UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

In the Matter of	)	
	)	
Philadelphia Electric Company	)	Docket Nos. 50-352
	)	50-353
(Limerick Generating Station, Units 1 and 2)	)	
	)	

APPLICANT'S RESPONSES TO "INTERROGATORIES OF DEL-AWARE UNLIMITED, INC. ADDRESSED TO APPLICANT PHILADELPHIA ELECTRIC COMPANY"

August 20, 1982

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Q PDR

Interrogatory 1: With respect to the impact of the intake structure proposed to be located in the Delaware River near Point Pleasant on the flow and related characteristics of the river, please provide the following information:

a. Please state whether PECO plans to utilize water from the Delaware River when the flow therein is less than 3,000 ("CFS") and, if so, the legal basis or bases upon which PECO will or may do so. Please include in this answer PECO's intentions, plans or expectations regarding its ability to utilize all or part of the water allocated to the Neshaminy Water Resources Authority ("NWRA") by the Delaware River Basin Commission ("DRBC").

Answer: Philadelphia Electric Company ("PECO") may use water from the Delaware River only in accordance with the terms of the Delaware River Basin Commission ("DRBC") order authorizing such use. The DRBC order provides:

> The Delaware River, as augmented for the purpose of water supply by upstream reservoirs may be used via the Point Pleasant pumping facilities, a pipeline, the East Branch of Perkiomen Creek and Perkiomen Creek with the limitations that such use will not reduce the flow as measured at the Trenton gage below 3000 cfs (1940 mgd), and that such use will not be permitted when the flow as measured at the Trenton gage is less than 3000 cfs (1940 mgd), provided that annually after pumping from the Delaware River has commenced, the rate of pumping will be maintained at not less than 27 cfs (17.5 mgd) throughout the normal low flow season for the protection of aquatic life in Perkiomen Creek and its East Branch regardless of ultimate downstream consumptive use requirements. During periods of high natural flow in East Branch Perkiomen Creek, pumping from Point Pleasant shall be kept at a level so as not to aggravate high water levels.
>
> This constraint would prohibit the use of the Delaware River water when such use would reduce the flow in the river at the Trenton gage below 3000 cfs, which is required to meet the salinity

> objective in the estuary of 250 mg/l at mile 92.47 (mouth of the Schuylkill River). DRBC Docket D-69-210-CP at 6 (March 29, 1973).

The imposition of this condition was reaffirmed in the DRBC order of February 18, 1981 in this proceeding.

With regard to low flow conditions, DRBC has stated that if it determines:

> . . . that the storage will not be adequate for all projected needs of the basin, the applicant will build or cause to be built, at its own expense, at a location approved by the Commission, for service in 1980, a reservoir of sufficient storage capacity to assure the water supply needed for consumptive use by the Limerick plant, during periods when such use would reduce the flow in the Delaware River at the Trenton gage below 3000 cfs. Storage and release of water in such facility will be under the Commission's regulation, at the expense of the applicant. DRBC Docket D-69-210-CP (March 29, 1973) at 7.

Interrogatory 1(b): Please state the maximum anticipated rate of pumping via the intake structure for the maximum minute and hour.

Answer: The total maximum anticipated rate of pumping is 95 mgd, which converts to a rate of 3.96 mg per hour, 0.066 mg per minute or 146 cfs, for the combined needs of PECO and NWRA.

Interrogatory 1(c): Please state the maximum capacity of the pumps proposed to be located at Point Pleasant for the maximum minute and hour.

Answer: The rated capacity of each of the four pumps to be located at Point Pleasant is approximately 16,500 gpm (gallons per minute) or 990,000 gallons per hour. The total four pump capacity is therefore 3.96 mg per hour or 0.066 mg per minute. Each turbine pump's rated capacity will be 21 mgd (See NWRA Environmental Report, 1979, Appendix A, p. 5). Withk head conditions suitable for maximum output, the maximum output would be 4.0 mg per hour.

Interrogatory 1(d): Please state the anticipated velocities in one foot, five foot, and ten foot circumferential distances, at each point (or representative points) along such circumferences surrounding the proposed intake screens. Please indicate the anticipated velocity of the water at such points, noting the location of such points, when the flow of the Delaware River at Trenton is 2,000 CFS.

Answer: River velocity tests were conducted at flows of 3,000 cfs and 4,500 cfs. Based on the results of these tests the screens were located about 245 feet from the normal water level shoreline at a point where the stream velocity passing the screens will be above 1 fps (foot per second). No tests were conducted to determine velocities at a river flow of 2,000 cfs. The maximum through-screen velocity will be 0.5 fps. Screen design is such that nearly uniform velocities are experienced over the entire screen surface. The low screen velocity assures a rapid decrease in velocities with distance from the screen. At a distance of one foot from the screen calculations indicate an inward flow component of approximately 0.071 fps, at five feet 0.0112 fps and at ten feet 0.0037 fps. The velocity continues to drop as the distance approaches 10 feet.

Interrogatory 1(e): Please state the relationship between the flow of the Delaware River at Point Pleasant and the flow at Trenton, as determined, and state the basis for such determination, at flows of 2,000 CFS, 2,500 CFS, 3,000 CFS, and 4,000 CFS, respectively, at Trenton. Please include in this answer the anticipated velocities at the water surface, at three feet below the water surface, at six feet below the water surface, at nine feet below the water surface, and at twelve feet below the water surface (if the water will be that deep at the given flow) for each flow described in the previous sentence. Please provide in detail the basis for the determination.

Answer: The flow relationship between the Point Pleasant site and the Trenton gage is the ratio of the drainage areas at each point adjusted for the change in river storage between the points. The flow at Point Pleasant is about 97% of the Trenton flow under normal conditions. This relationship applies to all the above flows.

With respect to the requested velocities, Applicant has data regarding only a flow of 3,000 cfs. This information is contained in the attached graph to the letter sent January 22, 1982 to the U.S. Corps of Engineers from E. H. Bourquard.

Interrogatory 1(f): Please state the anticipated distribution of the water sources between Tohickon Creek and the Delaware River through the intake at various flows in velocities, including velocities of 2,000, 2,500, 3,000, 3,200, 3,500, 4,000, 5,000, 6,000, 7,000, 8,000, 9,000, and 10,000 CFS in the Delaware River in combination with those of 200, 500, 750, 1,000, 1,500, 2,000, 2,500 and 3,000 CFS from the Tohickon Creek.

Answer: PECO does not have information responsive to this interrogatory.

Interrogatory 1(h): Please state whether PECO has given any consideration to the utilization of any hydrolic and/or hydrologic computer models or other means to simulate the operation of the intake, and if so, what determination was made and the basis therefor. If such a simulation was made or attempted, or is planned to be made or attempted, please describe the circumstances in detail, and indicate the dates of such tests, the availability of such data, the identity of the individual and organization making such tests or determinations, and their relationship to the applicant.

Answer: No.

Interrogatory 2: With respect to impacts of the proposed relocation of the intake facility on the American Shad,

a. Please describe in detail any studies relating to the impact of the proposed facility on and currents within the eddy and the anticipated affects of such impacts on the American Shad.

Answer: The intake structure is not in the eddy. See:

(1) "Biological Evaluation of the Proposed Water Intake in the Delaware River at Point Pleasant, Pennsylvania," (November 1980), Paul Harmon.

(2) "DRBC Final Environmental Assessment for the Neshaminy Water Supply System," (August, 1980), Section IV-E(3).

(3) E. H. Bourquard January 22, 1982 letter to COE provides a velocity study (currents).

Interrogatory 2(b): Please identify and describe the contents and conclusions of any studies respecting the differences in impact of the location of the intake on the stream bank (as originally proposed), its location as described in PECO's application to the Corps of Engineers, and its location as presently proposed (January, 1982) on the spawning, larvae, nursery and feeding area of the American Shad.

Interrogatory 2(c): Please provide in detail all measurements, studies and reports, indicate the methodology and the basis used, and identify all documents relating to such consideration.

Answer: PECO has no application before the COE.

(1) January 22, 1982 letter from E. H. Bourquard to the Corps of Engineers.

(2) "Biological Evaluation of the Proposed Water Intake in the Delaware River at Point Pleasant, Pennsylvania," prepared for NWRA by P. Harmon, November 1980.

Interrogatory 2(d): Please provide any information relating to and describe any documents which relate to or discuss findings of shortnosed sturgeon in the intake area and/or in the Delaware River at or above New Hope, Pennsylvania.

Answer:

(1) "Assessment of the Impacts of the Proposed Point Pleasant Pumping Station and Intake on the Shortnose Sturgeon, Acipenser Brevirostrum," prepared by Harold M. Brundage, III of IA, January 1982.

(2) Letter of October 29, 1981 from Paul Harmon, RMC to Cary H. Rush, PECO;

(3) Letter of August 20, 1981 from Paul Harmon to Robert Flowers, NWRA.

(4) Letter of June 29, 1981 to Robert Flowers, NWRA from Paul Harmon;

(5) Letter of June 10, 1982 from Harold M. Brundage to U.S. Marine Fisheries Service;

(6) Letter and biological opinion of National Marine Fisheries Service, July 19, 1982.

Interrogatory 7: With respect to the Bradshaw Reservoir:

a. Please identify and describe all engineering and other studies quantifying or estimating the extent of leakage from the Bradshaw Reservoir into the groundwater, and provide any and all information on which such estimates and conclusions were based.

Answer:

(1) "Supplemental Data and Information Accompanying Permit Application for Bradshaw Reservoir, November 1981, prepared by E. H. Bourquard for PECO and submitted to DRBC.

(2) "Project Manual for Bradshaw Reservoir and Pumping Station," by E. H. Bourquard, November 1981.

Interrogatory 7(b): Please identify and describe all studies of stability of the reservoir.

Answer: "Slope Stability Evaluation for Bradshaw Reservoir," June 1982, by E. H. Bourquard.

Interrogatory 13: Please identify all documents constituting, relating to, or considering the operating plan for the Point Pleasant intake, in and of itself and as related to the Bradshaw Reservoir and/or proposed releases to the Perkiomen Creek. Please identify any final or presently final documents relating to or constituting such operating plan.

Answer:

(1) DRBC Docket D-69-210 CP, November 7, 1975 (Final);

(2) DRBC Docket D-65-76 CP (8), (February 18, 1981);

(3) DRBC Docket D-79-52 CP, February 18, 1981.

(4) Point Pleasant, Pennsylvania
Pumping Facilities
Feasibility Study
Prepared by E.H. Bourquard
Associates, Inc.
March, 1970

(5) Final Environmental Impact
Statement
Point Pleasant Diversion Plan
Bucks and Montgomery Counties, PA
Prepared by Delaware River Basin
Commission
February, 1973

(6) Cooling Water Supply for Limerick
Nuclear Power Station
Prepared by Tippett-Abbett-
McCarthy-Stratton
May, 1973

(7) Environmental Report on Neshaminy
Water Supply System
Neshaminy Water Resources
Authority, Bucks County
Prepared by Neshaminy Water
Resources Authority
February, 1979

(8) Environmental Report - Bradshaw
Reservoir Transmission Main,
East Branch Perkiomen and
Perkiomen Creeks
Prepared by Philadelphia Electric
Company
July, 1979

(9) Agreement Between the Neshaminy Water Resources Authority and Philadelphia Electric Company for the Construction and Operation of Water Supply Facilities
February 12, 1980

(10) Environmental Assessment for the Proposed North Branch Water Treatment Plant Sponsored by the Neshaminy Water Resources Authority and a Review of Related Components Sponsored by the Neshaminy Water Resources Authority and the Philadelphia Electric Company
Prepared by Delaware River Basin Commission
February 15, 1980

(11) Final Environmental Assessment for the Neshaminy Water Supply System
Prepared by Delaware River Basin Commission
August, 1980

(12) Point Pleasant Pumping Facilities, Design Report No. 4, Proposed Criteria and Methods for Control of Point Pleasant Pumping Facilities
Prepared by E.H. Bourquard Associates, Inc.
January, 1974

(13) Study of Monitoring, Control and Operation of the Makeup Water Supply System for the Limerick Generating Station, Units 1 and 2
Prepared by Bechtel Power Corporation
May, 1974

(14) Intraoffice Memorandum of April 19, 1982, Limerick Generating Station, Units 1 and 2: Makeup Water System Control, D. L. Morad, PECO

Interrogatory 14: With respect to the relationship between PECO, Ichthyological Associates, Inc., E. H. Bourquard Associates, Inc., NWRA, Harmon, as well as any organizations related to or affiliated with any of them, please state the following:

a. Whether PECO ever had an ownership interest in Ichthyological Associates, Harmon or any related entity or predecessors, or successors, and the dates of such interests, and whether Ichthyological Associates was employed as a researcher by PECO during any of such times. Please respond specifically to each section of the foregoing question.

Answer: PECO has never had an ownership interest in Ichthyological Associates ("IA"). IA was engaged by PECO under contract to perform biological research as required in connection with several generating stations. In December, 1977, the contract was terminated with IA and the personnel operating at Limerick and Muddy Run Station became part of the Radiation Management Corporation ("RMC").

RMC is an organization established by a group of electric utilities to perform certain technical services in connection with nuclear generating stations. PECO was one of the founders and holds an ownership interest therein. Paul Harmon was an employee of IA and is currently the general manager of environmental services for RMC. He was never an employee of PECO. RMC and Mr. Harmon perform much work for PECO but they also have contracts with others for research and testing services. IA has been employed by the Public Service Electric and Gas Company for consultation on the Salem Generating Station, of which PECO has an approximately 42% ownership share.

Interrogatory 14(b): The extent to which PECO had access to data and analyses, reports, or other information prepared by E. H. Bourquard, and/or technical consultants for the NWRA. Please state whether and to what extent PECO participated in joint scoping and study meetings. Identify the personnel who attended such meetings and the dates of their attendance. Please state the extent to which the data described above in this subparagraph (b) is or has been made available to PECO and the terms on which it is or has been made so available, and describe any relationships, financial or otherwise, pursuant to which there has been mutual availability of data between NWRA, its consultants (including but not limited to E. H. Bourquard, Dresnack and Richman), and PECO.

Answer: PECO has engaged E. H. Bourquard's services as a consultant on various Limerick matters since 1970. Bourquard has also performed consulting services for NWRA.

Initially on an informal basis and later, following the execution of an Agreement between the NWRA and PECO for water supply services, in accordance with documented procedures, there has been a steady exchange of data, analysis, reports and other information regarding Point Pleasant. PECO has frequently attended major design meetings, reviewed drawings, studied consulting engineers reports, analyzed schedules and considered project costs. PECO has offered comments, made suggestions and supplied some information regarding design work. Several PECO engineers have been involved throughout the past years, but most of them have been involved in a limited area. During the last two years as the design has neared completion, V.S. Boyer, J.L. Allen, W.H. Dickinson and D.T. Morad have had the most frequent and broad contact with the NWRA and E. H.

Bourquard. The terms authorizing the transfer of information are contained in the aforementioned Agreement.

A list of specific meetings between PECO personnel and NWRA and its consultants follows:

July 29, 1980	-	Meeting between RMC, E. H. Bourquard and W. H. Dickinson to discuss the evaluation of intake screens.
January 24, 1981	-	E. H. Bourquard, Dave Marano, Dave Morad and W. H. Dickinson met to review design of the Bradshaw Reservoir.
January 24, 1981	-	E. H. Bourquard, Hershel Richman and W. H. Dickinson met with Corps of Engineers regarding permits.
April 21, 1981	-	E. H. Bourquard, Dave Morad and W. H. Dickinson met regarding the Bradshaw layout.
June 17, 1981	-	E. H. Bourquard, Dave Morad and some electrical engineers met to discuss electrical features of Bradshaw.
September 17, 1981	-	The NWRA, E. H. Bourquard, Dave Morad, W. H. Dickinson and some electrical engineers met to review the overall status of design for the water supply project.
December 16, 1981	-	NWRA Ichthyological Associates, E. H. Bourquard, and W. H. Dickinson met with the Corps of Engineers to review the permits.
February 23, 1982	-	NWRA, E. H. Bourquard, V. S. Boyer, J. L. Allen, E. J. Bradley and W. H. Dickinson met regarding permits, overall design and scheduling.

March 10, 1982	-	E. H. Bourquard, Robler, Dave Morad and W. H. Dickinson met regarding the heating, ventilating and air conditioning.
April 20, 1982	-	Dave Morad and electrical engineers met with Moxey regarding motor starting.
May 12, 1982	-	NWRA, V. S. Boyer, and W. H. Dickinson met regarding design and schedule.
June 15, 1982	-	Hershel Richman, Ann Newell and Joe Schuldenrein (an archeologist) and W. H. Dickinson met regarding the archeological search of the property.

Interrogatory 15: Please state the name of each and every person who, on behalf of PECO has contacted or made contact with any legislative or executive official of the federal government in the last two years for the purpose of discussing or otherwise presenting information concerning approval of the Point Pleasant diversion (e.g. contacts relating to permits from the Corps of Engineers, DRBC approval, and any other contacts relating to the withdrawal of water from the Delaware River and facilities related thereto). Please include the dates of such contacts, the names of the persons and agencies contacted, and the substance of each such contact. Please also state the results of any such contacts, and identify any documents reporting on such results including any reports stating that an official has contacted or been contacted by another official, and the results and commitments arising from such contacts.

Answer:

October 20, 1981 - V.S. Boyer met with Col. Baldwin, COE, to inquire as to the status of the schedule for the COE review of the pending applications for permits. Col. Baldwin discussed the need for a survey concerning the shortnose sturgeon as set forth in the memorandum of the meeting dated October 20, 1981, already furnished to Del-Aware.

December 9, 1981 - V.S. Boyer and W.H. Dickinson discussed matters relating to the intake structure with John Burns, COE, as set forth in the memorandum dated December 9, 1981, already furnished to Del-Aware.

December 16, 1981 - W.H. Dickinson attended a meeting with the Corps of Engineers, NWRA and Icthyological Associates during which matters related to the three issues were discussed as set forth in the memorandum dated December 21, 1981, already furnished to Del-Aware.

June 14, 1982 - V.S. Boyer, together with Robert Flowers and Hershel Richman, met with Col. Baldwin, COE, regarding the NRC Prehearing Conference Order and advised the Corps of the three issues the Board would consider in the NRC hearing beginning October 4, 1982.

Interrogatory 16: Please state the minimum height above sea level of the proposed intake at its present location during operation for the NWRA or for PECO.

Answer: The uppermost surface of the screen will be at elevation 66 feet. This elevation will not change during operation.

Interrogatory 20: Please identify and describe the contents and conclusions of any reports, or evaluations of reports, submitted by intervenors or other opponents of PECO in any proceeding before an agency, and made available to PECO of its technical consultants (including, but not limited to, reports by GKY Associates, Ezra Golub, and Edwin Beemer) relating to hydrolics, hydrology, location of the intake and the ambient velocities, the effects of blasing, or any other impacts. Please identify any reports relating to water quality information submitted by intervenor or any other opponent of PECO to the Pennsylvania Department of Environmental Resources, the Corps of Engineers, or any other agency, and made available to PECO or any its technical consultants.

Answer: In a letter dated October 3, 1981 to the COE, Edwin F. Beemer, Jr. questioned the geological input submitted to the Corps as part of the NWRA application for the Point Pleasant facilities. The Corps forwarded a copy to E. H. Bourquard who transmitted it to PECO.

Applicant has obtained a copy of a draft report dated May 10, 1982 prepared by GKY & Associates, Inc. which addresses questions concerning the Point Pleasant Pumping Station. Applicant has provided its consultants with a copy of this report. Several of Applicants' consultants have prepared preliminary analyses of this report. Generally, PECO's consultants have preliminarily concluded that the report contains deficieincies. A letter dated June 4, 1982 from E. H. Bourquard to Robert A. Flowers (copy attached) discusses some of these deficiencies. See also attached "P.L. Harmon's Comments to 'GKY & Associates, Inc.', J. T. Phillippe report letter dated May 10, 1982, 9 August 1982."

Interrogatory 21: Please describe the extent to which the data in the NWRA Environmental Report of February, 1979, was considered in preparing the July 1979 Report and identify all documents in which such data was considered. Please describe the coordination between the NWRA Environmental Report of February, 1979, and PECO concerning the collection, analysis, interpretation, and/or presentation of water quality data for the Delaware River. Please identify all documents constituting, reflecting, or prepared in the course of such consideration.

Answer: The data contained in the NWRA Environmental Report of February, 1979 were not considered in preparing the PECO Environmental Report of July 1979. These two reports were prepared independently.

VERIFICATION

Commonwealth of Pennsylvania)
) ss
County of Philadelphia)

Vincent S. Boyer, being first duly sworn, states that he is Senior Vice President, Nuclear of Philadelphia Electric Company, the Applicant herein; that he has read the contents of "Applicant's Response to 'Interrogatories of Del-Aware Unlimited, Inc. Addressed to Applicant Philadelphia Electric Company'" and that the statements and matters set forth therein are true and correct to the best of his knowledge, information and belief.

/ s /

Vincent S. Boyer

Subscribed and sworn to before me this 20th day of August, 1982.

/ s /

Notary Public

WASTEWATER DISPOSAL
WATER RESOURCES
HYDRAULIC STUDIES
FLOOD INSURANCE STUDIES

WATER RESOURCES ENGINEERS
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EXIT NO. 24, INTERSTATE 83
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FLOOD CONTROL PROJECTS
DAMS & RESERVOIRS
DRAINAGE-STORMWATER
HYDROLOGIC STUDIES
ENVIRONMENTAL STUDIES

June 4, 1982

Robert A. Flowers, Executive Director,
Neshaminy Water Resources Authority,
2875 Old York Road,
P. O. Box 378,
Jamison, PA 18929

Re: gky & associates' Report of May 10, 1982

Dear Bob:

The referenced report appears to consist, for the most part, of that firm's concept of what the Corps of Engineers and PaDER should examine in connection with their permit reviews; apparently prepared without knowing what these agencies have examined.

The part dealing with hydrology includes a number of statistical analyses which profess to show the frequency and duration of River flows less than 3000 cfs at Trenton. Unfortunately, the basic data covers a period of only 17 years, 1963-79, and includes the most severe and lengthy (1963-67) drought of record which has been classified as having a frequency of once in 100 to 500 years. Naturally, with such a drought included in a short period of record, the results of the analyses are heavily weighted toward low flows. An examination of river flows in the years 1969 thru 1979 as shown in the upper tabulation of Attachment 6 on page A-6, gives a more normal, or typical, view of low flow conditions.

In the hydraulics part, the use of 67 pumper trucks is cited to illustrate that flow and velocity patterns at the intake will have adverse effect on shad propagation. The writer evidently has no information on the flow and velocity patterns of this type of intake to be installed and, also, must not be aware that the intake is in the main stream channel of the River, not in a backwater area.

The part on water surface elevation at the intakes questions the existence of the Ringwood Township, N.J., Flood Insurance Study, yet proposes the use of cross-sections from the Study to develop low flow information. The Ringwood Study does exist and copies can be obtained from DRBC or the FEMA office in Philadelphia. However, the sections are 3,000 feet or more apart and, while usable for flood flowlines, are not particularly suitable for low flow computations. In any case, the actual water level measurements at the intake site when related to adjusted Trenton flows yield a more accurate rating for the site, as is confirmed

by the U.S.G.S. discharge measurements.

As the report provides little applicable and factual data, and offers only generalizations, the need for a response is questionable. Am sure the people at the Corps and at PaDER recognize this and, also, have noted the above mentioned discrepancies.

Best regards,

E. H. Bourquard

EHB/bs

c.c. Hershel J. Richman, Esquire

P. L. Harmon's Comments to "GKY & Associates, Inc.",
J. T. Phillippe report letter dated May 10, 1982
9 August 1982

1. Page 1, Para. 1. reference to "interbasin transfer of water."

All water and biota withdrawn by the Point Pleasant pumping Station (PPPS) and diverted out of the Delaware River will nevertheless remain within the Delaware River Basin.

2. Page 2, Para. 1.

Phillippe states that projected system demands and pumping schedules were not available for review at the time the subject letter report was prepared. This casts considerable doubt on his understanding of the intake operation, particularily the timing of withdrawals as related to Delaware River flows and biota (and life stages) likely to be present in the River when withdrawals occur.

3. Page 7, Para 3. reference several statements regarding water quality and quantity.

Such statements as:
(a) "there may be a shift in quality"
(b) "such a shift...can have"

Anything is possible; these statements are sheer speculation. He presents no data to support his statements.

(c) "water diverted from the Delaware will have an impact in terms of quality and quantity on the Perkiomen and Neshaminy Creeks"

This is a meaningless statement in terms of supporting a particular position. Every action has an impact; not all impacts are deleterious. He did not say whether this particular impact would be negative or positive.

4. Page 10, Para. 3. "shad spawning area"

Phillippe included no references or data to support his statement that "the area immediately downstream from Tohickon is recognized as a shad spawning area of considerable biological importance."

The major spawning grounds for American shad in the Delaware River were shown by Chittenden (1969) to be much further upriver, between

Dingman's Ferry, Pennsylvania (river km 381) and Hancock, New York (river km 531). Point Pleasant is at river km 253.

I know of no data showing that shad fish and associated recreational activities are important to the economy of the Point Pleasant area.

Philippe states that "the river at the location of the proposed intakes is relatively shallow and flat." In fact, the intake will be located in water about 10 feet deep; this is relatively deep in comparison to the reach just upstream of the Point Pleasant Canoe Rental boat ramp. The Lumberville wingdam forms a relatively large and deep pool.

5. Page 10, Para. 4 - Page 11, Para. 1.

The impact of the water diversion was evaluated with respect to shad in terms of location, design, and capacity in my November 1980 "biological evaluation". Several other documents also address this subject, e.g., offsetting storage-release requirements in DRBC's decision, hence Merrill Creek; NWRA's environmental report (February 1979), e.g., page V-19 "The proposed intake structure will meet the latest Environmental Protection Agency design criteria..." and subsequent statements by NWRA to utilize the best available intake technology. (More information can be generated with regard to what has been evaluated should this be desireable at a later date.)

6. Page 11, Para. 2.

The pumping station will not affect the backeddy area because the intake will be located out in the main river current and not in the backeddy. However, 67 pumper trucks (presumably on the river bank) pumping all at once certainly would disrupt the backeddy.

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Philadelphia Electric Company	)	Docket Nos. 50-352
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CERTIFICATE OF SERVICE

I hereby certify that copies of "Applicant's Responses to 'Interrogatories of Del-Aware Unlimited, Inc. Addressed to Applicant Philadelphia Electric Company,'" dated August 20, 1982 in the captioned matter have been served upon the following by hand delivery, as noted below, or by deposit in the United States mail this 20th day of August, 1982:

* Judge Lawrence Brenner (2)
Atomic Safety and Licensing Board
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

* Judge Richard F. Cole
Atomic Safety and Licensing Board
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

* Judge Peter A. Morris
Atomic Safety and Licensing Board
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Atomic Safety and Licensing Appeal Panel
U.S. Nuclear Regulatory Commission
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