Big Mud Creek is needed.

c) The valves will be routinely tested quarterly instead of semiannually.

TABLE 3.4-1

CIRCULATING WATER FLOW VELOCITIES(1)
(fps)

Location	Three Pump Operation	Four Pump Operation
1. Intake		
piping (ocean)	8.8(2)	10.0
canal	0.8(2)	0.9
intake structure approach	0.9(3)	0.9
2. Condenser & Yard Piping		
condenser & intake piping	10.0(3)	10.0
discharge piping	7.7(4)	10.0
3. Discharge		
canal	0.6(2)	0.7
ocean piping (16'0)	5.0	5.7
diffuser (16'0) average	2.5	2.9

Notes:

(1) Velocity calculations were based on: (i) high tide level (approximately +3.0 ft, MLW at Atlantic Ocean and -5.0 ft MLW at intake canal); and (ii) two unit flow (assuming constant Unit 1 four pump flow = 1159 cfs) to compute velocities for intake and discharge canals.

(2) Represents two unit flow (1159 + 880 = 2040 cfs) equally divided in the joint use pipelines and canals.

(3) Outage of one pump has no effect on the other individually isolated pumps and piping.

(4) The three pump flow (880 cfs) equally divided into two pipelines.

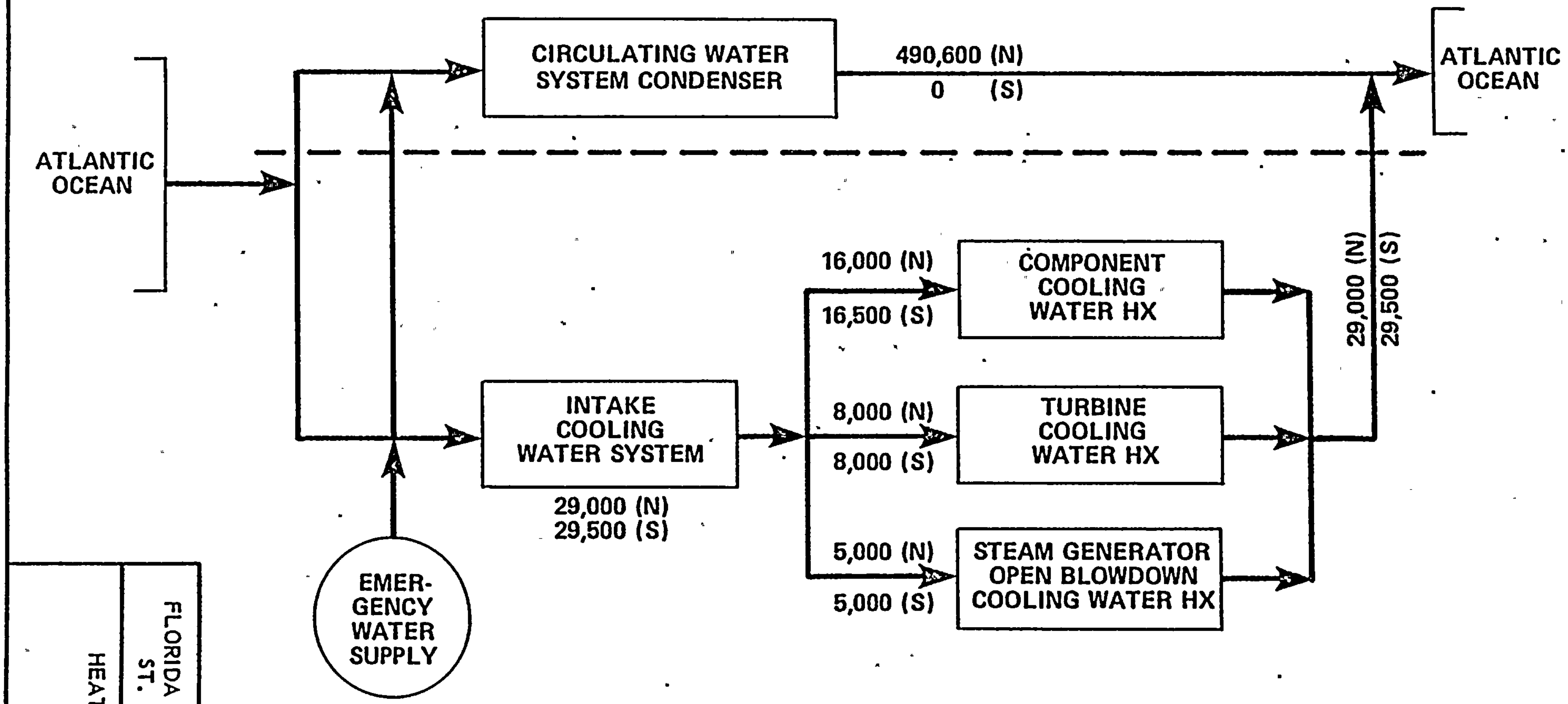
TABLE 3.4-2

RESIDENCE TIME FOR CIRCULATING WATER SYSTEM (seconds)

Location	Approximate Length (ft)	Three Pump Operation	Four Pump Operation
1. Intake			
piping (ocean)	1200	140	120
canal	5000	6250	5560
intake structure	*	*	*
	Subtotal	6390	5680
2. Condenser & Yard Piping			
condenser & intake piping	200 (approx)	20	20
discharge piping	700	90	70
	Subtotal	110	90
3. Discharge System			
canal	2200	3670	3140
ocean piping	2000	400	350
diffuser	1370	550**	480**
	Subtotal	4620	3970
	Grand Total	11120 (3 hrs, 5.3 min)	9740 (2 hrs, 42.3 min)

* = Negligible
** = Based on average velocity in diffuser

For other notes, see Table 3.4-1

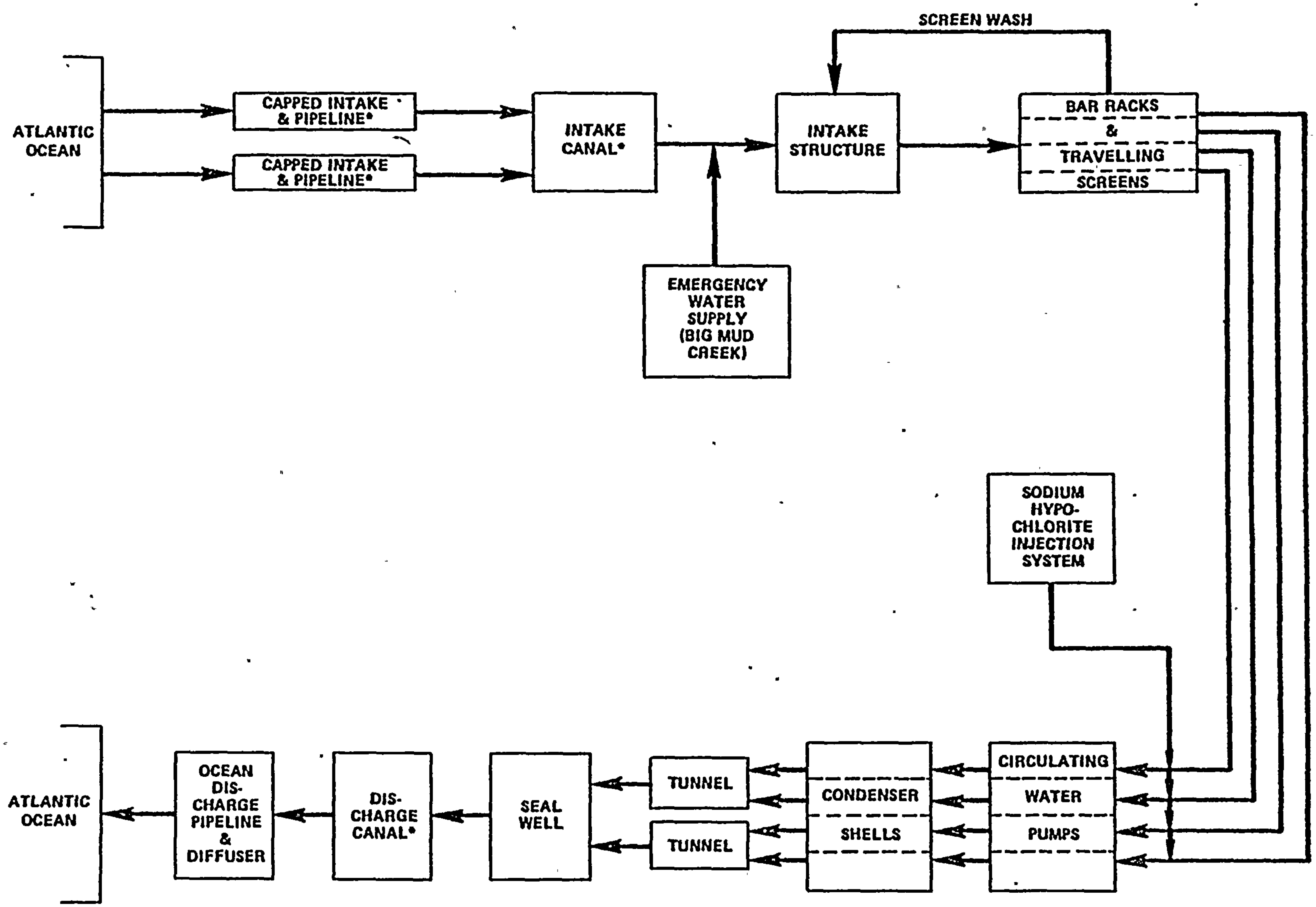


NOTES:

1. FLOW RATES ARE IN GPM
2. (N) = NORMAL PLANT OPERATION
   (S) = SHUTDOWN CONDITION
   HX = HEAT EXCHANGER

FLORIDA POWER & LIGHT COMPANY
ST. LUCIE PLANT UNIT 2

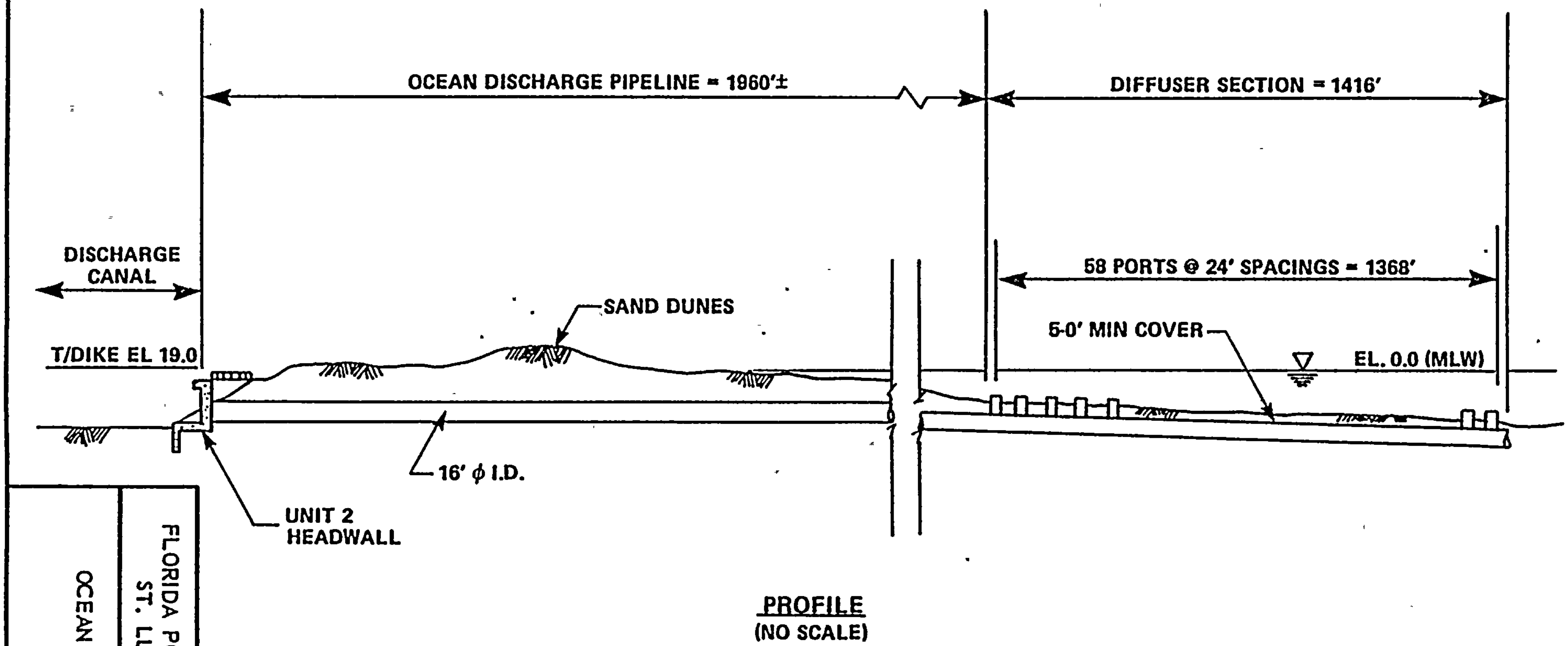
HEAT DISSIPATION SYSTEM
FLOW DIAGRAM
FIGURE 3.4–1



*SHARED BY BOTH UNITS 1 & 2

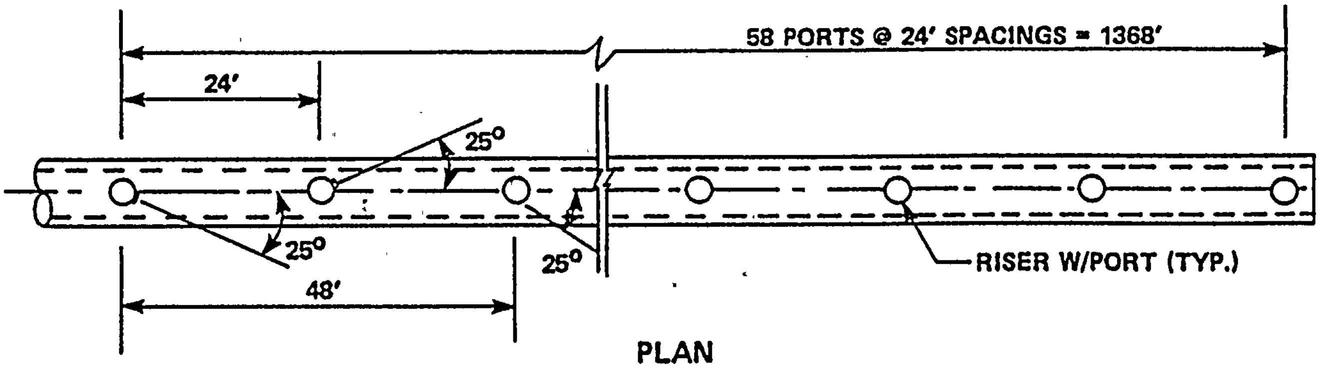
FLORIDA POWER & LIGHT COMPANY
ST. LUCIE PLANT UNIT 2

CIRCULATING WATER SYSTEM
FIGURE 3.4–2

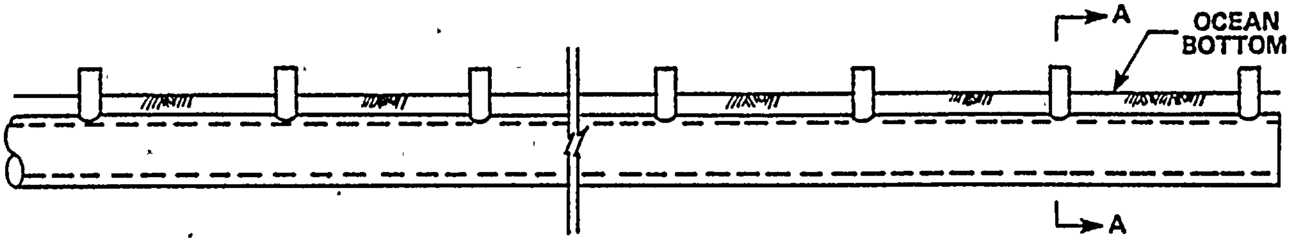


FLORIDA POWER & LIGHT COMPANY
ST. LUCIE PLANT UNIT 2

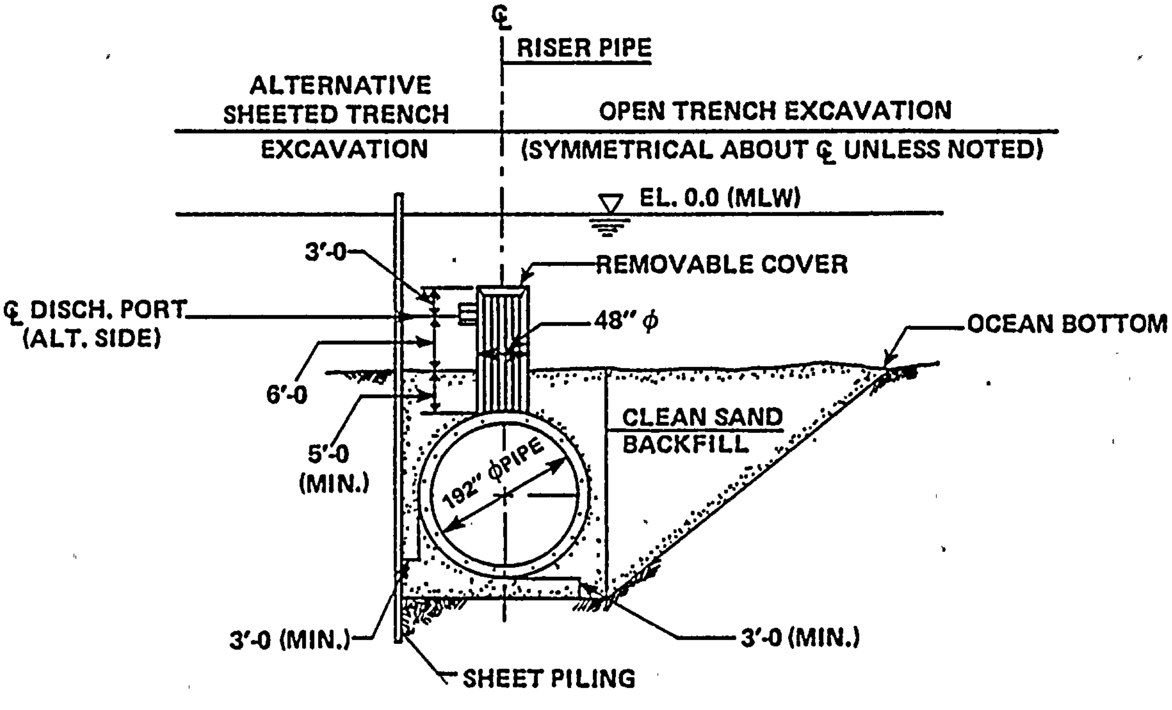
OCEAN DISCHARGE PIPELINE
FIGURE 3.4–3



PLAN
(NO SCALE)



ELEVATION



SECTION A-A

FLORIDA POWER & LIGHT COMPANY
ST. LUCIE PLANT UNIT 2

DETAILS OF THE
MULTIPORT DIFFUSER

FIGURE 3.4–4

ATTACHMENT 7

ST. LUCIE UNIT 2 ENVIRONMENTAL REPORT - OPERATING LICENSE,

SECTION 6.1

6.1 PREOPERATIONAL ENVIRONMENTAL PROGRAM

The Final Environmental Statement Related to Construction of St Lucie Unit 2 required that a preoperational environmental monitoring program be defined for St Lucie Unit 2. This program is in effect, and is the operational environmental monitoring program for St Lucie Unit 1. Program elements are described in Appendix B to Operating License No. DPR-67, Environmental Technical Specifications for Florida Power & Light Company's St Lucie Unit 1. Further information on this program is contained in three reports(1-3) submitted to USNRC by FP&L, in accordance with the St Lucie Unit 1 Environmental Technical Specifications.

6.1.1 SURFACE WATERS

Environmental monitoring of Atlantic Ocean waters, offshore of the St Lucie site, began in March 1976. The environmental monitoring program conducted by Applied Biology Inc serves two functions: 1) it provides preoperational information on physical, chemical and ecological parameters for St Lucie Unit 2; 2) the operational effects of St Lucie Unit 1 on the Atlantic Ocean are measured. Monitoring programs not defined in the St Lucie Unit 1 Environmental Technical Specifications are described below.

6.1.1.1 Tides

Ocean tide features at St Lucie are described from the unpublished tide record for Vero Beach, Florida, supplemented by a monitoring program at the plant site. The National Ocean Survey monitored ocean tides at a location about one mile north of Riomar, which is across the Indian River from Vero Beach. The NOS monitoring station, about 21 nautical miles north of the St Lucie plant site, was operated from June 1970 to November 1973, providing a tide record for 33 months of this period.

Ocean tides were also monitored by FP&L at the St Lucie plant site, near the circulating water intake location from April 1976 to May 1977. Three float-type drum recording gauges, Leupold and Stevens Model A-71, were installed in stilling wells which were mounted on the intake warning pylons. The gauge zero was surveyed relative to the local plant site datum, which is defined as 1.85 feet below National Geodetic Vertical Datum. Tidal elevation resolution was generally less than 0.1 feet except during brief periods of heavy swell when some wave effect was noticeable in the record. After combining the records from all three instruments data recovery was at least 94 percent during the monitoring interval of May 9, 1976, to May 8, 1977. Data were compiled as a listing of high and low tide elevations relative to the site datum.

6.1.1.2 Currents

Ocean currents near the St Lucie Unit 1 discharge were measured by Continental Shelf Associates (CSA), Tequesta, Florida, from November 1973 through May 1975(4). Two General Oceanics Model 2010 film recording current meters were installed at a monitoring station location 2000 feet offshore, at a water depth of 32 feet below mean low water. Surface currents were measured with a meter attached to a taut wire mooring 26 feet above the bottom. Bottom currents were measured one foot above bottom with the second meter mounted on a concrete block anchor. The tilting vane type current meters were serviced routinely at 20 to 30 day intervals when film packs were retrieved for processing. Data recovery was at least 82 percent for bottom current measurements and 67 percent for the surface record. Both bottom and surface current speed and direction were listed for 15 minute measurement intervals. After reducing the current data, CSA presented current speed and direction in the form of joint frequency distributions for 0.1 fps increments and 30 degree sectors. The independent distributions of current speed and direction are summarized in Tables 2.4-1 through 2.4-4 to describe seasonal trends and ranges.

Current measurements acquired during a ten day interval in March-April, 1977, were obtained as part of a program to evaluate performance of the St Lucie Unit 1 diffuser(5). An array of four in situ current meters was used to measure mid-depth currents within a one nautical mile radius of the diffuser. Environmental Devices Corporation (ENDECO) Model 105 current meters were deployed with recording intervals set for one-half hour increments.

6.1.2 GROUNDWATER

The series of subsurface investigations performed to determine the groundwater environment of the St Lucie site have been described in the St Lucie Unit 2 Environmental Report - Construction Permit.

6.1.3 AIR

6.1.3.1 Onsite Meteorological Measurements

The onsite meteorological program is designed to provide a dispersion climatology for use in safety planning of radioactive effluent releases and as a means of determining the appropriately conservative meteorological parameters to be used in estimating the potential consequences of hypothetical accidents. Analysis of meteorological data collected at the St Lucie tower permitted an assessment of the diffusion parameters characteristic of the site. The instrument package which complies with NRC Regulatory Guide 1.23 RO(6) is described in Sections 6.1.3.1.2 through 6.1.3.1.4.

The parameters which are monitored are wind speed, wind direction, temperature differential (delta T), dewpoint, temperature, barometric pressure and precipitation. The parameter, heights, and number of sensors installed at the St Lucie site are listed in Table 6.1-1.

6.1.3.1.1 Meteorological Tower

A meteorological tower was erected at the St Lucie Plant site on Hutchinson Island in December 1970. A 199 foot frame tower is located on site 2400 feet north of the reactor complex. It is situated in an area of relatively flat terrain characterized by mangrove trees in the range of eight to ten feet in height. Figure 6.1-1 illustrates the location of the meteorological tower relative to the rest of the plant site.

6.1.3.1.2 Instrumentation

a) Wind Speed

The wind speed sensors at the 32.8 foot and the 190.0 foot levels are Climatronics F460-WS wind speed transmitters. Each sensor consists of a sensitive three cup anemometer which drives a multi-holed light chopper in the transmitter. The rotating light chopper produces an electrical signal output from a phototransistor and a light emitting diode source. The resulting signal is shaped into a square wave whose frequency is proportional to the wind speed. This square wave signal is then sent to the translator for conversion to engineering units.

The specifications of the Climatronics model #F460-WS wind speed anemometer are as follows:

Accuracy	±0.15 mph or 1 percent, whichever is greater
Threshold	0.58 mph
Range	0 to 100 mph
Distance Constant	5 feet maximum
Temperature Operating Range	-40°F to 120°

b) Wind Direction

Climatronics F460-WD wind direction transmitters are used to measure the wind direction at the upper and lower levels. Each wind direction sensor consists of a light weight counterbalanced vane connected to a precision low torque potentiometer located in the transmitter. The position of the vane is sensed by the potentiometer and is sent to the translator as a dc voltage.

The specifications of the Climatronics model #F460-WD wind direction sensor are as follows:

Accuracy	±3° of azimuth
Threshold	0.58 mph
Range	0 to 540°
Distance Constant	3.7 feet maximum
Damping Ratio	0.4
Temperature Operating Range	-40°F to 120°F

The signal conditioning equipment is the Climatronics Model 100078 analog translator. The output of the translator is 0-1.0 volt for 0-120 mph wind speed. Wind direction output is 0-1.0 volt for 0-540°.

c) Air Temperature

Two Rosemount resistance temperature sensors Model 104 MB are used for the direct measurement of ambient temperature and delta T. The platinum resistance temperature sensor provides an extremely predictable and repeatable resistive output with changes in temperature. The Rosemount temperature sensors are coupled with Rosemount Model 414L linear bridges to provide a millivolt output signal with an accuracy of +0.17°F. Differential temperature is measured between the upper and lower temperature sensors (0-0.1 volt for 0-100°F) by using a differential amplifier supplied with the control room equipment for temperature differential. The differtial output range is ±15°F. The heights of each temperature sensor are given on Table 6.1-1.

The sensor consists of a precision, wire-wound resistance element, a protective enclosure, a mounting housing, and provisions for electrical connections.

The specifications of the Model 104 MB sensors are as follows:

Accuracy	±.085°F @ 32°F
Response Time	5.5 seconds
Range of Probes	-100°F to 500°F
Resistance at 32°F	approx 100 ohms (dependent on probe)
Radiation Shield	under test radiation intensity of 1.56 gram calories/cm^2/min, radiation errors are less than 0.2°F.
Aspiration Rate	10 ft/sec
Operating Temp Range of Shield	-40°F to 150°F
Shield Finish	highly reflective Dupont polar white epoxy

d) Rain Gauge

The precipitation sensor is a Belfort tipping bucket rain gauge. This type of sensor funnels rain into a small receptacle which tilts when it has received 0.01 inch of rain and another identical receptacle moves in place ready to receive the next 0.01 inch of rain. In the process of tipping, an electrical contact is closed momentarily. A translator card is connected to this electrical contact and counts the tips by adding 0.01 volts (0.01 inches precipitation). After each 1 inch accumulation of precipitation the translator automatically resets the output to 0.0 volts.

Belfort tipping bucket rain gauge (No. 595)

Sensitivity	0.01 inches
Range	infinite
Accuracy	2 percent for rainfall rate of 1 in/hour or less 4 percent for rainfall rate of 3 in/hour 6 percent for rainfall rate of 6 in/hour

e) Dewpoint

Dewpoint (at the 34.7 foot level) is measured by a Foxboro Model 2711 AAG lithium chloride dew cell. The range of the sensor is 0 to 120°F; the accuracy is ±0.5°F between 10 and 90 percent relative humidity. The linear output is recorded on a Bristol Model 550 Dynamaster analog recorder.

f) Barometric Pressure

A Belfort microbarograph (USWB No. 355-31SW) is employed to provide a continuous strip chart record of atmospheric pressure. It is calibrated to within .005 inches (.17 mbs).

6.1.3.1.3 Telemetric and Data Recording System Description

The meteorological data acquisition system for the St Lucie Plant is designed in accordance with the requirements listed in NRC Regulatory Guide 1.23 RO(6). The data acquisition equipment is at the onsite meteorological tower. The data output of the sensing equipment is routed to a local recording station located at the base of the meteorological tower.

The six parameters are recorded on individual, single point analog recorders. The chart width is 4.8 inches for each parameter. The range for the wind speed is 0-120 mph. The chart range for wind direction is 540° to eliminate full scale wiping. The delta T recorder has a ±15°F chart range. The temperature recorders have a 0-120°F range. The dewpoint has a 0-120°F range. Chart drive speeds are 1.5 inches per hour.

The following is a summary of the recorders provided in the local recording station at the base of the tower:

Laboratory Data Control
Model 2802
also Navy I.D. RO-447/GMQ29

a) Wind Speed Recorders (2) - 0-120 mph range

b) Wind Direction Recorders (2) - 0-540° sweep range

c) Dewpoint - 0-120° range

d) Delta T Recorder - ±15°F range

The telemetry system will be designed and described at a later point in time.

6.1.3.1.4 Data Reduction

Meteorological data for the diffusion evaluation are presently recorded on strip charts located in the recording station at the base of the meteorological tower. The data are reduced to mean hourly data and placed on computer punch cards. Present data include:

a) Wind direction for the 32.8 and 190.0 foot levels of the meteorological tower.

b) Wind speed for the 32.8 and 190.0 foot levels.

c) Vertical temperature lapse rates between the 110.3-foot and 32.8-foot levels and between 190.0-foot and 32.8-foot levels.

d) Ambient temperature for the 34.7, 112.0 and 191.9 foot levels.

e) Dew point temperature for the 34.7 and 110.3 foot levels

f) Precipitation at the surface.

6.1.3.1.5 Calibration and Maintenance

a) Wind Direction/Wind Speed Translator System

The translator cards supplying power to the wind direction and wind speed sensors are capable of supplying a "zero" and "span" or "full scale" output using an internally calibrated voltage, precision resistance or crystal frequency oscillator. Values for the "as found" and "as left" test are documented for both "zero" and "span" modes at the remote site. This procedure documents any changes made during the calibration and readings indicated by the analog system.

b) Wind Direction Sensor Calibration

The bearings in the wind direction sensor are changed every year with replacement date and sensor serial number documented. The wind vane is pointed toward a known azimuth and the reading compared with expected voltage and chart readings. Repeatability and proper

540° switching of the potentiometer are noted and documented. All values are checked for readings $\pm 5^\circ$ of known azimuth points. Calibration is performed and documentation on the "as found" and "as left" conditions recorded for analog indicator at the remote site.

c) Wind Speed Sensor Calibration

Wind speed sensor bearings are replaced every six months with sensor serial number and replacement date properly documented.

The sensor is checked by inhibiting any movement of the cups and checking for expected voltage and analog outputs. Calibration is performed after noting the "as found" condition. Documentation of "as left" condition is made for the tower site recorders.

d) Temperature System

A variable precision resistance is substituted for each temperature probe. Factory calibration curves are compared with a five point resistance test to verify temperature bridge linearity throughout the system operating range. Values recorded by the digital and analog systems are documented for the "as found" and "as left" condition for each point calibration.

e) Delta Temperature System

A variable millivolt source is substituted into the recorder and a five point linearity check performed against known temperature points. The calibration is documented at each point with the "as found" and "as left" values recorded. A comparison is made with the remote and control room digital and analog recorders with any changes made during the calibration documented.

f) Dew Point Temperature System

The dewprobe is disconnected and substituted with a variable millivolt supply. Probe resistance values are simulated over a five point linearity range to compare with known expected results. Readings from the remote site analog recorder are documented in the "as found" and "as left" mode for the calibration procedure.

g) Dewcell Calibration

The old dewcell is replaced with a spare dewcell that has been cleaned and retreated with lithium chloride (LiCl). Wet and dry bulb readings are taken with a sling psychrometer to determine dew point and compared with the system dew point. Analog recorders in the remote site are compared with the sling psychrometer and values documented.

h) Microbarograph System

The readings from the microbarograph are compared with the test barometer and recorded. A calibration is performed documenting the "as found" and "as left" condition. The battery pack voltage is checked and replaced if below factory specifications of 2.9 volts dc.

i) Rain Gage System

The tipping bucket is activated several times with the correct value being verified on the analog recorder. Values are logged and documented to indicate consistency in readings.

6.1.3.1.6 Data Recovery

Data recovery rates for the two year period are provided on an annual basis in Table 6.1-2. In compliance with NRC Regulatory Guide 1.23, RO(6),the parameters required for valid atmospheric diffusion estimates had recovery rates exceeding 90 percent.

6.1.3.2 Models

6.1.3.2.1 Short Term (Accident) Diffusion Estimates

The objective of this subsection is to describe the methods used to provide conservative estimates of atmospheric diffusion at both the site boundary and at the outer limits of the low population zone (LPZ) for appropriate time periods up to 30 days. The diffusion evaluations for the short term accidents are based on the assumption of a ground-level release (i.e., no reduction in ground concentrations due to elevation of the plume).

6.1.3.2.1.1 Diffusion Model For 0-2 Hours

The analytical procedure for evaluating the 0-2 hour accident period is based on a revision of the model described in NRC Regulatory Guide 1.4 R2(7). The changes reflect variations in atmospheric diffusion factors that occur as a function of wind direction and variable site boundary distance. Allowances are made for meandering plumes during light winds and stable atmospheric conditions. The new approach is described in the Draft Regulatory Guide 1.XXX (1978)(8).

The model is distance and direction dependent. Variability of wind direction frequency is considered in determining the relative concentration, X/Q, values. The hourly X/Q values are determined as described in the following manner.

During neutral and stable conditions when the wind speed at the lower (10 meter) level is less than 6 meters per second (mps) the relative concentration is computed as:

$$\frac{X}{Q} = \frac{1}{\bar{u}\,\pi\Sigma_y\sigma_z} \qquad (1)$$

provided it is less than the greater value calculated from either

$$\frac{X}{Q} = \frac{1}{\bar{u}\,(\pi\sigma_y\sigma_z + cA)} \qquad (2)$$

or

$$\frac{X}{Q} = \frac{1}{\bar{u}\,(3\pi\sigma_y\cdot\sigma_z)} \qquad (3)$$

where,

X/Q = is relative concentration at ground level (sec/m^3)

π = is 3.14159

$\bar{u}$ = is the hourly average wind speed at the 10 meter level above plant grade (m/sec).

Σ_y = is the lateral plume spread (m) with meander and building wake effects (m) (a function of atmospheric stability, wind speed u and downwind distance from the release). For distances up to 800 meters, $\Sigma_y = M\sigma_y$; where M is a function of atmospheric stability and wind speed(3). For distances greater than 800 meters, $\Sigma_y = (M-1)\,\sigma_{y\,(@800m)} + \sigma_y$

A = is the smallest vertical plane, cross-sectional area of the building from which the effluent is released (2726 m^2)

c = building shape factor (0.5, dimensionless)

σ_y = is the lateral plume spread (m) at a given distance and stability based on logarithmic fit of NRC curves in(8)

σ_z = is the vertical plume spread (m) at a given distance and stability based on logarithmic fit of NRC curves in(8)

During all other atmospheric stability and/or wind speed conditions, X/Q is the greater value calculated from equations (2) and (3).

Plume meander was accounted for by modifying the lateral diffusion coefficient σ_y. The meander function (M)(9) is evaluated as follows.

a) For Pasquill stabilities A-C at all wind speeds or all stabilities when wind speed > 6 mps; M = 1

b) For wind speed ≤ 2 mps; Stab D; M = 2
Stab E; M = 3
Stab F; M = 4
Stab G; M = 6

c) For 2 mps < wind speed ≤ 6 mps M is evaluated by a curve fitting technique.

An hourly observation is considered to be calm if the wind speed is less than the threshold of the wind instruments. For calm conditions a wind speed is assigned equal to the vane or anemometer starting speed, whichever is higher. A wind direction is assigned in proportion to the directional distribution of non-calm winds with speeds less than 1.5 meters per second. No substitution was made for missing or invalid data.

6.1.3.2.1.2 Diffusion Model For 0-8 Hours

The downwind centerline relative concentration of an effluent, continuously released from a point source at ground level has been evaluated. The model used in the calculations is as follows(8):

$$X/Q = \frac{1}{\bar{u}\,(\pi\sigma_y\sigma_z + cA)} \qquad (4)$$

where,

X/Q = relative concentration (sec/m^3)

$\bar{u}$ = average hourly wind speed (m/sec) at the 32.8 foot level above plant grade

$\sigma_y \sigma_z$ = the horizontal and vertical dispersion coefficients (m), corresponding to the Pasquill stabilities defined in Regulatory Guide 1.23 RO(6) from measurements of the vertical temperature differential

c = building shape factor (0.5, dimensionless)

A = minimum cross sectional area of the reactor building (2726 meters^2)

Hourly average winds less than or equal to the starting speed of the anemometer or vane (0.36 mps) were considered calm. The calms were directionally assigned in proportion to the distribution of the lowest (non-calm) wind speed class by stability class. Eight hour running average relative concentrations were calculated by wind direction at the exclusion area boundary and at the low population zone distance.

6.1.3.2.1.3 Diffusion Model For 8-24 Hours, 1-4 Days, and 4-30 Days

For the postulated 16 hour, 72 hour, and 624 hour accident periods, the following equation, from Regulatory Guide 1.4 R2(7) was used to calculate the relative concentrations by wind direction at 1.0 mile, the low population zone distance:

$$X/Q_n = \frac{1}{n} \sum_{i=1}^{n} \frac{2.032}{\bar{u}_i D \sigma_{z_i}} \qquad (5)$$

where,

D = distance to point of analysis (m)

n = running average time of 16 hours, 72 hours and 624 hours, from i = 1 to n

The equation above assumes that the plume meanders are spread uniformly over each of the 22.5 degree sectors. No wake correction factor is allowed as the wake effect becomes negligible beyond approximately eight hours.

6.1.3.2.2 Long Term (Routine) Diffusion Estimates

The long term diffusion characteristics for the St Lucie site were estimated in accordance with the criteria set forth in NRC Regulatory Guide 1.111 R1(9). The analysis was performed using the onsite meteorological data for a two year period, September 1976 through August 1978 (see Subsection 6.1.3.1).

Relative concentrations (X/Q) resulting from routine releases were calculated using a modification of the puff advection model MESODIF developed by Start and Wendell(10,11). A ground release was assumed. The Start and Wendell dispersion coefficients were replaced with those consistent with other NRC evaluations from Gifford(12). Building wake was incorporated to allow for initial dispersion credit in the building cavity. These calculations were made at distances of 0.5, 1.5, 2.5, 3.5, 4.5, 7.5, 15, 25, 35, and 45 miles.

Undepleted relative concentrations (X/Q) were also computed using a straight line plume model. The ratios between the X/Q's from each model were determined and are characterized as the terrain/recirculation correction factors.

6.1.3.2.2.1 Puff Advection Model

Spatial variability of stability, mixing height, wind speed, and wind direction facilitate that the effluent plume from a continuous point source be approximated by the release of a series of puffs. Each puff can be modified or advected independently according to the meteorological conditions of its immediate location. Total integrated concentrations at any sampling point can be calculated from the accumulated exposure due to individual puffs as they pass over the point.

The instantaneous contribution of an individual puff to a sampling point's total integrated concentration, after Slade(13), for a ground release, is given by:

$$\frac{X}{Q}(x,y) = \frac{2}{(2\pi)^{3/2}\sigma_r^2\sigma_z} \exp\left[-\frac{1}{2}\left(\frac{r^2}{\sigma_r^2}\right)\right] \qquad (6)$$

where,

$\frac{X}{Q}(x,y)$ = the instantaneous ground level relative concentration at coordinate (x,y), (seconds/meter^3),

σ_z = the standard deviation of effluent in the vertical direction (meters),

σ_r = the standard deviation of effluent in the horizontal direction (meters),

r = the distance from the center of the puff to the coordinate (x,y) (meters)

Using Equation (5), the total integrated concentrations are calculated as:

$$TIC(x,y) = \sum_{i=1}^{n} \sum_{j=1}^{J} \sum_{k=1}^{K_i} \sum_{l=1}^{L_j} \frac{\frac{X}{Q}_{ijkl}(x,y)}{J\ L_j} \qquad (7)$$

where,

TIC(x,y) = accumulated hourly relative concentration at grid point (x,y), (seconds/meter^3),

n = number of sampling hours,

J = the number of advection steps per hour,

K_i = the number of puffs released up to hour i,

L_j = the number of samples per advection step j, and

$\frac{X}{Q}_{ijkl}(x,y)$ = the instantaneous relative concentration coordinate (x,y) contributed from puff k, during i, advection step j, and sampling step l.

This approximation with adequate sampling frequency will converge to the continuous point source at any level of accuracy required (see Start and Wendell(10)).

The diffusion of effluents is described by the distance and stability dependent values of σ_r and σ_z. Because the time history of a puff includes spatial and temporal variations of meteorological parameters, the value of σ_r and σ_z cannot be determined as a discrete function of stability and distance. These values are determined in a stepwise fashion according to the general form:

$$\sigma = \sigma_o + \Delta\sigma \qquad (8)$$

where,

σ_o = the standard deviation before the advection step (meters),

$\Delta\sigma$ = the incremental change during the advection step just completed (meters), and

σ = the updated standard deviation following the completed advection step (meters).

Between sampling intervals, it is assumed that all meteorological conditions remain constant. Growth of the puff during this interval then is only a function of stability, total distance moved before the advection step, and distance increment moved during the advection step. $\Delta\sigma$ is specified by:

$$\Delta\sigma = S\ (\text{IPAS},\ \text{DIST} + \Delta\text{DIST}) - S\ (\text{IPAS},\ \text{DIST}) \qquad (9)$$

where,

$$S\ (A,B) = 10^{(a(A)+b(A)\ \log\ (B)+c(A)\ (\log(B))^2)}$$

IPAS = the Pasquill stability class characteristic of the advection process,

DIST = the total distance puff has moved prior to advection step,

ΔDIST = the distance increment moved during the advection step,

a,b,c = are coefficients dependent upon stability class, determined in a manner such that the functions S (A,B) fits the curves given by Gifford(12).

In a method similar to that of Turner(14), σ_z at any time and location is allowed to increase via Equation (8) and Equation (9) until a value of 0.80 times the mixing height has been reached. At this point, the effluent is assumed to be uniformly mixed in the vertical direction. If previously values of σ_z already exceed this limit, they are held constant (i.e., $\Delta\sigma = 0$); they are not reduced in any manner because a negative would imply negative diffusion (Start and Wendell(10)).

6.1.3.2.2.2 Straight Line Airflow Model

The use of a ground-level release model in calculating the annual average atmospheric relative concentration (X/Q) values was determined by the meteorological data and the initial plant parameters. Depletion factors are computed directly from depletion curves as are the relative deposition rates(9). For long term, ground level relative concentrations, the plume is assumed to meander evenly over a 22.5 degree sector.

The hourly relative concentration values are calculated at the sector defined by the wind direction using the equation:

$$X/Q = \frac{2.032}{\sigma_z \bar{U} D} \qquad (10)$$

where:

X/Q = relative ground level concentration (sec/m^3)

σ_z = vertical standard deviation of the plume (meters)

$\bar{u}$ = average wind speed (m/sec)

D = distance from the source (m)

However, with the wake turbulent effect considered, the equation is revised to:

$$X/Q = \frac{2.032}{\sqrt{\sigma_z^2 + \frac{cV^2}{\pi}}\ (\bar{u}D)} \tag{11}$$

where,

c = building shape factor

V = vertical height of the highest adjacent building

The wake factor $\frac{cV^2}{\pi}$ is limited, close to the source, to a factor of twice σ_z^2. So if $\sqrt{3}\,\sigma_z < \sqrt{\sigma_z^2 + \frac{cV^2}{\pi}}$ the equation is:

$$X/Q = \frac{2.032}{\sqrt{3}\,\sigma_z\,\bar{u}\,D} \tag{12}$$

(i.e., X/Q is calculated to be the larger of Equations (11) and (12).

The total integrated relative concentration at each sector and distance is then divided by the total number of hours in the data base.

6.1.3.2.2.3 Methods of Depletion and Deposition Calculation

Depleted X/Q values were computed by applying the depletion factors provided in Figure 2 of NRC Regulatory Guide 1.111 R1(9) to the calculated X/Q values. Relative ground deposition rates were calculated using the equation:

$$D/Q = RDep\ /\ (2 \sin (11.25)\ x) \tag{13}$$

where,

D/Q = ground deposition rate

$RDep$ = relative ground deposition rate

x = calculation distance

6.1.3.2.2.4 Terrain/Recirculation Correction Factors

There is a distinct difference in theory between the PUFF model and the straight line trajectory Gaussian diffusion model. A continuous release is approximated by dividing the plume into a sufficient number of plume elements to represent a continuous plume in the PUFF model. Each element can be modified or advected independently in accord with the meteorological conditions (wind direction and speed, and atmospheric stability) of its immediate location. This would account for the temporal and spatial variations in the airflow in the region of the site. The straight line trajectory Gaussian diffusion model assumes that a constant mean wind transports and diffuses plume effluents in the direction of airflow at the release point within the entire region of interest, i.e., the wind speed and atmospheric stability at the release point are assumed to determine the atmospheric dispersion characteristics in the direction of the mean wind at all distances. Spatial and temporal variations in airflow in the region of coastal sites should be incorporated(9). This is accomplished by the use of terrain/recirculation correction factors (TCF).

The terrain/recirculation correction factors (TCF) were determined as the ratio between the puff advection estimate and the straight line estimate in the form:

$$\mathrm{TCF}_{(x,y)} = \frac{\left[\frac{X}{Q}(x,y)\right]_P}{\left[\frac{X}{Q}(x,y)\right]_S} \qquad (14)$$

where,

$\mathrm{TCF}_{(x,y)}$ = terrain/recirculation correction factor at the point (x,y)

$\frac{X}{Q}(x,y)_P$ = the annual average relative concentration at point (x,y) using a puff advection modeling scheme

$\frac{X}{Q}(x,y)_S$ = the annual average relative concentration at point (x,y) using a straight line modeling scheme.

6.1.4 LAND

6.1.4.1 Geology and Soils

The geological and soil studies performed to determine the environmental impact of the construction of St Lucie Unit 2 have been described in the St Lucie Unit 2 Environmental Report - Construction Permit. No new geological or soil studies are currently underway at the St Lucie site.

6.1.4.2 Land Use and Demographic Surveys

6.1.4.2.1 Land Use Surveys

Land uses and land cover within a five mile radius of St Lucie Unit 2 were determined through photo interpretation and field checks. During the first week of October 1978, color infrared aerial photographs were taken at an altitude of 4,800 feet of the area within five miles of St Lucie Unit 2. During the weeks of January 14 and March 7, 1979, land uses were field checked.

Once identified, land uses and land cover were classified according to USGS Professional Paper 964 and the Coastal Mapping Handbook.(15,16). This system considers land use and land cover. According to the USGS, "land use refers to man's activities on and which are directly related to the land. Land cover, on the other hand, describes the vegetational and artificial constructions covering the land surface"(16). This system uses three levels of classification. Level I is the least detailed classification; Level III is the most detailed. Levels I, II and III were used to classify land uses for this report.

6.1.4.2.2 Demographic Surveys - Resident Population

Estimates and projections of the resident population have been carried out by two different methodologies, one for the area within 50 miles of St Lucie Unit 2 (Methodology A) and the other for the area within five miles of St Lucie Unit 2 (Methodology B).

The resident population of 1978 was estimated, projections were then prepared for the years 1980, 1983 (the date of plant start-up), 1990, 2000, 2010, 2020, and 2030. Data used in preparing the resident and transient population estimates is current to June 1, 1979.

Methodology A: 0-50 miles

Population by annular sector in the region within 50 miles of St Lucie Unit 2 has been estimated and allocated by the technique outlined below.

a) On a USGS map at a scale of 1:250,000, concentric circles are drawn, with the reactor at center point, at distances of 5, 10, 20, 30, 40 and 50 miles. Between five and 50 miles, these circles are divided into 22-1/2 degree segments with each segment centered on one of the 16 cardinal compass points (north, north northeast, northeast, etc). Grid cells created in this manner are referred to as "annular sectors". Between zero and five miles, the area is considered as a whole and is not divided into annular sectors.

b) Population for each annular sector for 1970 has been derived from ONSITE(17), a real-time, interactive computer system that retrieves demographic data according to site and study area specifications. ONSITE is a registered product of Urban Decision Systems made available through National CCS, Inc. The ONSITE system calculates population for each annular sector by searching coordinate MED (Master Enumeration District) lists (as corrected by Urban Decision Corp) for centroids of block groups or enumeration districts falling within the annular sector specified(18).

c) Adjustments have been made in four annular sectors based on comparison of ONSITE data with information provided by county planners. In each case, 1970 census data and, therefore, ONSITE shows no permanent residents in places where settlement has since occurred. The sectors and adjustments are as follows:

1) 30-40 SW - Martin County: Port Mayaca given a base population of 40 in 1970(19).

2) 40-50 WSW - Glades County: Buckhead Ridge given 556 registered voters in 1977(20).

3) 40-50 W - Highlands County: Settlement since 1970 of 30 persons at Rucks Road and SR 70(21).

4) 40-50 NNW - Osceola County: Yeehaw Junction in 1970 had a population of 77; and in 1975, of 97(22).

d) Calculations of projections by annular sector are based on the official State of Florida projections developed by the Division of Population Studies, Bureau of Economic and Business Research, University of Florida at Gainesville, which are the most recent and widely used population projections in the state. These state and county projections have been based on a two stage procedure: state level projections have used a cohort survival methodology; county projections have applied a ratio-share procedure to state totals. According to the report which accompanied population projections released in July 1978, natural increase has played a small role in Florida population growth. Between 1970 and 1977, net migration accounted for more then 90 percent of Florida's population growth(23). Because net migration levels vary considerably from year to year, three sets of projections were made, based on high, medium, and low migration assumptions. The medium migration assumptions, which average out the effects of rapid and slow growth years, are considered a more accurate predictor of future population than either high or low projections(23). The medium migration assumptions were therefore selected for use in this report.

State projections cover the years 1978, 1980, 1983, 1990, 2000, 2010 and 2020. The overall growth rate which the Bureau of Economic and Business Research applies to counties in 2010 to derive projections for 2020 is used to derive growth from 2020 to 2030. This seems reasonable based on the uncertainty of events so far in the future.

e) Calculation of population by annular sectors between five to 50 miles is primarily based upon the assumption that each annular sector will maintain its 1970 share of the county population through 2030. This assumption was considered valid for the 50 mile study area because growth is expected to conform for the most part to present patterns. The preponderance of population along the Atlantic Coast and to a lesser extent on Lake Okeechobee is expected to continue due to the desirability of these locations (proximity to the Atlantic and to Lake Okeechobee), natural conditions (primarily soils suitable for development), and existing land use and zoning in these regions. Where necessary, adjustments were made to the assumption that each annular sector will maintain its 1970 share of the County population. These adjustments are discussed in "f", "g" and "h" below, and reflect known development trends.

When an annular sector includes parts of more than one county, its population for 1970 is apportioned to each county based on a breakdown of block groups or enumeration districts provided by ONSITE. Each portion is then calculated as a percentage of the respective counties' totals. This percentage was applied to the county projections to determine the portion of the county's projected population allocated to the annular sector. All the portions are then summed to estimate the total projected population for that annular sector. The resulting overall rate of growth for the 50 mile radius area is 121.7 percent or 2.3 percent per year.

f) In order to reflect accurately the development activity in Palm Beach County in the annular sectors surrounding the city of West Palm Beach, the total population for all four annular sectors is apportioned based on the growth rate of West Palm Beach and the location of housing starts in areas adjacent to the city. The annular sectors affected are SSE 40-50, SSE 30-40, S 40-50, and S 30-40. The reapportionment is made because it is felt that these four sectors would maintain their 1970 share of total county population (48 percent), but that the slow growth rate exhibited by West Palm Beach city from 1960 to 1970 (2.1 percent) would continue for the built-up area. Since the 1970 Census, housing starts have proceeded at a vigorous rate in the three surrounding annular sectors. A map of dwelling units under construction in 1977(24) shows the residential development taking place on vacant land both north and west of the West Palm Beach area.

g) A similar reapportionment is used in the annular sectors surrounding the cities of Fort Pierce and Port St Lucie. Between 1970 and 1978, Port St Lucie's population grew by nearly 1,800 percent, from 330 to 6,465(25). Concurrently, its share of county population rose from less than one percent to more than eight percent. The location of the residential development within Port St Lucie city limits was identified from aerial photographs taken in 1966 and 1969 by the

Florida Department of Transportation(26). In the annular sectors within St Lucie County, population projections were adjusted to reflect the increasing share of population held by Port St Lucie.

In addition, in annular sector SW five to ten, a comparison is made of the number existing dwelling units and built-up land to total developable land in the annular sector. Land is considered developable if streets are in place. A total capacity of dwelling units was determined on the basis of existing land development patterns. From the number of residential units already built, a resident population capacity of 20,000 persons was estimated.

h) The 1983 resident population was distributed among the annular sectors to reflect the construction of two development projects: Spanish Lakes III and Midport. Specifically, 666 residents were added to annular sector SW four to five to account for Spanish Lakes III. For Midport, 4843 residents were added to those annular sectors which will house this project upon completion in 1983: 187 residents were added to annular sector SSW three to four, 458 were added to annular sector SSW four to five, 706 were added to annular sector SSW five to ten, 75 were added to annular sector SW three to four, 1813 to annular sector SW four to five, and 1604 to annular sector SW five to ten.

i) Age distribution of the projected population for the year 2000 was based on the distribution of the age groups under 12, 12 through 18, and over 18 in the U.S. population in accordance with 10CFR100, Appendix D.

Methodology B: Zero to Five Miles

In order to allocate population to the annular sectors inside five miles, the following procedures have been undertaken: 1) identification and location by annular sector of existing dwelling units in 1978; 2) development of factors to express the relative suitability for development of annular sectors inside five miles; and 3) the allocation of expected population growth for the five mile area for the required years to 2030.

a) On a base map constructed from USGS maps at a scale of 1:24,000, a circular grid has been superimposed at radii of one mile intervals (one, two, three, four, and five miles) and 16 sectors of 22-1/2 degrees centered on north. The number of dwelling units was counted from aerial photographs taken by Aerial Cartographics, Inc of Orlando, Florida in October and November 1978 and recorded on the map. Field checks were made in early January, 1979 to resolve questionable interpretations and to verify multi-family dwellings and the number of units in them. The number of permanent residents in major residential developments such as Spanish Lakes and Nettles Island have been verified with inquiries to their respective management offices(27,28). In addition, the number of residents anticipated to reside in Spanish Lakes III and Midport was determined with inquiries to the developers and the Treasure Coast Regional Planning Council.

The estimated population for the five mile radius was allocated to annular sectors according to the distribution of dwelling units, the number of persons per dwelling unit, and estimates of seasonal versus permanent residents.

b) On a base map of the zero to five mile region, areas suitable for residential development have been identified. Areas considered unsuitable for residential development included water bodies, FP&L property and portions of the mangrove areas on Hutchinson Island, the transmission line right of way and parts of the Savannahs purchased by the State of Florida for conservation on the mainland.

The most recent zoning maps(29,30) have been overlaid on the annular sector grid and base map. To determine residential development potential, the area zoned for each residential category is calculated for each annular sector and a dwelling unit density factor applied. (Dwelling unit density factors are the average of the range of dwelling units per acre in each class of residential land use as indicated in the St. Lucie County Growth Management Plan (29)). The numbers for each residential category in an annular sector are summed to determine the total residential development potential for each annular sector. These totals are added together for the entire five mile region. Each annular sector's development capability factor is the percentage of each annular sector's residential development potential to the total residential development potential within five miles.

c) For the required years from 1980 to 2030, the expected increase in population (derived from Methodology A) is allocated among annular sectors using the relative development capability factors as defined in (b).

6.1.4.2.3 Demographic Surveys - Transient Population

Figures 2.1-10 and 2.1-11 show total transient population by annular sector for 1978 through 2030. These estimates and projections have been reached by estimating the number of tourists and seasonal visitors, the number of participants at attractions or events, employment at major industries and enrollment at colleges in each annular sector.

Methodology for Estimating Peak Daily and Seasonal Transient Population by Annular Sector

Peak daily and seasonal transient population was estimated for 1978 and projected to the year 2030 for the area within 30 miles of St Lucie Unit 2. The 1978 peak daily and seasonal transient population was based on calculations of the number of people staying in tourist lodgings, campgrounds and with friends and relatives. Those people visiting attractions, working for major employers within the study area and attending colleges in the area are listed separately. The latter transient groups were not added to the transient population totals shown in Table 2.1-5 and Figures 2.1-10 and 2.1-11 to preclude double-counting.

Tourist Population

Inside the ten mile radius, the number of tourists staying in tourist lodgings (such as hotels, motels) and in campgrounds has been determined by contacting listed tourist accommodations(31-33), locating them within the proper annual sector, and inquiring as to their peak capacity or 100 percent occupancy.

The number of tourists staying with friends and relatives within ten miles of St Lucie Unit 2 has been determined by dividing the total resident population in each annual sector by 5.09. This factor was derived by dividing the peak number of visitors to the State of Florida not staying in motels and campgrounds in 1977(34). As previously mentioned, the number of tourists staying in motels, hotels and campgrounds was obtained by phone survey of listed tourist accomodations. This number was subtracted from the total number of tourists, to obtain the number of tourists who stay with friends and relatives. Within the ten mile radius the number of people staying in tourist accommodations was added to those staying with friends and relatives, to derive a total peak daily and seasonal tourist transient population.

Between ten and 30 miles, each campground has been located and its peak capacity ascertained. For other tourist lodgings, each annular sector was given a share of the total lodging units licensed by the State of Florida for the county within which it fell(35). It is assumed that an annular sector's share of lodging units was the same as its share of the total county resident population. For example, annular sector SSE 20-30 contains 0.089 percent of Martin County's resident population. Therefore, 0.089 percent of the total licensed tourist lodgings in Martin County was allocated to this annular sector.

Peak occupancy of lodging establishments is calculated at three persons per unit with an occupancy rate of 100 percent for the peak season. This occupancy rate is based on inquiries to each lodging establishment within the ten mile radius.

As within the ten mile radius, the number of tourists staying with friends and relatives between ten and 30 miles from St Lucie Unit 2, was determined by dividing the resident population in this area by 5.09. Once again, the number of persons staying in tourist facilities was added to the number of persons staying with friends and relatives to determine peak daily and seasonal visitors for the ten to 30 mile radii.

To project peak daily and seasonal transient visitors for the required years to 2030, two methods have been used, one for the years between 1978 and 1985, and one for the years between 1985 and 2030.

For projections to the year 1985, an annual rate of increase of eight percent estimated by the State of Florida Division of Tourism has been used. The Division of Tourism projections to 1985 are based, in part, on questionnaires administered to tourists arriving by auto and air. Responses to these questionnaires are used to establish annual tourist population figures. Projections are then determined on the basis of a linear annual growth rate reflecting the latest annual increase in tourist population. Thus, since the tourist population grew by eight percent from 1977 to 1978, this number is used as the annual rate of increase to 1985(34).

The Division of Tourism does not prepare tourist projections beyond the year 1985. A second projection method was developed for 1985 to 2030. For 1985 to 2030, a growth rate of 2.1 percent was used which is based on a linear regression of the historical growth rate of the tourist population during the years 1970-1978.

Having thus estimated the total tourist population for the required years between 1985 and 2030, it was necessary to allocate the population to each annular sector. To do this, it is assumed that each annular sector's share of campgrounds, other tourist lodgings, and persons staying with friends or relatives would remain the same as it was in 1978. Furthermore, based on 1978 data, it was determined that 27 percent of the total tourist population within 30 miles of St Lucie Unit 2 stayed at campgrounds, 23 percent stayed in hotels, motels or other tourist lodgings, and 50 percent stayed with friends and relatives. It is assumed that these percentages would also remain constant during the years under consideration.

Transient Population at Attractions and Events

Attractions and events occurring within 50 miles of St Lucie Unit 2 are shown in Figure 2.1-12. These events, along with estimated and projected attendance, are shown in Table 2.1-7. Attendance at events has been projected at the average annual rate of growth for the entire 50 mile radius; 121.7 percent for the 52 year projection period, or an average annual rate of 2.3 percent. If a facility had a maximum attendance which could not be exceeded, this was left constant. In the future, additional stadiums, frontons, civic centers, etc, may be established in the study areas; but since none is presently proposed, there is no way to predict their locations or capacity.

Transient Population at Major Industrial Employers and Colleges

Major industrial employers and colleges within 50 miles of St Lucie Unit 2 attract large numbers of people from a large area on a regular basis. Any employer with more than 500 persons on a shift has been included in the totals for the annular sector in which it was located. Since expansion and contraction are difficult to predict, and because none had plans to expand employment significantly, the number of employees has been held constant throughout the 52 year period. Table 2.1-8 shows full employment and peak daily shifts.

Colleges draw students from the four county area and from around the country. For Indian River Community College, which has four campuses, the proportion of the student body attending class on each campus is assumed to remain constant for the purpose of projecting enrollments. The peak daily population is estimated by projecting total enrollment to 1983 by five year growth rates provided by the school. Student population was interpolated for 1980. Between 1990 and 2030, projections are made by the average annual rate of growth for the 50 mile area. The number of students attending classes on the most heavily scheduled days of the week is used as peak daily population. The proportion of total enrollment to peak class attendance in 1978 is assumed to remain constant throughout the 52 year period.

Methodology for Estimating Transient Population from Transportation

Transient population generated by transportation is comprised of four basic modes: highways, railroads, waterways, and airports. Because transportation is not limited to individual annular sectors, it is described separately from totals for transient population. In addition, traffic volume numbers are given by average daily total number of passengers for highway, rail, waterway, and air traffic.

a) Highway Traffic

Between zero and ten miles from St Lucie Unit 2, travelers on major roads were estimated from the average daily traffic count (ADT)(36) from 1977 at the sampling stations closest to the ten mile radius (preferably at or just inside the ten mile radius line). Major roads include interstate highways and state roads. Where ADT counts separated traffic by direction of flow, travel into the ten mile radius area has been used. Where the directions were combined, the ADT count was divided in half, on the assumption that traffic is evenly distributed in both directions. Numbers of vehicles were increased by 2.4 percent to a 1978 estimate and then multiplied by 2.5 for interstate and turnpike(37), and by 1.5 for state roads, to achieve the number of passengers on the roads.

Between ten and 30 miles of St Lucie Unit 2, highway passengers have been estimated for the two major interstates, I-95 and the Florida Turnpike. The number of persons coming within 30 miles of St Lucie Unit 2 is derived from average daily traffic counts done by the State of Florida Department of Transportation. Numbers of vehicles traveling in the direction toward the plant are multiplied by 2.5 passengers per vehicle to generate passenger estimates.

Projections are calculated by using the expected rate of growth for the entire resident population for the 50 mile radius to 2030. Since it is possible that the vehicles counted at one station are counted at another, there has been no attempt to total passengers, or to assign persons in transit to an annular sector.

b) Waterway Traffic

Transient population on waterways has been derived from passenger counts for the Intracoastal Waterway and Fort Pierce Harbor, number of bridge openings, and operations of locks on the St Lucie Canal.(38) For the Waterway and Harbor, annual total passengers for 1976 were divided by 365 to get a daily average. An average annual growth rate of 2.4 percent was used to derive estimates for 1978 and for the required years through 2030.

Estimates of transient population were also derived from the number of drawbridge openings on the Indian River(39,40) and the St Lucie

River(41,42). The annual number of openings recorded by bridge tenders was divided by 365 to reach a daily average. An average of 1.2 vessels per opening (based on records of openings and vessels at the Roosevelt Bridge) has been applied to the number of openings, and then multiplied by four passengers per vessel(39) to arrive at an average daily number of passengers for each bridge. These estimates do not include passengers on small craft which can pass beneath draw bridges.

On the St Lucie Canal(43), transient population has been derived from lock tender's records of annual total of vessels. The annual total has been divided by 365 days in the year, and multiplied by four persons per vessel to reach an average daily number of passengers. On the St Lucie Canal, all vessels are counted as they pass through the locks.

Projections of transient population at the bridges and on the St Lucie Canal are based on the 2.4 percent average annual rate of growth for the 50 mile radius area.

c) Rail Passengers

Only one rail line within 50 miles of St Lucie Unit 2 has passenger service(44). The average daily passenger count in 1978 is derived by dividing the total passengers for the year by 365 days. Passenger totals were divided in half for 1980 because of anticipated reductions in Amtrak service to Florida(45). Passenger totals are projected at two percent per year from 1980 to 1983; and at the annual average growth rate of 2.4 percent per year from 1983 to 2030.

d) Airplane Passengers

Airports with scheduled passenger service in 1978 were considered sources of transient population within 50 miles of St Lucie Unit 2. Only the West Palm Beach International Airport(46) met this criterion (see Section 2.1.2.3.5.4). Estimates for 1978, 1980, 1983, and 1990 are based on projections of passenger service made in 1975, and on actual numbers of passengers in 1977. Interpolations have been made for 1978 and 1983. Projections to 2030 are based on the average annual growth rate of 2.4 percent for the 50 mile radius resident population. Total passengers per year have been divided by 365 to reach the daily average number of passengers.

6.1.4.3 Ecological Parameters

Beach surveys for nesting sea turtles have been conducted May through August in alternate years since 1971. A count of nests created the previous night is performed in nine, 0.75 mile long sampling areas each Monday through Friday during the nesting season. Each weekday night, adult females crawling on the beach to nest are tagged for the future identification. Tagging is done after egg laying commences to avoid alarming the turtle. Subsequent occurrence of the tagged turtles on the beach are recorded by date, location and nesting success.

The species of turtle making the nest is determined by the size and pattern of the nesting crawl and the nest is recorded and marked with a numbered stake. Nest suffering predation are recorded by stake number. False (non-laying) crawls are also noted. In addition to the nest counts in the sample area, the entire island is surveyed for leatherback and green turtle nest. The occurrence and locations of leatherback and green turtle nests are transmitted to the Florida Department of Natural Resources for possible egg removal and "head-starting" programs.

Capture and removal of turtles entering the St Lucie plant intake canal is performed on weekdays throughout the year. Turtles are identified, weighed, measured, examined for general health and condition and released.

6.1.5 RADIOLOGICAL MONITORING

The objective of the environmental radiological surveillance program is to compile sufficient information to permit an accurate prediction of the impact which could be caused by a known discharge of radionuclides into the environment. This capability for prediction of the impacts of a discharge will permit FP&L to accurately estimate the effects which could result from the small quantities of radionuclides released during the operation of St Lucie Units 1 and 2. In this way, technical specifications can be established which will ensure that the radiation protection guidelines for offsite human exposures to radioactivity, set forth in 10CFR20 and Appendix I to 10CFR50, will not be exceeded.

The St Lucie Unit 2 preoperational program is the ongoing monitoring program for St Lucie Unit 1. The St Lucie Site program satisfies the individual requirements for each unit and affords a continuing and comprehensive assessment of the radiological characteristics of surrounding areas. This ongoing program is described in detail in the St Lucie Unit 1 Environmental Radiological Technical Specifications.

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35. Lodging Establishments Licensed by the State of Florida, Department of Commerce, Division of Tourism, Tallahasee, Florida. October 1978.

36. State of Florida, Department of Transportation, Map of Alternate Corridor Locations. (Undated).

37. Office of Programming and Budget, State of Florida, Department of Transportation, Tallahassee, Florida. Personal Communication, November 13, 1978.

38. US Army Corps of Engineers, Waterborne Commerce, pp 135, 137, 145, 197. Jacksonville District.

39. Bridgetender, Jensen Beach Bridge, Personal Communication. September 14 and November 10, 1978.

40. Bridgetender, Stuart Causeway, Personal Communication. September 14, 1978.

41. Engineering Department, Martin County Department of Transportation, Personal Communication. September 14, 1978 (Roosevelt Bridge and Hobe Sound Bridge).

42. Bridgetender, St Lucie Bridge, Personal Communication. September 14, 1978.

43. Lockmaster, St Lucie Canal - Okeechobee Waterway, Personal Communication. September 14, and October 10, 1978.

44. Route Analyst - Eastern Routes Marketing Research, Amtrak, Washington, D.C. Letter Dated November 30, 1978.

45. Manager - Eastern Routes Marketing Research, Amtrak, Washington, D.C. Personal Communication, May 22, 1979.

SECTION 6.1: REFERENCES (Cont'd)

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TABLE 6.1-1

METEOROLOGICAL SENSOR HEIGHTS ON THE ST LUCIE METEOROLOGICAL TOWER

Parameter	Height (feet)		
	Lower	Upper	
Wind Speed	32.8	190.0	
Wind Direction	32.8	190.0	
	Lower	Middle	Upper
Ambient Temperature	34.7	112.0	191.9
Delta Temperature	32.8	110.0	190.5
Dew Point	34.7		110.3
Precipitation	Surface		

TABLE 6.1-2

DATA RECOVERY RATES, PERCENT

Parameter	Data Period		
	1976-1977	1977-1978	1976-1978
Dry Bulb Temp (34.7 ft)	95.6	96.5	96.1
Dry Bulb Temp (191.0 ft)	95.6	94.7	95.2
Dew Point Temp (34.7)	95.5	96.4	96.0
Precipitation	89.7	96.7	93.2
Wind Speed (32.8 ft)	94.8	98.9	96.8
Wind Speed (190.0 ft)	96.5	98.4	97.4
Wind Direction (32.8 ft)	91.9	96.7	94.3
Wind Direction (190.0)	95.0	98.0	96.5
Joint Stability and Wind (32.8 ft)	90.5	96.5	93.5
Joint Stability and Wind (190.0 ft)	93.4	97.8	95.6

TABLE 2.1-5

Sheet 1 of 8

PEAK DAILY TOURISTS AND SEASONAL VISITORS WITHIN 30 MILES OF ST LUCIE UNIT 2

1978

Annular Sector	0-1	1-2	2-3	3-4	4-5	5-10	* Total 0-10 *	10-20	20-30	* Total 10-30 *	Total 0-30
N	0	0	0	0	0	0	* 0 *	0	0	* 0 *	0
NNE	0	0	0	0	0	0	* 0 *	0	0	* 0 *	0
NE	0	0	0	0	0	0	* 0 *	0	0	* 0 *	0
ENE	0	0	0	0	0	0	* 0 *	0	0	* 0 *	0
E	0	0	0	0	0	0	* 0 *	0	0	* 0 *	0
ESE	0	0	0	0	0	0	* 0 *	0	0	* 0 *	0
SE	0	0	0	0	0	0	* 0 *	0	0	* 0 *	0
SSE	0	0	0	0	5133	6439	* 11572 *	3407	8348	* 11755 *	23327
S	0	0	0	42	44	1680	* 1766 *	6814	190	* 7004 *	8770
SSW	0	0	20	0	0	1861	* 1881 *	572	1125	* 1697 *	3578
SW	0	4	14	0	0	142	* 160 *	572	536	* 1108 *	1268
WSW	0	11	0	2	544	757	* 1314 *	0	0	* 0 *	1314
W	0	4	9	105	102	95	* 315 *	649	0	* 649 *	964
WNW	0	0	21	75	773	866	* 1735 *	234	0	* 234 *	1969
NW	0	0	0	6	154	7644	* 7804 *	3845	437	* 4282 *	12086
NNW	0	0	0	0	50	1582	* 1632 *	2467	16993	* 19460 *	21092
TOTAL	0	19	64	230	6800	21066	* 28179 *	18560	27629	* 46189 *	74368

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TABLE 2.1-5 Sheet 2 of 8

PEAK DAILY TOURISTS AND SEASONAL VISITORS WITHIN 30 MILES OF ST LUCIE UNIT 2

1980

Annular Sector	0-1	1-2	2-3	3-4	4-5	5-10	* Total 0-10 *	10-20	20-30	* Total 10-30 *	Total 0-30
N	0	0	0	0	0	0	* 0 *	0	0	* 0 *	0
NNE	0	0	0	0	0	0	* 0 *	0	0	* 0 *	0
NE	0	0	0	0	0	0	* 0 *	0	0	* 0 *	0
ENE	0	0	0	0	0	0	* 0 *	0	0	* 0 *	0
E	0	0	0	0	0	0	* 0 *	0	0	* 0 *	0
ESE	0	0	0	0	0	0	* 0 *	0	0	* 0 *	0
SE	0	0	0	0	0	0	* 0 *	0	0	* 0 *	0
SSE	0	0	0	0	10160	7326	* 17486 *	4470	9014	* 13484 *	30970
S	0	0	0	49	52	1840	* 1941 *	7962	194	* 8156 *	10097
SSW	0	0	24	0	0	1585	* 1609 *	586	1153	* 1739 *	3348
SW	0	4	17	0	447	167	* 635 *	586	550	* 1136 *	1771
WSW	0	13	0	2	638	889	* 1542 *	0	0	* 0 *	1542
W	0	4	10	123	119	111	* 367 *	660	0	* 660 *	1027
WNW	0	0	24	88	1335	935	* 2382 *	237	0	* 237 *	2619
NW	0	0	0	7	162	8989	* 9158 *	4693	478	* 5171 *	14329
NNW	0	0	0	0	102	1717	* 1819 *	3471	18599	* 22070 *	23889
TOTAL	0	21	75	269	13015	23559	* 36939 *	22665	29988	* 52653 *	89592

TABLE 2.1-5

Sheet 3 of 8

PEAK DAILY TOURISTS AND SEASONAL VISITORS WITHIN 30 MILES OF ST LUCIE UNIT 2

1983

Annular Sector	0-1	1-2	2-3	3-4	4-5	5-10	Total * 0-10 *	10-20	20-30	Total * 10-30 *	Total 0-30
N	0	0	0	0	0	0	* 0 *	0	0	* 0 *	0
NNE	0	0	0	0	0	0	* 0 *	0	0	* 0 *	0
NE	0	0	0	0	0	0	* 0 *	0	0	* 0 *	0
ENE	0	0	0	0	0	0	* 0 *	0	0	* 0 *	0
E	0	0	0	0	0	0	* 0 *	0	0	* 0 *	0
ESE	0	0	0	0	0	0	* 0 *	0	0	* 0 *	0
SE	0	0	0	0	0	0	* 0 *	0	0	* 0 *	0
SSE	0	0	0	0	12799	9228	* 22027 *	5631	11355	* 16986 *	39013
S	0	0	0	62	65	2317	* 2444 *	10030	237	* 10267 *	12711
SSW	0	0	29	0	0	1997	* 2026 *	738	1453	* 2191 *	4217
SW	0	5	21	0	564	210	* 800 *	738	692	* 1430 *	2230
WSW	0	16	0	3	804	1120	* 1943 *	0	0	* 0 *	1943
W	0	5	13	156	151	140	* 465 *	831	0	* 831 *	1296
WNW	0	0	31	111	1681	1179	* 3002 *	299	0	* 299 *	3301
NW	0	0	0	9	168	11326	* 11503 *	5910	540	* 6450 *	17953
NNW	0	0	0	0	129	1919	* 2048 *	4372	21008	* 25380 *	27428
TOTAL	0	26	94	341	16361	29436	* 46258 *	28549	35285	* 63834 *	110092

TABLE 2.1-5

PEAK DAILY TOURISTS AND SEASONAL VISITORS WITHIN 30 MILES OF ST LUCIE UNIT 2

1990

Annular Sector	0-1	1-2	2-3	3-4	4-5	5-10	*	Total 0-10	*	10-20	20-30	*	Total 10-30	*	Total 0-30
N	0	0	0	0	0	0	*	0	*	0	0	*	0	*	0
NNE	0	0	0	0	0	0	*	0	*	0	0	*	0	*	0
NE	0	0	0	0	0	0	*	0	*	0	0	*	0	*	0
ENE	0	0	0	0	0	0	*	0	*	0	0	*	0	*	0
E	0	0	0	0	0	0	*	0	*	0	0	*	0	*	0
ESE	0	0	0	0	0	0	*	0	*	0	0	*	0	*	0
SE	0	0	0	0	0	0	*	0	*	0	0	*	0	*	0
SSE	0	0	0	0	16562	11941	*	28503	*	7286	14693	*	21979	*	50482
S	0	0	0	80	84	2998	*	3162	*	12978	316	*	13294	*	16456
SSW	0	0	38	0	0	2584	*	2622	*	955	1880	*	2835	*	5457
SW	0	7	27	0	730	271	*	1035	*	955	896	*	1851	*	2886
WSW	0	21	0	4	1040	1449	*	2514	*	0	0	*	0	*	2514
W	0	7	17	201	195	181	*	601	*	1075	0	*	1075	*	1676
WNW	0	0	40	144	2176	1526	*	3886	*	388	0	*	388	*	4274
NW	0	0	0	11	217	14654	*	14882	*	7648	699	*	8347	*	23229
NNW	0	0	0	0	167	2484	*	2651	*	5658	27183	*	32841	*	35492
TOTAL	0	35	122	440	21171	38088	*	59856	*	36943	45667	*	82610	*	142466

TABLE 2.1-5

PEAK DAILY TOURISTS AND SEASONAL VISITORS WITHIN 30 MILES OF ST LUCIE UNIT 2

2000

Annular Sector	0-1	1-2	2-3	3-4	4-5	5-10	* Total 0-10 *	10-20	20-30	* Total 10-30 *	Total 0-30
N	0	0	0	0	0	0	* 0 *	0	0	* 0 *	0
NNE	0	0	0	0	0	0	* 0 *	0	0	* 0 *	0
NE	0	0	0	0	0	0	* 0 *	0	0	* 0 *	0
ENE	0	0	0	0	0	0	* 0 *	0	0	* 0 *	0
E	0	0	0	0	0	0	* 0 *	0	0	* 0 *	0
ESE	0	0	0	0	0	0	* 0 *	0	0	* 0 *	0
SE	0	0	0	0	0	0	* 0 *	0	0	* 0 *	0
SSE	0	0	0	0	20385	14698	* 35083 *	8968	18085	* 27053 *	62136
S	0	0	0	99	103	3690	* 3892 *	15974	389	* 16363 *	20255
SSW	0	0	47	0	0	3180	* 3227 *	1176	2313	* 3489 *	6716
SW	0	9	33	0	898	334	* 1274 *	1176	1103	* 2279 *	3553
WSW	0	27	0	4	1280	1784	* 3095 *	0	0	* 0 *	3095
W	0	9	21	247	240	223	* 740 *	1324	0	* 1324 *	2064
WNW	0	0	49	177	2678	1877	* 4781 *	478	0	* 478 *	5259
NW	0	0	0	14	268	18037	* 18319 *	9413	860	* 10273 *	28592
NNW	0	0	0	0	205	3057	* 3262 *	6965	33458	* 40423 *	43689
TOTAL	0	45	150	541	26057	46880	* 73673 *	45474	56208	*101682 *	175355

TABLE 2.1-5

PEAK DAILY TOURISTS AND SEASONAL VISITORS WITHIN 30 MILES OF ST LUCIE UNIT 2

2010

Annular Sector	0-1	1-2	2-3	3-4	4-5	5-10	*	Total 0-10	*	10-20	20-30	*	Total 10-30	*	Total 0-30
N	0	0	0	0	0	0	*	0	*	0	0	*	0	*	0
NNE	0	0	0	0	0	0	*	0	*	0	0	*	0	*	0
NE	0	0	0	0	0	0	*	0	*	0	0	*	0	*	0
ENE	0	0	0	0	0	0	*	0	*	0	0	*	0	*	0
E	0	0	0	0	0	0	*	0	*	0	0	*	0	*	0
ESE	0	0	0	0	0	0	*	0	*	0	0	*	0	*	0
SE	0	0	0	0	0	0	*	0	*	0	0	*	0	*	0
SSE	0	0	0	0	25093	18090	*	43183	*	11039	22259	*	33298	*	76481
S	0	0	0	122	128	4542	*	4792	*	19661	479	*	20140	*	24932
SSW	0	0	58	0	0	3914	*	3972	*	1447	2849	*	4296	*	8268
SW	0	11	41	0	1105	411	*	1568	*	1447	1358	*	2805	*	4073
WSW	0	32	0	5	1576	2195	*	3808	*	0	0	*	0	*	3808
W	0	11	26	304	296	275	*	912	*	1629	0	*	1629	*	2541
WNW	0	0	60	218	3297	2311	*	5886	*	587	0	*	587	*	6473
NW	0	0	0	17	329	22201	*	22547	*	11587	1059	*	12646	*	35193
NNW	0	0	0	0	252	3762	*	4014	*	8572	41182	*	49754	*	53768
TOTAL	0	54	185	666	32076	57701	*	90682	*	55969	69186	*	125155	*	215837

TABLE 2.1-5

PEAK DAILY TOURISTS AND SEASONAL VISITORS WITHIN 30 MILES OF ST LUCIE UNIT 2

2020

Annular Sector	0-1	1-2	2-3	3-4	4-5	5-10	* Total 0-10 *	10-20	20-30	* Total 10-30 *	Total 0-30
N	0	0	0	0	0	0	* 0 *	0	0	* 0 *	0
NNE	0	0	0	0	0	0	* 0 *	0	0	* 0 *	0
NE	0	0	0	0	0	0	* 0 *	0	0	* 0 *	0
ENE	0	0	0	0	0	0	* 0 *	0	0	* 0 *	0
E	0	0	0	0	0	0	* 0 *	0	0	* 0 *	0
ESE	0	0	0	0	0	0	* 0 *	0	0	* 0 *	0
SE	0	0	0	0	0	0	* 0 *	0	0	* 0 *	0
SSE	0	0	0	0	30886	22268	* 53154 *	13586	27398	* 40985 *	94139
S	0	0	0	150	157	5591	* 5898 *	24200	589	* 24789 *	30687
SSW	0	0	71	0	0	4818	* 4889 *	1781	3506	* 5287 *	10176
SW	0	13	50	0	1360	506	* 1929 *	1781	1670	* 3451 *	5380
WSW	0	40	0	7	1939	2702	* 4688 *	0	0	* 0 *	4688
W	0	13	32	374	364	339	* 1122 *	2005	0	* 2005 *	3127
WNW	0	0	74	268	4057	2843	* 7242 *	723	0	* 723 *	7965
NW	0	0	0	21	405	27327	* 27753 *	14261	1303	* 15564 *	43317
NNW	0	0	0	0	310	4631	* 4941 *	10550	50692	* 61242 *	66183
TOTAL	0	66	227	820	39478	71025	*111616 *	68887	85158	*154046 *	265662

TABLE 2.1-5 Sheet 8 of 8

PEAK DAILY TOURISTS AND SEASONAL VISITORS WITHIN 30 MILES OF ST LUCIE UNIT 2

2030

Annular Sector	0-1	1-2	2-3	3-4	4-5	5-10	*	Total 0-10	*	10-20	20-30	*	Total 10-30	*	Total 0-30
N	0	0	0	0	0	0	*	0	*	0	0	*	0	*	0
NNE	0	0	0	0	0	0	*	0	*	0	0	*	0	*	0
NE	0	0	0	0	0	0	*	0	*	0	0	*	0	*	0
ENE	0	0	0	0	0	0	*	0	*	0	0	*	0	*	0
E	0	0	0	0	0	0	*	0	*	0	0	*	0	*	0
ESE	0	0	0	0	0	0	*	0	*	0	0	*	0	*	0
SE	0	0	0	0	0	0	*	0	*	0	0	*	0	*	0
SSE	0	0	0	0	38014	27408	*	65422	*	16724	33723	*	50447	*	115869
S	0	0	0	185	193	6882	*	7260	*	29787	725	*	30512	*	37772
SSW	0	0	88	0	0	5930	*	6018	*	2193	4315	*	6508	*	12526
SW	0	16	62	0	1674	623	*	2375	*	2193	2056	*	4249	*	6624
WSW	0	49	0	8	2387	3325	*	5769	*	0	0	*	0	*	5769
W	0	16	39	461	448	417	*	1381	*	2468	0	*	2468	*	3849
WNW	0	0	91	330	4994	3501	*	8916	*	890	0	*	890	*	9806
NW	0	0	0	26	499	33634	*	34159	*	17554	1604	*	19158	*	53317
NNW	0	0	0	0	383	5700	*	6083	*	12986	62391	*	75377	*	81460
TOTAL	0	81	280	1010	48592	87420	*	137383	*	84795	104814	*	189609	*	326992

TABLE 2.1-7

TRANSIENT POPULATION: MAJOR INDUSTRIAL EMPLOYERS AND COLLEGES 1978-2030

	Annular Sector	Location	1978 Total Employment	1978 Peak Daily Employment	1980	1983	1990	2000	2010	2020	2030
A. Major Industrial Employers											
1. Grumman Aerospace(1)	S 10-20	Martin County Airport, Stuart	731	700	700	700	700	700	700	700	700
2. Piper Aircraft(2)	NW 10-20	Vero Beach Municipal Airport Indian River County	2887	2000	2000	2000	2000	2000	2000	2000	2000
3. Pratt & Whitney(3) Government Products Division	S 30-40	Route 770, South of Route 710 Palm Beach County	7261	6094	6094	6094	6094	6094	6094	6094	6094
			Total Enrollment	Peak Daily Enrollment							
B. Major Colleges											
4. Florida Institute of Technology(4)	SSE 5-10	Jensen Beach Campus Martin County		900	1050	1200	1200	1200	1200	1200	1200
5. Indian River Community College(5)	NW 5-10	Fort Pierce Campus St Lucie County	11200	1500	2050	2417	2818	3486	4312	5334	6599
	S 10-20	Stuart Campus, Martin County	1280	171	234	276	322	398	492	609	753
B. Major Colleges	WSW 30-40	Okeechobee Campus, Okeechobee County	320	43	59	69	80	100	123	152	188
	NNW 20-30	Vero Beach Campus, Indian River County	3200	428	585	691	806	997	1233	1526	1888

(1) Personal Communication, Personnel Department, Grumman Aerospace, November 30, 1978.

(2) Personal Communication, Personnel Department, Piper Aircraft Corp, December 4, 1978.

(3) Personal Communication, Employment Office, Pratt & Whitney Aircraft, November 30, 1978.

(4) Personal Communication, Student Activities Office, Florida Institute of Technology, Jensen Beach Campus, November 27, 1978.

(5) Personal Communication, Office of the Vice President, Indian River Community College, Fort Pierce Campus, November 28, 1978.

TABLE 2.1-8

TRANSIENT POPULATION: AVERAGE DAILY PASSENGERS ON MAJOR ROADS WITHIN 30 MILES OF ST LUCIE UNIT 2

1978-2030

Highways and State Roads Within 10 Miles of St Lucie Unit 2

Route	County	Station Number	Estimated Average Daily Number of Passengers(2)							
			1978	1980	1983	1990	2000	2010	2020	2030
SR A1A	St Lucie	114 (North Beach Causeway)	2,802	2,935	3,134	3,599	4,259	4,926	5,590	6,248
SR 605	St Lucie	268	2,505	2,624	2,802	3,217	3,808	4,404	4,997	5,586
US 1	St Lucie	121	14,357	15,038	16,058	18,440	21,823	25,240	28,642	32,016
SR 607A	St Lucie	199	6,525	6,834	7,298	8,381	9,918	11,471	13,017	14,551
SR 68	St Lucie	151	8,271	8,663	9,251	10,623	12,572	14,540	16,501	18,444
SR 611	St Lucie	274	2,172	2,275	2,429	2,790	3,301	3,818	4,333	4,844
SR 70	St Lucie	106	5,910	6,190	6,610	7,591	8,983	10,390	11,790	13,179
I-91/ Florida's Turnpike	St Lucie	Southbound	15,151	15,869	16,946	19,460	23,030	26,635	30,226	33,787
SR 709	St Lucie	279	990	1,037	1,107	1,272	1,505	1,740	1,975	2,208
I-91/ Florida's Turnpike	St Lucie	Northbound	25,541	26,752	28,568	32,805	38,822	44,901	50,954	56,956
US 1	Martin	113 (Roosevelt Bridge/Northbound)	20,922	21,911	23,399	26,862	31,778	36,767	41,731	46,647
SR A1A	Martin	144	8,516	8,920	9,525	10,938	12,944	14,971	16,989	18,991
Highways Within 30 Miles of St Lucie Unit 2										
I-95	Indian River	Southbound	9,971	10,444	11,153	12,807	15,156	17,529	19,892	22,235
I-91/ Florida's Turnpike	Okeechobee	Southbound	15,151	15,869	16,946	19,460	23,030	26,635	30,226	33,787
I-95/ Florida's Turnpike	Palm Beach	Northbound	26,527	27,782	29,668	34,059	40,292	46,618	52,911	59,144

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(1) State of Florida, Dept of Transportation, Bureau of Planning assigns code numbers to each station where average daily traffic (ADT) counts are taken in each county.

(2) See Methodology, Section 2.1.3.8.2.

TABLE 2.4-1

FREQUENCY DISTRIBUTION OF SURFACE CURRENT DIRECTION MONTHLY AND ANNUAL AVERAGES WITHIN 30 DEGREE SECTORS (PERCENT)

Month - 1974	000-030	030-060	060-090	090-120	120-150	150-180	180-210	210-240	240-270	270-300	300-330	330-360
Jan	12.6	6.2	3.4	4.2	0.9	3.0	4.5	2.2	4.0	5.7	18.5	32.7
Feb	1.7	1.3	1.2	2.6	6.0	11.1	4.7	1.9	1.7	6.1	27.8	33.8
Mar	3.9	1.6	1.5	4.0	10.6	16.8	9.6	2.2	0.9	3.4	12.4	33.1
Apr	3.7	1.0	1.3	2.2	9.0	15.0	5.5	1.8	2.1	7.4	24.7	26.4
May	4.7	1.5	1.4	1.1	5.1	7.4	1.9	1.9	1.9	7.5	27.8	37.9
Jun						-Data	Missing-					
Jul	4.1	0.6	0.9	3.9	8.3	13.2	4.4	0.8	1.1	5.3	17.8	39.5
Aug	5.4	2.0	1.5	5.8	16.9	14.0	5.1	2.1	2.1	4.0	19.0	21.7
Sep	5.7	2.6	2.0	4.2	12.8	20.8	5.8	3.6	3.0	4.8	12.3	22.6
Oct*	4.3	3.4	3.1	6.6	16.7	22.8	10.5	6.4	6.0	5.4	8.1	6.5
Nov	4.2	3.3	1.8	2.7	11.4	18.1	7.9	3.4	2.4	3.3	14.3	27.4
Dec	4.3	2.3	1.5	2.2	8.8	19.2	15.2	3.4	0.6	4.3	11.5	26.6
Annual Average	5.0	2.2	1.9	3.3	9.0	13.9	6.5	2.3	2.0	5.2	18.6	30.2

Annual average based on ten months data. *1973 measurements not included in annual average.

TABLE 2.4-2

FREQUENCY DISTRIBUTION OF BOTTOM CURRENT DIRECTION MONTHLY AND ANNUAL AVERAGES WITHIN 30 DEGREE SECTORS (PERCENT)

Month - 1974	000-030	030-060	060-090	090-120	120-150	150-180	180-210	210-240	240-270	270-300	300-330	330-360
Jan	4.8	1.7	2.4	5.0	2.6	2.6	6.4	2.6	7.2	16.9	30.1	17.8
Feb*	1.0	3.2	1.2	1.3	2.2	18.7	33.1	1.7	1.3	2.2	4.3	29.9
Mar	3.0	6.0	1.6	7.2	8.3	9.0	6.6	4.0	4.9	10.2	18.2	21.0
Apr	5.3	2.8	1.6	4.7	7.4	14.8	11.0	3.0	1.4	7.9	16.5	23.5
May	3.8	2.0	2.9	8.2	14.0	11.1	7.1	5.5	6.1	16.8	17.0	5.5
Jun						- Data	Missing -					
Jul	5.9	3.0	2.8	3.4	5.4	6.7	8.1	2.5	4.9	16.9	19.6	20.9
Aug	2.9	5.6	7.3	10.8	11.4	11.2	10.0	6.3	6.6	8.9	8.9	10.2
Sep	2.5	3.6	2.8	6.0	9.8	18.3	9.8	5.8	6.8	7.4	15.1	12.1
Oct	2.3	1.7	2.4	5.3	15.6	21.2	10.8	3.0	3.1	7.6	16.5	10.4
Nov	3.1	2.0	3.0	5.2	15.4	21.2	5.2	2.9	1.5	4.1	14.3	22.1
Dec	10.9	3.3	3.6	6.3	9.2	20.5	18.2	1.1	1.0	3.0	7.0	16.1
Annual Average	4.5	3.8	3.0	6.2	9.9	13.7	9.3	3.7	4.4	10.0	16.3	16.0

Annual average based on ten months data. *1975 measurements not included in annual average.

TABLE 2.4-3

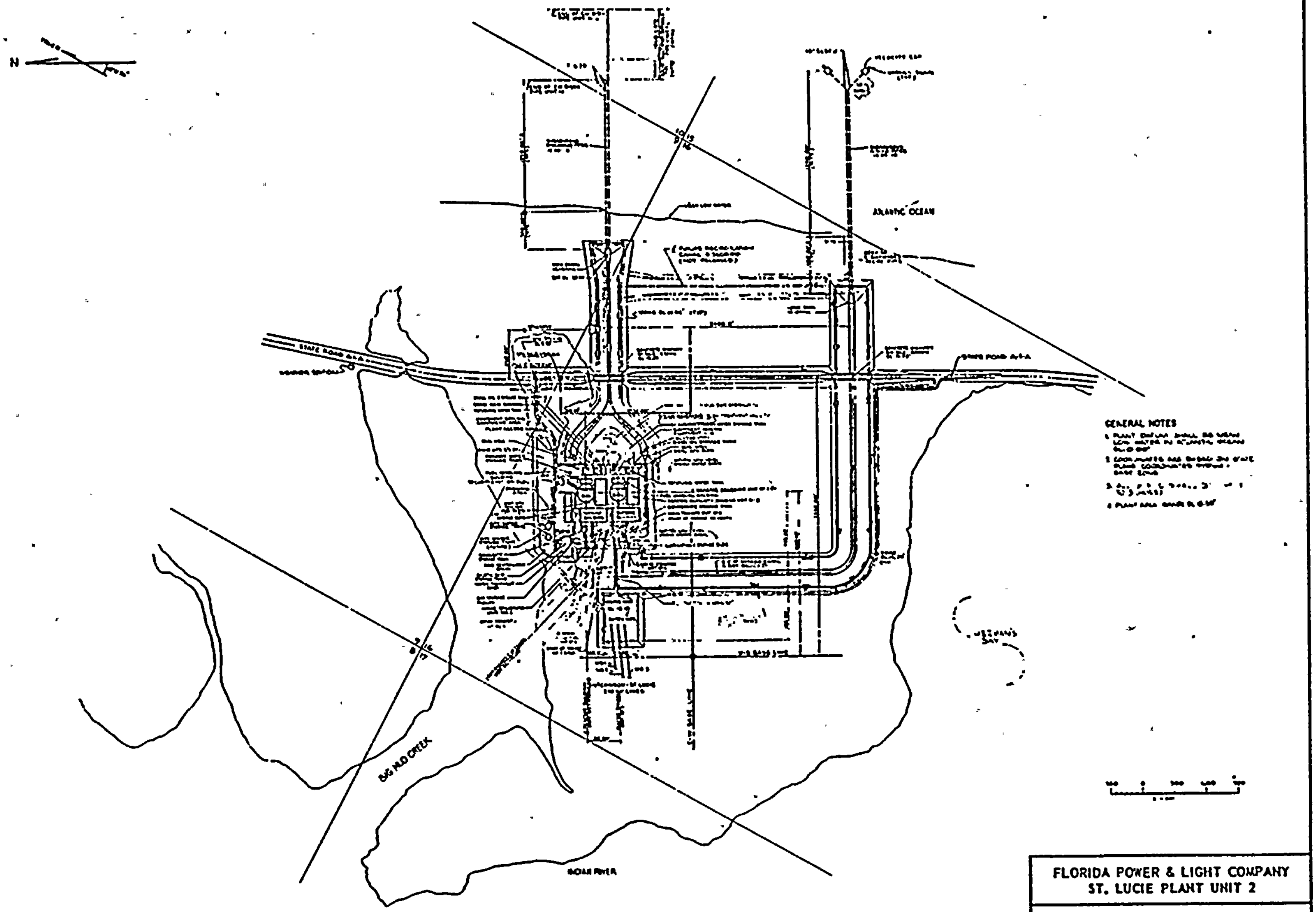
FREQUENCY DISTRIBUTION OF SURFACE CURRENT SPEED MONTHLY AND ANNUAL AVERAGES WITHIN 0.1 FPS INCREMENTS (PERCENT)

Month 1974	0.0-0.1	0.1-0.2	0.2-0.3	0.3-0.4	0.4-0.5	0.5-0.6	0.6-0.7	0.7-0.8	0.8-0.9	0.9-1.0	1.0-1.1	1.1-1.2	1.2-1.3	1.3-1.4	1.4-1.5	1.5-1.6	1.6
Jan	0.1	0.7	2.8	4.4	13.8	9.9	15.7	16.6	14.3	6.9	7.7	4.0	0.7	1.0	0.4	0.2	0.9
Feb	0.4	1.4	1.7	3.3	12.3	6.9	13.5	16.3	12.9	11.0	10.4	5.3	1.5	1.2	0.4	0.15	1.4
Mar	0.4	1.1	0.8	3.3	11.0	8.8	14.7	12.1	13.3	7.3	10.7	6.7	3.3	2.3	0.8	0.7	2.5
Apr	0.2	2.5	2.1	1.3	8.0	7.3	11.7	12.5	13.6	11.8	9.2	7.4	3.0	3.1	1.4	0.6	4.3
May	0.6	1.4	2.3	2.3	4.8	7.5	7.2	9.5	21.0	12.3	8.3	8.0	4.9	2.5	1.8	0.5	4.7
Jun	- Data Missing -																
Jul	1.7	1.3	5.1	4.0	11.3	8.4	11.4	14.2	14.9	8.8	7.4	5.5	2.8	0.9	0.8	0.5	1.3
Aug	1.7	1.4	3.7	4.5	9.7	13.0	14.1	13.5	10.8	9.4	6.7	4.8	2.8	1.7	1.5	0.6	1.3
Sep	0.2	1.6	3.0	3.3	4.5	13.7	11.4	17.3	13.6	10.7	8.4	5.1	3.4	0.8	1.1	0.4	1.4
Oct	- Data Missing -																
Nov	1.1	3.4	4.2	3.6	11.8	9.8	11.1	6.2	18.6	7.6	8.3	6.0	3.6	1.7	0.7	1.0	1.1
Dec	0.0	1.5	1.8	3.1	13.2	7.7	14.7	10.7	23.3	5.1	9.0	3.5	1.4	1.8	0.7	0.5	2.0
Annual Average	0.64	1.63	2.87	3.31	10.04	9.3	12.55	12.89	15.63	9.09	8.63	5.63	2.74	1.7	0.97	0.52	2.3

TABLE 2.4-4

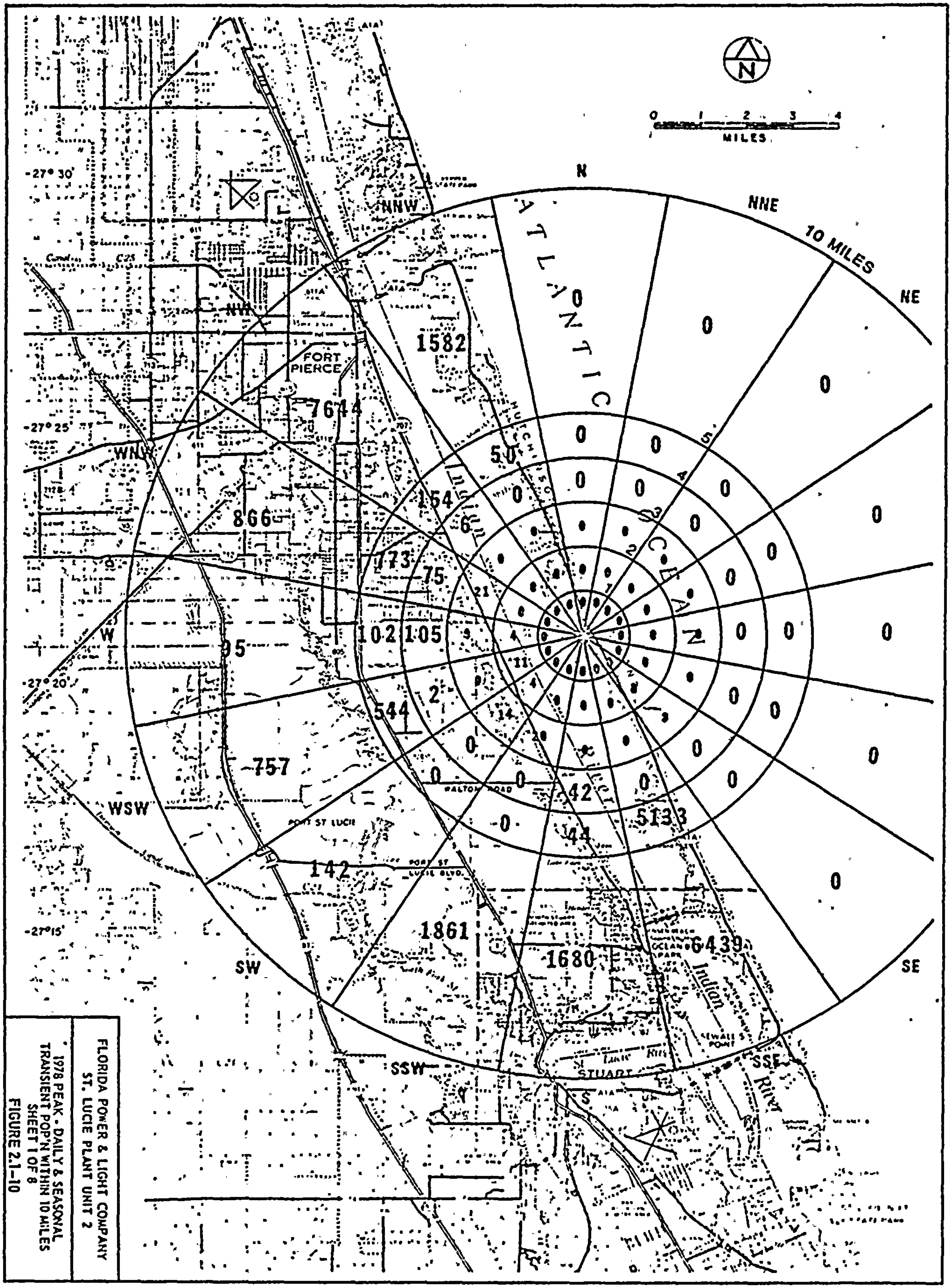
FREQUENCY DISTRIBUTION OF BOTTOM CURRENT SPEED MONTHLY AND ANNUAL AVERAGES WITHIN 0.1 FPS INCREMENTS (PERCENT)

Month 1974	0.1-0.1	0.1-0.2	0.2-0.3	0.3-0.4	0.4-0.5	0.5-0.6	0.6-0.7	0.7-0.8	0.8-0.9	0.9-1.0	1.0-1.1	1.1-1.2	1.2-1.3	1.3-1.4	1.4-1.5	1.5-1.6	1.6
Jan	2.7	3.2	10.1	9.9	26.4	19.5	15.4	9.4	2.5	0.7	0.4						
Feb							- Data Missing -										
Mar	0.9	5.0	4.1	10.5	20.7	9.0	19.5	11.5	9.7	4.1	3.9	1.1					0.1
Apr	3.7	12.3	12.0	7.7	19.4	16.1	13.9	7.7	3.3	1.9	0.4	0.3	0.5				0.6
May	0.5	14.8	15.7	4.2	4.6	25.0	6.5	18.1	6.9	3.7							
Jun							- Data Missing -										
Jul	9.3	14.1	21.0	13.4	16.7	10.7	6.2	4.6	2.8	0.8	0.6						
Aug	3.8	3.3	24.6	13.6	22.2	18.0	7.7	3.6	1.4	1.0	0.4	0.3	0.08	0.06			
Sep	0.2	7.3	26.4	11.9	27.8	13.4	6.5	5.2	0.9	0.7							
Oct	0.7	4.0	11.4	8.4	19.0	12.0	12.8	7.6	12.2	4.6	2.6	3.1	0.6	0.3	0.1		0.4
Nov	0.1	1.3	11.4	9.2	25.7	11.6	13.9	5.0	13.6	4.6	2.1	1.2		0.1			
Dec	0.1	0.4	5.6	8.9	34.6	12.4	18.7	10.5	6.0	1.7	0.7	0.5	___	___	___	___	___
Annual Average	2.2	6.6	14.2	9.8	21.7	14.8	12.1	13.3	5.9	2.5	1.1	0.7	0.1	0.05			0.5



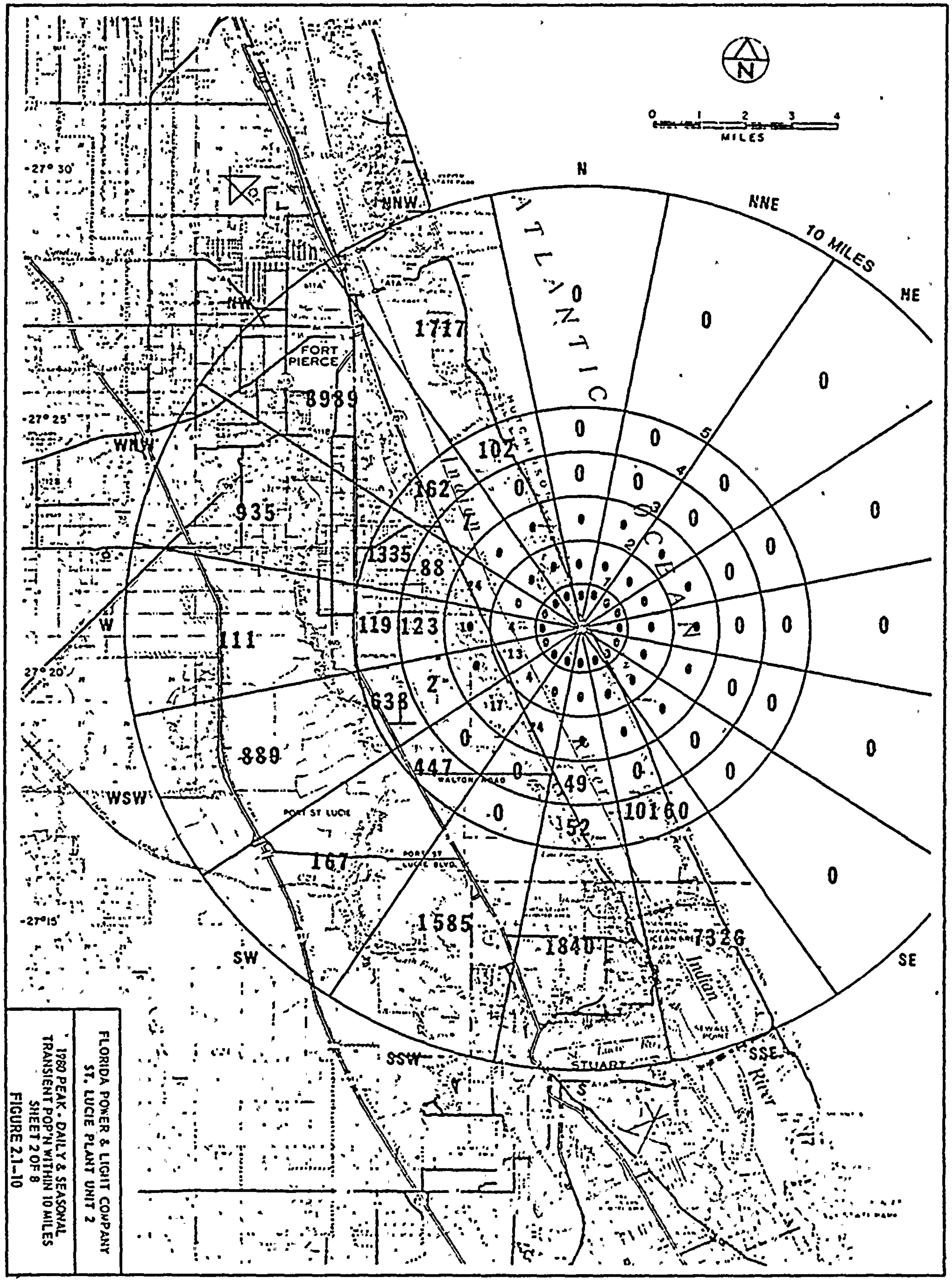
FLORIDA POWER & LIGHT COMPANY
ST. LUCIE PLANT UNIT 2

SITE METEOROLOGICAL
TOWER MAP
FIGURE 6.1-1



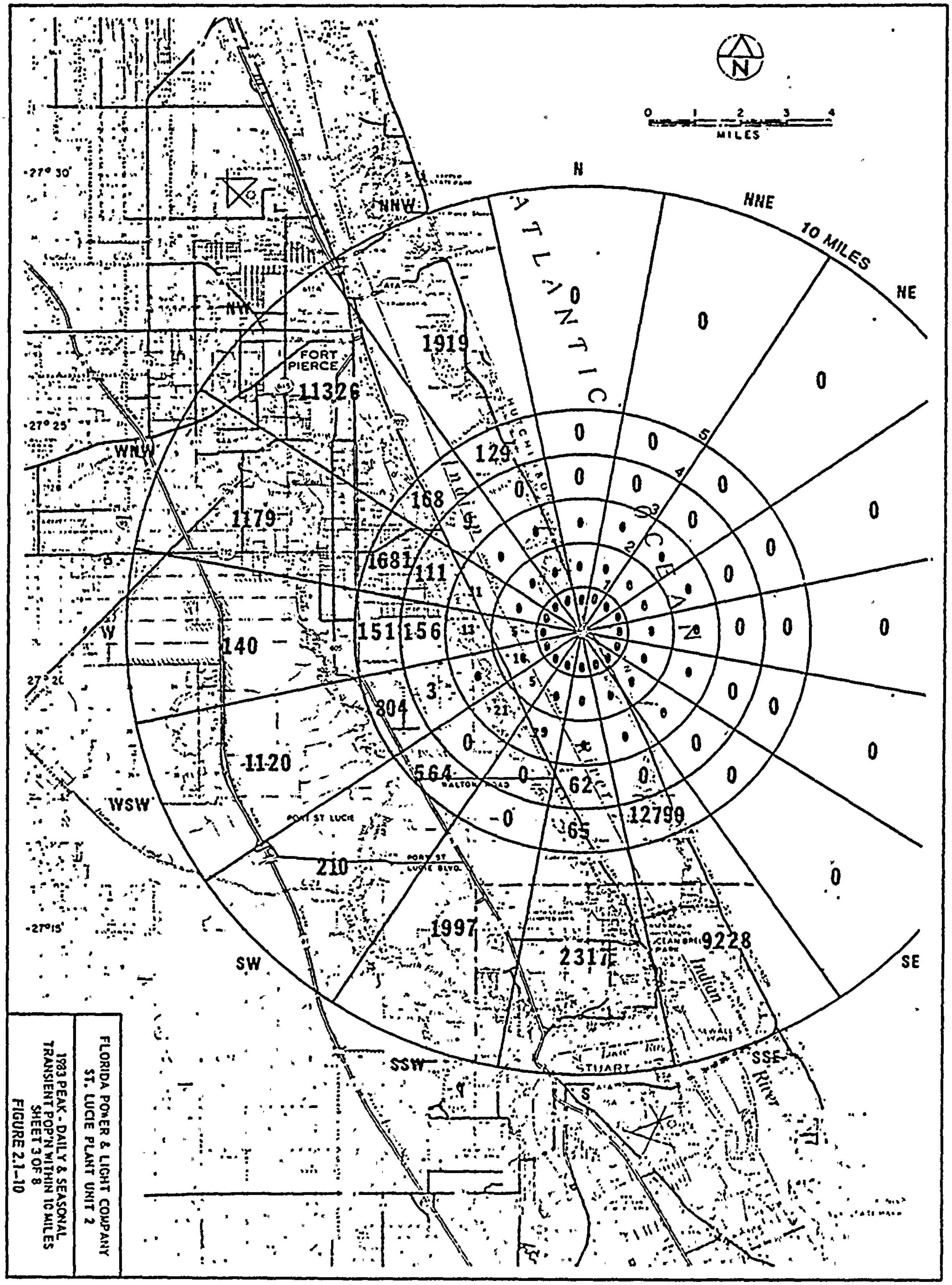
FLORIDA POWER & LIGHT COMPANY
ST. LUCIE PLANT UNIT 2

1978 PEAK - DAILY & SEASONAL TRANSIENT POP'N WITHIN 10 MILES
SHEET 1 OF 8
FIGURE 2.1-10



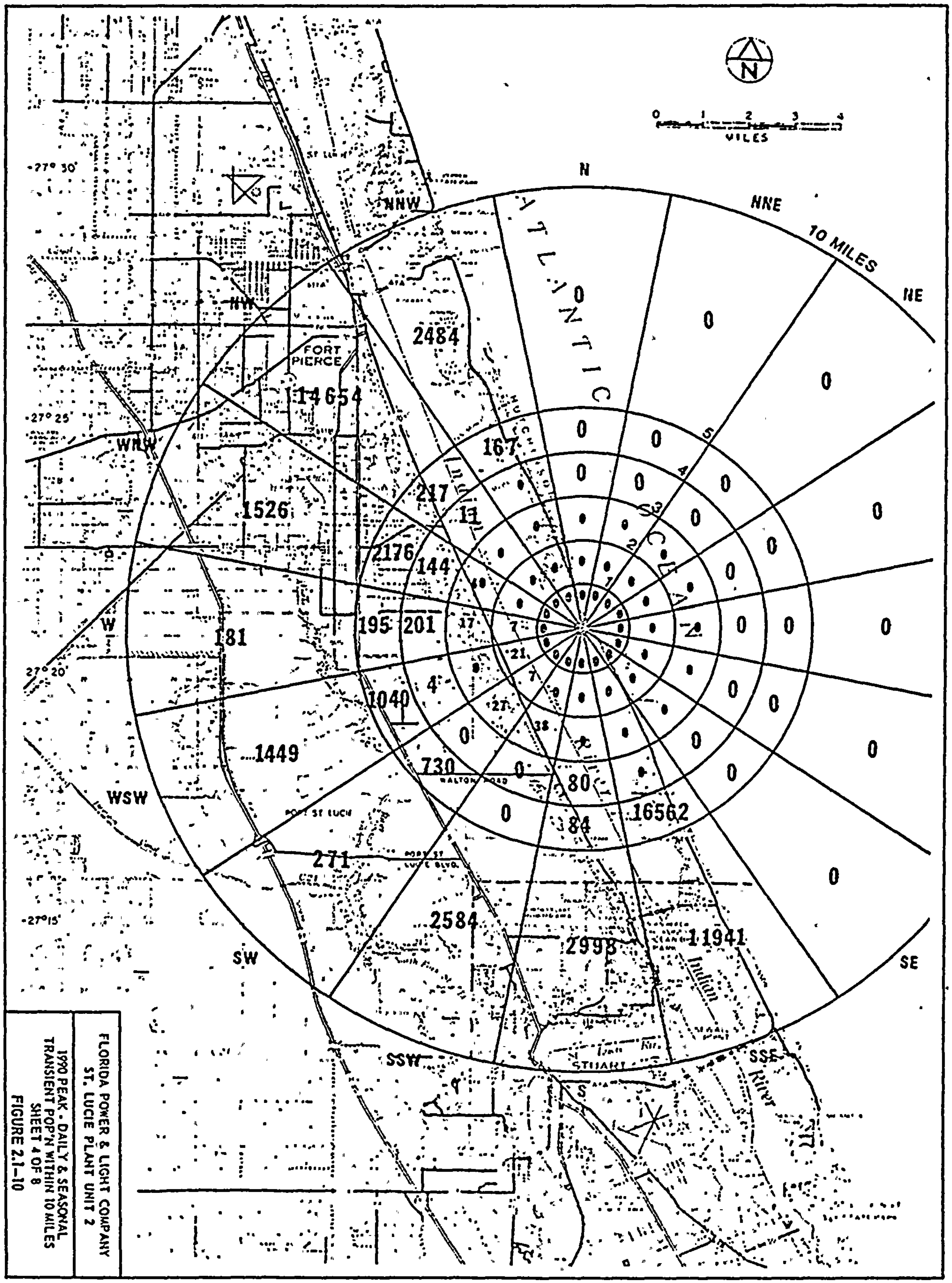
FLORIDA POWER & LIGHT COMPANY
ST. LUCIE PLANT UNIT 2

1980 PEAK - DAILY & SEASONAL TRANSIENT POP'N WITHIN 10 MILES
SHEET 2 OF 8
FIGURE 2.1-10



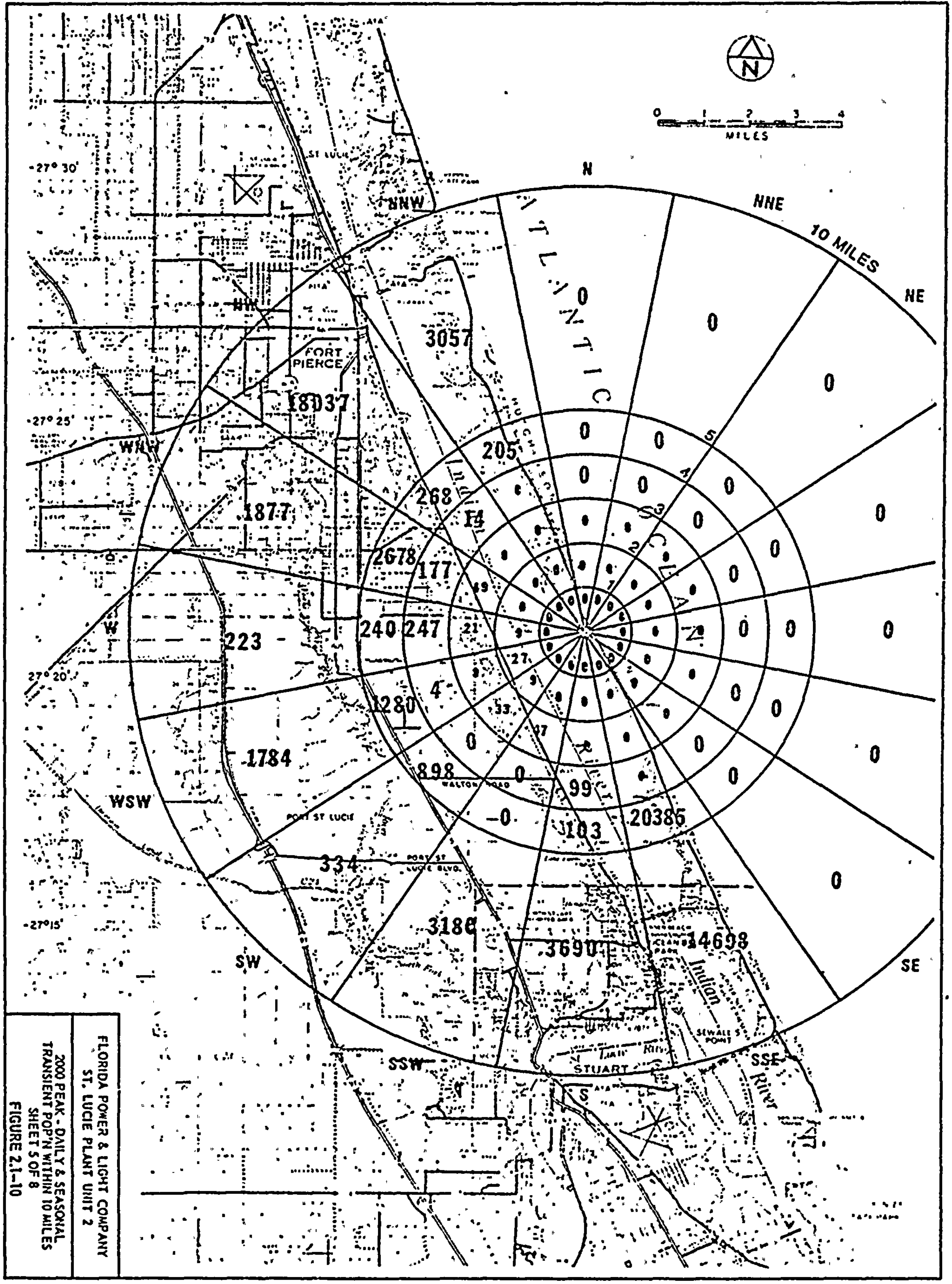
FLORIDA POWER & LIGHT COMPANY
ST. LUCIE PLANT UNIT 2

1983 PEAK - DAILY & SEASONAL TRANSIENT POP'N WITHIN 10 MILES
SHEET 3 OF 8
FIGURE 2.1-10



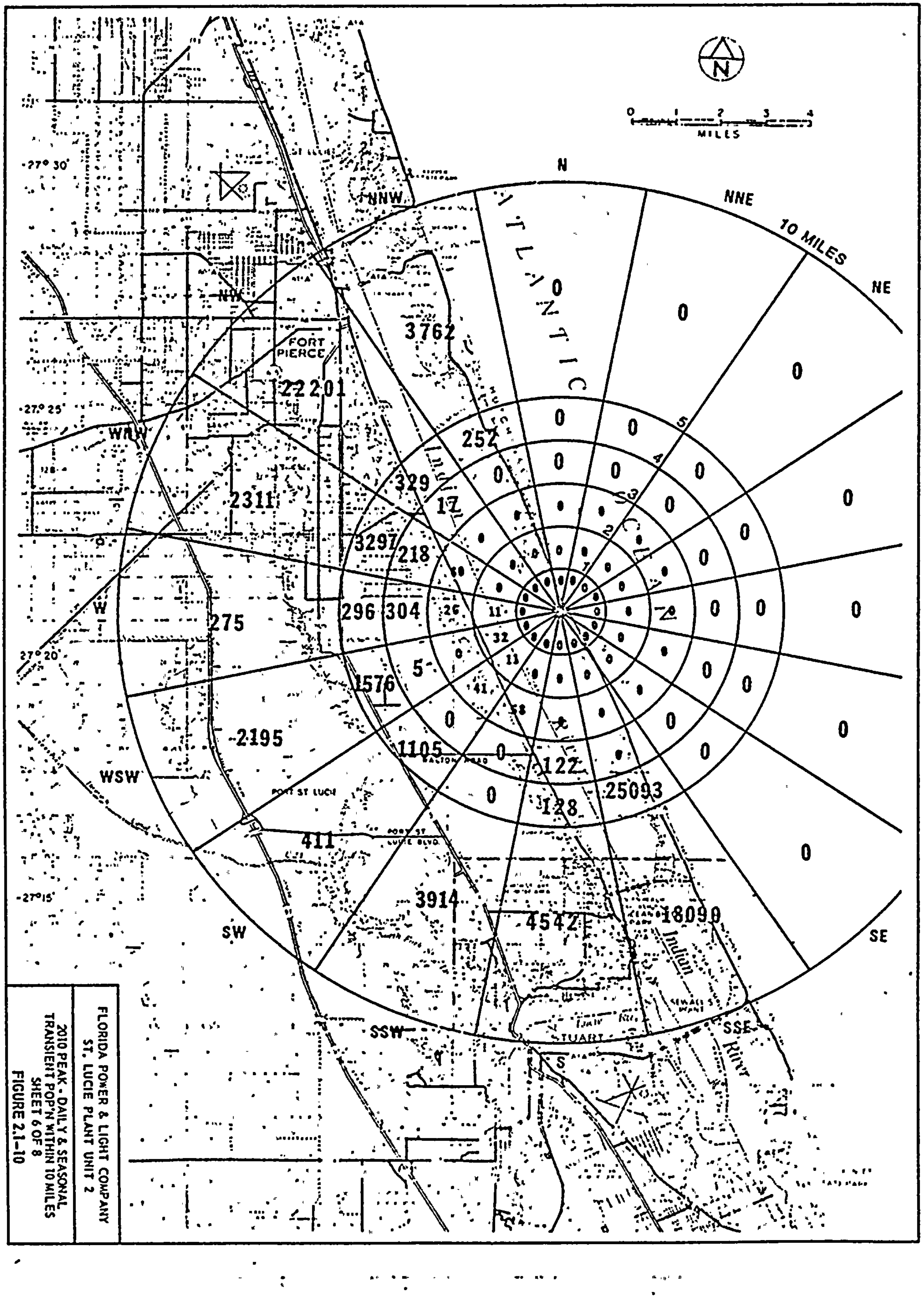
FLORIDA POWER & LIGHT COMPANY
ST. LUCIE PLANT UNIT 2

1990 PEAK - DAILY & SEASONAL
TRANSIENT POP'N WITHIN 10 MILES
SHEET 4 OF 8
FIGURE 2.1-10



FLORIDA POWER & LIGHT COMPANY
ST. LUCIE PLANT UNIT 2

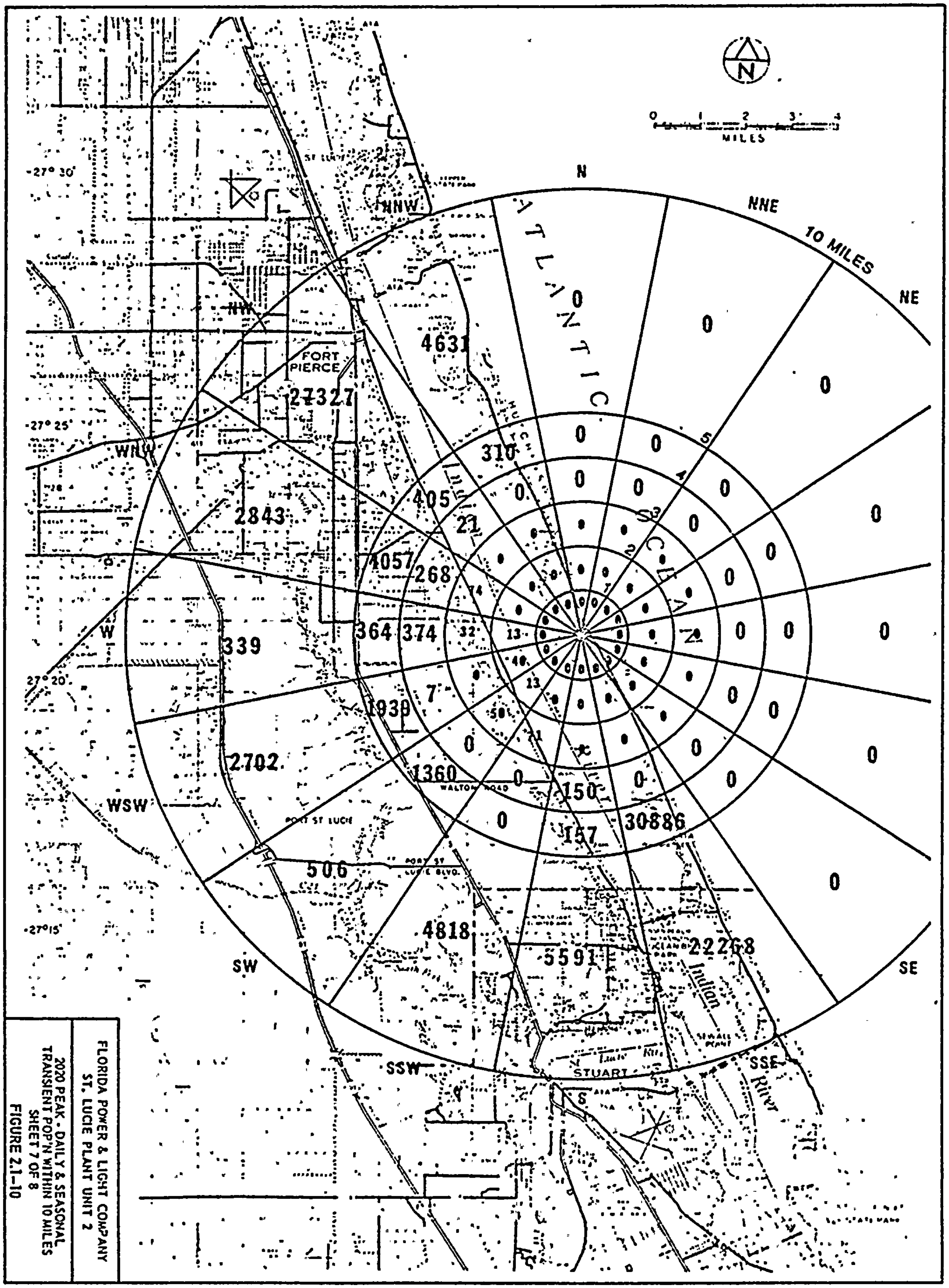
2000 PEAK - DAILY & SEASONAL
TRANSIENT POP'N WITHIN 10 MILES
SHEET 5 OF 8
FIGURE 2.1-10



FLORIDA POWER & LIGHT COMPANY
ST. LUCIE PLANT UNIT 2

2010 PEAK - DAILY & SEASONAL
TRANSIENT POP'N WITHIN 10 MILES
SHEET 6 OF 8

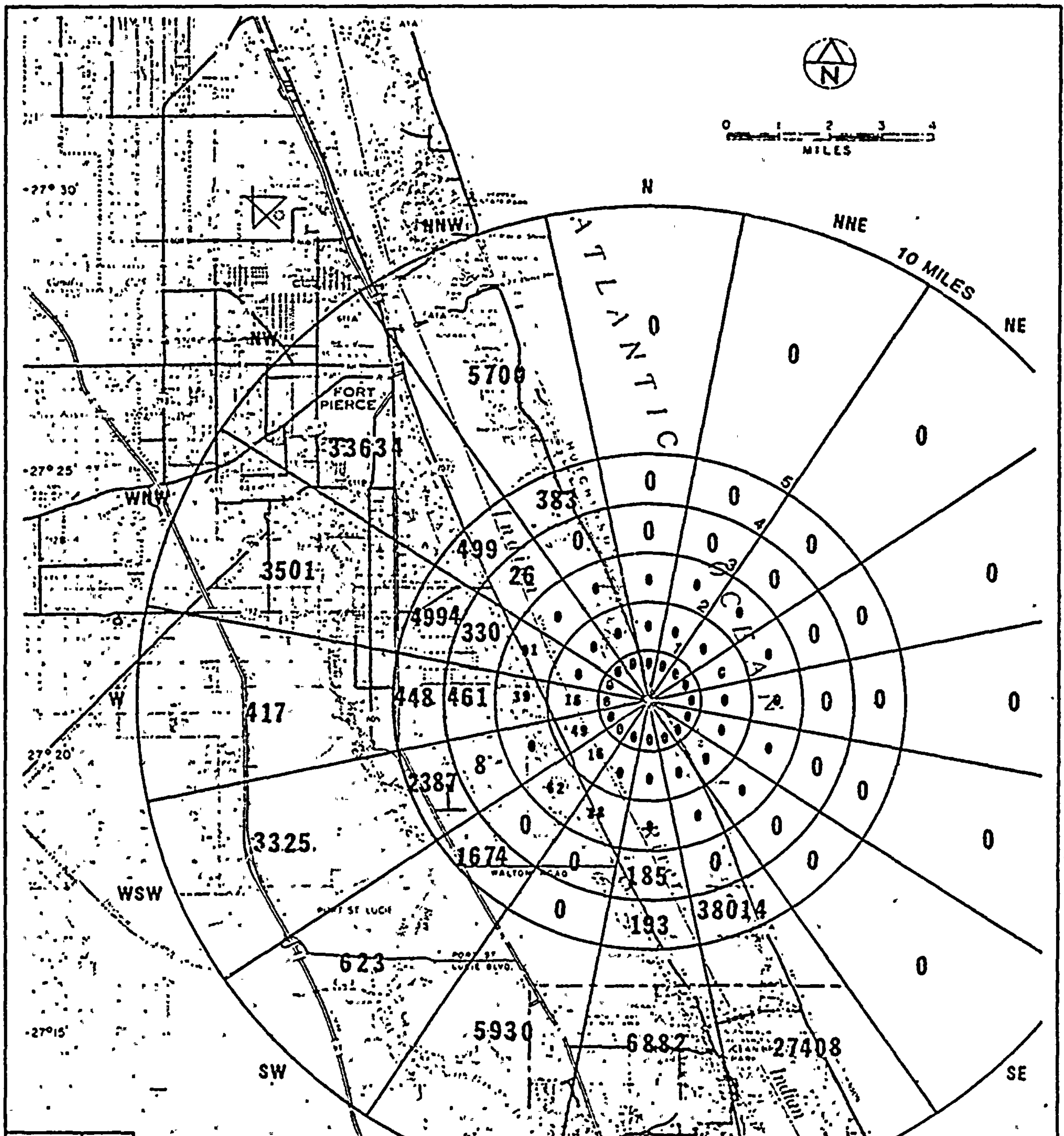
FIGURE 2.1-10



FLORIDA POWER & LIGHT COMPANY
ST. LUCIE PLANT UNIT 2

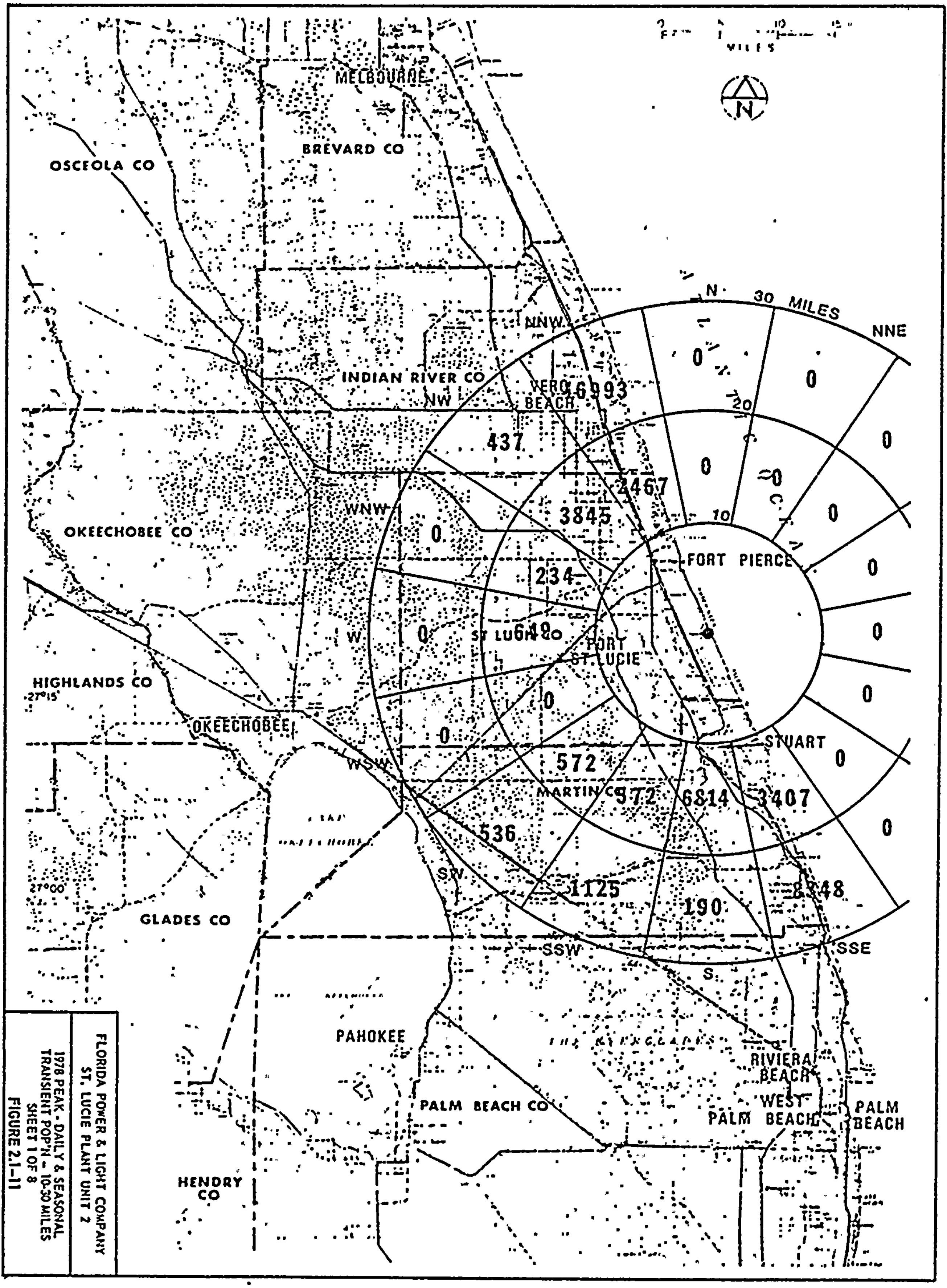
2020 PEAK - DAILY & SEASONAL
TRANSIENT POP'N WITHIN 10 MILES
SHEET 7 OF 8

FIGURE 2.1-10



FLORIDA POWER & LIGHT COMPANY
ST. LUCIE PLANT UNIT 2

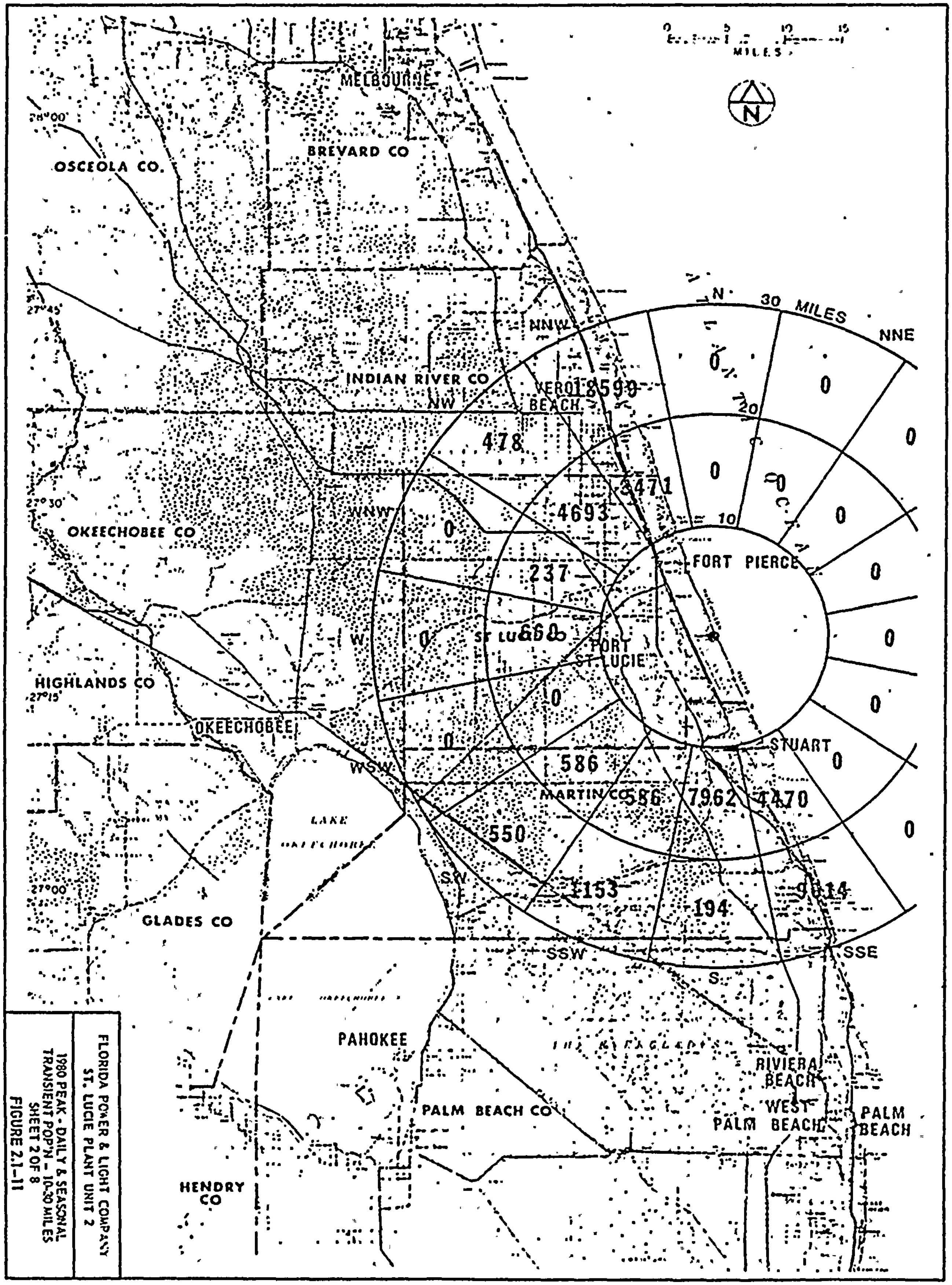
2030 PEAK - DAILY & SEASONAL
TRANSIENT POP'N WITHIN 10 MILES
SHEET 8 OF 8
FIGURE 2.1-10



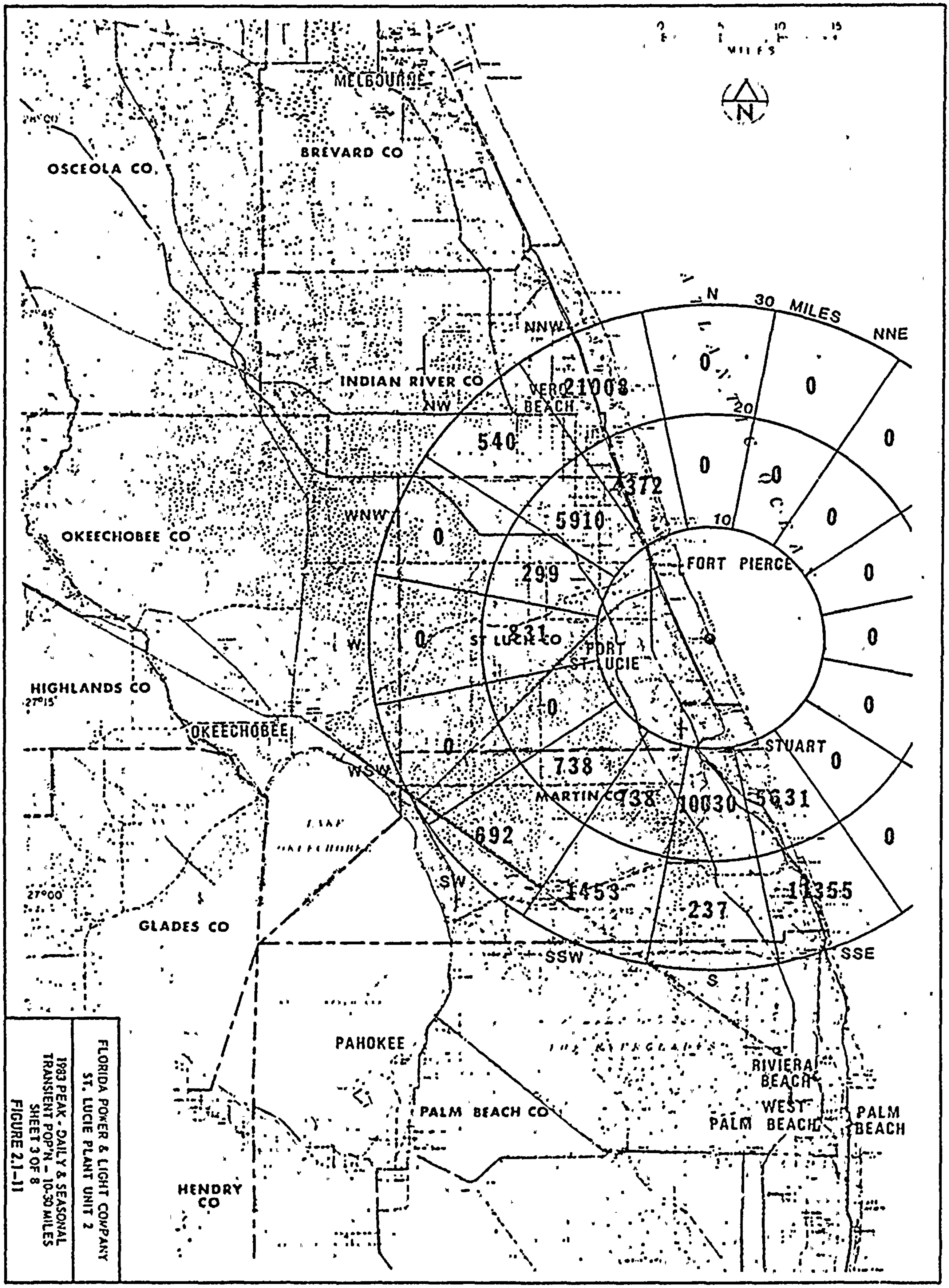
FLORIDA POWER & LIGHT COMPANY
ST. LUCIE PLANT UNIT 2

1978 PEAK - DAILY & SEASONAL TRANSIENT POP'N - 10-30 MILES
SHEET 1 OF 8

FIGURE 2.1-11

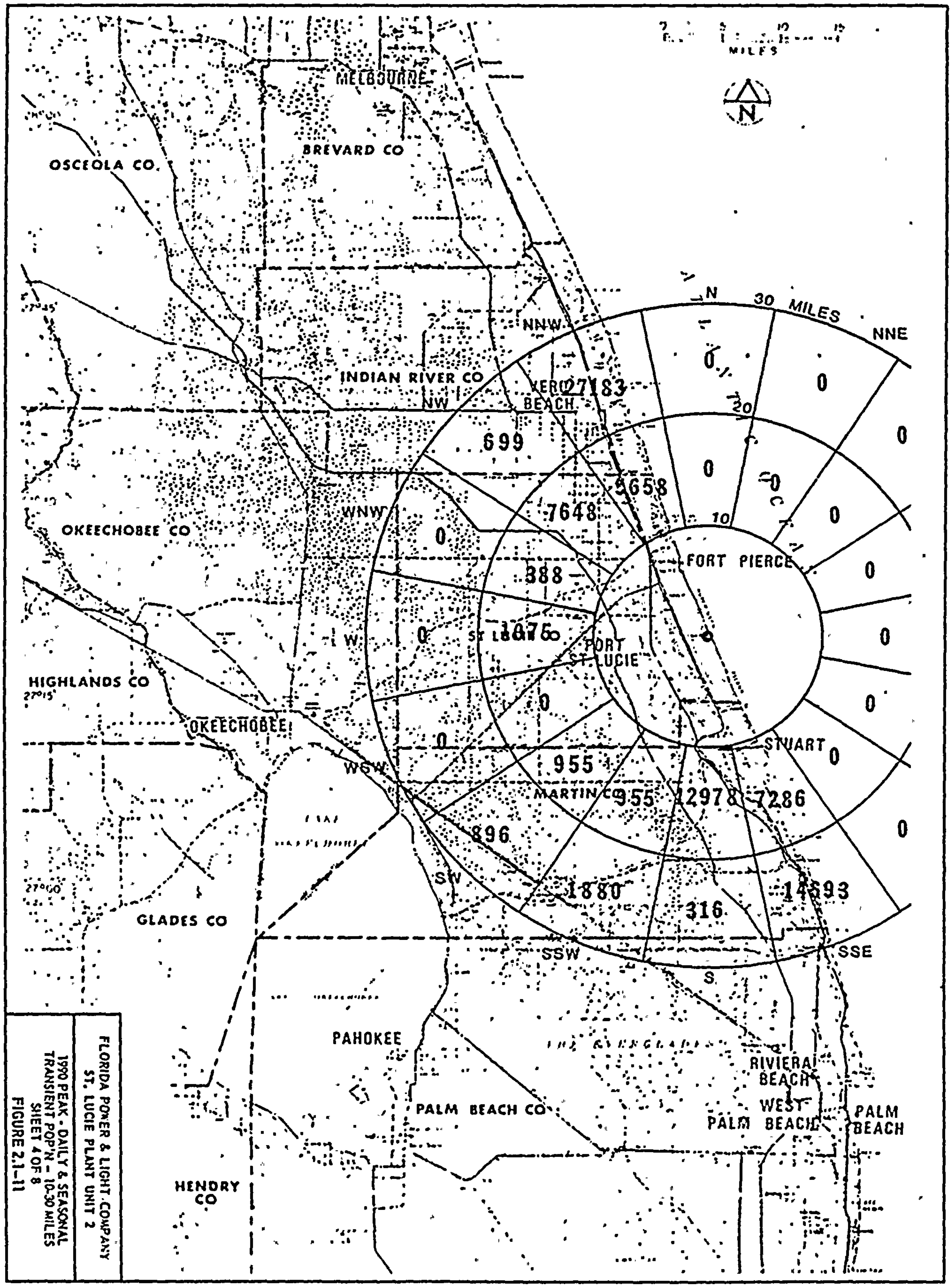


FLORIDA POWER & LIGHT COMPANY
ST. LUCIE PLANT UNIT 2
1980 PEAK - DAILY & SEASONAL TRANSIENT POP'N - 10-30 MILES
SHEET 2 OF 8
FIGURE 2.1-11



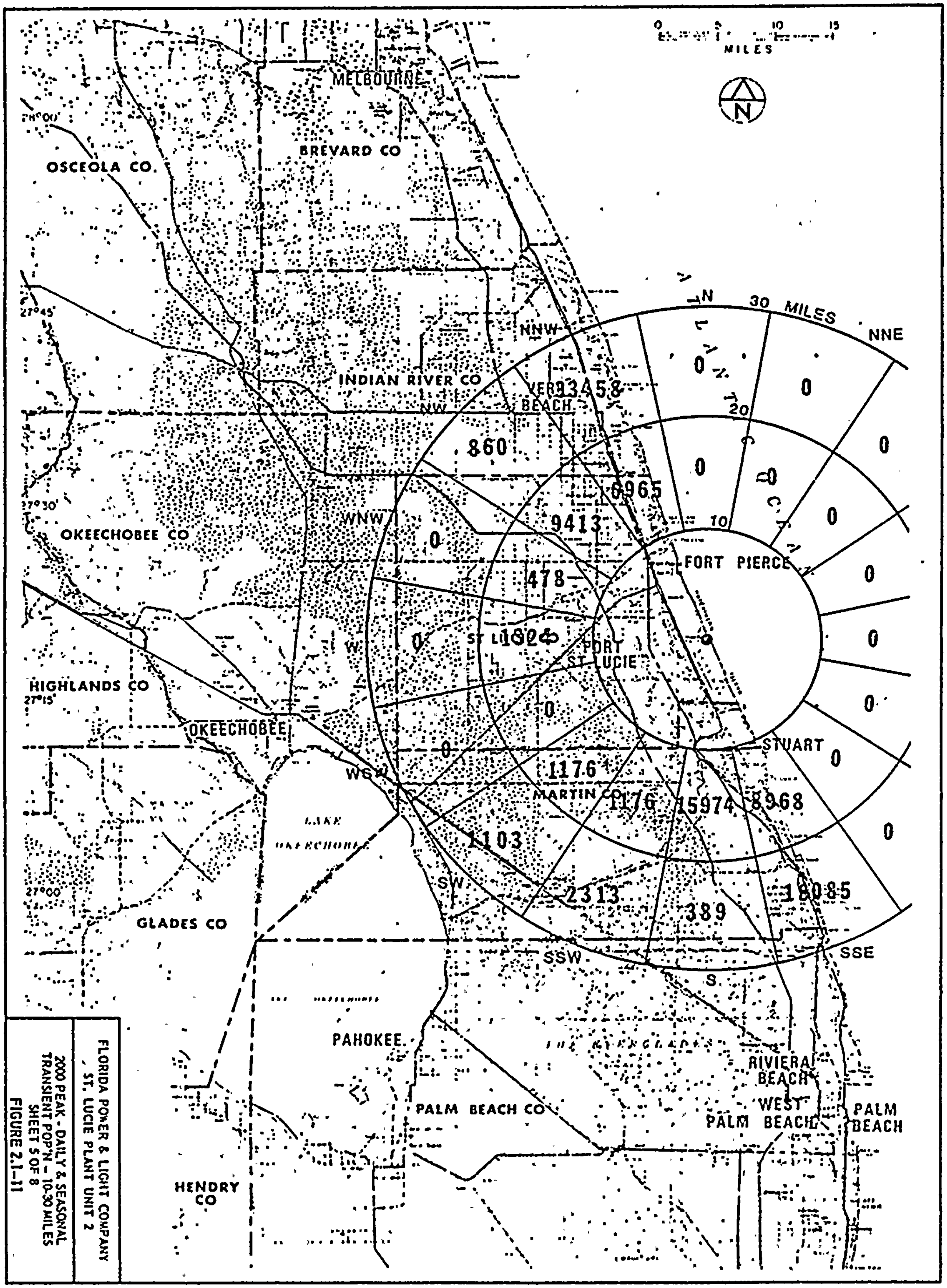
FLORIDA POWER & LIGHT COMPANY
ST. LUCIE PLANT UNIT 2

1983 PEAK - DAILY & SEASONAL
TRANSIENT POP'N - 10-30 MILES
SHEET 3 OF 8
FIGURE 2.1-11

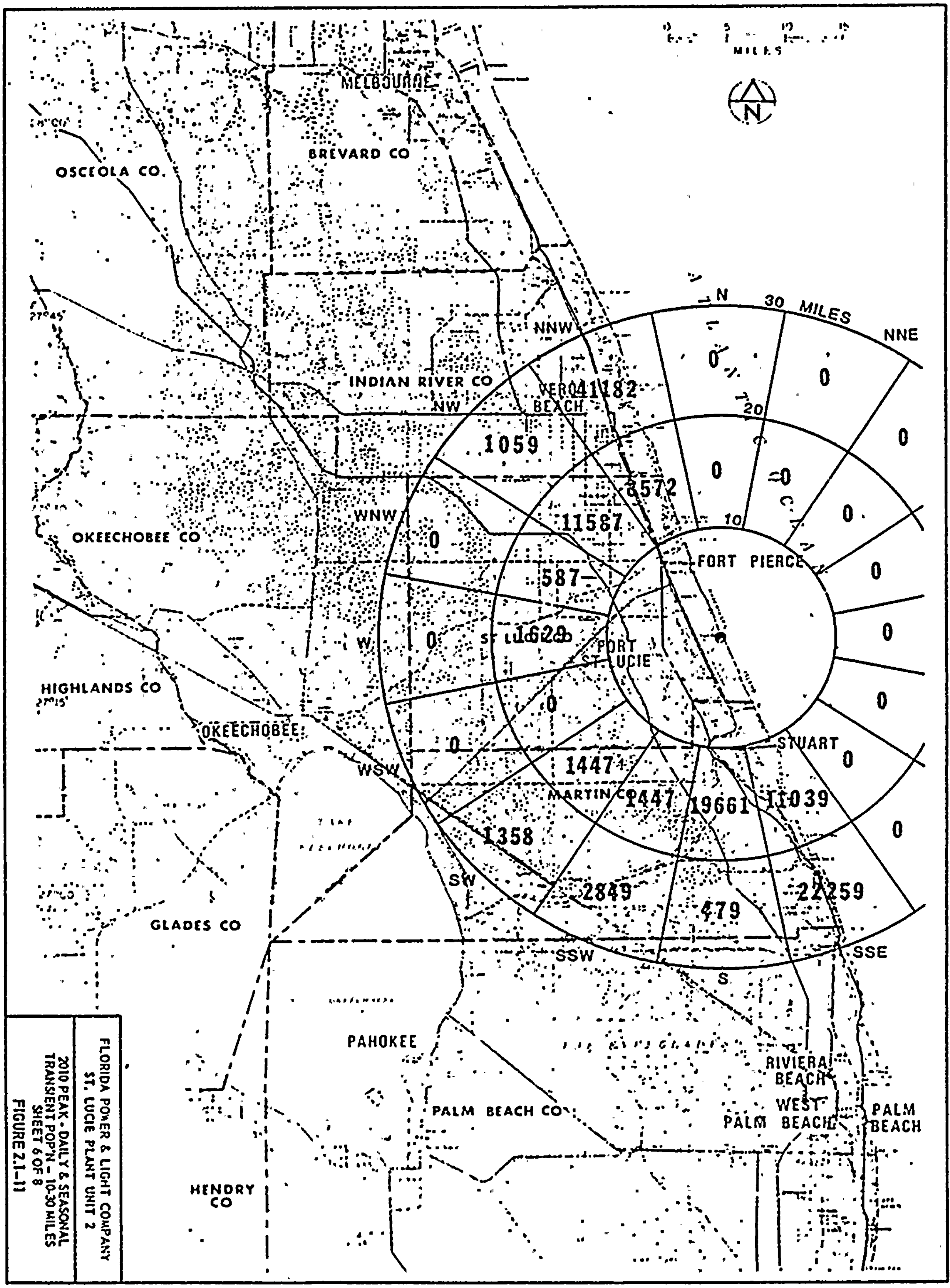


FLORIDA POWER & LIGHT COMPANY
ST. LUCIE PLANT UNIT 2

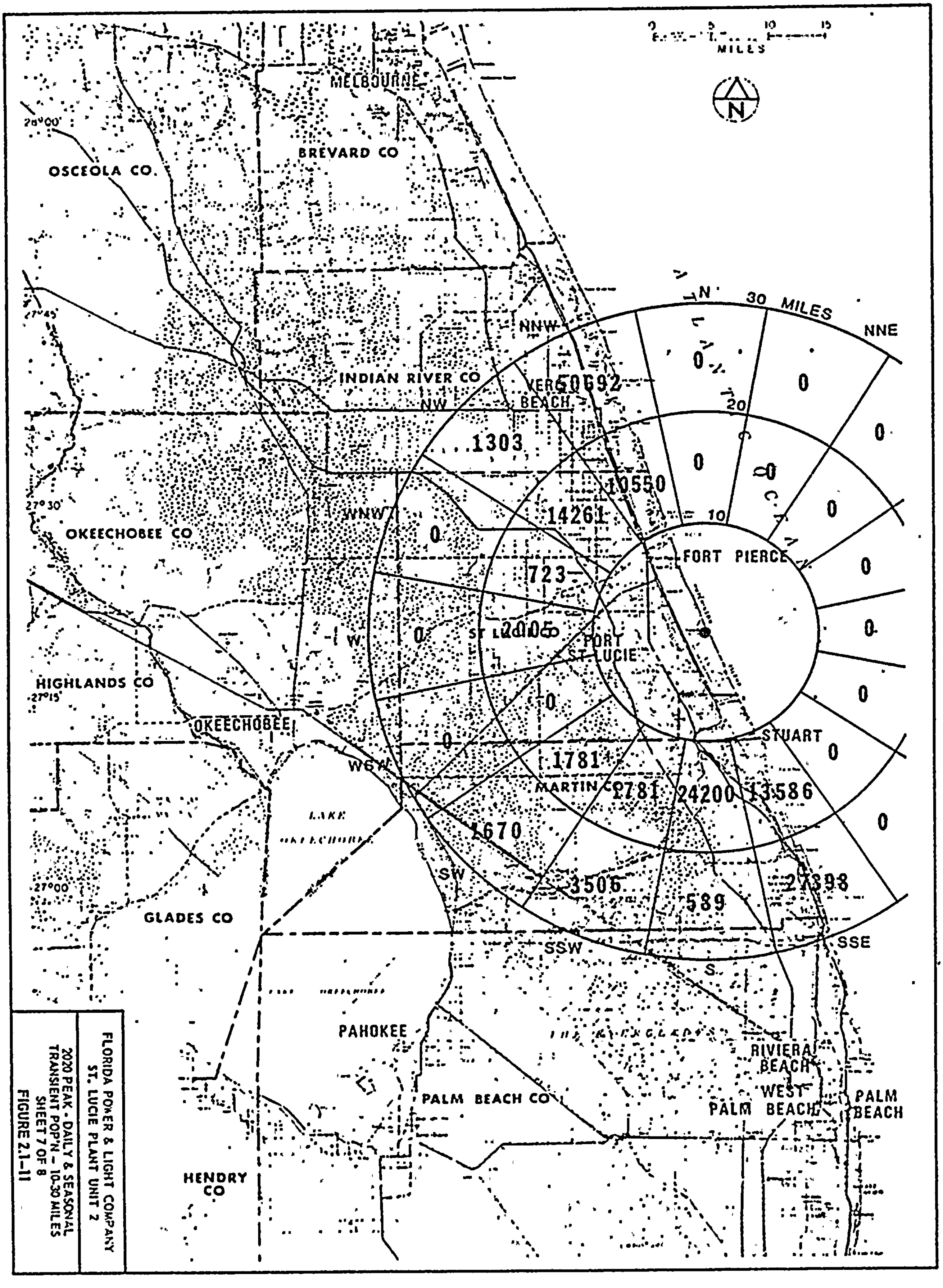
1990 PEAK - DAILY & SEASONAL TRANSIENT POP'N - 10-30 MILES
SHEET 4 OF 8
FIGURE 2.1-11



FLORIDA POWER & LIGHT COMPANY
ST. LUCIE PLANT UNIT 2
2000 PEAK - DAILY & SEASONAL
TRANSIENT POP'N - 10-30 MILES
SHEET 5 OF 8
FIGURE 2.1-11



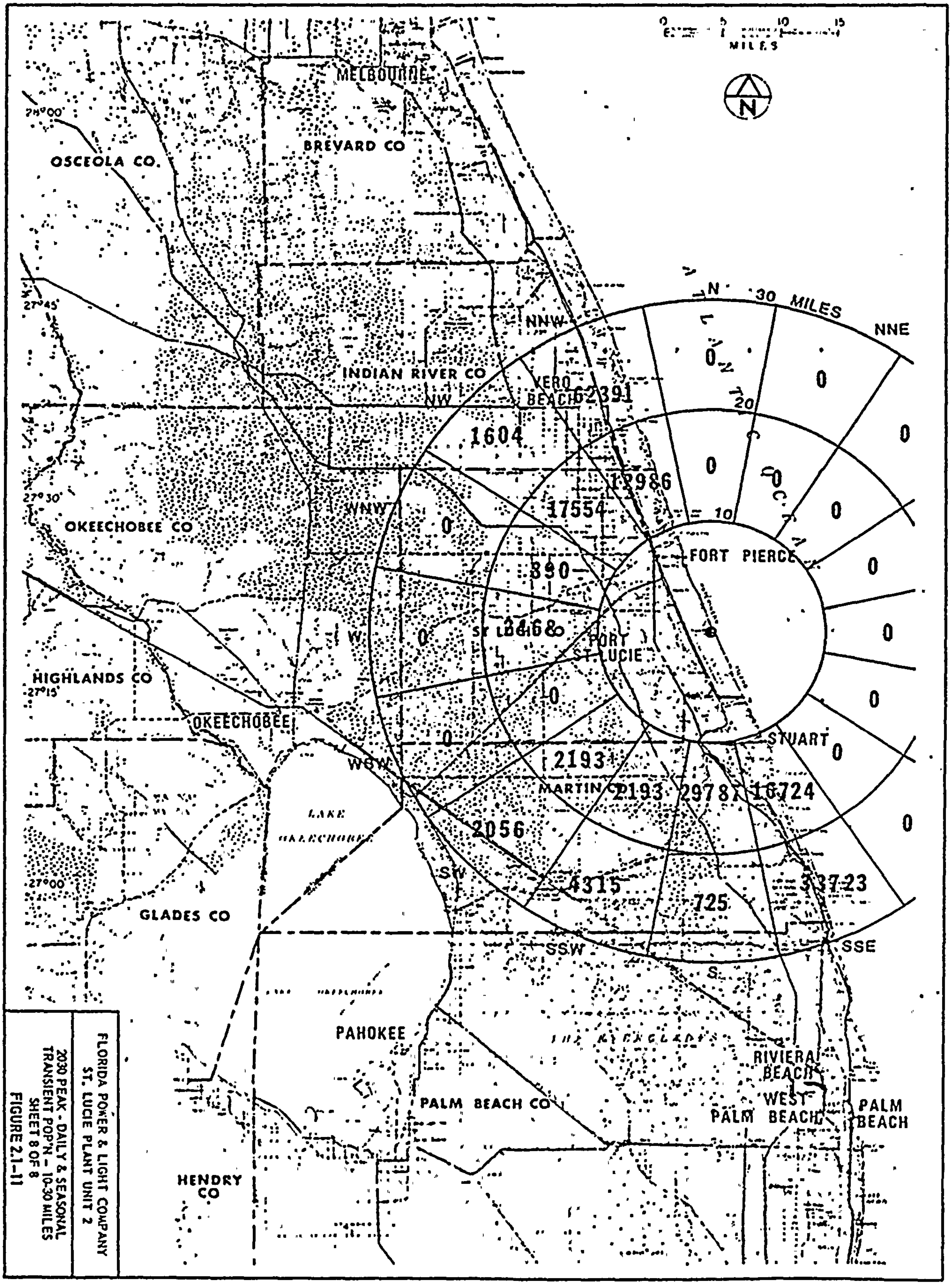
FLORIDA POWER & LIGHT COMPANY
ST. LUCIE PLANT UNIT 2
2010 PEAK - DAILY & SEASONAL
TRANSIENT POP'N - 10-30 MILES
SHEET 6 OF 8
FIGURE 2.1-11



FLORIDA POWER & LIGHT COMPANY
ST. LUCIE PLANT UNIT 2

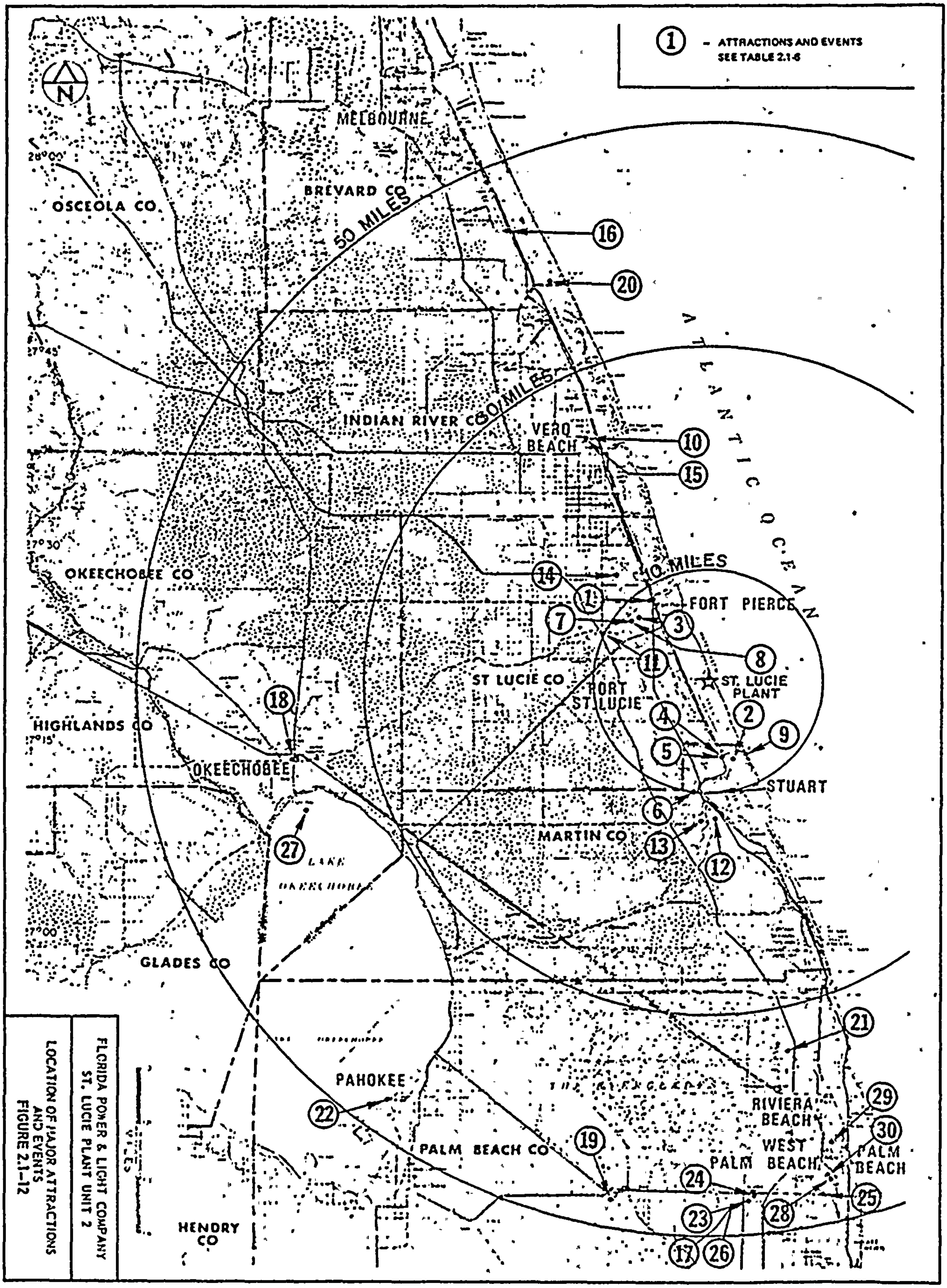
2020 PEAK - DAILY & SEASONAL
TRANSIENT POP'N - 10-30 MILES
SHEET 7 OF 8

FIGURE 2.1-11



FLORIDA POWER & LIGHT COMPANY
ST. LUCIE PLANT UNIT 2

2030 PEAK - DAILY & SEASONAL TRANSIENT POP'N - 10-30 MILES
SHEET 8 OF 8
FIGURE 2.1-11



FLORIDA POWER & LIGHT COMPANY
ST. LUCIE PLANT UNIT 2

LOCATION OF MAJOR ATTRACTIONS AND EVENTS
FIGURE 2.1-12