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ACCESSION NBR:8202020389 DOC.DATE: 82/01/28 NOTARIZED: NO DOCKET #
FACIL:50-389 St. Lucie Plant, Unit 2, Florida Power & Light Co. 05000389
AUTH.NAME AUTHOR AFFILIATION
UHRIG,R.E. Florida Power & Light Co.
RECIP.NAME RECIPIENT AFFILIATION
EISENHUT,D.G. Division of Licensing

SUBJECT: Responds to NRC 820118 ltr requesting addl info re proposed third intake pipeline. Question numbers revised per 820121 telcon.

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	NRR/DE/HGEB		1	1	NRR/DE/SAB	07	1	1
	NRR/DSI/ETSB		1	1	NRR/DSI/RAB	09	1	1
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P.O. BOX 529100 MIAMI, FL 33152

FLORIDA POWER & LIGHT COMPANY

January 28, 1982
L-82-33

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

Dear Mr. Eisenhut:

Re: St. Lucie Unit 2
Docket No. 50-389
Environmental Report
Requests for Additional Information

Attached are Florida Power & Light Company (FPL) responses to NRC staff requests for additional information which have been formally submitted on the St. Lucie Unit 2 docket via your letter of January 18, 1982. These responses will be incorporated into the St. Lucie Unit 2 Environmental Report in a future amendment.

Please note that the question numbers have been revised per a telephone conversation with Mr. V. Nerses on January 21, 1982.

Very truly yours,

Robert E. Uhrig
Vice President
Advanced Systems and Technology

REU/RAK/ah

Attachments

cc: J.P. O'Reilly, Director, Region II (w/o attachments)
Harold F. Reis, Esquire (w/o attachments)

Cool
S/1

RESPONSE TO NRC
REQUEST FOR ADDITIONAL INFORMATION
ON THE PROPOSED THIRD INTAKE PIPELINE
FOR THE ST. LUCIE PLANT UNIT 2

Question 291.11: The discussion of the difficulties experienced maintaining flows introduces uncertainty as to what the actual cooling water flow will be with two units in service. With the new intake in service what will the flow be through each unit? Will this be maintained by throttling back pumps? Apparently higher flows could be employed. At what reduced flow and corresponding elevated temperature rise will intake pipeline cleaning procedures be initiated?

Response: The actual cooling water flow rate requirements will remain constant for St. Lucie 1 and 2 assuming a design condenser Δ T of 24° F. Intake canal water level will be drawn down slowly to offset the increased pipe resistance in the ocean intake lines as a result of marine fouling. When the canal level has been drawn down to the lowest allowable limit ocean intake pipe cleaning must be initiated to preclude a reduction in flow and a corresponding reduction in unit output.

Question 291.12: Discuss recirculation of discharged water to the new intake pipeline.

Response: The separation distance between the existing twin intake pipelines and the plant discharge diffusers is approximately 2300 feet. The addition of the third pipeline (located north of the existing pipelines) will reduce the separation distance by 100 feet which is only 4.35 percent of the original separation distance. The following discussion relates to recirculation of discharged water to the new intake pipeline as well as the existing pipelines.

(1) There would be no recirculation for either individual or two unit operation under both stagnant and northward current conditions.

(2) Under a southward current condition, there would be some possibility of recirculating discharge water to all three intake pipelines up to 30 percent of the time on an annual basis.

(3) For the worst case conditions the plant intake water temperature rise due to recirculation would be 0.2°F and 1.2°F for one unit and two unit operation respectively. This is based on the assumption that the new intake pipeline will carry 1150 CFS and each of the two existing pipelines will carry 575 CFS. The addition of a new intake pipeline will not increase nor decrease

flow volume used for plant operation. Therefore recirculation potential for three intake pipelines is expected to be similar to that for two intake pipelines.

(4) The temperature rises due to recirculation are relatively small as compared to the daily ambient temperature fluctuations of the ocean water, which can range from 2° to 5° F.

Based on the above discussions it appears that the addition of a third intake pipeline will not significantly reduce the separation distance between the intake and discharge pipelines nor will it increase the flow volume used for plant operation. Therefore, it is concluded that the recirculation potential for three intake pipelines will not be significantly higher than, if not the same as, that for two intake pipelines.

Question 291.13: Page 10 of the Circulating Water System Modification document provides some flow velocities in the pipelines. Indicate if these velocities are based on no pipe fouling or with fouling. Explain why the maximum flow velocity would be reduced to 2/3's of the twin pipeline flow velocity when the existing pipelines are 12' in diameter and the new pipeline is to be 16' in diameter.

Response: The maximum calculated flow velocity of 10.18 fps through the two existing 12' dia intake pipelines corresponds to the initial design requirement: supply a total flow of Q=2300 cfs for two unit operation.

The maximum flow velocity of 6.8 fps through the proposed 16' dia third intake pipeline was developed for a calculated flow distribution of Q=1360 cfs through the 16' pipe and Q=470 cfs through each of the 12' pipes. This flow distribution results from the following assumed friction factors: f=0.02 in the proposed pipe and f=0.07 in the existing pipes. (the increased friction factor is a result of marine growth built up in the pipes since the last pipe cleaning performed in 1980).

Question 291.14: Provide estimates of flow velocities at the entrance of each velocity cap, each vertical pipe section of the velocity cap, each intake pipeline, and the intake canal under one and two unit operation and clean and fouled conditions.

Response: The flow distribution through the three pipes varies with the change in the friction factors as a result of marine fouling.

For the scheduled start of two unit operation in June 1983 the friction factors are assumed to be f=0.07 for the 12 foot pipes which were last cleaned in 1980 and f=0.02 for the new 16 foot line (note: f=0.015 for a clean pipe, however, it takes less than 2 months for the friction factor to increase to f=0.02).

It is estimated that the pipes will be able to operate on a 7 to 8 year cleaning cycle with the flow velocities noted in Table 1. Please note that the velocities in Table 1 are for two units operation. Velocities for one operation are 1/2 the values shown.

TABLE 1

Year	Friction Factor "f"		Velocity Cap Flow Velocity (FPS)		Vert. Pipe Sect. Flow Velocity (FPS)		Pipe Flow Velocity (FPS)		Canal Flow Velocity (FPS)
	12'	16'	12'	16'	12'	16'	12'	16'	
1983	0.07	0.02	0.368	1.00	1.18	6.77	4.16	6.77	1.0±
1986	0.115	0.07	0.401	0.941	1.28	6.34	4.54	6.34	1.0±
1988	0.145	0.10	0.411	0.927	1.31	6.24	4.62	6.24	1.0±
1990	0.175	0.13	0.414	0.918	1.32	6.18	4.67	6.18	1.0±

Question 291.15: Describe the procedures for removing a pipeline from service and cleaning it.

Response:

I. For 16' diameter intake line:

A. Remove line from service by closing the 16' line sluice gate.

B. Place stop-logs into headwall

C. Insert cleaning machine into intake structure

D. Open sluice gate

E. Cleaning machine is hydraulically forced through the ocean pipeline to effect cleaning.

F. Cleaning machine is removed, sluice gate closed, stop logs removed.

G. Line is placed into service by opening the sluice gate.

II. For 12' diameter intake line:

A. During a period of zero flow through either 12' diameter line, the cleaning machine is inserted into the pipeline and a cover plate is then installed on the headwall.

B. Cleaning machine is hydraulically forced through the ocean pipeline to effect cleaning.

C. During a subsequent zero flow condition, the cover plate and cleaning machine are removed and the line restored to service.

Question 291.16: Indicate whether cleaning of any of the ocean intake pipelines will be attempted during two unit operation or whether cleaning be limited to outages.

Response: Normally, pipe cleaning will be scheduled during a unit outage. However, cleaning of 16' intake pipe during two unit operation may be performed if warranted.

Question 291.17: Indicate whether all three pipelines will be used at all times or whether any pipeline will be blocked off during periods of one unit operation or kept on standby for any reason.

Response: Except for periods of cleaning, all three intakes pipelines will be in service during one unit operation.

Question 291.18: Verify that construction is still planned for February through December 1982.

Indicate if applicable the period of time construction activities will occur on a three shift per day basis.

Response: Mobilization has commenced and construction activity is presently scheduled for three shifts per day from February through December 1982.

Question 291.19: On page 13 of the Circulating Water System Modification document a discussion of decreased turtle nesting due to initial intake and discharge construction is presented. Provide the magnitude of the decrease in turtle nesting due to recent construction of the second discharge structure.

Response: As a test for 1981 construction effects (i.e. the second discharge pipeline), the number of nests occurring at the Plant Site (Area 4; Figure H-1, Applied Biology, Inc., 1980) were compared to the expected number predicted by a linear regression model. These counts were within 14 percent of the estimate each year except 1975 and 1981, when the counts dropped to 50 and 65 percent, respectively, of the estimate (Applied Biology, Inc., 1982). The apparent cause of these discrepencies was the construction of intake pipelines (1975) and discharge pipelines (1975 and 1981) in the beach and nearshore environment. Construction activity and lights on the construction pier at night, as well as localized beach erosion south of the structures, reduced nesting activity in this area. Nesting is expected to return to normal levels as was observed during years following nearshore construction in 1975.

References:

Applied Biology, Inc. 1980. Florida Power & Light Company, St. Lucie Plant, annual non-radiological environmental monitoring report 1979, AB-244. Applied Biology, Inc., Atlanta, Ga.

Applied Biology, Inc. 1982. Florida Power & Light Company, St. Lucie Plant, annual non-radiological environmental monitoring report 1981, AB-379. Applied Biology, Inc., Atlanta, Ga.

Question 291.20: Is there any intention of using chemical procedures or chemical coatings to control fouling in the new intake? If so, give adequate detail for impact assessment.

Response: FPL has no intention of using chemicals to control fouling of the ocean intake pipelines.

Question 291.21: Indicate the status of other Federal and State permit actions related to the new intake. Where actions are complete, provide copies of the permits or approvals along with copies of any conditions or qualifications. Provide copies of all environmental impact appraisals and other environmental review documents prepared in conjunction with the other permitting actions. Specifically, provide copies of the comments of the USFWS and the NMFS submitted to the Corps of Engineers on their permit.

Response: FPL submitted a Dredge and Fill permit application to the Corps of Engineers on November 24, 1981. The Corps Permit #81D-1679 was signed by FPL on December 31, 1981, with stipulations for modification to the special conditions. The Corps has agreed that mangroves do not have to be transplanted but instead FPL will plant seedlings. Because the area to be used for mitigation will be used during construction as a lay-down area, the Corps has agreed that mangroves will be planted within one year of issuance of the Dredge and Fill Permit. The Corps expects to sign the permit momentarily. No official comments were received from National Marine Fisheries Service or the U.S. Fish and Wildlife Service. The Corps informed FPL that both agencies verbally advised the Corps that they had no comments.

FPL applied for a modification to the St. Lucie NPDES Permit #FL0002208 on December 3, 1981 to include the third intake pipe.

FPL petitioned the Florida Department of Environmental Regulation to amend the St. Lucie 2 Certification #PA-24-02 on November 30, 1981 to include the construction of the third intake pipe. At this time, the amendment is expected to be approved on January 26, 1982.

FPL applied for an easement with the Florida Department of Natural Resources for the third intake pipe on November 30, 1981. The easement #3177-56, will be granted on January 13, 1982.

FLORIDA POWER & LIGHT COMPANY

November 30, 1981

Dr. Elton J. Gissendanner
Executive Director
Florida Department of Natural Resources
3900 Commonwealth Blvd.
Tallahassee, FL 32303

RE: APPLICATION FOR EASEMENT
ST. LUCIE POWER PLANT - ST. LUCIE COUNTY
THIRD INTAKE PIPELINE

Dear Dr. Gissendanner:

Enclosed please find an Easement Application for a subaqueous cooling water pipeline extending approximately 1195 feet offshore from Hutchinson Island into the Atlantic Ocean. The foregoing application and attachments are being submitted on behalf of Florida Power and Light in reference to its St. Lucie Power Plant. These materials are being submitted in an effort to obtain an Easement across sovereignty lands of the State of Florida for public utility purposes, pursuant to chapter 16Q-17.09 F.A.C. (Sovereignty Submerged Lands).

We request that you review the enclosures describing the Florida Power and Light Company's proposed easement, and that you place this application before the Board of Trustees of the Internal Improvement Trust Fund at the earliest possible date. We have provided the pertinent information regarding our proposal on the aforementioned application and attachments for your convenience.

Respectfully submitted this 30th day of November 1981.

Sincerely,

W. J. Barrow, Jr., Manager
Environmental Permitting and Programs

WJBjr/pc

Attachments: Easement Application
Map of Survey - Project No. 225
Permit Appraisal - Biological Report
Circulating Water System Modification

cc: Victoria Tschinkel - W/O Attachments
Hamilton Oven - W/O Attachments

P.O. BOX 529100, MIAMI, FL 33152

FPL
FLORIDA POWER & LIGHT COMPANY

November 30, 1981

Dr. Elton J. Gissendanner
Executive Director
Florida Department of Natural Resources
3900 Commonwealth Blvd.
Tallahassee, FL 32303

RE: APPLICATION FOR EASEMENT
ST. LUCIE POWER PLANT - ST. LUCIE COUNTY
SUBAQUEOUS INTAKE PIPELINES

Dear Dr. Gissendanner:

Enclosed please find an Easement Application for two existing and one proposed intake pipeline extending approximately 1195 feet offshore from Hutchinson Island into the Atlantic Ocean. The two existing intake lines were permitted by the Board of Trustees (TIIF) on March 22, 1972 (Permit No. 253.123(2) (b)-1101). The foregoing application attachments are being submitted on behalf of Florida Power and Light Co. in reference to its St. Lucie Power Plant. These materials are being submitted in an effort to obtain an easement across sovereignty lands of the State of Florida for public utility purposes, pursuant to Chapter 16Q-17.09 F.A.C. (Sovereignty Submerged Lands).

We request that you review the enclosures describing the Florida Power and Light Company's proposed easement, and that you place this application before the Board of Trustees of the Internal Improvement Trust Fund at the earliest possible date. We have provided the pertinent information regarding our proposal on the aforementioned application and attachments for your convenience.

Respectfully submitted this 30th day of November, 1981.

Sincerely,

W. J. Barrow, Jr.
Manager
Environmental Permitting & Programs

WJBjr/os

Attachments: Easement Application
Map of Survey - Project No. 225
Permit Appraisal - Biological Report
Circulating Water System Modification

cc: Victoria Tschinkel - w/o attachments
Hamilton Oven - w/o attachments

EASEMENT APPLICATION

Easement No. _____ Date _____

Please type or print. Fill in the blanks for all applicable information. If information requested is not applicable, so indicate by placing N/A in the blank.

APPLICANT INFORMATION:

Name Florida Power & Light Company

Address P. O. Box 529100

Miami, FL Zip Code 33152

Telephone Number: (305) 552-3564

Name of Agent W. J. Barrow, Jr.
Manager, Environmental Permitting & Programs

Address of Agent 2250 Palm Beach Lakes Blvd.

West Palm Beach, FL Zip Code 33409

Telephone Number: (305) 684-8500

Proposed easement will be used for:

Public Utility (XX) Public Road Right-of-Way ( )
Private Utility ( ) Private Road Right-of-Way ( )
Other ( ) Explain: Electric Generating Facility (Power Plant)
Ocean Intake Pipeline for plant cooling water.

LOCATION:

Section 16 Township 36 South Range 41 East

County St. Lucie City Ft. Pierce

Water body affected by activity: Atlantic Ocean

Project is in an aquatic preserve? Yes ( ) No (X)
If "yes", give preserve number: N/A

List names and addresses of the riparian land owners of property on each side of the project site.

North Boundary: Krantz, Christ. & Mary Lou
Geo. & Mary Ann
200 Ocean Tr. Apt. 1210
Jupiter, FL 33458

South Boundary: Sand Dollar Villas Dev. Co.
P. O. Drawer 2315
Stuart, FL 33494

Describe the proposed activities in detail.

An ocean intake pipeline and channel extension to convey cooling water from the Atlantic Ocean into the intake canal is proposed. The 1515 foot pipeline has an inside diameter of 16 feet and extends 1195 feet offshore and is to be buried beneath the dunes and ocean bottom. The pipe terminates with a velocity cap of precast reinforced concrete, supported on tremie concrete placed within a sheetpiling enclosure below the ocean bottom. Dredged materials include sands, silts and clay. Backfill material will be dredged sands.

The channel extension projects about 100 feet into the east slope of the existing intake canal.

* See supplemental sheet 1

-OVER-

List all approvals or certification required for this activity:

Issuing Agency	Type of Approval	Identification Number	Date of Application	Date of Approval
US NRC	Construction Permit	Docket 50-389	-	May. 2, 1977
State of Florida	Site Suitability Certificate	PA-74-02	-	June 10, 1975
U. S. COE	Dredge & Fill Permit	81D-1679	11/23/81	Pending

REMARKS: Any comment that you feel should be made in regards to this application.

See Supplemental Sheet 2.

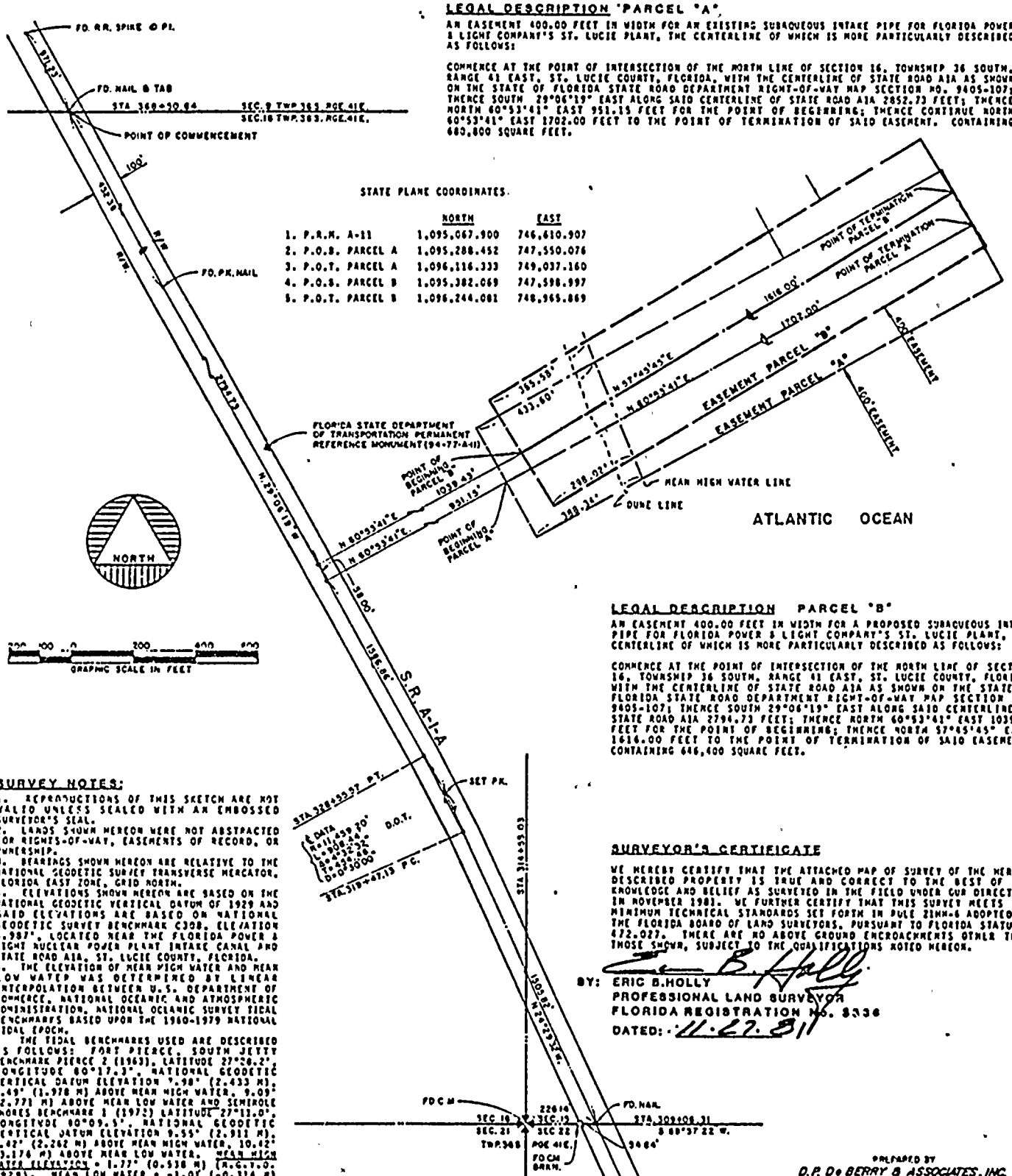
ALL LISTS OF REQUIRED INFORMATION SHOULD BE ATTACHED TO THIS APPLICATION WHEN THE APPLICATION IS SUBMITTED.

Date: December 30, 1981 Signature of Applicant: _____

W. J. Barrow, Jr.
Manager
Environmental Permitting & Programs

MAP OF SURVEY
FOR
FLORIDA POWER AND LIGHT COMPANY, INC.
ST. LUCIE UNIT #1 AND UNIT #2
SUBAQUEOUS INTAKE PIPE EASEMENT

ST. LUCIE COUNTY, FLORIDA



STATE PLANE COORDINATES

		NORTH	EAST
1.	P.R.M. A-11	1,095,067.900	746,610.907
2.	P.O.B. PARCEL A	1,095,288.452	747,550.076
3.	P.O.T. PARCEL A	1,096,116.333	749,037.160
4.	P.O.B. PARCEL B	1,095,382.069	747,598.997
5.	P.O.T. PARCEL B	1,096,244.081	748,965.869

LEGAL DESCRIPTION "PARCEL "A"

AN EASEMENT 400.00 FEET IN WIDTH FOR AN EXISTING SUBAQUEOUS INTAKE PIPE FOR FLORIDA POWER & LIGHT COMPANY'S ST. LUCIE PLANT, THE CENTERLINE OF WHICH IS MORE PARTICULARLY DESCRIBED AS FOLLOWS:

COMMENCE AT THE POINT OF INTERSECTION OF THE NORTH LINE OF SECTION 16, TOWNSHIP 36 SOUTH, RANGE 41 EAST, ST. LUCIE COUNTY, FLORIDA, WITH THE CENTERLINE OF STATE ROAD A1A AS SHOWN ON THE STATE OF FLORIDA STATE ROAD DEPARTMENT RIGHT-OF-WAY MAP SECTION NO. 9405-107; THENCE SOUTH 29°06'19" EAST ALONG SAID CENTERLINE OF STATE ROAD A1A 2852.73 FEET; THENCE NORTH 60°53'41" EAST 951.15 FEET FOR THE POINT OF BEGINNING; THENCE CONTINUE NORTH 60°53'41" EAST 1702.00 FEET TO THE POINT OF TERMINATION OF SAID EASEMENT. CONTAINING 680,800 SQUARE FEET.

LEGAL DESCRIPTION PARCEL "B"

AN EASEMENT 400.00 FEET IN WIDTH FOR A PROPOSED SUBAQUEOUS INTAKE PIPE FOR FLORIDA POWER & LIGHT COMPANY'S ST. LUCIE PLANT, THE CENTERLINE OF WHICH IS MORE PARTICULARLY DESCRIBED AS FOLLOWS:

COMMENCE AT THE POINT OF INTERSECTION OF THE NORTH LINE OF SECTION 16, TOWNSHIP 36 SOUTH, RANGE 41 EAST, ST. LUCIE COUNTY, FLORIDA, WITH THE CENTERLINE OF STATE ROAD A1A AS SHOWN ON THE STATE OF FLORIDA STATE ROAD DEPARTMENT RIGHT-OF-WAY MAP SECTION NO. 9405-107; THENCE SOUTH 29°06'19" EAST ALONG SAID CENTERLINE OF STATE ROAD A1A 2794.73 FEET; THENCE NORTH 60°53'41" EAST 1039.43 FEET FOR THE POINT OF BEGINNING; THENCE NORTH 87°05'45" EAST 1616.00 FEET TO THE POINT OF TERMINATION OF SAID EASEMENT. CONTAINING 646,400 SQUARE FEET.

SURVEY NOTES:

1. REPRODUCTIONS OF THIS SKETCH ARE NOT VALID UNLESS SEALED WITH AN EMBOSSED SURVEYOR'S SEAL.
2. LANDS SHOWN HEREON WERE NOT ABSTRACTED FOR RIGHTS-OF-WAY, EASEMENTS OF RECORD, OR OWNERSHIP.
3. BEARINGS SHOWN HEREON ARE RELATIVE TO THE NATIONAL GEODETIC SURVEY TRANSVERSE MERCATOR, FLORIDA EAST ZONE, GRID NORTH.
4. ELEVATIONS SHOWN HEREON ARE BASED ON THE NATIONAL GEODETIC VERTICAL DATUM OF 1929 AND SAID ELEVATIONS ARE BASED ON NATIONAL GEODETIC SURVEY BENCHMARK C308, ELEVATION 4.987', LOCATED NEAR THE FLORIDA POWER & LIGHT NUCLEAR POWER PLANT INTAKE CANAL AND STATE ROAD A1A, ST. LUCIE COUNTY, FLORIDA.
5. THE ELEVATION OF MEAN HIGH WATER AND MEAN LOW WATER WAS DETERMINED BY LINEAR INTERPOLATION BETWEEN U.S. DEPARTMENT OF COMMERCE, NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, NATIONAL OCEANIC SURVEY TIDAL BENCHMARKS BASED UPON THE 1960-1979 NATIONAL TIDAL EPOCH.

THE TIDAL BENCHMARKS USED ARE DESCRIBED AS FOLLOWS: FORT PIERCE, SOUTH JETTY BENCHMARK PIERCE 2 (1963), LATITUDE 27°28.2' LONGITUDE 80°17.3'. NATIONAL GEODETIC VERTICAL DATUM ELEVATION 9.98' (2.433 M): 6.49' (1.978 M) ABOVE MEAN HIGH WATER. 9.09' (2.771 M) ABOVE MEAN LOW WATER AND SEMINOLE SHORES BENCHMARK 2 (1972) LATITUDE 27°33.0' LONGITUDE 80°09.5'. NATIONAL GEODETIC VERTICAL DATUM ELEVATION 9.55' (2.911 M): 2.42' (2.262 M) ABOVE MEAN HIGH WATER. 10.42' (3.176 M) ABOVE MEAN LOW WATER. MEAN HIGH WATER ELEVATION = 1.77' (0.538 M) (N.G.V.D. 1929). MEAN LOW WATER = -1.01' (-0.314 M) (N.G.V.D. 1929).

SURVEYOR'S CERTIFICATE

WE HEREBY CERTIFY THAT THE ATTACHED MAP OF SURVEY OF THE HEREON DESCRIBED PROPERTY IS TRUE AND CORRECT TO THE BEST OF OUR KNOWLEDGE AND BELIEF AS SURVEYED IN THE FIELD UNDER OUR DIRECTION IN NOVEMBER 1981. WE FURTHER CERTIFY THAT THIS SURVEY MEETS THE MINIMUM TECHNICAL STANDARDS SET FORTH IN RULE 21HH-6 ADOPTED BY THE FLORIDA BOARD OF LAND SURVEYORS, PURSUANT TO FLORIDA STATUTES 472.027. THERE ARE NO ABOVE GROUND ENCROACHMENTS OTHER THAN THOSE SHOWN, SUBJECT TO THE QUALIFICATIONS NOTED HEREON.

BY: ERIC B. HOLLY
PROFESSIONAL LAND SURVEYOR
FLORIDA REGISTRATION NO. 3336
DATED: 11.22.81

PREPARED BY
D.P. DeBERRY & ASSOCIATES, INC.
ENGINEERS · SURVEYORS · PLANNERS
STUART, FLORIDA
PHONE (305) 287-2626

Sheet 3 of 3 Sheets

PROJECT NO. 222

FPL
FLORIDA POWER & LIGHT COMPANY

November 25, 1981

Ms. Victoria Tschinkel, Secretary
Florida Department of Environmental Regulation
2600 Blair Stone Road
Tallahassee, FL 32301

RE: St. Lucie Power Plant Unit No. 2
Modification of Conditions of Certification
No. PA-74-02

Dear Secretary Tschinkel:

We are submitting this letter to request that the Florida Department of Environmental Regulation modify the conditions of the above-referenced certification for the St. Lucie Power Plant Unit No. 2 pursuant to § 403.516(1), Florida Statutes, and § 10 of the General Conditions of Certification. As grounds for this requested modification, Florida Power & Light Company relies upon the material and information contained in the enclosed Joint Application Department of the Army/Florida Department of Environmental Regulation for Activities in Waters of the State of Florida and attachments. We have provided the pertinent information regarding our proposal on the aforementioned application and attachments for convenience, since these same forms are being hand-delivered this date to the Department of Army/Corps of Engineers, Jacksonville District. A copy of the cover letter sent to the Corps has also been attached.

We request that you review the enclosures describing Florida Power and Light's proposed modification, and that you amend and modify the conditions of certification accordingly.

Respectfully submitted this 30th day of November 1981.

Sincerely,

W. J. Barrow, Jr., Manager
Environmental Permitting and Programs

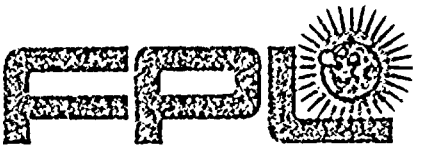
WJBjr/pc

Enclosures:
1) Joint Application (2 pages)
2) Joint Application Supplement Sheet #1 (1 page)
3) Joint Application Supplement Sheet #2 (2 pages)
4) Joint Application Drawings (6 pages)
5) Cover letter to Corps of Engineers (1 page)
6) Circulating Water System Modification (18 pages)

cc: Hamilton S. Oven

Copies of the foregoing letter and enclosures have been furnished to all of the individuals and entities listed on the attached service list.

P.O. BOX 529100 MIAMI, FL 33152



FLORIDA POWER & LIGHT COMPANY

November 30, 1981

TO WHOM IT MAY CONCERN:

Attached for your information is an application to the Department of Environmental Regulation for Modification of Conditions of Certification No. PA-74-02 at Florida Power & Light Company's St. Lucie Power Plant Unit No. 2. This notification is for the construction of a 16' third intake pipe which is explained in detail by the attached documents.

Respectfully submitted this 30th day of November, 1981.

Sincerely,

W. J. Barrow, Jr.
Manager
Environmental Permitting & Programs

WJBjr/os

attachments

SERVICE SCHEDULE

Mr. Hamilton S. Oven
Administrator of Power Plant Siting
State of Florida Department of
Environmental Regulation
2600 Blair Stone Road
Tallahassee, Florida 32301

John C. Bottcher, Esq.
Deputy General Counsel
State of Florida Department of
Environmental Regulation
Office of General Counsel
2600 Blair Stone Road
Tallahassee, Florida 32301

Arthur Canaday, Esq.
General Counsel
Florida Public Service Commission
Room 207, Fletcher Building
Tallahassee, Florida 32301

Ms. Joan M. Heggen, Secretary
Department of Veteran and
Community Affairs
2571 Executive Center Circle East
Tallahassee, Florida 32301

C. Laurence Keesey, Esq.
Department of Veteran and
Community Affairs
2571 Executive Center Circle East
Tallahassee, Florida 32301

Mr. James Dean
Associate Planner
Power Plant Siting Program
Bureau of Veteran and
Community Affairs
2571 Executive Center Circle East
Tallahassee, Florida 32301

Conservation Alliance of St. Lucie
County
c/o Mrs. Margorie Silver Alder
304 St. Andrews Lane
Fort Pierce, Florida 33450

Martin County Conservation
Alliance
c/o Martin Harold Hodder, Esq.
1131 Northeast 86th Street
Miami, Florida 33138

League of Women Voters of
St. Lucie County
c/o Mrs. Judith James
Route 3, Box 423
Fort Pierce, Florida 33450

Mr. Estes Whitfield
Senior Governmental Analyst
Office of Planning and Budgeting
Office of the Governor
The Capitol
Tallahassee, Florida 32301

Citizens United Against Radioactive
Environment
c/o Harold H. Alder
304 St. Andrews Lane
Fort Pierce, Florida 33450

Steve Walker, Esq.
South Florida Water Management
District
Post Office Box V
West Palm Beach, Florida 33402

Sam Shannon, Esq.
Treasure Coast Regional Planning
Council
Post Office Box 396
Stuart, Florida 33495

The Honorable Bob Graham
Governor
The Capitol
Tallahassee, Florida 32304

The Honorable George Firestone
Secretary of State
The Capitol
Tallahassee, Florida 32301

The Honorable Jim Smith
Attorney General
The Capitol
Tallahassee, Florida 32304

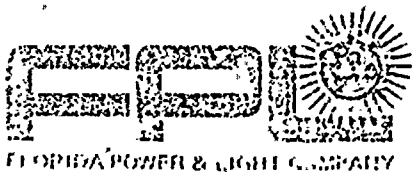
The Honorable Gerald Lewis
Comptroller
The Capitol
Tallahassee, Florida 32301

The Honorable Bill Gunter
Treasurer
The Capitol
Tallahassee, Florida 32304

The Honorable Ralph D. Turlington
Commissioner of Education
The Capitol
Tallahassee, Florida 32301

The Honorable Doyle E. Conner
Commissioner of Agriculture
The Capitol
Tallahassee, Florida 32301

P. O. Box 529100, Miami, FL 33152



November 24, 1981

Mr. John Adams, Chief
Regulatory Section
U. S. Department of the Army
Corps of Engineers
P. O. Box 4970
Jacksonville, FL 32201

RE: APPLICATION FOR DREDGE AND FILL
ST. LUCIE POWER PLANT-ST. LUCIE COUNTY
THIRD INTAKE PIPELINE

Dear Mr. Adams:

Enclosed please find a Joint Application Department of the Army/Florida Department of Environmental Regulation for Activities in Waters of the State of Florida and attachments. The foregoing application and attachments are being submitted on behalf of Florida Power and Light in reference to its St. Lucie Power Plant Unit No. 2. These materials are being submitted in an effort to obtain a Department of Army Permit to perform works in or affecting navigable waters of the United States and to discharge dredged or fill material into waters of the United States. The foregoing activities are being conducted in accordance with the provisions of the Florida Electrical Power Plant Siting Act, 403.501 et seq., Florida Statutes, and therefore a modification of the power plant's certification is required for this proposed activity but said modification procedures obviate the need for a separate Florida Department of Environmental Regulation dredge and fill permit. We are also, this date, submitting a request to the Secretary of the Florida Department of Environmental Regulation for modification of the power plant certification, consistent with the enclosed.

Thank you for your assistance and cooperation in this matter.

Very truly yours,

W. J. Barrow, Jr.
Manager
Environmental Permitting & Programs

cc: Victoria Tschinkel, THIS COPY FOR
Secretary of Florida Dept. of Environmental Regulation

WJBjr/os

enclosures

JOINT APPLICATION
DEPARTMENT OF THE ARMY/FLORIDA DEPARTMENT OF ENVIRONMENTAL REGULATION
FOR
ACTIVITIES IN WATERS OF THE STATE OF FLORIDA

Refer to Instruction Pamphlet for explanation of numbered items and attachments required.

1 Application number (To be assigned)	2. Date 24 Nov. 1981 Day Mo. Yr.	3. For official use only -

4. Name, address and zip code of applicant

W. J. Barrow, Jr., Manager
Environmental Permitting and Programs
Florida Power & Light Company
P.O. Box 529100
Miami, FL 33152

Telephone Number 305-684-8500

5. Name, address, zip code and title of applicant's authorized agent for permit application coordination

Mrs. Elsa A. Bishop
Associate Environmental Coordinator
Environmental Permitting and Programs
Florida Power & Light Company
P. O. Box 529100
Miami, FL 33152

Telephone Number 305-684-8500

6. Describe the proposed activity, its purpose and intended use, including a description of the type of structures, if any, to be erected on fills, or pipe or float-supported platforms, and the type, composition and quantity of materials to be discharged or dumped and means of conveyance.

Anocean intake pipeline and channel extension to convey cooling water from the Atlantic Ocean into the intake canal is proposed. The 1515 ft long pipeline is 16 ft inside diameter extends 1195 ft offshore and is buried beneath the dunes and ocean bottom. The pipe terminates into a velocity cap, a precast reinforced concrete structure, supported on tremie concrete, placed within a sheetpiling enclosure below the ocean bottom. Dredged soils will be sands, silts and clay. Backfill will be dredged sands.

The channel extension projects about 100 ft into the east slope of the existing intake canal.

Volume of Material: *	Dredged/Excavated		Filled/Deposited	
	Waterward of O.H.W. or M.H.W.	Landward of O.H.W. or M.H.W.	Waterward of O.H.W. or M.H.W.	Landward of O.H.W. or M.H.W.
	____ CY	____ CY	____ CY	____ CY

*See Supplement Sheet 1

7. Proposed use

Private [ ] Public [ ] Commercial [X] Other [ ] (Explain in remarks)

8. Name and address including zip code of adjoining property owners whose property also adjoins the waterway.

North Boundary: Barnett Winston, 720 Gilmore St., Jacksonville, Florida 32204

South Boundary: John R Mayer & Elizabeth M Johnston
P O Box 617, Jensen Beach Florida

9. Location where proposed activity exists or will occur

Street address N/A
Longitude N 80°14' Latitude W 27°21' (If known)
Sec. 16 Twp. T 36 S Rge. R 41E

Florida	St Lucie		Ft Pierce
State	County	In City or Town	Near City or Town

10. Name of waterway at location of the activity Atlantic Ocean

SAJ FORM 983
21 Jul 77

11. Date activity is proposed to commence Feb. 1982

Date activity is expected to be completed Feb. 1983

12. Is any portion of the activity for which authorization is sought now complete? Yes [ ] No [X]

If answer is "Yes" give reasons in the remarks section. Month and year the activity was completed _____

_____. Indicate the existing work on the drawings.

13. List all approvals or certifications required by other Federal interstate, state or local agencies for any structures, construction, discharges, deposits or other activities described in this application, including whether the project is a Development of Regional impact.

Issuing Agency	Type of Approval	Identification No.	Date of Application	Date of Approval
US NRC	Construction Permit	Docket 50-389	-	May 2, 1977
State of Florida	Site Suitability Certificate	PA-74-02	-	June 10, 1975
Fla DNR	Easement	No		

14. Has any agency denied approval for the activity described herein or for any activity directly related to the activity described herein?

Yes [ ] No [X] (If "Yes" explain in remarks)

15. Remarks (see Instruction Pamphlet for additional information required for certain activities)

See supplemental sheets entitled "Item 15 Remarks"

16. Application is hereby made for a permit or permits to authorize the activities described herein. I agree to provide any additional information/data that may be necessary to provide reasonable assurance or evidence to show that the proposed project will comply with the applicable State Water Quality Standards or other environmental protection standards both during construction and after the project is completed. I also agree to provide entry to the project site for inspectors from the environmental protection agencies for the purpose of making preliminary analyses of the site and monitoring permitted works, if permit is granted. I certify that I am familiar with the information contained in this application, and that to the best of my knowledge and belief such information is true, complete, and accurate. I further certify that I possess the authority to undertake the proposed activities.

Florida Power and Light Company

_____ November 24, 1981

Signature of Applicant Date

W. J. Barrow, Jr., Manager, Environmental Permitting and Programs

18 U.S.C. Section 1001 provides that: Whoever, in any manner within the jurisdiction of any department or agency of the United States knowingly and willfully falsifies, conceals, or covers up by any trick, scheme, or device a material fact or makes any false, fictitious or fraudulent statements or representations or makes or uses any false writing or document knowing same to contain any false, fictitious or fraudulent statement or entry, shall be fined not more than $10,000 or imprisoned not more than five years, or both.

The application must be signed by the person who desires to undertake the proposed activity; however, the application may be signed by a duly authorized agent if accompanied by a statement by that person designating the agent and agreeing to furnish upon request, supplemental information in support of the application.

FEE: Attach Checks/Money Orders on front

Payable to Department of Environmental Regulation

$200 Standard form projects

$20 Short forms and Chapter 403 projects only

FLORIDA POWER & LIGHT COMPANY
ST LUCIE PLANT

JOINT APPLICATION
DEPARTMENT OF THE ARMY/FLORIDA DEPARTMENT OF ENVIRONMENTAL REGULATION
FOR
ACTIVITIES IN WATERS OF THE STATE OF FLORIDA

ITEM 6 - Volume of Material

The table below has been prepared to delineate the volumes of dredge and fill material estimated for this proejct. The project has been divided into two parts: pipeline construction and channel extension.

VOLUME OF MATERIAL

ITEM	DREDGED/EXCAVATED		FILLED/DEPOSITED	
	Waterward of MHW	Landward of MHW	Waterward of MHW	Landward of MHW
Pipeline Construction	37,700 cy	11,800 cy	25,100 cy	8,400 cy
Channel Extension		31,400 cy		3,900 cy

cy - cubic yard

SUPPLEMENTAL SHEET 1

FLORIDA POWER & LIGHT COMPANY
ST LUCIE PLANT

JOINT APPLICATION
DEPARTMENT OF THE ARMY/FLORIDA DEPARTMENT OF ENVIRONMENTAL REGULATION
FOR
ACTIVITIES IN WATERS OF THE STATE OF FLORIDA

ITEM 15 - Remarks:

The proposed pipeline and channel extension is part of the plant cooling water system. This system consists of subaqueous ocean intake and discharge pipelines extending into the ocean, canals on land connecting the ocean pipelines to the plant, and equipment and conduits in the plant area. Major portions of this system were constructed with the first unit (St. Lucie 1) and have been in operation for about 5 years. The proposed intake pipeline is for both units (St. Lucie 1 & 2). Construction of St. Lucie 2 is authorized by a Construction Permit dated May 2, 1977 issued by the Nuclear Regulatory Commission (NRC). Alternatives to the pipeline, such as cooling towers and cooling ponds were evaluated in the Environmental Report submitted to and reviewed by the NRC in the Final Environmental Statement, Docket 50-389 dated May 1974. The State of Florida Site Suitability Certificate was issued on June 10, 1975. The plan of development for the site is found in the Environmental Report.

The site for the St. Lucie Nuclear Power Plant consists of approximately 1132 acres on Hutchinson Island in St. Lucie County about half way between the cities of Fort Pierce and Stuart on the East Coast of Florida. The St. Lucie plant is sited near the center of a long, narrow island. To the east is the Atlantic Ocean. To the west, the island is separated from the mainland by the Indian River.

The site itself is generally flat. Much of it consists of swamp and, outside the mosquito control areas, the land is covered with a dense vegetation characteristic of Florida coastal mangrove swamps. At the ocean shore the land rises slightly in a dune or ridge to approximately 15 feet above mean low water. Of the 1132 acres owned by Florida Power and Light Company, approximately 380 acres is occupied or modified by the plant (Units 1 & 2) and the plant facilities.

The effects of the construction of the pipeline and the water conveyed from the Atlantic Ocean into the plant were evaluated in the same documents outlined above. These documents state that the waters of the state will not be degraded by the proposed activity. Specific provisions designed to minimize the potentially adverse environmental impact caused by construction are: a) construction of a temporary beach dune when cutting through the natural dunes, b) use of sheet piling and/or silt screens around excavation work to limit turbidity to less than 50 Jackson Units, and c) the disposal of spoils in approved onshore disposal areas.

Construction methods to be used for this project are anticipated to be as follows:

Material will be dredged from the Atlantic Ocean from within a sheetpile trench by a crane.

The pipe trench will be excavated from in situ soils. Material removed from within the sheetpile will be used to backfill other portions of the pipeline; or will be stockpiled temporarily on the ocean adjacent to the trench, or will be disposed of in approved onshore spoil areas. The ground profile along the pipeline will be restored to its original contour after construction. Construction equipment and materials will be brought to and removed from the site via truck transport or via barge. Barges may be off loaded at an existing barge slip located at the site on an appendage of the Indian River, or they may be moved directly to the construction site (the Atlantic Ocean).

The channel extension on land, behind the dune line, will involve clearing less than 1/2 acre of mangrove swamp. The concrete headwall structure will require dewatering and excavation within a cofferdam. After completing the structure, the onland portion of the pipeline will be constructed followed by the canal and dike construction modification.

Water from the dewatering operation will be discharged into the intake canal.

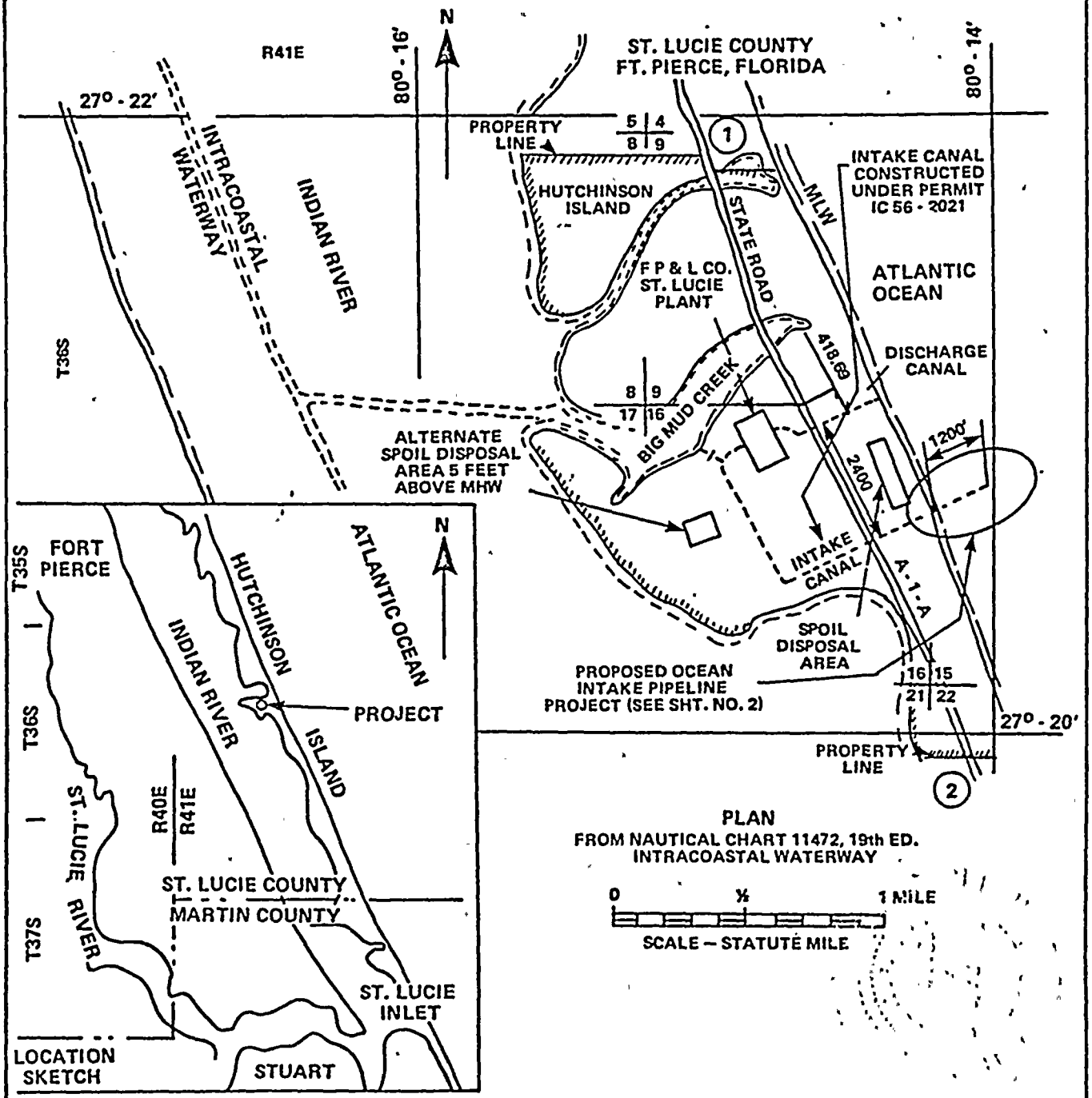
Dredged material disposed of onland will be contained by dikes or other means as necessary such that any runoff will not contaminate the waters of the State. Dredge water will be decanted and released to either the intake or discharge canal. Rainfall runoff will not affect any part of this construction except where there are bare soil slopes during construction. Such slopes include the canal dike extension and spoil piles. Runoff from such slopes will not adversely affect the waters of the State.

The pipeline will be constructed with concrete pipe.

The proposed intake pipeline is sixteen feet inside diameter, four feet larger than the existing two twelve foot inside diameter pipelines previously installed in the ocean at this site. This increase in size is due to the effects of marine fouling experienced with the operation of the twelve foot diameter pipes. The marine fouling effects experienced are a heavy build-up of marine organism on the pipe wall. This build-up results in an increase in pipe friction and pressure drop, decrease in canal water level and a reduction in the flow of water through the system. To limit these adverse effects, the pipelines have been periodically "cleaned," a not inexpensive operation.

The sixteen foot diameter pipeline will greatly reduce the effects of marine growth. This reduction is due to the fact that pressure drop through the pipeline is proportional to the square of the flow velocity. For the twelve foot diameter pipeline, with a design flow velocity of 10 feet per second (fps), the pressure drop was proportional to 100. For the sixteen foot diameter pipeline, with a maximum design flow velocity of approximately 6.8 fps, the pressure drop is proportional to 46. Therefore, the sixteen foot pipe results in a 54% reduction in pressure drop. This reduction is important as it will reduce the frequency of pipe cleanings necessary.

DRAWN BY	V.S.							APPROVED:
CHECKED	C.P.C.							
CORRECT	K.F.							
		NO.	DATE	REVISION	DR.	CH	AP	REGISTERED ENGINEER NO. 21050



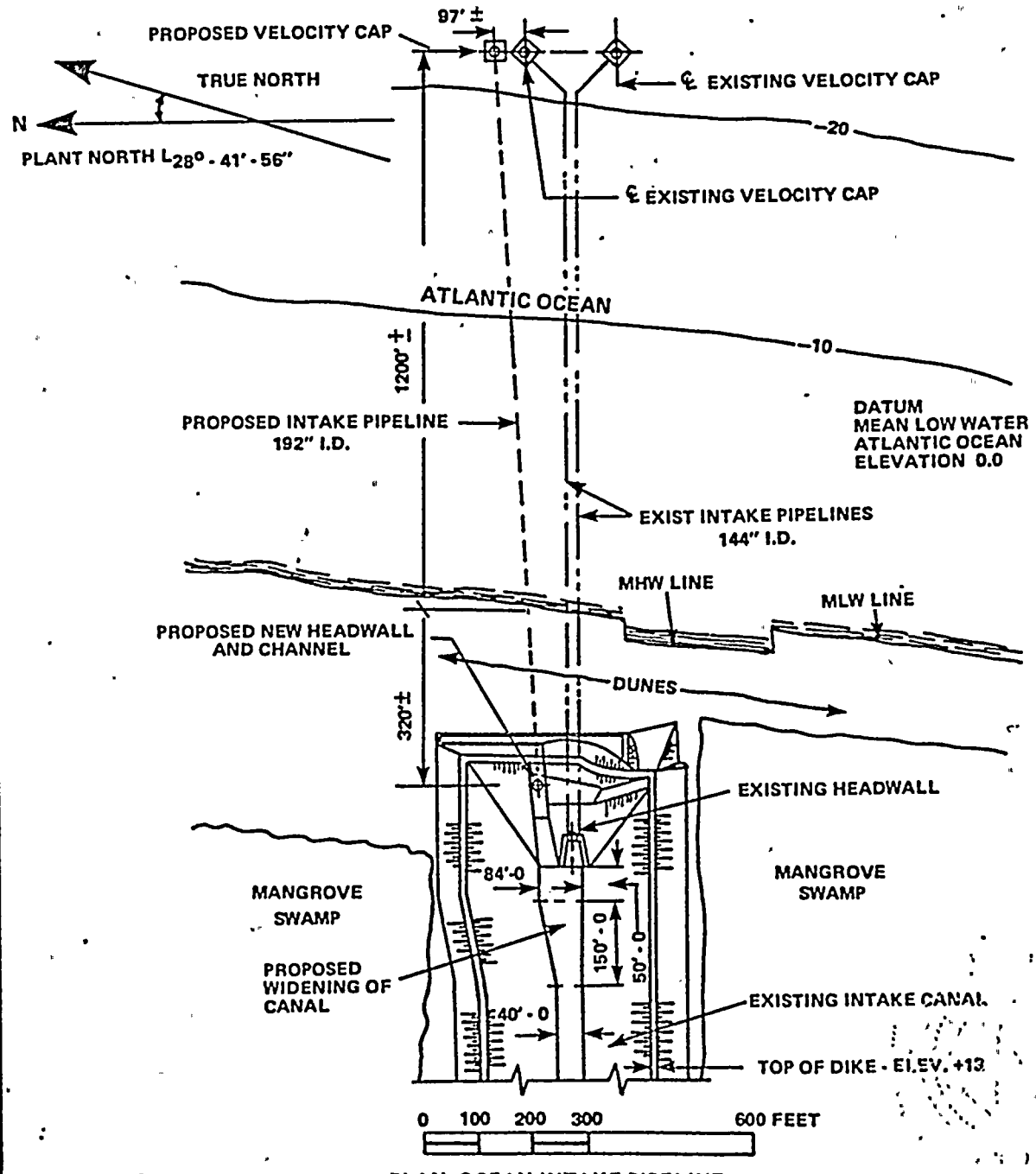
PURPOSE: OCEAN INTAKE PIPELINE
DATUM: MEAN LOW WATER-ATLANTIC OCEAN
ADJACENT PROPERTY OWNERS:
1. BARNETT WINSTON
2. J.R. MAYER & E.M. JOHNSTON

OCEAN INTAKE PIPELINE CONSTRUCTION
AT ST. LUCIE PLANT-HUTCHINSON ISLAND
COUNTY OF ST.LUCIE STATE OF FLORIDA
APPLICATION BY FLORIDA POWER & LIGHT CO.
SHEET 1 OF 6 DATE

DRAWN BY	V.S.	NO.	DATE	REVISION	DR.	CH	AP
CHECKED	C.P.C.						
CORRECT	RG						

APPROVED:

REGISTERED ENGINEER NO. 21050



PLAN OCEAN INTAKE PIPELINE

OCEAN INTAKE PIPELINE CONSTRUCTION
AT ST. LUCIE PLANT-HUTCHINSON ISLAND
COUNTY OF ST. LUCIE STATE OF FLORIDA
APPLICATION BY FLORIDA POWER & LIGHT CO.
SHEET 2 OF 6 DATE

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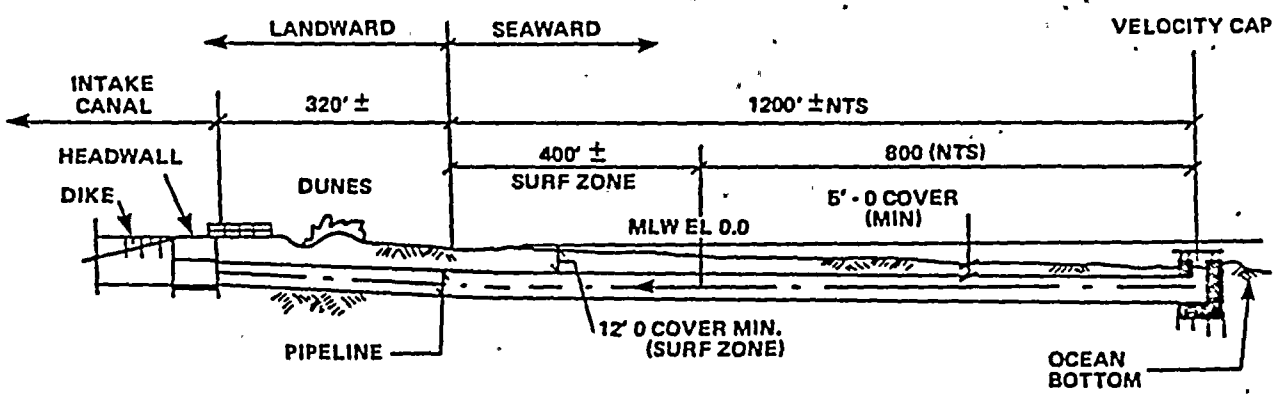
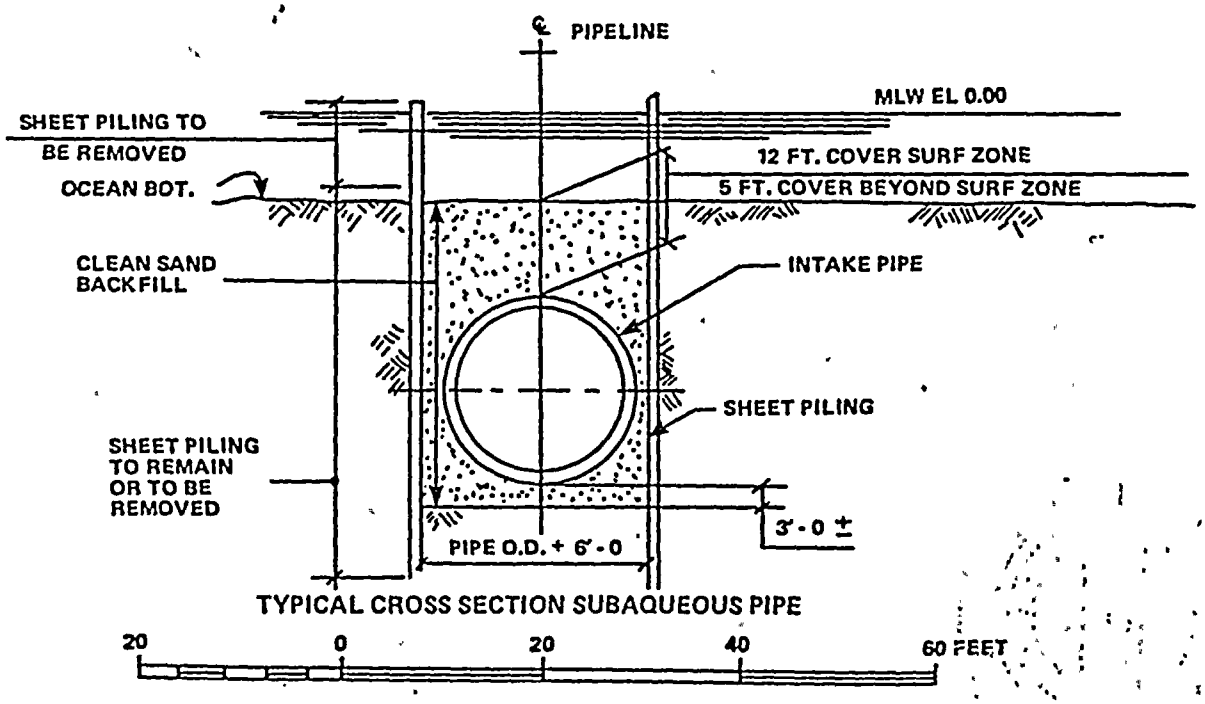
		NO.	DATE	REVISION	DR	CH	AP	REGISTERED ENGINEER NO. 21050



PROFILE – INTAKE PIPE

100 0 100 200 300 400 500 600 FEET



TYPICAL CROSS SECTION SUBAQUEOUS PIPE

20 0 20 40 60 FEET

OCEAN INTAKE PIPELINE CONSTRUCTION
AT ST. LUCIE PLANT-HUTCHINSON ISLAND
COUNTY OF ST. LUCIE STATE OF FLORIDA
APPLICATION BY FLORIDA POWER & LIGHT CO.
SHEET 3 OF 6 DATE

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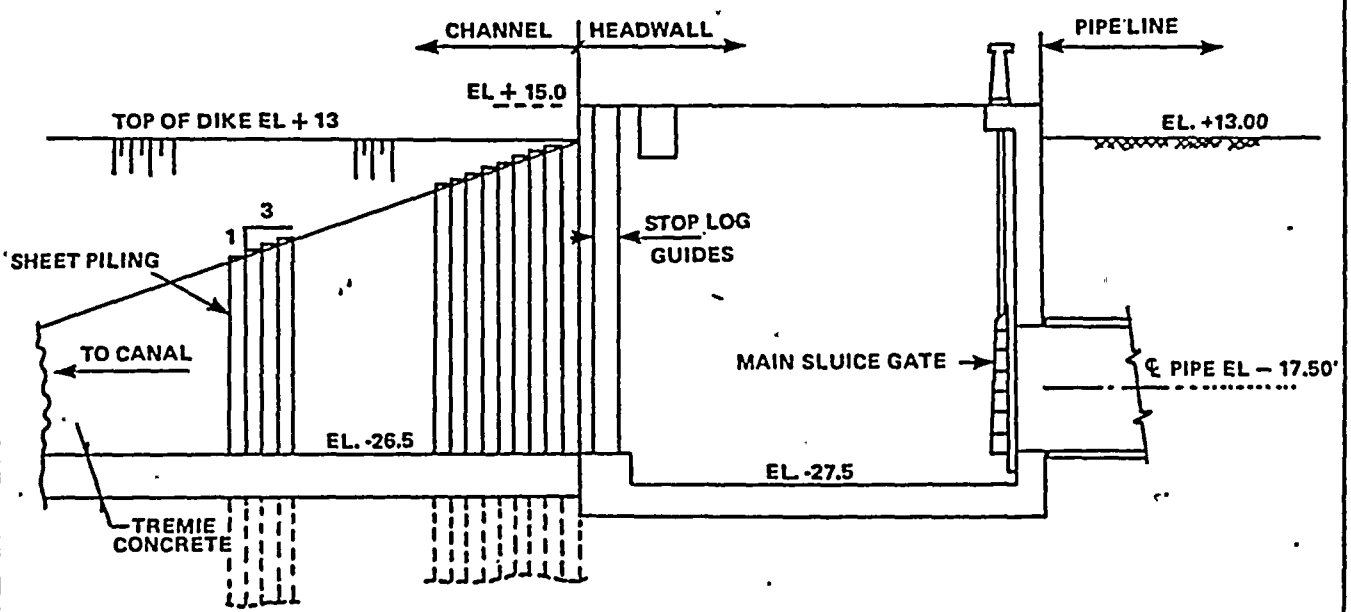
		NO.	DATE	REVISION	DR.	CH	AP	REGISTERED ENGINEER NO. 21050



SECTION THROUGH HEADWALL & CHANNEL

OCEAN INTAKE PIPELINE CONSTRUCTION
AT ST. LUCIE PLANT-HUTCHINSON ISLAND
COUNTY OF ST. LUCIE STATE OF FLORIDA
APPLICATION BY FLORIDA POWER & LIGHT CO.
SHEET 4 OF 6 DATE

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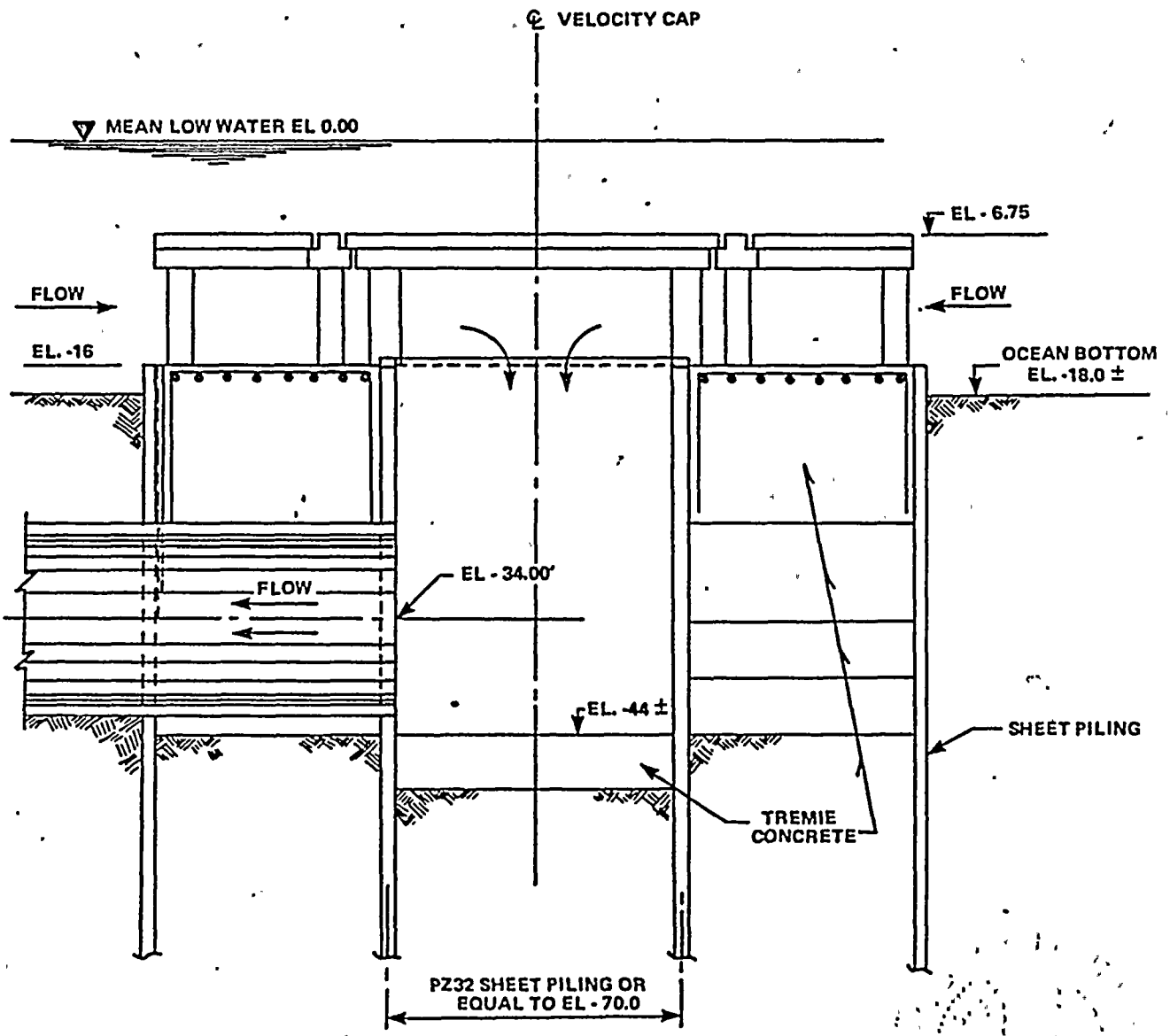

SECTION THROUGHT VELOCITY CAP

OCEAN INTAKE PIPELINE CONSTRUCTION
AT ST. LUCIE PLANT-HUTCHINSON ISLAND
COUNTY OF ST. LUCIE STATE OF FLORIDA
APPLICATION BY FLORIDA POWER & LIGHT CO.
SHEET 5 OF 6 DATE

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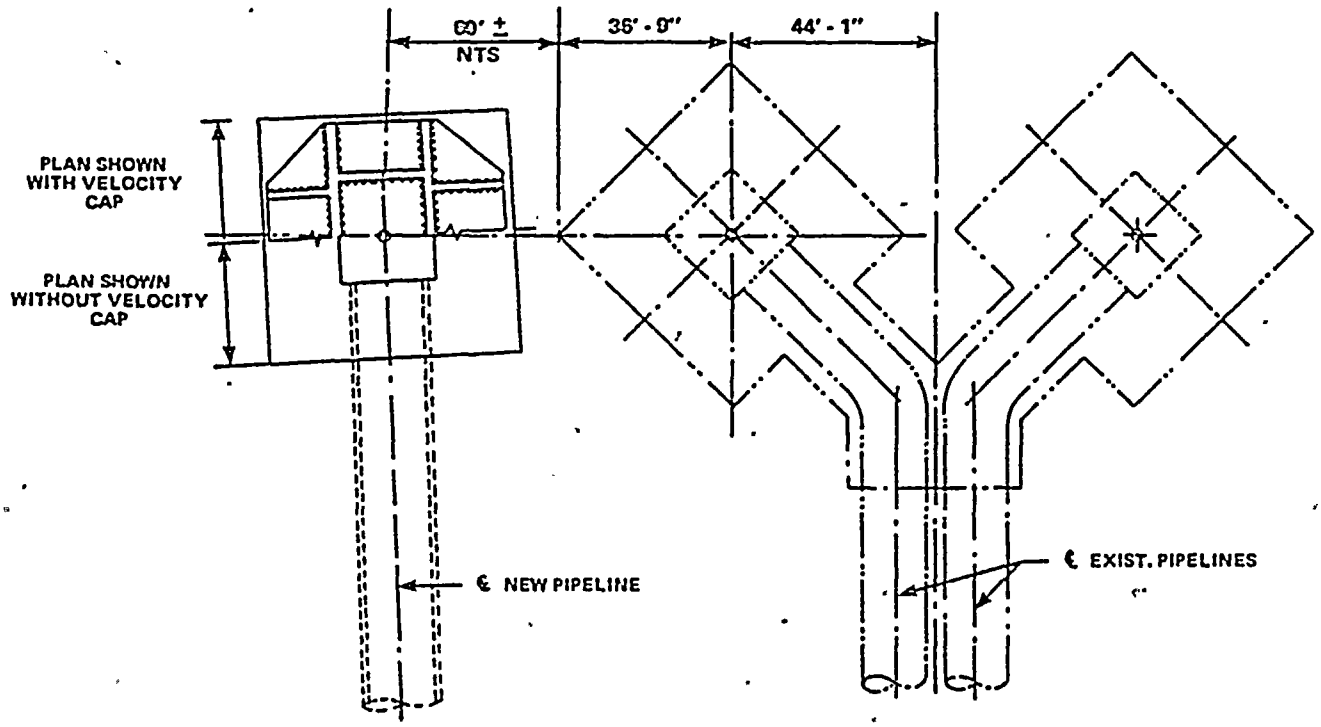
		NO.	DATE	REVISION	DR.	CH.	AP	REGISTERED ENGINEER NO. 21050

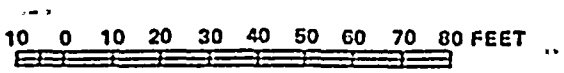
N ← PLANT NORTH



PROPOSED VELOCITY CAP

EXISTING VELOCITY CAPS

PLAN - OFFSHORE VELOCITY CAPS



OCEAN INTAKE PIPELINE CONSTRUCTION
AT ST. LUCIE PLANT-HUTCHINSON ISLAND
COUNTY OF ST. LUCIE STATE OF FLORIDA
APPLICATION BY FLORIDA POWER & LIGHT CO.
SHEET 6 OF 6 DATE

FLORIDA POWER AND LIGHT COMPANY

ST LUCIE PLANT - UNITS 1 & 2

CIRCULATING WATER SYSTEM MODIFICATION

November, 1981

CONTENTS

CONTENTS (Cont'd)

1.0 NEED FOR CIRCULATING WATER SYSTEM MODIFICATION

Full flow operation of the Circulating Water System (CWS) for St Lucie Unit 1 was attempted in January of 1976. At that time, the ocean portion of the system consisted of two 12 foot diameter intake pipelines and one 12 foot discharge pipeline. Separate intake and discharge canals on land conveyed the ocean cooling water to and from the plant. During initial operation, very high water levels occurred in the discharge canal, causing some flow over an emergency spillway. Because of this, the system was shutdown. Subsequent testing of CW pumps performance in early February indicated that they were pumping about 15 percent above the design flow. However, throttling the pumps with the discharge valves to the design flow still resulted in higher than expected water level in the discharge canal and hydraulic headlosses in excess of those expected in both intake and discharge pipelines. These conditions were determined to be the result of higher than expected ocean tides, and the formation of marine growth on the pipe wall, as described below.

A diver's inspection of the pipelines revealed the formation of marine growth on the pipe wall (several inches thick on the intake pipelines, about one inch thick on the discharge pipeline) along the entire length of these pipelines. Tests performed to determine the hydraulic characteristics of each pipeline indicated that the hydraulic headlosses in the ocean pipelines were high, and that the pipeline friction factor (Darcy-Wiesbach 'f') was determined to be 0.030 for the intake pipeline and 0.024 for the discharge pipeline, as compared with a clean pipe

friction factor of 0.015 or less. These higher friction factors were caused by marine growth on the pipe wall and added approximately three ft and two ft of hydraulic headloss to the intake and discharge pipelines, respectively, representing 50 percent and 30 percent increase in total headlosses for these pipelines.

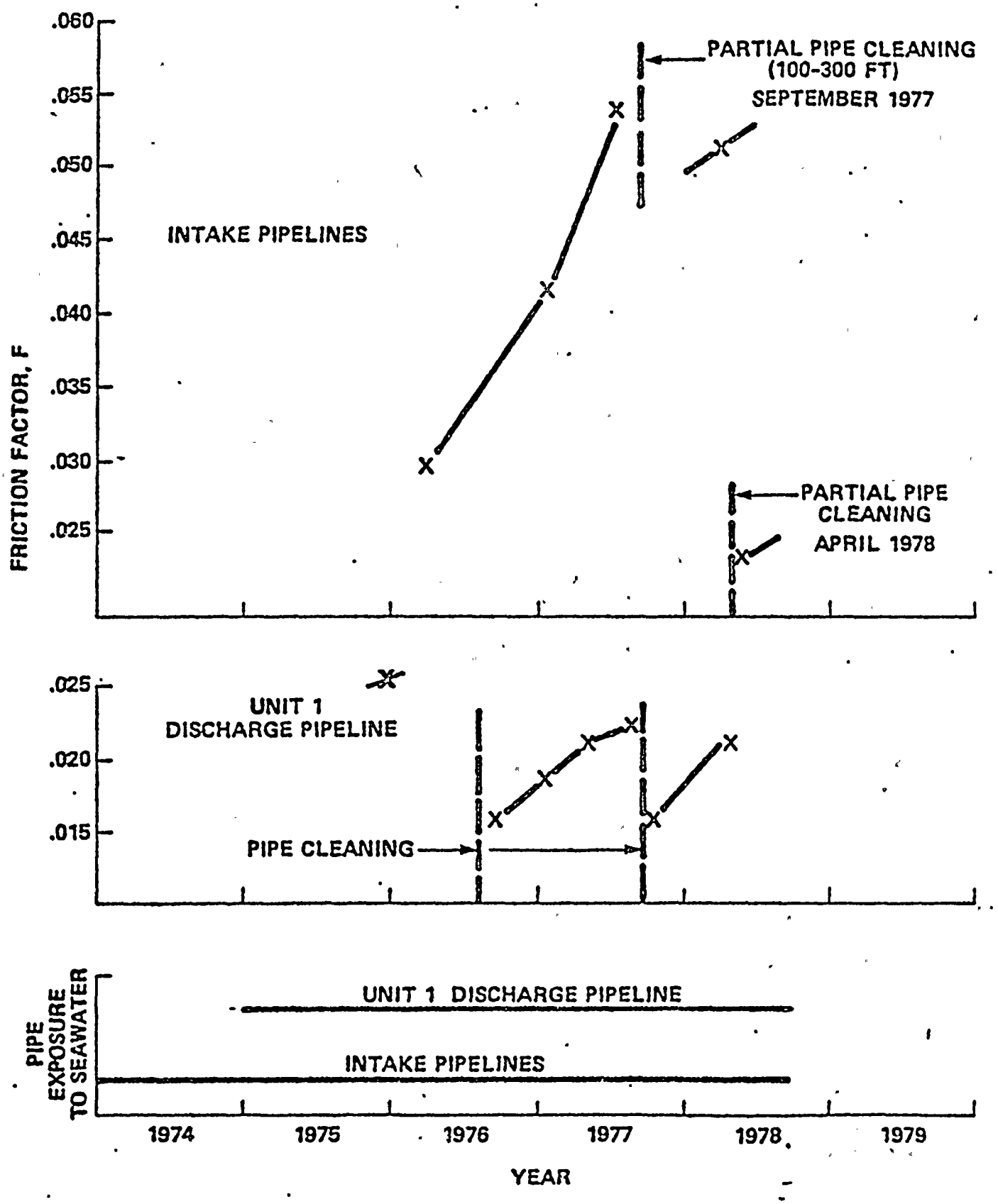
To demonstrate that the marine growth seriously affected the hydraulic friction factor, the discharge pipeline was cleaned in September of 1976 to restore the friction factor to 0.016. A reduction of about two feet of headloss was realized. Additionally, periodic monitoring of the hydraulic performance of the ocean pipelines was initiated to determine changes in the friction factor. The results of this monitoring are shown in Figure 1.0-1.

From the monitoring program, it was concluded that marine growth on the pipe wall would require treatment either by periodic cleaning of the pipelines, or by some type of control or by physical modification of the system.

Since the two intake pipelines were designed to supply water for St Lucie Units 1 and 2, no operating problem was experienced for St Lucie Unit 1 on the intake side. However, when St Lucie Unit 2 becomes operational in 1983 the combined effects of headlosses, as indicated in tests simulating two unit operation, will adversely affect plant operations in that excessive headlosses through the intake pipelines could reduce the intake canal water level such that minimum pump submergence requirements could

not be met. Similarly, excessive headlosses in the ocean discharge pipeline would result in high water levels in the discharge canal and possible spillway overflow to the mangroves north of the canal. Finally, the combined headloss increases would reduce the volume of cooling water pumped through the plant such that plant temperature rise would exceed the original 24 F maximum and plant efficiency would be reduced.

In 1978, the discharge canal dikes and the overflow spillway were raised to accommodate higher water levels in the discharge canal. Additionally, a periodic pipe cleaning routine was intitated for the 12 foot diameter ocean discharge pipeline. Finally, the St Lucie Unit 2 ocean discharge pipeline, which has been constructed, was increased in diameter to allow for marine growth accumulations. These actions alleviated the problem on the discharge side. For the intake side, a third intake pipeline is proposed. This new pipeline will be constructed north of the existing twin intake pipelines. Environmental impacts associated with the construction and operation of the third intake pipeline are addressed herein.



FLORIDA POWER & LIGHT COMPANY
ST. LUCIE PLANT

HYDRAULIC PERFORMANCE
MONITORING FOR INTAKE
& DISCHARGE PIPELINES

2.0 EXISTING CIRCULATING WATER SYSTEM

The circulating water system for St Lucie Plant has been described in detail in Section 3.4 of the St Lucie Unit 2 Environmental Report - Operating License.

3.0 ECOLOGY

3.1 TERRESTRIAL

Terrestrial vegetation and wildlife in the Plant site area has been described in detail in Section 2.2-1 of the St Lucie Unit 2 Environmental Report - Operating Licensing. The following description relates to the area where the proposed third intake pipeline is located.

Beach and dune vegetation near the existing intake pipelines are characterized by dense stands of saw palmetto (Serenoa repens) or sea grape (Coccoloba uvifera) and sandy open areas with sea oats (Uniola paniculata), battis (Battis maritima) and other species. Plant species observed in this area along two sampling transects are noted in Tables 3-1 and 3-2 along with estimates of cover/abundance. Important species are sea oats, which stabilize the foredune against wind and storm erosion, and other species which are of tropical affinity and consequently of interest to botanists and naturalists. The latter include sea grape, Spanish bayonet (Yucca aloifolia), Myrsine guianensis, lantana (Lantana involucrata)[1] and neckless pod (Sophora tomentosa)[2]

Land immediately north of the existing intake canal comprises of mangrove swamp, and an area used for storage of heavy equipment during construction. The swamp is dominated by red mangrove (Rhizophora mangle). It includes scattered individuals of white mangrove (Laguncularia racemosa) black mangrove (Avicennia genminans) and

buttonwood (Conocarpus erectus). Hydrologically, this swamp is isolated from marine and estuarine communities by State Route A1A, the intake and discharge canals, and a service road parallel to the beach.

3.2 AQUATIC

Atlantic Ocean marine communities offshore Hutchinson Island which would be exposed to construction and operation of the circulating water system are described in Section 2.2.2 of the St Lucie Unit 2 Environmental Report - Operating License.

CHAPTER 3: REFERENCES

1. Long, R W and O Lakela, 1976. A Flora of Tropical Florida, Banyan Books, Miami, Florida.

2. Small, J K, 1933. Manual of the Southeastern Flora, Hafner Publishing Company, New York.

TABLE 3-1

COVER/ABUNDANCE ESTIMATES FOR DUNE FLORA: AREA OF INTAKE PIPELINES

SPECIES	STATIONS: 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Uniola paniculata (sea oats)	7	5	7	7	7	5	3																							
Coccoloba uvifera (sea grape)					1	3	3		3	2	3	5	4	1		1	2		4					2						
Helianthus debilis var debilis (sunflower)						3	5	4		2		5	4	6	4	4	4	7	5	3										
Cenchrus incertus (burgrass)											6	3	5	3			5	3	4	3	4	1								
Croton punctatus								1																						
Yucca aloifolia (Spanish bayonet)									5	5																				
Battis maritima (bnattis)										2		5	5	2	2	2														
Vitex trifolia																				4	7	3	5	3						
Cassuarina sp (Australian pine)																								1	7					
Bare Sand	3	5	3	3	3	5	5	7	6	6	4	5	3	3	7	6	5	3	3	6	4	7	7	7	3	7	7	7	7	7

Note: Stations located contiguously along transect perpendicular to coastline. Stations 1-5 occur on east side of foredune; transect terminated on west side of foredune at FP&L fenceline (road). Each station is one meter (3.3 feet) square. Observations recorded January 30, 1979. Voucher specimens identified at University of Miami. Nomenclature follows Long and Lakela[1]. Cover abundance scale[3]: 1 = solitary, cover less than 6 percent; 2 = few, cover less than 6 percent; 3 = numerous, cover less than 6 percent; 4 = 6-25 percent cover; 5 = 26-50 percent cover; 6 = 51-75 percent cover; 7 = 76-100 percent cover.

TABLE 3-2

COVER/ABUNDANCE ESTIMATES FOR DUNE FLORA: AREA IMMEDIATELY NORTH OF INTAKE PIPELINES

SPECIES / STATIONS:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Uniola paniculata (sea oats)	6	7																													
Croton punctatus	2	3																													
Helianthus debilis var debilis (seaflower)		1																										3	7	4	
Cenchrus incertus (burgrass)		1																													
Coccoloba uvifera (sea grape)			7	7	7																						5	5			
Yucca aloifolia (Spanish bayonet)					2																										
Serenoa repens (saw palmetto)						7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	5	7	4	6					
Myrsine guianensis																			1	5	3	1	7	7	6						
Sophora tomentosa (neckless pod)		4	1																						1	1				4	1
Lantana involucrata (lantana)																									7	5					
Panicum rhizomatum			1																												
1																															
Bare Sand	4	3	2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	5	4	5	7

Note: See note for Table 3-1. Stations 1-3 occur on east side of foredune.

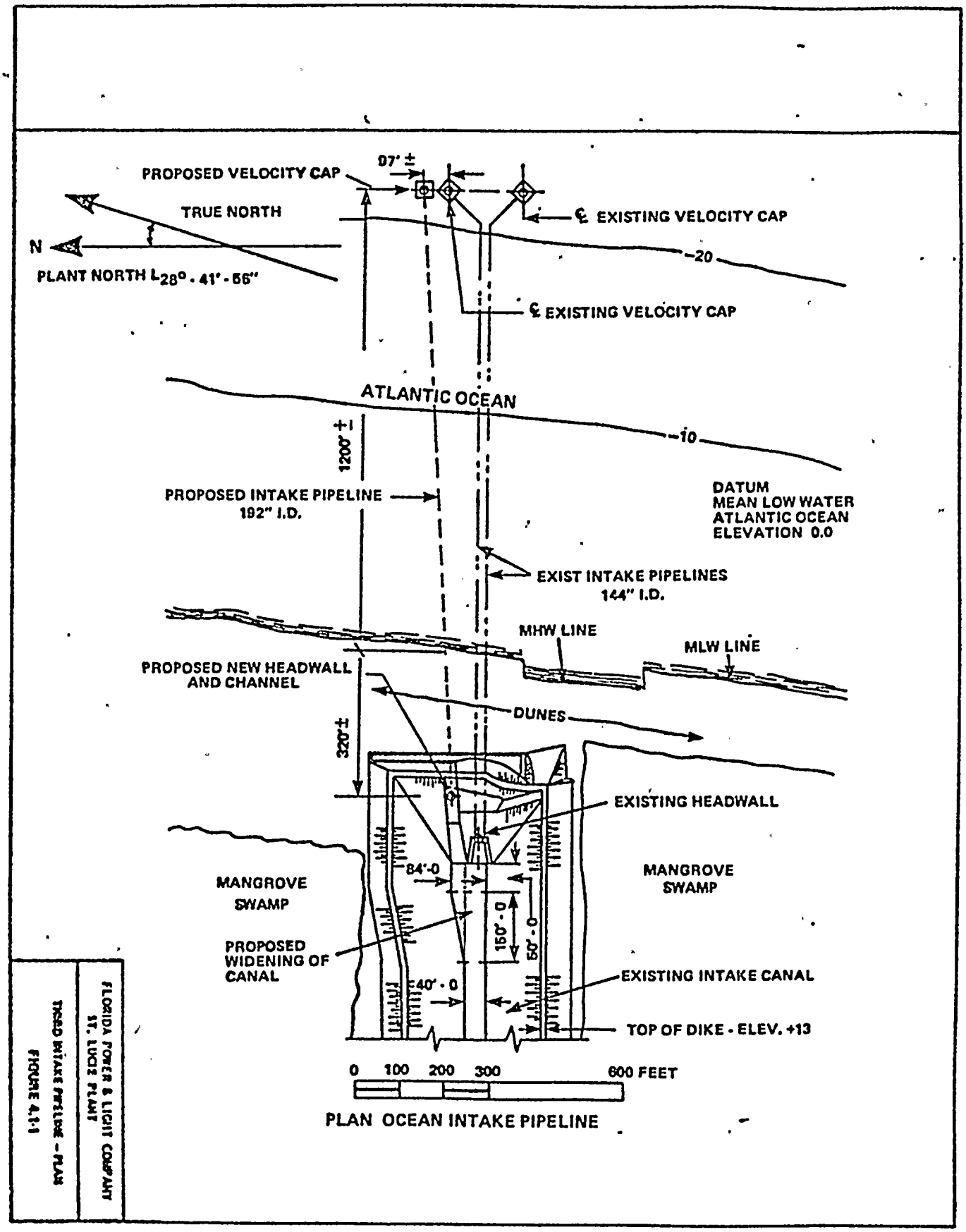
4.0 THIRD INTAKE PIPELINE

The addition of a third intake pipeline (TIP) would reduce the hydraulic losses in the ocean intake pipelines because headlosses are a function of the velocity of flow squared (V^2). For example, by adding a third 16 foot diameter pipeline, the maximum flow velocity would be reduced to two-thirds of the twin pipeline flow velocity (from approximately 10 fps, to approximately 6.8 fps); the headlosses would correspondingly be reduced by 54 percent.

During the several years that the intake pipeline headlosses were monitored, and before the pipelines were cleaned, marine fouling continued to grow and the pipe wall friction factor increased. An upper limit for growth and friction factor were not established. Accordingly, it has been assumed that periodic pipe cleaning will be necessary even with a TIP in service; however, the frequency of such cleanings can be greatly reduced. Cleaning of the TIP can be scheduled to coincide with refueling outage of one unit, without interrupting operation of the other unit. Therefore, by adding a TIP, operational reliability and flexibility of the Plant CWS systems would be greatly improved.

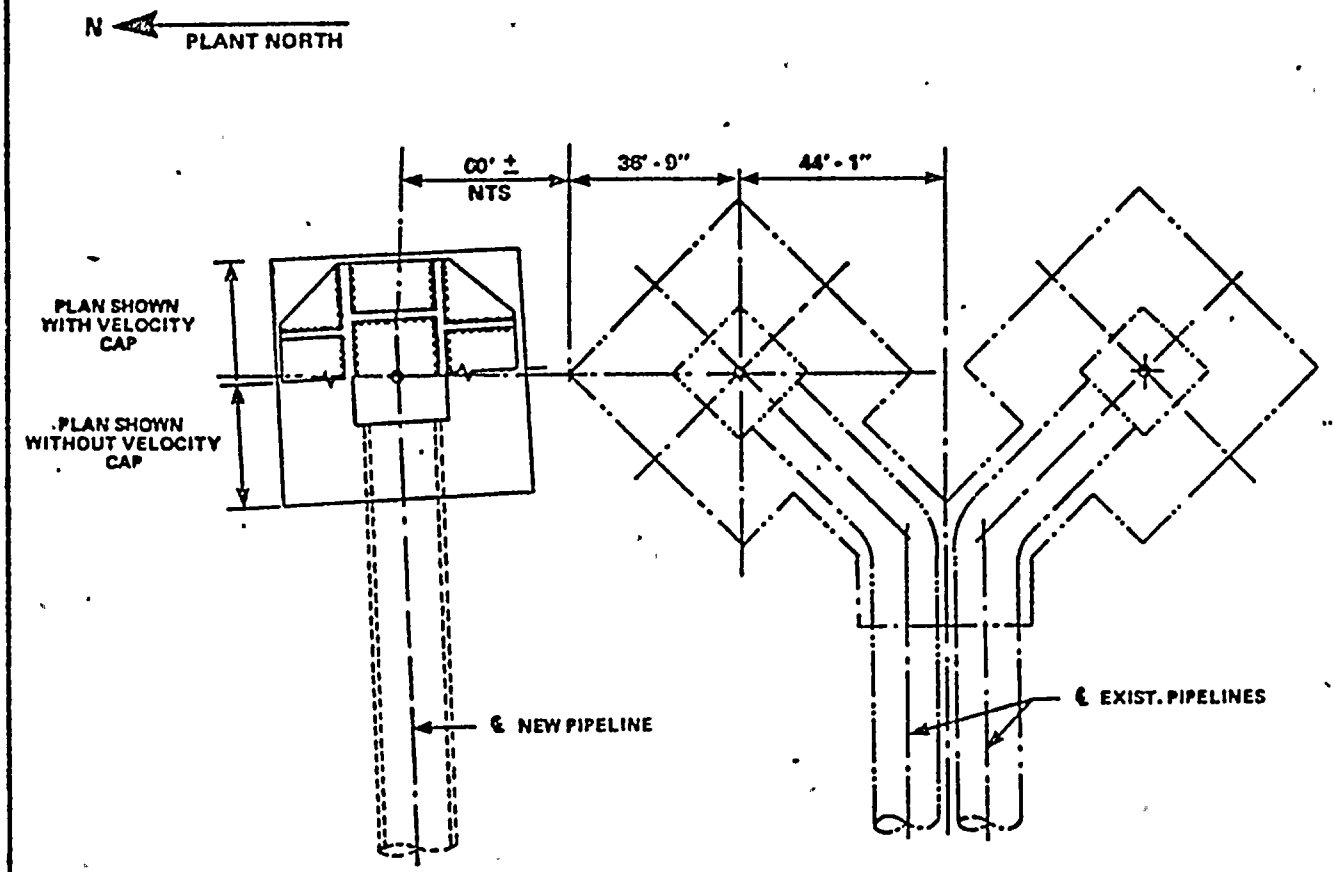
Construction of the 16 foot diameter pipeline would be within a sheetpiled trench and would be similar in all respects to the construction methods used for both the twin intake pipeline construction in 1973/74 and the Unit 2 discharge pipeline construction in 1980/81. Construction methodology for the latter is described in Section 4.1 of the St Lucie Unit 2 Environmental Report - Operating License.

As shown in Figures 4.1-1 through 4.1-4, the pipeline would begin at an offshore velocity cap structure located approximately 1200 feet from the Mean Low Water line. The velocity cap structure would be of similar size and design to the existing structures. The pipeline would be buried for its entire length, both offshore and onshore. The pipeline would enter the east end of the intake canal at a new headwall structure. The headwall structure would be of similar design to the one built for St Lucie Unit 2 discharge structure. A short sheetpile channel would be constructed from the headwall to the existing canal.



FLORIDA POWER & LIGHT COMPANY
ST. LUCIE PLANT

THIRD INTAKE PIPELINE – PLAN
FIGURE 4.1-1

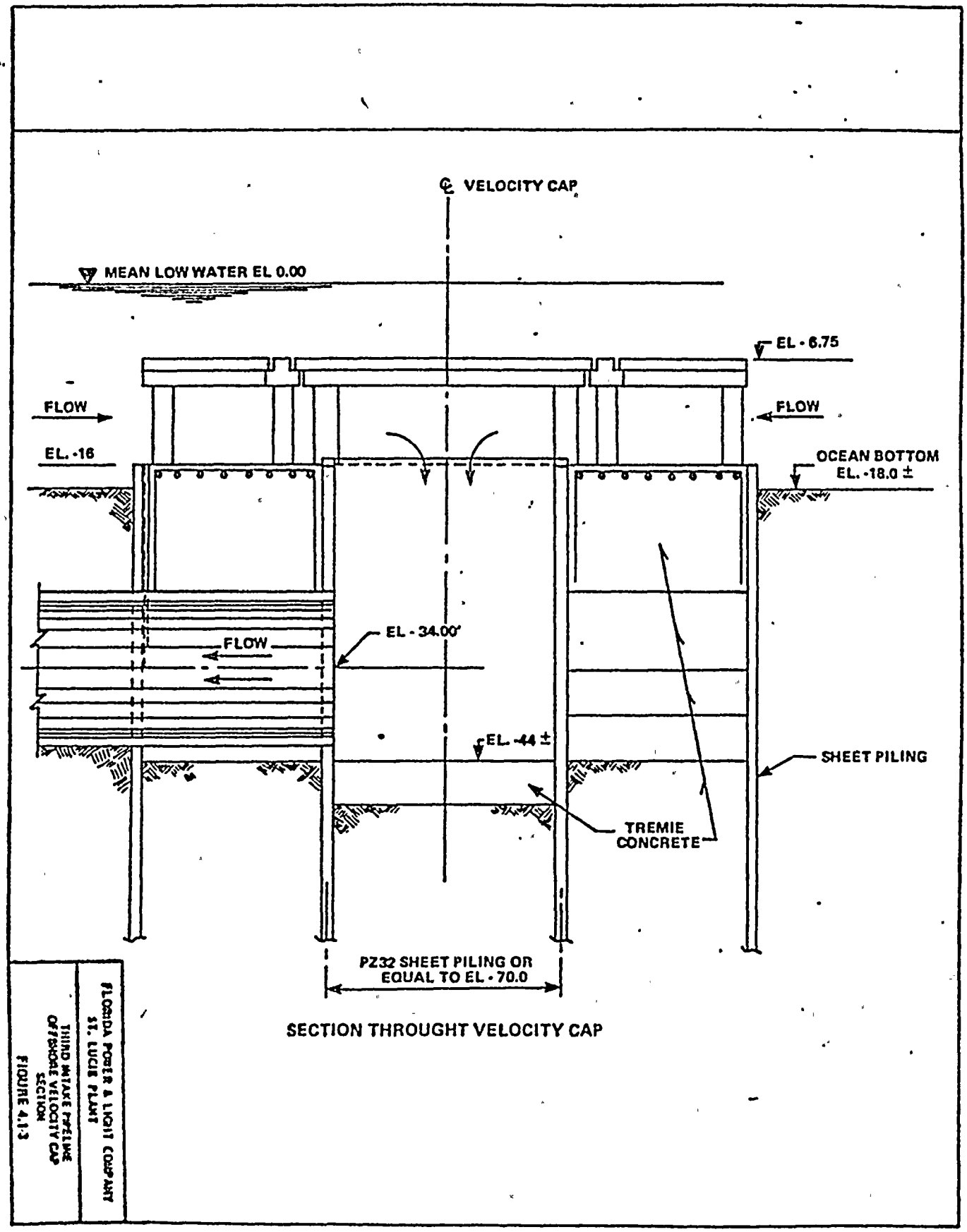


PLAN - OFFSHORE VELOCITY CAPS

10 0 10 20 30 40 50 60 70 80 FEET

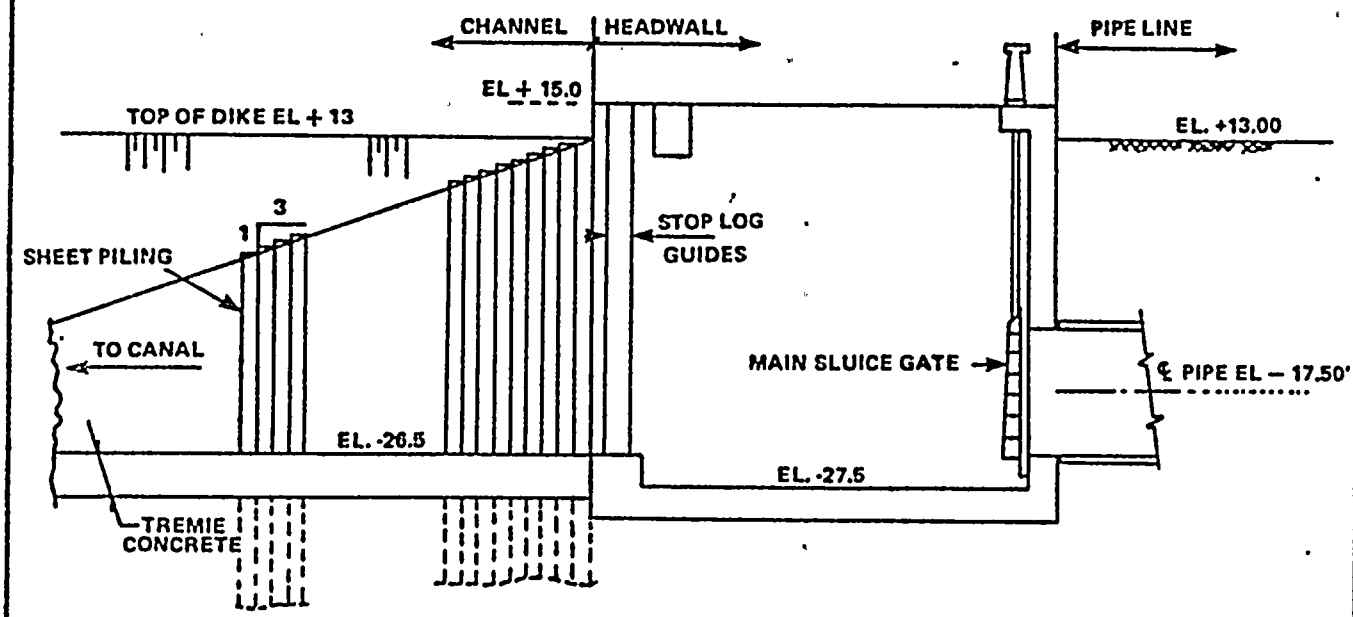
FLORIDA POWER & LIGHT COMPANY
ST. LUCIE PLANT

THIRD INTAKE PIPELINE
OFFSHORE VELOCITY CAP - PLAN
FIGURE 4.1-2



SECTION THROUGHT VELOCITY CAP

FLORIDA POWER & LIGHT COMPANY
ST. LUCIE PLANT
THIRD INTAKE PIPELINE
OFFSHORE VELOCITY CAP
SECTION
FIGURE 4.1-3



SECTION THROUGH HEADWALL & CHANNEL

FLORIDA POWER & LIGHT COMPANY
ST. LUCIE PLANT

THIRD INTAKE PIPELINE
HEADWALL STRUCTURE – SECTION
FIGURE 4.1-4

5.0 CONSTRUCTION EFFECTS

5.1 ECOLOGICAL EFFECTS

Construction of the TIP will probably begin in February 1982 and will be completed by December 1982, before the operation of St Lucie Unit 2.

Ecological effects are temporary and impacts are primarily restricted to marine systems.

5.1.1 Terrestrial

Construction of the TIP will follow the same practices for constructing the discharge pipelines which were addressed in Sections 4.1.3.2 and 4.1.3.3 of the St Lucie Unit 2 Environmental Report - Operating License. Terrestrial impacts include (i) excavation of a strip of dune vegetation and sand less than 100 feet wide, and (ii) preemption of less than one half an acre of mangrove swamp immediately west of the storage area and north of the intake canal for an access road and canal widening (see Figure 4.1-1).

The dune area affected is characterized by dense stands of saw palmetto and more open areas providing habitat for plant species noted in Tables 3-1 and 3-2. Dune flora is important for its role in soil stabilization, and for the assemblage of relatively uncommon plants of tropical affinity. After contours have been restored to pre-construction

conditions, the disturbed areas will be replanted with native dune-stabilizing species. No longterm effects on dune flora diversity or abundance are anticipated. Removal of less than one half an acre of the mangrove swamp represents about one percent of the mangrove between the intake and discharge canals.

5.1.2 Aquatic

Construction of a TIP during any part of the marine turtle nesting season (1 May to 1 September) will probably cause local, short-term impacts on marine turtles. In 1975, pipeline construction at the St. Lucie site apparently reduced the suitability for nesting of the beach near the Plant. Analysis of nesting data showed that nesting density near the Plant decreased to about 50 percent of the expected number of nests.[1, 2] However, turtles that failed to nest in the Plant vicinity probably nested elsewhere on the island as evidenced by the higher than expected nest densities in areas to the north and south of the plant. The effects of construction should be limited to the nesting season during which construction occurs. After construction ended in 1975, nest numbers were near expected values.

Additional impacts associated with construction of the TIP may include the crushing and excavation of nests by construction equipment on the beach and nest losses resultng from beach erosion. A nest surveillance and relocation program will be instituted on those areas of beach potentially affected by construction activity, as described in Section 4.1.3.2 of the St Lucie Unit 2 Environmental Report - Operating License.

The pipeline sheetpiled trench will disrupt the littoral flow of sand that normally stabilizes beaches and, with time, could result in some changes in beach profiles near the construction site. During storms, the process is accelerated and nests in the affected area could be lost to erosion, flooding or additional accumulations of sand.

In the marine environment, impacts due to construction of a TIP would be identical in nature to those discussed in Section 4.1.3.3 of the St Lucie Unit 2 Environmental Report - Operating License. The sheetpile trench excavated for the TIP would be 364 m (1200 ft) long and 7.6 m (25 ft) wide. The total surface area disturbed would be 2782 m^2 (0.7 acre), raising the total amount of disruption from 55640 m^2 (14 acres for the St Lucie Unit 2 discharge pipeline alone) to 58420 m^2 (14.7 acres). Thus, the temporary loss in numbers and/or biomass of benthic organisms would be five percent greater than that presented in St Lucie Unit 2 Environmental Report - Operating License. Past history at the St Lucie site indicate that substrate stabilization and recolonization should occur rapidly following pipeline construction.

CHAPTER 5: REFERENCES

1. Applied Biology Incorporated ABI. 1978. Ecological monitoring at the Florida Power & Light Co. St. Lucie Plant, annual report 1977. 2 vol. AB-101. Prepared for Florida Power & Light Co., Miami, Fla.

2. Applied Biology Incorporated. 1980. Non-radiological environmental monitoring report 1979. vol. AB-244. Prepared for Florida Power & Light Co., Miami, Fla.

6.0 OPERATION EFFECTS

6.1 ECOLOGICAL EFFECTS

Operational impacts of the TIP include entrainment and impingement, as described below.

6.1.1 Entrainment

Section 5.1.3.1.1 of the St Lucie Unit 2 Environmental Report - Operating License described impact of entraining planktonic organisms into the circulating water system. Use of three intake pipelines, rather than two, to convey the required 2320 cfs cooling water will not increase plankton entrainment. The types and concentration of planktonic organisms will also be similar among intake pipelines due to the fact that the TIP would withdraw water from the same source volume as that presently used.

Three intake pipelines, will have intake velocities lower than the 1.0 fps evaluated for the existing twin pipelines (Section 3.4.2.1 of the St Lucie Unit 2 Environmental Report - Operating License). Thus, to the extent that entrainment is a species-specific function of intake velocity (ie, ability to resist or avoid intake currents), actual losses of organisms for two unit operation may be less than that estimated in Section 5.1.3.1.1 of the St Lucie Unit 2 Environmental Report - Operating License. An entrainment rate of 3.6 percent of the near-field community was presented as a worst case for two unit operation in the St Lucie Unit 2 Environmental Report-Operating License.

6.1.2 Impingement

Impingement effects of two unit operation at St Lucie were discussed in detail in Section 5.1.3.1.2 of the St Lucie Unit 2 Environmental Report-Operating License. Conservative impingement rates for fish and shellfish were estimated to be 150,000 and 60,000 individuals/yr, respectively. These estimates assumed a linear increase in impingement with respect to capacity or velocity, and year-round operation of both units. The actual rate is likely to be lower, particularly for important species such as Spanish mackerel and bluefish which appear capable of avoiding entrainment into the pipelines. Impingement rates for two pipeline operation with average intake velocities of 1.0 fps should exceed those for three pipeline operation.

Intake operation will affect mostly subadult turtles because they may frequent nearshore waters more than adults. Adult turtles are found inshore only during the nesting season. Studies of turtle populations in Mosquito Lagoon, at the north end of the Indian River, showed that subadults were selectively inhabiting these inshore waters.

It is not known if turtles are attracted to the plant intake area or if they encounter the intakes by chance. However, turtles do seem attracted to underwater objects that appear to provide cover. Behavioral studies of immature loggerhead and green turtles showed that turtles seek out covered areas in which to rest. The existing two velocity caps and exposed portions of the intake probably appear to turtles as suitable resting and foraging spots in an area otherwise devoid of bottom

profile. Turtles may enter the intake pipes in response to the visual cue of the dark area under the velocity caps, or accidentally, while searching for food or swimming in the area when the water is turbid.

The addition of a third intake structure may increase the entrapment rate of marine turtles. The percentage of turtles coming in contact with the plant intake that actually enter the pipelines is not known, but a TIP will increase the probability of a turtle encountering a structure.

6.2 OTHER EFFECTS

6.2.1 Aesthetics

Since the TIP is buried under the ocean and the beach dunes, operation of the TIP will offer no visual impacts.

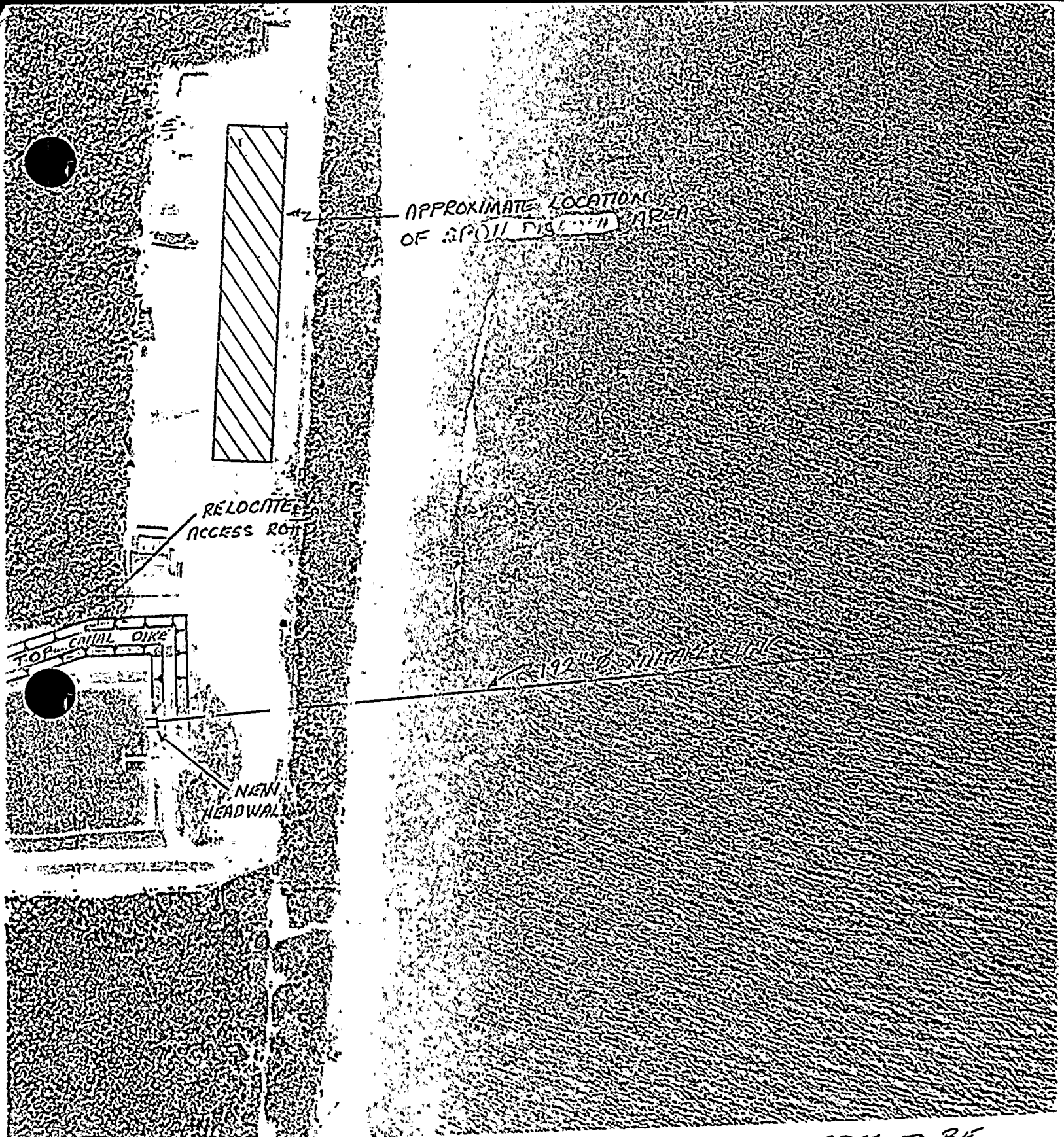
6.2.2 Noise Effects

Operation of the TIP as well as the existing twin intake pipelines would not produce any noise.

Question 291.22: On an aerial photo such as provided on site visit (scale 1"=200', taken 12/12/80) show the exact location for the third intake pipeline including detail for the on-land portion. Also show the details of the mitigation area to be provided as compensation for the destruction of mangrove swamp.

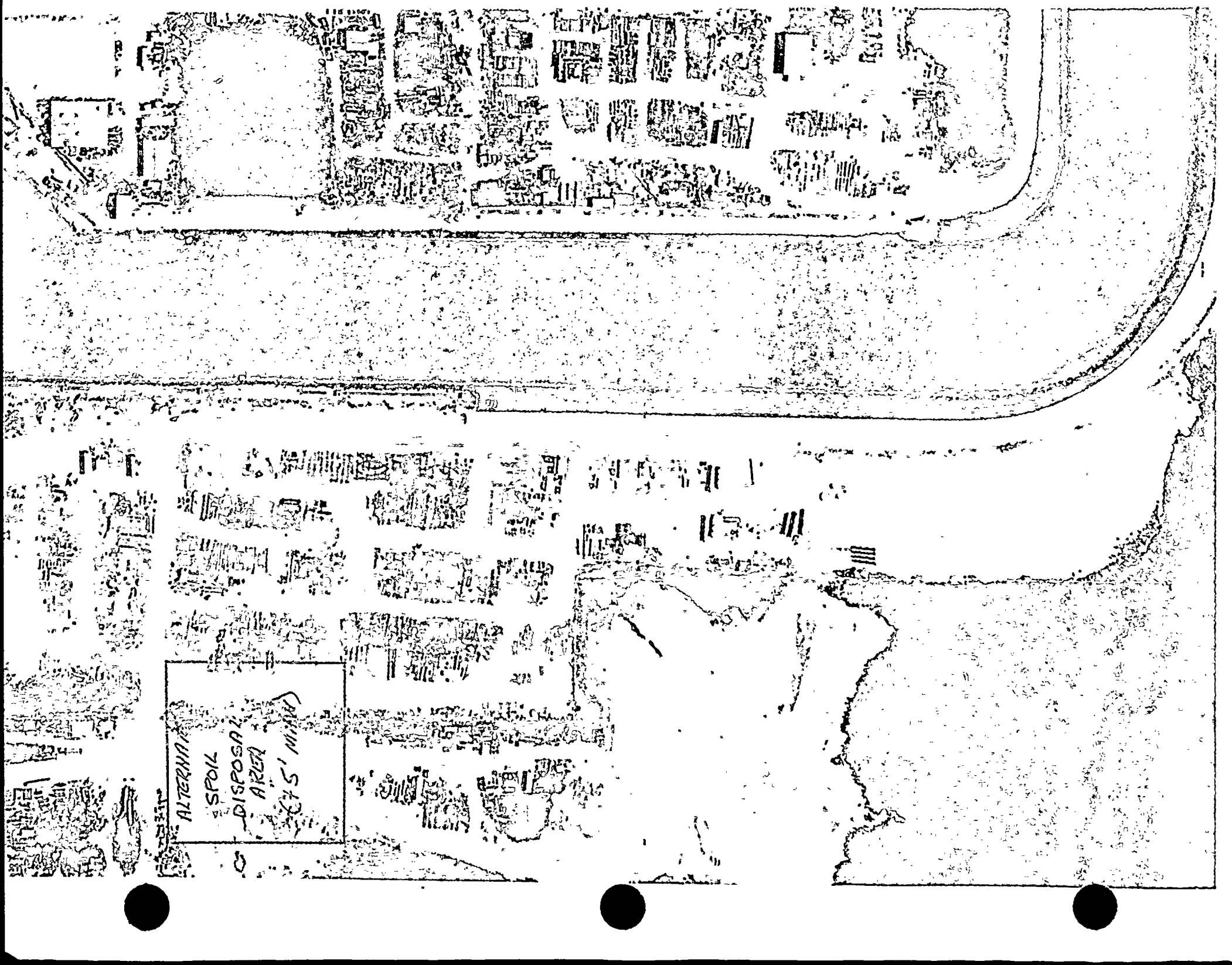
On the same photo, if appropriate, or on other photo identify boundaries of areas to be used for the disposition of dredge spoils resulting from the construction of the third intake pipeline, headwall, and widening of the intake canal.

Response: See attached marked-up aerial photo.



NOTE: LOCATION OF MANGROVE MITIGATION AREA TO BE DETERMINED BY CORPS OF ENGINEERS.

10 11 12 13


ALTERNATIVE
SPOIL
DISPOSAL
AREA
74.5' MSL

Question 291.23: Provide the following information:

A. The month the mangrove swamp mitigation action is to take place.

B. The kind of equipment used to perform the mitigation action (e.g., backhoe, dragline).

C. The names of the specific native species to be planted.

Response:

A. The mangrove swamp mitigation will be completed by February 1, 1983.

B. Equipment to be used will be a backhoe to bring the lay down area elevation down to wetland elevation. Mangrove seedlings will be planted by either using a mechanical auger or by hand.

C. Mangroves (Rhizophora mangle) will be planted per the Crops permit special conditions.

Question 291.24: Conduct a survey of the mangrove swamp to determine whether any leather ferns are in area to be destroyed.

Response: A survey of the construction area has been conducted and no leather ferns were found.

Question 291.25: Provide a narrative of any present or future efforts that have been or will be taken to prevent marine turtle entrainment at the offshore intake structure.

Response: Efforts to understand and reduce turtle entrapment at St. Lucie Plant date to May 1976, when Unit 1 began operation. Monitoring of entrapped sea turtles began in 1976 (intermittent plant operation) when 33 loggerheads were handled. Monitoring of entrapped sea turtles continued in 1977 and 84 turtles (mostly loggerheads) were handled. After the 1977 entrapment data were reviewed for the annual non-radiological reports, the Environmental Department realized that turtle entrapment would be a continuing phenomenon and began a series of evaluations on potential methods to reduce it.

On April 5, 1978, a recommendation was made to the Power Plant Engineering Department that they investigate the feasibility of covering the underwater intake opening with a network of bars. Based on carapace width of 140 turtles (four species: green, n=4; hawksbill n=1; leatherback n=3; loggerhead n=132), maximum dimensions recommended were: square opening of 31.5 cm (12.5 in.) on a side or a diagnoal measurement of 44.5. These dimensions would exclude approximately 95% of the turtles. On July 24, 1978 this preliminary design was completed and reviewed by FPL. The design called for a cage-like structure with a network of bars on 30.5 cm centers to be hinged to the top of the velocity cap. The package included a description of the project, data sheets, material lists, and estimated costs. No further work was authorized on this design because of expected marine fouling and

subsequent reduction of flow, costs, and because other methods to modify turtle behavior were under consideration.

An experiment to reduce turtle entrapment occurred in June, 1978, when one of the two intake pipes was plugged and Unit 1 operated off the other pipe, which had just been cleaned of fouling organisms. This action increased the horizontal approach velocity around the plane of the velocity cap to 30.5 cm/sec and doubled the water velocity in the pipeline (e.g. the design criteria when both units are in operation). The hypothesis being tested was that the lower approach velocity of 15.3 cm/sec was insufficient for turtles to detect and by operating at the design criteria, the turtles could sense this velocity and avoid being entrapped. Turtle catch per effort during one pipe mode of operation (June 1-24) was compared to catch data during two-pipe operation and it was concluded that there was no difference between the two modes of operation.

On June 8, 1978, Florida Power & Light Company contracted with Applied Biology Inc., of Atlanta, Georgia to conduct a 28 month laboratory investigation on methods to minimize sea turtle entrapment at the St. Lucie Plant. Area of investigation included how light and mechanical devices would modify turtle behavior.

In August, 1980, a final report on this project (Applied Biology, 1980) concluded that under laboratory conditions, turtles readily sought out and utilized dark box habitats during resting periods in both night and day situations. Lights (100 watts) in the box habitats were a useful deterrent at night but were ineffective during the day when ambient solar light negated their results.

The study also concluded that a bubble screen was effective in excluding turtles from the box habitats during daylight hours. The effects were more positive during bright light conditions probably due to increased visibility as the bubbles reflected the sun light. At night the bubble screen was ineffective.

Under laboratory conditions, the combined installation of lights and a bubble screen in or around the velocity cap was felt to be promising methods to reduce turtle entrapment. Further testing of prototype designs was felt warranted, but a number of unknowns needed to be evaluated such as effects on other biotic communities and logistics of installing these devices in an ocean environment.

Based on the results of the above study, an evaluation was made on methods to determine if there was a day or night pattern of turtle entrapment. To monitor time of turtle entrapment, sonar and underwater closed-circuit television were considered for the velocity cap and an optical beam was considered for the headwall. However, because of practical and logistic problems associated with the installation of this

equipment and other research work on electrical field about to begin, no further work using these monitoring methods was authorized.

On June 1, 1981, FPL contracted with Environmental and Chemical Science (ECS) of Atlanta, Georgia, to perform a study on how electrical fields (AC and DC) could modify turtle behavior. The final report (Environmental and Chemical Sciences, 1981) was issued in December, 1981, and is being evaluated by FPL at the present time. The conclusions of the study are as follows:

1. Marine turtles avoided both AC and pulsed DC electric fields of sufficient intensity.
2. Exposure to low voltage electric fields did not harm the turtles. Turtles did not exhibit learned behavior after repeated exposures to such fields.
3. For a given peak voltage, sine wave AC fields were more effective than pulsed DC in repelling turtles. While there was some variability in the response of turtles to different DC pulse rates, pulse width and waveforms, no well-defined set of parameters appear to be superior.
4. There was considerable variation in the responses exhibited by individual turtles to electric fields. Size was important because the larger turtles are more sensitive. Species variations may exist as

there were some indication that green turtles are more sensitive than loggerheads.

5. The field intensity experienced by the head of the turtle may be the most important electrical parameter determining behavior.
6. Under some conditions, turtles entered strong electrical fields and lost motor coordination. At the field intensity studied, the turtles recovered immediately when released from the field with no apparent damage and, again, no apparent learning.

The scope of work for the ECS contract was expanded on November 30, 1981, to allow a preliminary analysis on using sound to modify turtle behavior. This evaluation is underway at this time.

Future Efforts

Until the electrical field and sound work is further evaluated on engineering, cost, practicality and safety criteria, the direction of future work is uncertain. Undoubtedly, further laboratory testing using scale models of the intake structure would be appropriate. Depending on a number of variables, lights, bubble curtains, electrical fields, and sound devices may all have potential for modifying turtle behavior and reducing turtle entrapment at St. Lucie Plant.

References:

Applied Biology, Inc. 1980. Turtle Entrainment Deterrent Study, AB-290, Atlanta, Ga.

Environmental and Chemical Sciences, Inc. 1981. Avoidance responses by sea turtles exposed to electric fields, Atlanta, Ga.

Question 291.26: Provide details on any refinements considered for the current procedures used to capture turtles in the intake canal.

Response: In April 1978, it was recognized that if the turtles entrapped in the intake canal could be restricted to a small area by the headwall, then the efficiency of their removal could be improved. Based on this reasoning, a request was made to the Power Plant Engineering Department to install a 12 inch square mesh barrier net (strand diameter 3/8") the entire width of the canal at the A1A bridge. This net was installed in the summer of 1978 and is still in place.

On May 3, 1977, Applied Biology, Inc., under contract with Florida Power & Light Company, prepared formal procedures on net placement, turtle removal, tagging, data recording, and turtle release. These procedures were updated in May 1979 and June 1981 and incorporated the following steps to reduce mortalities (not limited to greens):

1. The utmost care is taken in handling the animals to prevent injury and trauma.
2. Sick or injured turtles are treated and occasionally held for observation prior to release. Treatment includes injections of antibiotics and vitamins by a local veterinarian if warranted.
3. Resuscitation techniques are used if the animal appears recently dead (a green was revived by mouth-to-mouth resuscitation in 1981).

4. Sport fishing in the canal has been prohibited (turtles have been found with hooks and monofilament line entangled or attached; however, this did not necessarily happen while they were in the canal).
5. Gill netting for fish monitoring has been deleted at a station by the headwall.
6. Plant personnel have home phone numbers of Applied Biology, Inc., personnel so they can be notified of sea turtle occurrences at irregular hours.
7. Plant and Applied Biology personnel are checking the tangle nets more frequently.

The following are methods which will be evaluated and/or employed to further reduce mortalities (emphasis on greens or other small turtles):

1. Use special nets which are lighter in weight, fish near the surface, and have finer mesh than presently used.
2. Modification in size, weighting or positioning of the presently used nets.
3. Discontinue use of one of the two currently used turtle nets during January through March when the majority of greens occur.
4. Check the nets more frequently during January through March.
5. Experiment with net positions and its effectiveness as a function of turtle behavior. For example, if the greens stay near the headwall the lighter nets could

fished there, while the heavier nets could be placed farther up the canal for the loggerheads.

Through practical experience as other ideas occur on on methods to reduce turtle netting mortality, they will be tested and, if effective, they will be incorporated into the procedures.

Question 291.27: Provide information on what percent of the Caribbean populations of green and loggerhead sea turtles nest in the area of the power plant. Also provide an estimate of the number of nesting turtles (both green and loggerhead) on Florida's east coast. Fully document and reference your response.

Response: Data on green and loggerhead nestings on Hutchinson Island (i.e. the vicinity of the power plant) are based on six survey years - 1971, 1973, 1975, 1977, 1979, and 1981 conducted by the Florida Department of Natural Resources and Applied Biology, Inc., under contract with Florida Power & Light Company. Further details of these studies are reported in the annual non-radiological monitoring reports for St. Lucie Plant including the 1982 report, which is in draft stages.

Green turtles over the six-year period had a range of 5 - 37 nests per year (actual count, but excluding the northern 10 percent of the island during the first five survey years) with a mean of 19 per year (Applied Biology, Inc., 1980, 1982). R. Witham of DNR reported 62 nests in 1978 (a non-survey year for FPL) (Applied Biology, Inc. 1980). Loggerhead turtles had a range of 3000 - 4800 nests per year with a mean of approximately 4000 (these figures are whole island estimates based on extrapolations from transects)(Applied Biology, Inc., 1980, 1982).

Figure H-11 (Applied Biology, Inc. 1980) illustrates that greens predominantly nest south of the St. Lucie Power Plant (Area 4). However, in 1981 when 10 green nests were verified on Hutchinson Island, there was one nest recorded in Area 4. (Applied Biology, Inc. 1982).

Figure H-3 (Applied Biology, Inc.,1980) illustrates the nesting pattern of loggerheads in Area 4 (e.g. the Plant Site). In 1981 (Applied Biology, Inc.,1982), 65 nests were recorded in Area 4, compared to 124 nests observed in 1979 when no beach and nearshore construction occurred.

Pritchard (1978) estimates the U.S. loggerhead population consists of about 15,714 adult females. An estimated 19,895 nests are dug in Florida each year by an adult female population estimated at 14,210 individuals.

Pritchard (1978) also estimates the current population of the Florida green as no more than 50 mature females, however, other data suggests this estimate is low. For example, Huff et al. (1980), surveyed selected Florida beaches on the east coast (a total of 222.1 km), and listed actual green nest counts at 281(Table 2). Counts for loggerhead nests during the same survey were 9448 (Table 2). Comparison from 1979 and 1980 revealed two short-term trends: loggerhead nesting decreased in 1980 and green turtle nesting increased in 1980.

References:

Applied Biology, Inc. 1980. Florida Power & Light Company, St. Lucie Plant, annual non-radiological environmental monitoring report 1979, AB-244. Applied Biology, Inc., Atlanta, Ga.

Applied Biology, Inc. 1982. Florida Power & Light Company, St. Lucie Plant, annual non-radiological environmental monitoring report 1981, AB-379. Applied Biology, Inc., Atlanta, Ga.

References (Contd)

Huff, J. Alan, P. Ross Witham Carol J. Gray, and Lou Fallon 1980. Summary of Marine turtle activity in Florida in 1980. Florida Department of Natural Resources, Marine Research Laboratory, St. Petersburg, Fl.

Pritchard, Peter C. H. (ed.) 1978. Rare and endangered biota of Florida, Vol. 3, Amphibians and Reptiles. University Presses of Florida, Gainesville, Fl.

Table 2 - 1980 Nest Survey-Atlantic Coast of Florida - Actual Counts

Location		County	Caretta caretta	Chelonia mydas
1.	Key Biscayne	Dade	22	10
2.	Miami Beach	Dade	10	0
3.	Deerfield Beach	Broward	555	21
4.	Boca Raton	Palm Beach	127	2
5.	Highland Beach	Palm Beach	511	34
6.	Lantana	Palm Beach	10	0
7.	Lost Tree Village Beach	Palm Beach	189	16
8.	Juno Pier	Palm Beach	384	2
9.	Jupiter Island	Martin	1,104	23
10.	Hutchinson Island	St. Lucie	528	14
11.	Fort Pierce Beach	St. Lucie	1	0
12.	Fort Pierce Inlet	St. Lucie	16	0
13.	Sebastian Inlet	Brevard & Indian R.	335	0
14.	Indialantic	Brevard	35	0
15.	Port Canaveral S. to Sebastian Inlet	Brevard	3,933	122
16.	Canaveral National Seashore & Kennedy Space Center	Brevard	1,261	33
17.	North of Brevard County Line	Volusia	392	4
18.	Fort Matanzas	St. Johns	3	0
19.	Little Talbot Island	Duval	32	0
	TOTAL		9,448	281