

JERSEY CENTRAL POWER & LIGHT COMPANY

RESPONSE TO

FEDERAL AND STATE COMMENTS

ON

AEC DRAFT ENVIRONMENTAL IMPACT STATEMENT

FOR

OYSTER CREEK NUCLEAR GENERATING STATION

DOCKET NUMBER 50-219

JANUARY 1974

1. Agency Reference: Letter dated January 23, 1973 from Secretary of the Interior to Mr. Muller, U. S. AEC.

- (1) Response to Comment Letter

The Applicant concurs in the concern for the canal banks instability which contribute to the sediment problems and which also result in a rather unsightly condition. The canal stabilization program has been given top priority, along with other major areas of concern. During the summer of 1973, an engineering study was conducted to determine the technical problems and costs involved in preparing such a program in order to define a specific approach to stabilize the canal banks. Specifications have been prepared for such a program. Work on canal stabilization will be initiated in 1974.

2. Agency Reference: Letter dated July 29, 1973 from Mr. Fred H. Tschirley, Department of Agriculture to Mr. Daniel R. Muller, U. S. AEC.

(1) Response to Comment Letter

The removal of 352 acres of wildlife habitat during construction was not significant because similar mobile organisms' habitat was available nearby. A description of land use patterns within the plant site may be helpful.

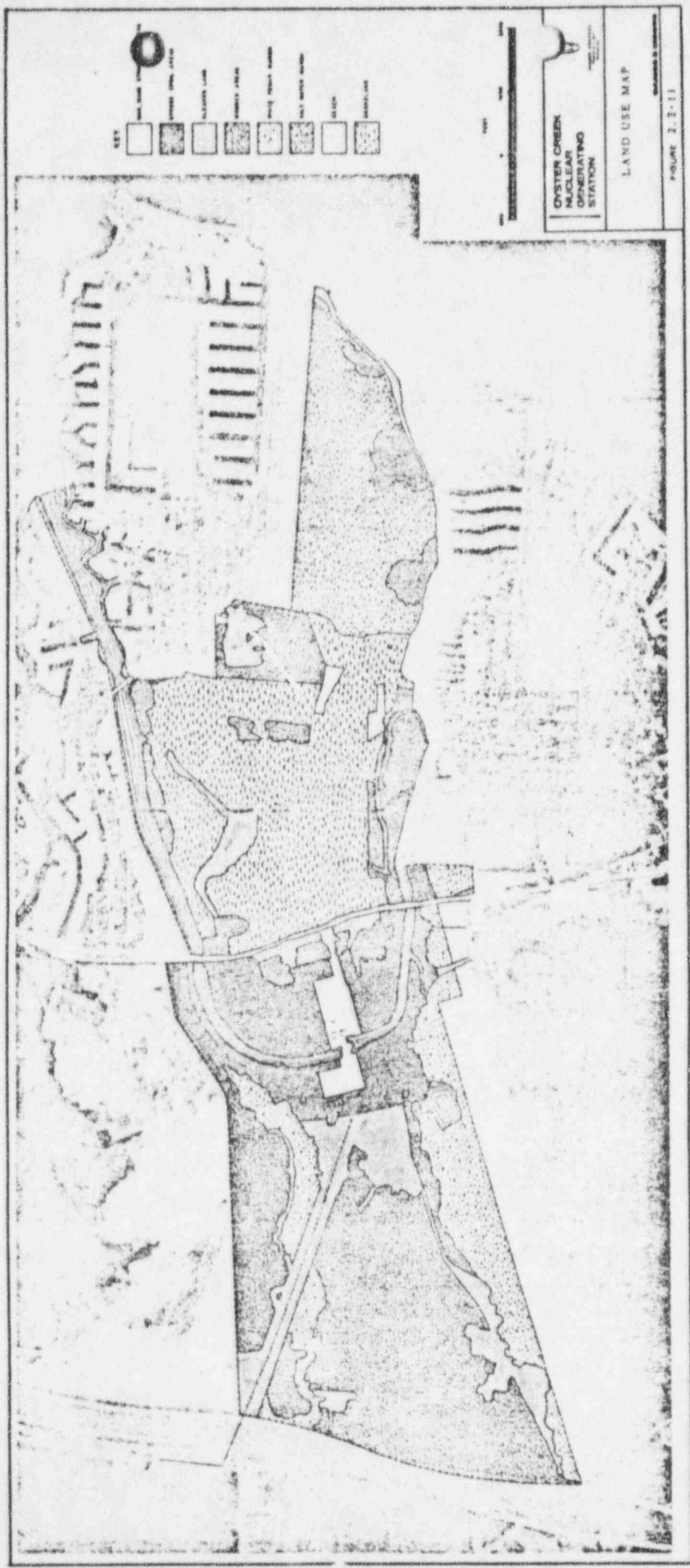
Land use patterns within the plant site fall into either of two broad classifications: some land has been altered or developed by man for his use, and the remainder of the site has been left in its natural state. Figure 2.2-11 reproduced from the Oyster Creek Nuclear Generating Station Environmental Report depicts the location of the land devoted to each of these uses. Land developed by man includes that occupied by the generating station and grounds, the switch yard, transmission right-of-way, several spoil areas, cleared land, transportation right-of-way, and areas designated for industrial or recreational land use, residences, and farm structures. Natural areas are identified as forested or wooded land, salt water marsh, white cedar swamps, and land previously used for pasture and cultivation.

There were 352 acres of land within the plant site utilized during construction of the plant and transmission right-of-way: 288 acres of spoil and cleared area; 33.5 acres of right-of-way for railroads and transmission lines; 22 acres occupied by the generating plant and switch yard; and 8.5 acres set aside for an emergency fire pond on Oyster Creek. The spoil within the plant site was deposited during dredging the South Branch of Forked River and Oyster Creek. The cleared areas include the transmission right-of-way, areas adjacent to U. S. Highway 9, and the Garden State Parkway. Approximately a 33 acre area near the Garden State Parkway was cleared of vegetation by the former owner before the Applicant acquired the land. Vegetation is slowly being reestablished in all of these areas. Regrowth ranges from very sparse areas to areas with thick ground cover and some trees, such as white cedar. Soil in these areas is sandy and relatively infertile, therefore, regrowth of vegetation has been slow.

Surface routes in the vicinity of the plant includes a railroad, two highways, service roads, and farm access roads. One road goes to the emergency fire system pond on Oyster Creek and another service road serves the transmission line corridor. Also, several dirt and paved roads within the site serve as access roads to the pasture, cultivated land, and forested areas. About 9 acres of land are devoted to roads within the site. No industries or recreational facilities were displaced by the plant. In 1964 the Lacey Township governing body zoned the land industrial that is bounded on the north by the Middle Branch of Forked River, on the east by U. S. Highway 9, on the south by Oyster Creek, and on the west by the Garden State Parkway. The Oyster Creek Nuclear Generating Station is the only industry that has been constructed in this industrially zoned area. One family resides on the Applicant's land between the Bay and Highway 9. This family lives in a well landscaped farm which includes a house and several adjoining farm buildings.

Wooded and forested areas consist of pitch pine and some mixed hardwoods. The largest of these areas within the site is located west of the plant, but there are also smaller scattered stands to the east. The forests provide wildlife habitat, control erosion, and partially screen the plant and transmission lines from the Garden State Parkway and U. S. Highway 9. There are 218 acres of marshlands on the site which are habitats for terrestrial and aquatic life. In addition to the marshlands, 358 acres of white cedar swamp adjoin the streams. The land had originally consisted of pine vegetation and fresh and salt water marshes. The pine and mixed hardwood were cleared east of U. S. Highway 9 and the marsh was drained and plowed for crops and pasture by the former owner. Since the Applicant purchased the land, the cleared cropland and pasture has reverted to a savannah (grassland with scattered trees). The cultivated land has now reverted to the original marsh habitat for wildlife.

Disturbances to the land during construction of plant facilities included the removal of some pine and hardwood forest, the dredging of a canal, and the replacement of some white cedar swamp and salt water marsh with spoil from dredging and site excavation. The effect of these activities resulted in the elimination of some small non-mobile mammals (i.e., moles), reptiles, and amphibians that lived on the disturbed area surrounding the plant. The short-term effect of the removal of 352 acres of wildlife habitat during construction did not significantly affect mobile organism movements, because similar habitat was available nearby.



OYSTER CREEK
NUCLEAR
GENERATING
STATION

LAND USE MAP

FIGURE 2.2-11

3. Agency Reference: Letter dated August 22, 1973 from Mr. Paul Cromwell, Department of Health, Education and Welfare to Mr. Daniel R. Muller, U. S. AEC.

(1) Response to Comment 1

A thorough analysis of the effects of the "proposed" action on the local community, addressing such areas as the effect of 100* plant employees and their families on education, transportation, housing, health facilities, etc., in the local area, is not considered appropriate at this time since the plant was under construction in 1964 and in operation in 1969. Those effects have since been assimilated. However, the material presented in the Draft EIS does provide an adequate information base from which certain conclusions can be drawn to form a simple analysis regarding those effects.

The effects of 100 plant employees and their families on transportation in the local area are considered to be minor in view of the following:

- (a) The local area is traversed by major state and federal highways, i.e., the Garden State Parkway and U. S. Highway 9 (Draft EIS page 2-1).
- (b) The resident population within a local area of 10 miles of the site in 1970 was estimated to be 45,000 (Draft EIS page 2-1). The average family size in the State of New Jersey is 3.17 people (Draft EIS page 8-12). The additional effect, therefore, of adding 317 people to that resident population amounts to approximately a 0.7% increase in the local area. The Applicant considers this increase to be insignificant. Assuming all other variables constant, if the resident population experiences a slight 0.7% increase, one would expect a proportional or slight increase in the local area traffic flow.
- (c) The resident and seasonal population within a local area of 10 miles of the site in 1970 was estimated to be 97,315 (Draft EIS page 2-6). The additional effect, therefore, of adding 317 people to the resident and seasonal population amounts to approximately a 0.3% increase in the local area. The Applicant considers this increase to be virtually undetectable. Assuming all other variables constant, if the resident and seasonal population experiences a virtually undetectable increase of 0.3%, one would expect a proportional or virtually undetectable increase in the local area traffic flow. This is especially true with the large numbers of additional casual one-day or weekend visitors during the summer months.

* A plant census in December, 1973 determined that there were about 118 employees working at different times during any 24-hour period, which therefore closely substantiates the average plant staff number of 100 (Draft EIS page 8-12).

- (d) The plant was designed to meet electrical base loads occurring within the Applicant's service area and accordingly, is a source of supply of continuous power (Draft EIS page 8-3), and accordingly the plant is operated on a continuous basis which requires that the plant staff work three shifts over a 24-hour period. 98 personnel staff the day shift from 7:30 A.M. to 4:00 P.M., 10 personnel staff the afternoon shift from 3:30 P.M. to 12:00 P.M., and 10 personnel staff the night shift from 11:30 P.M. to 8:00 A.M. The maximum vehicular rate resulting from the day shift change to the afternoon shift is 108 vehicles over a 1 hour duration. The maximum vehicular rate resulting from the afternoon shift change to the night shift is 20 vehicles over a 1 hour duration. The maximum vehicular rate resulting from the night shift change to the day shift is 108 vehicles over a 1 hour duration. The net results are average increases in vehicular traffic flow of about 1 vehicle every 33 seconds from 7:15 A.M. to 8:15 A.M., 1 vehicle every 33 seconds from 3:15 P.M. to 4:15 P.M., and 1 vehicle every 180 seconds from 11:15 P.M. to 12:15 P.M. The Applicant considers, therefore, that the net results of average increases in vehicular traffic flow directly at the plant site are small and simply are not excessive or burdensome on the available local transportation roads and highways.

The effects of 100 plant employees and their families on education, health facilities, etc., in the local area are considered to be minor in view of the following:

- (a) Facilities such as schools, etc., are generally financed, constructed and operated by local agencies. The major source of revenue for schools is local real estate taxes on land and buildings. The plant brought to Lacey Township substantial revenues through the gross receipts and franchise taxes paid by the Applicant as well as through real estate taxes on the land and buildings. In addition, its 100 employees caused the creation of additional rateables in the form of housing and the plant supplied nearly all of the municipal revenues.
- (b) Increases of 0.7% and 0.3% in the respective resident and combined resident-seasonal population levels of 1970 are considered by the Applicant to be relatively small and insignificant increases on the local educational and health facilities.

The effects of 100 plant employees and their families on housing in the local area are considered to be minor in view of the following:

- (a) The construction of the plant induced the construction of approximately 85* new residences in surrounding communities (Draft EIS page 10-1). This provided both a major source of homesites for the new employees and employment for the local building industry.
- (b) The addition of the newly constructed residences caused a net increase in available real estate which is assessable on a local level for tax revenue. It was estimated that this increase had an assessable worth of about \$2.5 million (Draft EIS page 10-1).

* 85=66.6% of 130.

(2) Response to Comment 2

The environmental effects on the estuarine functions of Oyster Creek and the South Branch of Forked River due to the operation of the plant are important areas of concern to the Applicant. This is evident by noting that extensive investigations of the aquatic biota-benthic flora and fauna and plankton have been conducted from 1965 to the present. Further, the Applicant agrees with the AEC in its conclusion (Draft EIS page 10-11) that items of slight to moderate environmental impact are associated with operation of the plant. Additionally, the Applicant is concerned about the stability of the canal banks, as well as its aesthetics, and therefore intends to implement the most practical means of stabilizing the banks and improving their aesthetic appeal.

The Applicant considers it appropriate to note that safeguards will be provided whose purpose is to result in an acceptable environmental impact due to plant operation. Pursuant to Section 50.50 of 10 CFR 50, each operating license issued by the AEC for a nuclear power plant will specify certain conditions and limitations on the operation of the plant which will result in an acceptable environmental impact.

4. Agency Reference: Letter dated August 9, 1973 from E. C. Anderson, Department of Health, Education and Welfare to Mr. Paul Cromwell, DHEW.

(1) Response to General Comment 1

Complete data has been recorded during plant operation since 1969, i.e., tritium releases as well as other radionuclides. Such data has been continuously recorded and made public in Semi-Annual Reports to the Atomic Energy Commission. These reports are submitted to the AEC and other agencies requesting copies within sixty days after the end of the six month reporting period. The reports are available for public viewing in the public document room in Washington, D. C. Additionally, records have been made, submitted and distributed in the semi-annual reports regarding radioactivity data for fluid nuclide releases. It should be noted that the Applicant is not seeking a proposed power increase but rather requesting a license for the life of the plant at the presently approved and licensed power level.

(2) Response to General Comment 2

The Applicant currently has underway a design and engineering effort aimed at making improvements at the Oyster Creek Station to reduce both gaseous and liquid radioactive releases. These modifications for which AEC approval is currently being sought are aimed at conformance with the "as low as practicable" guidelines. It should be noted again that the Applicant is not seeking an increase in power level.

In a letter to the AEC dated June 1, 1973, Jersey Central indicated that it has completed its evaluation of the radioactive waste systems currently installed at the Oyster Creek Station to determine the conformance with the proposed Appendix I to 10 CFR 50 - Numerical Guides for Design Objectives and Limiting Conditions for Operation to Meet the Criterion "As Low as Practicable" for Radioactive Material in Light Water Cooled Nuclear Power Reactor Effluents. Jersey Central further indicated that the existing radioactive gaseous waste system required augmentation to insure conformance with the guidelines of proposed Appendix I and submitted a report entitled "Proposed Modification to the Gaseous Radioactive Waste System for Oyster Creek Nuclear Generating Station". That report discussed the analytical models, data, assumptions and calculations which were used with respect to four possible alternative systems to demonstrate conformance to the proposed Appendix I to 10 CFR 50. In addition, regarding the liquid and solid radioactive waste systems, the Applicant indicated that studies were also in progress to select appropriate modifications to those systems such that they would no longer experience difficulty in meeting proposed Appendix I limitations.

By letter dated September 20, 1973, the Applicant further informed the AEC that it had completed its evaluations and had selected suitable modifications to the solid, liquid and gaseous radioactive waste systems for the station, which the Applicant has determined will provide conformance to the effluent guidelines of the proposed Appendix I to 10 CFR 50. These modifications were described in a report entitled "Preliminary

Description and Analyses of Proposed Modifications to the Gaseous, Liquid and Solid Radioactive Waste Treatment Systems for the Oyster Creek Nuclear Generating Station". It is anticipated that the system descriptions in that report will allow the AEC to give its concurrence that the design and construction of the systems as described will result in effluent releases well within the limitations of proposed Appendix I to 10 CFR 50 and meet with AEC approval.

Amendments to the Final Safety Analysis Report (FSAR) regarding the modifications to the gaseous, liquid and solid radwaste system of the Oyster Creek Nuclear Generating Station are also being prepared and will be submitted to the AEC upon completion.

(3) Response to Specific Comment 1

Actual release values for tritium are given in the Radwaste Summary Section of each Semi-Annual Report issued by the Applicant.

(4) Response to Specific Comment 2

See Response to General Comment 2, above.

(5) Response to Specific Comment 5

Fuel assemblies are being supplied by Exxon Nuclear Company. To date, there have not been any shipments of spent fuel to any reprocessing plant. Shipments to the GE fuel reprocessing plant in Illinois are expected to be during 1974.

5. Agency Reference: Letter dated August 22, 1973 from John J. Russo, State of New Jersey Department of Environmental Protection to Director of Regulation, U. S. AEC.

(1) Response to Overall Comments, Section 6.2

Since the startup of the Oyster Creek environmental monitoring program, substantial changes have occurred in both the objectives and the techniques of radiological environmental monitoring. The Applicant is in the process of upgrading the program to conform with recommendations of the EPA (ORP/SID 72-2) and the AEC (Regulatory Guide 4.1 and 1.42). The upgrading will involve more sophisticated sampling and analyses. The design of the upgraded program is essentially complete and a proposed technical specification change will be submitted to the AEC shortly. Sampling and analysis procedures are already being tested to assure that the upgraded program will be functioning smoothly at the earliest possible date.

(2) Response to Comment 1, Section 6.2

The upgraded program will use thermoluminescent dosimeters (TLD) to measure gamma radiation. Although high pressure ion chambers with tape recorders could be used to measure plant-related doses as low as one or two mr/year, for economic reasons, thermoluminescent dosimetry using carefully selected sampling locations, rigid control procedures, and proper data evaluation should enable detection of plant-related doses as low as 10 mr/year with reasonable certainty.

(3) Response to Comment 2, Section 6.2

The TLD sampling locations were selected on the basis of maximum expected off-site doses to the public. Dosimeters will be located at eight locations near the site boundary, five locations two to three miles from the plant, and three locations about 25 miles from the plant to provide background data.

(4) Response to Comment 3, Section 6.2

Although the upgraded program will use high volume samplers as supplemental monitoring (not as part of the formal program) at two locations, low flow rate pumps will be used for the formal program. Commercially available high volume pumps, designed for intermittent use, require frequent repair and replacement when used for continuous sampling. Frequent breakdowns would mean loss of data. Low flow rate pumps (approximately 1 cfm) are sufficient to meet program sensitivity requirements for the inhalation pathway and are considered adequate by the EPA (ORP/SID 72-2). The feasibility of high volume sampling is being investigated because there is hope that a great increase in sensitivity can be obtained if reliability problems can be solved.

(5) Response to Comment 4, Section 6.2

In the upgraded program, five air samplers will be distributed around the plant at a distance of about two to three miles. Three of

these stations will be located near areas of maximum expected ground-level concentration. The other two stations will be located in populated areas. Additional samplers will be located about 25 miles from the plant to provide background data.

(6) Response to Comment 5, Section 6.2

Charcoal cartridges are being used in air sampling systems to measure airborne radioiodine.

(7) Response to Comment 6, Section 6.2

In the upgraded program, vegetation and soil samples and composite air samples will be analyzed by high-resolution gamma spectrometry. Precipitation will be analyzed by high-resolution gamma spectrometry if the gross beta concentration exceeds a predetermined limit.

(8) Response to Comment 7, Section 6.2

Surface water from Barnegat Bay and Oyster Creek has been analyzed for tritium, strontium-90, and gamma emitters for at least a year. The upgraded program will continue these analyses in addition to the analysis of strontium-89.

(9) Response to Comment 8, Section 6.2

The upgraded program will discontinue special analyses for isotopes not present in plant effluents. No sampling or analyses will be discontinued, however, until AEC approval of the proposed technical specification change is obtained.

(10) Response to Comment 9, Section 6.2

The use of a continuous or proportional sampler to collect water samples from Oyster Creek is being considered.

(11) Response to Comment 10, Section 6.2

In the upgraded program, bottom sediment samples will be analyzed by high-resolution gamma spectrometry.

(12) Response to Comment 11, Section 6.2

In the upgraded program, gross alpha and beta analysis of clam meat will be replaced by gamma spectrometry and radiochemical analysis for strontium-89 and strontium-90.

(13) Response to Comment 12, Section 6.2

See Response to Comment 11, Section 6.2, above.

(14) Response to Comment 13, Section 6.2

The upgraded program will include sampling and analysis of fish and crabs, as well as clams. It is expected that these results and

results of sediment analysis can be used to establish trends of concentrations in algae and other vegetation. Studies performed by the State of New Jersey and by the EPA indicate that the same plant effluent isotopes which appear in algae and other aquatic vegetation also appear in sediment, fish, clams and crabs. Measurements of radioactivity in clam and sediment in the past have shown very little contamination from plant effluent.

6. Agency Reference: Letter dated September 4, 1973 from Mr. Sidney R. Galler, Office of the Assistant Secretary of Commerce to Mr. Daniel R. Muller, U. S. AEC.

(1) Response to Comment on Section 2.7.2, Page 2-30

The natural depth of the bay and the induced intake-discharge current patterns do not indicate that demersal eggs of fish could be swept from the bay bottom and entrained in the cooling water. The only demersal eggs ever found at the plant was a clutch of about five eggs of an unidentified species that were adhering to a piece of sea lettuce (*Ulva*) taken from the screens at the time of the 1971 screen census. *Ulva*, as well as other macroalgae, characteristically drifts as part of its natural life history. There is no reason to believe that bottom currents of the bay between the mouths of Oyster Creek and Forked River ever attain scouring velocities due to the recirculation pattern. Bottom growths in this area clearly indicate that bottom currents are within the range of natural velocities to which bottom forms are adapted. This would include demersal fish eggs if they are deposited in this stretch of bay bottom.

(2) Response to Comment on Section 4.3.2, Page 4-4, Paragraph 4

Those fish species that have migratory behavior as anadromous, catadromous, or lesser migratory patterns in the bay include striped bass, white perch, winter flounder, menhaden, the American eel and the blue crab. (These would be the species of greatest importance to the public interest - other species show minor movements associated with feeding, spawning and seasonal changes.) These species are presently found in both the intake and discharge canals of the Oyster Creek Plant. In point of fact, the discharge canal, formerly little fished, has developed into a popular recreational fishery asset.

(3) Response to Comment on Section 5.2.1, Page 5-2

The Applicant has already addressed the subject of thermal plume dispersion in a letter to the AEC dated November 8, 1973 which forwarded the proposed Oyster Creek Nuclear Generation Station Environmental Technical Specifications (ETS). Section 6 of those ETS describes special surveillance, research or study activities which the Applicant has proposed to undertake. The objective of the Applicant's thermal plume mapping activity is to describe the horizontal and vertical extent of the plume under various conditions of tides, time of day and winds. In order to understand the general three-dimensional heat distribution as it is affected by various environmental conditions, the plume will be mapped using an airborne infrared sensor and simultaneous temperature-depth profiles from a surface vessel. This will be supplemented by current measurements. These mapping surveys will be of several days duration. During each survey period the plume size and shape will be measured during three portions of the tide stage. Current drogue surveys conducted prior to the first temperature survey and periodically throughout the program will be utilized to assess current characteristics. Temperature-depth measurements made during the aerial surveys at several points on approximately five transects

oriented normal to the Bay channel will be used to construct cross section profiles along these portions of the plume. The results of this program, as well as all of the other environmental surveillance programs, will be submitted to the AEC.

(4) Response to Comment on Section 5.2.1, Page 5-3

See Response to Comment on Section 5.2.1, Page 5-2 above.

(5) Response to Comment on Section 5.2.2.4, Page 5-5

The Applicant has already addressed the concern of canal erosion and silting. See Response to Comment Letter to a letter dated January 23, 1973 from the Department of the Interior herein. Also see Response to Comment 2 to a letter dated August 22, 1973 from the Department of Health, Education and Welfare herein. The purpose of Environmental Technical Specifications (ETS) is to establish certain conditions and limitations on the operation of the plant which, if not exceeded, should result in an acceptable environmental impact. The Applicant has submitted proposed ETS to the AEC which specifically address the Staff's conclusions (Draft EIS page 5-5) regarding thermal discharge and which also address the State of New Jersey recommendations (see Letter dated September 12, 1973 from the State of New Jersey Department of Environmental Protection and response thereto).

(6) Response to Comment on Section 5.5.2.2, Page 5-18

The assumption that the loss of 32,000 crabs per year and 24,000 winter flounder per year "is significant" has no foundation. In the opinion of Dr. C. Wurtz, significant losses imply a loss rate that is of such an order of magnitude that losses in successive years would be cumulative. This would lead to lowered populations with each succeeding year. The reports of the work done by the Rutgers' study group do not demonstrate any significant population variation attributable to Oyster Creek Station operation. Therefore, this effect is not considered significant.

(7) Response to Comment on Section 5.5.2.3, Page 5-20

In the Rutgers Progress Report Number 8 the statement of import appears on the first page of the Introduction as: "Although these conclusions are based on an extremely complex situation and do not appear to be statistically significant (emphasis added), we should be aware of the general trend which is taking place." The general trend referred to is a lowering in the number of benthic organisms in and around Oyster Creek and lower primary productivity in the same area. The latter circumstance dates from the pre-operational period. The eighth Rutgers report does not include any discussion of fish eggs and larvae passing through condenser tubes and cannot, therefore, contribute anything to a discussion of that subject.

It should be noted that the Applicant has proposed to undertake a special surveillance activity as described in Section 6 of the proposed Oyster Creek Nuclear Generating Station Environmental Technical Specifications. The principal objective of that activity is to estimate

standing crops of zooplankton in Barnegat Bay and the intake canal. Zooplankton will be sampled monthly for up to three years with plankton nets and/or pumps. Sampling will be conducted at least monthly for the first year; the frequency may be altered during the last two years on the basis of the first year's results. Specimens will be identified to the lowest taxon possible. Special emphasis will be placed on determining the species of copepods, bivalve larvae, fish eggs, and fish larvae. Relative abundance and species diversity will be calculated. The mean biomass of zooplankton per cubic meter will be determined. Egg ratios will be used as a measure of biological activity in populations of dominant species. Temperature and salinity measurements will be taken at the time of each sample. To assess the effects of entrainment or of the thermal plume on zooplankton, mortality from these sources must be compared with the standing crop in Barnegat Bay.

(8) Response to Comment on Section 5.5.2.4, Page 5-23

The Applicant has taken the necessary action to align itself with the Staffs' opinion regarding the control of the outfall temperature in Oyster Creek (see Response to Comment Letter to a letter dated September 12, 1973 from the State of New Jersey Department of Environmental Protection herein). It is noted that the State of New Jersey has concurred in the Staff's recommendation in the control of temperature in Oyster Creek. Additionally, it is further noted that the statement regarding the limitation of outfall temperature to less than 87°F was qualified in the Draft EIS on the basis of (a) the winter flounder avoidance breakdown temperature of 87°F, (b) the hatchability of copepod eggs show no decrease in viability until temperatures exceed 86°F, (c) the larvae of oysters experience a 50% mortality when exposed for 1 hour at 95°F, (d) the mortalities of Mulinia larvae increase sharply between 93°F and 98°F, (e) estuarine waters with temperatures above 87°F will be an unacceptable environment for the majority of important young-of-the-year or small fish species and (f) large individuals of the examined fish species may actively avoid temperatures lower than those avoidance temperatures which produce a mean avoidance temperature of 87°F.

(9) Response to Comment on Section 5.5.2.4, Page 5-28

The Applicant has no information or indication of finfish (or shellfish) starvation in the discharge waters from the Oyster Creek Nuclear Generating Station either in the canal proper or in the plume area beyond the mouth of the canal. It is noted, however, that the Applicant has taken action to implement controls and operating procedures to minimize problems caused by attracting fish to the warm discharge area during the cold months. On November 8, 1973, the proposed Oyster Creek Nuclear Generating Station Environmental Technical Specifications were filed with the AEC for the Commissions' review and approval. Special operating procedures were proposed to minimize the temperature of the discharge water so as to reduce adverse thermal effects on some aquatic organisms. A special surveillance activity was proposed to evaluate the effectiveness of techniques to be implemented for the reduction of winter fish kills.

(10) Response to Comment on Section 6.2.3, Page 6-2

The Applicant has taken the necessary action to align itself with the Staffs' opinion regarding the accumulation of information needed to complement existing data. Section 4, Environmental Surveillance, and Section 6, Special Surveillance, Research, or Study Activities of the Oyster Creek Nuclear Generating Station Proposed Environmental Technical Specifications (ETS), submitted to the AEC on November 8, 1973, identify and describe each activity which the Applicant has proposed to undertake.

(11) Response to Comment on Section 6.2.4, Page 6-3

The comment suggests sampling of herbivorous and carnivorous fishes, waterfowl, and other consumers of aquatic life and notes that neither fish nor aquatic vegetation is sampled at present. An updated environmental monitoring program, to be implemented in the near future, will include sampling of fish, clams, and crabs. The State of New Jersey and the USEPA have sampled and analyzed fish, crabs, clams, algae, and other vegetation extensively in the vicinity of Oyster Creek. (The brief description of these studies in the AEC Environmental Impact Statement did not mention all of these analyses.) Comparison of vegetation data with fish, clam, and crab data indicates that fish, clam, and crab samples can be used as indicators to monitor time trends in aquatic vegetation concentrations.

(12) Response to Comment on Section 8.6, Page 8-18

The Applicant disputes the statement that "... significant detrimental effects (are) being caused by the plant in its present design (which) warrant initiation of corrective measures ...". The Applicant considers that items of slight to moderate environmental impact are associated with the operation of the plant. After four years of operation, the addition of heated cooling water has had a discernable but minor effect on aquatic organisms. An annual accumulation of warm water or a rise in seasonal water temperatures from operation of the plant is not expected to produce any significant deleterious effect. The environmental monitoring program, instituted in 1965, would have detected any change to the environment which would have had a significant detrimental effect.

The Applicant has addressed the areas of concern regarding impingement monitoring and entrainment monitoring in its proposed Environmental Technical Specifications. It should be noted that the environmental surveillance program has been designed to determine the extent that plant operation may be causing adverse and beneficial changes in the ecosystem and that the programs are sufficiently comprehensive to cover all elements of the ecosystem that could reasonably be expected to be affected by plant operation.

(13) Response to Comment on Section 9.2.1.1, Pages 9-8 to 9-10

The comment neglects to admit that there are disadvantages to absolutely everything that man proposes, even operational variations of a single cooling scheme. The operational variations of the existing

cooling scheme, as well as consideration of other cooling schemes, have been evaluated and the balance favors the once-through cooling scheme even though it, as well as any other man-made action, will clearly have disadvantages. The Applicant has already proposed special impact monitoring studies in the areas of entrainment and impingement in order to ascertain the effect on aquatic organisms due to the recommended utilization of the plant's dilution system.

(14) Response to Comment on Sections 9.2.1.3, 9.2.1.4 and 9.2.1.5,
Pages 9-13 to 9-19

The Applicant considers the comment requesting further discussion of salt water cooling towers "... with smaller approaches than 23°F ..." to be unreasonable and inappropriate. The Oyster Creek plant went into construction in 1964 and went into commercial operation in 1969. The commenting agencies are reminded that the Oyster Creek plant review under NEPA is unique, in that the plant has already been constructed. Alternatives were evaluated in 1964 and thereafter. There was no large salt water cooling tower technology available in 1964, or even in 1969. The information presented in the draft EIS regarding utilization of salt water cooling towers is adequate and draws from the best available information on that subject that the Applicant was able to obtain.

The Applicant agrees with the AEC on their basis of the reasoning for including the operation of the dilution pumps in the discussion of the alternative of a natural draft salt water cooling tower.

The Applicant has addressed the area of improving liquid, solid and gaseous radioactive waste systems. See Response to General Comment 2 to letter dated August 9, 1973 from the Department of Health, Education and Welfare herein.

The Applicant considers that it has rigorously explored all the various avenues of alternative action and suggest the commenting agency's inspection of both the Applicant's Environmental Report prepared for the Oyster Creek Project and the Forked River Project. However, the Applicant is bound by law to consider economic costs and cannot, therefore, ignore the economic cost associated with any alternative. This consideration applies to every single action which the Applicant takes since all costs are eventually borne by the consumer. Therefore, the Applicant does not concur that the alternatives be explored without regard to cost.

The Applicant also does not concur with the comment that "... it would seem that a more complete evaluation of the environmental benefits of alternative closed-cycle cooling systems should be presented ...". A complete evaluation has been made. It is unreasonable to request that "it would seem that a more complete evaluation" be done when a complete evaluation has already been done by the Applicant and independently assessed by the Commission. Additionally, the Applicant disagrees that "... Barnegat Bay is too shallow for optimum heat dispersion and is unable to discharge its total waste heat load to the atmosphere ..." since if this were the case, Bay temperatures would continue to rise as long as the plant operates. This is not the case.

The Bay is able to disperse the heat through the use of a mixing zone which is a limited area existing at a constant, slightly higher temperature than ambient Bay temperature. Also, the comment that "... several large fish kills have occurred in the past ..." implies larger losses than have in fact occurred. The comment additionally fails to limit those losses to what were essentially monospecific incidents (Atlantic menhaden).

(15) Response to Comment on Section 9.2.1.10, Page 9-24

The Applicant disagrees with the comment that "It seems to us that ... diverting fish toward the dilution pumps would not greatly reduce fish entrapment losses". In the past, one or more dilution water pumps have been operated as required to control the temperature of the plant discharge water. The dilution pumps are used at other times also, to meet minimum dilution water requirements for the existing radwaste system discharges when all four circulating water pumps are not operating. The dilution pumps are protected only by trash racks which permit the passage of large fish directly into and through the pumps. The low speed, axial flow pumps have seven foot diameter impellers. Consequently, damage to fish has not been a problem; this is further substantiated by the experience with run-of-river hydroelectric turbines of similar characteristics. The diversion of fish toward the dilution pumps, therefore, is an alternative to reducing fish entrapment losses. Accordingly, the Applicant considers the suggestion of further discussion and expansion of this section to be unnecessary. Additionally, the Applicant has proposed to the AEC on November 8, 1973, in its submittal of the Oyster Creek Nuclear Generating Station Environmental Technical Specifications, that the Applicant undertake, as part of its overall environmental surveillance program, an impingement monitoring program to determine the number and mortality of organisms impinged on the intake screens and transferred to the heated effluent canal. Under this program the number, size, weight and condition (dead or alive) of organisms collected on the intake screens will be recorded periodically for three years. During the first year sampling will be conducted weekly; thereafter, the sampling frequency may be altered. At the time of sampling, intake velocity, temperature and salinity will be measured. Mortality to organisms transferred to the effluent canal will be evaluated by placing some living impinged specimens in cages in the effluent canal for a length of time equivalent to the time of passage in the canal. The Applicant has further agreed to study methods of reducing the number of fish impinged should the results of the impingement monitoring program demonstrate that a significant level of impingement is indeed occurring.

7. Agency Reference: Letter dated September 6, 1973 from Mr. Sidney R. Galler, Office of the Assistant Secretary of Commerce to Mr. Daniel R. Muller, U. S. AEC.

(1) Response to Comment Letter

The doses due to releases of halogens from the Oyster Creek station are not substantially above the proposed Appendix I to 10 CFR 50, design objectives.

The Applicant has already responded to the AEC regarding proposed modifications to the solid, liquid and gaseous radioactive waste systems in order to conform to proposed Appendix I to 10 CFR 50. See Response to General Comment 2 to a letter dated August 9, 1973 from the Department of Health, Education and Welfare herein.

8. Agency Reference: Letter dated September 12, 1973 from Mr. Phillips,
Federal Power Commission to Mr. Daniel R. Muller, U. S. AEC.

(1) Response to Comment Letter

Table 8.4, page 8-11, of the Draft Environmental Statement was updated on November 29, 1973 using later information equivalent to that contained in MAAC's Report dated April 1, 1973 and submitted under FPC's Order 383-2. The revised Table 8.4 is attached herewith.

TABLE 8.4

PROJECTED GROWTH RATES AND RESERVE MARGINS IN
MAAC POWER POOL FOR THE YEARS 1973 THROUGH 1982 (a)

Calendar Year	Summer Requirements				Winter Requirements			
	Installed Capacity (MWe)	Peak Loads (MWe)	Reserve With Oyster Creek %	Reserve Without Oyster Creek % (b)	Installed Capacity (MWe)	Peak Loads (MWe)	Reserve With Oyster Creek %	Reserve Without Oyster Creek % (b)
1973	36368	30320	19.9	-	39627	26520	49.4	-
1974	40904	33040	23.8	22.0	43758	28540	53.3	51.1
1975	45691	35740	27.8	26.2	47621	30700	55.1	53.1
1976	48476	38570	25.7	24.1	50379	32870	53.3	51.4
1977	52599	41600	26.4	25.0	55364	35330	57.6	54.9
1978	56009	44730	25.2	23.9	60265	38060	58.3	56.7
1979	60566	48230	25.6	24.3	63783	40820	56.3	54.7
1980	65547	51820	26.5	25.3	68803	43860	56.9	55.4
1981	71775	55660	29.0	27.9	75029	47080	59.4	58.0
1982	76211	59740	27.6	26.6	78379	50530	55.1	53.9

(a) Reference 1, Section 2 and 3

(b) Starting in 1974

9. Agency Reference: Letter dated September 12, 1973 from Mr. Richard J. Sullivan, State of New Jersey Department of Environmental Protection to Mr. Mintzing.

(1) Response to Comment Letter

The canal bank stabilization program, which the Applicant already has underway, was discussed in Response to Comment Letter to the letter dated January 23, 1973 from the Department of Interior herein.

The Applicant has already addressed the AEC Staff conclusion on page 5-5 of the Draft EIS regarding operation of the dilution system at full capacity when the water in the discharge canal exceeds 87°F, as measured at the U. S. Route 9 bridge over the discharge canal. By letter dated November 8, 1973, the Applicant submitted their proposed environmental technical specifications (ETS) for the Oyster Creek Nuclear Generating Station for AEC approval. Special conditions for operation were proposed that specifically address the Staff's conclusion in this area. The Applicant has proceeded with the ordering of equipment and arranging for contractors in order to accomplish the ETS as proposed. The Applicant will further be prepared to implement those proposed ETS when the Full Term Operating License is issued. It is noted that the AEC already has regulations that require establishment and implementation of ETS that are subject to a continuing review by the AEC. Additional information on ETS is discussed in:

- (a) Response to Comment 2 to the letter dated August 22, 1973 from the Department of Health, Education and Welfare herein.
- (b) Response to Comment on Section 5.2.1, Page 5-2, Response to Comment on Section 5.5.2.3, Page 5-20, Response to Comment on Section 5.5.2.4, Page 5-28, Response to Comment on Section 6.2.3, Page 6-2, Response to Comment on Section 8.6, Page 8-18, and Response to Comment on Section 9.2.1.10, Page 9-24 to the letter dated September 4, 1973 from the Office of the Assistant Secretary of Commerce herein.
- (c) Response to Comment Letter and Response to Comment 7, Introduction and Conclusions to the letter dated September 24, 1973 from the Environmental Protection Agency herein.

10. Agency Reference: Letter dated September 24, 1973 from Mr. Sheldon Meyers Environmental Protection Agency to Mr. Muntzing, U. S. AEC.

(1) Response to Comment Letter

The Applicant has already responded to the AEC regarding proposed modifications to the solid, liquid and gaseous radioactive waste systems in order to conform to proposed Appendix I to 10 CFR 50. See Response to General Comment 2 to a letter dated August 9, 1973 from the Department of Health, Education and Welfare herein. The modifications proposed for the Oyster Creek plant are currently in engineering and detailed information is planned to be submitted as FSAR Amendments in May and December 1974.

The Applicant will construct a new meteorological tower at the Oyster Creek-Forked River site in the near future to conform with AEC Regulatory Guide 1.23 requirements.

The Applicant has already addressed the concern areas of impingement and entrainment losses and has responded to the AEC on November 8, 1973 identifying all of the studies it has proposed to undertake as part of its environmental surveillance program and special surveillance, research and study activities. Additionally, the Applicant disagrees with the statement that "the little information that is provided points to an unacceptable level of damage". The Applicant submits that there is no justification for the extrapolation of the impingement rates the EPA arrived at in their detailed comments.

The Applicant hereby requests the AEC or the EPA to furnish the Applicant the complete EPA aerial infrared studies of the Oyster Creek thermal discharge including procedures, calibration, equipment and all data thereto in order to permit the Applicant to adequately comment on the study performed. Absent such submission, the Applicant suggests that the AEC should properly ignore this EPA comment. It is noteworthy that the studies have not been released for public information, and that the Applicant has been unable to procure even a preliminary report on this subject for their review and comment. Notwithstanding the foregoing, the Applicant has proposed to conduct a thermal plume mapping study, whose objectives have been previously described. See Response to Comment on Section 5.2.1, page 5-2 to a letter dated September 4, 1973 from the Office of the Assistant Secretary of Commerce herein. The results of this program will be submitted to the AEC and will be made available to the public.

Regarding the comment that there is a "lack of information concerning the biological effects of the plants' cooling system and the extensive impact of the plants' thermal discharge on Barnegat Bay ...", the Applicant submits that there is extensive information on the effects of the cooling system incorporated in the Rutgers and Wurtz reports. In summary, these multiple studies have found no significant biological effects caused by the plant operation. Further, it is empirically obvious that the plant has provided a popular recreational fishery for

game fish and crabs in the discharge waters. EPA's expression of "extensive impact" is baseless, since if there was a lack of information, then there is obviously no basis for their determination of "extensive impact". The Applicant, therefore, disagrees with EPA and requests that the AEC proceed as expeditiously as possible in its review of all these matters and grant the full-term operating license in a timely manner.

(2) Response to Comment 1, Introduction and Conclusions

See Response to Comment Letter above.

(3) Response to Comment 2, Introduction and Conclusions

See Response to Comment Letter above.

(4) Response to Comment 3, Introduction and Conclusions

See Response to Comment Letter above. As indicated, the meteorological station at the plant is being upgraded to conform to new guidelines. Nevertheless, the Applicant categorically denies the EPA's assertion that, based on a few observed problems during one site visit, that the extensive data gathered over many years is "useless". Such a conclusion is unfounded.

(5) Response to Comment 5, Introduction and Conclusions

See Response to Comment Letter above.

(6) Response to Comment 6, Introduction and Conclusions

See Response to Comment Letter above.

(7) Response to Comment 7, Introduction and Conclusions

Analyses performed by Rutgers University in October 1967 (Third and Fifth Progress Reports) have yielded dissolved oxygen concentrations in Oyster Creek of 8.1, 7.96, 8.11 and 8.01 mg/l with a mean of 8.04 mg/l. Data from water quality surveys, conducted by the EPA together with the New Jersey Department of Environmental Protection during the summer of 1966 and 1967, have shown that the dissolved oxygen concentrations of seventeen samples were above the applicable criteria for Oyster Creek. (Reference: "Pre-conference Report for Water Quality Standards Setting/ Revision Conference, New Jersey Atlantic Coastal Area", U. S. Environmental Protection Agency, Region II Office, New York, New York, May 1972 and personal communication). The mean dissolved oxygen concentration in Oyster Creek for the period June 1970 through March 1971 was 7.41 mg/l (Rutgers University, Seventh Progress Report).

All of the observed dissolved oxygen values, both pre-operational and post-operational, are greater than the State criteria for Oyster Creek. The applicable criteria are: "Daily average not less than 5.0 mg/l. Not less than 4.0 mg/l at any time." In light of the criteria, the dissolved oxygen levels in Oyster Creek should not be construed as low.

If the dissolved oxygen levels in Oyster Creek are not construed to be low, in view of the preceding evidence, then the Applicant should not reasonably be expected to (a) characterize the adjacent waters with respect to physiochemical data, (b) determine whether oxygen concentrations in the near Bay area are lower than acceptable and (c) determine the effect that the heated effluent has on dissolved oxygen concentrations in the Bay. The Applicant fails to understand how the EPA can relate acceptable dissolved oxygen concentrations in the Oyster Creek heated effluent to the point where it is necessary to provide data as to the effect it is having on the Bay.

Noteworthy of mention and pertinent to this comment is the general ecological survey of aquatic macroinvertebrates proposed by the Applicant on November 8, 1973 in the Oyster Creek Nuclear Generating Station Environmental Technical Specifications. The survey has been proposed to provide information to complement existing data as identified by the AEC in the draft EIS (pages 6-2 and 6-3). The objective of that survey is to evaluate changes in populations of commercial, sport and non-commercial organisms, including shellfish, and to identify alterations of community structure in the region of the Bay affected by the thermal plume. Benthic macroinvertebrate organisms will be sampled monthly for three years at stations selected as representative during transect studies along the Bay. Quantitative replicate samples will be taken within and outside of the plume to detect thermal effects on the biota. Numbers and sizes of organisms collected at sites within the thermal plume will be compared with those at control sites elsewhere in the Bay. Larger organisms may also be evaluated with photographs and traps. Additionally, measurements of dissolved oxygen, temperature and salinity will be taken for each sample.

(8) Response to Comment on Radiological Aspects, Dose Assessment

The environmental monitoring program is being upgraded to conform with recommendations in USEPA ORP/SID 72-2, and USAEC Regulatory Guides 4.1 and 1.42. At the present time, it is anticipated that all analyses will be performed by an outside contractor who will bear primary responsibility for laboratory analysis quality control. However, the adequacy of the contractor's laboratory analysis quality control program will be monitored by the Applicant.

(9) Response to Comment on Non-Radiological Aspects, Biological Effects

On page 13 of the EPA statement a six-month period of maximum abundance of crabs impinging on the screens is given as 466 crabs per hour from April to October. The Applicant's screen census clearly demonstrates that this cannot be the case. The rate of impingement on the screens for each month of the 1971 survey was:

April	17 samples	34 crabs per hour
May	33 samples	77 crabs per hour
June	40 samples	223 crabs per hour
July	5 samples	400 crabs per hour.

It is readily apparent from the above data that crabs do not occur abundantly until June. Crab samples from the screens taken during the 1971 screen census included 39 taken during the day (7 A.M. to 7 P.M.) and 48 taken at night (7 P.M. to 7 A.M.). Crabs were found at an overall rate of 45 per hour during the day and 247 per hour during the night. Of the five July samples collected four were night samples. (The one day sample produced 40 crabs; the four night samples produced 566 crabs.) The July rate of crab impingement in the above data is strongly skewed to the high side.

There is no justification for the extrapolation of an impingement rate as projected in Figure 1 of the EPA comments.

The EPA states that mortality from screen impingement combined with lag effects after passage to the discharge canal should be estimated to be 50% rather than 5%. The Applicant does not agree. Crabs are amazingly hardy animals. Once passed to the discharge canal no further kill would be expected that would come anywhere near a 50% loss. No dead crabs have ever been observed in the discharge canal. Some minor losses due to residual mechanical damage could conceivably occur. Crabs have pronounced regenerative capabilities and lost appendages reform. Mechanical losses would have to be associated with severe body damage. This has never been observed and any such losses would probably represent much less than one percent of the animals passed over the screens.

Heat in the discharge canal is not lethal to the crabs. As a matter of fact, Oyster Creek supports the best inshore crab fishery of Barnegat Bay in so far as the Applicant's consultant has been able to determine. The site is very popular with crabbers who prefer the discharge waters to the cooler intake waters for their crabbing activities. A simple count of crabbers along both waters clearly demonstrates this.

If the losses hypothesized by the EPA did in fact occur the crab population in Oyster Creek would by now be so reduced that the public would no longer bother to crab there.

On page 15 of the EPA statement a reference is made to a study showing 165 million mehanden larvae killed at the Brayton Point Plant (New England Power Company). This figure was extrapolated from a one-hour sample collected by Dr. Clarence Tarzwell. (Telephone conversation between Mr. R. R. Younger, Resource Management, Inc., and Mr. Milton Anderson, environmental engineer, New England Power Co.) The EPA comments imply that fish larvae are being destroyed in massive numbers. There simply is no evidence to support this. Comparative guesses of possible conditions at the Oyster Creek Plant with possible conditions at some other plant are misleading. The geographic relationship of each plant to its aquatic environment, the species present, plant size, and mechanical operation of the plants must be considered. Each plant should be studied individually. In the absence of specific studies only the broadest generalizations can be drawn.

The Oyster Creek Nuclear Generating Station, after three years of operation, has not eliminated any species from the area. Further, it has provided a popular, productive fishery that, in season, produces, contrary to the EPA prognostications, striped bass, white perch, winter flounder, crabs, bluefish, and many other species for recreational angling.

(10) Response to Comment on Non-Radiological Aspects, Chemical Effects

The Applicant has made efforts to reduce the chlorine residual level as much as is practicable. Additionally, monitoring for chlorine has been proposed by the Applicant as part of the Oyster Creek Nuclear Generating Station Environmental Technical Specifications. It has been specified that the concentration of chlorine, the only biocide used at the plant, shall not exceed 0.1 mg/l as measured at the discharge outlet. Samples will be taken during chlorine treatment once per month for one year. Three replicate samples will be taken each month. A suitable standard method will be used for chlorine analysis. Should concentrations greater than 0.1 mg/l in any two of three replicate samples in any month occur, the addition of chlorine in the station will be adjusted to such a level that concentration does not exceed 0.1 mg/l at the discharge outlet on the basis of the analysis of another series of samples. Generally, aquatic organisms can be adversely affected by concentrations of chlorine at least as low as 1.0 mg/l. Continuous exposure to concentrations of 2.5 mg/l or greater is necessary to kill most encrusting organisms. However, some organisms are sensitive to much lower levels for long exposure times.

Although residual chlorine concentrations at the condenser or plant waste discharges have been found to be about 0.1 mg/l, these levels are greatly reduced upon mixing in the discharge canal. Residual chlorine concentrations of 0.1 mg/l or less at the discharge points should not result in significant adverse effects to aquatic biota in the receiving waters. The chlorine addition rates will be adjusted to match the existing chlorine demand of the circulating water, such that the residual chlorine meets the limiting condition of the proposed Environmental Technical Specifications. Mixing in the discharge tunnel with water from the other five circuits of the plant's condenser results in concentrations at the discharge outlet of less than 0.1 mg/l. Any residual chlorine discharge is probably consumed in the discharge canal within 5 minutes (draft EIS page 5-28). Monitoring at the discharge outlet monthly for one year should provide adequate support for the fact that minimal residual chlorine from the station enters Barnegat Bay.

(11) Response to Additional Comments

The Applicant will undertake special surveillance to determine the source and magnitude of the EPA measured exposure rates near Route 9. Unpublished preliminary data suggest that the incremental exposure rates compare with typical natural radiation exposure rates throughout the area.