MAY 17 1979

Docket No. 50-333

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Mr. George T. Berry
General Manager of Chief
Engineer
Power Authority of the State
of New York
10 Columbus Circle
New York, New York 10019

Dear Mr Berry:

The Commission has issued the enclosed Amendment No. 46 to Facility Operating License No. DPR-59 for the James A. FitzPatrick Nuclear Power Plant. The amendment consists of changes to the Appendix B Environmental Technical Specifications.

Your Environmental Specifications have been under review since early 1977. The enclosed revised ETS reflects your submittals of January 10, 1977, January 15, 1979 and January 17, 1979 as well as numerous meetings and phone conversations with Power Authority personnel.

The proposed ETS modifications pertain to ETS Section 2.2, "Chemical Protection Limits", and Section 4.1, "Biological Environmental Surveillance and Special Study Programs." By letter dated January 10, 1977 you proposed the deletion of Limiting Conditions of Operation (LCO) for Section 2.3, "Suspended and Dissolved Solids." The staff has reviewed and approved this deletion. By letter dated January 17, 1977 you proposed modification of LCO's for Sections 2.1, 2.2 and 2.4, "Biocides, Corrosion, Inhibitors, and pH and Conductivity." The staff has reviewed and approved these modifications. By letter dated January 15, 1979 you proposed modification to the environmental non-radiological aquatic biological monitoring program. As agreed to, most deletions were approved and the need to process data accumulated to date has been eliminated. However, maintaining a low intensity fish sampling program is still required.

The amendment does not involve significant new safety information of a type not considered by a previous Commission safety review of the facility. It does not involve a significant increase in the probability or consequences of an accident, does not involve a significant decrease in a safety margin, and therefore does not involve a significant hazards consideration. We have also concluded that there is reasonable assurance that the health and safety of the public will not be endangered by this action.

cp 1
ED

OFFICE ➤					
SURNAME ➤				7906250377	
DATE ➤					

NRC FORM 318 (9-76) NRCM 0240 ★ U.S. GOVERNMENT PRINTING OFFICE: 1976 - 265 - 769

Copies of the Environmental Impact Appraisal and the Notice of Issuance are also enclosed.

Sincerely,

V. Rooney for

Thomas A. Ippolito, Chief
Operating Reactors Branch #3
Division of Operating Reactors

Enclosures:
1. Amendment No. 46 to DPR-59
2. Environmental Impact Appraisal
3. Notice

cc w/enclosures:
See next page

OFFICE	ORB #3	ORB #3	DSE	OELD	AD:E&P	ORB #3
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DATE	4/23/79	4/23/79	5/2/79	5/15/79	5/10/79	5/9/79

NRC FORM 318 (9-76) NRCM 0240

★ U.S. GOVERNMENT PRINTING OFFICE: 1978 - 265 - 769

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New York, New York 10007

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

POWER AUTHORITY OF THE STATE OF NEW YORK

DOCKET NO. 50-333

JAMES A. FITZPATRICK NUCLEAR POWER PLANT

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 46
License No. DPR-59

1. The Nuclear Regulatory Commission (the Commission) has found that:

   A. The application for amendment by the Power Authority of the State of New York (the licensee) dated January 17, 1979, 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;

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

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

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

   E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and paragraph 2.C.(2) of Facility Operating License No. DPR-59 is hereby amended to read as follows:

   (2) Technical Specifications

   The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 46, are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of the date of its issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

Thomas A. Ippolito, Chief
Operating Reactors Branch #4
Division of Operating Reactors

Attachment:
Changes to the Technical
Specifications

Date of Issuance: May 17, 1979

ATTACHMENT TO LICENSE AMENDMENT NO. 46

FACILITY OPERATING LICENSE NO. DPR-59

DOCKET NO. 50-333

Replace the following pages of the Appendix "B" Technical Specifications with the enclosed pages. The revised pages are identified by Amendment number and contain vertical lines indicating the area of change.

Remove	Insert
i	i
--	iii
iv	iv
3	3
4	4
5	5
20	20
21	21
22	22
23	23
24	24
25	25
26	26 Intentionally Blank
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29	29 Intentionally Blank
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BASES

For the maximum anticipated power output the plant will require a total recirculation flow of 370,200 gpm. Of the total flow 352,300 gpm is for the main condenser and 17,900 gpm is for service water requirements, which will raise the circulating water temperature to 32.4°F.

BASES

The temperature sensors on the inlet of the main condenser and the plant outlet will provide information on the ΔT across these two points.

2.2 Chemical

2.2.1 Biocides

OBJECTIVE

The purpose of this Specification is to protect the quality and purity of Lake Ontario waters.

SPECIFICATION

No biocides shall be used in the main condenser cooling water or service water systems.

MONITORING REQUIREMENT

No monitoring is required because no biocides shall be used in the main condenser cooling water or service water systems.

BASES

The Specification will ensure that the lake water quality is not jeopardized by the introduction of biocides from the main condenser cooling water or service water systems.

Amendment No. 25, 46

4.2.2 Corrosion Inhibitors

OBJECTIVE

The purpose of this Specification is to protect the quality and purity of Lake Ontario waters.

SPECIFICATION

The plant shall not normally discharge corrosion inhibitors to the lake. Prompt action will be taken to correct any leakage.

MONITORING REQUIREMENTS

Level checks shall be performed on the Diesel Generator Closed Loop Cooling System at least monthly to determine if leakage from the system has occurred. A determination of the amount of chromate discharged to the lake shall be made if leakage is detected. An evaluation of the environmental impact of any such leakage shall be made and shall be included in the Annual Environmental Monitoring Report.

BASES

Adherence to the Specification will ensure that the lake water quality is not jeopardized by the introduction of corrosion inhibitors from the plant.

Chromate corrosion inhibitor is used in the Diesel Generator Closed Loop Cooling System. No discharges from this system are made to the Lake.

2.2.3 pH and Conductivity

OBJECTIVE

The purpose of this Specification is to limit the liquid effluent pH to a range of values consistent with the classifications and standards governing the quality and purity of Lake Ontario waters.

SPECIFICATION

The pH of treated water in the waste neutralizer tanks and floor drain sample tanks prior to being discharged into the discharge tunnel shall be between 6.0 and 9.0. When the conductivity of a floor drain sample tank is below 10 μmho/cm, the pH shall be between 4.0 and 9.0.

MONITORING REQUIREMENT

Sampling and analysis for pH and conductivity shall be performed in accordance with Table 2.2-2.

The waste neutralizer tanks shall be monitored continuously for pH during release to the cooling water discharge.

The pH monitors shall be set to alarm at pH levels below 6.0 and above 8.5. The pH sensors shall be located in the discharge pipe from the waste neutralizer tank and shall be sensitive to at least 0.1 pH units.

Once a month, the pH monitors shall be checked to verify the operability of the inline pH probes.

BASES

Lake Ontario is designated Class A-Special (International Boundary Water). This classification specifies a lake water pH range of 6.7 to 8.5. However, pH observations performed during site monitoring programs have fallen predominantly in the range from 8.0 to 9.0 and have frequently exceeded 8.5.

Waste neutralizer tank and floor drain sample tank releases are diluted by a factor of more than 2,000 in the circulating water prior to discharge. After such dilution, the discharge is at essentially the same pH as the incoming lake water.

With increased usage of the waste concentrator, pure water inventory increases. To allow for discharge of water with only CO_2 as contaminate, a lower pH is allowed for low conductivity floor drain sample tanks.

4.0 Environmental Surveillance and Special Study Programs

4.1 Biological

4.1.1 Aquatic

a. Lake Survey

Discussion

Large scale, intensive aquatic ecological sampling has been performed in the vicinity of Nine Mile Point since 1972. Plankton, benthos, periphyton, and nekton were collected during well-designed surveys, identified, counted, and analyzed according to appropriate methods. No significant impact of the FitzPatrick Plant in conjunction with the Nine Mile Point Plant on these trophic levels was found.

Nekton Sampling Program

Monthly bottom gill nets shall be set at the 30' depth at all four transects (see Figure 4.1.1-1). See Table 4.1.1-1 for sampling schedule.

On each sampling date, nets shall be set at night for a period of approximately 12 hours during the April through December period. In order to provide comparative data between impingement collections and the Lake Program, each gill net collection shall be scheduled for the night preceeding an impingement collection. All fish collected shall be separated by species. A random sample of 40 fish per species shall be analyzed for length and weight from collections with more than 40 fish of a species only. Lengths and weights of each fish shall be taken for species with less than 40 individuals in the collection.

Water Quality

Temperature and dissolved oxygen shall be measured in conjunction with each gill net set.

Reporting Requirements

At the end of each year of study, the results from the Lake Program shall be summarized in the Annual Environmental Operating Report.

Bases

The information obtained will provide an adequate index of the condition of the aquatic ecosystem of the NMP vicinity.

b. Impingement of Organisms

Objective

To estimate the number and weight and to determine the species of fish impinged on the traveling screens in the intake screenwell.

Specification

The species and numbers of fish removed from the traveling screens during a 24-hour period shall be recorded.

Sampling days each month shall be designated using the stratified random program outlined in Table 4.1.1-1

All fish collected shall be separated by species. A random sample of 40 fish per species shall be analyzed for length and weight from collections with more than 40 fish of a species only.

Based upon the mean weight of individuals of each species, an estimate of the number of fish by species shall be calculated.

When the number of fish collected during a 24-hour period exceeds 20,000, sampling shall be continued until the number of fish is diminished to less than 20,000 in a 24-hour period.

Reporting Requirements

When the number of fish collected during a 24-hour period exceeds 20,000, the NRC Regional Office shall be notified by telephone within 24 hours after sampling collections are completed. When the number of fish collected during a 24-hour period is reduced to less than 20,000 a

licensing event report shall be prepared. In the event that collection exceeds 20,000 for more than 7 days, an LER shall be filed at the end of the seventh day and every seventh day thereafter.

Table 4.1.1-2 shows the monthly maxima experienced during 1975-1978. In the event that the total monthly number of fish impinged exceeds the number indicated by 50%, the NRC Regional Office shall be notified by telephone within 24 hours of determining such, and an environmental impact assessment will be conducted and a report of the assessment will be included in the Annual Environmental Operating Report.

A report of impingement sampling results shall be included in the Annual Environmental Operating Report, submitted to the Director of the NRC Regional Office, in accodrance with Section 5.6.1.

Bases

The program in the Specification will monitor the magnitude of fish impingement at the FitzPatrick Plant.

Table 4.1.1-1

Frequency of Sampling

Nine Mile Point Area of Lake Ontario

Survey Group	Frequency	Period(1)
Water Quality	Monthly	April-December
Fish Gill Netting	Monthly	April-December

Impingement of Organisms(3)	Sampling Days Per Month(2)	Throughout Year
January	4	
February	4	
March	4	
April	16	
May	20	
June	6	
July	4	
August	4	
September	4	
October	4	
November	4	
December	4	

(1) Sampling shall not be required when prevented by inclement weather.
(2) Days are to be randomly assigned within each month.
(3) Water quality measurements at the intake and discharge, performed according to Specification Sections 2.1.1, 2.2.3 and 2.2.4, are available for comparison with impingement results.

Table 4.1.1-2

Impingement Collections

Monthly Maximum

1975*-1978**

January	41,596
February	16,646
March	22,595
April	413,854
May	1,750,162
June	131,769
July	67,249
August	33,708
September	31,570
October	32,428
November	87,928
December	30,837

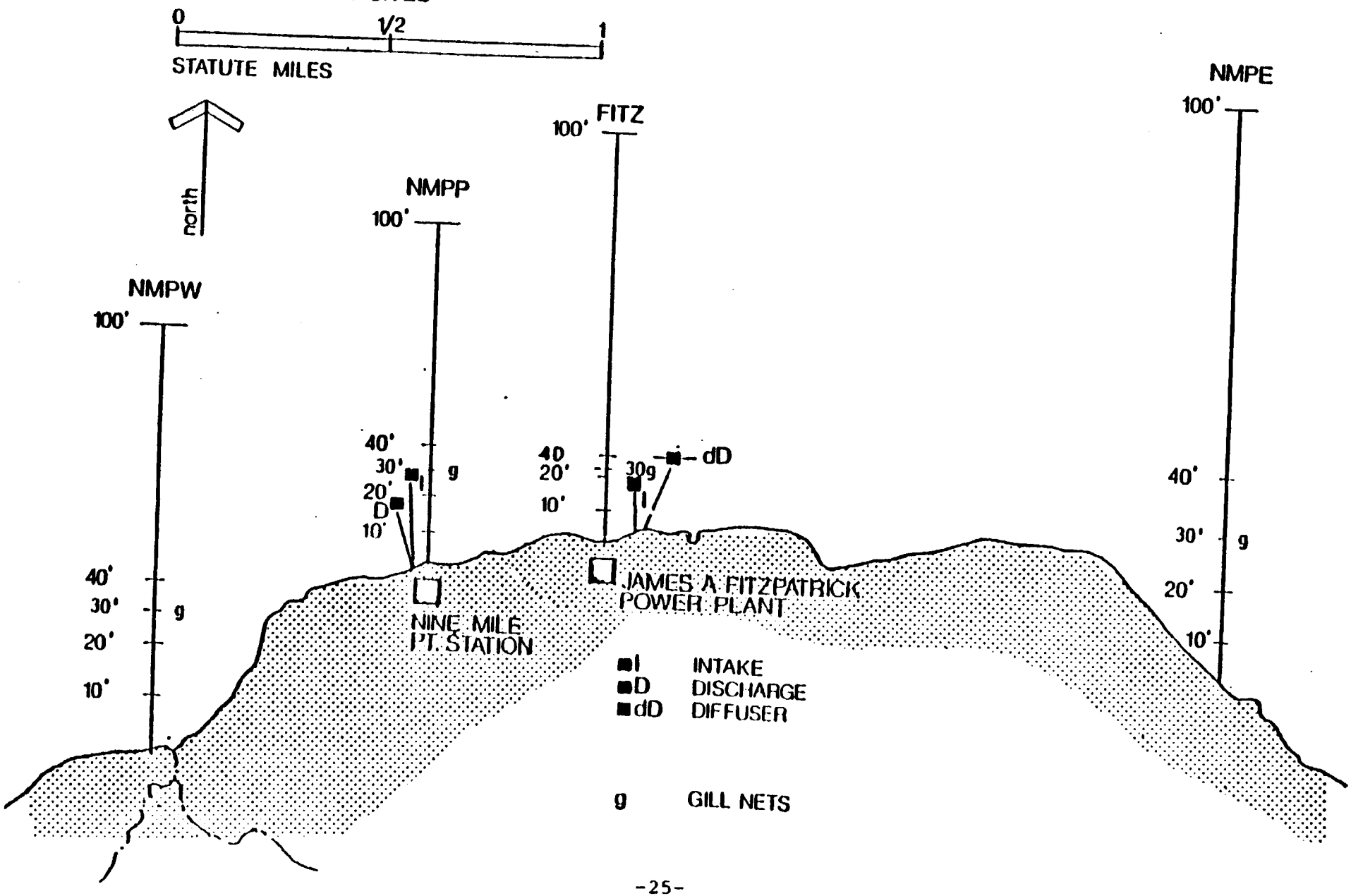
*1975 collections included only September - December.

**1978 collections included only January - September.

SAMPLING LOCATIONS

ENVIRONMENTAL TECHNICAL SPECIFICATIONS

NINE MILE POINT SITES



Amendment No. 46

FIGURE 4.1.1-1

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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

ENVIRONMENTAL IMPACT APPRAISAL BY THE OFFICE OF NUCLEAR REACTOR REGULATION

SUPPORTING AMENDMENT NO. 46 TO LICENSE NO. DPR-59

POWER AUTHORITY OF THE STATE OF NEW YORK

JAMES A. FITZPATRICK NUCLEAR POWER PLANT

DOCKET NO. 50-333

1.0 Introduction

1.1 Chemical Protection Limits

By letters dated January 10, 1977 and January 17, 1979, the Power Authority of the State of New York (the licensee) requested an amendment to the Appendix B Non-Radiological Environmental Technical Specifications (ETS) for the James A. FitzPatrick Nuclear Power Plant. The licensee proposes to modify the limiting conditions for operation (LCO's) in ETS Section 2, "Protection Limits," for biocides, corrosion inhibitors, suspended and dissolved solids, and pH and conductivity. The proposed modifications to Section 2 include:

A. Subsection 2.2.1. The licensee proposes to include service water in its prohibition of the use of biocides.

B. Subsection 2.2.2. The licensee proposes to reword the specification prohibiting discharge of corrosion inhibitors (chromates);

C. Subsection 2.2.3. The licensee proposes rewording of LCO's for suspended and dissolved solids. The staff has deleted these requirements; and

D. Subsection 2.2.4. The licensee proposes to monitor conductivity and to discharge effluents with a pH between 4.0 and 9.0 when the conductivity of the waste tank is below 10 μmho/cm.

The evaluation of this portion of the ETS revision is discussed in Section 2.1.

1.2 Environmental Surveillance and Special Study Programs

By letter dated January 17, 1979, the Power Authority of the State of New York (the licensee) renewed their request for an amendment to the Appendix B Non-Radiological Environmental Technical Specifications

(ETS) for the James A. FitzPatrick Nuclear Power Plant. The licensee proposes to delete all portions of the environmental non-radiological aquatic biological monitoring program in Section 4 with the exception of impingement sampling, which they propose to reduce in sampling intensity, and a low-level fish sampling program in the lake to complement the impingement monitoring. This appraisal reviews the results of, and provides a basis for, deleting Specifications 4.1.1.a (except for a low-intensity fish sampling program to complement the impingement monitoring), 4.1.1.c, 4.1.2, 4.1.3, and 4.2.1, and reducing the intensity of sampling required by Specification 4.1.1.b.

The evaluation of this portion of the ETS revision is discussed in Section 2.2.

2.0 Evaluation/Environmental Impacts of Proposed Action

2.1 Chemical Protection Limits

The following is a discussion of the environmental impact for each change proposed by the licensee.

a) The licensee proposes to prohibit the use of biocides in the service water system as well as in the main condenser cooling water. This would result in a lower level of environmental impact than if biocides were allowed to be used in the service water system. Therefore, impact would be less than that permitted by the existing ETS and the proposed change is acceptable.

b) The licensee proposes to reword the specification prohibiting discharge of corrosion inhibitors. The specification has been changed to read that corrosion inhibitors shall not normally be discharged to the lake. This change is in recognition that although there is no intentional discharge of corrosion inhibitors, some chromate could appear in the discharge due to leakage from the diesel generator closed loop cooling system where chromate is used as a corrosion inhibitor. If leakage from this system should occur, the chromate would be collected in floor drains and routed to the waste tanks, where its release to the circulating water system could be controlled. A requirement has been added that the licensee monitor the Diesel Generator Closed Loop Cooling System at least monthly to determine if leakage from the system occurred and to determine the amount of leakage. An evaluation of environmental impact shall be made and prompt action will be taken to prevent any further leakage. The staff finds these changes to be acceptable.

c) Specification 2.2.3 limits the concentration of solutes released from the makeup water system to Lake Ontario. Each of two makeup demineralizer waste neutralizer tanks, with a capacity of 25,000 gallons, is typically discharged at a maximum rate of 50 gpm over a period of 8 to 10 hours once a week. The Commission's Final Environmental Statement (FES) for the James A. FitzPatrick Nuclear Power Plant predicted that with a 7200-fold dilution of the makeup demineralizer waste neutralizer tank discharge into the circulating water system and an additional 10-fold dilution at the boundary of 3-acre area on the lake surface, the chemical concentration of solutes during discharge will be close to lake water concentrations. The FES also gives estimates for daily discharges of solutes from the plant as a result of operation of the makeup water system. Results of 4 years of monitoring makeup demineralizer waste tank releases indicate that the FES predictions were conservative for all solutes measured. Thus, with respect to yearly pounds of solutes discharged, it is apparent that the licensee is operating the facility in a manner consistent with what was assessed in the FES.

In the current ETS the licensee is required to provide for additional dilution when the concentration of any solute in the station discharge exceeds the lake ambient concentration of that solute by more than 5% or when total dissolved solids in the station discharge exceeds lake ambient by more than 1%. In order to determine compliance with the specifications, the licensee must take grab samples from the intake and from the discharge and compare them with each other. Because of the difficulty of taking a representative sample, and because of relatively low precision of analytical techniques, coupled with the stringent limit, the licensee is frequently found to be out of compliance. This occurs even though measurements of the waste tank concentrations and subsequent calculations of the dilution provided by release into the circulating water flow indicate that actual releases are within the specified limits. Examination of operating data taken by the licensee over the past 4 years reveals that the chemical discharge concentrations in the plant discharge due to demineralizer regeneration wastes are very much below those levels which have been shown to be acutely toxic to aquatic organisms in Lake Ontario.[1,2]

d) The licensee proposes to increase the pH range of discharge effluents to between 4.0 and 9.0 when the conductivity of the waste tank is below 10 μ mho/cm and to monitor the conductivity. The pH is still restricted to a range of 6.0 to 9.0 when the conductivity exceeds 10 μ mho/cm. A condition of low conductivity could occur when increased usage of the waste concentrator increases the pure water inventory, with only CO_2 as a contaminant, or when a small

amount of acid occurs in a poorly buffered solution. It is calculated that less than 2 mg/l of sulfuric acid in distilled water would produce a conductivity in excess of 10 μ mho/cm. The presence of any additional salts beyond this biologically insignificant amount would increase conductivity, and the discharge would have to be neutralized to bring the pH within the 6.0 to 9.0 range. The low pH waste would be discharged at a maximum rate of 100 gpm into the circulating water discharge of 350,000 gpm. Thus, a dilution of 3500 to 1 occurs before the station discharge enters the lake. After such dilution, the discharge is at essentially the same pH as the ambient lake water; and no adverse impact on biota in the lake is expected. As indicated in the FES, the impact on the lake due to losses of biota within the circulating water system would be small even assuming 100% mortality of entrained organisms; thus, minor impacts during dilution within the station piping are acceptable as well.

2.2 Environmental Surveillance and Special Study Programs

Specification 4.1.1.a required a general ecological survey consisting of monitoring programs for phytoplankton, microzooplankton, macrozooplankton, ichthyoplankton, periphyton, benthos, and fish. The specific objectives of the general ecological survey are as follows:

(1) Determination of distribution and relative abundance of species in space and time in the biotic groups (phytoplankton, zooplankton, periphyton, benthos, and fish);

(2) Determination of changes in biological parameters and their significance within and out of the area influenced by the thermal plume;

(3) Determination of the relationship of changes within and among biotic groups and with the physical and chemical characteristics of the environment; and

(4) Determination of the relationship of changes to the operation of the plant and significance of the effects of such changes on the ecosystem.

This survey, described in the FES and designed to be descriptive in nature, was to span at least a two-year period, ending approximately in November 1976 and was to be used to: (1) identify which of the biological parameters require continual monitoring throughout the life of the plant and establish limiting conditions and report levels for these biological parameters; or

(2) establish that measurement of such parameters is unnecessary due to insignificant impact. Data collected during more than four years of plant operation, combined with the preoperational data, have documented cyclic short-term seasonal variations in the lake, but have failed to indicate that operation of FitzPatrick is causing a significant adverse impact on any segment of the biota as described below.

Phytoplankton

Surface (50% light transmittance level) whole water phytoplankton samples have been collected monthly at stations along four transects (two thermally influenced and two control) at four depths (10, 20, 40 and 60-ft. contours) since 1973. Also samples have been taken at the 25% and 1% light transmittance levels at five of these stations since 1975. Abundance, species composition, and chlorophyll were measured during all years; biovolume and primary productivity (uptake of ^{14}C) were measured during some, but not all years. With this comprehensive data base, encompassing both potentially impacted and non-impacted areas in the Nine Mile Point vicinity*, any significant changes in phytoplankton community composition or productivity due to plant operation would be evident.

The seasonal patterns of phytoplankton abundance and species composition observed in the vicinity of Nine Mile Point since 1973 reflect seasonal patterns typical of Lake Ontario. There is some phytoplankton growth throughout the year, with species identified from all phytoplankton groups (diatoms, green algae, blue-green algae and flagellates). The annual cycle is usually characterized by two periods of rapid and intense phytoplankton growth, termed "pulses" or "blooms". One pulse during the spring, is dominated by diatoms, while the fall pulse is usually dominated by blue-green algae. Maximum chlorophyll "a" generally occurs during the summer, although peaks also occur in the spring and sometimes during the fall. The seasonal patterns are correlated closely with natural changes in physical conditions, i.e., water temperature and light intensity, and with the supply of dissolved inorganic nutrients.

The species composition of the phytoplankton community in the Nine Mile Point vicinity has been relatively consistent throughout the years despite considerable natural variation. Green algae tends to be the dominant component of the phytoplankton in the late summer, with a large increase in abundance during July being dominated by the same species reported to exist throughout the lake. The spatial differences in abundance, species

* Both the FitzPatrick and the Nine Mile Point, Unit 1, nuclear power plants are located on a geographical feature on Lake Ontario called Nine Mile Point.

composition and productivity in the site vicinity appear to be related to natural phenomena such as lake circulation patterns and the Oswego River. West to east trends (Oswego River influence) of decreasing standing crop have been noted. Trends of decreasing abundance and chlorophyll "a" at offshore stations compared to nearshore ones have also been noted. No consistent trend of increased or decreased species abundance or chlorophyll "a" was detected in the near field. Although primary productivity was occasionally enhanced in the discharge area, the effect was not noted outside of a localized area, nor was it present during each year or consistent throughout the year.

The phytoplankton species in the vicinity of Nine Mile Point conform closely to the inventory of species recorded for shoal waters in Lake Ontario. The taxonomy, distribution and abundance of phytoplankton in the area are essentially the same as have been determined for the lake as a whole. It can be concluded that the impact of the James A. FitzPatrick Nuclear Power Plant is not detectable above natural variations and is not significant since no large-scale shifts in the composition of the phytoplankton community have occurred over the last five years. The phytoplankton community is expected to continue to display similar seasonal and spatial trends in standing crop and species composition in the future. This fact plus the lack of any significant plant impacts make further monitoring of the phytoplankton community unnecessary.

Zooplankton

For the purposes of the studies undertaken at Nine Mile Point, the zooplankton were separated by size into two categories: microzooplankton and macrozooplankton. "Macrozooplankton" are those invertebrate zooplankton retained in a 571-micron mesh zooplankton net, while "microzooplankton" are functionally defined as the zooplankton ranging in size from 76 to 571 microns. Microzooplankton were collected at least monthly from 1973 and 1977. Samples were collected by oblique or vertical tows through the entire water column along four transects (two potentially thermally influenced and two controls) at four depth contours (10, 20, 40, and 60-ft depth contours) and species composition and abundance were measured.

Microzooplankton

The microzooplankton fraction of the total zooplankton community in the vicinity of Nine Mile Point was composed of four major taxonomic groups; rotifers, cladocerans, copepods and protozoans. Strong seasonal trends were evident in all years, with maximum microzooplankton abundance occurring during the summer, and a secondary peak often occurring in the fall. Rotifers contributed the greatest percentage of microzooplankton abundance in the vicinity of Nine Mile Point, exhibiting a bimodal pattern, peaking once during the summer with a second smaller pulse in the early fall.

Statistical analysis performed by the licensee indicated that the abundance at the transects were not significantly different. A three-way ANOVA indicated that the greatest variance in the data was attributable to differences among dates followed by contour depths at the stations and finally by transects. The only consistent trend was one of decreasing microplankton densities recorded offshore at all transects and was unrelated to plant operation. Some changes have been documented in the microzooplankton community between years, but no consistent or unidirectional change has been noted over the past five years. The same species have dominated the community during each year, and no long-term increases or decreases in the standing crop of any group have been observed. The seasonal patterns are similar to those reported by other researchers. Variations in the temporal and spatial patterns appear to be primarily the result of natural fluctuations.

Macrozooplankton

Macrozooplankton samples were collected concurrently with the ichthyoplankton samples since the same sampling gear was used for both. Samples were collected during 5 minute tows with a 571 micron plankton net from surface, mid and bottom depths at 15 stations distributed in three concentric arcs (0.5, 1.0 and 3.0 mile radii from the FitzPatrick Nuclear Power Plant) on five depth contours (20, 40, 60, 80, and 100-ft contours). Sampling was conducted weekly and collections were made both day and night and were analyzed for species composition and abundance. The dominant macrozooplankton groups were cladocerans, copepods and amphipods (many of the same species collected in the microzooplankton samples due to the wide range of sizes encompassed by the developmental stages of these organisms), with the macrozooplankton community frequently dominated by the cladoceran Leptodora and the amphipod Gammarus. The species composition of the macrozooplankton community remained relatively stable over the years studied, with the same species occurring each year. Some macrozooplankton, such as Gammarus typically exhibited diel vertical migrations, moving into the water column during the night and remaining on the bottom during the day. Highest abundances for the dominant organisms occurred during the summer when seasonally warm water temperatures and abundant food supplies (both of which affect reproduction and growth) are prevalent. Pontoporeia and Mysis, both cold-water species (glacial relects) were observed primarily during periods of cold water upwellings. Patterns of spatial distribution have been variable over the years, but it appears that there is an increase in the abundance of Gammarus and Diptera toward the eastern stations where more sand and silt are found in the substrate beyond the 20-ft contour. In addition, a trend of decreasing Gammarus abundance with increasing depth has been noted. These trends are similar to those found in the benthic collections. No significant or consistent changes appear to have occurred in the macrozooplankton community that can be attributed to plant operation. Rather, most of the variability noted seems to be related to natural environmental fluctuations.

Periphyton

The artificial substrate periphyton program conducted near Nine Mile Point since 1973 consists of bottom and buoy (suspended) periphyton samplers. Bottom periphyton was collected by placing artificial substrates on the lake bottom along two experimental and two control transects at five depth contours (5, 10, 20, 30, and 40-foot depth contours). Buoy periphyton was collected by suspending substrates at defined depths (2, 7, 12, and 17 ft) in the water column at three transects (one experimental and two control) along the 40-ft depth contour. Samplers were placed in the water after the spring thaw, and the substrates were retrieved and replaced by clean ones every 2-4 weeks until the end of the year. Species composition, numerical abundance, biomass (dry weight and ash-free dry weight), and photosysthetic pigments (chlorophyll a and phaeophyten) were measured.

The periphyton community on the artificial substrates was composed primarily of diatoms in the spring, green and/or blue-green algae during the warm months, and diatoms again in the fall. Protozoa, primarily ciliates and suctorians, were common particularly at the deeper depth where light intensity was lower. The presence of a relatively large blue-green algal component is consistent with recent reports of increasing eutrophication of Lake Ontario, particularly in the nearshore waters. Numerical densities were greater on buoy than bottom substrates probably due to lower siltation and higher light intensity on the suspended samplers. Biomass on buoy periphyton was generally higher at the experimental station than at either of the controls, and the difference was statistically significant. (However, ratios of biomass to chlorophyll did not differ between control and experimental transects, indicating no change in the ratio of primary to secondary production.) Similar results were not observed for biomass of bottom periphyton, for which statistical analysis indicated no difference associated with the experimental versus the control station. This observation demonstrates that if increased production is a plume effect, it is not reflected in the periphytic community on the lake bottom, which is the natural habitat for these organisms. (Thus, the results of the buoy study are not directly applicable, since the periphytic community does not naturally inhabit the upper regions of the water column in 40 feet of water). The species composition and standing crop of the bottom periphyton have remained relatively constant over the five-year study period. No consistent trends attributable to plant operation were observed among years or among transects for bottom periphyton, which is the more realistic indication of the local periphyton community, as periphyton is present only on the lake bottom.

Benthos

Replicate quantitative benthic samples have been collected from 20 stations (10, 20, 40 and 60-ft depth contours on each of four transects) during alternate months between April and December from 1973 through 1977. These benthic studies have spanned a sufficient length of time to allow comparisons

between pre and post-operational years and the number of stations were sufficient to provide data from plume and non-plume areas over a range of depths. Thus, the benthic program was adequate to detect significant plant-induced effects as well as to describe natural cycles in the benthic community. All organisms were enumerated and identified to the lowest possible taxon (over 120 taxa comprising seven different phyla have been identified). Visual observation of the type of substrate in the area of Nine Mile Point established a gradient of increasing sedimentation eastwards, with the two westernmost transects dominated more by bedrock than by sand and silt. The two easternmost transects were characterized as having bedrock and rubble in the inshore areas with sand and silt prevalent beyond the 20-ft contour.

Benthic invertebrates in the Nine Mile Point area have a seasonal growth and reproduction pattern similar to that expected for temperate latitudes. Benthic organisms were most abundant in the June-August months. The trend of greater benthic invertebrate abundance during the summer is mainly due to the presence of actively growing Cladophora, a filamentous green algae which provides food and refuge for many invertebrate populations. Seasonally, the distribution of macroinvertebrates was as follows: polychaetes and gastropods were dominant in April, the oligochaetes and ostracods in June, the amphipod Gammarus and polychaetes in August, Gammarus and oligochaetes in October and Gammarus in December. Differences observed in the distribution and species abundance of benthic invertebrates between stations and transects are attributed to animal-substrate relationships. For example, Gammarus and the polychaete Manayunkia were dominant and associated with bedrock substrate while the nematode Dorylaimus, tubificids and the dipteran Cryptochironomus were abundant where the substrate was mostly sand and silt. In general, more organisms were found in deep areas where silt content was high and in shallow water in association with Cladophora beds, while fewest organisms were found at intermediate depths. Abundance and biomass also showed an increasing trend from west to east similar to the trend of increasing silt content.

Gammarus was the single dominant organism in the benthic samples. The U.S. EPA identified it as a representative important species for the purposes of the "316(a) and (b) demonstrations"* at FitzPatrick and Nine Mile Point because of its importance as a food source for fish in the area. Therefore, particular emphasis was placed on Gammarus throughout the study. The analysis of long-term abundance data showed no significant differences in Gammarus abundance between pre and post-operational years. In addition, analysis of seasonal data indicate that the organism is

* Federal Water Pollution Control Act, 1972. PL 92-500, Sections 316(a) and (b).

successfully completing annual reproductive cycles in the area. Typical seasonal fluctuations in mean density of Gammarus in the study area were between 100 and 6,000 organisms/meter^2, with less than 2% of the animals suspended in the water column above the bottom (as shown by the macrozooplankton tows). Spatial distribution of Gammarus was shown to be the result of substrate variation and seasonal growth patterns. Comparison of observed abundance between plume and non-plume stations with similar substrates showed no significant differences on Gammarus or other benthic macroinvertebrates, indicating that the heated discharge has had no discernable effect on the benthic community.

Although scouring has been observed in the immediate vicinity of the high velocity (15 fps) FitzPatrick discharge, this is a very localized effect which will not have a significant impact on the benthic community outside of the immediate discharge vicinity. None of the spatial, seasonal or annual fluctuations in the benthic community were found to be related to plant operation. The benthic community has exhibited normal population dynamics in response to the natural spatial and temporal variations in habitat and environment. Because there have been no significant adverse impacts on the benthic community as a result of plant operation and because the FES predictions of no impact have been verified, this study may be terminated.

Fish

Fishes have been collected from four transects twice monthly from April through December in the vicinity of Nine Mile Point with gill nets, trawls, beach seines and trap nets since 1973. Fish collected in trap nets were identified, counted, tagged and released. Fish collected from gill nets, trawls and seines were identified to species, weighed and measured. Detailed secondary analysis, including coefficient of maturity, age, and growth and food habit studies were conducted for yellow perch, smallmouth bass and white perch. Detailed analysis of abundance data comparing catch-per-effort between control and experimental transects were made yearly for the above three species and for the alewife and rainbow smelt.

The fish species identified as representative and important by the EPA for the purposes of the 316(a) and (b) demonstrations of FitzPatrick and Nine Mile Point were the alewife, brown trout, coho salmon, rainbow smelt, smallmouth bass, three spine stickleback, and yellow perch. The range of fishery gear types, and the spatial distribution and frequency of fish collections, were adequate to collect data that would indicate the presence of any significant plant-induced impacts on the fish populations in the area of Nine Mile Point.

A total of 72 species have been identified in fish samples collected near Nine Mile Point. Approximately 75% of the fish collected were alewives. Rainbow smelt, spottail shiner, yellow perch, and white perch comprised approximately 18% of the total fish collected, indicating the small numbers

of the other species reported in the taxonomic listing of the fish community. On a seasonal basis, the greatest abundance of fish was observed during the spring months, corresponding to the shoreward migration of rainbow smelt and alewives. Fish diversity (Shannon-Weaver index) was high during the spring due to the onshore migration of a number of lake fishes. Diversity was lowest during the warm-water months when alewives reached their greatest abundance, and increased during the fall when the offshore movement of the alewife resulted in a more even distribution of fishes among the species. The greatest fish concentrations were found at the two eastern transects, which is consistent with findings for other trophic levels. The shoreline community, evaluated through the use of beach seines, was found to be low in abundance and dominated by young alewife. Cyprinids (mainly the important forage species, spottail shiner), centrarchids, and white perch, were the other major community members in the nearshore environment.

There were few changes in the fish community between pre and post-operational years as determined by gill net collections. Gizzard shad abundance has been reported to be increasing in Lake Ontario and data collected on gizzard shad indicate an increasing shad population in the Nine Mile Point vicinity, with the greatest concentrations occurring during the fall. Yearly catch-per-effort data for rainbow smelt, white perch and smallmouth bass collected by gill nets show no significant difference among years from 1969 to 1974. Alewives have increased in abundance, with significantly greater numbers collected in 1974 compared to earlier years (alewives have been shown to undergo large year-to-year fluctuations in population size in other land-locked situations). Yellow perch exhibited a general decline in abundance over the six years with significantly fewer collected in 1974. The following year, however, the abundance of yellow perch collected in gill nets increased by three-fold. These seem to be normal fluctuations in population dynamics, unrelated to plant operation.

The alewife, rainbow smelt, white perch, yellow perch, and smallmouth bass were collected in sufficient quantity and at all stages of development to demonstrate completion of the normal life cycle in the vicinity of Nine Mile Point. The salmonids (brown trout and coho salmon) were collected infrequently, but year-to-year changes in abundance of these species in gill net collections reflected the stocking intensity as reported by the New York State Department of Environmental Conservation. The licensee's statistical analyses of monthly species diversity using a three-way ANOVA indicated that there were no significant differences between transects for any temporal comparison. In addition, there was no significant difference in mean annual species diversity. These results indicate that thermal discharges from FitzPatrick are not causing significant adverse impacts on the fish populations in the area.

The licensee's 316(a) demonstration examined the indirect effects of the FitzPatrick discharge. These factors included effects of current shear, pressure change, and dissolved oxygen. The changes found to occur in each of these parameters were all well within the tolerance limits of the species

present or similar species. As a result of the extensive field sampling program conducted in the vicinity of Nine Mile Point, personnel have been present during several plant shutdowns, which included shutdowns during colder water periods. To date no observations of cold shock mortality on fish have been made as a result of shutdown by FitzPatrick. The summer maximum upper incipient lethal temperature thresholds, corresponding to the most critical temperature period for the representative important species, were evaluated to determine the potential of thermal kill occurring during the warmer months. Only three species (brown trout, coho salmon, and rainbow smelt) have lethal threshold temperatures that may be exceeded in the thermal plume downstream of the initial mixing of the discharge. However, these species are normally found in cooler offshore water during the summer months when the discharge would represent a potential lethal factor. The preference for colder water would normally limit the number of these fish in the warmer nearshore zone during the summer months.

The results of these studies have shown that: the thermal discharge from FitzPatrick is not causing a significant adverse impact on fish populations in the area; the predictions of no harm presented in the FES have been validated; and the potential for damage to fish populations in the future is considered small if the plant continues operation in its present mode. For these reasons the present fish sampling study may be terminated, except for a reduce gill netting program which is to complement the impingement sampling.

Ichthyoplankton

Ichthyoplankton samples collected concurrently with the macrozooplankton samples for the five years from 1973 through 1977 were comprised of eggs and larvae of several fish species. Seasonal patterns of egg and larval abundance indicated two periods of larval presence. The first was comprised of the late fall, winter and early spring-spawning fish. Rainbow smelt and yellow perch were the most abundant species collected during this period, with occasional occurrences of burbot and cisco in low numbers. The second period included summer-spawning fish species dominated by the alewife. Rainbow smelt were generally the second most abundant larvae and were present in more collections over a longer period (but in lower numbers) than the alewife. Larvae of other species were collected in low numbers or not at all. The egg collections (as might be expected from the larvae fish collections) were dominated by alewife and rainbow smelt. Eggs of the other species were collected in extremely low numbers and on only ten sampling dates. Eggs and larvae of all species were collected in greater concentrations in all years at the 20-ft depth contour than at the deeper contours throughout the study area. As the larvae mature, they emigrate to the deeper water, creating an onshore-offshore distribution. Diel patterns, in which alewife eggs and larvae and rainbow smelt larvae were more abundant in night collections than day collections, suggest greater spawning activity at night for alewives and greater larval activity at night for both alewives and rainbow smelt. Furthermore, the licensee's

data indicate that the Nine Mile Point area is not a major spawning area for most Lake Ontario fishes. However, for those species that do utilize the area (principally alewife and rainbow smelt) no consistent patterns in distribution of eggs and larvae between plume and non-plume areas have been found. These conclusions confirm the FES predictions that plant operation would have a minimal effect on ichthyoplankton and would not adversely affect fish populations in the area.

Lake Water Chemistry Survey

Sixteen water quality parameters have been collected at six stations twice per month for more than four years. These surveys are intended to complement the sampling for biotic groups. (See analysis under Specification 4.1.2.)

Impingement and Entrainment

Specification 4.1.1.b requires collection of fish impinged on the intake travelling screens during a 24-hour period at a frequency of three times weekly. One of these weekly collections consists of 24 one-hour samples to determine day-night differences in the rate of impingement. Additionally, when daily collections result in 20,000 or more fish, 24-hour samples are conducted on subsequent days until the total number impinged drops below 20,000 fish/day. The Power Authority of the State of New York has requested that they be allowed to redesign the impingement program. The licensee proposes a stratified random sampling program which the licensee indicates will provide the same degree of statistical precision with half the sampling effort, compared to the present program. (This is the approach advocated by staff at Argonne National Lab after analysis of years of impingement data at several different nuclear power plants throughout the U.S.*.) The reporting requirements and the requirement to continue sampling on successive days if impingement exceeds 20,000 fish in a 24-hour period are not being changed. The staff finds the licensee's proposal acceptable, particularly if the licensee maintains the requirement that whenever impingement levels reach 20,000 fish/day, the licensee will continue sampling until the number of fish impinged drops below 20,000 in a 24-hour period. Impingement levels (both high and low) based on five years of impingement data have been proposed that will trigger the licensee to perform an environmental impact assessment and a report to the NRC when impingement levels are significantly different than those recorded in the past. The environmental impact assessment shall be conducted to determine what caused the impingement anomaly, whether or not it was plant-related, and the significance of the impact.

* I. P. Murarka, and D. J. Bodeau. 1977. Sampling Designs and Methods for Estimating Fish Impingement Losses at Cooling Water Intakes. Argonne National Laboratory. ANL/ES-60. 277 p.

Specification 4.1.1.c requires entrainment sampling of plankton, and fish eggs and larvae twice each month from April through October. Only alewife and rainbow smelt eggs or larvae were collected in sufficient numbers to allow evaluation of impact. Because larval fish and eggs which are entrained are exposed to a ΔT of 32°F for over three minutes, 100% mortality of entrained ichthyoplankton was assumed. Due to the lakewide nature of spawning populations of both alewife and rainbow smelt, a lakewide assessment of larvae cropping by both FitzPatrick and nearby Nine Mile Point was done. This analysis by the licensee yielded cropping estimates of 0.26% for both species assuming that both plants were operating at full flow throughout the larval season. The estimated total number of eggs of both the alewife and rainbow smelt entrained at FitzPatrick were evaluated in terms of the number of spawning females required to produce the eggs. Based on average fecundity data and local standing stock estimates for adult fish, the required number of females represented 0.006 and 0.004% of the mature females in the local standing stocks of alewife and smelt. (The eggs losses due to entrainment at Nine Mile Point, Unit 1, are expected to be slightly smaller due to a slightly smaller plant capacity and intake flow.) These cropping estimates for eggs and larvae are sufficiently low to preclude any significant effect on the populations.

Laboratory studies indicate that mortality to the amphipod Gammarus (the most important macrozooplankter) is expected to be around 40%. The 316(b) demonstration for FitzPatrick indicates that less than 1% of the Gammarus standing stock is entrained. Losses of Gammarus due to entrainment at Nine Mile Point, Unit 1, are expected to be slightly smaller due to lower intake flow, and these losses are not considered to be significant either. The FES predicts that even with 100% mortality of zoo and phytoplankton the entrainment effects will be diffused over a wide area, and are not expected to be measurable. Results of the general ecological survey (discussed earlier) substantiate this prediction, as no changes beyond natural fluctuations have been detected. Because the FES predictions have been verified and no significant entrainment effects have been detected, this program may be deleted.

Water Quality

Specification 4.1.2 requires monthly sampling of 48 water quality parameters at two stations in the vicinity of the plant. The objective of this program is to measure and document water quality conditions in the vicinity of the site and to supplement data collected during previous surveys. The ETS also requires that the water quality surveys be conducted to complement the biological sampling program.

Comparison of annual averages for each parameter sampled in this program as well as those listed in the Lake Water Chemistry Survey (Specification 4.1.1.a) indicates that no cumulative changes in any of the parameters have occurred over the four years of plant operation. In addition, analyses of the data from the annual reports have not indicated either short or long-term effects of plant operation on water quality in the Nine Mile Point area. The major influences on water quality identified by our review were effects of the nearby Oswego River and naturally occurring seasonal fluctuations and short-term variations due to lake upwellings. The lack of any identifiable effect on water quality as a result of plant operation indicates that no significant adverse impacts are likely in the future (assuming that the plant operating mode does not change). Therefore, the water quality program in the lake is not needed to follow plant-induced changes. Furthermore, the deletion of the biological sampling program in the lake eliminates the need for water quality data for interpretation of biological data. However, the low-intensity fish sampling program in the lake will be accompanied by measurements of temperature and dissolved oxygen.

Thermal Monitoring

Specification 4.1.3 requires weekly surveys to determine the vertical temperature structure off-shore of the site. Temperature measurements were taken in 100 feet of water from surface to bottom in 1 meter increments at 3 stations during more than two years of operation. These surveys have resulted in an extensive data base concerning lake temperature structure and provide the basis for determining any changes in natural stratification due to plant operation. Results indicate that Lake Ontario is a dimictic lake with turnovers in the late spring and late fall. In the summer, the lake becomes highly stratified with surface-to-bottom temperature gradients of $30^{o}F$, or more. In the winter, the temperature gradient remains small, usually less than $5^{o}F$, and the vertical temperature profile is isothermal. In general, the annual temperature cycle of the lake at the 100-foot depth has remained unchanged and is a result of natural seasonal processes unrelated to plant operation. The staff concludes that deletion of this study is acceptable.

Specification 4.2.1 requires two years of triaxial thermal plume mapping and dye studies during normal plant operation. The studies were conducted during several different sets of anticipated critical lake conditions (e.g., high temperature, maximum lake current and low lake level) at least four times a year. These surveys have resulted in a data base with which to assess changes in lake hydrology due to operation of FitzPatrick. These temperature measurements and dye studies indicate that the FES predictions of thermal plume characteristics were accurate. The plume sinks when the

ambient water temperature falls below 39.2°F and the direction and velocity of lake currents determine the length and shape of the plume. Higher surface ΔT's (3-4°F) attributable to FitzPatrick are confined to the immediate vicinity of the diffuser and biological studies have shown that the thermal discharge is not causing a significant adverse impact on lake biota. Because these studies verify the predictions in the FES and because the licensee has completed the required two years of monitoring, the staff concludes that deletion of this program is acceptable.

3.0 Conclusion and Basis for Negative Declaration

On the basis of the foregoing analysis, the staff concludes that there will be no environmental impact attributable to the proposed action. The changes assessed herein are to the environmental monitoring programs and do not involve any change in plant design or operation or involve an increase in effluent types or quantities. The impact of the overall plant has already been predicted and described in the Commission's FES for the James A. FitzPatrick Nuclear Power Plant. On this basis and in accordance with 10 CFR Part 51.5, the Commission concludes that no environmental impact statement for the proposed action need be prepared and a negative declaration to this effect is appropriate.

Dated: May 17, 1979

References

1. Quality Criteria for Water, U. S. Environmental Protection Agency, EPA-440/9-76-023; July 1974.

2. Toxicity of Power Plant Chemicals to Aquatic Life; United States Atomic Energy Commission, WASH-1249; June 1973.

7590-01

UNITED STATES NUCLEAR REGULATORY COMMISSION

DOCKET NO. 50-333

POWER AUTHORITY OF THE STATE OF NEW YORK

NOTICE OF ISSUANCE OF AMENDMENT TO FACILITY OPERATING LICENSE AND NEGATIVE DECLARATION

The U. S. Nuclear Regulatory Commission (the Commission) has issued Amendment No. 46 to Facility Operating License No. DPR-59, issued to Power Authority of the State of New York (the licensee), which revised Technical Specifications for operation of the James A. FitzPatrick Nuclear Power Plant (the facility) located in Oswego County, New York. The amendment is effective as of its date of issuance.

This amendment revises the Technical Specifications to establish Limiting Conditions for Operation pertaining to chemical concentrations in cooling water systems discharges.

The application for the amendment complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations. The Commission has made appropriate findings as required by the Act and the Commission's rules and regulations in 10 CFR Chapter I, which are set forth in the license amendment. Prior public notice of this amendment was not required since the amendment does not involve a significant hazards consideration.

The Commission has prepared an environmental impact appraisal for this action and has concluded that an environmental impact statement for this particular action is not warranted because there will be no significant environmental impact attributable to the action other than that which has

already been predicted and described in the Commission's Final Environmental Statement for the facility.

For further details with respect to this action, see (1) the application for amendment submitted by letter dated September 1, 1978, (2) Amendment No. 46 to License No. DPR-59, and (3) the Commission's related Environmental Impact Appraisal. All of these items are available for public inspection at the Commission's Public Document Room, 1717 H Street, N. W., Washington, D. C. and at the Oswego County Office Building, 46 East Bridge Street, Oswego, New York. A copy of items (2) and (3) may be obtained upon request addressed to the U. S. Nuclear Regulatory Commission, Washington, D. C. 20555, Attention: Director, Division of Operating Reactors.

Dated at Bethesda, Maryland, this 17th day of May 1979.

FOR THE NUCLEAR REGULATORY COMMISSION

Vernon L. Rooney, Acting Chief
Operating Reactors Branch #3
Division of Operating Reactors