

ATTACHMENT 1

Description of Changes to the

Oyster Creek Environmental Technical Specifications (OCETS)

The requested changes are listed by section as they correspond to those same sections of OCETS.

1.0 DEFINITIONS

Delete the following definitions:

- a) Ambient Water Temperature
- b) Channel Check
- c) Circulating Water
- d) Circulating Water Intake Line
- e) Circulating Water Intake Structure
- f) Circulating Water Pump
- g) Circulating Water System
- h) Condenser Backwash
- i) Cooling Water Biocide
- j) Corrective Maintenance
- k) Dilution Pumps
- l) Discharge Canal Bridge Temperature
- m) Discharge Outlet
- n) Discharge Temperature
- o) Emergency Need for Power
- p) Emergency Service Water Pump
- q) Intake Canal
- r) Intake Components
- s) Key Species
- t) Key Species of Fin and Shellfish
- u) Key Species of Ichthyoplankton
- v) Key Species of Macrozooplankton
- w) Molluscan Borers
- x) Normal Operation
- y) Preventive Maintenance
- z) Plant Waste Discharge Line
- aa) Pump Failure
- bb) Screen Wash System
- cc) Semi-Annual
- dd) Semi-Monthly
- ee) Service Water Pump
- ff) Thermal Discharge
- gg) Weekly

Justification

The definitions for the above phrases or words will not be required if the other requested changes are made, since these words or phrases will no longer appear in OCETS.

2.0 Limiting Conditions for Operation (LCO)

Delete the following limiting conditions for operation:

- a) 2.1.1 Maximum delta T between the circulating water intake and discharge

Justification

The intent of this LCO is met by our NPDES/NJPDES permit section 9(b)1(b).

- b) 2.1.2 Maximum delta T between the circulating water intake and discharge during pump or intake component failure.

Justification

The intent of this LCO is met by our NPDES/NJPDES permit section 9(b)1(b) and associated footnote.

- c) 2.1.3 Maximum Discharge Temperature

Justification

The intent of this LCO is met by our NPDES/NJPDES permit section 9(b)1(a) and associated footnote.

- d) 2.1.4 Use of Dilution Pumps

Justification

The intent of this LCO is met by our NPDES/NJPDES permit section 9(b)2.

- e) 2.1.5 Rate of Change of Discharge Canal Temperature During Winter Shutdown

Justification

The intent of this LCO is met by our NPDES/NJPDES permit section 10(c)(5) and 10(c)(6). Also plant procedure number 324 describes the dilution pump and circulating pump operation during controlled reactor shutdown with the intake canal water temperature below 10.0°C (50.0°F)

Note a copy of our NPDES/NJPDES permit is attached

3.0 Environmental Monitoring

Delete the following environmental monitoring requirements:

- a) Section 3.1 Nonradiological Monitoring delete the phrase "... and percent cloud cover ..."

Justification

Cloud cover estimates are not pertinent to impingement sampling.

b) 3.1.1 Abiotic

- 3.1.2A(1) Biotic-Aquatic--General Ecological Survey; Commercial Landings of Fin and Shellfish.

Justification

The original technical specification required a comparison of commercial landing data with impingement data for key species of fin and shellfish. A detailed comparison was provided in the last annual report (Ecological Analysts 1982) and covered 1975-1976 through 1980-1981 study years. The comparison showed negligible relation between commercial landings and impingement at OCNGS.

- c) Section 3.1.2.B1 delete last paragraph under conventional traveling screens which begins with "Inter-and-Intra study element ..." Replace with "Weekly and annual estimates of the number and weight of impinged organisms shall be calculated and compared with those of previous years. The significance of any differences will be discussed."

Justification

Inter element analysis was meant to compare impingement data with seine and trawl data from Barnegat Bay. Since seining and trawling are no longer performed the analysis cannot be done.

- d) Section 3.1.2.B2 delete last paragraph under continuous screen operation which begins with "Inter-and-Intra study element ..." Delete last paragraph under automatic or intermittent screen operation which begins with "Inter-and-Intra Study Element ..." Replace these paragraphs with "Data analysis shall assess statistical significance of difference in data due to date, time of day, water quality, meteorological conditions, station cooling water flow, and heat rejection."

Justification

Same as for section 3.1.2.B1.

e) Section 3.1.2.B2 delete final paragraph in this section which begins "... This information ..."

Justification

Since section 3.1.2A was previously deleted the reference to combination of the data from the two sections is no longer appropriate.

f) Table 3-1 delete General Ecological Survey.

Justification

Since finfish species and abundance trends were previously deleted and we are requesting that the commercial landings of fin and shellfish be deleted, these items no longer need to appear on the table.

g) Delete Figure 3-1.

Justification

This figure references a deleted monitoring program.

h) Section 3.1.2D change the first sentence of the last paragraph to read "... when combined with the results of the impingement monitoring, will provide ..."

Justification

The general ecological survey and entrainment programs have been deleted, therefore only the impingement data will be used to judge the impact of OCNGS.

4.0 Special Monitoring and Study Activities

a) Section 4.1.1 fourth paragraph delete last sentence that starts "The panel, ..."

Justification

These studies are still being performed.

b) In section 4.1.4 change the accuracy of salinity measurements from "+ 3%" to "+10%". Change the accuracy of the dissolved oxygen measurements from "+ 2%" to "+ 0.2 ppm".

Justification

The requested changes reflect the level of accuracy of the instruments used to measure water quality over the range of values observed in the field. The requested limits were previously found in section 3.1.2A2 which was deleted in September 1981 under Amendment No. 56.

c) In section 4.1.4 delete the requirement to analyze three replicate samples for chemical parameters.

Justification

Woodborer samples are collected once a month with water quality analyses being performed to obtain a description of the physio-chemical environment at the time of sampling. The collection of one sample is sufficient for this purpose.

Delete the following special monitoring and study activities:

d) 4.2 Thermal Plume Measurement Program

4.3 Hydrographic Study

Justification

The intent of these studies are met by an order issued by the New Jersey Board of Public Utilities Docket No-652-60

e) 4.4 Chemical Release Inventory

Justification

The intent of this requirement is met by our NPDES/NJPDES permit. Chemical/wastewater releases from the station are regulated by this permit.

5.0 Administrative Controls

Delete the following:

a) 5.4 Action To Be Taken If a Limiting Condition For Operation Is Exceeded

Justification

Since we are requesting deletion of all limiting conditions for operation this section is no longer required.

b) In section 5.5.3 Delete the phrase "... the limiting conditions for operation established as part of the..."

Justification

Applies to limiting conditions for operation which we are requesting be deleted.

c) In section 5.6.2 Non-Routine Environmental Operating Reports. Delete the following phrase from the first paragraph "... a limiting condition for operation is exceeded (as specified in Section 2.0, Limiting Conditions for Operation) or if ..."

Justification

The reference made to limiting conditions for operation is no longer applicable since we are requesting deletion of the Limiting Condition for operation.

d) In section 5.6.3C delete the following phrase found on lines 8 and 9 "... limiting condition for operation or ..."

Justification

Since we are requesting deletion of all limiting conditions for operation this requirement no longer applies.

e) In section 5.7.3 delete the following phrase "... including non-radiologically related limiting conditions for operation ..."

Justification

Since we are requesting deletion of all LCO's this requirement no longer applies.

Reorganizing of OCETS

Since the quantity of changes requested is large and would leave the OCETS in a confusing format, we have renumbered and reorganized the OCETS to provide a logical and understandable document. In doing so appropriate editorial changes were made throughout the document correcting cited references to be consistent with the renumbering and reorganization.

ATTACHMENT 2

APPENDIX B

TO FULL-TERM OPERATING LICENSE

ENVIRONMENTAL TECHNICAL SPECIFICATIONS

FOR

OYSTER CREEK NUCLEAR GENERATING STATION

DOCKET NO. 50-219

OCEAN COUNTY, NEW JERSEY

JERSEY CENTRAL POWER & LIGHT COMPANY

GPU NUCLEAR CORPORATION

November, 1978

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INTRODUCTION

The bases, which provide technical support for the OCETS, are included for informational purposes in order to clarify the intent of the specification. These bases are not part of the OCETS nor do they constitute limitations or requirements on the licensee.

1.0 DEFINITIONS

Accuracy

Refers to the deviation of a result obtained by a particular method from the value accepted as true.

Actual Damage

The damage incurred by a wooden test panel by marine borers burrowing in or on the submerged device.

Annually

Annually is once per calendar year at intervals of twelve calendar months plus or minus 30 days.

Calibration

An instrument or device calibration shall be the adjustment, as necessary, of the output such that it responds, with the necessary range and accuracy, to known values of the parameter which the instrument sensor, or device monitors. The calibration shall encompass all aspects of the circuit, including the sensor, indicating control features, alarm, and/or trip functions.

Creosoted Panels

Creosoted Panels are wooden test panels that have been pressure treated with creosote to 20 pounds per square inch as a chemical deterrent to woodborer attack.

Discharge Canal

The discharge canal is the body of water that flows between the discharge outlet and Barnegat Bay via Oyster Creek.

Gonadal Ripeness

The state of readiness to release viable gametes as determined by histological analysis of the sexual organs of a woodborer.

Isopod Borers

See definition of marine borer.

Marine Borer

Saltwater organisms that, as part of their natural life cycle, spend their adult stage living and burrowing into wood. In the Oyster Creek study area there are molluscan borers and isopod borers. Molluscan borers are members of the Phylum Mollusca, Class Pelecypoda, which is comprised of bivalves such as the clam. They are commonly called shipworms. Isopod borers are members of the Phylum Arthropoda, Class Crustacea. These borers are small, appear as shrimp-like organisms, and are commonly called gribbles.

Monthly

Monthly is once every calendar month at intervals of 30 days, plus or minus 6 days.

Potential Damage

By the use of wooden test panels and a semi-quantitative assessment of the actual damage done to them by woodborers, an estimate of the damage to an actual wooden structure of similar characteristics (treated or untreated) that is near the test panel location.

Quarterly

Quarterly is once during each successive three month period of the calendar year, counting from January 1, at intervals of 13 weeks plus or minus 14 days.

Reproductive State

See the definition of gonadal ripeness.

Survival Rate

For a particular species, the survival rate is the percentage of live individuals out of the total number of individuals of that species entrained or impinged.

Thermal Plume

The thermal plume is the portion of the discharge canal, Oyster Creek, and Barnegat Bay with temperature elevated 0.8°C (1.5°F) over ambient due to the flow from the Oyster Creek Nuclear Generating Station.

Treated Wood

See the definition for creosoted panels.

Untreated Wood

Wood, usually used for piling or bulkheading in the marine environment, that has not been chemically processed or treated to resist woodborer attack.

Woodborer

See definition of marine borer.

Woodborer Settling

Settling refers to the behavior of a woodborer larva as it matures into an adult. This behavior is characterized by the attachment onto a piece of wood (the new home for the organism) from its open water larval habitat. This attachment, and the subsequent initial boring activity into the wood, is termed settling.

Wooden Test Panel

Lengths of soft wood planking (usually treated or untreated pine) that are placed in strategic station locations in a study area for monitoring purposes. Monitoring involves checking periodically for attack by woodborers.

2.0 ENVIRONMENTAL MONITORING

2.1 Nonradiological Monitoring

Table 2-1 provides a summary of aquatic nonradiological monitoring programs. For the purposes of Section 2.1, meteorological data include, as a minimum, the following information: air temperature, wind direction, and an estimate of wind speed.

2.1.1 Biotic - Aquatic

A. Impingement of Organisms

(1) Conventional Traveling Screens

Objective

The objective of the impingement program, prior to the installation of the fish return system and the sampling pool, is to determine the species composition and abundance of fin and shellfish which become impinged on the circulating water intake screens.

TABLE 2-1 OCETS - NONRADIOLOGICAL SURVEILLANCE

Program	Parameter	Frequency	Gear	Sampling Station	Water Quality
A. Impingement of organisms					
Before sampling pool installation	Species composition and abundance	Two 12 hr. periods a week	Pit sampler	Screen wash pit	T, Sal, pH, DO, meteorology station flow and heat rejection
After sampling pool installation	Species composition and abundance; Condition (LDD) of sample of impinged organisms	Eight 3-minute samples a week or fourteen 3 minutes samples a week depending on screen rotation	Dip net	Pool	Same
B. Winter Kill					
	species composition and abundance	When intake water temperature below 8.5°C (47.3°F)	visual inspection	Shores of discharge canal and lower reaches of Oyster Creek	continuous temperature record throughout the 24-hour period after reaching cold shutdown

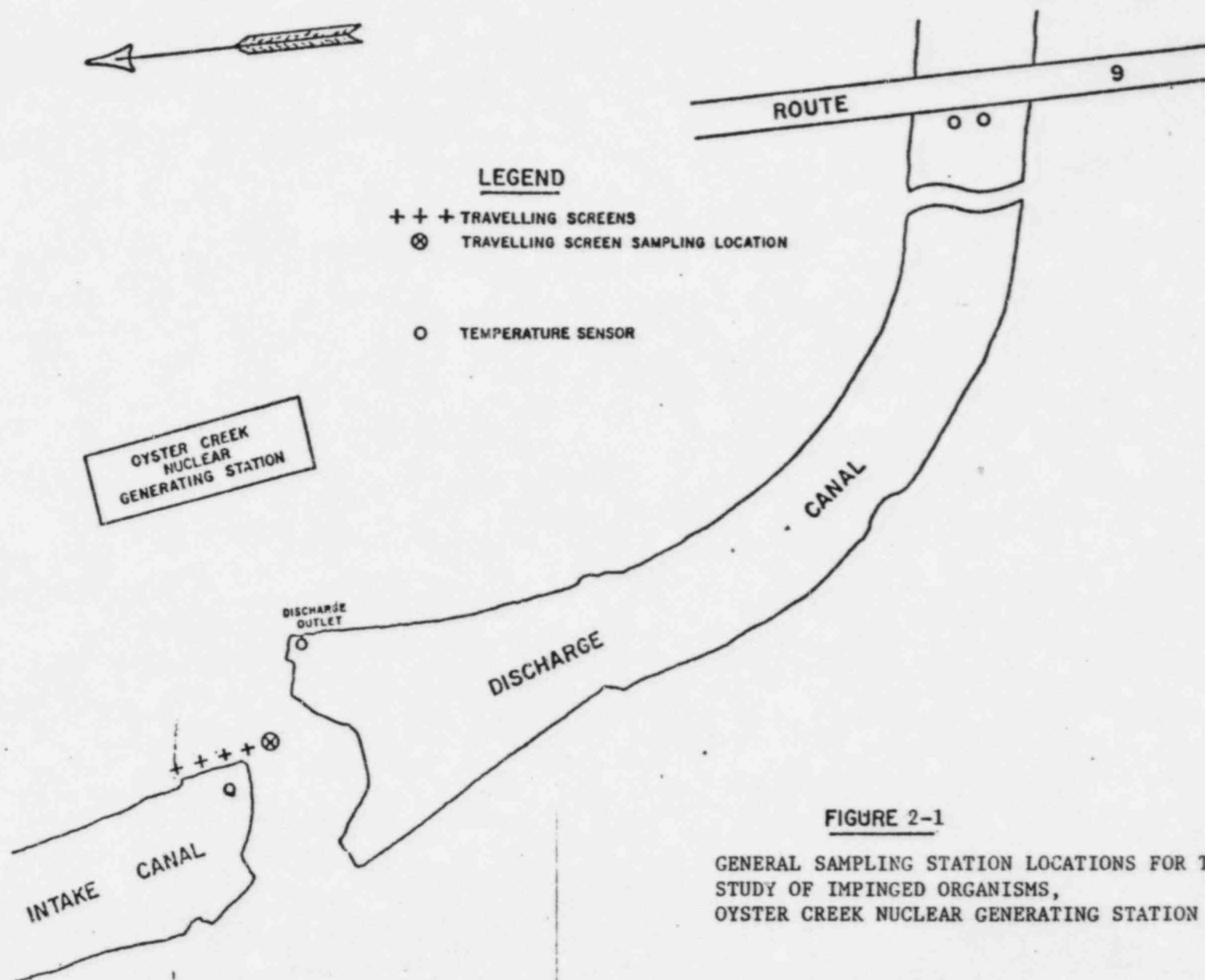


FIGURE 2-1

GENERAL SAMPLING STATION LOCATIONS FOR THE
STUDY OF IMPINGED ORGANISMS,
OYSTER CREEK NUCLEAR GENERATING STATION

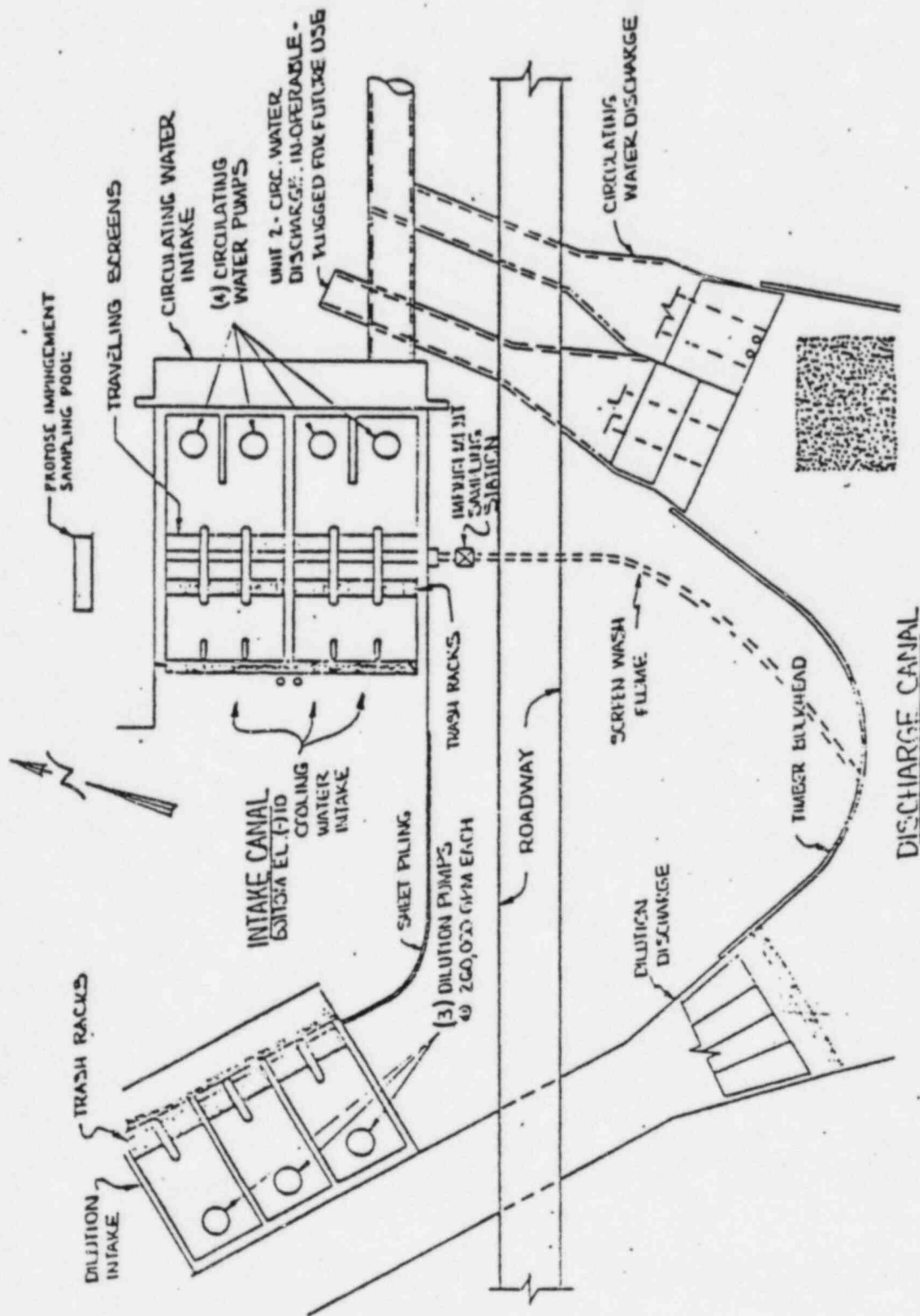


FIGURE 2-2

LEGEND

- X IMPINGEMENT SAMPLING AREA
- TEMPERATURE PROBE LOCATIONS
- APPROXIMATE SAMPLING STATION LOCATIONS FOR THE STUDY OF IMPINGED ORGANISMS AT OYSTER CREEK NUCLEAR GENERATING STATION

Specifications

Species composition and abundance of fin and shellfish impinged on the circulating water intake screens shall be determined for two 12-hour periods per week at least one of which shall include the period of greatest anticipated impingement (2 hours after sunset). Exact time of the sampling will vary seasonally; however, a minimum of two 12-hour samples per week shall be collected. When algae or detrital load in the intake water cause frequent unscheduled screen washes, subsampling within sampling periods is permitted.

For each period, records shall be kept of the number of screen washes which occurred and the number sampled. Total number and total weight (or estimated total number and estimated total weight if subsampling is performed) shall be determined for each taxa for each sampling period.

Water quality measurements (temperature, salinity, pH, and dissolved oxygen) of the intake water shall be taken during each sampling period. Sampling equipment shall conform to those presented in Section 3.1.4. Meteorological, and station cooling water flow and heat rejection data will be recorded for each sampling period.

Weekly and annual estimates of the number and weight of impinged organisms shall be calculated and compared with those of previous years. The significance of any differences will be discussed.

(2) Fish Return System

Objective

The objective of the impingement monitoring program is to (1) determine the species composition and (2) quantify the numbers of fin and shellfish which become impinged on the circulating water intake screens; as well as (3) quantify survival rates of fin and shellfish after impingement on the circulating water intake screens.

Specification - Continuous Screen Operation

The impingement monitoring program described in this specification shall be initiated upon: (1) completion of the fish return system and the sampling pool and (2) written notification to the NRC one month prior to the anticipated change to the new sampling procedure. This specification only applies during intentional continuous slow speed rotation of all circulating water intake traveling screens.

Species composition and abundance of fin and shellfish shall be determined and recorded from at least four three-minute screen wash samples during each of two 12-hour sampling periods a week at least one of which shall include the period of greatest anticipated impingement (2 hours after sunset). Condition shall be determined after at least a 30-minute wait and based on the following criteria:

Live: Swimming vigorously, no apparent orientation problems, behavior normal.

Damaged: Struggling or swimming on side, apparent orientation problems, behavior abnormal or indication of severe abrasions or lacerations.

Dead: No vital life signs, no body or opercular movement, no response to gentle probing.

The following shall be reported by species for each 12 hour sampling period: total number, catch weight, and percent survival. Estimates of the total number and total weight of each species impinged per week shall be determined.

Water quality (temperature, salinity, pH, and dissolved oxygen) of the intake water shall be taken during each 3 minute sample. Sampling equipment shall conform to those presented in Section 3.1.4. Meteorological, and station

cooling water flow and heat rejection data shall be recorded before and after each 12 hour sampling period.

Data analysis shall assess statistical significance of difference in data due to date, time of day, water quality, meteorological conditions, station cooling water flow, and heat rejection.

Specification - Automatic or Intermittent Screen Operation

The impingement monitoring program described in this specification shall be initiated upon: (1) completion of the fish return system and the sampling pool and (2) written notification to the NRC one month prior to the anticipated change to the new sampling procedure. Monitoring, as prescribed by this specification, shall be conducted if the circulating water intake screens are being operated intermittently (either tripped by differential pressure across the screens, a timer, or operated manually).

During each of the two 12-hour sampling periods per week, one of which shall include the period of greatest anticipated impingement (2 hours after sunset), at least

seven three-minute screen wash samples shall be taken. Each of the seven samples shall be taken by diverting a minimum of three minutes flow of screen wash water to the holding chamber. All fin and shellfishes collected for each sample shall be identified to the lowest practical taxonomic level and the number of specimens recorded for each species. Condition shall be determined from the first sample after at least a 30-minute wait and based on the following criteria:

Live: Swimming vigorously no apparent orientation problems, behavior normal.

Damaged: Struggling or swimming on side, apparent orientation problems, behavior abnormal or indication of severe abrasions or lacerations.

Dead: No vital life signs, no body or opercular movement, no response to gentle probing.

Survival by species shall be calculated from each 3 minute sample. Number and catch weight by species shall be determined from the sample by extrapolating the time between screen washes and used to estimate total number and total weight by species impinged per week.

Water quality (temperature, salinity, pH, and dissolved oxygen) of the intake water shall be taken during each 3

minute sample. Sampling equipment shall conform to those presented in Section 3.1.4. Meteorological, station cooling water flow and heat rejection data shall be recorded before and after each 12 hour sampling period.

Data analysis shall assess statistical significance of difference in data due to date, time of day, water quality, meteorological conditions, station cooling water flow, and heat rejection.

Reporting Requirements

The results of this program shall be submitted in February of each year covering 12 months of sampling and four months of data analysis.

Bases

The magnitude of loss and the potential impact to the aquatic ecosystem in the vicinity of the power station resulting from impingement of fin and shellfish on the traveling screens is not precisely known nor is it determinable on a theoretical basis alone.

The Final Environmental Statement for the OCGS dated December 1974 identified impingement of fin and shellfish as a potentially significant environmental impact. Sampling of fin and shellfish collected on the traveling screens will ensure that a reasonable estimate of the number of organisms impinged on the intake structure will be obtained.

OCGS is modifying the structural and operational method of returning aquatic organisms to the discharge canal. When this system is operational, data on species composition, abundance and biomass, and condition (live, dead or damaged) shall be collected to determine the impingement impact reduction associated with the modifications.

B. Fish Kill Monitoring Program

Objective

The objective of this program is to determine the species composition, abundance and distribution of station-induced fish kills due to winter shutdowns.

Specifications

After each Station shutdown, when the intake water temperature is below 8.5°C (47.3°F), visual inspections for

fish shall be made along the shores of the discharge canal and the lower reaches of Oyster Creek within 24 hours of the initiation of the shutdown in accordance with the procedures prepared by the licensee per Section 4.4. A continuous temperature record shall be maintained through the 24-hour period after reaching cold shutdown.

Reporting Requirements

For planned shutdowns with the temperature of the intake water below 8.5°C (47.3°F) the NRC Region I office will be notified at least 24 hours in advance of such shutdown. This notification shall not be given for unplanned, automatic, or manual station trips.

If the shutdown results in greater than 100 fish killed and/or stressed, this event shall be reported to the NRC in accordance with Section 4.5.2.

The results of this program shall be submitted in February of each year covering the preceding 12 months of sampling and four months of data analysis.

Bases

The Final Environmental Statement for the Oyster Creek Nuclear Generating Station documents cold shock fish kills

associated with rapid temperature decreases caused by plant shutdown during the winter.

Station shutdown during winter months are, on occasion, unavoidable. Due to the physical configuration of the station and the discharge canal, some mortality to organisms will undoubtedly be experienced during winter shutdowns.

Mortality information associated with a winter shutdown, when combined with the results of the impingement monitoring, will provide the empirical bases on which to judge the impact of OCGS operations on Barnegat Bay, Oyster Creek and Forked River.

3.0 SPECIAL MONITORING AND STUDY ACTIVITIES

3.1 Woodborer Monitoring Program

3.1.1 Introduction

Objective

The primary objective of this program is to determine the contribution of Station operation to the marine borer-caused activity in Oyster Creek, Forked River, Barnegat Bay and adjacent influent streams. The activity will be related to the potential damage to structural wood. The secondary objective is to determine whether any remaining resident marine borer population in the Oyster Creek discharge canal is contributing significantly to marine borer-caused damage in Barnegat Bay, especially after removal of the preponderance of the untreated wood in the discharge canal, which harbored a woodborer population.

Most of the nonstructural, untreated wood in the discharge canal has been made inaccessible to marine borer settlement by removal or burial. Most of the structural, untreated wood has been removed. This should have a direct effect on the woodborer population by removing adult shipworms which can release larvae and removing suitable habitat for larval settlement. The effects of the wood removal on the woodborer population shall be evaluated during the program.

The program shall attempt to establish any incremental increase in the rate of destruction to wood in Oyster Creek, Forked River, Barnegat Bay and adjacent influent streams due to the operation of the station over that rate of wood destruction which occurs and has occurred in the Bay historically. It must be recognized that, since the wood test panel method is being used, the potential for damage to "real" structures and the actual damage to the test panels will be reported. This method, pioneered by the W. F. Clapp Labs., has long been used as an index to woodborer damage.

Approach

The Oyster Creek Woodborer Monitoring Program is comprised of three allied studies: wooden exposure panel study, woodborer developmental (gonadal ripeness) study, and the water quality study. Data from all three studies shall be analyzed together. The data shall be subjected to statistical and graphic analysis. Methods of analysis appropriate for data summary and hypothesis testing shall be employed.

The data obtained from the wooden exposure panels, woodborer developmental and water quality studies will provide information on the amount of potential destruction caused by the woodborers released and surviving in specific areas of Barnegat Bay in relation to the plant operation.

Action

The quarterly reports shall be sent to the NRC within 75 days following each quarter of the study and the annual report be submitted within 150 days of the end of the calendar year.

3.1.2 Wooden Exposure Panel Study

Objective

To determine the following: a) presence of borers, b) survival of borers, c) quantity and size of borers, d) species identification of borers, e) sexual identification of borers, and f) amount of destruction to the wooden panel. The study will include molluscan and isopod borers.

Requirement

Exposure panel arrays have been set out at 17 stations (see Figure 3-1). The sites are located near the generating station, within the reaches of the thermal plume, and at points that are only influenced by normal changes in temperature and salinity (Table 3-1). The last mentioned areas shall serve as control sites. All arrays have been placed near existing wooden structures and are completely accessible from land.

[illegible]

LEGEND

○ PANEL ARRAY
□ PLANKTON TOW

TABLE 3-1
EXPOSURE PANEL ARRAYS
BARNEGAT BAY, NEW JERSEY

<u>Site No.</u>	<u>Site*</u>	<u>Structure to be Used for Suspension of Rack**</u>	<u>Approximate Latitude and Longitude</u>
1	Barnegat Coast Guard Station Barnegat Inlet	Finger Pier	Lat. 39° 45.8'N Lo. 74° 06.5'W
2	Ashton Marina 1450 Bay Ave. Manahawkin, N.J.	Bulkhead	Lat. 39° 40'N Lo. 74° 13'W
3	Iggie's Marina East Bay Ave. Barnegat, N.J.	Bulkhead	Lat. 39° 45'N Lo. 74° 12.5'W
4	Liberty Harbor Marina Washington Ave. Waretown, N.J.	Bulkhead	Lat. 39° 47'N Lo. 74° 11'W
5	Mouth of Oyster Creek Lagoon (Compass Road)	Pier	Lat. 39° 48.5'N Lo. 74° 10.3'W
6	Oyster Creek #1 Lagoon, (inshore end) Private Residence	Pier	Lat. 39° 48.5'N Lo. 74° 10.9'W
7	Barnegat Marine Service Center Dock Avenue Sands Pt. Harbor Waretown, N.J.	End of Dock	Lat. 39° 48.5'N No. 74° 11.1'W
8	Oyster Creek R.R. Bridge Discharge Canal	Cross Member R.R. Bridge	Lat. 39° 48.7'N Lo. 74° 12'W

TABLE 3-1 - Continued

<u>Site No.</u>	<u>Site*</u>	<u>Structure to be Used for Suspension of Rack**</u>	<u>Approximate Latitude and Longitude</u>
9	Forked River South Branch Intake Canal	Cross Member R.R. Bridge	Lat. 39° 49.2'N Lo. 74° 12.2'W
10	Teds Marina Bay Avenue Forked River	Pier	Lat. 39° 50.1'N Lo. 74° 11.6'W
11	Forked River (near mouth) 1413 River View Dr. Private Residence	Bulkhead	Lat. 39° 49.7'N Lo. 74° 10'W
12	Stouts Creek 1273 Capstan Dr. Private Residence	Pier	Lat. 39° 50.5'N Lo. 74° 08.8'W
13	Rocknak's Yacht Basin Seaview Avenue Lanoka Harbor, N.J.	End of Pier	Lat. 39° 52'N Lo. 74° 09'W
14	Dicks Landing Island Drive Bayville, N.J. (Holly Park)	Pier	Lat. 39° 54'N Lo. 74° 08.1'W
15	Winter Yacht Basin Inc., Rt. 528 at Mantoloking Bridge W. Mantoloking, N.J.	Pier	Lat. 40° 02.5'N Lo. 74° 03.5'W
16	Berkely Yacnt Basin J. Street Seaside Park, N.J.	Pier	Lat. 39° 55.9'N Lo. 74° 04.9'W

<u>Site No.</u>	<u>Site*</u>	<u>Structure to be Used for Suspension of Rack**</u>	<u>Approximate Latitude and Longitude</u>
17	Island Beach State Park	Pier	Lat. 39° 47.1'N Lo. 74° 05.9'W

* The sampling locations are permanent unless vandalism or revocation of permission occurs. Under such an occurrence, a new station will be utilized as close as possible to the original.

**All exposure panel racks will be suspended where there is a minimum water depth at mean low water of at least three feet. Racks to be hung with nylon line from existing structures so the bottom panels are close to, but not touching the bottom.

Each exposure panel array shall consist of seven 10" x 3-1/2" x 3/4" untreated soft-wood panels and two creosoted panels attached to a metal frame. The panels shall be submerged and replaced in sequence so that, after the initial cycle is completed, a long-term exposure panel submerged for six months and a short-term exposure panel submerged for one month will be obtained monthly. Each exposure panel retrieved shall be returned to the laboratory and examined microscopically in order to ascertain the information detailed in the objective above.

The short-term panel (one month) provides data as to whether or not woodborer settling occurs during the month and, if so, the number and size of the organisms involved. This information is used in the establishment of the breeding season.

All untreated panels shall be seasoned for two weeks in saltwater before being placed on the array. The two treated panels on each array shall be creosote treated to 20 lbs., seasoned in saltwater for two weeks, and exposed for the duration of the study. They shall be used to assess any damage to treated wood caused by the isopod borer, Limnoria tripunctata, which is not deterred in its attack by creosoted wood. Monthly inspections of these treated panels shall be made for evidence of crustacean borers.

Through microscopic technique, a given test panel shall be analyzed using dissecting needles, etc. and rated as to the amount of damage (heavy, moderate, light) incurred due to woodborers. This evaluation

is based upon a consistent set of damage evaluation criteria specifically designed to yield damage estimates that are directly relatable to the amount of wood missing. The criteria used at the Oyster Creek Station follows the Clapp Laboratory index of damage.

Action

See Section 3.1.1

3.1.3 Woodborer Developmental Study

Objective

Determine reproductive state of woodborers from the various array station regions of the study area in order to determine any differential in status due to a station effect.

Requirement

A representative sample of woodborer adults that are collected in the test panels retrieved during a particular monthly sampling period shall be microscopically/histologically examined to ascertain the developmental status of the teredinid reproductive structures. This information shall be used to determine if the molluscan populations inhabiting Oyster Creek and the thermal plume area have a prolonged breeding cycle.

Action

See Section 3.1.1

3.1.4 Water Quality Study

Objective

Describe physico-chemical environment of each array and plankton station at time of every sampling.

Requirement

Salinity (accuracy of $\pm 10\%$), water temperature (accuracy of $\pm 0.45^{\circ}\text{C}$ ($\pm 0.81^{\circ}\text{F}$) between 5° and 25°C ($41-77^{\circ}\text{F}$) and $\pm 0.65^{\circ}\text{C}$ ($\pm 1.17^{\circ}\text{F}$) between 25° and 45°C ($77-113^{\circ}\text{F}$)), dissolved oxygen (accuracy of ± 0.2 ppm) and pH (accuracy of ± 0.2 pH units) shall be measured or determined at each array station on a monthly basis. The instrument is calibrated before each daily use.

Action

See Section 3.1.1

Bases

The FES of OCGS identified the proliferation of woodborers in Oyster Creek and Barnegat Bay as a potentially significant impact of OCGS operation. Recent studies by JCP&L suggest a lack of correlation of OCGS operation and woodborer abundance. The woodborer monitoring program will allow future assessment of the marine borer related impacts.

3.2 Unusual or Important Environmental Events

Environmental Monitoring Requirement

Unusual or important events are those that cause potentially significant environmental impact or that could be of public interest concerning environmental impact from station operation. The following are examples: on-site plant or animal disease outbreaks; unusual mortality of any species protected by the Endangered Species Act of 1973; fish kills in the vicinity of the site; unusually high impingement mortality episodes.

This special requirement shall commence with the date of issuance of the OCETS and continue until approval for modification or termination is obtained from the NRC in accordance with Subsection 4.5.3.

Action

Should an unusual or important event occur, the licensee shall make a non-routine prompt report to the NRC in accordance with the provisions of Subsection 4.5.2.

Bases

Prompt reporting to the NRC of unusual or important events as described above is necessary for responsible and orderly regulation of the nation's system of nuclear power reactors. The information provided may be useful or necessary to others concerned with the same environmental resources. Prompt knowledge and action may serve to alleviate the magnitude of the environmental impact.

4.0 ADMINISTRATIVE CONTROLS

This section describes administrative and management controls established by the Applicant to provide continuing protection to the environment and to implement the environmental technical specifications.

4.1 Responsibility

Corporate responsibility for implementation of the Oyster Creek Environmental Technical Specifications and for assuring that plant operations are controlled in such a manner as to provide continuing protection of the environment has been assigned by the Office of the President to the Vice President and Director Oyster Creek.

The responsibility for conducting the studies as set forth in Section 2.1 (Non-Radiological Surveillance) and all of Section 3.0 (Special Surveillance Programs) rests with the GPUNC Manager, Environmental Controls.

Administrative measures are defined in Section 4.3 which provide that the individual or group responsible for auditing or otherwise verifying that an activity has been correctly performed is independent of the individual or group responsible for performing the activity.

4.2 Organization

The organization of the personnel responsible for implementation, audit, and review of the OCETS is shown in Figure 4-1.

4.3 Review and Audit

Independent audit and review functions for environmental matters are the responsibility of the GPUNC Manager, Environmental Controls. This department reports directly to the Vice President and Director Radiological & Environmental Controls and is independent of line responsibility for the operation of the plant. The independent reviews and audits of the OCETS will be carried out by personnel from the Environmental Controls Department or by other personnel from GPUNC, GPUSC, outside contractors or consultants at the request of the Environmental Controls Department.

When individuals in the Environmental Controls Department of GPUNC perform any function relating to the OCETS other than independent audit and review, the Vice President and Director of Oyster Creek will ensure that an independent review and audit of that work is performed by another individual in the Environmental Controls Department or some other who is not directly responsible for the specific activity being reviewed and audited.

The audits and reviews will be performed as required or requested but in no case less than yearly. The results of all reviews and audits will be documented in reports directly to the Vice President and Director Oyster Creek.

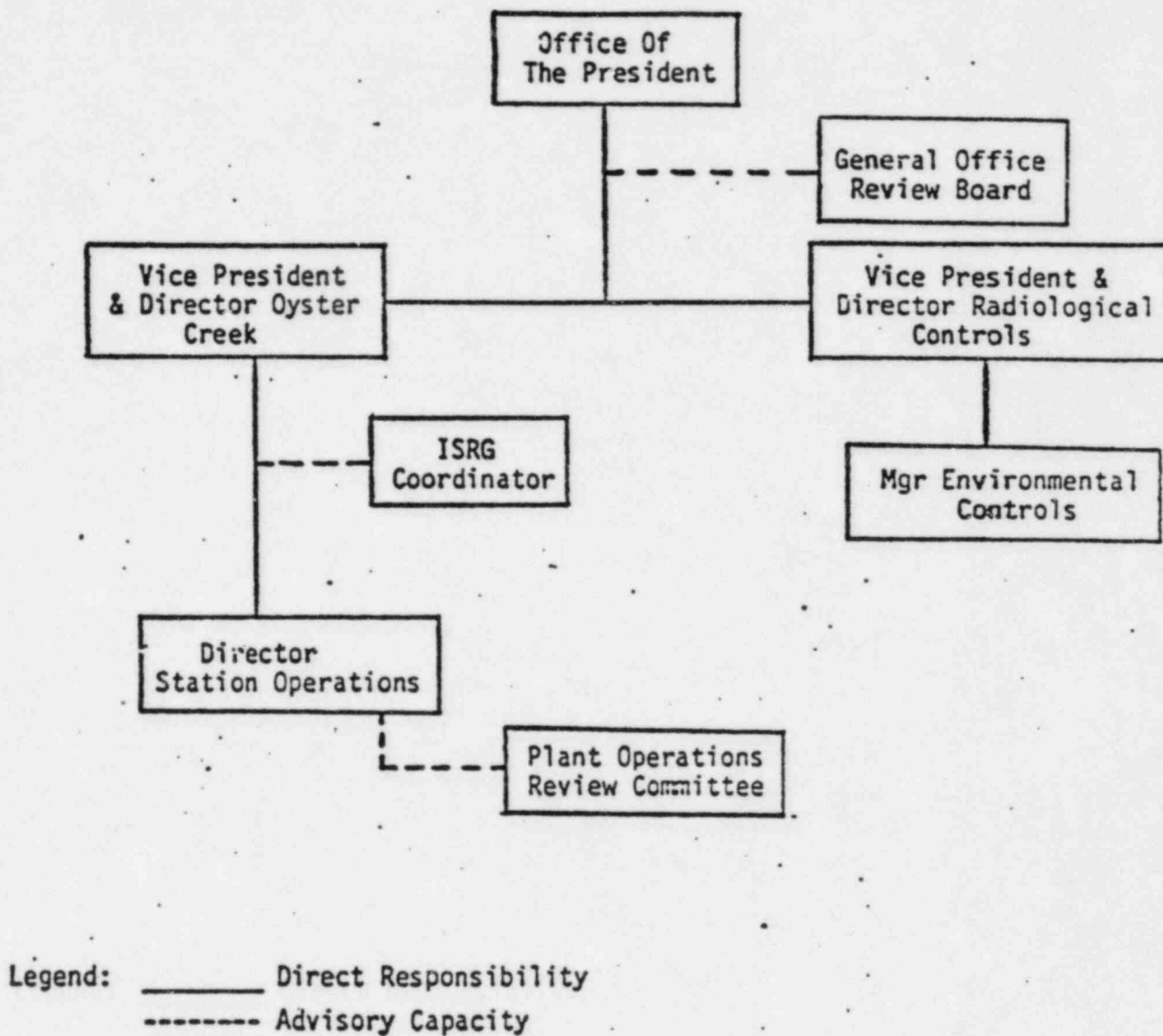


FIGURE 4-1

ORGANIZATION FOR THE IMPLEMENTATION OF
 THE ENVIRONMENTAL TECHNICAL SPECIFICATIONS

Independent audits and reviews will encompass:

- A. Coordination of the OCETS with the safety technical specifications to avoid conflicts and maintain consistency.
- B. Compliance of station activities and operations with the OCETS.
- C. Adequacy of the programs and station procedures which are involved in ensuring the plant is operated in accordance with the OCETS.
- D. The proper functioning in accordance with the responsibilities listed in Section 4.1 of the OCETS.
- E. Proposed changes to the OCETS and the evaluation of the impacts resulting from the changes.
- F. Proposed written procedures, as described in Section 4.4.1 and 4.4.3 and proposed changes thereto which affect the environmental impact of the plant.
- G. Proposed changes or modifications to plant systems or equipment and a determination of the environmental impact resulting from the changes.
- H. Adequacy of the procedures described in Section 4.4.2 and the results obtained and conclusions drawn from the monitoring programs and special studies involved in the OCETS.

- I. Adequacy of investigations of violations of the OCETS and adequacy of and implementation of the recommendations to prevent recurrence of the violations.

4.4 Procedures

4.4.1 Detailed written procedures, including applicable check lists and instructions, will be prepared and adhered to for all activities involved in carrying out OCETS. Procedures shall include sampling, data recording and storage, instrument calibration, measurements, analyses and actions to be taken when limits are approached or exceeded. Testing frequency of any alarms will be included. These frequencies, if not specified in the OCETS, will be determined from experience with similar instruments in similar environments and from manufacturers' technical manuals.

4.4.2 Procedures will be prepared for assuring the quality of environmental monitoring and surveillance program results, including analytical measurements. These procedures will document the monitoring and surveillance programs in terms of policy directives, responsible individuals or groups, purchased services and audits and will include systems that will identify and correct deficiencies, investigate anomalous or suspect results and review and evaluate program results and reports.

4.4.3 In addition to the procedures specified in Section 4.4.1, the plant standard operating procedures for systems which directly interact with the outside environment will include provisions to ensure the plant and its systems and components are operated in compliance with the OCETS.

4.5 Plant Reporting Requirements

4.5.1 Routine Reports

A. Annual Environmental Operating Report

A report on the non-radiological environmental surveillance programs for the previous 12 months of operation shall be submitted to the Office of Inspection and Enforcement (with copy to the Director of Nuclear Reactor Regulation) as a separate document within 90 days after January 1 of each year (except as otherwise specified in the OCETS). In the event that some results are not available within the 90-day period, the report will be submitted noting and explaining the reasons for the missing data. The missing data shall be submitted as soon as possible in a supplementary report. The report shall include summaries, analyses, interpretations and statistical evaluation of the results of the environmental monitoring required by the non-radiological environmental monitoring activities (Section 2), and the special monitoring study activities (Section 3) for the report period, including a comparison with preoperational

studies, operational controls (as appropriate) and previous environmental monitoring reports, and an assessment of the station operation on the environment. If harmful effects or evidence of irreversible damage are suggested by the monitoring or special programs, the licensee shall provide a more detailed analysis of the data and a proposed course of action to alleviate the problem.

The Annual Report shall also include a summary of:

- 1) All OCETS noncompliances and the corrective action taken to remedy them.
- 2) Changes made to state and federal permits and certificates which pertain to the requirements of OCETS.
- 3) Changes in station design which could involve an environmental impact.
- 4) Changes in EIS.

4.5.2 Non-Routine Environmental Operating Reports

A prompt report shall be submitted in the event that an Unusual or Important Environmental Event occurs (as specified in Section 3.2). Such an occurrence will be reported within 24 hours by telephone, telegraph, or facsimile transmission to the Office of Inspection and Enforcement and within 30 days by a written report to the Director of the Office of Inspection and Enforcement (with copy to the Director of Nuclear Reactor Regulation).

The written report and, to the extent possible, the preliminary telephone, telegraph, or facsimile report shall (a) describe, analyze, and evaluate the occurrence, including the extent and magnitude of the impact, (b) describe the cause of the occurrence, and (c) indicate the corrective action, if necessary, taken (including any significant changes made in the procedures) to preclude repetition of the occurrence should the occurrence be station related.

4.5.3 Change in Environmental Technical Specifications

- A. A report shall be made to the NRC prior to implementation of a change in plant design, in plant operation, or in procedures described in Section 4.4, only if the change would have a significant adverse effect on the environment or involves an environmental matter or question not previously reviewed and evaluated by the NRC. The report shall include a description and evaluation of the changes and a supporting benefit-cost analysis.
- B. Request for changes in environmental technical specifications-- shall be submitted to the Director of Nuclear Reactor Regulation for review and authorization. The request shall include an evaluation of the environmental impact of the proposed change and a supporting benefit-cost analysis.

C. Changes or additions to required Federal, and State permits and certificates for the protection of the environment that pertain to the requirements of OCETS shall be reported to the NRC within 30 days. In the event that the licensee initiates or becomes aware of a request for changes to any of the water quality requirements, limits or values stipulated in any certification or permit issued pursuant to Section 401 or 402 of the Federal Water Pollution Control Act (PL 92-500) which is also the subject of an OCETS reporting requirement, NRC shall be notified concurrently with the authorizing agency. The notification to the NRC shall include an evaluation of the environmental impact of the revised requirement, limit or value being sought.

If, during NRC's review of the proposed change, it is determined that a potentially severe environmental impact could result from the change, the NRC will consult with the authorizing agency to determine the appropriate action to be taken.

4.6 Records Retention

4.6.1 Eighty (80%) percent data recovery annually for each environmental monitoring requirement is considered satisfactory for the purposes of the OCETS. The variability and uncertainty of environmental conditions demand allowance for some missed data in order to preclude an excessive reporting burden. This provision for missed data does not permit deliberate omission of sample collection or analyses but rather is meant to cover data missed due to

circumstances beyond the control of the licensee, its representative or subcontractor. Records of the reasons for all missed data shall be retained with the data reports.

4.6.2 Records and logs relative to the following areas will be retained for the life of the plant.

A. Records and drawings detailing plant design changes made to systems and equipment as described in Section 4.5.3.

B. Records of all environmental surveillance data.

4.6.3 All other records and logs relating to the environmental technical specifications will be retained for five years following logging _____ or recording.

REFERENCES

- Atomic Energy Commission, 1974. Final environmental statement - Oyster Creek Nuclear Generating Station. Docket No. 50-219
- Ichthyological Associates, Inc., 1976 (a) Progress Report of Ecological Studies for the Oyster Creek Generating Station, September-December 1975, Volumes 1 and 2.
- _____, 1976 (b) Progress Report of Ecological Studies for the Oyster Creek Generating Station, January-April 1976.
- _____, 1977 (a), Preliminary final report of ecological studies for the Oyster Creek Generating Station, Volume One - Fin and Shellfish.
- _____, 1977 (b), Preliminary final report of ecological studies for the Oyster Creek Generating Station, Volume Two, Plankton.
- Jersey Central Power & Light Company, 1972. Oyster Creek Nuclear Generating Station environmental report. Amendment 68 to the "Application for Construction Permit and Operating License", Docket 50-219.
- Marcellus, K. L., 1972. Fishes of Barnegat Bay, New Jersey with particular references to seasonal influences and the possible effects of thermal discharges. Unpublished Ph. D. Thesis, Rutgers University, New Brunswick New Jersey.
- Murarka, I. P., and R. K. Sharma, Undated. Sampling design for fish impingement at 9-Mile Point Unit number 1. Unpublished Technical Report, Argonne National Laboratory.
- Reintjes, J. W., 1974. Compilation and correlation analysis of published and unpublished environmental data with distribution, abundance, and movement of young menhaden in mid-Atlantic estuaries. Technical Report, National Marine Fisheries Services, Beaufort, North Carolina.
- Tagaz, M. E. 1969. Biology of the blue crab, Callinectes sapidus Rathbun, in the St. Johns River, Florida. Fish. Bull., U. S. 67(1):17-33

Thomas, D. L., et al, 1972. Ecological studies in the vicinity of ocean site 7 and 8, Part I of Vol. I. In ecological considerations for ocean sites off New Jersey for proposed nuclear generating stations, Vol. I, Ichthyological Associates, 138 p.

Thomas, D. L., and C. B. Milstein, 1973. Ecological studies in the bay and other waterways near Little Egg Inlet and in the ocean in the vicinity of the proposed site for the Atlantic Generating Station, New Jersey. Ichthyological Associates Progress Report for the period January-December 1972, 1065 p.

Thomas, et al, 1974. Ecological studies in the bays and other waterways near Little Egg Inlet and in the ocean in the vicinity of the proposed site for the Atlantic Generating Station, New Jersey. Ichthyological Associates Progress Report for the period January-December 1973, Vol. I, Fishes, 709 p.

AUTHORIZATION TO DISCHARGE TO SURFACE WATER UNDER THE
NEW JERSEY POLLUTANT DISCHARGE ELIMINATION SYSTEM

BY AUTHORITY OF JERRY FITZGERALD ENGLISH, COMMISSIONER, NEW JERSEY
DEPARTMENT OF ENVIRONMENTAL PROTECTION, (HEREINAFTER "NJDEP") AND
IN COMPLIANCE WITH THE PROVISIONS OF THE NEW JERSEY "WATER
POLLUTION CONTROL ACT", N.J.S.A. 58:10A-1 ET SEQ.,

JERSEY CENTRAL POWER & LIGHT

HEREINAFTER REFERRED TO AS "THE PERMITTEE" IS AUTHORIZED TO
DISCHARGE FROM A FACILITY LOCATED IN

LACEY /TWP/

OCEAN

COUNTY

TO RECEIVING WATERS NAMED

OYSTER CREEK

IN ACCORDANCE WITH EFFLUENT LIMITATIONS, MONITORING REQUIREMENTS
AND OTHER CONDITIONS SET FORTH IN THE "NEW JERSEY POLLUTANT
DISCHARGE ELIMINATION SYSTEM REGULATIONS", N.J.A.C. 7:14A-1 ET
SEQ., INCLUDING, BUT NOT LIMITED TO SECTIONS 2.1, 2.5, 3.10, 3.11,
3.12, 3.13, 3.14, AND 3.15, AND THE NATIONAL POLLUTANT DISCHARGE
ELIMINATION SYSTEM PERMIT NUMBER NJ0005550 ISSUED BY THE U.S.
ENVIRONMENTAL PROTECTION AGENCY (HEREINAFTER "EPA").

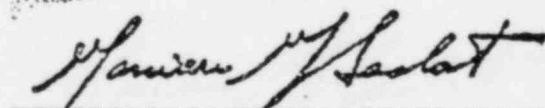
THIS PERMIT IS IN EFFECT AS OF MARCH 6, 1981.

THIS PERMIT AND THE AUTHORIZATION TO DISCHARGE SHALL CONTINUE IN
FORCE UNTIL EPA OR NJDEP ISSUES A NEW PERMIT.

SIGNED THIS 6TH DAY OF MARCH 1981.

NEW JERSEY STATE DEPARTMENT OF
ENVIRONMENTAL PROTECTION

BY AUTHORITY OF
ARNOLD SCHIFFMAN, DIRECTOR
DIVISION OF WATER RESOURCES



DR. MARWAN M. SADAT, P.E.
ASSISTANT DIRECTOR
WATER QUALITY MANAGEMENT

Application No.: NJ0005550

Name of Permittee: Jersey Central
Power & Light Company - Oyster Creek
Nuclear Generating Station

Effective Date: January 31, 1975

Expiration Date: January 30, 1980

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM PERMIT

DISCHARGE PERMIT

In reference to the above application for a permit authorizing the discharge of pollutants in compliance with the provisions of the Federal Water Pollution Control Act, as amended by the Federal Water Pollution Control Act Amendments of 1972, P.L. 92-500, October 18, 1972 (33 U.S.C. 51251-1376) (hereinafter referred to as "the Act"), Jersey Central Power & Light Company

Madison Avenue at Punch Bowl Road, Morristown, New Jersey 07960

(hereinafter referred to as "the permittee")

is authorized by the Regional Administrator, Region II, U. S. Environmental Protection Agency

to discharge from Oyster Creek Nuclear Generating Station

Route 9

Lacey Township, Ocean County, New Jersey

to Oyster Creek to Barnegat Bay

in accordance with the following conditions.

1. All discharges authorized herein shall be consistent with the terms and conditions of this permit; facility expansions, production increases or process modifications which result in new or increased discharges of pollutants must be reported by submission of a new NPDES application, or if such new or increased discharge does not violate the effluent limitations specified in this permit, by submission to the Regional Administrator of notice of such new or increased discharges of pollutants; the discharge of any pollutant more frequently than or at a level in excess of that identified and authorized by this permit shall constitute a violation of the terms and conditions of this permit.

2. After notice and opportunity for a public hearing, this permit may be modified, suspended, or revoked in whole or in part during its term for cause including, but not limited to, the following:

- a. Violation of any terms or conditions of this permit;
- b. Obtaining this permit by misrepresentation or failure to disclose fully all relevant facts;
- c. A change in any condition that requires either a temporary or permanent reduction or elimination of the permitted discharge.

3. Notwithstanding Condition 2 above, if a toxic effluent standard or prohibition (including any schedule of compliance specified in such effluent standard or prohibition) is established under Section 307(a) of the Act for a toxic pollutant which is present in the discharge authorized herein and such standard or prohibition is more stringent than any limitation upon such pollutant in this permit, the Regional Administrator shall revise or modify this permit in accordance with the toxic effluent standard or prohibition and so notify the permittee.

4. The permittee shall allow the Regional Administrator or his authorized representative and/or the authorized representative of the State water pollution control agency, in the case of non-Federal facilities, upon the presentation of his credentials:

- a. To enter upon the permittee's premises in which an effluent source is located or in which any records are required to be kept under the terms and conditions of this permit;
- b. To have access to and copy at reasonable times any records required to be kept under the terms and conditions of this permit;
- c. To inspect at reasonable times any monitoring equipment or monitoring method required by this permit;
- d. To sample at reasonable times any discharge of pollutants.

5. The permittee shall at all times maintain in good working order and operate as efficiently as possible any facilities or systems of treatment or control installed or utilized by the permittee to achieve compliance with the terms and conditions of this permit.

6. The issuance of this permit does not convey any property rights either in real estate or material, or any exclusive privileges, nor does it authorize any injury to private property or any invasion of rights, nor any infringement of Federal, State or local laws or regulations; nor does it obviate the necessity of obtaining State or local assent required by law for the discharge authorized.

7. This permit does not authorize or approve the construction of any onshore or offshore physical structures or facilities or the undertaking of any work in any navigable waters.

8. The specific effluent limitations and other pollution controls applicable to the discharge permitted herein are set forth in the following conditions. The following conditions also set forth self-monitoring and reporting requirements. Unless otherwise specified, the permittee shall submit duplicate original copies of all reports to the head of the State water pollution control agency and the Regional Administrator. Except for data determined to be confidential under Section 305 of the Act, all such reports shall be available for public inspection at the office of the Regional Administrator. Knowingly making any false statement on any such report may result in the imposition of criminal penalties as provided for in Section 309 of the Act.

9. General Limitations

a. Except as specifically authorized in this permit, the permittee shall not discharge floating solids or visible foam, except such materials as are contained in the intake water. The causing of foam by agitation of the ambient water shall not be deemed a violation of this condition.

b. Initial Limitations - Unless specified otherwise in Conditions 10 and 11, the following conditions apply on the effective date of this permit and last for the duration of the permit.

(1) The permittee shall discharge condenser cooling water effluents such that the following conditions are satisfied:*

<u>Discharge Serial No.</u>	<u>Effluent Limit</u>
001	(a) The discharge temperature shall not exceed 41.1°C(106.0°F).**
	(b) The discharge-intake temperature difference shall not exceed 12.8°C (23.0°F).**
	(c) The net rate of addition of heat to the receiving water shall not exceed 1.37×10^9 Kcal/hr. (5.42×10^9 BTU/hr).
	(d) Free available chlorine shall not exceed 0.5 mg/l nor 372 kg/day (820 lbs/day).
	(e) The pH shall have a value of not less than 6.5, nor greater than 8.5, except that during periods when the pH of the intake water exceeds 8.5, the pH of the facility discharge shall not exceed that of the intake, and during periods when the pH of the intake water is less than 6.5, the pH of the facility discharge shall not be lower than that of the intake.

* These limitations apply to the cooling water effluent prior to dilution in the discharge canal or with dilution water.

** These limitations may be exceeded during periods when one or more circulating water pumps are not in operation, due to pump breakdown, pump maintenance, or intake screen maintenance. In the event of pump breakdown, the permittee shall take corrective action as soon as possible. Routine maintenance resulting in these limitations being exceeded should be avoided during June-September. The permittee shall indicate on the Discharge Reporting Form (1) which circulating water pumps, if any, were not in

operation, (2) the dates and times such pumps were not operating, (3) the reason(s) (dates and times) during which these limitations were exceeded. In any case, the discharge temperature shall not exceed 43.3°C (110.0°F) and the discharge-intake temperature difference shall not exceed 18.3°C (33.0°F).

(2) When the temperature in Oyster Creek exceeds 87°F, as measured 4 (FOUR) feet below the surface at the U.S. Route 9 bridge over Oyster Creek, one dilution pump will be put into operation. If, after one dilution pump has been in operation for at least two hours, the temperature measured at such point continues to exceed 87°F, second dilution pump will be put into operation.

When the ambient water temperature is less than 60°F, two dilution pumps will be put into operation.

The station's third dilution pump will be held in reserve and will be put into operation within 15 (FIFTEEN) minutes of such time as an insufficient number of dilution pumps are operable in order to meet the intent of this specification.

Instances may occur during which an insufficient number of dilution pumps are available to meet the intent of this specification despite the operation of the reserve pump. The station may be operated under these circumstances for a period not to exceed 14 (FOURTEEN) days in order to make necessary repairs.

If the intent of this specification cannot be met, remedial action will be taken within 24 hours to bring the plant into compliance with this specification. If the remedial action taken involves reduction of station power output, power will be reduced as necessary to achieve the same effect as operating the proper number of dilution pumps required in order to meet the intent of this specification.

(3) Phase I: The intake velocity shall not exceed 2.2 fps averaged over one minute at any point at the midplane of each port and the average of the average readings taken at 5 foot intervals from the top to the bottom of the water column of the individual port shall not exceed 1 fps.

A chart shall be developed during Phase I which shall consist of a table of velocities varying with water level, circulating pump operation, and ports opened. This chart will be completed and submitted to the Regional Administrator for his review and approval by February 28, 1978.

Phase II: Having developed the chart referred to in Phase I, the permittee shall report velocities monthly based upon the chart and measurement of the variables assumed thereby.

(4) Routine shutdown shall not be scheduled during December through March.

(5)		Average	Maximum	Average	Maximum
Discharge Type	Parameter				
Hardcoal Filter Backwash	Total	7.3(16)*			
	Suspended Solids				
Demineralizer Wastes	Total	0.73(1.6)*	2.4(5.3)*		
	Suspended Solids				

* These limitations are specified in kg/batch (lbs./batch).

(6) The permittee shall discharge non-contact cooling water from the augmented offgas system and the radwaste treatment system such that the following conditions are satisfied:

Discharge

Heat Exchanger Cooling Water
(Contribution to the discharge canal via the intake canal).

Effluent Limit

- (a) The discharge temperature shall not exceed 45°C (113°F).
- (b) The discharge-intake temperature difference shall not exceed 15°C (27°F).
- (c) The net rate of addition of heat to the receiving water shall not exceed 12.2×10^6 Kcal/hr. (49.4×10^6 BTU/hr.).
- (d) The pH shall not be less than 6.5 nor greater than 8.5 at any time.**
- (e) The concentration of free available chlorine shall not exceed (1) an average of 0.2 mg/l and (2) a maximum of 0.5 mg/l. Chlorination shall be limited to 2 hours per day.

**When the intake pH is less than 6.5, the discharge pH shall not be less than the intake pH; when the intake pH is greater than 8.5, the discharge pH shall not exceed the intake pH.

10. Required Limitations. Beginning July 1, 1977 and lasting until the date of expiration of this permit, discharges shall comply with the conditions specified below:

(a)

<u>Discharge Type</u>	<u>Parameter</u>	<u>Discharge Limitations in kg/day(lbs/day)-Gross</u>		<u>Discharge Limitations in mg/l (Gross)</u>	
		<u>Daily Average</u>	<u>Daily Maximum</u>	<u>Daily Avg.</u>	<u>Daily Max.</u>
Sewage Treatment Plant Effluent	BOD ₅	1.14(2.5)*	1.70(3.75)*	30*	45*
	TSS	1.14(2.5)*	1.70(3.75)*	30*	45*
	Fecal	N/A	N/A	200 MPN/100ml**	400 MPN/100ml**
	Coliform				
	pH	N/A	N/A	(range)6.0-9.0 at all times.	
Hardcoal Filter Backwash	All	No discharge at any time.			

*This average and maximum shall be the arithmetic mean of the values for effluent samples collected in a period of 30 consecutive days and 7 consecutive days, respectively. The daily average and daily maximum limitations are based upon a flow of 10,000 gpd.

**This average and maximum shall be the geometric mean of the value for effluent samples collected in a period of 30 consecutive days and 7 consecutive days, respectively.

(b) The concentration of free available chlorine at the outlet of each condenser section shall not exceed an average of 0.2 mg/l, and a maximum of 0.5 mg/l. Neither free available nor total residual chlorine may be discharged for more than a total of two hours per condenser section in any one day, and not more than one condenser section may discharge free available chlorine or total residual chlorine at any time.

(c) The discharge(s) shall not cause the following criteria to be exceeded in Oyster Creek as provided for in the Surface Water Quality Standards:*

- (1) Shall not be raised above ambient by more than 4°F (2.2°C) during September through May, nor more than 1.5°F (0.8°C) during Jun. through August, nor shall temperatures exceed 82°F (27.8°C) in yellow perch waters or 85°F (29.4°C) in other nontrout waters.

Temperatures shall be measured outside of designated heat dissipation areas.

- (2) The limitations specified above may be exceeded in designated heat dissipation areas by special permission on a case-by-case basis.

- (3) The determination of designated heat dissipation areas in estuarine waters, including bays, shall take into special consideration the extent and nature of such waters so as to meet the intent and purpose of the criteria and standards including provision for the passage of free-swimming and drifting organisms so that negligible or no effects are produced on their populations.

Heat dissipation areas shall be limited to no more than 1/4 of the cross-sectional area and/or volume of flow of the body of water, leaving at least 3/4 free as a zone of passage including a minimum of 1/3 the surface measured from shore to shore at any stage of tide.

- (4) Where waste discharges would result in heat dissipation areas in such close proximity to each other as to impair protected uses additional limitations may be prescribed to avoid such impairment.

- (5) The rate of temperature change in designated heat dissipation areas shall not cause mortality of fish or shellfish.

- (6) The rate of temperature change outside designated heat dissipation areas shall not cause mortality of fish or shellfish.

*In order to assure the protection and propagation of a balanced indigenous population of shellfish, fish and wildlife, thermal limitations based upon load allocations and other factors may be imposed and/or appropriate mixing zone dimensions may be defined (if not already done so) in accordance with the procedural requirements of Condition 2.

11. Schedule of Compliance. The permittee shall comply with the following schedule and shall report to both the Regional Administrator and the State Agency within 14 days following each date on the schedule detailing its compliance or noncompliance* with the schedule date and requirement:

(a) The permittee shall complete an engineering report and submit it to the State Agency in accordance with State requirements* by June 1, 1975.

(b) The permittee shall complete final plans and specifications for the treatment facilities and submit it to the State Agency in accordance with State requirements* by November 1, 1975.

(c) The permittee shall submit a report detailing its progress toward completion of the facilities required to comply with Condition 10 by June 1, 1976.

(d) The permittee shall complete construction of the facilities by April 1, 1977.

(e) The permittee shall attain the operational levels required to achieve the limits specified in Condition 10 by July 1, 1977.

*Each notice of noncompliance shall include the following information:

- (1) A short description of the noncompliance;
- (2) A description of any actions taken or proposed by the permittee to comply with the elapsed schedule requirement without further delay;
- (3) A description of any factors which tend to explain or mitigate the noncompliance; and
- (4) An estimate of the date permittee will comply with the elapsed schedule requirement and an assessment of the probability that permittee will meet the next schedule requirement on time.

All reports, plans and/or specifications that propose new or modified waste treatment and/or disposal facilities must be approvable and signed, and sealed, by a professional engineer, licensed to practice in the State in which the facilities are to be built.

2. Monitoring and Recording. The permittee shall monitor and record the quantitative values of each discharge according to the following schedules and other provisions: For each discharge and for each Sampling Schedule listed below, the flow (in gallons per day) shall be measured.* Where net values are listed in Conditions 9(b) and/or 10 the surface water intake is to be sampled with the same frequency and type of sample as specified below for each required parameter.

- (a) Sampling Schedule for the Cooling Water Discharge
(Discharge Serial No. 001) - The following sampling schedule shall commence on February 1, 1975 and last for the duration of the permit:

(1) Parameter	Minimum Freq. of Analysis	Sample Type
Discharge temperature****	Continuous***	
Intake temperature****	Continuous***	
pH****	Twice weekly	Grab**
Free available chlorine*****	Continuous during chlorination periods***	

(2) The intake velocity in the middle of each intake port shall be monitored at various depths on a monthly basis.

* The flow of condenser cooling water discharges shall be continuously monitored by recording the operating mode of the circulating water pumps; for all other discharges or internal waste streams (only those which are limited) the flow shall be measured and recorded at a frequency coinciding with the most frequently sampled parameter. Methods, equipment, installation and procedures shall conform to those prescribed in the Water Measurement Manual, U.S. Department of the Interior, Bureau of Reclamation, Washington, D.C. 1967.

** Grab samples only shall be taken for analysis of dissolved oxygen, oil and grease, pH and bacteriological analysis, except where specified otherwise. Care shall be exercised when collecting a composite sample such that the proper preservative is present in the sample container during sample collection. Depending on the analysis to be conducted several different containers and preservation techniques may be required. Samples shall be analyzed as quickly as possible after collection and in no case shall the maximum holding time exceed that contained in the reference cited in Condition 12(g).

*** These requirements shall commence by May 1, 1975. Until that time, daily grab samples shall be taken.

**** These parameters shall be measured prior to dilution in the discharge canal or with dilution water.

***Values at the outlet of each condenser section shall be calculated employing the values measured at DSN 001 and appropriate dilution factors relating total discharge flow to that for each condenser section. Dilution factors used and pump operating history shall be included in the monthly monitoring reports required by Condition 12(h).

(3) Beginning May 1, 1975 and lasting until start-up of the facilities required to comply with Condition 10(c), the permittee shall continuously monitor the temperature of Oyster Creek at a point four feet below the surface at the U.S. Route 9 bridge over Oyster Creek.

(4) Beginning upon start-up of the facilities required to comply with Condition 10(c) and lasting for the duration of the permit, the permittee shall measure the temperature of Oyster Creek by taking weekly grab samples. Measurements shall be taken in Oyster Creek (1) upstream of the permittee's dam and (2) at representative points at the Route 9 bridge. The permittee shall specify the rationale for choosing such points in the first monthly report after commencement of this requirement. Monitoring points may be modified and/or added by the Regional Administrator as deemed necessary to determine compliance with Condition 10(c).

(b) Sampling Schedule for Wastes Other Than Cooling Water

(1) Demineralizer Wastes and Sewage Treatment Plant Effluent-
The following sampling schedule shall commence February 1, 1975 and last for the duration of the permit.

<u>Discharge Type</u>	<u>Parameter</u>	<u>Minimum Freq. of Analysis</u>	<u>Sample Type</u>
Demineralizer Wastes	Total Suspended Solids	Monthly	Composite over duration of discharge
Sewage Treatment Plant Effluent	BOD ₅	Monthly	Composite
	Total Suspended Solids	Monthly	Composite
	Fecal Coliform	Monthly	Grab
	pH	Monthly	Grab

(2) Hardcoal Filter Backwash - The Hardcoal Filter Backwash Effluent shall be monitored for Total Suspended Solids by taking grab samples at a minimum frequency as specified below for the various sampling schedules. Schedule I shall commence on February 1, 1975 and last for 2 months.

Schedule II shall commence upon completion of Schedule I and last until the discharge is abated on or before July 1, 1977.

<u>Schedule No.</u>	<u>Minimum Freq. of Analysis</u>
I	Twice Weekly
II	Monthly

(3) Heat Exchanger Cooling Water - The heat exchanger cooling water effluent from the augmented offgas system and the radwaste treatment system shall be monitored as follows commencing with initial operation of the discharge and lasting for the duration of the permit.

<u>Parameter**</u>	<u>Minimum Frequency of Analysis</u>	<u>Sample Type</u>
Discharge Temperature	Twice per month	Grab
pH	Twice per month	Grab
Free Available Chlorine	Twice per month	Grab

**These parameters shall be monitored at a point in the discharge line prior to the discharge of the effluent to the intake canal.

(c) Biological Monitoring

By May 1, 1975, the permittee shall submit to the Regional Administrator and the State Certifying Agency a proposed biological monitoring program designed to determine the nature and extent of impingement (including and excluding the dilution system) and entrainment of aquatic organisms and the impact upon the aquatic community. Upon the direction of the Regional Administrator, the permittee shall implement such monitoring program and any modifications and/or additions thereto.

Similar studies performed for and/or required by other Federal and/or State agencies, such as the Department of Interior, New Jersey Department of Environmental Protection, U.S. Army of Corps of Engineers, or other relevant studies, may be used to satisfy all or part of the above requirements, provided that the company submits a written request, detailing such studies to the Regional Administrator and receives the approval of the Regional Administrator.

Upon review of the biological data and other relevant information, future conditions, corresponding compliance schedules and additional monitoring requirements may be imposed in accordance with the procedural requirements of Condition 2.

(d) Modifications to Sampling Schedules- The permittee may submit for approval an alternate schedule(s) to account for - any realignment of discharges, for substitutions of parameters to be samples, for analytical and sampling methods to be utilized, for realignment of sampling locations so that concentrations to be measured are within reliable sensitivity ranges of the analytical techniques, and for the compositing by volume of individual discharge samples to make a single plant sample. With regard to substituting parameters such as TOC or COD for BOD, the permittee shall provide test data to support the correlation between the parameters.

If the permittee monitors any pollutant more frequently than is required by this permit, he shall include the results of such monitoring in the calculation and reporting of the values required in the Discharge Monitoring Report Form (EPA Form 3320-1 (10-72)) in Condition 12(h). Such increased frequency shall be indicated on the Discharge Monitoring Report Form.

(c) Quality Control - Adequate care shall be maintained in obtaining, recording, and reporting the required data on effluent quality and quantity, so that the precision and accuracy of the data will be equal to or better than that achieved by the prescribed standard analytical procedures.

The permittee shall calibrate and perform maintenance procedures on all monitoring and analytical instrumentation at sufficiently frequent intervals to ensure accuracy of measurements.

Sampling shall be representative of the volume and quality of effluent discharged over the sampling and reporting period.

The permittee is responsible for assuring that the methodology used is reliable for their specific wastes in their laboratory. The permittee must be able to demonstrate to the Regional Administrator that they have a viable quality control program.

(f) Recording - The permittee shall maintain and record the results of all required analyses and measurements and shall record, for all samples, the date and time of sampling, the sample method used, the dates analyses were performed, who performed the sampling and analyses, and the results of such analyses.

All records shall be retained for a minimum of 3 years, such a period to be extended during the course of any unresolved litigation or when so requested by the Regional Administrator. The permittee also shall retain all original stripchart recordings from any continuous monitoring instrumentation and any calibration and maintenance records for a minimum of 3 years, such period to be extended during the course of any unresolved litigation or when so requested by the Regional Administrator.

The permittee shall provide the above records and shall demonstrate the adequacy of the flow measuring and sampling methods upon request of the Regional Administrator. The permittee shall identify the effluent sampling point used for each discharge pipe by providing a sketch or flow diagram, as appropriate, showing the locations.

(g) Sampling and Analysis

All sampling and analytical methods used to meet the monitoring requirements specified above shall conform to guidelines establishing test procedures for the analysis of pollutants, published pursuant to Section 304(g) of the Federal Water Pollution Control Act, as amended. If the Section 304(g) guidelines do not specify test procedures for any pollutants required to be monitored by this permit and until such guidelines are promulgated, sampling and analytical methods used to meet the monitoring requirements specified in this permit shall, unless otherwise specified by the

Regional Administrator, conform to the latest edition of the following references:

Standard Methods for the Examination of Water and Wastewaters, 13th Edition, 1971 American Public Health Association, New York, New York 10019.

A.S.T.M. Standards, Part 23, Water; Atmospheric Analysis, 1972, American Society for Testing and Materials, Philadelphia, Pennsylvania 19103.

W.Q.O. Methods for Chemical Analysis of Water and Wastes, April 1971, Environmental Protection Agency, Water Quality Office, Analytical Quality Control Laboratory, NERC, 1014 Broadway, Cincinnati, Ohio 45268.

(h) Reporting

The results of the above monitoring requirements shall be reported by the permittee in the units specified in Conditions 9(b) and 10. A report or a written statement shall be submitted even if no discharge occurred during the reporting period. A report shall also be submitted if there have been any modifications in the waste collection, treatment, and disposal facilities, changes in operations procedures, or other significant activities which alter the quality and quantity of the discharges or otherwise concern these Conditions. Permanent elimination of a discharge shall be promptly reported by the permittee in writing to the Regional Administrator.

The permittee shall include in this report any previously approved non-standard analytical methods used. Copies of the report shall be sent to both the Regional Administrator and the State Agency on the 10th of each month reporting the monitoring data from the previous month. A Discharge Monitoring Report form [EPA Form 3320-1 (10-72)] shall be used for reporting.

13. Sludge Disposal.* Collected screenings, sludges, and other solids and precipitates separated from the permittee's discharges authorized by this permit and/or intake or supply water by the permittee shall be disposed of in such a manner as to prevent entry of such materials into navigable waters or their tributaries. Any live fish, shellfish, or other animals collected or trapped as a result of intake water screening or treatment may be returned to their water body habitat. The permittee shall report on all effluent screenings, sludges and other solids associated with the discharge herein described. The following data shall be reported quarterly:

a. The method by which they were removed and transported;

b. Their final disposal locations.

* Condition 13 does not pertain to the disposal of radioactive wastes.

14. Discharge Containing Parameter Not Previously Reported. The permittee shall not discharge any wastewater containing a substance or characterized by a parameter which was indicated as absent in its NPDES Permit Application. In the event of such a discharge, the permittee shall notify the Regional Administrator and the State Agency prior to the discharge.

15. Non-Compliance with Conditions(1) If, for any reason, the permittee does not comply with, or anticipates that it will be unable to comply with, any daily maximum effluent limitation specified in this permit, the permittee shall provide the Regional Administrator and NJDEP with the following information, in writing, within 5 (FIVE) working days of becoming aware of such condition:

a. a description of the discharge and the cause of the non-compliance; and

b. the period of non-compliance, including exact dates and times; or, if not corrected, the period of time for which the non-compliance is anticipated to continue, and the steps being taken to reduce or eliminate it, and to prevent recurrence of the non-complying discharge.

(2) The permittee shall take all reasonable steps to minimize any adverse impact to navigable waters resulting from non-compliance with any effluent limitation specified in this permit, including such accelerated or additional monitoring as is necessary to determine the nature and impact of the non-complying discharge.

(3) It is recognized that influent quality changes, equipment malfunction, acts of God or other circumstances beyond the control of the permittee may sometimes result in effluent concentrations exceeding the permit limitations despite the exercise of appropriate care and maintenance measures, and corrective measures by the permittee. The permittee may come forward to demonstrate to the EPA that such circumstances exist in any case where effluent concentrations exceed those set forth in this permit. The EPA, however, is not bound to wait for, or solicit, such demonstrations prior to the initiation of any enforcement proceeding, nor must it accept as valid on its face the statements made in any such demonstration. Nevertheless, if the EPA seeks to enforce in an administrative or judicial proceeding any provision of any permit issued to the permittee by any permitting agency, the permittee may raise at that time the issue of whether, under the United States Constitution, statute, or decisional law, it is entitled to a defense that its conduct was caused by circumstances beyond its control.

16. Bypass Provision.* Any diversion from, or bypass of, facilities necessary to maintain compliance with the terms and conditions of this permit is prohibited, except (1) where unavoidable to prevent loss of life or severe property damage; or (2) where excessive storm drainage or runoff would damage any facility necessary for compliance with the effluent limitations and prohibitions of this permit. The permittee shall promptly notify the Regional Administrator and the NJDEP in writing of each such diversion or bypass within 48 hours of its occurrence.

17. Authorized Signature for Reporting Requirements. All reports required to be submitted by a corporation must be signed by a principal executive officer of at least the level of vice president, or his duly authorized representative, if such representative is responsible for the overall operation of the facility from which the discharge described in the application form originates. In the case of a partnership or a sole proprietorship, all reports must be signed by a general partner or a sole proprietor, respectively. In the case of a municipal, State, Federal or other public facility, the application must be signed by either a principal executive officer, ranking elected official or other duly authorized employee.

18. U.S. Army Corps of Engineers Requirements

The United States Army Corps of Engineers conducts maintenance dredging of navigable waters and their tributaries pursuant to certain Federal statutes. The permittee should be aware of its possible responsibilities under the maintenance dredging program. Under these laws, any person, firm or entity discharging suspended solids into a navigable waterway of the United States, or tributary thereof, which contribute to the necessity for maintenance dredging of that waterway may be required to participate in the maintenance dredging program.

*This condition does not apply to radioactive waste treatment facilities subject to sole regulation by the NRC.

Definition:

Regional Administrator: Regional Administrator
Region II
Environmental Protection Agency
26 Federal Plaza
New York, New York 10007
ATTN: Status of Compliance Branch

State Certifying Agency: Director
Division of Water Resources
New Jersey Department of Environmental
Protection
Labor & Industry Building
P. O. Box 2809
Trenton, New Jersey 08625

Daily - each operating day.

Weekly - every seven days, plus or minus two days.

Monthly - once every calendar month plus or minus one week.

Daily Average - the total discharge by weight or in other appropriate units as specified herein, during a calendar month divided by the number of days in the month that the production or commercial facility was operating.

Daily Maximum - the total discharge by weight or in other appropriate units as specified herein, during any calendar day.

Net - the amount of a pollutant contained in the discharge measured in appropriate units as specified herein, less the amount of a pollutant contained in the surface water body intake source, measured in the same units, over the same period of time.

1. The intake source must be the same water body that is being discharged to.

2. In cases where the surface water body intake source is pretreated for the removal of pollutants, the intake level of a pollutant to be used in calculating the net, is that level contained after the pretreatment steps.

Composite - a combination of individual (or continuously taken) samples obtained at regular intervals over the entire discharge day. The volume of each sample shall be proportional to the discharge flow rate. For a continuous discharge, a minimum of 24 individual grab samples (at hourly intervals) shall be collected and combined to constitute a 24-hour composite sample. For intermittent discharges of 4 - 8 hours duration, grab samples shall be taken at a minimum of 30 minute intervals. For intermittent discharges of less than 4 hours duration grab samples shall be taken at a minimum of 15 minute intervals.

Crowns - the poundage contained in the discharge. (Crowns applies when the intake source is a municipal or private water supply, ground water, or a surface water body other than the one being discharged to.)

Grab - An individual sample collected in less than 15 minutes.

Average (Sewage Treatment Plant Effluent)

(1) BOD₅ and Total Suspended Solids - the arithmetic mean over a 30-consecutive day period.

(2) Fecal Coliform - the geometric mean over a 30-consecutive day period.

Maximum (Sewage Treatment Plant Effluent)

(1) BOD₅ and Total Suspended Solids - the arithmetic mean over a 7-consecutive day period.

(2) Fecal Coliform - the geometric mean over a 7-consecutive day period.

Average (Chlorine Limitations) - the mean value determined over the chlorination period(s) in any calendar day.

Instantaneous Maximum - the highest value at any time.

Continuous - a succession of measurements taken without interruption or taken at fixed intervals not exceeding 15 minutes around the clock.

This permit and the authorization to discharge shall be binding upon the permittee and any successors in interest of the permittee and shall expire at midnight on January 30, 1980. The permittee shall not discharge after the above date of expiration. In order to receive authorization to discharge beyond the above date of expiration, the permittee shall submit such information, forms, and fees as are required by the agency authorized to issue NPDES permits no later than August 1, 1979.

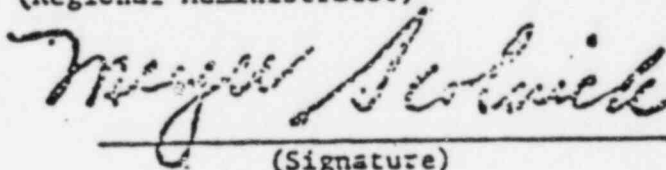
Gerald M. Hansler, P.E.

By authority of _____

(Regional Administrator)

DEC 22 1974

(Date)



(Signature)

Meyer Scolnick

Director

Enforcement and Regional Counsel Division

Introduction -

The studies described in this specification are designed to provide supplementary data for GPUN's 316(a) and (b) demonstration for the Oyster Creek Nuclear Generating Station and to fulfill the monitoring obligations mandated by Section 3.1.2B (Impingement of Organisms) of the Oyster Creek Environmental Technical Specifications. The program is based upon specific studies recommended by EPA Region II and NJDEP staffs as a result of their review of the 316 demonstration.

Program of Study -

Duration - Field and laboratory work, 24 months, January 1, 1983 through December 31, 1984.

Reports - Progress Reports are due to GPUN on September 30, 1983 and September 30, 1984 covering the January 1 through June 30 period of each year.

The first annual report covering the January 1, 1983 - December 31, 1983 period will be due to GPUN on April 30, 1984. The second annual report will cover the entire two year investigation and will be due to GPUN on April 30, 1985.

Detailed quantitative and qualitative analyses including pertinent comparisons with data collected in previous investigations must be incorporated into all reports.

Quality Assurance -

A Quality Assurance Procedure Manual must be submitted to GPUN before April 1, 1983. The manual will include detailed descriptions of the procedure for all field work, laboratory analysis, instrument calibration, record management and resumes of all personnel. It will be maintained in a current condition should methods, procedures or personnel change.

The consultant is expected to conduct internal audits on a regular basis. Monthly Quality Assurance reports, in letter form, will be submitted to GPUN outlining the work scheduled and completed during the previous month. The results of the internal audits are to be presented in these monthly QA reports.

Field and Laboratory Studies -

Impingement of Fin and Shellfish

The objectives of the impingement monitoring program are:

- 1) to determine the species composition and abundance of fin and shellfish impinged upon the modified travelling screens, solely for the fulfillment of monitoring obligations mandated by Section 3.1.2B of the OCETS. The results of these species composition and abundance studies shall not be used to supplement CPUN's 316 demonstration for the Oyster Creek Station.
- 2) to determine the initial condition (live, dead, damaged) of fin and shellfish impinged upon the travelling screens.
- 3) to determine the latent mortality rates of selected species of impinged organisms.
- 4) to determine the collection efficiency of the modified travelling screens.

The results of the latter three types of studies will be used to supplement the 316 demonstration for the Oyster Creek Station.

This monitoring program shall be initiated upon completion of the fish return system and the sampling pool. For bidding purposes contractors should assume that the circulating water intake modifications will be completed by the start date (January 1, 1983) of this program.

Two modes of intake screen operation will be experienced. During daylight hours the screens will be operated intermittently, being tripped by differential pressure across the screens, a timer, or operated manually. During hours of darkness, the screens will run continuously. Sampling methodology will vary depending upon mode of screen operation.

1) Species Composition, Abundance and Initial Condition -

Continuous Screen Operation (Night Sampling) - Species composition and abundance of fin- and shellfish shall be determined for at least seven three-minute screen wash samples during one 12-hour sampling period (commencing two hours after sunset) each week. Condition shall be determined after a 30-minute wait based upon the following criteria:

- | | |
|----------|--|
| Live: | Swimming vigorously; no apparent orientation problems; behavior normal. |
| Damaged: | Struggling or swimming on side; apparent orientation problems; behavior abnormal or indication of severe abrasions or lacerations. |

Dead: No vital life signs; no body or opercular movement;
no response to gentle probing.

Total number, catch weight and initial condition, shall be reported by species for each 12 hour sampling period. Estimates of the total number and total weight of each species impinged per week shall be calculated.

Water quality (temperature, salinity, pH, dissolved oxygen and transparency) measurements shall be taken with each 3 minute sample. Instrumentation shall conform to the criteria presented in Addendum 1. Meteorological, station cooling water flow and heat rejection data shall be recorded before and after each 12 hour sampling period.

Intermittent Screen Operation (Day Sampling) - Species composition and abundance of fin and shellfish shall be determined for at least four three-minute screen wash samples during one 12-hour sampling period per week.

Total number, catch weight and initial condition shall be determined for each species as described above. Estimates of the total number and total weight of each species impinged per week shall be calculated. Water quality measurements shall be taken with each three minute sample as described above.

In both modes of screen operation, samples shall be taken by diverting three minutes of screen wash flow into the sampling pool and partially draining the pool to concentrate the organisms for collection. The tentative location of the sampling pool is illustrated in Figure 1.

Appropriate statistical analyses shall be performed in order to determine the significance of any differences in species composition and abundance ascribable to date, time of day (screen wash mode), water quality, atmospheric conditions, station cooling water flow or heat rejection.

2) Latent Mortality Studies -

96-hour latent mortality studies shall be conducted on the following organisms, assuming they occur in sufficient abundance:

Crangon septemspinosa
Alosa aestivalis
Brevoortia tyrannus
Anchoa mitchilli
Menidia menidia
Pomatomus saltatrix
Cynoscion regalis
Leiostomus xanthurus
Pseudopleuronectes americanus
Sphoeroides maculatus

Live and damaged organisms taken from the sampling pool shall be maintained for 96 hours under flow through conditions in ambient and heated condenser discharge water. Where feasible, non-impinged controls, maintained under otherwise identical conditions, shall be employed. Condition (live, dead, damaged) shall be determined at the outset of the holding period and subsequently at 30 minutes and 1, 2, 3, 6, 12, 24, 36, 48, 72 and 96 hours.

A minimum of two tests per month will be conducted during the periods of each individual species abundance, conditions permitting. Each test will consist of at least 200 individuals which may be accumulated by pooling subsamples over a maximum period of one month if necessary. The tests will be conducted during both screen wash modes (continuous and intermittent) and will cover the size range commonly impinged.

Loading in the test system will not exceed 5 grams per liter at temperatures of 20°C or less or 2.5 grams per liter at temperatures above 20°C. The holding facility will be designed to minimize holding stress.

The lengths and weights of all test organisms shall be determined at death or at the end of the test. Water temperature, dissolved oxygen, salinity and pH shall be measured with each of the condition determinations (see Addendum I for instrumentation criteria). Qualitative observations on abnormal behavior or conditions such as erratic swimming, lost of reflex, discoloration, excessive mucus production, hyper-ventilation, opaque eyes, hemorrhaging and cannibalism should be reported.

When sufficient data are available, the significance of any differences in latent mortality due to screen wash mode, time of year, size of organism, water quality or other factors shall be determined. Latent mortality on the modified travelling screens shall be compared with that already determined for the conventional travelling screens.

3) Collection Efficiency of the Travelling Screens -

In an attempt to quantify the collection efficiency of the travelling screens, known quantities of marked dead fish shall be released in front of the travelling screens and the number recaptured by the screens shall be determined.

Collection efficiency experiments will be conducted twice under intermittent and twice under continuous screen wash conditions during the first year of study. Depending upon the results of these studies, additional experiments may be conducted during the second year of the monitoring program.

Each experiment will consist of tagging from 100-1,000 individuals using an appropriate group marking technique and releasing the known number of marked, dead organisms in front of the intake ports. The experimental organisms will be homogeneously distributed across the width of the intake structure just prior to a regular impingement sampling period. The species composition, total number and range of sizes of released organisms will then be compared with the species

composition, number and size of recaptures taken in subsequent impingement samples. The actual number and type of organisms to be used in these studies will depend upon availability, however, as wide a range of sizes and shapes as possible will be included.

Entrainment of Organisms

The objective of the entrainment program is to determine the abundance of impingeable and entrainable sized organisms passing through the dilution pumps and the initial and latent condition of important forms entrained in the condenser and dilution pump flows. The resulting data, used in conjunction with the abundance data collected since 1975, will be used to assess the impact of cooling system and dilution pump entrainment.

1) Dilution Pump Species Composition and Abundance

The abundance of entrainable sized organisms passing through the dilution pumps will be estimated by multiplying the previously obtained condenser entrainment abundance estimates by the differential flow factor for the dilution pumps. This factor will vary seasonally depending upon the number of dilution pumps in operation. The entrainable size category comprises the ichthyoplankton, microzooplankton and macrozooplankton, the latter category including Crangon septemspinosa and Palaemonetes spp.

The species composition and abundance of impingeable-sized organisms shall be determined for eight, one hour periods per day, three days per week. During each sampling day, three one hour samples shall be taken during daylight hours and the remaining five at least two hours after sunset. Samples shall be collected at the easternmost operating dilution pump and shall be representative of the entire water column. Total number and catch weight shall be reported by species for each one hour sample. Estimates of the total number and total weight of each species entrained per week shall be calculated.

Water quality (temperature, salinity, pH, dissolved oxygen and transparency) and volume sampled shall be determined for each one hour sample. Water quality instrumentation shall conform to the criteria presented in Addendum 1.

2) Mortality Studies

Initial and 96-hour latent mortality will be determined for the following entrainable-sized forms:

<u>Callinectes sapidus</u>	zoeae and megalopae
<u>Anchoa mitchilli</u>	eggs and larvae
<u>Pseudopleuronectes americanus</u>	larvae

Samples will be taken simultaneously in the intake canal and the condenser or dilution pump discharge using a sampling device for which sampling mortality is demonstrably lower than traditional plankton nets. The design of the sampling device shall result in minimization of the following factors:

- a) velocities through the filtering mesh
- b) turbulence
- c) sample retention time

If pumps are to be used, pump type, size and operating flow should be specified. More than one sampling device may be used if warranted by species specific differences in behavior, density or susceptibility to sampling mortality. The rationale for the choice of sampling gear should be presented in detail, including references to the results of previous studies wherever possible.

Sampling will be conducted during all months in which the form is present in sufficient abundance, at the frequency outlined in Table 1. Condenser mortality studies will be conducted during the initial year of the sampling program; a similar level of effort will be exerted during the second year. The species to be studied and the sampling location (condenser and/or dilution pumps), however, will be determined following a review of the previous year's data by USEPA, NJDEP and CPUN biologists.

Each test will consist of at least 200 individuals which may be accumulated by pooling subsamples over reasonable time spans and temperature ranges. Sample duration should be as short as possible in order to minimize sampling mortality. Temperature, salinity and dissolved oxygen shall be measured with each sample (see Addendum 1). Cooling water biocide measurements shall be made on condenser discharge samples utilizing the amperometric titration method or its equivalent. Station cooling water flow and heat rejection data shall be obtained for each sampling period. If pumps are utilized, pump head, flow and rpm should be recorded. Sample duration should also be recorded.

Subsequent to collection, the samples shall be taken to the laboratory and held in intake and discharge flow-through water baths for sorting and initial condition determinations. Live and damaged larvae and live eggs shall be carefully transferred to aerated containers maintained in the flow-through water baths. Dead specimens shall be preserved for later identification. Live and stunned organisms shall be examined at 3, 6, 12, 24, 48, 72 and 96 hours after sample collection. Dead organisms shall be removed and preserved at each examination; all live organisms remaining after 96 hours shall be preserved. Condition of larvae shall be based upon the following criteria:

Live: swimming vigorously; no apparent orientation problems; behavior apparently normal.

Damaged: struggling or swimming on side; apparent orientation problems; behavior abnormal.

Dead: no vital life signs; no body or opercular movement; no response to gentle probing.

Condition of eggs shall be based upon the following criteria:

Live: eggs clear and transparent

Dead: eggs cloudy and opaque, or chorion ruptured.

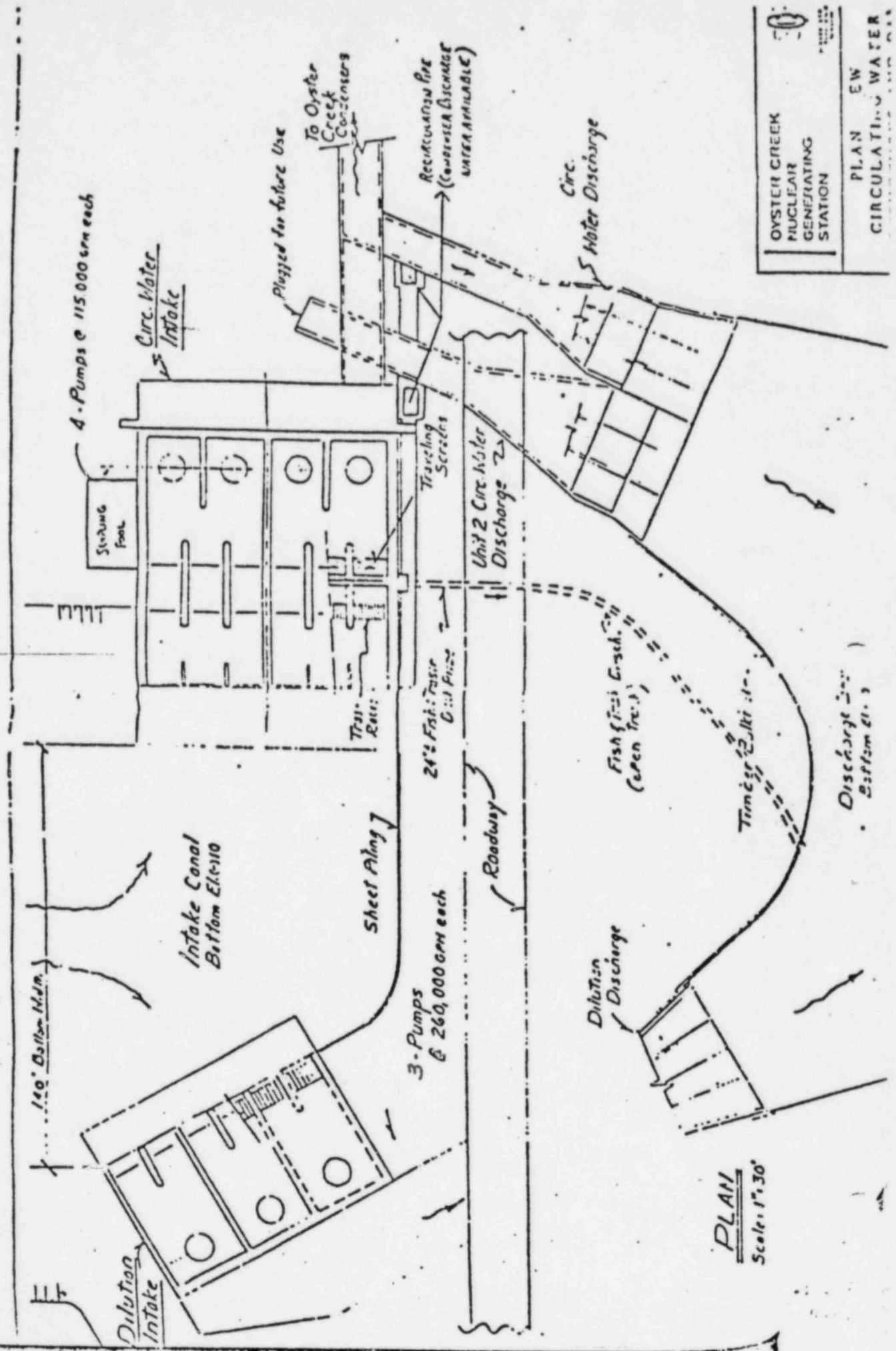
The percentage initial and latent mortality shall be determined for each form at each station; entrainment mortality shall be estimated. The statistical significance of differences in mortality due to date, water quality and station cooling water flow, heat rejection or other factors shall be determined. The resulting information, used in conjunction with the abundance data collected since 1975, shall be used to compute the impact of cooling system and dilution pump entrainment on Barnegat Bay populations.

The initial condition (live, dead, damaged) of impingeable sized organisms passing through the dilution pumps shall be determined during the species composition and abundance studies described above. Latent condition studies of impingeable sized organisms will be conducted at the travelling screens during the initial year of the program (see page 3). Based upon a review of those data by USEPA, NJDEP and CPUN biologists, the need for similar studies at the dilution pumps during the second year of study will be determined.

	<u>Year 1</u>	
	<u>Condenser</u>	
	<u>Intake</u>	<u>Discharge</u>
<u>C. sapidus</u> - Zoeae -	10	10
+		
Megalopae		
<u>A. mitchilli</u> - Eggs -	10	10
Larvae -	10	10
<u>P. americanus</u> - Larvae -	20	20

Table 1 - Sampling frequency (number of samples per week) for entrainment mortality studies

FIGURE 1



ADDENDUM I

Salinity measurements shall be made with a device possessing an accuracy of at least $\pm 1\%$, and calibrated monthly against standard seawater. Dissolved oxygen measurements shall be made with a device possessing an accuracy of at least 0.2ppm, if temperature is within 5 C (9 F) of the calibrated temperature, and calibrated by air daily and by saturated water and the Winkler method weekly. Temperature shall be measured with a device possessing an accuracy of at least 0.9 C (1.6 F) which is calibrated at least monthly. pH measurements shall be made with a device possessing an accuracy of at least .02 pH units which is calibrated with two buffers (4.0 and 7.0) weekly. A daily performance check shall be made on all water quality measuring devices prior to use.