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August 19, 1973

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U. S. Atomic Energy Commission
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Oak Ridge, Tennessee 37830

Re: In the Matter of Florida Power & Light Company (St. Lucie Nuclear Power Plant Unit 1) Docket No. 50-335

Dear Members of the Board:

Enclosed please find copies of the following:

	Section
A list of exhibits to be offered in evidence by the Applicant together with a proposed exhibit number for each item.	1
A list identifying Applicant's primary panel of witnesses. Applicant will also have available a number of speciality technical witnesses in specific subject areas who may be called as required by the course of the proceedings.	2

Prepared written testimony as follows:

Witness	Topic	Section
Mr. Ellis H. O'Neal, FPL (Lead Witness)	Lead Witness Statement	3
	Census Figure Update	4
	Effect of Water Line Atomic Safety and Licensing Board Question #4	5
	Shortages of Oil and Transportation Costs	6
	Current Costs Re: Alternates	7
	Alternate Site Locations	8
	Steam Generator Blowdown Rates, Appendix I, EPA Comments on the Draft Environmental Statement and Atomic Safety and Licensing Board Question #6	9
	Chlorine Residuals and Boron Concentrations	10
	Thermal defouling	11
	Recommendation in ACRS Letter	12
	Atomic Safety and Licensing Board Question #7 regarding Environmental Effects of Section 7B of the Final Environmental Statement	13
	Atomic Safety and Licensing Board Question #9 on Plant Lighting	14
Mr. William D. Lang, FPL	Projected loads and Atomic Safety and Licensing Board Question #11	15
	Generating Capacity Additions	16
	Selection of Transmission River Crossing Spans	17
	Hydrology in the Savannas and Atomic Safety and Licensing Board Question #3	18

Witness	Topic	Section
Nancy Walls, Ph. D.	Studies on Offshore Currents	19
	Plankton Studies	20
	Migratory Fish Species Near the Coast	21
	Pre-Operational Environmental Monitoring Program	22
	Protection of Turtle Nests	23
Mr. Murray Weber, Ebasco	Erosion From Installation of Intake and Discharge structures	24
	Atomic Safety and Licensing Board Question # 5 on a Wave Topping the Dune	25
	Atomic Safety and Licensing Board Question # 8 on Septic Tanks	26
Mr. Neil Wilding, Ebasco	Use of Velocity Cap Intake at Other Plants and the Effect of Intake Velocity on Small Fish and Atomic Safety and Licensing Board Question # 10	27
Mr. Joe W. Williams, FPL	Percent Completion, Labor Force and Schedule	28
	Work on Beach and Dune Areas	29
	Primary Panel Educational and Professional Qualifications	30

We shall introduce the testimony and exhibits separately at the hearing, having sufficient copies for the reporter. However, this material has been combined in book form for your use at this time.

Respectfully submitted,

Norman A. Coll

Norman A. Coll

NAC/nch

UNITED STATES OF AMERICA

ATOMIC ENERGY COMMISSION

In the Matter of:	)	DOCKET NO. 50-335
Florida Power & Light Company (St. Lucie Nuclear Power Plant Unit 1)	)	
	)	

CERTIFICATE OF SERVICE

I HEREBY CERTIFY that copies of the foregoing attached letter and the enclosures thereto were served upon each addressee and each of the following by mail this 19 day of August, 1973:

1. Mr. Frank W. Karas
   Chief, Public Proceedings Branch
   United States Atomic Energy Commission
   Washington, D. C. 20545
   (Original plus 20 copies)

2. A. Grey Staples, Esquire
   Counsel for AEC Regulatory Staff
   United States Atomic Energy Commission
   Washington, D. C. 20545
   (2 copies)

3. Chairman, Atomic Safety and Licensing
   Appeal Board
   United States Atomic Energy Commission
   Washington, D. C. 20545
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4. Mr. Nathaniel H. Goodrich
   Chairman, Atomic Safety and Licensing Board Panel
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5. Mr. John F. O'Leary, Director
Directorate of Licensing
United States Atomic Energy Commission
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6. Local Public Document Room
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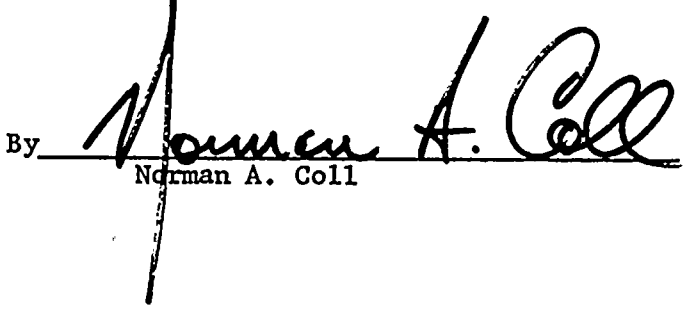
By 
Norman A. Coll

LIST OF EXHIBITS

EXHIBIT	PROPOSED EXHIBIT NO.
1. Application	1
2. Final Safety Analysis Report and Amendments 1-14 thereto (Volumes 1-8)	2(a)-2(h)
3. Environmental Report and Supplements 1-9 thereto	3

APPLICANT'S WITNESSES

1. Ellis H. O'Neal (FPL)

   Lead Panel Witness

   Sponsor of Application, FSAR, as amended and Environmental Report, as supplemented.

2. William D. Lang (FPL)

3. Nancy Walls, Ph. D. (Georgia Institute of Technology)

4. Murray Weber (EBASCO)

5. Neil Wilding (EBASCO)

6. Joseph W. Williams (FPL)

7. Al Jameson (Combustion Engineering)

UNITED STATES OF AMERICA
ATOMIC ENERGY COMMISSION

BEFORE THE ATOMIC SAFETY AND
LICENSING BOARD

In the Matter of	
Florida Power & Light Company	Docket No. 50-335
St. Lucie Unit No. 1	

Lead Witness Statement of

Ellis O'Neal

My name is Ellis O'Neal. My business address is P. O. Box 3100, Miami, Florida 33101. I am the Florida Power & Light Company Project Manager for the St. Lucie Project. A resume of my educational and professional qualifications has been previously received in evidence.

TESTIMONY OF ELLIS H. O'NEAL

My name is Ellis O'Neal. I am the Florida Power & Light Company Project Manager for the St. Lucie Project. A resume of my educational and professional qualifications has been previously received in evidence.

The purpose of this testimony is two-fold: (1) to describe the procedure followed in the preparation of the Final Safety Analysis Report and the Environmental Report for the St. Lucie project; and (2) to state the company's position with respect to the items proposed by the AEC staff in the Final Environmental Statement (p. iv) as conditions for the continuation of our construction permit at St. Lucie.

As Project Manager for the St. Lucie project I have had general responsibility for supervising the preparation of the Preliminary Safety Analysis Report, the Final Safety Analysis Report as amended and the Environmental Report as supplemented including responsibility for coordinating and reviewing the input of Florida Power & Light and all of our contractors and consultants in the preparation of these documents. Specifically, I had responsibility for coordinating the efforts of Florida Power & Light, Southern Nuclear Engineering, Combustion Engineering and Ebasco, as well as several specialized consultants in the preparation of these reports and the answers to the many questions that were asked of us by the staff of the Directorate of Licensing. I also participated in meetings with the AEC staff, on the review of the PSAR, FSAR and the Environmental Report and was generally responsible for the Applicant's conduct of those meetings.

The Environmental Report and the FSAR obviously represent a considerable joint effort of many parties. I was responsible for making individual assignments for the preparation of rough drafts of various

sections of the FSAR and the Environmental Report. In general, we assigned responsibility to our various contractors to prepare sections of these documents which fell within the scope of their particular activities or supplies. Each organization was given a schedule for the submission of initial drafts. As draft material was completed it was reviewed by me or persons under my supervision. From time to time we scheduled meetings with representatives of each organization to discuss and review each organization's comments on the draft materials. In many cases second drafts were ordered and a comparable review cycle was initiated. As each section reached its final draft, it was approved by Florida Power & Light. The final approval was generally made by me or under my supervision.

The time involved in preparation of the Final Safety Analysis Report was approximately one year. Our initial Environmental Report was submitted on May 20, 1971. It was subsequently amended in September, 1971 to conform with the Commission's new regulations following the Calvert Cliffs case. The Environmental Report has since been supplemented nine (9) times.

I have reviewed the three copies of the Application and the FSAR, as amended, and the Environmental Report, as supplemented which have been provided to the reporter for the record of this proceeding. To the best of my knowledge and belief they are complete copies of these documents as of August 28, 1973. The contents of these documents are true and accurate to the best of my knowledge, information and belief.

The staff's Final Environmental Statement (FES) proposes three conditions for the continuation of construction of St. Lucie. These appear at p. iv. of the FES. We shall comply with all of these conditions.

Specifically, our construction program is being conducted with a view to minimize its impact on turtle nesting activities. Our current program for the protection of turtle nests is described in subsequent testimony. We shall also return the dune area to its original condition following construction and will replant the area with dune stabilizing plants. Finally, as discussed in subsequent testimony, we shall install equipment for processing steam generator blowdown in order to assure that radioactive discharges are "as low as practicable". I might add, parenthetically, that we would also intend to comply with those conditions specified by the staff for the issuance of an operating license for the St. Lucie project, although I do understand that the staff proposes to delete condition No. 5 on p. v.

Again, we welcome you to Florida and look forward to this opportunity to assist in your deliberations.

UNITED STATES OF AMERICA
ATOMIC ENERGY COMMISSION

BEFORE THE ATOMIC SAFETY AND
LICENSING BOARD

In the Matter of	
Florida Power & Light Company	Docket No. 50-335
St. Lucie Unit No. 1	

Testimony of

Ellis O'Neal

Relating to
Question on Census Figure Update

My name is Ellis O'Neal. My business address is P. O. Box 3100, Miami, Florida 33101. I am the Florida Power & Light Company Project Manager for the St. Lucie Project. A resume of my educational and professional qualifications has been previously received in evidence.

Response to
Question on
Census Figure Update

The purpose of this testimony is to respond to the question asked by Dr. Paxton which appears at Page 22, Lines 15-19 of the transcript of the prehearing conference. Dr. Paxton asked if there was any basis for updating the population figures beyond the 1970 census.

There has been no official census taken since 1970 in either St. Lucie or Martin County. Future population estimates for 1980 have been researched with the following results: references in the State of Florida Statistical Abstract 1972 as published by the Bureau of Economic & Business Research College of Business Administration, the University of Florida, are contained in the listing below. This study was coordinated with the State of Florida Department of Administration, Bureau of Planning.

	1970 Population (Census)	1980 Projective
St. Lucie County	50,836	61,800
Martin County	28,035	40,700

UNITED STATES OF AMERICA
ATOMIC ENERGY COMMISSION

BEFORE THE ATOMIC SAFETY AND
LICENSING BOARD

In the Matter of	
Florida Power & Light Company	Docket No. 50-335
St. Lucie Unit No. 1	

Testimony of

Ellis O'Neal

Relating to
Effect of Water Line and Atomic Safety
and Licensing Board Question #4

My name is Ellis O'Neal. My business address is P. O. Box 3100, Miami, Florida 33101. I am the Florida Power & Light Company Project Manager for the St. Lucie Project. A resume of my educational and professional qualifications has been previously received in evidence.

Response to
Question on Water Line

The purpose of this testimony is to respond to the question asked by Dr. Paxton which appears at Page 23, Lines 17-22 of the transcript of the prehearing conference. Dr. Paxton asked if the water line to the plant has had any effect on development on Hutchinson Island.

The water line to the plant has made possible the development of Hutchinson Island as follows: the line has been extended southward to serve the Sheraton resort hotel and a campground for travel trailers and recreational vehicles, both of which are now in operation. This extension of the line will also serve a 12-unit motel now under construction, and another hotel which is now planned. North of the plant, a condominium apartment complex is planned and will be served by the line. There are other indications of other developments which will use water from the line, but no other firm plans are known at this time.

Because the plant has reserved a majority (over 65% of the presently installed line capacity, the final contribution for the use by new developments has a lessened effect. As the projected increases upon the demand for water occur, additional development must obtain alternate supplies. The Applicant has learned from the St. Lucie County Utility Authority that they are presently considering supplementing the water supply to Hutchinson Island. The concept under consideration would call for a 12" or 16" main line to enter the island via the South Bridge area.

UNITED STATES OF AMERICA
ATOMIC ENERGY COMMISSION

BEFORE THE ATOMIC SAFETY AND
LICENSING BOARD

In the Matter of	
Florida Power & Light Company	Docket No. 50-335
St. Lucie Unit No. 1	

Testimony of

Ellis O'Neal

Relating to
Shortages of Oil and
Transportation Costs

My name is Ellis O'Neal. My business address is P. O. Box 3100, Miami, Florida 33101. I am the Florida Power & Light Company Project Manager for the St. Lucie Project. A resume of my educational and professional qualifications has been previously received in evidence.

Response to Question Concerning Shortages of Oil and Transportation Costs

The purpose of this testimony is to respond to the question asked by Dr. Paxton which appears at page 24, lines 7-12 of the transcript of the prehearing conference. Dr. Paxton asked about the applicability of the statement in the Draft Environmental Statement concerning threatened shortages of oil and increased transportation costs.

This statement has been carried to page XI-5 of the Final Environmental Statement. We would disagree with the conclusion that the oil situation is improving. Our current experience with the procurement of oil as a fuel for electric power generation indicates continuing price increases, actual shortages and increased transportation costs. For example, upon review of FP&L's official Expense Analysis report, the price of a barrel of oil has increased from a price of $3.74 in January, 1973 to $4.15 as of June, 1973.

UNITED STATES OF AMERICA
ATOMIC ENERGY COMMISSION

BEFORE THE ATOMIC SAFETY AND
LICENSING BOARD

In the Matter of	
Florida Power & Light Company	Docket No. 50-335
St. Lucie Unit No. 1	

Testimony of

Ellis O'Neal

Relating to
Alternates

My name is Ellis O'Neal. My business address is P. O. Box 3100, Miami, Florida 33101. I am the Florida Power & Light Company Project Manager for the St. Lucie Project. A resume of my educational and professional qualifications has been previously received in evidence.

Response to Question about Alternates

The purpose of this testimony is to respond to the question asked by Dr. Paxton which appears at page 24, lines 13 - 17 of the transcript of the prehearing conference, Dr. Paxton asked about changes to cost of alternatives since preparation of the Draft Environmental Statement. We have reviewed the alternatives and their costs. In the period since preparation of the cost estimates which were used in the statement, construction costs have continued on an upward trend. The cost of the cooling tower system, for example, would now be estimated at a ten to twenty percent higher cost than is shown in the Draft Environmental Statement. Cost of other alternatives would be escalated by a similar amount.

With regard to the alternative of abandoning the present site the major development is the construction progress made on the plant. Overall, the plant is now 59% complete, and a total of approximately $193,932,000.00 has been spent or committed, virtually all of which is irretrievable. The cost of the alternative of abandoning the present site must take this figure into account, as well as the cost of many years of delay in startup of the alternate plant.

Similarly, consideration of alternatives to the condenser cooling system and transmission system must take into account the construction work done in the last year. The condenser cooling system is 40% complete, with canal excavation well along, and work on the dune area in progress. The transmission crossing Project of the Indian River is 50% complete. All foundations and pilings for transmission towers have been installed and the towers are ready for erection. Irretrievable costs for the transmission system are estimated at an additional $3,500,000.

UNITED STATES OF AMERICA
ATOMIC ENERGY COMMISSION

BEFORE THE ATOMIC SAFETY AND
LICENSING BOARD

In the Matter of	
Florida Power & Light Company	Docket No. 50-335
St. Lucie Unit No. 1	

Testimony of

Ellis O'Neal

Relating to
Alternate Site Location Question

My name is Ellis O'Neal. My business address is P. O. Box 3100, Miami, Florida 33101. I am the Florida Power & Light Company Project Manager for the St. Lucie Project. A resume of my educational and professional qualifications has been previously received in evidence.

Response to Alternate Site Location Question

The purpose of this testimony is to respond to the question asked by Dr. Paxton which appears at page 25, line 25, through page 26, line 5 of the transcript of the prehearing conference. Dr. Paxton asked about alternate site locations.

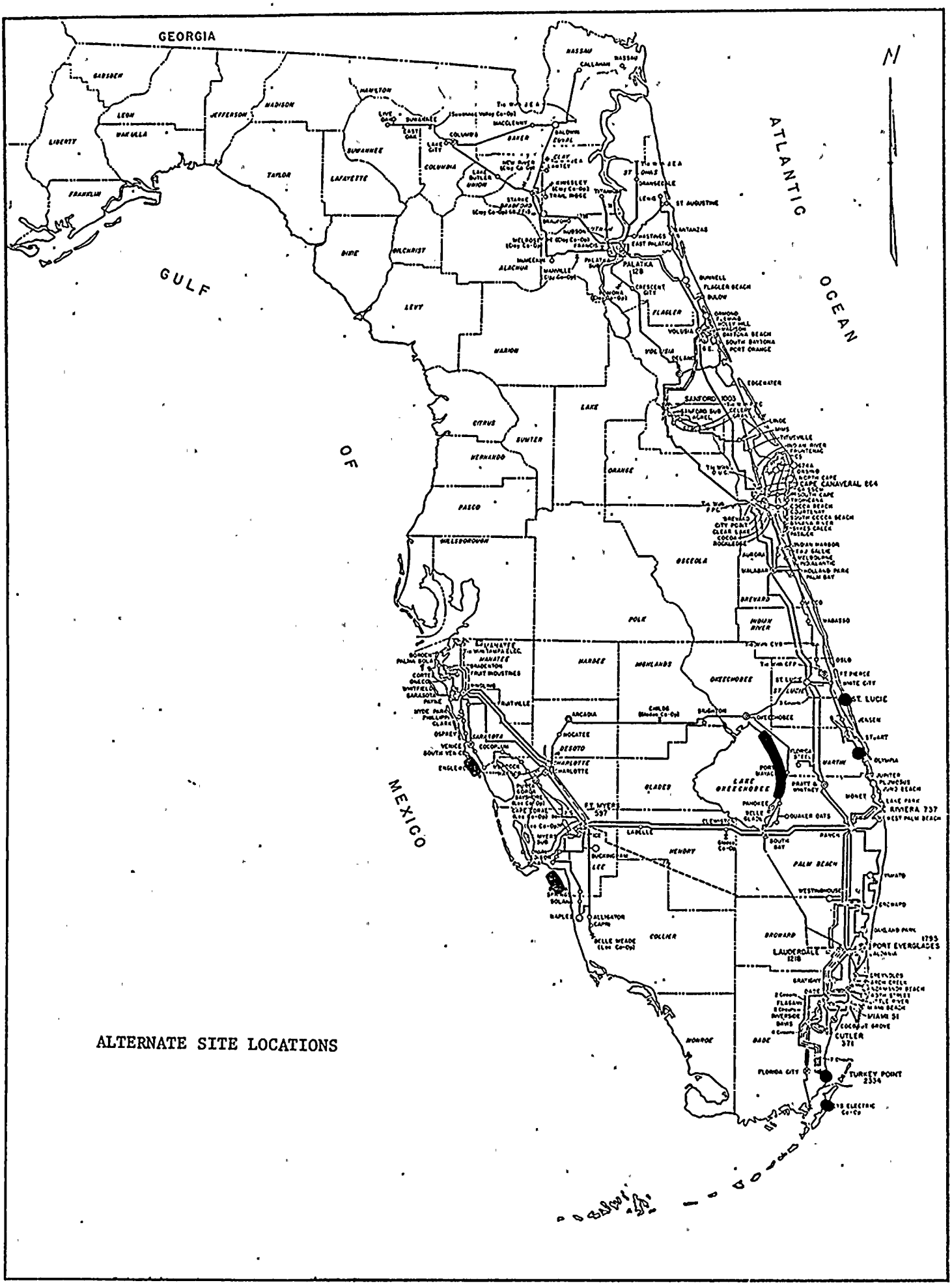
In comparing candidate locations for the PWR unit, the following criteria were employed:

1) Distance of the site from population centers
2) Availabilty of a large area of land at the site
3) Natural characteristics of the site such that the environmental impact would be minimal
4) Proximity to load centers
5) Convenient access to navigable water ways for the transport of heavy systems components
6) Provision for a cooling system with a minimum environmental effect

Considerable knowledge was available in regard to each question.

It was evaluated that Hutchinson Island best fulfilled the requirements and uniquely stood out in regard to distance from population centers and in the quantity of land available. The Hutchinson Island site also provided that there would be reliable service to the expanding West Palm Beach area without dependence on long transmission lines.

The attached figure is a map showing the locations of the general areas which were considered for siting this unit.


GEORGIA
ATLANTIC OCEAN
GULF OF MEXICO
N
ALTERNATE SITE LOCATIONS
TURKEY POINT
2334
RIVIERA 737
PORT EVERGLADES
1795
CUTLER
371
ST LUCIE
CAPE CANAVERAL 864
PALATKA
128
LAUDERDALE
1218
FT MYERS
597

UNITED STATES OF AMERICA
ATOMIC ENERGY COMMISSION

BEFORE THE ATOMIC SAFETY AND
LICENSING BOARD

In the Matter of	
Florida Power & Light Company	Docket No. 50-335
St. Lucie Unit No. 1	

Testimony of

Ellis O'Neal

Relating to
Steam Generator Blowdown Rates,
Appendix I, EPA Comments and ASLB Question #6

My name is Ellis O'Neal. My business address is P. O. Box 3100, Miami, Florida 33101. I am the Florida Power & Light Company Project Manager for the St. Lucie Project. A resume of my educational and professional qualifications has been previously received in evidence.

Response to Questions about
Steam Generator Blowdown Rates, Appendix I,
EPA Comments and ASLB Question #6

The purpose of this testimony is to respond to the question asked by Mr. Lazo, which appears on page 30, lines 1 - 13 of the transcript of the prehearing conference. Mr. Lazo asked about steam generator blowdown rates and what committments would be made to meet Appendix I guidelines. This was also the subject of the main EPA comment on the draft environmental statement for St. Lucie and was the basis for a question asked by Dr. Purdom which appears on page 28, lines 10 through 12 of the transcript of the prehearing conference. Other EPA comments have been addressed by the Regulatory Staff in the Final Environmental Statement.

The actual steam generator blowdown requirements will be determined by plant conditions during operation. Blowdown rates are variable due to the variability of dissolved solids entering the secondary system. Dissolved solids concentrate in the steam generators, and blowdown will be used to control their build-up.

As of June, 1973 there were two plants in operation using Combustion Engineering nuclear steam supply systems, the same manufacturer as St. Lucie. Both of these were operating without continuous blowdown. The Applicant's figure of 0.14 gallons per minute blowdown discussed in the Environmental Report was based on a rate of 20 gallons per day. The ten gallon per minute rate stated in the Draft Environmental Statement is based upon experience and recommendations for steam generators of another design and manufacture. This condition has now been adopted by the Applicant as a design basis, and a blowdown treatment system will be installed that will be capable of processing a minimum of 10 gallons

per minute per steam generator to insure that discharges of I-131 in the liquid effluents are as low as practicable. The capacity of the liquid radioactive waste treatment system will be increased to process the radioactive waste which may appear in the steam generator blowdown. Treatment of the resultant blowdown involves sufficient cooling to preclude flashing and any subsequent venting via the blowdown tank vent.

The Applicant is evaluating a number of alternatives for the blowdown treatment system. A brief discussion of those alternatives is presented below.

a) Evaporation-demineralization system. In this system blowdown water passes from the steam generators to an existing flash tank, where the pressure is reduced by a flashing process and vapor vented to the main condenser. Liquid from the flash tank is pumped through particulate filters to evaporators where the effluent is evaporated. The evaporated distillates are processed through ion exchangers and collected in monitor tanks. From these tanks the processed blowdown can be recycled to the ion exchangers for reprocessing or released to the discharge canal through a radiation monitor. Bottoms from the evaporators are concentrated and passed through a cooler to concentrate storage tanks which serve as a holdup tank for the bottoms. The bottoms are pumped from the storage tanks to a bottoms concentrator for maximum concentration (to dryness) prior to being drummed for offsite disposal. Distillates from the bottoms concentrator are combined with evaporator distillates to be processed by the ion exchangers. Since the ion exchangers are non-regenerable, spent resin is periodically transferred to a resin storage tank and pumped to a drumming station.

b) Demineralizer system. Blowdown water is passed through a heat exchanger and a pressure reducing valve. The liquid is then processed through a particulate filter, a series of cation bed demineralizers and then a series of mixed bed demineralizers. The demineralizer effluent then passes through another filter to a surge tank. From this tank the treated water can be either reprocessed, recycled or released to the discharge canal through a radiation monitor. Depleted resins are collected in a separate tank and sent to the solids waste handling system for packaging and ultimate offsite disposal.

c) Evaporation system. Blowdown liquid is passed through a heat exchanger followed by a pressure reduction station and is collected in waste tanks. The fluid is pumped through a particulate filter to the waste concentrator. The concentrator distillate is processed through an ion exchanger and is collected in monitor tanks. From these tanks the water can be pumped either to recycle via condensate storage tanks or released through a radiation monitor to the discharge canal. Concentrator bottoms are directed to a bottom concentrator for maximum concentration prior to being drummed, offsite disposal.

UNITED STATES OF AMERICA
ATOMIC ENERGY COMMISSION

BEFORE THE ATOMIC SAFETY AND
LICENSING BOARD

In the Matter of)	
)	
Florida Power & Light Company)	Docket No. 50-335
)	
St. Lucie Unit No. 1)	

Testimony of

Ellis O'Neal

Relating to
Chlorine Residuals
and Boron Concentrations

My name is Ellis O'Neal. My business address is P. O. Box 3100, Miami, Florida 33101. I am the Florida Power & Light Company Project Manager for the St. Lucie Project. A resume of my educational and professional qualifications has been previously received in evidence.

Response to
Question on Chlorine Residuals
and Boron Concentrations

The purpose of this testimony is to respond to the question asked by Dr. Purdom which appears at page 28, lines 1-6 of the transcript of the prehearing conference. Dr. Purdom asked for further information concerning chlorine residuals and boron concentrations in the cooling water discharge.

Chlorine is required to prevent fouling of the heat transfer surfaces of the plant, especially the main condenser. If uncontrolled, algae and bacteria form slimes and other deposits on these surfaces would seriously interfere with heat transfer and decrease the efficiency of the plant. Intermittent chlorination has been found to be an effective method of controlling these organisms and maintaining efficient condenser operation.

Since only intermittent chlorination will be employed, the amount of chlorine used will be small. The chlorination procedure will be adjusted to provide a concentration of 1 mg/ℓ or less free residual chlorine in the water leaving the condenser-half being treated. The operational technique of chlorinating only one condenser-half at a time will allow this water to be mixed with the effluents of the other condenser-half prior to discharge. This will allow further reduction in chlorine residual by the chlorine demand of the water from the unchlorinated condenser-half and by dilution.

Chlorine residual will be monitored on a scheduled basis, to assure that residual chlorine during chlorination will not exceed 0.1/mg/ℓ when measured in the discharge canal, prior to entering the outfall

discharge pipe.

Boron releases from the plant into the cooling water discharge will be made intermittently and in concentrations which amount to a small fraction of the naturally occuring boron concentrations in sea water.

UNITED STATES OF AMERICA
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BEFORE THE ATOMIC SAFETY AND
LICENSING BOARD

In the Matter of	
Florida Power & Light Company	Docket No. 50-335
St. Lucie Unit No. 1	

Testimony of

Ellis O'Neal

Relating to
Response to Thermal Defouling Question

My name is Ellis O'Neal. My business address is P. O. Box 3100, Miami, Florida 33101. I am the Florida Power & Light Company Project Manager for the St. Lucie Project. A resume of my educational and professional qualifications has been previously received in evidence.

Response to Thermal Defouling Question

The purpose of this testimony is to respond to the question asked by Dr. Purdom which appears on page 28, lines 4 through 9, of the transcript of the prehearing conference. Dr. Purdon asked about the thermal defouling treatment.

The thermal defouling system, is provided as a backup in the event the growth of barnacles and marine life exceeds the one foot fouling allowance that has been provided in each of the two ocean intake conduits. The basis for the system is derived from the experience of utilities located on the west coast of the United States. The process is one of utilizing the plant turbine-condenser to heat water to 120 - 125°F and then circulating the water to the pipeline which is to be defouled.

The process as adapted to the St. Lucie Plant, requires a canal and gate structures from the discharge canal to each of the ocean intake conduits to allow each of the conduits, in turn, to be filled with heated water for the soak period of approximately four hours. The use of water heated to 125°F for purposes of defouling the intake conduits is considered to be a maximum temperature requirement. If in actual practice, a lower temperature is found to produce the required amount of defouling, the procedure will be amended accordingly.

UNITED STATES OF AMERICA
ATOMIC ENERGY COMMISSION

BEFORE THE ATOMIC SAFETY AND
LICENSING BOARD

In the Matter of	
Florida Power & Light Company	Docket No. 50-335
St. Lucie Unit No. 1	

Testimony of

Ellis O'Neal

Relating to
Recommendations in ACRS Letter

My name is Ellis O'Neal. My business address is P. O. Box 3100, Miami, Florida 33101. I am the Florida Power & Light Company Project Manager for the St. Lucie Project. A resume of my educational and professional qualifications has been previously received in evidence.

Response to Question About Certain Recommendations in ACRS Letter

The purpose of this testimony is to respond to the question asked by Mr. Lazo which appears at page 30, lines 13-24 of the transcript of the prehearing conference. Mr. Lazo asked if the recommendations of the ACRS letter of March 12, 1970, concerning installation of charcoal filters, have been dealt with.

The specific paragraphs of the ACRS letter read:

"Pump seal and other leakage from emergency core cooling (ECCS) equipment and lines outside the containment may lead to undesirable releases of radioactivity in the unlikely event of a loss-of-coolant accident. The Committee recommends that the atmosphere around the ECCS lines and pumps outside the containment be vented through a charcoal filter system."

"Further study is required with regard to potential releases of radioactivity in the unlikely event of gross damage to an irradiated sub-assembly during fuel handling and the possible need for a charcoal filtration system in the fuel handling building. This matter should be resolved in a manner satisfactory to the Regulatory Staff."

The applicant has acted on the Committee's recommendation that the atmosphere around the ECCS lines and pumps outside the containment be vented through a charcoal filter system. The system will be installed. Section 9.4.3 of the FSAR* describes the system. The applicant has also acted on the recommendation of further study with regard to potential releases of radioactivity in the unlikely event of damage to fuel during fuel handling. These studies are described in FSAR section 15.4.3.

*Copy attached

In the April 1970 Safety Evaluation by the Division of Reactor Licensing, the AEC stated "unless the applicant can provide additional information to demonstrate to our satisfaction that assumptions less conservative than those we now assume for this situation are warranted, we will require the installation of the charcoal filters ...." The system referred to above is the ventilation system for the fuel handling building. Since the AEC issued that statement, they themselves have adopted less conservative assumptions, based on thorough investigation, so that the original contention is no longer valid. Section 15.4.3 of the FSAR fully discusses the assumptions and calculational procedures utilized in the fuel handling accident analysis. The results show that the consequences of such an accident are well within the accepted limits established in 10CFR 100.

9.4.3 EMERGENCY CORE COOLING SYSTEM AREA VENTILATION SYSTEM

9.4.3.1 Design Bases

The emergency core cooling system (ECCS) area ventilation system is designed to provide post-LOCA filtration and adsorption of fission products in the exhaust air from areas of the reactor auxiliary building which contain the following equipment:

a) containment isolation valves

b) low pressure safety injection pumps

c) high pressure safety injection pumps

d) containment spray pumps

e) shutdown heat exchangers

f) piping which contains recirculating containment sump water following a LOCA

9.4.3.2 System Description

The ECCS area ventilation system air flow diagram is shown on Figure 9.4-1, the P & I diagram on Figure 9.4-2 and design data on Table 9.4-6.

The air exhaust system consists of two redundant centrifugal exhaust fans (HVE-9A, B), HEPA and charcoal filter banks, and associated duct work dampers and controls. The exhausted air is vented to the outside atmosphere.

Under normal operation, the reactor auxiliary building main ventilation supply and exhaust system provides the necessary ventilation of the ECCS pump rooms. Under accident conditions when several or all of the pumps are operating, the air supply to the nonessential section of the reactor auxiliary building is directed to the pump rooms to provide the additional cooling air requirement. Dampers are positioned automatically on SIAS signal to provide the proper flow path for supply air to the ECCS area. Simultaneously, the exhaust fans are energized and dampers in the exhaust ductwork are positioned to allow the fans to draw all exhaust air from the area through the HEPA and charcoal filter bank before discharge to the atmosphere. Table 9.4-5 lists the components actuated on SIAS and gives the control function of the SIAS on that component.

The ventilation system is sized to maintain a slightly negative pressure of between 1/4 and 1 inch wg in the ECCS area with respect to surrounding areas of the reactor auxiliary building. Access into the ECCS area from other parts of the reactor auxiliary building is through gasketed self-closing or locked closed doors. Opening of locked doors is under administrative controls.

TABLE 9.4-6

DESIGN DATA FOR ECCS AREA VENTILATION SYSTEM COMPONENTS

1. Fans

Quantity	2
Capacity, cfm	30,000
Static pressure, in. wg	6 (HVE-9A), 5 (HVE-9B)
Actual air flow at inlet, cfm	30,000
Air density, lb/ft^3	0.075
Code	Class III
Type, both systems	Centrifugal, variable pitch belt, air foil, non-overloading

2. Motors

Quantity	2
Type	Horizontal, 40 HP, 460 volt, 3 phase, 60 cycle
Insulation	Class B powerhouse
Enclosure & ventilation	Open, drip-proof

3. HEPA Filters

Quantity, per bank	30
Air flow, cfm	30,000
Cell size, in.	24 x 24 x 11½
Cell arrangement	5 wide x 6 high
Max resistance, clean, in. wg	1.0
Max resistance, loaded, in. wg	3.0
Efficiency	99.97% with 0.3 micron DOP smoke
Material	Glass asbestos paper separated by aluminum inserts, supported on cadmium plated steel frame
Code	UL-586, Class 1

4. Charcoal Adsorbers

Quantity per bank	90
Air flow, cfm	30,000
Cell size, in.	24 x 8 x 30
Cell arrangement	6 wide x 15 high
Max air resistance, in. wg	1.15
Efficiency	99.9% min of iodines with 5% in the form of methyl iodine, when operating at 70 percent relative humidity and 150 F

UNITED STATES OF AMERICA
ATOMIC ENERGY COMMISSION

BEFORE THE ATOMIC SAFETY AND
LICENSING BOARD

In the Matter of	
Florida Power & Light Company	Docket No. 50-335
St. Lucie Unit No. 1	

Testimony of

Ellis O'Neal

Relating to
ASLB Question #7

My Name is Ellis O'Neal. My business address is P. O. Box 3100, Miami, Florida 33101. I am the Florida Power & Light Company Project Manager for the St. Lucie Project. A resume of my educational and professional qualifications has been previously received in evidence.

Response to the Atomic Safety and Licensing Board
Question #7 Regarding Possible Environmental Implications
Relating to Part 7b of the Final Environmental Statement

The purpose of this testimony is to address the Board's concerns of possible environmental considerations in regard to the approach concepts as seen by the Applicant.

The recommended studies and monitoring programs cover the effect of plant operation on the ocean environment, including entrainment effects and fish entrapment, effects of the discharge plume on turtles, radiological effects, and chlorine effects. Should an unforeseen problem appear, further studies may be required to determine the primary cause and possible solutions. The types of remedies which may be necessary cannot specifically be foreseen at this time, however a discussion of remote possibilities follows:

In the event that the aquatic biological monitoring program reveals adverse effects to plankton or fish as a result of entrapment, possible approaches suggest taking the inlet water from a different level, or the installation of fish repellent devices such as bubble screens or sonic devices at the intake.

In the event there is an effect from the discharge thermal plume on turtles, it may be possible to remedy the problem by relocation of nests from the immediate vicinity of the discharge.

In the event of radiological problems plant operation and procedure can be altered to minimize or eliminate adverse effects. This might include measures such as better use of holdup capabilities in waste processing, better maintenance of fuel integrity, or shipment of waste offsite for disposal.

In the highly unlikely event that chlorine disturbs the marine community at or near the discharge, it may be possible to remedy the situation by adding chlorine-neutralizing chemicals to the discharge canal.

UNITED STATES OF AMERICA
ATOMIC ENERGY COMMISSION

BEFORE THE ATOMIC SAFETY AND
LICENSING BOARD

In the Matter of	
Florida Power & Light Company	Docket No. 50-335
St. Lucie Unit No. 1	

Testimony of

Ellis O'Neal

Relating to
Atomic Safety and Licensing Board
Question #9 on Plant Lighting

My name is Ellis O'Neal. My business address is P. O. Box 3100, Miami, Florida 33101. I am the Florida Power & Light Company Project Manager for the St. Lucie Project. A resume of my educational and professional qualifications has been previously received in evidence.

Response to Atomic Safety and Licensing Board Question #9 on Plant Lighting

The purpose of this testimony is to respond to the Atomic Safety and Licensing Board's question #9 on plant lighting.

Compliance with ANSI N18.7 does not impose any unusual requirements for St. Lucie Plant lighting nor for access outside the fence perimeter which is permitted in a manner consistent with emergency procedures.

Consistent with ANSI N18.7, lighting is provided within the protected area as well as on the fence. However, the lighting arrangement is such that the illumination outside of the fenced perimeter only extends a short distance beyond the fence. The level of lighting is not high enough to require control of lighting during the passage of storm fronts. The statement on page IV-5 of the Final Environmental Statement concerning control of construction lighting during the passage of storm fronts is not affected since ANSI N18.7 does not apply to construction lighting.

UNITED STATES OF AMERICA
ATOMIC ENERGY COMMISSION

BEFORE THE ATOMIC SAFETY AND
LICENSING BOARD

In the Matter of	
Florida Power & Light Company	Docket No. 50-335
St. Lucie Unit No. 1	

Testimony of

William D. Lang

Relating to
Projected Loads

My name is William D. Lang. My business address is P. O. Box 3100, Miami, Florida 33101. I am employed by Florida Power & Light Company as Assistant Chief Engineer of General Engineering. A resume of my educational and professional qualifications has been previously received in evidence.

Response to
Question of Projected Loads

The purpose of this testimony is to respond to the question asked by Dr. Paxton which appears at Page 24, Lines 3-6 of the transcript of the prehearing conference. Dr. Paxron asked about projections of the need for power.

This testimony also answers the question (#11) asked by the Board in their letter of July 31, 1973, related to the effect on power needs of the delay in scheduled commercial operation until December 1975.

The applicant has continued to update projections of future load demand. These updated projections do not differ significantly from the values shown in Table X-2 located on Pages X-6 and X-7 of the Final Environmental Statement. Attached is a table of the latest projections of future load demand and expected generating capabilities and reserves.

As shown on the attached table, generating reserves during the summer of 1975 will be in the order of four percent. Alternative means of power supply for that period are now under study. These alternatives include purchased power, if available, and installation of peaking generation.

FLORIDA POWER & LIGHT COMPANY
SUMMER PEAK LOADS, CAPABILITIES, AND RESERVES

(Capability is Summer Peak Gross Capability)

Year	Peak Load Gross 15-Minute (MW)	Percent Increase	Capability (MW)	Reserve		Largest Unit	Reserve With Largest Unit Out		Gas Turbine	
				MW	Percent		MW	Percent	MW	Percent Capability
1961	1636	13.9	1963	327	20.0	225	102	6.2		
1962	1874	14.5	2263	389	20.8	300	89	4.7		
1963	2163	15.4	2538	375	17.3	300	75	3.5		
1964	2419	11.8	2938	519	21.5	400	119	4.9		
1965	2693	11.3	3597	904	33.6	400	504	18.7		
1966	3038	12.8	3498	460	15.1	400	60	2.0		
1967	3338	9.9	3898	560	16.8	400	160	4.8		
1968	4004	20.0	4298	294	7.3	400	(106)	(2.6)		
1969	4563	14.0	5125	562	12.3	400	162	3.6		
1970	5316*	16.5	5569	253	4.7	400	(147)	(2.8)	444	8.0
1971	5713*	7.5	6013	300	5.3	400	(100)	(1.7)	888	14.8
1972	6513*	14.0	6857	344	5.3	400	(56)	(0.8)	1332	19.4
1973	7250	11.3	8713	1463	20.2	728	735	10.1	1332	15.3
1974	8100	11.7	9396	1296	16.0	728	568	7.0	2015	21.4
1975	9000	11.1	9396 **	396	4.4	728	(332)	(3.7)	2015	21.4
1976	10000	11.1	11046 **	1046	10.5	850	196	2.0	2015	18.2
1977	11150	11.5	12646 **	1496	13.4	850	646	5.8	2015	15.9
1978	12400	11.2	13966 **	1566	12.6	850	716	5.8	2015	14.4
1979	13800	11.3	15099 **	1299	9.4	850	449	3.3	2348	15.6
1980	15400	11.5	16749 **	1349	8.8	850	499	3.2	2348	14.0
1981	17100	11.0	18849 **	1749	10.2	850	899	5.3	2348	12.5

* Actual load plus curtailment of interruptible load.
** Additional peaking generation for operation in 1975 is presently being considered but is not included in capability shown.

UNITED STATES OF AMERICA
ATOMIC ENERGY COMMISSION

BEFORE THE ATOMIC SAFETY AND
LICENSING BOARD

In the Matter of	
Florida Power & Light Company	Docket No. 50-335
St. Lucie Unit No. 1	

Testimony of

William D. Lang

Relating to
Question on Generating
Capacity Additions

My name is William D. Lang. My business address is P. O. Box 3100, Miami, Florida 33101. I am employed by Florida Power & Light Company as Assistant Chief Engineer of General Engineering. A resume of my educational and professional qualifications has been previously received in evidence.

Response to
Question on Generating
Capacity Additions

The purpose of this testimony is to respond to the question asked by Dr. Paxton which appears at Page 24, Line 18 through Page 25, Line 11 of the transcript of the prehearing conference. Dr. Paxton asked about future generation addition plans, for all types of generation.

The current schedule for unit additions is given in the attached table; it is more current then table X-5 on page X-11 of the Final Environmental Statement. As this table shows, FPL plans, after St. Lucie Unit 1, to add various types of generation. These include a nuclear unit, fossil steam units, mid-range units, and gas turbines. Each of these represents a different combination of capital, fuel and operating costs, and each is best suited to varying system load requirements. Longer range projections prepared for the period 1983-1993 continue this balance between fossil or nuclear base load units and mid-range and gas turbine generation.

GROSS SUMMER PEAK CAPABILITY AND UNIT ADDITIONS

Year	Unit Additions	Capability (MW)	Fuel	SYSTEM CAPABILITY (MW) Nuclear Steam	Fossil Steam	Fossil Gas Turbine, Diesel & Mid-Range	Total
					4,271	27	4,298
1969					5,098	27	5,125
1970					5,098	471	5,569
1971					5,098	915	6,013
1972					5,498	1,359	6,857
1973	Turkey Point No.3	728	Nuclear				
	Turkey Point No.4	728	Nuclear				
	Sanford No.5	400	Fossil	1,456	5,898	1,359	8,713
1974	Ft. Myers Gas Turbines	683	Fossil	1,456	5,898	2,042	9,396
1975				1,456	5,898	2,042	9,396*
1976	St. Lucie No.1	850	Nuclear				
	Manatee No.1	800	Fossil	2,306	6,698	2,042	11,046*
1977	Manatee No.2	800	Fossil				
	Martin No.1	800	Fossil	2,306	8,298	2,042	12,646*
1978	Martin No.2	800	Fossil	2,306	9,098	2,562	13,966*
	Mid-Range	520	Fossil				
1979	South Dade No.1	800	Fossil				
	Gas Turbine	333	Fossil	2,306	9,898	2,895	15,099*
1980	St. Lucie No.2	850	Nuclear				
	South Dade No.2	800	Fossil	3,156	10,695	2,895	16,749*
1981	Steam Turbine	1050	Fossil	3,156	12,798	2,895	18,849*
	Steam Turbine	1050	Fossil				
1982	Steam Turbine	1050	Fossil				
	Steam Turbine	1050	Fossil	3,156	14,898	2,895	20,949*

*Additional peaking generation for operation in 1975 is presently being considered but is not included in capability shown.

GROSS SUMMER PEAK CAPABILITY
SYSTEM CAPABILITY (MW)

Year	Nuclear Steam	Fossil Steam	Fossil Gas Turbine & Mid-Range	System Capability Total
1983	5276	14898	2895	23069
1984	5276	16998	2895	25169
1985	5276	19098	2895	27269
1986	6336	20148	4075	30559
1987	6336	22548	4595	33479
1988	7536	23748	5255	36539
1989	8736	24948	5775	39459
1990	9936	26148	6435	42519
1991	12936	26148	6955	46039
1992	14436	27648	7475	49559
1993	17436	27648	8135	53219

UNITED STATES OF AMERICA
ATOMIC ENERGY COMMISSION

BEFORE THE ATOMIC SAFETY AND
LICENSING BOARD

In the Matter of	
Florida Power & Light Company	Docket No. 50-335
St. Lucie Unit No. 1	

Testimony of

William D. Lang

Relating to
Selection of Transmission
River Crossing Spans

My name is William D. Lang. My business address is P. O. Box 3100, Miami, Florida 33101. I am employed by Florida Power & Light Company as Assistant Chief Engineer of General Engineering. A resume of my educational and professional qualifications has been previously received in evidence.

Response to
Question concerning Selection of
Span Lengths for Transmission Line River Crossing

The purpose of this testimony is to respond to the question asked by Dr. Purdom which appears at Page 26, Line 20, through Page 27, Line 8. Dr. Purdom asked about the selection of 2000' spans for the transmission river crossing.

The selection of the particular river crossing design, approximately 2000' span lengths, was made after evaluation of a number of alternatives including shorter spans with concrete H-frames and span lengths of up to 6500 feet. The design requirement was to limit the number of structures in the water, therefore reducing obstructions to boat traffic and minimizing disturbance to the river bottom during construction. This had to be balanced against the appearance of the structures as they become taller and more massive to re-accommodate the longer spans.

The optimum combination was determined to be approximately 2000' span lengths with tower heights limited to less than 200' feet.

By limiting the tower heights to less than 200 feet, it was not necessary to paint or light the towers to meet FAA aircraft warning requirements thereby reducing their visual impact. To improve the appearance, it was decided to install tubular steel towers at a premium cost compared to the lattice design.

A single conductor of 2.356" diameter (3400 Kcmil) was selected to give increased strength and reduce sag, thus enabling FPL to use approximately 2000' spans so that only 3 structures, one (1) per circuit, need be placed in the water.

UNITED STATES OF AMERICA
ATOMIC ENERGY COMMISSION

BEFORE THE ATOMIC SAFETY AND
LICENSING BOARD

In the Matter of	
Florida Power & Light Company	Docket No. 50-335
St. Lucie Unit No. 1	

Testimony of

William D. Lang

Relating to
Effects of Transmission Line Construction
on Hydrology in the Savannas

My name is William D. Lang. My business address is P. O. Box 3100, Miami, Florida 33101. I am employed by Florida Power & Light Company as Assistant Chief Engineer of General Engineering. A resume of my educational and professional qualifications has been previously received in evidence.

Response to
Question Concerning Effects of
Transmission Line Construction
on Hydrology in the Savannas

The purpose of this testimony is to respond to the question asked by Dr. Purdom which appears at Page 28, Lines 13-19 of the transcript of the prehearing conference. Dr. Purdom asked about the effects of transmission line construction through the Savannas on hydrology and drainage. This will also respond to questions (#3) raised in the July 31, 1973 letter on the same subject.

Construction has been going forward on the three transmission lines which will connect the St. Lucie Plant into the FPL system. The river crossing portions of each of the three lines will terminate in two steel towers on the mainland, near the western shore of the Indian River. From the point, the lines proceed overland to the St. Lucie Switching Station, where they join the existing FPL transmission system. The overland portions of the transmission route are carried on concrete H-frame structures. The overland portion of the route cross the Savannas, a swampy area. Construction of a diked road across the Savannas was once contemplated, but the plan was dropped and will not be implemented. Construction of this road might have affected drainage and surface water hydrology, but since it will not be built, there will be no effect. In addition, the design of this section of the line has been changed to accommodate 1400' spans. This will allow structures to be set on either side of the Savannas. Consequently no structures will be set in these areas and construction traffic will be a truck installing a lead or pulling wire for

each circuit and a minimum of travel in the area.

Precast foundations for the steel towers on the mainland end of the river crossing (between the Savannas and the Indian River) have been emplaced by hydraulic jetting. Water from the Savannas was used for the jet emplacement procedure. The volume of water withdrawn from the Savannas was about 1.5 acre-feet per week, over a construction period of about 7 weeks.

The ground water level in a well was monitored during these activities, and no distrubances were noted that could be ascribed to the use of water for setting these piles. Conditions in the Savannas were observed by state agencies during this construction period and no problems were found.

Because of the fact that no road will be constructed in the area, no transmission structures will be set in the Savannas and the precautions described above have been and will be taken, we believe there will be no effect on drainage, surface water hydrology, or ground water hydrology in the Savannas.

UNITED STATES OF AMERICA
ATOMIC ENERGY COMMISSION

BEFORE THE ATOMIC SAFETY AND
LICENSING BOARD

In the Matter of Florida Power & Light Company St. Lucie Unit No. 1	Docket No. 50-335

Testimony of

Nancy Walls Ph. D.

Relating to
Studies on Offshore Currents

My name is Nancy Walls Ph. D. My business address is Georgia Institute of Technology, Atlanta, Georgia. I am a Research Associate Professor, School of Biology, Georgia Institute of Technology. A resume of my educational and professional qualifications has been previously received in evidence.

Response to Question About Preliminary Data on Off-Shore Currents

The purpose of this testimony is to respond to the question asked by Dr. Paxton which appears at page 22, lines 20 through 23 of the transcript of the prehearing conference. Dr. Paxton asked for further information concerning preliminary data on off-shore currents.

Data have been collected monthly on surface current direction and velocity since the inception of the pre-operational monitoring program in April, 1971. A General Oceanics Flowmeter Model 2030 is being used in this work. This instrument provides instantaneous measurements of these two parameters. Presently, two General Oceanics Model 2010 current meters are being installed offshore at the plant site which will provide measurements of current direction and velocity at 15 minute intervals.

Sampling stations Number I, II, and III are in a line with the discharge plume and 0.34, 0.93 and 1.81 miles off-shore respectively. Number IV is at the southern tip of Pierce Shoal (0.87 miles off-shore), and Number V is northwest of station Number II, and 0.95 miles off-shore. These locations are shown in the attached Figure I.

Results indicate a range of surface current volocity from 0 to 47.0 cm/sec and covering most directions of the compass. These are shown in the attached Table 1. The surface current direction as observed in these data is predominately associated with the northern section (63-74%). There is a good deal of apparent consistency of surface current directions over the entire sampling area at any particular sampling time.

The mean recorded depth of the water at the sampling stations ranges from 7.1 to 11.2m. The current velocity and directional data are only taken just below the surface, however.

Data will continue to be acquired during the pre-operational phase

of the program and into operation to provide correlation with the biological data on the marine environment.

TABLE 1.

	STATION LOCATIONS				
	I Vel /Dir (cm/sec)	II Vel /Dir (cm/sec)	III Vel /Dir (cm/sec)	IV Vel /Dir (cm/sec)	V Vel /Dir (cm/sec)
Sept. 71	17.5/NE	17.4/NE	23.0/N	23.0/NE	12.0/NE
Oct. 71	----------	-------	-----	------	-------
Nov. 71	26.7/SSE	25.0/SSE	18.5/E	35.0/NW	32.5/NW
Dec. 71	17.0/NW	18.5/N	19.0/NW	17.0/NW	17.0/NW
Jan. 72	32.5/NW	36.5/N	29.0/N	27.9/N	30.0/N
Feb. 72	31.5/NW	38.0/NNW	36.5/NNW	35.5/NNW	37.5/N
Mar. 72	17.0/N	26.0/N	35.0/N	37.5/N	33.5/NNW
Apr. 72	26.5/S	26.2/S	29.0/(var)	25.5/(Var)	25.0/(Var)
May 72	19.6/N	25.5/NNE	18.0/E	15.0/S	22.5/S
June 72	0/0	21.5/SE	19.5/SE	19.4/SSE	18.0/SSE
July 72	32.5/N	36.0/N	26.0/N	32.5/N	15.8/N
Aug 72	24.8/NNW	27.5/NNW	33.6/NNW	28.5/NNW	29.3/NNW
Sept. 72	21.5/S	44.0/S	38.6/S	47.0/S	34.5/S
Oct. 72	19.6/S	25.4/S	19.7/S	21.8/S	18.2/S
Nov. 72	32.4/N	17.0/N	21.0/N	26.0/N	27.5/N
Dec. 72	X/X	26.0/S	48.6/S	X/X	29.6/S
Jan. 73	0/0	0/0	0/0	21.4/N	30.0/N
Feb. 73	18.0/NW	18.0/NW	0/0	0/0	0/0
Mar. 73	26.5/NW	32.5/NNW	30.0/N	28.5/N	27.5/N
Apr. 73	29.0/N	26.5/N	24.8/N	22.5/N	20.7/N

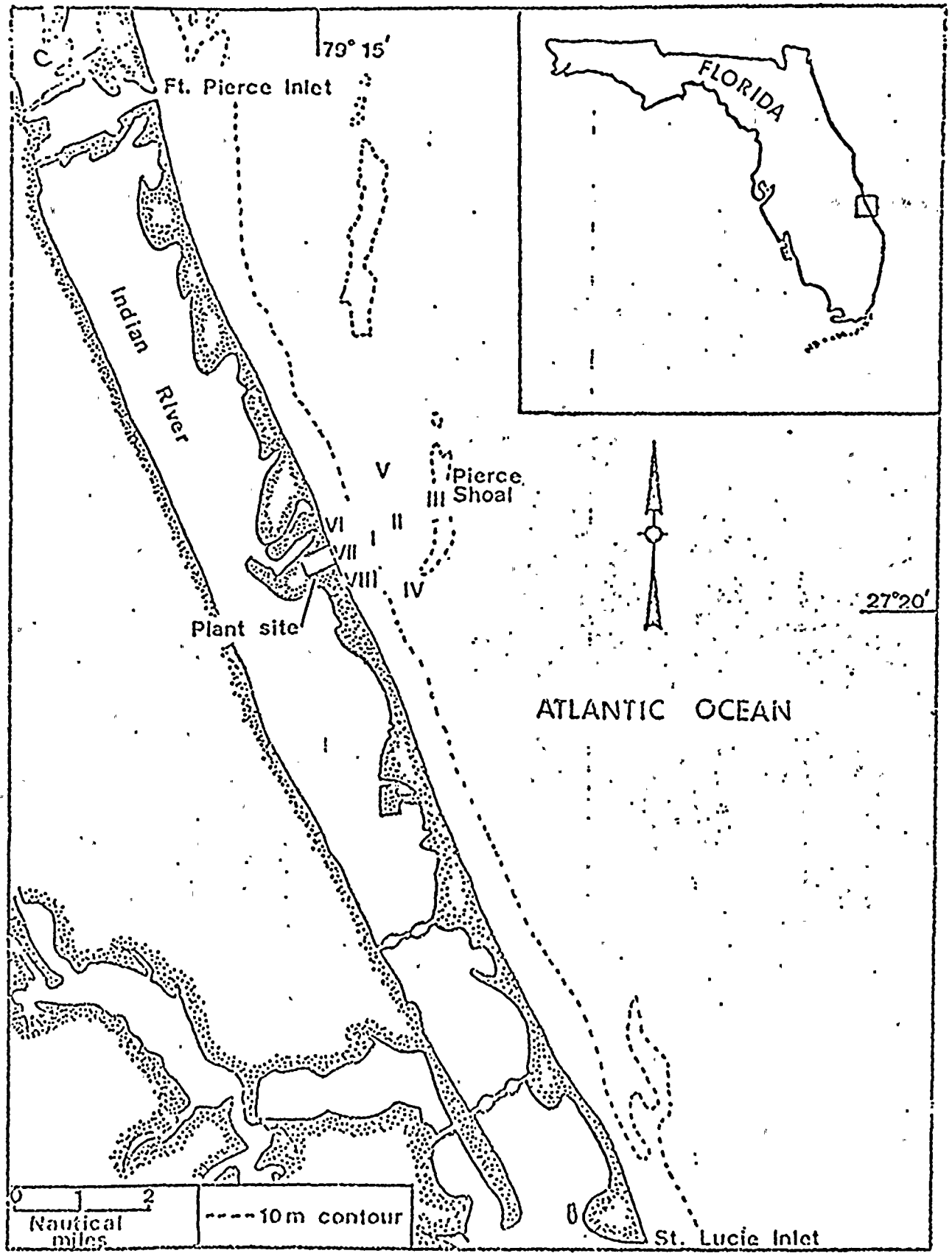
79° 15'
Ft. Pierce Inlet
FLORIDA
Indian River
V
Pierce
III Shoal
VI
II
I
VII
VIII
IV
Plant site
27°20'
ATLANTIC OCEAN
0
1
2
Nautical miles
----10 m contour
St. Lucie Inlet

FIGURE I

UNITED STATES OF AMERICA
ATOMIC ENERGY COMMISSION

BEFORE THE ATOMIC SAFETY AND
LICENSING BOARD

In the Matter of	
Florida Power & Light Company	Docket No. 50-335
St. Lucie Unit No. 1	

Testimony of

Nancy Walls Ph. D.

Relating to
Plankton Studies

My name is Nancy Walls Ph. D. My business address is Georgia Institute of Technology, Atlanta, Georgia. I am a Research Associate Professor, School of Biology, Georgia Institute of Technology. A resume of my educational and professional qualifications has been previously received in evidence.

Response to Question about Plankton Studies

The purpose of this testimony is to respond to the question asked by Dr. Paxton which appears at page 23 line 23 through page 24 line 2 of the transcript of the prehearing conference. Dr. Paxton asked about the status of plankton studies and results to date.

Plankton samples were taken originally every other month and later at monthly intervals. To sample plankton, a bottom to surface step-oblique 10-minute tow is made at off-shore stations with a General Oceanics 0.5 m diameter plankton net of 202 micron mesh (No. 10). The No. 10 net was selected as the most efficient mesh size to sample plankton communities in this area since smaller mesh nets rapidly clog and small organisms pass through nets of larger mesh size. The net is equipped with a General Oceanics Model 2030 Flowmeter to measure the amount of water filtered by the net. Plankton species are identified and counts are made by dilution techniques; the number of organisms per cubic meter is then calculated.

These studies are continuing at the present time. Monthly sampling will be continued into plant operation to determine any effect of the plant upon the plankton populations in the marine environment.

Net phytoplankton collected at five stations offshore of Hutchinson Island were enumerated and identified. Results from September 1971 through April 1973 are shown in Table I. Net phytoplankton densities ranged from 1.0 to 30,532.0 cells per liter for the 65 samples taken during this period, and in general were relatively similar from station to station during any given sampling period. The greatest variation in cell density occurred in Stptember 1971, when a difference of 10^3 cells per liter was recorded between Station I and Station V. (See Table I) Chlorophyall a data (Table II)

indicate that two to three blooms occur yearly. There is a fall bloom characterized by the diatom SKELETONEMA, then a lower winter and spring peak.

Net phytoplankton cell counts should not be used for standing stock levels; the counts only establish diatom and dinoflagellate diversity and abundance, dominants of the communities, and seasonality whereas chlorophyll and other physical and chemical data will be used to assess standing stock and primary production.

In general, the net phytoplankton co-lected at Hutchinson Island have been numerically dominated by diatoms, although five samples contained more than 50 percent dinoflagellates and/or blue-green algae.

Zooplankton were collected every other month at the five stations off-shore of Hutchinson Island. These results are shown in Table III. Data are available from September 1971 to July 1972. Total zooplankton ranged from 244 to 12,023 organisms per cubic meter and copepods varied in number from 82 to 10,930 per cubic meter. (See Table III).

Copepod numbers and total zooplankton counts correlate well, and zooplankton density seems broadly correlated with phytoplankton cell density.

These studies are continuing, and results are reported as the data are obtained. Interpretation of plankton and chemical data up to September, 1973 will begin this fall.

TABLE I

NET PHYTOPLANKTON CONCENTRATIONS OFFSHORE OF HUTCHINSON ISLAND, CELLS/LITER

	STATION NUMBERS				
Date	I	II	III	IV	V
Sept. 1971	92.8	4655.1	1357.9	449.9	30,532.9
Nov. 1971	9.6	4.3	19.3	3.6	3.2
Jan. 1972	1088.1	248.1	763.9	919.3	123.7
Mar. 1972	165.5	83.8	53.2	243.8	12.3
May 1972	122.3	47.3	42.7	90.3	286.1
July 1972	1.0	14.4	3.1	4.3	7.2
Sept. 1972	201.3	414.7	166.0	238.1	179.7
Oct. 1972	845.9	2111.6	664.3	3233.5	5,612.8
Nov. 1972	7.9	15.7	15.2	11.8	24.9
Jan. 1973	5.3	19.0	15.8	14.4	78.9
Feb. 1973	173.4	206.8	164.9	63.7	105.3
Mar. 1973	2.8	92.6	16.4	236.2	467.3
Aprl. 1973	5.6	13.1	126.6	14.4	38.3

TABLE II

CHLOROPHYLL-a (MINUS PHAEOPIGMENT) OFFSHORE OF HUTCHINSON ISLAND, mg/M^3

Date	Surface Bottom	STATION NUMBERS I	II	III	IV	V
Nov. 1971	S/B	2.52/7.70	2.26/1.92	0.76/0.94	2.14/1.85	3.14/2.19
Dec. 1971	S/B	1.09/2.14	0.88/1.21	0.87/1.71	0.66/2.28	0.51/2.42
Jan. 1972	S/B	1.46/2.06	0.94/2.78	1.57/1.18	0.75/1.12	0.90/2.08
Feb. 1972	S/B	3.99/5.87	2.41/2.89	2.55/2.41	1.68/1.97	2.89/2.75
Mar. 1972	S/B	2.13/1.51	0.97/1.15	0.78/0.93	0.10/1.05	0.92/1.85
Apr. 1972	S/B	2.76/4.99	1.13/2.04	0.78/1.62	1.48/3.79	1.77/3.68
May 1972	S/B	1.62/1.21	1.07/2.49	2.03/4.39	3.92/2.57	2.40/3.56
June 1972	S/B	0.86/5.86	0.77/0.31	0.60/0.26	0.61/0.55	0.47/1.42
July 1972	S/B	2.20/0.99	0.64/0.56	0.59/0.72	0.53/0.39	0.66/2.35
Aug. 1972	S/B	2.26/1.47	0.64/0.51	0.81/0.63	0.75/0.68	0.98/1.30
Sept. 1972	S/B	2.89/4.85	1.66/2.06	2.45/2.75	2.11/1.47	2.27/2.06
Oct. 1972	S/B	6.50/5.24	3.50/3.18	2.14/1.52	2.30/3.41	4.54/5.29
Nov. 1972	S/B	1.09/1.60	1.48/1.64	0.87/0.90	0.95/1.16	0.56/0.74
Dec. 1972	S/B	8.98/3.73	5.37/4.81	2.76/2.94	3.86/4.41	4.66/6.42
Jan 1973	S/B	0.90/1.13	0.70/1.24	0.35/ -	0.98/1.50	0.91/1.70
Feb. 1973	S/B	0.59/0.72	0.53/0.49	0.36/0.53	0.38/0.32	0.32/0.43
Mar. 1973	S/B	1.86/4.67	0.63/6.27	1.28/2.49	2.55/5.24	2.23/2.84
Apr. 1973	S/B	0.88/1.47	0.34/0.37	0.29/0.34	0.34/0.08	0.09/0.35

TABLE III

ZOOPLANKTON CONCENTRATIONS OFFSHORE OF HUTCHINSON ISLAND

ORGANISMS/M^3

DATE		STATION NUMBERS I	II	III	IV	V
Sept. 1971	Copepods	178	1128	1206	820	458
	Total	299	1416	2638	1211	958
Nov. 1971	C	206	159	82	198	215
	T	244	478	249	550	307
Jan. 1972	C	2292	3232	3948	2872	4570
	T	3005	4868	5462	4971	7432
Mar. 1972	C	1613	1111	2207	1895	1082
	T	1965	1441	2399	2847	1291
May 1972	C	2576	1085	10930	4958	3041
	T	3946	1525	12023	4775	3769
July 1972	C	194	958	2303	758	492
	T	379	1758	3843	2135	1272

UNITED STATES OF AMERICA
ATOMIC ENERGY COMMISSION

BEFORE THE ATOMIC SAFETY AND
LICENSING BOARD

In the Matter of	
Florida Power & Light Company	Docket No. 50-335
St. Lucie Unit No. 1	

Testimony of

Mancy Walls Ph. D.

Relating to
Migratory Fish Species Near the Coast

My name is Nancy Walls, Ph. D. My business address is Georgia Institute of Technology, Atlanta, Georgia. I am a Research Associate Professor, School of Biology, Georgia Institute of Technology. A resume of my educational and professional qualifications has been previously received in evidence.

Response to Question About Migratory Fish Species Near the Coast

The purpose of this testimony is to respond to the question asked by Dr. Purdom which appears at page 27, line 14 through line 22 of the transcript of the prehearing conference. Dr. Purdom asked for further information concerning what species of fish might be migrating close to the coast either to feed or to breed and what effect the plume might have on their migration route.

There are three species of migratory pelagic fish which predominate in the offshore area close to the coast in St. Lucie County as confirmed by landings of commercial fishermen. These are the blue fish (Pomatomus saltatrix), Spanish mackerel (Scomberomorus maculatus) and the king mackerel (Scomberomorus cavalla).

The exact spawning grounds of many species of pelagic fishes is unknown. This is true for the Spanish and king mackerel. The paucity of larvae and juveniles collected in the southern portion of their range (the east coast of North America from Florida to Maine) would indicate that this is not an important spawning area. Data obrained from a tagging program show that blue fish spawn off the east coast of Florida but in waters 60 to 300 feet deep. Normally, this depth is achieved only at a considerable distance from shore. There is no evidence that any of these species migrate close to the coast for breeding purposes.

All three of these species move north in the spring and early summer. During this period of Northward travel, they are assumed to remain near the coast, presumably because food supplies are better here than in the deeper ocean regions. Since the great variations of water temperature to be found in the range of the population of these species would indicate a wide temperature tolerance, the presence of a slightly warmer plume

(only 1°F) over a 2860 acre area that does not originate right at the shore, and therefore does not form a complete thermal barrier, presumably would not have a significant effect on the rate or direction of this northward migration.

UNITED STATES OF AMERICA
ATOMIC ENERGY COMMISSION

BEFORE THE ATOMIC SAFETY AND
LICENSING BOARD

In the Matter of	
Florida Power & Light Company	Docket No. 50-335
St. Lucie Unit No. 1	

Testimony of

Nancy Walls, Ph. D.

Relating to
Pre-Operational Environmental
Monitoring Program

My name is Nancy Walls, Ph. D. My business address is Georgia Institute of Technology, Atlanta, Georgia. I am a Research Associate Professor, School of Biology. A resume of my educational and professional qualifications has been previously received in evidence.

RESPONSE TO QUESTIONS ABOUT THE PRE-OPERATIONAL ENVIRONMENTAL MONITORING PROGRAM

The purpose of this testimony is to respond to the question asked by Dr. Purdom which appears at page 27 line 23 through page 28 line 2 of the transcript of the prehearing conference. Dr. Purdom asked about the biological monitoring program.

This testimony also responds to the question asked by Mr. Lazo which appears at page 29 line 11 through 23 of the transcript of the prehearing conference. Mr. Lazo asked for further information concerning the extent of the biological monitoring program and future plans in this respect.

The Florida Power & Light Company has implemented a comprehensive biological program to monitor subtle changes in the aquatic biota at St. Lucie. The field program is designed as follows: Five offshore sampling stations were established. Three of these stations were positioned to evaluate any effect of the thermal plume once it begins, and the other two located to provide control stations north and south of the plume. An additional criterion in the establishment of an offshore station was that it was representative of a dominant macrohabitat in the immediate area. Three additional stations were selected near the beach for sampling ichthyofauna near the point proposed for effluent discharge. The program is being conducted by an outside biological sciences consulting firm with cooperation from the Florida Department of Natural Resources pursuant to a written contract that has been in operation since April of 1971. The baseline information being collected includes studies of benthic organisms, water quality, microscopic organisms and fish. Sea water samples are obtained monthly. Water thus obtained is used for chlorophyll and

particulate matter analyses and to measure several chemical and physical properties. As of February, 1972, surface and bottom water samples were also analyzed for nutrients by the University of South Florida. Nutrients being measured are nitrate, nitrite, ammonia, silicate, and ortho-phosphate. Plankton samples are also obtained monthly. Species are identified and counts made to provide the density of organisms per m^3 of water. Benthic samples and beach seine samples are obtained bi-monthly. The benthic sampling technique is designed to obtain quantitative samples of samples of small benthic fauna from which the density of organisms can be obtained. A 15 minute trynet tow is made at each offshore station to collect fishes and larger invertebrates. Replicate subtotals from three samples at each location are combined for computing abundances of fish at each station. Sediment samples in which any subtle changes may be expected to occur much more slowly, were obtained semi-annually in 1971 and 1972. Starting in January 1973, the sampling frequency of sediments has been increased to once every two months. The results of these studies to date are described in detail in quarterly progress reports.

The St. Lucie Program is intended to provide a realistic evaluation of the present state of the marine biota and to indicate areas of ecological significance where additional studies (during the operational phase) by other techniques may be advisable. For example, some subtle details which involve behavioristic, physiological, or genetic changes of the biota can best be studied by using selected indicator species which tend to maximize the biological effect being studied. The present program, modified and adapted on the basis of data obtained during the pre-operational phase, will be continued after operation of the St. Lucie power plant begins.

UNITED STATES OF AMERICA
ATOMIC ENERGY COMMISSION

BEFORE THE ATOMIC SAFETY AND
LICENSING BOARD

In the Matter of	
Florida Power & Light Company	Docket No. 50-335
St. Lucie Unit No. 1	

Testimony of

Nancy Walls Ph. D.

Relating to
Turtle Nests

My name is Nancy Walls. Ph. D. My business address is Georgia Institute of Technology, Atlanta, Georgia. I am a Research Associate Professor, School of Biology, Georgia Institute of Technology. A resume of my educational and professional qualifications has been previously received in evidence.

Response to Question About Protection of Turtle Nests

The purpose of this testimony is to respond to the question asked by Dr. Purdom appearing at page 28, lines 20-23 of the transcript of the prehearing conference. Dr. Purdom asked about protection of turtle nests during construction activities.

A turtle nest survey is being performed on Hutchinson Island. There are nine survey areas on the island, one of which includes the areas of construction. Since turtles nest on the beach, the only construction activities which will endanger their nests are those related to the cooling water intake and discharge piping and structures. Turtle survey areas are checked daily during the nesting season. When a turtle nest is found which may become endangered by construction activities, eggs are either removed to the Florida Department of Natural Resources Laboratory where they are hatched, and the young turtles released, or the nests are moved to a safe area.

As of July 15, 1973, 105 nests have been laid by loggerhead turtles in the plant area this year, approximately the same number of nests laid in this area by this date two years ago, when the last nesting survey was conducted. Only one of these nests was dug in a place threatened by intake pipe construction, and this nest was moved to a safe area. All nests laid in the construction area are being labeled with nest number, nest type, and approximate date of egg hatching.

UNITED STATES OF AMERICA
ATOMIC ENERGY COMMISSION

BEFORE THE ATOMIC SAFETY AND
LICENSING BOARD

In the Matter of	
Florida Power & Light Company	Docket No. 50-335
St. Lucie Unit No. 1	

Testimony of

Murray Weber

Relating to
Erosion From Installation of
Intake and Discharge Structures

My name is Murray Weber. My business address is Two Rector Street, New York, New York 10006. I am the Supervising Engineer of Concrete Hydraulic Engineering for Ebasco. A resume of my educational and professional qualifications has been previously received in evidence.

Response to Question on Erosion From Installation of Intake and Discharge Structures

The purpose of this testimony is to respond to the question asked by Dr. Purdom which appears on page 27, lines 9-13 of the transcript of the prehearing conference. Dr. Purdom asked about possible erosion resulting from installation of the intake and discharge structures. No erosion problems are anticipated for the following reasons.

Erosion of the ocean floor will not be caused by the intake of plant cooling water because of a concrete base which surrounds the point of intake. The concrete base prevents erosion because it extends over the area where intake water velocity would exert any influence. In addition, the concrete base rises a minimum of 2 feet above the ocean bottom further reducing the potential scour effect of the moving water on the ocean bottom. As a result of the size and height of the concrete base and the velocity reducing design of the velocity cap, the maximum water velocity which the bottom sands would experience due to the ocean intake structure is approximately 0.4 fps. This low velocity is not expected to have any scour effect.

Regarding any scour effect caused by a combination of ocean currents and the ocean intake structure, field studies indicate that the maximum longshore current is 1.2 fps with 0.6 fps typical. Since the ocean intake structure is essentially an open structure, it presents little interference to normal ocean current and would not be expected to precipitate any erosion phenomena.

Erosion of the ocean floor will not be caused by the discharge structure. The "Y" port discharge at the end of the discharge line is

set in an excavated area which has been sized to provide sufficient clearance for the discharging buoyant jet. The bottom of the excavated area is covered with rip-rap to prevent scour.

The only effect ocean currents and the resulting sand movements are expected to have on the discharge area is to slightly reshape the initial excavation.

The hydraulic structure at the discharge end of the pipe is a concrete pipe encasement which is below the ocean bottom except where it projects into the excavated discharge area. No scour effects are foreseen for this structure.

UNITED STATES OF AMERICA
ATOMIC ENERGY COMMISSION

BEFORE THE ATOMIC SAFETY AND
LICENSING BOARD

In the Matter of	
Florida Power & Light Company	Docket No. 50-335
St. Lucie Unit No. 1	

Testimony of

Murray Weber

Relating to
the Atomic Safety and Licensing
Board Question #5 on a Wave Topping the Dune

My name is Murray Weber. My business address is Two Rector Street, New York, New York 10006. I am the Supervising Engineer of Concrete Hydraulic Engineering. A resume of my educational and professional qualifications has been previously received in evidence.

Response to Question #5
Wave Topping the Dune

The puspose of this testimony is to address the Board's concern of a wave topping the dune and resultant effects of wave runup.

The results of preliminary calculations to simulate hurricane induced high water levels and wave runup, using the most recent AEC methodology, indicates that the St. Lucie Plant grade elevations of +18 feet will not be reached even assuming that the dune is breached. These results are applicable even for the probable maximum hurricane which approaches the physical upper limits of hurricane intensity. In addition plant structures and components required for plant safety are flood protected to elevation + 22 feet. Therefore, there will be no effect on plant operations.

UNITED STATES OF AMERICA
ATOMIC ENERGY COMMISSION

BEFORE THE ATOMIC SAFETY AND
LICENSING BOARD

In the Matter of	
Florida Power & Light Company	Docket No. 50-335
St. Lucie Unit No. 1	

Testimony of

Murray Weber

Relating to
the Atomic Safety and Licensing
Board Question #8 Regarding Septic Tanks

My name is Murray Weber. My business address is Two Rector Street, New York, New York 10006. I am the Supervising Engineer of Concrete Hydraulic Engineering. A resume of my educational and professional qualifications has been previously received in evidence.

Response to Question #8
Regarding Septic Tanks

The purpose of this testimony is to respond to the Atomic Safety and Licensing Board's question #8 which concerns the height of the septic tank leaching field above the water table.

The distribution pipes for the leaching fields are installed at elevation +16 (MLW) ocean, which is approximately 16 feet above the ground water table.

UNITED STATES OF AMERICA
ATOMIC ENERGY COMMISSION

BEFORE THE ATOMIC SAFETY AND
LICENSING BOARD

In the Matter of	
Florida Power & Light Company	Docket No. 50-335
St. Lucie Unit No. 1	

Testimony of

Neil Wilding

Relating to
Use of Velocity Cap Intake at Other
Plants and the Effect of Intake Velocity
On Small Fish and A.S.L.B. Question #10

My name is Neil Wilding. My business address is Two Rector Street, New York, New York 10006. I am the Senior Scientist in the Consulting Environmental Engineering Department of Ebasco. A resume of my educational and professional qualifications has been previously received in evidence.

Response to Questions About Use of Velocity Cap Intake at Other Plants and the Effect of Intake Velocity on Small Fish

The purpose of this testimony is to respond to the question asked by Dr. Paxton which appears at page 25, lines 12-24 of the transcript of the prehearing conference. Dr. Paxton asked about experience at other power plants with the same type cooling system intake as will be used at the St. Lucie Number 1, particularly with respect to the use of a velocity cap.

Mr. Lazo asked a related question at page 31, lines 6 through 13 of the transcript of the prehearing conference concerning the effect on small fish of the intake velocity of 1 ft. per second at the perimeter of the cap.

The Atomic Safety and Licensing Board also requested information on the effort involved in altering design and construction of the offshore intake to reduce water velocity to one-half foot per second or less (Question 10).

We have investigated further the use of this type cooling water intake, and have learned of the existence of eight velocity cap systems, all in Southern California. One of these is the existing San Onofre unit, as mentioned by Dr. Paxton. A number of additional installations are planned in the same area. There may also be overseas installations. Experience at some of these installations is discussed below.

Velocity caps installed at two Southern California Edison plants, namely El Segundo and Huntington Beach, produce velocities of 3.5 ft/sec and 2.0 ft/sec., respectively. The El Segundo plant had been originally designed and operated without a velocity cap but with an offshore intake

of the type designed for St. Lucie Unit 1. Before the velocity cap was installed, fish entrapment at the El Segundo plant had been a serious problem. Operating experience for the year following the installation of a velocity cap revealed a 94.5 percent reduction in the amount of fish entrapped at El Segundo (Weight, 1958). This successful method for reducing fish entrapment is now used at all Southern California Edison plants; El Segundo, Huntington Beach, San Onofre 1, Redondo and Ormond Beach, and will be employed at two units under construction, San Onofre 2 and 3.

In addition, the city of Los Angeles Department of Water and Power has experienced a 90 percent increase in fish entrapment at their Scattergood plant when the velocity cap was removed.

While little work has been done on the swimming speeds of marine fish, some data are available for certain anadromous and freshwater fish. Milo Bell (1973) of the University of Washington has collected much of the available data on the swimming ability of fishes and has defined three classes of swimming speeds:

1. Cruising speed - a speed which can be maintained for long periods (hours).

2. Sustained speed - one that can be maintained for minutes.

3. Darting speed - a single effort, not sustainable.

The cruising speed of small striped bass, 1 inch long, has been measured at 1 ft/sec. Larger fish posses greater swimming abilities, as shown below.

Swimming Speeds

Species	Cruising	Sustained	Darting
Striped bass Morone saxatilis	1 fps (1" fish)	2.75 fps (5" fish)	18 fps (22" fish)
Alewife Alosa Pseudoharengus			11-12 fps (10" fish)
River Herring			15 fps (12" fish)
White Sucker Catostomus commersoni	2 fps (12-18" fish)	5.5 fps (12-18" fish)	10 fps (12-18" fish)
Carp Cyprinus carpio	1.5 fps (30" fish)	4 fps (30" fish)	8.5 fps (30" fish)
Eel Anguilla rostrata	4 fps (30" fish)		

(from Bell. 1973)

The data given above indicate that, for fish of the same species and equal size, cruising speed approximates 20 per cent of the darting speed. Using this approximation, it appears that the darting speed of a 1 inch striped bass would be about 5 ft/sec, fast enough to allow such fish to escape from the <1 ft/sec (0.85) velocity at the perimeter of the St. Lucie intake.

Kerr (1953) performed a series of experiments with striped bass of various sizes and found that young bass, 1 to 3 inches long, could withstand velocities of 2 ft/sec for 10 minutes with 95 per cent survival. He also investigated the effects of velocity on king salmon and found that 92 percent of the king salmon fingerlings, 1.25 to 1.5 inches long, could withstand a velocity of 1 ft/sec for 10 minutes. Kerr concluded that a maximum design approach velocity of 1.5 ft/sec appears reasonable to protect small striped bass and king salmon.

Extrapolation of the available information on the swimming speeds of various fishes indicates the <1 ft/sec (0.85) velocity at the perimeter of

the St. Lucie velocity cap should prevent entrapment of the great majority of the fish which may occur there.

The ocean intake structure now planned for St. Lucie Unit 1 cannot be altered to accommodate an approach velocity of 0.5 ft/sec or less without major redesign. Such a redesign effort would incur a substantial cost increase and a six month construction delay.

Two schemes could be used to provide a 0.5 ft/sec approach velocity. The first scheme would retain the existing cap and substructure, but would require two such structures and would require additional piping to connect the second ocean intake to the intake pipeline.

The second scheme would require that the velocity cap and associated substructure be changed to a rectangle approximately 50 ft by 110 ft which would provide the increased area required to reduce the approach velocity to 0.5 ft/sec.

It appears that an approach velocity of <1 ft/sec (0.85) will provide adequate protection to fish which may occur near the ocean intake structure. In fact, Weight (1958) has implied that very low approach velocities may be insufficient to "warn" fish of impending entrapment.

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UNITED STATES OF AMERICA
ATOMIC ENERGY COMMISSION

BEFORE THE ATOMIC SAFETY AND
LICENSING BOARD

In the Matter of	
Florida Power & Light Company	Docket No. 50-335
St. Lucie Unit No. 1	

Testimony of

J. W. Williams

Relating to
Question Regarding Percent Completion
Labor Force and Schedule

My name is J. W. Williams. My business address is P. O. Box 3100, Miami, Florida 33101. I am the Florida Power & Light Company Project General Manager for the St. Lucie Project. A resume of my educational and professional qualifications has been previously received in evidence.

Response to
Question on Percent Completion
Labor Force and Schedule

The purpose of this testimony is to respond to the question asked by Dr. Paxton which appears at Page 22, Line 24, through Page 23, Line 10 of the transcript of the prehearing conference. Dr. Paxton asked about % completion, number on the labor force, and schedules.

The percentage completion of St. Lucie Unit 1 is 59% as of August 15, 1973. The labor force on site, including all classes of personnel and all shifts, is now between 1350 and 1450. Current projections are that it will remain at about that level until the reactor coolant system hydrotest and then decrease rapidly. Hydrotest is expected to occur in February 1975.

Our current estimated dates are as set forth in the Final Environmental Statement on Page IV-1. Fuel loading is scheduled for September 1975 and commercial operation December 1975.

The applicant, however, is continuing in its field efforts to achieve these milestones at desired earlier dates.

UNITED STATES OF AMERICA
ATOMIC ENERGY COMMISSION

BEFORE THE ATOMIC SAFETY AND
LICENSING BOARD

In the Matter of	
Florida Power & Light Company	Docket No. 50-335
St. Lucie Unit No. 1	

Testimony of

J. W. Williams

Relating to
Question Regarding
Work on Beach

My name is J. W. Williams. My business address is P. O. Box 3100, Miami, Florida 33101. I am the Florida Power & Light Company Project General Manager for the St. Lucie Project. A resume of my educational and professional qualifications has been previously received in evidence.

Response to
Question Regarding
Work on Beach

The purpose of this testimony is to respond to the question asked by Dr. Paxton which appears at Page 23, Line 11-16, of the transcript of the prehearing conference. Dr. Paxton asked about progress and completion dates for work in the dune area and on the beach.

The work in the dune areas and beach consists of emplacement of the cooling water intake and discharge pipes and construction of the associated structures. The work will be carried out in a manner which will continuously maintain the integrity of the dune line as a protective barrier against wave and storm damage to the island. The procedure for doing this is described on Page IV-5 of the Final Environmental Statement.

The construction work in the vicinity of the dune began in June 1973 for the on-shore structure. At present, the concrete headwalls for both the intake and discharge water lines are complete. The temporary dune has been completed for the intake water lines and excavation of the dune started on August 15, 1973. It is estimated that all the work in the dune area, both intake and discharge, will be completed by October 1974.

EDUCATIONAL AND PROFESSIONAL QUALIFICATIONS

ELLIS H. O'NEAL - PROJECT MANAGER

FLORIDA POWER & LIGHT COMPANY

My name is Ellis H. O'Neal. My residence address is 8701 S. W. 82 Court, Miami, Florida. I am Project Manager for Florida Power & Light Company for the St. Lucie Unit #1 nuclear plant. I am responsible for direction and coordination of all engineering, design and quality assurance work performed by Florida Power & Light Company, Ebasco Services, Inc. and Combustion Engineering, Inc. on this project.

I received a Bachelor of Mechanical Engineering degree with high honors from the University of Florida in 1949 and have taken graduate courses conducted by the University of Florida in Elements of Vibration, Nuclear Engineering, Advanced Nuclear Technology and Nuclear Power Reactors.

Upon graduation from the University of Florida I joined General Electric Company and held test engineering and design assignments on jet engines, steam turbines, and aircraft instrumentation, among others.

In 1950 I joined Florida Power & Light Company and have been involved with the design engineering and project coordination as project engineer for 19 steam electric generating units. Since 1967 I have been Project Manager for the St. Lucie nuclear plant.

I am a member of the American Nuclear Society, American Society of Mechanical Engineers, Florida Engineering Society, National Society of Professional Engineers and am a licensed professional engineer in the State of Florida.

EDUCATIONAL AND PROFESSIONAL QUALIFICATIONS

WILLIAM D. LANG - ASSISTANT CHIEF ENGINEER

FLORIDA POWER & LIGHT COMPANY

My name is William D. Lang. I am employed by Florida Power & Light Company as Assistant Chief Engineer. In this position, my areas of responsibility include substation engineering, substation systems and equipment design, protective relay control and design, drafting, and system planning. I have served in this capacity since July, 1972.

I have been employed by Florida Power & Light Company since June 25, 1951. Prior to July, 1972, I served as Manager of System Planning with the primary responsibility for planning the expansion of our electric system.

I received a Bachelor of Electrical Engineering Degree from Georgia Institute of Technology in 1951. From 1951 until 1961 I served in various capacities in Engineering and Operating Departments of Florida Power & Light Company. In 1961 I was transferred to General Engineering Department of Florida Power & Light Company with a primary responsibility in distribution planning. In 1966 I was made Section Head of Planning and assumed responsibilities for expansion of the transmission and distribution systems.

I am a Registered Professional Engineer in the State of Florida, Senior Member of IEEE National Society of Professional Engineers and Florida Engineering Society.

EDUCATIONAL AND PROFESSIONAL QUALIFICATIONS

NANCY W. WALLS - RESEARCH ASSOCIATE PROFESSOR

SCHOOL OF BIOLOGY - GEORGIA INSTITUTE OF TECHNOLOGY

My name is Nancy W. Walls. I am a Research Associate Professor in the School of Biology at the Georgia Institute of Technology in Atlanta, Georgia. My present academic responsibilities include teaching at both the undergraduate and graduate educational levels, research in the field of microbial ecology, and direction of graduate student research and thesis writing.

I received my educational training at the University of Michigan in Ann Arbor, Michigan, where I earned a Bachelor of Science degree in botany (with a minor in chemistry) in 1952; a Master of Science degree in microbiology in 1953; and a Ph.D. Degree in radiation microbiology in 1959.

I have been associated with the Georgia Institute of Technology since October, 1959. I was an Assistant Research Biologist in the Engineering Experiment Station at this Institute from 1959 through 1961. In 1962 I was promoted to the rank of Research Biologist in the Engineering Experiment Station and, simultaneously, given an academic appointment as Research Assistant Professor in the School of Biology. In 1967 I became a Senior Research Biologist in the Engineering Experiment Station and continued to hold the rank of Assistant Professor in the School of Biology. In 1969 I was promoted to Associate Professor in the School of Biology and became Acting Director of the Department. I held this administrative post for 18 months (1969 - 1970) and then resigned to become a full-time Associate Professor in the School of Biology. I have held this title and position from 1970 to the present time.

I have administered - as principal investigator - research grants on the following topics: 1) factors affecting the radiation sensitivity of bacteria; 2) effects of irradiation on protein molecules; 3) physiological studies on Clostridium botulinum; 4) microbiological studies in the Southern Ocean; 5) ecology of anaerobic bacteria in blue crabs; and 6) microbial ecology of a sub-tropical terrestrial biome; and have 30 major reports and publications on the results of these investigations. The scientific studies performed in connection with number 5 above included six months in the field aboard the National Science Foundation's research ship, Eltanin, operating in the Antarctic Ocean between South America and New Zealand. Our research was part of an integrated program on the ecology of this cold ocean. My current research involves energy cycles and material transfer in ecosystems.

I have taught courses in Animal Behavior, Botany, Ecology, Evolution, Experimental Cell Biology, Microbiology, Physiology, Radiobiology, and Taxonomy.

I hold membership in the following professional and honor societies: American Association for the Advancement Of Science, American Institute of Biological Sciences, American Society for Microbiology, Association of Southeastern Biologists, Georgia Academy of Sciences, New York Academy of Sciences, Phi Sigma, Radiation Research Society, and Society of the Sigma Xi. I have served on numerous academic committees and have been a consultant to industry in the field of ecology since 1970.

EDUCATIONAL AND PROFESSIONAL QUALIFICATIONS

MURRAY WEBER - SUPERVISING ENGINEER - CONCRETE HYDRAULIC ENGINEERING

EBASCO SERVICES, INC.

My name is Murray Weber. My business address is Ebasco Services, Inc., Two Rector Street, New York, New York. I hold the position of Supervising Engineer - Concrete Hydraulic Engineering with Ebasco Services, Inc. I am responsible for the supervision of engineering and design of all concrete and hydraulic structures for the St. Lucie Nuclear Power Plant.

I was graduated from the City College of New York in 1942 with a B. S. degree in Civil Engineering. I was graduated from Brooklyn Polytechnic Institute in 1952 with a Master of Civil Engineering degree. I am a Registered Professional Engineer in the State of New York, Maryland and Washington. I am a Fellow in the American Society of Civil Engineers and a member of the American Concrete Institute.

I am an Assistant Professor at Pratt Institute in the Civil Engineering Department.

I was employed as a Junior Structural Engineer with the TVA in 1942 and as a Junior Civil Engineer in 1943. My responsibilities included the design of reinforced concrete highway bridges and inspection of construction of the Fort Loudon Dam.

I was a First Lieutenant in the U. S. Army Air Force from 1943 to 1946.

From 1946 to 1951 I was a Structural & Project Engineer with Kennedy Van Saun Manufacturing & Engineering Company in New York City. I was responsible for design of cement plants, rotary kilns, concrete aggregate plants, conveyors, ball mills, rock crushers, vibrating screens,

hammer mills and waste heat power plants utilizing heat from cement kilns.

From 1951 to 1965 I was a Principal Civil Engineer with Burns and Roe, Incorporated in Hempstead, New York. I was responsible for portions of civil design of Hanford Nuclear Station for Washington Public Power Supply System, including 500 kv transmission line; Jersey Central Conventional Steam Plant; Danskammer Point Conventional Steam Station; diesel electric power stations for Project SAGE; blast resistant facilities for SAGE; Nike Zeus missile system, Bomarc missile system; jet engine testing facility for Naval Testing Station; communications system and large radar antenna foundations, coal unloading crane 2000 ton per day capacity and jet engine test stand.

From 1965 to 1966 I was the Chief Civil Engineer with Walter Kidde Constructors in New York, New York. I was responsible for engineering and design of industrial facilities, hospitals, commercial buildings and warehouses.

From 1966 to 1967 I was a Project Engineer with Pope Evans & Robbins in New York City. I was responsible for various testing facilities at Bettis Atomic Laboratory and National Reactor Testing Station, including test cells, shipping casks, fuel handling, fire protection, materials handling, cranes and monorails, railroad facilities. I also was a Project Engineer for 7500 kw diesel generating station on Midway Island, landfill sanitary disposal and, incinerator plants.

From 1967 to 1973 I was a Principal Engineer with Ebasco Services, Inc. in New York, New York. My responsibilities included portions of civil design of four (4) units of 900 mw PWR Nuclear Power Plants for

Carolina Power & Light Company; BWR Nuclear Power plant for Tokyo Electric Power Company, Fukushima Units 1 and 2; BWR Nuclear Power plant for Chubu Electric Power Company; circulating water system study for Millstone BWR Nuclear Power Plant, and study of various containments for BWR type reactors.

I have served in my present capacity as Supervising Engineer - Concrete-Hydraulic Department on the St. Lucie Project since May 1, 1973.

EDUCATIONAL AND PROFESSIONAL QUALIFICATIONS

NEIL J. WILDING - SENIOR SCIENTIST

EBASCO SERVICES, INC.

My name is Neil J. Wilding. I was born in Newark, New Jersey in 1938 and I am currently employed by Ebasco Services, Inc. as a Senior Scientist in the Consulting Environmental Engineering Department.

I received a Bachelor of Science Degree in Zoology and Entomology from the Pennsylvania State University in 1960 and a Master of Science Degree in Marine Biology from the University of Miami in 1968. I also spent one year as a Predoctoral Student in Life Sciences at the University of California.

My professional experience as a biologist spans a period of 13 years and includes studies performed while a member of the U. S. Armed Forces as well as in positions with the E. R. Squibb Company, the University of Miami, the University of California, and Ebasco Services, Inc.

Since 1969, I have been employed by Ebasco Services, Inc. engaged in the performance of biological and ecological studies related to the determination and minimization of environmental impact from both nuclear and fossil-fired generating plants. My principal responsibilities have included the supervision, design and direction of ecological monitoring programs; the prediction of ecological impact due to the release of pollutants, including heat, from power plants; the assessment of environmental alterations due to power plant construction and operation, the development of guidelines and design criteria to minimize such environmental impact; and the preparation of ecological data for power plant environmental reports.

Major assignments have included the preparation, organization and supervision of a preoperational ecological monitoring program on the Lower Mississippi River in the vicinity of Louisiana Power & Light Company's Waterford site, the design and supervision of a marine fouling study as related to the design of an offshore intake for a nuclear power plant constructed for Florida Power and Light; analysis of data and development of predictions on the effects of power plant operation on the ecology of Galveston Bay; investigations of fish deflection and bypass devices for power plant intake structures; and environmental field studies of proposed sites for nuclear and fossil-fueled power plants.

From 1964-1968, while performing research for my thesis on the water balance, osmotic behavior and physiological ecology of Acanthopleura granulata, an intertidal chiton, I served as a research assistant engaged in the collection and organization of data on the distribution of phytoplankton in the Gulf of Mexico and the Caribbean Sea. While at the University of Miami, I also participated in a survey of on-shore marine sediments, assisted in the development of enumeration techniques for marine bacteria, and investigated the potency of various marine toxins by determining their lethal dose concentrations in fiddler crabs. I then spent a year at the University of California as a Teaching Assistant responsible for laboratory experiments and lectures for an introductory course in biology.

During the period 1960-1963, I served as a Microbiology Technician for the United States Army at the Walter Reed Army Medical Center in Washington, D. C. My principal activities during this time included the culture and identification of various strains of intestinal bacteria as well as developing preparations for the separation of bacterial proteins by column chromatography and gel electrophoresis.

EDUCATIONAL AND PROFESSIONAL QUALIFICATIONS

JOSEPH W. WILLIAMS - PROJECT GENERAL MANAGER - ST. LUCIE

FLORIDA POWER & LIGHT COMPANY

My name is Joseph W. Williams. I am employed by Florida Power & Light Company as Project General Manager - St. Lucie Project. In this position I am responsible for the coordination of the engineering, construction, and operating departments in so far as they relate to the St. Lucie Project. I have served in this capacity since July 1, 1973.

I graduated from the University of Florida in 1950 with a Bachelor of Chemical Engineering Degree.

I have twenty-one years of experience in the operation, maintenance, and supervision of modern oil and gas fueled high pressure steam power plants, including participation in the start up of three high pressure boiler, and turbine generator units. In addition, I served as Manager of Quality Assurance for one year and two months, during which time I had the responsibility for Florida Power & Light Company's Quality Assurance program for nuclear plants. This experience is summarized as follows:

(a) Student Engineer, Training and Operations Departments - June 1950 to September 1951.

(b) Betterment Engineer, Plant Betterment Foreman, and Plant Results Foreman, Palatka Plant, 128 MW capability - September 1951 to April 1955.

(c) Assistant Plant Superintendent - Operations, Riviera Plant, 130 MW capability - April 1955 to October 1955.

(d) Assistant Plant Superintendent - Operations, Palatka Plant, 128 MW capability - October 1955 to June 1957.

(e) Assistant Plant Superintendent - Operations, Cutler Plant, 400 MW capability - June 1957 to January 1960.

(f) Plant Superintendent, Palatka Plant, 128 MW capability - January 1960 to September 1962.

(g) Plant Superintendent, Cutler Plant, 400 MW capability - September 1962 to March 1966.

(h) Plant Superintendent, Turkey Point Plant Unit Nos. 1 and 2, 864 MW capability - March 1966 to May 1972.

(i) Manager of Quality Assurance - May 1972 to July 1973.

(j) Project General Manager - St. Lucie Plant - July 1973 to Present.

I have completed the following educational courses related to the nuclear industry:

(a) Nuclear Power Reactor - University of Florida, 1966.

(b) Nuclear Fuel Management - NUS, 1966.

(c) Radiological Health - PHS, 1966.

(d) Reactor Safety & Hazards Evaluation - PHS, 1967.

(e) Advanced Nuclear Technology - University of Florida, 1967.

I am a Member of the American Society of Mechanical Engineers, a Member of the Florida Engineering Society, and a Member of the National Society of Professional Engineers. I am a Registered Professional Engineer in the State of Florida (Certificate No. 4058).

EDUCATIONAL AND PROFESSIONAL QUALIFICATIONS

A. S. JAMESON - NUCLEAR PROJECT MANAGER

COMBUSTION ENGINEERING

My name is A. S. Jameson. I am employed as the Project Manager by Combustion Engineering, Inc., the supplier of the Nuclear Steam Supply System and fuel for the St. Lucie Plant. I have been serving in this capacity since Project inception in early 1968. I have been associated with Combustion Engineering since 1957 and have been engaged in the Nuclear field for the past 24 years.

I am a graduate of Stevens Institute of Technology and received a Bachelor of Science degree in Mechanical Engineering in 1940.

From 1949 to 1957 I was a member of the reactor engineering division of Argonne National Laboratory where I had assignments starting as a designer and operator of heat transfer test facilities and successively leader of the experimental group in the heat transfer section, head of the heat transfer section, project engineer for the Experimental Boiling Water Reactor (EBWR) and plant operating supervisor EBWR.

In 1957 I joined General Nuclear Engineering, which later became part of Combustion Engineering and served as Project Manager in the design of the Boiling Nuclear Superheat (BONUS) reactor in Puerto Rico and as Project Manager during construction and operation until plant turnover to the Puerto Rico Water Resources Authority.