GPU Nuclear

GPU Nuclear Corporation
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609 971-4000
Writer's Direct Dial Number:

July 6, 1984

Mr. Dennis M. Crutchfield, Chief
Operating Reactors Branch No. 5
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Dear Mr. Crutchfield:

Subject: Oyster Creek Nuclear Generating Station
Docket No. 50-219
License No. DPR-16
Appendix B - Environmental Technical Specifications (ETS)

Confirming the discussion of July 2, 1984 between Messrs. Clarence Hickey and James Lombardo of USNRC and Mr. Ronald K. Lacey, Manager Environmental Licensing for GPUN the Biotic-Aquatic Impingement of Organisms study required by Section 2.1.1A of the OCNGS Appendix B Environmental Technical Specifications will begin within one week of the date the station resumes operation following completion of the present refueling/maintenance outage.

Resumption of the impingement study on this schedule will fulfill the monitoring obligations of Section 2.1.1A of the ETS and is consistent with revised GPUN Specification EC 83-1 submitted to Mr. Paul Kurisko, NJDEP on December 19, 1983 (copy enclosed) and Mr. Kurisko's concurrence with this proposal dated February 3, 1984 (copy enclosed).

This interpretation clarifies that the impingement monitoring need not be conducted during periods of circulating pump testing that will preceed resumption of station operation and will allow for proper scheduling and coordination of the impingement sampling required by Section 2.1.1A of the ETS and Specification EC 83-1 regarding the Section 316 (a & b) Demonstration.

If you have any questions regarding this program, please contact Mr. Ronald K. Lacey at (201) 299-2271.

NOTE: Add: NRR/DSI/AEB
NRR/OL/TAPMG

Very truly yours,

John P. Fullwood Jr. for.

Peter B. Fiedler
Vice President and Director
Oyster Creek

dls:0595f:0017f
Enclosure

cc: Mr. James Lombardo - NRC
Oyster Creek Resident Inspector

A001
1/1

State of New Jersey

JOHN W. GASTON JR., P.E.
DIRECTOR

DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF WATER RESOURCES
CN 029
TRENTON, NEW JERSEY 08625

DIRK C. HOFMAN, P.E.
DEPUTY DIRECTOR

FEB 3 1984

R.W. Heward, Vice President
Radiological & Environmental Controls
GPU Nuclear Corporation
100 Interpace Parkway
Parsippany, New Jersey 07054

RE: Oyster Creek Nuclear Generating Station
Supplemental Studies for 316(a+b) Demonstration

Dear Mr. Heward:

We have reviewed revised Specification EC83-1 submitted on December 19, 1983, and are satisfied with the inclusion of our concerns (Kurisko to Lacey, August 3, 1983) in the program of study, and hereby approve the study as outlined. The final study plans developed by your consultant remain subject to our review and approval. We anticipate that the Phase I studies will begin within one week of the date the station resumes operation.

A final issue concerns the timely submission of data so that the Phase I studies may be reviewed and adequate lead time is allowed to plan and initiate any required Phase II work. A schedule for the submission of progress reports should be developed and submitted with the final work plans.

Very truly yours,

Paul C. Kurisko

Paul C. Kurisko, P.E., Chief
Bureau of Industrial Waste Management
Water Quality Management

WQM106:tmc

cc: Dr. D. Cafaro, GPU Nuclear
Mr. J. Vouglitois, GPU Nuclear
Mr. J. Makai, NJDEP
Mr. F. Locicero, USEPA, Region II

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FEB 10 1984
L+RA/C.H.B.

GPU Nuclear Corporation
100 Interpace Parkway
Parsippany, New Jersey 07054
201 263-6500
TELEX 136-482
Writer's Direct Dial Number:

December 19, 1983

Mr. Paul C. Kurisko, P.E.
Chief, Bureau of Industrial Waste Management
New Jersey Department of Environmental Protection
Division of Water Resources
PO Box CN-029
Trenton, NJ 08625

Dear Mr. Kurisko:

Subject: Oyster Creek Nuclear Generating Station (OCNGS)
Supplemental Studies for 316 (a & b) Demonstration

As a result of your review of Specification EC 83-1, subsequent meeting with GPU Nuclear Environmental Controls and Environmental Licensing staffs, and letter of August 3, 1983 Specification 83-1 has been revised to address your concerns. Enclosed is a copy of the revised specification with the changes highlighted.

Revision was made to the program of study. This modification breaks the study down into two phases each lasting 12 months. Phase II will only be initiated if the review of Phase I data justifies Phase II work. Changes were also incorporated into the section on Latent Mortality Studies. These changes include the following: sampling locations should be picked to consider overall impact of the total fish and debris handling system and the analyses will include the overall effect of the passage of fish through the fish and debris handling systems. Finally, the collection efficiency study will take into account the varying operating modes of the pumps, ports and screens. Also, collection efficiency experiments will be conducted during the intermittent and continuous screen wash modes.

Should you have any questions, please contact Mr. Ronald K. Lacey, Manager Environmental Licensing (201) 299-2271.

Very truly yours,

R. W. Heward
Vice President
Radiological & Environmental Controls

MG:dls:0195f
cc: Dr. R. Califano (NJDEP)
Mr. J. Makai (NJDEP
Mr. F. Locicero (USEPA)

Specification EC 83-1
Oyster Creek Impingement and Entrainment Studies

Introduction -

The studies described in this specification are designed to provide supplementary data for GPU Nuclear's 316(a) and (b) demonstration for the Oyster Creek Nuclear Generating Station and to fulfill the monitoring obligations mandated by Section 2.1.1A (Impingement of Organisms) of the Oyster Creek Environmental Technical Specifications (OCETS). The program is based upon specific studies recommended by EPA Region II and NJDEP as a result of their review of the 316 demonstration.

Program of Study -

Duration - Due to the large variation in the availability of many of the organisms to be studied, it is estimated that a minimum of two years would be required to complete the entire study. In order to assure the most intelligent and efficient allocation of time and financial resources, the study will be conducted in two phases. Phase I will consist of the initial 12 months of study. Phase II will consist of an additional 12 months of study; the need for this additional work and, if appropriate, the sampling locations and the species to be studied, will be determined following a review of the Phase I results by NJDEP, USEPA, and GPUN scientists. The program elements to be included in each study Phase are outlined in Table 1.

ITEM #1 (see Table

The Phase I studies will begin within one week of the date that the station resumes operation and continue for a period of 12 months.

Reports - A report covering the entire Phase I program of study will be due to GPU Nuclear within 90 days of the completion of field and laboratory work.

Detailed quantitative and qualitative analyses, including pertinent comparisons with data collected in previous investigations, must be included in the report.

Periodic raw data reports, in computer printout form, will be sent to the Oyster Creek Biological Program Manager. The schedule for the submission of these reports will be determined shortly after the initiation of the Phase I studies.

Quality Assurance -

A Quality Assurance Procedure Manual must be submitted to GPU Nuclear within 60 days of the commencement of work. The manual will include detailed descriptions of the procedures 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 GPU Nuclear 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 -

I. 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, to fulfill monitoring obligations mandated by Section 2.1.1A of the OCETS. The results of these species composition and abundance studies shall not be used to supplement GPUN'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 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. Two 12-hour periods per week will be sampled, one of which will include the period of greatest anticipated impingement, after sunset.

1) Species Composition, Abundance and Initial Condition -

a) Continuous Screen Operation (Night 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 (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 weekly total number and total weight of each species impinged shall be calculated.

Water quality (temperature, salinity, pH, dissolved oxygen and transparency) measurements shall be taken with each 3 minute sample. Instrumentaion shall conform to the criteria presented in Addendum 1. Pertinent meteorological and station operational data shall be recorded for each 12 hour sampling period.

b) Intermittent Screen Operation (Day 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 per week.

Total number, catch weight and initial condition shall be determined for each species as described above. Estimates of the weekly total number and total weight of each species impinged 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 or station cooling water flow.

2) Latent Mortality Studies -

96-hour latent mortality studies shall be conducted on the following organisms, assuming they are impinged 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 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.

The location from which the experimental organisms are obtained shall be at the discretion of the consultant. At the Oyster Creek Station, organisms washed off the travelling screens are subjected to screen wash flume passage and enter the discharge canal at a point where considerable turbulence as well as elevated temperatures are experienced. Site selection should consider the question of overall impact resulting from passage through the fish and debris handling system and not simply the effectiveness of the modified travelling screens. ITEM #2

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 1 for instrumentation criteria). Qualitative observations on abnormal behavior or conditions such as erratic swimming, loss 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. The analyses should consider the overall effect of passage through the fish and debris handling system and into the discharge canal, not simply the effects of impingement upon the travelling screens. ITEM #2

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.

A total of eight collection efficiency experiments will be conducted, four during the intermittent screen wash mode and four during the continuous mode. Within each screen wash mode, experiments will be conducted during varying operating conditions including the 4 circulating water pump, 6 screen mode as well as periods when less than the total number of pumps and screens are in operation. Depending upon the results of these studies, additional experiments may be conducted during the Phase II studies. ITEM #3

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.

II. 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, Abundance and Initial Condition

a) 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.

b) The species composition, abundance and initial condition 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 weekly total number and total weight of each species entrained 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) Entrainment Mortality Studies

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

Callinectes sapidus	zoeae and megalopae
Anchoa mitchilli	eggs and larvae
Pseudopleuronectes americanus	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 Phase I sampling program; a similar level of effort will be exerted during Phase II if necessary. The species to be studied and the sampling location (condenser and/or dilution pumps), however, will be determined following a review of Phase I results by USEPA, NJDEP and GPUN 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.

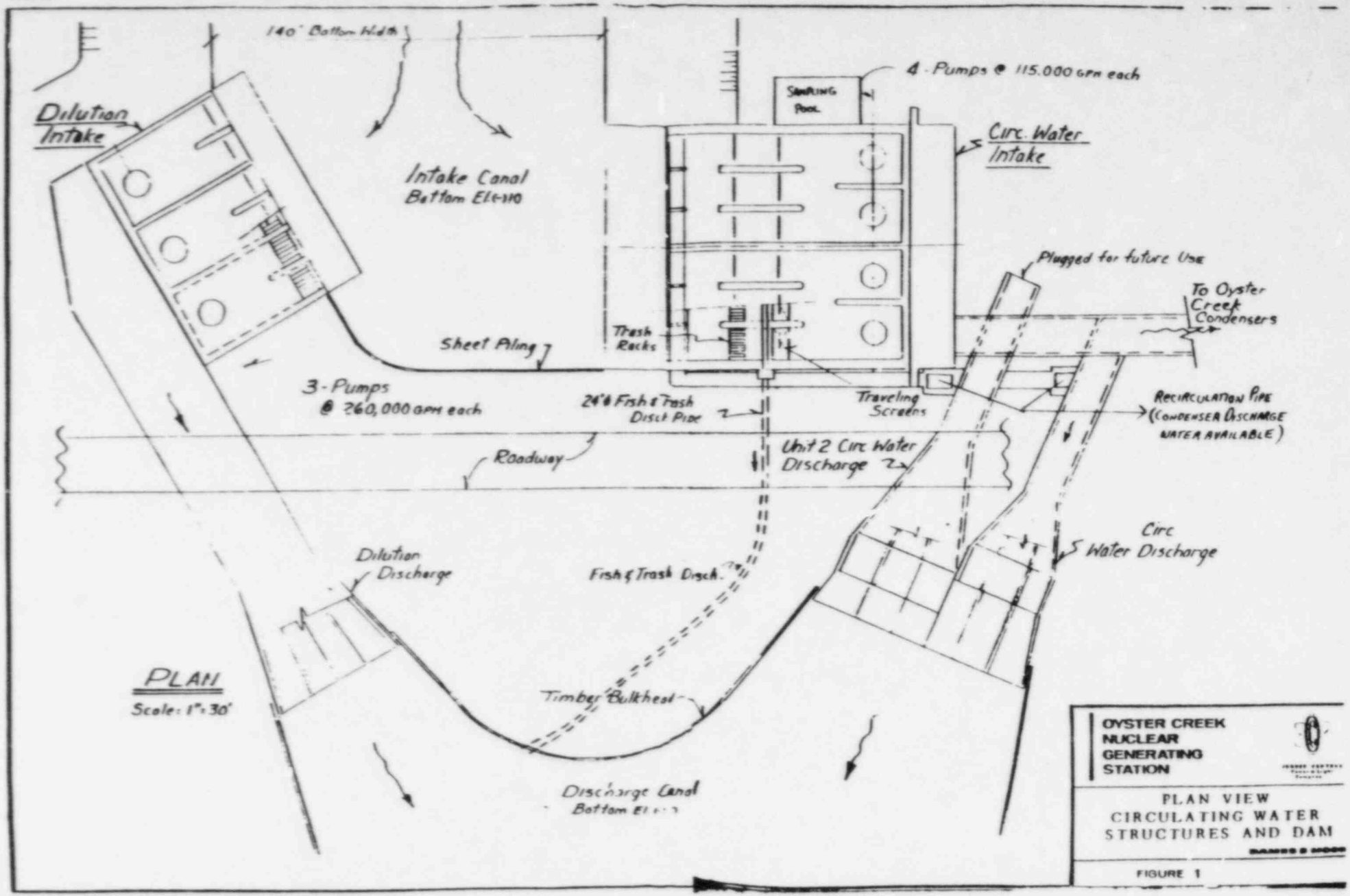
Dead: eggs cloudy and opaque, or chorion ruptured.

The initial and latent mortality percentages 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 estimate the impact of cooling system and dilution pump (Phase II) 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 Phase I program (see page 3). Based upon a review of those data by USEPA, NJDEP and GPUN biologists, the need for similar studies at the dilution pumps will be determined.

Table 1 - Sampling Schedule for Specification EC 83-1.

	Phase I	Phase II
Impingement -		
Species Composition, Abundance and Initial Condition (I-1a&b)	- Two 12 hour periods/week	- Two 12 hour periods/week
Latent Mortality of Impinged Organisms (I-2)	- Emphasis will be placed on performing the required number of tests on 5 species: C. septemspinosa A. mitchilli M. menidia L. xanthurus P. americanus	- Additional tests on Phase I species if necessary + tests on 5 additional species if found in sufficient abundance: A. aestivalis B. tyrannus P. saltatrix C. regalis S. maculatus
Collection Efficiency Studies (I-3)	- Total of 8 experiments under various operating modes	- Necessity of additional studies to be determined after review of Phase I results.
Entrainment -		
Dilution Pump Species Composition + Abundance (II-1a)	- Abundance of entrainable sized organisms will be calculated	- Same as above
(II-1b)	- Impingeable sized organisms, species composition + abundance determined during eight one hour periods per day 3 days per week.	- Same as above.
Dilution Pump Mortality (II-1b)	- Initial condition of impingeable sized organisms will be determined during eight one hour periods per day, 3 days per week	- Same as above.
Condenser Mortality (II-2)	- Initial and 96 hour latent condition of the following forms: C. sapidus zoeae-10 samples/week, megalopae-10 samples/week A. mitchilli eggs-10 samples/week, larvae-10 samples/week P. americanus larvae-20 samples/week	- Same as above.


140' Bottom Width
4 - Pumps @ 115,000 gpm each
Sampling Pool
Dilution Intake
Circ. Water Intake
Intake Canal Bottom El+10
Plugged for future Use
To Oyster Creek Condensers
Trash Racks
Sheet Piling
3 - Pumps @ 260,000 gpm each
24'ø Fish & Trash Disch Pipe
Traveling Screens
Recirculation Pipe ((Condenser Discharge Water Available)
Roadway
Unit 2 Circ Water Discharge
Circ Water Discharge
Dilution Discharge
Fish & Trash Disch.
Timber Bulkhead
Discharge Canal Bottom El +7
PLAN
Scale: 1" = 30'
OYSTER CREEK NUCLEAR GENERATING STATION
PLAN VIEW CIRCULATING WATER STRUCTURES AND DAM
FIGURE 1

ADDENDUM 1

Salinity measurements shall be made with a device possessing an accuracy of at least ± 10%, and calibrated weekly against standard seawater. Dissolved oxygen measurements shall be made with a device possessing an accuracy of at least 0.2ppm and calibrated by air and by saturated water weekly. Temperature shall be measured with a device possessing an accuracy of at least ±0.45°C between 5° and 25°C and ±0.65°C between 25° and 45°C which is calibrated monthly against a traceable standard. pH measurements shall be made with a device possessing an accuracy of at least 0.2 pH units which is calibrated with two buffers (4.0 and 7.0) daily. A daily performance check shall be made on all water quality measuring devices prior to use.