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APR 20 1973

Docket No. 50-251

Florida Power & Light Company
ATTN: Mr. James Coughlin
Vice President
P. O. Box 3100
Miami, Florida 33101

Gentlemen:

The Commission has issued Facility Operation License DPR-41 (copy enclosed) to Florida Power & Light Company to operate Turkey Point Nuclear Generating Unit 4 at reactor core power levels not to exceed 2200 megawatts thermal (full power) in accordance with the provisions of the license and Technical Specifications. A copy of a related notice which has been forwarded to the Office of the Federal Register for filing and publication is also enclosed.

Two signed copies of Amendment No. 5 to Indemnity Agreement No. B-46 are enclosed for your review and acceptance. Please sign and return one copy of the amendment to this office.

Sincerely,

Original signed by
Karl R. Goller

R. C. DeYoung, Assistant Director
for Pressurized Water Reactors
Directorate of Licensing

Enclosures:
1. License DPR-41
2. Federal Register Notice
3. Amendment No. 5 to IA No. B-46

ccs:
Listed on page 2

bcc: H.J.McAlduff, ORO
J.R.Buchanan, ORNL
T.B.Abernathy, DTIE
ARosenthal, ASLAB
NHGoodrich, ASLBP

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SURNAME ▶	MSERVICE	PCheck	KKniel	JGallo	RDeYoung KRG	DRM
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Form AEC-318 (Rev. 9-53) AECM 0240 ☆ U. S. GOVERNMENT PRINTING OFFICE: 1972—486-983

cc w/encl:
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Newman, Reis & Axelrad
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Honorable Ray Goode
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SURNAME ▶						
DATE ▶						

UNITED STATES
ATOMIC ENERGY COMMISSION
WASHINGTON, D.C. 20545

FLORIDA POWER AND LIGHT COMPANY

DOCKET NO. 50-251

FACILITY OPERATING LICENSE

License No. DPR-41

The Atomic Energy Commission (the Commission) having found that:

a. The application for license filed by Florida Power & Light Company (the applicant) complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations set forth in 10 CFR Chapter I and all required notifications to other agencies or bodies have been duly made; and

b. Construction of the Turkey Point Nuclear Generating Unit No. 4 (the facility) has been substantially completed in conformity with Provisional Construction Permit No. CPPR-28, as amended, and the application, as amended, the provisions of the Act and the rules and regulations of the Commission; and

c. The facility will operate in conformity with the application, as amended, the provisions of the Act, and the rules and regulations of the Commission; and

d. There is reasonable assurance (i) that the activities authorized by this operating license can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the rules and regulations of the Commission; and

e. The applicant is technically and financially qualified to engage in the activities authorized by the operating license in accordance with the rules and regulations of the Commission; and

f. The applicant has satisfied the applicable provisions of 10 CFR Part 140, "Financial Protection Requirements and Indemnity Agreements," of the Commission's regulations; and

g. The issuance of this operating license will not be inimical to the common defense and security or to the health and safety of the public; and

h. After weighing the environmental, economic, technical and other benefits of the facility against environmental costs and considering available alternatives, the issuance of Facility Operating License No. DPR-41 (subject to the conditions for protection of the environment set forth herein) is in accordance with 10 CFR Part 50, Appendix D , of the Commission's regulations and all applicable requirements of said Appendix D have been satisfied; and

i. The receipt, possession, and use of source, byproduct and special nuclear material as authorized by this license will be in accordance with the Commission's regulations in 10 CFR Parts 30, 40, and 70, including 10 CFR Sections 30.33, 40.32, 70.23, and 70.31.

Facility Operating License No. DPR-41 is hereby issued to the Florida Power & Light Company (the applicant), to read as follows:

1. This license applies to the Turkey Point Nuclear Generating Unit No. 4, a pressurized water reactor and associated equipment (the facility) which is owned by the Florida Power & Light Company. The facility is located on the applicant's site located in Dade County, about 25 miles south of Miami, Florida, and is described in the Final Safety Analysis Report and Environmental Report as supplemented and amended.

2. Subject to the conditions and requirements incorporated herein, the Commission hereby licenses Florida Power & Light Company (the applicant):

   A. Pursuant to Section 104b of the Atomic Energy Act of 1954, as amended (the Act), and 10 CFR Part 50, "Licensing of Production and Utilization Facilities," to possess, use, and operate the facility as a utilization facility at the designated location on the Turkey Point site in accordance with the procedures and limitations described in this license;

   B. Pursuant to the Act and 10 CFR Part 70, "Special Nuclear Material," to receive, possess, and use at any one time up to 3200 kilograms of uranium-235 contained in reactor fuel assemblies and in monitoring system detectors, and 18 grams of plutonium-238 as plutonium-beryllium neutron sources in connection with operation of the facility;

C. Pursuant to the Act and 10 CFR Part 30, "Rules of General Applicability to Licensing of Byproduct Material," to receive, possess, and use in connection with operation of the facility any byproduct material with Atomic Numbers between 3 and 83, inclusive, as sealed sources; and

D. Pursuant to the Act and 10 CFR Parts 30 and 70, to possess, but not separate, such byproduct and special nuclear materials as may be produced by the operation of the facility.

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

A. Maximum Power Level

The reactor shall not be made critical until the tests described in the applicant's letter of April 3, 1973, have been satisfactorily completed. Thereafter, the applicant is authorized to operate the facility at reactor core power levels not in excess of 2200 megawatts thermal.

B. Technical Specifications

The Technical Specifications attached hereto as Appendices A and B are hereby incorporated in this license. The applicant shall operate the facility in accordance with these Technical Specifications. No changes shall be made in these Technical Specifications unless authorized by the Commission in accordance with the provisions of Section 50.59 of 10 CFR Part 50.

C. This license is subject to the following conditions for the protection of the environment:

(1) The applicant shall pursue evaluations of alternatives to the proposed cooling channel system during construction, interim operation, and evaluation of the channel system. These evaluations shall include at least the following:

(a) Study of availability of groundwater or other alternative sources of surface water to use in the cooling system.

(b) Study of applicability of mechanical cooling devices, including powered spray modules and cooling towers.

(c) Study of marine environmental impacts of once-through cooling alternatives (described in Section X of the AEC Final Environmental Statement on Turkey Point Units 3 and 4, July 1972).

(2) The applicant shall take appropriate corrective action on any adverse effects determined as a result of monitoring and study programs. To the fullest extent practicable, the applicant shall utilize results of study programs in improving and modifying the operation of the facility and its cooling system so as to achieve a minimal adverse environmental impact.

4. This license is effective as of the date of issuance, and shall expire at midnight April 27, 2007.

FOR THE ATOMIC ENERGY COMMISSION

A Giambusso

A. Giambusso, Deputy Director
for Reactor Projects
Directorate of Licensing

Attachments:
Appendix A - Technical Speicifications
Appendix B - Environmental Technical Specifications

Date of Issuance: APR 1 0 1973

UNITED STATES ATOMIC ENERGY COMMISSION

DOCKET NO. 50-251

FLORIDA POWER & LIGHT COMPANY
(Turkey Point Nuclear Generating Unit No. 4)

NOTICE OF ISSUANCE OF FACILITY OPERATING LICENSE

Notice is hereby given that the Atomic Energy Commission (the Commission) has issued Facility Operating License No. DPR-41 to Florida Power & Light Company (the licensee) which authorizes the licensee to operate the Turkey Point Nuclear Generating Unit No. 4 at reactor core power levels not in excess of 2200 megawatts (thermal), in accordance with the provisions of the license and the Technical Specifications appended thereto. The Notice of AEC Consideration of Issuance of Facility Operating License was published in the Federal Register on October 30, 1971, (36 F.R. 20906). The Turkey Point Nuclear Generating Unit No. 4 is a pressurized water nuclear reactor located at the licensee's site in Dade County, Florida.

A Notice of Hearing encompassing both Units 3 and 4 of the Turkey Point facility was published by the Commission in the Federal Register on April 4, 1972, (37 F.R. 6777). The notice indicated that an Atomic Safety and Licensing Board (Board) would be designated by the Commission to conduct the hearing, provided for intervention by Paul Siegel, and provided an opportunity to make limited appearances to other persons who wished to make a statement in the proceeding but who did not wish to intervene. The Notice of Hearing also provided that the issue for hearing consideration would be the steam line safety

valve header failure of December 2, 1971, as refined through appropriate prehearing procedure, and that, depending on the resolution thereof, authorization for issuance of the license might be granted or denied, or that the license might be authorized as appropriately conditioned. The Notice of Hearing Further provided that an operating license would be issued only after appropriate findings had been made by the Director of Regulation on certain specified matters not embraced by the Board's decision.

On July 10, 1972, after a public hearing held pursuant to the Notice of Hearing, the Board issued an "Order Resolving Issue Prescribed for Consideration" which set forth the Board's conclusion that "the safety valve header system as now constructed and tested can be operated without undue risk to the health and safety of the public." Pursuant to an Order from the Atomic Safety and Licensing Board dated July 10, 1972, a license was issued for Unit 3 on July 19, 1972.

The Commission's regulatory staff has inspected Unit 4 and has determined that for operation as authorized by this license, the facility has been constructed in accordance with the application, as amended, the provisions of Provisional Construction Permit No. CPPR-28, as amended, the Atomic Energy Act of 1954, as amended , and the Commission's regulations. The licensee has submitted proof of financial protection in satisfaction of the requirement of 10 CFR Part 140.

In accordance with the Notice of Hearing, the Director of Regulation has made the findings which are set forth in the license, and has concluded that the application, as amended, complies with the requirements of the Atomic Energy Act of 1954, as amended, and the Commission's regulations in 10 CFR Chapter 1, and that the issuance of the license will not be inimical to the common defense and security or the health and safety of the public.

The license is effective as of the date of issuance and shall expire on April 27, 2007, unless extended for good cause shown or upon the earlier issuance of a superseding operating license.

A copy of (1) Facility Operating License No. DPR-41, complete with Technical Specifications, (2) the applicant's Environmental Report dated November 15, 1970 and supplements thereto, dated April 4, 1971; November 8, 1971; and March 16, 1972, respectively, (3) the report of the Advisory Committee on Reactor Safeguards, dated June 18, 1971, (4) the "Safety Evaluation by the Division of Reactor Licensing [now the Directorate of Licensing], U.S. Atomic Energy Commission, in the Matter of the Florida Power & Light Company, Turkey Point Plant, Units 3 and 4," dated March 15, 1972, (5) the Final Safety Analysis Report and amendments thereto, (6) the Draft Statement on Environmental Considerations dated February 11, 1972, and (7) the Final Detailed Environmental Statement dated July 1972, are available for public

inspection at the Commission's Public Document Room at 1717 H Street, NW, Washington, D. C. Copies of these documents will also be made available at the Lily Lawrence Row Public Library, 212 Northwest, First Avenue, Homestead, Florida 33030, for inspection by members of the public between the hours of 10:00 A.M. to 8:00 P.M. on Monday and 10:00 A.M. to 5:30 P.M. on Tuesday through Saturday. Copies of items (1), (4), and (7) may be obtained upon request addressed to the United States Atomic Energy Commission, Washington, D. C. 20545, Attention: Deputy Director for Reactor Projects, Directorate of Licensing.

Dated at Bethesda, Maryland this day of April, 1973.

FOR THE ATOMIC ENERGY COMMISSION:

Karl Kniel, Chief
Pressurized Water Reactors Branch No. 2
Directorate of Licensing

APPENDIX B - ENVIRONMENTAL TECHNICAL SPECIFICATIONS

1.0 DEFINITIONS

The definitions for terms used in these environmental technical specifications are listed below.

a. "National power emergency" shall mean any event causing authorized Federal officials to require or request that Florida Power & Light supply electricity to points within or without the State of Florida.

b. "A regional emergency" shall mean any of the following occurrences within the State of Florida: (1) a catastrophic natural disaster including hurricanes, floods, and tidal waves; or (2) other emergencies declared by State, county, municipal, or Federal authorities during which an uninterrupted supply of electric power is vital to public health and safety.

c. "Reactor emergency" shall mean an unanticipated equipment malfunction necessitating prompt remedial action to avoid endangering the public health or welfare.

d. "Cooling system" and "condenser cooling water system" shall include any and all waterways, lakes, ponds, canals, dikes, levees, dams, barriers, or other structures, devices, or appurtenant facilities which shall be constructed and employed to reduce the temperature of water discharged from Florida Power & Light's generating facilities at Turkey Point.

e. "Licensed facilities" shall mean Turkey Point Plant Units No. 3 and 4.

2.0 ENVIRONMENTAL PROTECTION LIMITS

Objective:

To define operating limits for the condenser cooling water system for the licensed facilities to ensure that the environment is adequately protected.

Specification:

1. GENERAL

a. The condenser cooling water system shall be operated so as to avoid adverse effects on the environment to the fullest extent practicable, in a manner consistent with the limits and conditions of the consent Final Judgment and orders subsequently entered in United States of America v. Florida Power & Light Company, Civil Action No. 70-328-CA, in the United States District Court for the Southern District of Florida. Flexibility of operation is permitted, consistent with considerations of health and safety, to ensure that the public is provided a dependable source of power even under unusual operating conditions which may temporarily result in operations which exceed the limits set forth in this specification, as provided below in 1.b and 1.c.

b. During a national power emergency, regional emergency, reactor emergency, or at any time when the health, safety, or welfare of the public may be endangered by the inability of Florida Power & Light to supply electricity from any other sources available to it, the operating limits provided in this specification shall be inapplicable. However, during such emergencies, the operating limits shall not be exceeded except as is necessitated by the emergency.

c. Whenever, in accordance with subparagraphs a. and b. above, Florida Power & Light exceeds the operating limits otherwise imposed, notification shall be made within 24 hours by telephone or telegraph to the Director of the Region II Field Office of the Directorate of Regulatory Operations.

2. DISCHARGE TEMPERATURE

   a. Operation of licensed facilities shall be controlled so that temperature of water discharged to Biscayne Bay or Card Sound will not at any time exceed 95°F.

   b. Operation of the licensed facilities shall be conducted to the extent practicable so as to minimize the rates of change of temperature of discharge water.

3. CHEMICAL CONCENTRATIONS

   a. The total residual chlorine level (including chloramines) in effluent water from the licensed facilities shall be controlled such that residual chlorine in discharge water leaving Lake Warren shall not exceed 0.1 ppm.

   b. Data (including existing plant data) shall be analyzed periodically (at least semiannually) to ascertain the minimum effective amount of chlorine usage necessary to achieve adequate control of fouling of condenser tubing and piping, and operation of the licensed facilities shall be conducted to the extent practicable so as not to exceed this minimum usage of chlorine.

   c. The salinity of water which is discharged from the cooling channel system, as measured at the outlet to Card Sound, shall not exceed 1.10 times the salinity of the water of Card Sound and shall not exceed 44 parts per thousand.

4. TURBIDITY

   a. During construction of the canal-cooling system, the canals under construction shall be isolated from Card Sound Canal discharges.

   b. Return waters to Card Sound and Biscayne Bay shall meet applicable turbidity requirements of the State of Florida.

5. DISCHARGE VELOCITIES AND VOLUME

   a. The rate of discharge shall be controlled so that water will not enter Biscayne Bay or Card Sound at a velocity greater than 1.5 fps.

b. After completion of the Card Sound Canal and until October 1, 1973, water shall not be discharged at an average 24-hour rate in excess of 2750 cfs into Card Sound and 1500 cfs into Biscayne Bay; thereafter, water shall not be discharged at an average 24-hour rate in excess of 2150 cfs into Card Sound and 2100 cfs into Biscayne Bay.

6. ADDITIONAL LIMITATIONS

Additional or revised limits of operation will be set forth as revisions occur in the mode of operation of the cooling system or as monitoring results indicate to be appropriate.

Bases:

The Final Judgment consent decree (Civil Action No. 70-328-CA in the United States District Court for the Southern District of Florida) and the AEC's Final Environmental Statement for Turkey Point Units 3 and 4 (July 1972) set forth needs for protection of the environment related to operation of this plant. The limits set forth above are in response to the discussions in those documents for temperature, chlorine concentrations, salinity, and velocity and flow of discharge water from the cooling system. In addition, it has been observed that turbidity of discharge water, primarily related to cooling channel construction activity, has a potential for adverse impact on the receiving waters. The limits set forth are expected to provide reasonable assurance that there will be no unacceptable adverse impacts on the environment from normal operation of the plant. It is recognized that these limits may be appropriately modified as the mode of operation of the cooling system is changed.

3.0 MONITORING REQUIREMENTS

Objective:

To verify the operating conditions of the cooling system and define monitoring and surveillance related to the cooling system and effluents discharged from the licensed facilities.

Specification:

1. TEMPERATURE OF COOLING WATER

Temperatures of cooling system water used in the licensed facilities shall be measured at the point of intake from Biscayne Bay, at the points of discharge from the Grand Canal and the Card Sound Canal, and at the outlet end of Lake Warren, not less often than at hourly intervals. The sensors should represent the mean canal temperatures to ± 0.5°F.

2. CHEMICAL CONCENTRATIONS IN COOLING WATER

a. At the intake to the licensed facilities for water from Biscayne Bay measurements shall be made on intake water:

i. Not less often than at daily intervals for:

(a) salinity ±1 ppt

(b) dissolved oxygen (D.O.) ± 0.2 ppm

ii. Monthly for:

Cu, Zn, Co, As, Hg, and NH_3

b. Prior to leaving Lake Warren measurements on cooling water from the licensed facilities shall be made

i. Not less often than at daily intervals for:

(a) pH ± 0.1

(b) dissolved oxygen (D.O.) ± 0.2 ppm

ii. Weekly for

(a) total residual chlorine (free and combined forms) at time of maximum concentration

(b) ammonia

(c) biological oxygen demand and chemical oxygen demand (BOD and COD)

iii. Monthly for

Cu, Zn, Co, As, Hg

c. At mouths of Card Sound Canal and Grand Canal measurements on discharged water shall be made:

i. Not less often than at intervals of 6 hours for:

(a) salinity ± 1 ppt

(b) dissolved oxygen (D.O.) ± 0.2 ppm

ii. Weekly at low slack tide on a weekday for:

(a) suspended solids

(b) dissolved and particulate organic carbon

(c) total residual chlorine (free and combined forms)

(d) COD, BOD and ammonia

(e) pH ± 0.1

Records shall be maintained of additions of chlorine and all other chemicals from the licensed facilities to the water pumped through the licensed facilities.

3. TURBIDITY CONTROL

At the mouths of Card Sound Canal and Grand Canal measurements on discharged water shall be made not less often than every six hours for turbidity except when actions other than normal system operations may be expected to result in increased turbidity, in which circumstance measurements shall be done at hourly intervals.

4. FLOW AND VELOCITY OF DISCHARGE WATER

Flow and velocity of cooling system discharges from Grand Canal and Card Sound Canal shall be measured not less often than at hourly intervals.

5. MONITORING UNIT OPERABILITY

Monitoring units for temperature, chemistry, flow and velocity shall be maintained operable in a practicable manner. When equipment malfunctions occur, immediate action shall be taken to return the units to operation.

Bases: The monitoring program as set forth will provide information to allow for a reasonable determination of the quality of water discharged from the cooling system and of compliance with the limits set forth. It is recognized that these limits may be appropriately modified as the mode of operation of the cooling system is changed.

4.0 SURVEILLANCE AND SPECIAL STUDY PROGRAMS

Objective:

To provide information to be used in assessment of plant operations upon the environment.

Specification:

The licensee shall establish and conduct an operational monitoring program and perform assessments of the impacts of plant operation on the environment. The monitoring program shall follow the following outline except as otherwise specifically approved by the AEC Directorate of Licensing.

ENVIRONMENTAL SURVEILLANCE AND ASSESSMENT PROGRAM

A. AQUATIC ENVIRONMENT

A program will be conducted to monitor and sample effluents discharged from the plant for temperature, salinity and chemical concentrations and the biological variables in the area of potential impact in Biscayne Bay/Card Sound. The objectives of the program are to (1) map the area affected by the plant discharges, (2) evaluate the planktonic, epibenthic and benthic characteristics of this area compared with a control area, (3) assess the effects of operation of the cooling system for the Turkey Point power plant on the physical, chemical and biological variables of the estuary and (4) measure recovery rates of affected areas when Grand Canal and other canals open to the bay are closed. This program, designed to provide data on the marine environmental impact of the closed and once-through modes of cooling, will include:

1. Aquatic Biota

A biological monitoring program will be conducted to detect any measurable changes in the planktonic, epibenthic and benthic communities of the Biscayne Bay/Card Sound area in the vicinity of the Turkey Point power plant. The results obtained will be correlated with the condenser cooling water data to determine biological changes that may occur as a result of operation of the Turkey Point power plant units. This information will be further compared with the three years of baseline data on the biological characteristics of this estuary system already collected by the University of Miami in a program jointly funded by the AEC and FPL.

a. Epibenthic biology: Four replicate samples will be collected at each of 12 stations. Collection will be in seining or trawling at monthly intervals and the samples will be analyzed both qualitatively and, where possible, quantitatively for identification of different species present, their relative abundance, biomass, life history stage, and size distribution.

b. Benthic biology: Replicate benthic grab samples will be collected at the same stations as the epibenthic samples once every two months. Population characteristics, such as species composition, number of individuals, biomass, diversity and richness shall be determined. The data will be analyzed to detect any significant measurable changes in specific components of the benthic community. Samples will be taken to a depth of at least 20 cm, where practicable.

c. Plankton: Water samples for plankton analysis shall be collected at each of nine stations, including one station each in the intake and both discharge canals.

Phytoplankton. Samples will be taken monthly and analyzed quantitatively in terms of sample volume to establish the dominant genera of the community, biomass, and chlorophyll "a" content. Primary production will be determined monthly.

Zooplankton. Samples will be taken monthly and analyzed quantitatively in terms of sample volume to determine generic composition, biomass and life history stage.

d. Attached grasses, macroalgae and sponges: Twenty quadrats will be established in Card Sound and Biscayne Bay and examined every two months for biomass, growth, recruitment and relative health of the plant and animal community.

e. Macroinvertebrates and fish impinged on the traveling screens in a given day (24 hours) three times a week at the Turkey Point power plant will be identified by species, size and quantity, and the data will be recorded in tabular form. In each periodic report the data will be reviewed to determine whether the sampling frequency can be reduced. In the event of exceptional kills on the

traveling screens or in the cooling system canals, notification shall be made within 24 hours by telephone or telegraph to the Director of the Region II Field Office of the Directorate of Regulatory Operations.

f. Entrained Organisms: The effect of passage through the plant on survival of plant and animal forms will be evaluated to the level that present "state-of-the-art" techniques will permit. Representative water samples will be collected once every two weeks at the plant intake, plant discharge, a point partway down the Card Sound Canal, and at the discharge points of Grand Canal and Card Sound Canal into Biscayne Bay and Card Sound, respectively. The samples will be examined for numbers and kinds of representative organisms and their survival at different locations will be measured by applicable state-of-the-art techniques. Results will be compared with similar samples taken from four points in Biscayne Bay and Card Sound that are outside the influence of power plant operations.

The data obtained from the above programs (paragraphs 1.a through 1.f) shall be analyzed as they are collected and will be compared with model and analytical predictions and preoperational data that have been collected. A report to the AEC of the results of this evaluation will be submitted within 60 days of the end of each six-month period or fraction thereof terminating on June 30 and December 31 of each year. At the end of each year, the program and the need for its continuance will be reevaluated.

g. Tolerance studies: Laboratory studies will be performed as a supplement to the existing programs being conducted by the University of Miami under AEC/FPL sponsorship to evaluate the effect of short-term exposures to temperatures and salinities that might be experienced under emergency conditions. These studies will be evaluated by July 1, 1974, and a report submitted to the AEC within 60 days thereafter, on the findings and any need for additional information.

h. Recovery in discharge areas: Following the construction and completion of the Card Sound control structure and closure of the Grand Canal discharge, quadrat stations in the affected area will be established to determine semiannually the rate of recovery in terms of sedimentation and revegetation by grasses and macroalgae.

i. Assessment of impacts from turbidity in discharged water: A program shall be conducted to assess the impacts on the receiving waters and marine ecosystems from turbidity in discharged water from the operation of the licensed facilities and the construction and testing of the cooling channel system. No later than thirty (30) days from the date of issuance of this license, the Applicant shall submit to the AEC Directorate of Licensing, for review and approval, the program implemented to provide this assessment.

2. Groundwater

a. Groundwater studies will be conducted through groundwater monitoring at 23 wells which have been drilled south and east of the cooling system area. These wells will be checked monthly for water level, conductivity (salinity), temperature and biocides, and every three months for transmissivity.

b. A second groundwater program will be conducted in connection with an interceptor ditch located west of the cooling canal system to intercept cooling canal water from flowing westward underground. This program will involve monitoring of 41 wells and 10 surface points for temperature, water level and conductivity (salinity). The monitoring schedule for these locations varies in frequency from monthly to weekly. The monitoring schedule is reviewed on a quarterly basis by FPL with the Central and Southern Florida Flood Control District in consultation with the USGS. The monitoring schedule will continue as long as necessary as determined by the CSFFCD and the USGS.

c. Copies of reports prepared periodically for paragraphs a. and b. above will be submitted to the AEC simultaneously.

d. A water temperature survey will be conducted monthly in Biscayne Bay in the vicinity of the Grand Canal discharge and in Card Sound in the vicinity of the Card Sound Canal discharge. Temperatures just below the surface will be determined with calibrated thermocouples and strip chart recorder. Traverses will be made by boat along predetermined

courses in the areas of interest. Information thus obtained will be used to construct isotherms on a map of the area. In addition, in-depth temperature measurements will be taken at certain locations along the traverses, and noted on the map. The data will be submitted within 20 days of the end of each period. The need for continuance of this program will be reviewed when a pattern is established or at the end of one year.

3. In view of the current testing of the cooling channel system and major changes from the once-through mode of operation, the surveillance program set forth above in sections 4.A.1.a, b, c, d, e, f and 2.d need not be performed during testing while there is no once-through operation. However, all of the above surveillance program or an AEC Staff approved alternative program (consistent with the operating mode determined by the test program) must be instituted no later than January 1, 1974. An alternative program for monitoring during revised mode of operation shall be prepared and submitted to the AEC by October 1, 1973. Until such alternative program is approved, the applicant shall initiate the above surveillance program whenever the cooling system is operated in a once-through mode and shall notify the Region II Office of Regulatory Operations and the Directorate of Licensing in accordance with Section 5.4.b.ii.a.

B. TERRESTRIAL ENVIRONMENT

1. Baseline Program

In order to establish baseline conditions that are characteristic of the South Florida terrestrial ecosystem, an intensive and comprehensive three-year research program shall be conducted to provide control information against which the impact of the cooling canal system can be evaluated. This planned ecological program will include the following:

a. Definition of different types and relative abundance of natural plant associations as a function of topography over a 10,000-acre tract of land that includes tidal, mangrove salt marshes, freshwater wetlands, and dry land communities. This will include analyses of the characteristics of the soils in which these plants are formed (e.g., depth of organic layer, pH, available nutrients, soil profile, salinity, etc.) as a basis for predicting conditions under which these plant associations will survive.

b. Study of the kinds and abundance of native animals that live in association with the different plant communities and utilize them for food and shelter and breeding. In this phase of the study, field observations and trapping techniques will be used to prepare accurate lists of the species noted, especially any rare or endangered species, and will include birds, mammals, amphibians, reptiles, fishes and selected invertebrates.

c. Experimental studies on selected parameters such as (a) peak standing crop of different plant species as a function of seasons of the year, (b) effect of certain soil characteristics on occurrence of plant association groups, (c) nutrient turnover in the mangrove salt marsh and its relative contribution to adjacent estuary areas, and (d) effect of possible groundwater seepage on mangrove ecosystems. Reports of the results of the work will be submitted to the AEC yearly within 60 days after each anniversary of the start of the program.

2. Impact at Turkey Point Site

Data from the above baseline program will be compared with information gathered at Turkey Point. The program at that site will include a study of the native flora association and their accompanying fauna to serve as a means of identifying and correlating this "ground-truth" data with aerial photographs that exist of the area prior to the start of construction activities. This technique will allow an assessment of the degree of change to different plant community types that has and will result from the construction of the cooling canals. Results will be correlated with the baseline data to attempt to quantify the long-range ecological effects of construction.

3. Revegetation of Cooling Canal Banks

In addition, a study will be performed to assess the rates and kinds of vegetation that will recolonize the mud spoil banks created as a result of cooling canal construction. The first step in this program will involve analysis of the soils of the spoil banks for pH, saline content, amounts of nutrient minerals present, temperature, and composition as a function of the height of the soil above the water line. Soil samples will be taken at points (1) just above the canal water level,

(2) halfway between the water and the top of the spoil bank, and (3) from the top of the banks. Tests to determine erosion rates in both the wet and dry seasons will also be performed. At the same time, a biological study will be conducted to identify the numbers and kinds of fauna associated with these banks as compared with surrounding areas at the present time. This will include both species that are permanent residents (e.g., amphibians, reptiles) and transient users (e.g., birds) of the habitats.

The advice of agricultural scientists familiar with the flora of the South Florida region will be solicited to predict the feasibility of an experimental program of revegetation by seeding - using native species that are tolerant of the soil conditions found in the spoil banks. The predicted rate of ground coverage accomplished by this program will be compared with the natural rate of revegetation that occurs through ecological succession. This latter rate will be determined by studying similar mud banks of the region that have been in place for longer periods of time.

Results of the soil analyses, faunistic survey and initial floristic studies will be used to predict rate and extent of recovery as well as to enhance the extent of the present level of description of the terrestrial ecosystem. The biological and soil studies will continue on a quarterly basis to evaluate the kinds and rates of changes actually occurring (both naturally and experimentally) as compared with predicted rates. Reports will be submitted to the AEC within 60 days of the end of each yearly cycle. This will include a further evaluation of the program based on all the data obtained to that date, including observations of any undue intrusion of the vegetation into the cooling channels proper in order to assess the total terrestrial impacts of the cooling water channels. At the end of each year, the program and the need for its continuance will be reevaluated.

4. Long-term Monitoring

In conjunction with the long-term work described in paragraphs 1. and 3. above, long-term monitoring of the impacts of the plant will include:

a. Annual aerial photographs of the site will be taken. Color and color infrared film will be used with a scale of 1:25,000.

b. Surveillance will be maintained of canal banks to document changes in edaphic and floristic conditions, especially reinvasion by native flora such as red mangrove.

c. Limited sampling of soils and flora will be conducted annually in the native vegetation west and south of the cooling canals to determine whether the operation of the cooling canals adversely affects the surrounding areas of native vegetation.

The results of this work will be reported annually in conjunction with the reports in paragraph 3. above. This program will be reassessed yearly in conjunction with paragraph 3. above.

C. OTHER ITEMS

1. Design and Operation of Discharge Control Structure

In addition to the significant engineering work completed to date on the canal cooling system, a program is under way to develop the information needed to finalize operation of the discharge control structure. This program includes analytical modeling studies to describe the discharges in terms of temperature and salinity over the full range of cooling system operating and emergency conditions. Also, the program will involve parameter studies including surface evaporation rate under all plant operating and weather conditions, effects of rainfall, and effects of groundwater exchange. This program will be completed by September 1974 and a final report submitted to the AEC within 60 days thereafter. During this same period of time the mechanical design of the control structure will be completed.

2. Water Circulation in Card Sound and Biscayne Bay

Programs have been under way in conjunction with the Universities of Florida and Miami to develop and validate numerical models for simulation of the hydromechanics of the Lower Biscayne Bay/Card Sound system. It is planned to continue these programs as appropriate to (1) improve the models, (2) obtain field measurements of the Lower Biscayne Bay/Card Sound exchange characteristics, and (3) obtain certain long duration data to further verify the models. This program will be completed by December 1974, and results of this work will be reported to the AEC within 60 days thereafter.

3. Storm Damage

Information developed to date and experience with existing canals at the plant site including actual occurrence of hurricane and flood conditions has indicated good resistance to storm damage. Significant restoration work has not been required. A limited program will be carried out to define the extent and nature of storm damage which can be expected and to develop a contingency plan for restoration of the cooling facilities as required. This work will be completed by December 1973 and a report submitted to the AEC within 60 days thereafter.

4. Alternate Water Sources

In accordance with the consent Final Judgment, work has been under way under the direction of "Working Group 1 - Groundwater" to study the availability of groundwater or other alternate sources of surface water for use in the cooling system. In addition to the work discussed in paragraph B.2.a above, a groundwater research program is in progress which consists of a single deep test well drilled into the Floridan Aquifer (about 2000 feet deep) in an attempt to find a sufficient quantity of lower salinity water for possible use as makeup water for the cooling canal system. Copies of the periodic reports to the Working Group will be submitted to the AEC simultaneously.

5. Mechanical Cooling Devices

In accordance with the consent Final Judgment, a program will be initiated to evaluate mechanical cooling devices, including cooling towers and powered spray modules. As in paragraph C.4, above, planning and performance of the work will be guided by a working group in accordance with the consent Final Judgment.

Subject to the approval of the working group, the proposed program will consist of (1) installing mechanical cooling devices at Turkey Point, (2) measuring the ambient air salt concentrations with and without the cooling devices in operation, (3) measuring the salt water drift from the cooling devices, and (4) observing the behavior of materials, components, crud deposit, etc., relative to the use of warm salt water. The drift measurements will include use of alternate measurement techniques to confirm the accuracy of the data. The program will have a two-year duration. Copies of the periodic reports on this project will be submitted to the AEC.

Bases: To the extent there is a continuation of the once-through operating mode until construction and completion of the cooling channel system, it is important to monitor the impact of that mode of operation on the environments of Biscayne Bay and Card Sound. The grasses and associated macro algae have been established by the research studies as the base productivity of the two ecosystems. This segment of the system will provide sufficient data to monitor the potential effects of the interim operating mode.

Data on the benthic infauna has not been made available from the ongoing research studies. In view of the fact that in the final operating mode there may be wedges of highly saline warm water in direct contact with the bottom, this baseline study is needed.

Although the Staff and FPL, on the basis of limited data, concluded that predicted mortality of organisms due to passage through the condensers during once-through operation will not have a significant effect upon the total productivity of Biscayne Bay and Card Sound, it is necessary to demonstrate this. Determination of survival following the passage through the condensers and determination of potential reduction or enhancement of the plankton productivity in Biscayne Bay and Card Sound is necessary for the determination of the potential impact of once-through operation of the cooling system.

Prior to the construction and operation of the Card Sound Control Structure, the differences in tidal amplitude in Biscayne Bay and Card Sound can result in inflows at certain periods into the Card Sound Canal and the Grand Canal. This offers the potential for the ingress of organisms to the main canal system and for mortality on flow reversal. Studies are appropriate to provide data to predict the degree of potential damage.

Since it is the responsibility of FPL to restore environmental degradation caused by operation of the plant, data is required on the rate of recovery of benthic communities at the mouth of Grand Canal following its closure.

The licensee is permitted under defined conditions to operate above specified temperature, salinity and flow conditions. However, only limited data is available on the effects of high temperatures for relatively short periods of time. Thermal stress studies are required in order to predict potential effects from operations under emergency conditions.

Since some of the effects on the terrestrial environment of plant construction and operation will not be clear for several years, continued surveys must be conducted to assess future impacts.

It is recognized that changing modes of operation of the cooling system and results of ongoing monitoring and assessments programs may make it appropriate for modification of these programs. The licensee should include in his programs a continuing review as to what modifications should be enacted due to changing conditions and new data.

5.0 ADMINISTRATIVE CONTROL

Objective: To describe the administrative controls and procedures necessary to implement the environmental technical specifications.

Specification: 1. REVIEW AND AUDIT

The licensee shall be responsible for the establishment, execution and review of the necessary programs to administer the Environmental Technical Specifications (ETS). The licensee may delegate to other organizations the work of establishing and executing portions of the ETS, but shall retain responsiblity therefor.

Administrative measures should provide that the individual or group assigned the responsibility for auditing or otherwise verifying that an activity has been correctly performed is independent of the individual or group directly responsible for performing the specific activity. The review function should not be performed by supervisory personnel involved in the activity under review.

The licensee shall establish organizational and administrative procedures that will provide for both management review and independent audit functions for the following areas:

a. Environmental technical specifications

b. Results of the environmental monitoring programs prior to their submittal in each semiannual Environmental Monitoring Report.

c. Proposed changes to the environmental technical specifications and the evaluated impact of the change.

d. Proposed changes or modifications to plant systems or equipment and the evaluated impact which would require a change in the procedures described in f. below, or which would affect the evaluation of the plant's environmental impact.

e. Coordination of environmental technical specification development with the safety technical specifications to avoid conflicts and for consistency

f. Proposed sampling, analysis, calibration and alarm

check procedures, as specified in 5.3.a. and any other proposed procedures or changes thereto as determined by the responsible company official to affect the plant's environmental impact.

g. Investigation of all reported instances of violations of environmental technical specifications, including appropriate recommendations to prevent recurrence.

2. ACTION TO BE TAKEN IF A PROTECTION LIMIT IS EXCEEDED

a. Exceeding a protection limit should be promptly reviewed as specified in Section 5.1.

b. As specified in Section 5.4.b., a separate report for each occurrence should be prepared. This report should include an evaluation of the cause of the occurrence, a record of the corrective action taken, and recommendations for appropriate action to prevent or reduce the probability of a recurrence.

c. The circumstances of the occurrence should be reported to the AEC as specified in Section 5.4.b.

3. OPERATING PROCEDURES

a. Detailed written procedures, including appliable checkoff lists and instructions, should be prepared, approved as specified in Section 5.3.b. and adhered to for operation of all systems and components involved in carrying out the environmental monitoring program. Procedures should include sampling, instrument calibration, analysis, and actions to be taken when limits are approached or exceeded.

Calibration frequencies for instruments used in performing the measurements required by the environmental technical specifications should be included.

Testing frequency of any alarms should be included. These frequencies should be determined from experience with similar instruments in similar environments and from manufacturers' technical manuals.

b. All procedures described in 5.3.a above, and changes thereto, should be reviewed and approved, as specified in Section 5.1, prior to implementation. Temporary changes to procedures

which do not change the intent of the original procedure may be made, provided such changes are approved by two members of the company management staff. Such changes should be documented, subsequently reviewed and approved on a timely basis.

4. PLANT REPORTING REQUIREMENTS

a. A Semiannual Environmental Monitoring Report covering the previous six months operations should be submitted within 60 days after January 1 and July 1 of each year. The first such period should begin with the date of initial criticality. In the event that some results are not available within the 60 day period, the report should be submitted noting and explaining the reasons for the missing results. The missing data shall be submitted as soon as possible in a supplementary report.

These reports should include the following:

i. Records of monitoring requirement surveys and samples.

ii. Analysis of environmental data.

iii. Records of changes in survey procedures.

iv. List of any special environmental studies related to the licensed facilities not required by the environmental technical specifications.

v. Records of any violations of the environmental technical specifications.

vi. Records of changes as described in Section 5.4.b.

b. Non-Routine Reports

i. In the event that a protection limit is exceeded, or the occurrence of an unusual event associated with construction or operation of the licensed facilities involves a significant environmental impact, a report should be made within 24 hours by telephone or telegraph to the Director of the Region II Office of Regulatory Operations, followed by a written report within 10 cays to the Director of Licensing (cc to Director of the Region II Regulatory Operations Office).

The written report and to the extent possible, the preliminary telephone or telegraph report should: (a) describe, analyze and evaluate implications, (b) determine the cause of the occurrence, and (c) indicate the corrective action (including any significant changes made in procedures) taken to preclude repetition of the occurrence and to prevent similar occurrences involving similar components or systems.

ii. Changes

(a) When a change to the plant (that affects the environmental impact evaluation contained in the Environmental Report or the Environmental Statement) or to the environmental monitoring procedures or equipment is planned, a report of the change should be submitted to the AEC for information prior to implementation of the change. This is not intended to preclude making changes on short notice that are significant in terms of decreasing adverse environmental impact. However, these changes should be promptly reported. The report should include an evaluation of the impact of the change for both environmental and safety considerations.

(b) All documentation concerning changes or additions to permits and certificates required by Federal, State , local and regional authorities for the protection of the environment should be submitted to the Deputy Director of Reactor Projects, Directorate of Licensing USAEC, for information. The submittal should include an evaluation of the environmental impact of the change.

(c) Request for changes in environmental technical specifications should be submitted to the Deputy Director of Reactor Projects, Directorate of Licensing, USAEC, for prior review and authorization. The request should include an evaluation of the impact of the change for both Safety and Environmental considerations.

5. RECORDS RETENTION

a. Records and logs relative to specifications contained in Section 5.0 of the environmental technical specifications should be retained for five years except as described in 5.5.b below.

b. All records and logs relative to the following areas should be retained for the life of the plant:

i. Records and drawing changes reflecting plant design modifications made to systems and equipment as described in Section 5.4.b.ii(a) above.

ii. Records of environmental monitoring data.