UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

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BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

DOCKETING & SERVICE BRANCH

In the Matter of PHILADELPHIA ELECTRIC COMPANY (Limerick Generating Station Units 1 and 2)	)	Docket Nos. 50-352 OL 50-353 OL

REQUEST OF DEL-AWARE LIMITED, INC. FOR RECONSIDERATION OF ASPECTS OF SPECIAL PRE-HEARING CONFERENCE ORDER

Del-Aware Unlimited, Inc., requests that the Board reconsider four aspects of its Pre-Hearing Order dated June 1, 1982, as follows:

I. <u>Request to Reconsider Order Precluding Consideration of Portions of Point Pleasant to be Utilized Solely by NWRA</u>.

In its extensive and well-reasoned opinion, explaining the interrelationship of "segmented" projects and the impacts of segmentation, the Board determines that the NWRA portions of the water system need not be analyzed because under segmentation doctrines, it is independently useful and has a distinctly different purpose. (Order, p. 78-79)

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It is the latter characterization, independently useful, which Del-Aware submits is crucial to the determination of the need for reconsideration. Del-Aware's proferred contentions V-17 and V-18 state that the NWRA system would not and could not be built without the construction of the Limerick-financed Point Pleasant diversion. In other words, even though NWRA might decide to place the facility at Point Pleasant to divert water for its purposes, without PECo's financial contribution it could not do so.

Apparently, although Del-Aware sought to make it clear that its argument was that Limerick is sine qua non to the NWRA system, in fact, the Board interpreted Del-Aware's argument as being that the two projects had been made compatible and might have cumulative effects.

Whatever the reasons, Del-Aware submits that it is inappropriate for the NRC to segment the NWRA-only portions of the system in a situation where the PECo portion is a sine qua non to the NWRA system. Thus, it is crucial, as Del-Aware alleges, that NWRA could not and can not build a system without PECO, not that NWRA would have chosen to build a different system had PECo not joined them. The interdependent financial situation involved in this matter is equivalent to the lack of an independent physical utility involved in Indian Lookout Alliance v. Volpe, 484 F. 2d 11, at 20, where the Court of Appeals held that a segment of a proposed highway did not have

"the requisite independent utility to be the appropriate segment to be covered by the Environmental Impact Statement".

II. The Board Should Require Consideration of All Operating Effects of Portions of Point Pleasant Not Considered in the 1975 Appeal Board Decision and Accompanying FES, Not Only Those Arising from Changes from the Earlier Decision in FES.

Del-Aware agrees and concurs with the Board's determination that the common aspects of the Point Pleasant diversion must be considered, even though they may be construction activities, to the extent that their impacts are operating impacts, since they were not considered in 1975. However, Del-Aware submits that this reasoning extends beyond "changes" in the project design as it existed in 1975, since the "common" elements of the 1975 plan were never considered by the Licensing Board or the Appeal Board at that time.

The requirement that only changes be presented in the FES at the OL stage is predicated on the assumption that these environmental impacts were considered at the CP stage. The Board directly points this out at page 55 of its present Order.

What is not clearly stated in the Order, however, is that even elements in the earlier plan which are unchanged must be presently considered with respect, at least, to their operating impacts, since they were never considered in the earlier ER or CP proceedings.

It should be noted that Del-Aware does not contend that this would necessarily be true in all cases; only in this situation, where the earlier decision and proceedings fail to consider those issues precisely because they were considered to be non-segmented attributes of the NWRA proposal, should they be addressed in the OL stage without regard to their newness in this proceeding.

Thus, for example, the impacts of construction under the historic canal and up the hillside should be considered de novo, not just because of the new designation of the landmark and determination of eligibility of the district, nor just because of the change of law, but also because they were never considered in the 1975 proceedings because it was assumed that these activities would take place anyway, even without Limerick. At least, the operating impacts of all such elements of the intake in the Del-Aware River should be considered. Thus, the concept of the joint project depleting the water in the River and depleting the spawning area should be considered without regard to the location of the intake, and not as dependent only on the comparison of the intake on the streambank as opposed to the intake in the pool. Only in this way can the Board now supply the deficiency of the 1975 proceedings in failing to account for the impact of the project on the River.

III. <u>The DRBC Decision Should Not be Regarded as Binding Concerning the Environmental Effects of Taking from the Delaware River</u>.

Although the DRBC decided Point Pleasant was consistent with the water use plan of the Delaware River, the DRBC did not make a final decision on Point Pleasant. Recognizing the necessity for interplay between the question of water diversion and the question of the public's need for the water, which in turn raised the question of the relative value of the Limerick facility, and recognizing that the latter question was outside of its statutory and technical competence, the DRBC expressly referred that question to this Commission. In these circumstances, this Commission can hardly treat the DRBC Commission decision on that subject as definitive. At some point, obviously, the two agencies cannot continue to defer to each other in the question of making the balance between the competing potential uses of the water and competing potential means of providing electrical service. This issue must be considered at this stage, since the DRBC has taken its final action and has deferred these questions to this Commission. This arises not only from the NRC staff letter to the DRBC stating that all questions would be addressed in the OL proceedings, but also from the language of the DRBC Resolution. (Refer to previously sited DRBC Decision and December 24, 1980, letter from Mr. Tedesco to Mr. Hansler.) For this Commission,

in these circumstances, to treat the DRBC decision as authoritative on the question of the diversion would in effect, elevate the DRBC decision to a standing which was abrogated by the DRBC.

IV. The Commission Should Admit Del-Aware's Contention Regarding Toxic Contamination of the Neshaminy and Perkiomen.

Del-Aware's contention regarding adverse effects of the proposed project on the water quality of the Neshaminy and Perkiomen were expressed in contention V-17. This contention was not objected to specificity grounds, and Del- Aware has been conducting detailed investigations to determine the nature of the water that would be diverted to the Neshaminy and Perkiomen. But with the most recent change of the intake location in January, 1982, after the close of the pre-hearing conference, the likely hydrology of the intake and the source of intake water has again shifted. It now appears the diverted water will be some combination from the Delaware River and from Tohikon Creek.

In addition, Del-Aware has been acquiring data from EPA and NJDEP reflecting water quality studies of Delaware River water immediately upstream and downstream from Point Pleasant. These studies are not readily available because of the difficulty of obtaining toxic data and its interpretation capability. However, it appears now that there would be significant transfers of toxic materials from the Del-Aware

River into the Neshaminy and Perkiomen Creeks, information that has not been generally available and which Del-Aware has only, with difficulty, acquired over the last few months. (Refer to attached March 8, 1982, letter and comments to DER Regional Planning Engineer and excerpts from the NJDEP Study, Dredging the Raritan and Delaware Canal.) To reject the contention, in these circumstances, seems an unnecessary hardship, and contrary to the Commission's need to acquire true information. This is particularly true in light of the EROL and staff inquiries into the water quality impacts on the Neshaminy and Tohikon in terms of toxic materials.

Del-Aware, therefore, requests reconsideration of the above specific aspects of this Board's determination.

Respectfully submitted,

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CERTIFICATE OF SERVICE

I hereby certify that I have served copies of the foregoing Request of Del-Aware Limited, Inc. for Reconsideration of Aspects of Special Pre-Hearing Conference Order, by mailing the same at their respective addresses, as follows:

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Respectfully submitted,

Robert J. Sugarman /BMC

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SAVE THE DELAWARE

Del-AWARE Unlimited, Inc.

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March 8, 1982

Regional Planning Engineer
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RE: Neshaminy Water Resources Authority request for Water Quality Certification for portions of the proposed Point Pleasant Diversion Plan (1) Construction of the intake on the Delaware River at Point Pleasant (2) Rechannelization of the Pine Run and North Branch Neshaminy Creeks.

Sirs:

Del-AWARE Unlimited submits the following documented evidence on impacts associated with the above captioned certification request. We strongly urge the Department of Environmental Resources to hold public hearings and conduct a complete analysis of all pertinent aspects of the proposed Point Pleasant Diversion project. Although department regulations are unclear as to the scope of review on such requests, we are assured by Article 1 Section 27 of the Pennsylvania State Constitution that the parameters will be sufficiently broad.

The proposed diversion project has an almost interminably long history, having been conceived by the applicant and Philadelphia Electric Company and approved "in concept" by the Department many years ago through issuance of a water allocation permit. Interestingly, the present request for water quality certification is the first opportunity for the State to review any substantive aspect of the plan. Although the project has been before various agencies at different times for approval of other aspects and ostensibly was approved by the DRBC, it is obvious that a comprehensive and thorough analysis has yet to be done.

Surrounding circumstances such as projected need, the concept of proper utilization of natural resources, the political and economic climate, as well as the project design itself, have undergone major changes. The project design is still undergoing change as recent as January 22, 1982.

It was necessary for the NWRA to submit to the Corps of Engineers yet another (the fourth) location and design for the intake and its facilities on the Delaware River at Point Pleasant. All former designs have been rejected as unacceptable environmentally and this one has never been assessed.

The proposed location of the intake is a highly sensitive part of the Delaware River. It is affected by the Tohickon Creek entering there, it is the location of an eddy forming a pool which is a fish spawning area and an area of sediment collection forming a benthis layer of silt. Approximately one mile south is

a diversion to New Jersey of 75 mgd. An intake at Point Pleasant may well affect the quality of water taken by New Jersey in the Raritan River Diversion.

Consideration must be given to the myriad of potentially serious and significant site specifics and secondary impacts of the diversion project. We will be addressing the following issues: downstream estuarine quality, creeping salinity intrusion, the intake location, the receiving streams and ground water.

In addition, the Department must evaluate all of the implications and adverse effects all along the water path to Limerick Station in Montgomery County and to the North Branch Water Treatment Plant, including the ultimate disposal of the waster products of water treatment.

This comment is a supplement to our attorney's (Robert Sugarman, Esq.) previous correspondence to the Department on February 4, 1982 , which briefly outlines our concerns.

Respectfully,

Colleen Wells

Colleen Wells

Del-AWARE Unlimited, Inc.

Encl.

CW/cvd

COMMENTS AND OBJECTIONS

REGARDING THE NESHAMINY WATER RESOURCES AUTHORITY'S REQUEST FOR WATER QUALITY CERTIFICATION FOR PORTIONS OF THE PROPOSED POINT PLEASANT DIVERSION PLAN

Prepared for the
Department of Environmental Resources

By Del-AWARE Unlimited, Inc.

March 8, 1982

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SECTION I

Potential Impacts of Intake Operations on Water Quality in the Region

The Proposed Point Pleasant Diversion Plan will have significant impact on water quality and present water policy as promulgated by the DRBC and the Pennsylvania State Water Plan. Therefore the issues outlined below must be included in the Department's review.

Under present Basin policy:

1.) there is no legally guaranteed minimum flow to the estuary.

2.) there is no upper limit on the amount of water that can be removed from the Delaware River and the estuary either by evaporation or exportation out of the basin.

3.) the only obligation of the DRBC is to maintain the salt line.

Conservation within the Basin is meaningless as long as such policies are permitted to continue.

Although the presently proposed maximum withdrawal for the year 2010 has been downscaled to 95 MGD from previous plans to divert 250 MGD, the proposed facilities are still designed to divert 250 MGD. Since no formal action has been taken by Bucks County agencies to delete componants previously included in the Neshaminy Water Supply System, evaluation of 95 MGD as a maximum withdrawal is deceptive and unacceptable. Whatever the amount of the water diverted at Point Pleasant, it is a 100% consumptive loss to downstream water users.

There has been no analysis of the impact of the removal of huge quantities of water from the Delaware and Estuary.

Since 1959, however, the USGS has been using an extremely simple formula known as the "Montana Method" to evaluate water quality impacts relative to average river flows. This method has been used successfully

over a wide variety of rivers across the country and can quite simply determine what water quality will be, by expressing actual stream flow as a percentage of the average flow, and then referring to a simple chart that can be put on a 3x5 index card for resultant water quality (See Exhibit 3). According to the chart a river flow of 30% of the average flow will result in fair or degrading conditions during summer months.

A few numbers are needed to put the Delaware Basin and Point Pleasant problems into perspective. The average flow of the Delaware River at Trenton is 11,550 cubic feet per second (CFS). For a number of years a flow of 3000 cfs at Trenton, or about 25% of the average flow was used as the so-called "minimum flow objective" for planning purposes, although necessary technical work had not been done to determine the actual flow regime necessary to protect water quality in the Estuary. Despite the lack of these data and analyses, despite the failure to analyse the impacts of the removal of vast quantities of water from the Estuary, and despite the ready availability of the Montana Method, agencies responsible for Delaware

Basin water resources planning and management continue to base future planning on the assumption that all flows in excess of 3000 cfs at Trenton can be withdrawn from the River (See Exhibit 4). In other words, that all flows above 25% of the average flow can be diverted.

Additionally, recent administrative actions of the DRBC indicate that the Commission, without going to public hearing has changed from a policy of minimum sustained flow to a policy of maximum sustained flow for Basin streams (See Exhibit 5).

Under such policies, Delaware Basin water users have no protection whatsoever from having riparian waters taken away.

The Point Pleasant Diversion sets policy in this regard. As the initial project of a vastly larger water supply system, it is simply the tip of the iceberg. It will set the standard for both planning and quality of review of similiar diversions which are now planned. Its importance lies as much in its precedent setting aspects as in its direct and indirect impacts (See Exhibit 6 & 7)

Use of imported water instead of developement and use available water resources in area of need creates artificial water shortages and water quality problems in the exporting watersheds. Such "problems" may be then used by various agencies as justification for structural "solutions" which would otherwise be not needed. And from which the agencies may profit; for example, reservoir construction for water supply or water quality augmentation purposes.

The open-ended Point Pleasant Diversion per se will have a substantially underestimated impact on the Delaware River mainstem flows, particularly during seasonal low flow or drought conditions.

Downstream water users have testified repeatedly that they do not benefit from projects, policies, plans, or programs which remove their water resources (See Exhibits 8 through 13).

Additionally, more than ten years of technical testimony exists documenting the active participation of downstream water users in Bucks County in various

aspects of water resources planning and management. Extensive technical testimony has been incorporated in both the Delaware River Basin Comprehensive (level B) Study, and also COWAMP/208 Studies, including the development of the new Delaware Estuary water quality models (See Exhibit 13). For example, just as background pollution loading from the proposed Point Pleasant Diversion to East Branch Perkiomen and North Branch Neshaminy Creek is now being ignored in evaluating the Point Pleasant Diversion Project, so there exists (in COWAMP 208 and DRBC level B exhibits) a length of planning and management agencies ignoring background pollution loadings on the order of 650,000 pounds BOD_5 per day from the Delaware River mainstem into the upper Estuary at Trenton.

SECTION H

SALINITY INCURSION

The impacts of the diversion of water at Point Pleasant coupled with the use of upstream reservoirs for low flow augmentation to hold the salinity incursion in check has never been adequately addressed.

Evidence indicates that a net increase in fresh water outflow is necessary in increasing quantities to hold back the salt line of the Atlantic Ocean.

1. SEA LEVEL EFFECTS

We quote from several publications: "The Ocean's Rise" by Stacy D. Hicks from the National Ocean and Atmospheric Archives, April 1972, vol. 2,2. "Since that time (1962), the sea along the coast from Maine through Virginia has been rising at a very rapid rate. From 1964 to the present (1972), sea level in this coastal area has risen an average of 3 inches."

"Water Resources of the Delaware River Basin" by Parker, et al, "An increase in salinity of the Delaware estuary, probably due to this recent rise is sea level, caused Chester, Penna. to abandon its local supply in 1951 and to obtain a safe supply inland from the Susquehanna River Basin."

Journal of Geophysic l Research , Vol. 83, #13, March 20, 1978. "An average Geopotential Sea Level Series for the United States" by Stacy D. Hicks page 1379: "The trend (slope) is 1.5 dynamic mm/yr., the rising sea level (noted in the Final Environmental Assessment) may be assumed to continue, as the continent tilts its eastern edge into the sea."

It may be assumed the rising sea levels will continue as the continent tilts its eastern edge into the sea. If stated

figures are correct, then to maintain the salinity incursion at its present location will require an additional 10 cubic feet per second of flow each year. In 14 ½ years additional fresh water flows equal to the maximum daily withdrawal at Point Pleasant will be required just to maintain the salinity wedge at present levels.

2. DELAWARE RIVER FLOWS

It is apparent that the rationale for using high flow skim storage reservoirs to augment periods of low flow and replace water diverted and lost to the Basin has not been adequately addressed.

Although the Merrill Creek Reservoir is designed to replace water withdrawn at Point Pleasant, evidence indicates that the most important relationship may be the total annual flow to the estuary that is the most significant determinant of estuarine water quality rather than manipulations of upstream storage reservoirs during low flow conditions.(DRBC Level B Study 1980).

Further indication of the sensitive relationship of fresh water outflow and saltwater inflow is found in the PLANNING AID REPORT: The Sensitivity of the Delaware Estuarine Ecosystem to Alteration of the Natural Cycle of Salinity Change prepared by the U.S. Dept. of the Interior Fish and Wildlife Service for the Army Corps of Engineers July 1981. We excerpt from the Summary and Conclusion on the following page:

Summary:

" This report is an assessment of the sensitivity of the Delaware estuarine ecosystem to alteration of the natural cycle of salinity change. The assessment is based on review of published and unpublished literature and personal interviews.

Freshwater outflow and saltwater inflow largely determine salinity concentrations in the estuary. Generally, salinity concentrations are highest during the low freshwater outflow period of summer, and lowest during the high freshwater outflow period of winter and spring. Salinities decline with increasing distance from the mouth of the bay, reaching fresh water near Philadelphia. Tide-induced mixing minimizes salinity stratification in the lower river and upper bay throughout the year. This is also the case in the lower estuary except during winter and spring when the bay is strongly stratified. The intrusion of heavier, saltier water from the ocean beneath fresher, lighter water from the Delaware River sets up a transport mechanism important in the life cycles of many estuarine fauna. The DRBC proposes to limit salinity intrusion in the Philadelphia area by storing water in reservoirs during winter or spring and augmenting summer flows. As a result, salinity would be depressed below normal levels in summer, and increased above normal levels during the storage period. "

* * * *

" Reducing freshwater outflow would lead to a reduction of low salinity environments and a reduction in the extent of the freshwater-saltwater mixing zone. This would restrict the availability of suitable habitat for low salinity dependent species. Reducing freshwater outflow may alter bottom currents and interfere with transport of eggs and larvae up the estuary. Changing runoff cycles, but not the total volume of water received, could disrupt the salinity gradient at a critical time for plants and animals, causing a reduction in estuarine productivity. Overall, reducing freshwater outflow would result in lowered estuarine productivity, the degree of decline dictated by the amount of reduction. Not all of the decline can be attributed to salinity change. Loss of nutrients and other changes may also contribute to the reduction in productivity. "

* * * *

" Reducing freshwater outflow in spring would allow benthic invertebrates associated with higher salinities to advance up the bay. This would increase benthic diversity while reducing habitat for brackish species. Oyster drill predation would extend into oyster beds formerly protected by intermediate to low salinity. MSX disease may also be extended. Oyster losses would increase, damaging the oyster industry. Increasing salinity in spring may interfere with residual bottom currents, disrupting up-estuary movement of blue crab larvae and young. Nursery grounds may be shifted northward and perhaps reduced in size. Decreasing salinities in the summer via flow augmentation would restrict the advance of salt-tolerant benthos up the estuary and benefit brackish and freshwater types. It would also restrict the shrinkage of blue crab nursery habitat which coincides with declining runoff. "

" Reducing spring flows may alter bottom currents, disrupting up-estuary transport of fish eggs and larvae. Many valuable recreational and commercial species could be adversely affected, including weakfish, striped bass, Atlantic menhaden, American eel, summer flounder, bay anchovy (forage) and spot (forage). Reducing spring flows would shift spawning and nursery grounds of estuarine fishes up the estuary. Eggs and larvae of weakfish would be brought closer to the intakes of the Salem Nuclear Generating Station, possibly increasing entrainment/impingement losses. Eggs and larvae of striped bass would be brought closer to the Philadelphia pollution zone, possibly increasing mortality. Reducing spring flows would reduce the extent of the low salinity zone, limiting valuable spawning and nursery habitat for low salinity dependent fishes. Many commercial/recreational species would be adversely affected. Reducing salinity intrusion would limit the up-estuary shift of fishes, which coincides with declining river flow. It would also minimize the shrinkage of the low salinity zone. "

" Increasing salinity in spring via reduction of freshwater outflow would not affect the composition of waterfowl food plants, but would reduce productivity, forcing waterfowl to forage over larger areas. Reducing salinity in summer would prevent brackish to saltwater marsh conversions, benefiting waterfowl. Muskrat production, limited by high salinity, would also benefit from protection of brackish marshes. Wading birds and shorebirds would not be affected by increasing or decreasing salinity. "

Conclusion:

" The results of our work indicate that increasing salinity in spring would lower the productivity of the Delaware estuarine ecosystem. However, reducing salinity intrusion in summer would benefit the ecosystem. The magnitude of the detriment and benefit are dependent on the degree of change. Overall, the Service would not encourage low flow augmentation to the detriment of reducing freshwater spring flows. The benefits to the ecosystem in summer would not appear to outweigh damages in spring. "

" This report only addresses changes in the salinity regime. Water circulation, turbidity, water quality, temperature, sedimentation, scouring and nutrient loading may also be affected by altering runoff patterns. These factors should be assessed in other studies. We would particularly like to see a study of circulation patterns and the effects of changes on fish and benthic invertebrate egg and larval movements. "

" In view of these findings, the Service recommends that reducing freshwater outflow in spring be avoided, and if it can't be avoided, be minimized to protect and maintain the health of the Delaware estuarine ecosystem."

It is clear that further investigation is needed to determine the risk to the delicate balance between fresh water outflow and salt water inflow that will be caused by storage of water at Merrill Creek during spring high flows and diversion of water at Point Pleasant during summer low flow.

Evidence indicates that the detrimental effect are not all known, and neither is a solution.

The Department therefore must consider other, non-consumptive alternatives, such that downstream water quality is protected.

SECTION III

Location of Intake-Impacts and Implications

The proposed intake location is influenced by many factors which have not been considered. The interrelationship of the Tohickon Creek, the main channel of the river, the pool and the eddy to the south have not been analyzed as to the effects of each on the other nor the potential impacts of the introduction of the river structures. It is clear that documentation of that portion of the river is essential to determine the impacts, in all flow conditions, of this relationship, before the consideration or approval of the water quality certification.

It is evident that the Tohickon Creek is subject to influences which significantly effect the flows and location of the mouth. The factors that precipitate these apparently rapid changes must be analyzed so that the future of the creek and its potential impacts on the intake structure can be understood.

In Design Report 2(Bourquard 1972) it is noted that the intake

should be situated as to avoid or minimize the hazards of blocking by ice; blocking by logs and heavy debris; blocking by siltation; and undermining of intake foundation by river currents. The report goes on to say that the intake alignment would intercept the actual river channel and thus the main river current at about a right angle and about 800 feet downstream of the mouth of the Tohickon Creek. At this point, Bourquard points out, the river channel has about returned to its normal cross-section after being restricted by the deposition below Tohickon Creek.

As the actual surveyed location is several hundred feet north of that discussed in the report as acceptable, an evaluation must be made as to the feasibility and soundness of the present location.

The river flow is significantly affected by the cross currents from both the Tohickon Creek and Hickory Creek which result in material deposition and some scouring of the west bank.

The effects of the intake structure on the evolution of the Tohickon Creek must be evaluated as to the potential changes in flow patterns which may cause an increase in rates and volumes of sediment, rock, and debris deposition into the pool, the eddy and further downstream.

The effects of the intake structure on the

creek movement and the water withdrawal less than 400 feet to the south is essential to an understanding of the soundness and permanence of this location. The future flow patterns of the creek (as affected by the intake) will certainly affect the flow patterns of the main channel of the river, and the hydrology of the pool and the eddy, as well as the topography of the river bottom.

The pool is subject to the hydrolics of the Tohickon Creek and to impacts due to changes in the channel, and the eddy below, seasonal, manmade and other. The potential for increased deposition of silt, rocks and debris in the pool is great. The resultant need for maintenance dredging, and other mitigative measures and the associated adverse impacts of these must be determined. The potential destruction of a sensitive environment for aquatic life, the nature and deposition of the dredged material, as well as downstream and land use impacts must be considered.

The intake structure design and location make the structure extremely vulnerable to destruction from rocks, sediment, debris, ice damage or deposition, reducing its efficiency and endangering the structure itself as well as the aquatic environment in which it is located.

A map showing the river bottom topography is needed to show the details and stability of the river bottom geology. The rates and volumes of rock and

an sediment movement, during high flows and ice, must be determined. The effects of such movement on the intake structure, as well as the effect of the structure on this deposition, should be evaluated under all flow conditions. As the need for maintenance dredging and the resultant turbidity will adversely effect the the water quality downstream and further allow the transfer of toxics and priority pollutants into Bradshaw Reservoir and the receiving streams.

POTENTIAL PRESENCE OF TOXIC POLLUTANTS

A study must be undertaken to determine the degree of contamination of transportable benthis and sediment deposits in the vicinity of the proposed intake location. Specific analysis for heavy metals,as well as chemical determinations for hazardous organic residues that could be absorbed or entrained on or in the sediment layer(s),should be executed to ascertain whether potential hazards exist from relocation of these deposits.

Concerns exist when contaminated sediments are relocated as shown in studies funded by the U.S. Army Corps of Engineers (1,2,3,4,5)* and the U.S. Environmental Agency (6)*. Release of chemical contaminents can be facilitated when contaminated sediment encounters a different physiochemical environment (7,8,9)*. Because released contaminents can enter the food chain (10 & 11)* and contaminate a previously unpolluted niche (10 & 11)*, the potential hazards as they relate to the intake on the Delaware must be addressed.

Of primary concern are sediments:1.which may be relocated through dredging and excavation operations or during construction and operations of the pumping facility, 2. the deposition of said sediments in the Bradshaw Reservoir and Lake Galena and 3. those sediments which will be removed in primary treatment at the North Branch Water Treatment Plant.

Given the degree of upstream industrialization on the Delaware River and its tributaries in the past and present and the potential for accumulation at the proposed intake zone, a study should be carried out to determine the degree of contamination of transportable sediment and its ultimate deposition and disposal.

A survey of upstream pollution sources should be executed to determine whether non-removable river pollutants may be encountered in the proposed water source. Of primary concern here is the possible upstream pollutant spills which may render the surface water source non-potable even after treatment has been performed.

Finally, we would like to call to the Department's attention a report entitled "WATER QUALITY ANALYSIS AREA-Specific Dilution Studies Region III" prepared for EPA and dated January 1981. This report provides a preliminary identification of areas where water quality goals for toxic pollutants might not be attainable, even with the application of the best available technology, and indicates with respect to the affected reach of the Delaware River a potential presence of 15 priority toxic pollutants above the draft water quality criteria of such pollutants in the Lehigh River, of which 5 (copper, lead, benzine, hexachloro, acenaphthylene and florine) would exceed criteria at the confluence with the Delaware River. Although this study is based on discharges to be expected from the industries and municipalities upstream in the Lehigh River, it does not include dilution by Delaware River flows or pollutants added by the Delaware River.

Certainly, as a result of the above and the fact that best available technology has yet to be instilled by most industries, there is a substantial concern as to the water quality impacts on the Perkiomen and the Neshaminy, as well as ground water impacts at Bradshaw Reservoir and Lake Galena. All of which will be discussed in further sections of this comment.

* Reference documents available upon request

SECTION IV

WATER QUALITY EFFECTS OF THE RECEIVING STREAMS FROM THE PROPOSED POINT PLEASANT PUMPING STATION

My concern is that the location of the intakes for the proposed Point Pleasant pumping station would be only 380 feet downstream from the mouth of the Tohickon Creek. Depending on exactly where and how the intakes function, they could well be pumping a majority of Tohickon Creek water instead of Delaware River main stem water to the Neshaminy and Perkiomen Creeks.

According to the C.O.W.A.M.P./ 208 Water Quality Management Plan, the water quality of the Tohickon Creek is indicated to be "seriously degraded".

This "seriously degraded" water in turn, if pumped into the Neshaminy or Perkiomen Creeks, would then violate water quality standards by several parameters including fecal coliform, ph, dissolved oxygen, phosphates, and possibly more.

According to the 208 Plan, the water quality data indicates that "water quality has improved in the Delaware Valley to some degree during the last half of the 70's decade. However, both local areas with occasional problems and widespread problem areas exist and will likely continue to exist into the 1980's." The Tohickon Creek appears to be one of those problem areas. An excerpt from the 208 Water Quality Management Plan follows:

"Water quality data indicates that Tohickon Creek is seriously degraded in some upstream reaches especially in the Richland Township-Quakertown area. Upstream of Quakertown, Tohickon Creek receives a

significant nutrient load: phosphorus averages 0.49 mg/l and nitrate as high as 2.39 mg/l has been observed. Dissolved oxygen problems are also indicated in this reach. The mean DO concentration is 7.2 mg/l and has approached 4.0 mg/l. In two instances, the 4.0 mg/l DER stream criteria has been violated. The Tohickon Creek also exhibits elevated fecal coliform levels (violating DER stream criteria) and occasionally elevated chlorides (62.0 mg/l).

Available data indicates the Quakertown area exerts a major influence on stream water quality in Tohickon Creek. Comparison between upstream and downstream parameter levels shows very substantial increases in nitrate, total phosphorus and chloride loadings in the downstream samples.

Dissolved oxygen continues to be a problem in Tohickon Creek downstream of Quakertown. Mean DO concentration is about 7 mg/l with occasional criteria violations. Water quality monitoring data also indicate elevated coliforms (DER stream criteria violated), as well as high nitrates and extremely high phosphorus loadings (the mean concentration is 4.9 mg/l and a maximum of 27 mg/l)., which is a DER stream criteria violation. The chloride concentration also becomes very high in the reach with an average concentration of 61.7 mg/l.

Water quality data for Tohickon Creek immediately upstream of Nockamixon Reservoir indicates that the reservoir is receiving a very large nutrient load. The time trends indicate that the loadings for each of the individual constituents are variable. The mean and maximum values reported were: 1.83 mg/l for nitrates (5.87 mg/l maximum); 41 mg/l and 120 mg/l for chlorides; 0.197 mg/l nad 3.6 mg/l for phosphates; and 0.76 and 1.10 mg/l for ammonia, respectively.

Water quality in the Tohickon downstream of the Nockamixon Reservoir exhibits similar problems to the upstream reaches. Deep Run Creek, a major

tributary to the Lower Tohickon, has somewhat poor water quality. High in-stream coliform, nitrate, phosphate and organic loads have been noted. The DO in Deep Run Creek occasionally approaches 5.0 mg/l with highs in excess of 15 mg/l reported. Elevated ph values (above 8.5) in violation of stream criteria also indicate the presence of a significant diurnal DO uctuation due to aquatic growth, stimulated by high nutrient levels.

Tohickon Creek, below the confluence with Deep Run Creek, exhibits organic and nutrient loadings. The BOD_5 averages about 2 mg/l but may periodically achieve higher values. The average DO is 11.4 mg/l with as low as 3.0 mg/l being reported (DER stream criteria violated). Septic systems are also indicated by high suspended solid values and elevated chlorides and an extremely high mean fecal coliform concentration of 38,572 MPN/100 ml. (this indicates a gross DER stream criteria violation, typically anything over 200 MPN/100 ml would be a DER stream criteria violation) As in the case of Deep Run Creek, the Lower Tohickon Creek data also show a number of high ph values of over ph 8.5." (would violate Delaware River stream criteria)

So in view of the serious degraded water quality of the Tohickon Creek, how would it in turn effect the stream criteria fo the Perkiomen and Neshaminy Creeks? If the pumps took a majority of Tohickon water, fecal coliform DER stream criteria of 200 MPN/100 ml would be violated in both streams. Ph DER stream criteria of 6.0 - 9.0 would not be violated, but the upper limits are already being pushed (8.5) and in view of the ever present acid-rain problem, the stream criteria for both streams might be violated in the near future. Chlorides, also while within the DER stream criteria, (no more than 150 mg/l) are pushing the upper limits (120 mg/l). Phosphorus DER stream criteria would be violated in the Neshaminy (not more than 0.03 mg/l) and possibly the Perkiomen (not more than 0.1 mg/l) also as the Tohickon discharges approximately 0.197 mg/l.

Nitrates, which contributes to other stream problem are presently within acceptable limits. Temperature violations (shock) could easily be violated as DER stream criteria allows only a 2^{o}F. rise or fall per hour when adding water to a stream. Stream temperatures could easily vary that much from one stream to another depending on the local amount of summer shading, influx of spring run-off vs reservoir runoff etc.

Assuming that the majority of water to be pumped is Delaware River main stem water, how would this affect the Neshaminy and Perkiomin Creeks? Water quality data of the Delaware main stem at Point Pleasant appears to be lacking. Typically, sample locations of the main stem are two to three miles downstream at the walking bridge at Lumberville or five miles upstream at Frenchtown. The Lumberville data would be suspect because of the potential of mixing Tohickon Creek water with main stem water as they pass through the wing dam just upstream of the walking bridge at Lumberville, thus not giving true main stem characteristics at Point Pleasant. Frenchtown data on the other hand, being five miles upriver, could change significantly over its travel to Point Pleasant. Truely, there is a need for more careful monitoring of the main stem at Point Pleasant. Perhaps a robot monitor could be attached to one of the piers of the "broken bridge" opposite Pt. Pleasant Canoe Rentals, which is just upstream of the mouth of the Tohickon Creek. This would be a much more accurate representation of the water quality of the main stem that would be potentially taken at the proposed intake 380 feet downstream of the mouth of the Tohickon Creek.

With limitations in mind, how would Delaware River from Lumberville, Pa. and Frenchtown N.J. respectively affect the ecology of the Neshaminy and Perkiomin Creeks with respect to several water quality parameters?

Using the U.S. Geological Survey Water Data Report: N.J. 80-2, DER stream criteria for fecal coliform would be violated for both the Neshaminy

and Perkiomin Creeks (2284 MPN/100 ml average Frenchtown and 2606 MPN/100 ml average Lumberville). Ph would be within limits, as would dissolved oxygen, chlorides, and nitrates. Phosphates would violate both the Neshaminy and Perkiomin Creeks (0.38 mg/l average Frenchtown and 0.27 mg/l average Lumberville). Temperature shock analysis requires more consistent data as most of the different data sources seem to average the data over a year.

Fecal strep, while tested for do not appear to have a specific DER stream criteria. Fecal strep however, are considered to verify fecal pollution from warm blooded animals. Reported levels are high enough to warrant concern and furthur study. STORET data for the Tohickon Creek indicates fecal strep counts of 1955 MPN/100 ml average. STORET data for the Delaware River at Lumberville Pa. indicate fecal strep counts of 288.6 MPN/100 ml average. USGS data shows counts of 367 MPN/100 ml average for Lumberville (alluding to another problem with the data base) counts of 383 MPN/100 ml at Frenchtown.

From the COWAMP.208 Water Quality Management Plan the following concerns with the data base were noted:

"Problems With The Existing Data Base

An important lesson learned in this data inventory is that management of water quality information must have equal weight with data collection and analysis activities. A data base with incomplete and erroneous numbers is an invitation to problems. The management system must also be capable of consolidating information gathered by governmental, private and academic groups. Specific problems found in the data inventory and analysis were:

1) Significant duplication among the many water quality monitoring stations. Two or more agencies collecting data at a single site results in two limited data sets which can lead to conflicting water quality interpretations. Furthur, two samplings are more costly. The preferable approach is a single sampling effort to meet the needs of both agencies.

2) Many extraneous patameters are samples while other significant parameters are ignored due to oversight, Limited manpower, limited fiscal resources or other reasons. In many cases, parameters are arbitarily selected instead of being specifically targeted to stream reach. Revisions to parameter lists oftem are not made and long "laundry" lists of "pollution-sensitive" varibles result. In particular, primary collection efforts have emphasized "classic" sanitary engineering parameters such as nutrients, fecal coliform, and alkalinity, while slighting "newer" parameters of interest, such as toxic organics, heavy metals, and pesticides.

3) Sampling has reflected a lack of appreciation of the appropriate sampling frequency. This is in part a result of the absence of specific sampling objectives. Frequencies are selected arbitrarily, for convenience, or because of manpower constraints. Much of the existing water quality data from various sampling programs have not proved efficient for trend or causal analysis. The limited interpretive utility of existing data have been most acute on major tributaries other than the Schuylkill and for pollution from nonpoint sources. In addition, the sampling frequencies encoutered in the data have proved inappropriate for assissing diurnal variations in most streams.

4) There are significant data gaps caused by inappropriate location of stream sampling sites. Data were missing on important stream reaches with potential serious problems. A number of sampling points were located on streams with identified problems but either on reaches of those streams that manifest slight or no water quality effect of pollutants or that were more convient to sample.

5) Existing data fail to account adequately for the seasonal and reach-to-reach varibility in water quality that results from hydrologic phenomena.

6) There was a general scarcity of stream bottom sampling as compared

to the preponderance of data concerned with water column parameters.

7) The sampling data collected by various agencies were primarily determined by the needs of the agencies. In particular, DER, DRBC, and EPA have systems that generate information primarily related to regulatory functions. While this is appropriate for these agencies in their functions as regulatory agencies, the data possesses serious shortcomings as it relates to planning water resource and pollution management uses."

Even taking into consideration the drawbacks with data base, it appears that the location of the pumps at Point Pleasant is a poor one. The potential of polluting both the Neshaminy and Perkiomin Creeks with a mix of Tohickon Creek and Delaware River water seems very real. In view of the fact that the Tohickon Creek is so "seriously degraded" it is ironic that it's water is being slated for possible future developement. Potable water for future growth needs should not originate from such an obviously poor source.

A few other points still come to mind. Given the need to manage Lake Galena with Delaware River water, the spring "fill up" of Lake Galena would possibly coincide with a major spawning of species of fish in the pool at Pt. Pleasant. Typically, one sees a progression of walleye spawning, then shad, then herring, and then smallmouth bass. By then it would be early June, so there is a need to know what is spawning in that pool at times of major projected withdrawls. Which brings up the need for a detailed hydrologic/ ecological model of the pool to determine 1) what % of Tohickon' Creek water will actually be taken up by the pumps and 2) how will the intermitent pumping affect aquatic life?

Also I am concerned about increased acidic runoff from snowmelt and spring "acid" rains resulting in increased leaching of heavy metals (such as

aluminum) into the watershed. This could possibly cause a seasonal pollution problem.

Finally, any reduction in main stem flow will negatively effect downstream water quality in light of Tohickon Creek's "seriously degraded" water quality. However, it would be ultimately very ironic if the reverse happened. That is if the pumps ended up taking mostly Tohickon Creek water instead of Delaware River main stem water. Although the Neshaminy and Perkiomin Creeks would suffer, the downstream effect of the Delaware River itself would most likely be beneficial because of the elimination of the Tohickon Creek insult to the river.

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SECTION V.

Water Quality: Other Areas of Impact

The following section is an excerpt from a document entitled, "Objections and Questions on Neshaminy Water Resources Authority Permit Applications NAPOP-80-534-3 and NAPOP-80-813-3, which was prepared by Del-AWARE Unlimited and submitted to the U. S. Army Corps of Engineers, July 6, 198

The permit applications referred to are: for construction of the intake on the Delaware River, and, rechannelization of Pine Run and North Branch Neshami ny Creeks.

These applications are pending the Corps' own review and consultation with other agencies, including the request presently before the Department. Referenced documents available.

Water Quality: Bradshaw Reservoir/Perkiomen Discharge

The size of the proposed 70 MG Bradshaw Reservoir has been increased from the 46 MG capacity proposed in 1973. Presently proposed storage allocations are: 18 MG for operating capacity

46 MG for emergency storage
6 MG for silt buildup
70 MG total

No analysis is made of the rate of accumulation of the of the silt load, its impacts on water quality, the frequency of sediment removal, nor of the location of a perma ient disposal site, presumable local.

Bradshaw retention times will vary, depending on cooling water demand at Limerick, water demand at the treatment plant, and whether water for the treatment plant passes into Bradshaw or goes directly from the Combined Transmission Main via the by-pass into the North Branch Reservoir (Lake Galena)

Since there are no publicly available analyses of data on the magnitude of the pollutant loading to the East Branch Perkiomen Creek from the discharge of Delaware River water, the estimates of the diversion's pollution loading to Lake Galena, although in themselves substantially underestimated,

offer a conservative indication of the impast of the pollutant discharge into the Perkiomen's headwaters. This is suggested because the average annual cooling water demand of 35 MGD at Limererick is comparable to the 33.6 MGD figure used by NWRA's consultant as the annual average inflow from the Delaware to Lake Galena for production of 40 MGD.

Obviously, neithr water demand nor stream flows occur in averages, and cyclical or seasonal loading should be evaluated for suspended solids, settleable solids, dissolved solids, volatile and fixed solids, and heavy metals as well as nutrients. Analysis should be made relative to ranges in temperature and retention time.

Water Quality Criteria and Effluent Standards: Antecedent Conditions. It is noted that policies regarding stream quality and effluent loading are based on low flow conditions, not average conditions, and that pollution loading also varies with natural conditions such as temperature and cyclical or seasonal conditions.

Antecedent conditions also have been found to have a direct impact on Delaware River mainstream water quality, increasingly deteriorating stream quality as periods of diminished flows lengthen. (See Water Resources Engineers (WRE) Reports to Delaware Estuary Model Technical Advisory Committee and DRBC Level B Study Draft Final Report.)

The quality of water diverted at Point Pleasant under summertime low flow or drought conditions would be of lesser quality than water diverted under normal or average conditions. Because of the known importance of antecedent conditions,

analyses of Delaware diversion impacts on the receiving streams and impoundments should be based on water sampling which carries information on antecedent conditions in the Delaware, e. g., precipitation, temperature, Trenton flows, and actual flows at the Pt. Pleasant intake site. Antecedent conditions must also be given for flows in the receiving streams.

It is also noted there appears to be no data on actural river flows at Point Pleasant, and that percentages of water removed at Point Pleasant have been given as percentages of the flows at Trenton instead. Withdrawal percentages should be restated for actual flow at Point Pleasant and given also for low flow and drought conditions.

Operating Mode of North Branch Reservoir (Lake Galena)

Because Lake Galena is already highly eutrophic and because this condition will be worsened by accelerated pollution loading as the amount of water from the Delaware increases, NWRA's consultant has recommended maintaining a high rate of flushing and has claimed that the more water pushed through Lake Galena, the more beneficial the diversion.

It is grossly irresponsible to ignore the impact passed on to the receiving streams and the communities downstream from the reservoir. This is of particular importance because of the anticipated diminished flows in North Branch Neshaminy, Pine Run and Neshaminy mainstem, and because these streams are already water-quality-limited stream segments.

Maintenance of a constant high water level in a reservoir for recreational purposes substantially reduces its utility for water supply purposes, and for this reason the

allocation for water supply in Lake Galena was cut by 50%. Recreational benefits were then increased by this amount. Although a ten month long, 20 foot drawdown is now the planned operating mode of Lake Galena no analysis has been made of how this will affect recreational use of that facility. (See Exhibits C1 and C2). Such operational modes have been considered unacceptable at Nockamixon Reservoir and the proposed Evansburg Reservoir precisely for this reason and, further, because such a mode of operation would violate the cost allocation benefits used to justify construction.

If this mode of operation is used to purportedly protect Lake Galena water quality while flushing the imposed problem downstream, it appears that the Soil Conservation Service would be justified in assessing NWRA for the amount of lost recreational benefits.

Under-estimates of pollution loading to Lake Galena, North Branch Neshaminy, and Neshaminy Creek; Examples of Inaccuracies in Dresnack Report. This report, "Impact of Delaware River Flow Augmentation on the Trophic State in Lake Galena" is appended as Exhibit B3.

The consultant has estimated only poundage loadings of phosphorus. Poundage loadings of other nutrients, e.g., nitrogen, have not been estimated nor have sediment loadings.

There are no estimates of suspended solids, dissolved solids, volatile and fixed solids, heavy metals, or priority pollutants which include TCE and PCE.

A simulated rather than an actual long-term average flow is used as the North Branch Neshaminy flow into Lake Galena. The simulated average flow figure is questionable because it is

related to recorded flow data at the Langhorne gage on the Neshaminy Creek. Since the Langhorne gage is downstream from several reservoirs, it is unlikely that it is indicative of flows which are not augmented or impounded.

No figures are given for cyclical or seasonal pollution loading to Lake Galena. For example, no evaluation has been made of the impacts of spring and summer overturns in either the Delaware River mainstem or in the receiving streams.

The 1971-75 Delaware River samples contained substantially higher levels for NO_3-N, NH_3-N, and total phosphorus than most other data used for calculations in this report. Although these samples were dismissed as being outdated, they were then favorably commented upon by the author relative to the levels found in the North Branch Neshaminy.

The most recent sampling was taken at the Lumberville footbridge, 1.5 miles downstream from the proposed intake point. The specific site is not well described nor is there narrative or drawings to justify the author's claim that this site better simulates intake conditions. Description of site and flow conditions are essential to evaluate validity of the data. particularly in view of the migration of the mouth of the Tohickon Creek and River channel since completion of Nockamixon Reservoir in 1973.

Filtered samples were taken at the Lumberville footbridge site. Use of filtered samples is questioned because this filters out phytoplankton as well as inert solids.

Use of filtered Delaware River samples was justified by the author's assumption that, based on a 21 hour retention time in Bradshaw Reservoir, suspended material eroded from the River bottom will settle out in Bradshaw. We question this assumption

in view of the proposed by-pass of the Reservoir and lack of settling time under maximum continuous pumping.

Present Violations of Stream Quality Criteria in Streams to Receive Delaware River Water. The following table was compiled from information in the cited figures in Chapter VI, "Existing Water Use and Quality", in PADER's Comprehensive Water Quality Management Plan (COWAMP/208), Lower Delaware and Schuylkill River Basins, "Existing Water Uses and Quality", Draft Chapter VI, June 1975.

Present Violations of Stream Quality Criteria of Streams to Receive Delaware River Water Discharged from Proposed Bradshaw Reservoir

Criteria Violation	Stream Occurence	Legend	Fig.No.
Dissolved Oxygen	Neshaminy Creek below Newtown E. Br. Perkiomen	Daily average value violates criteria during summer*	VI-7
pH and Total Dissolved Solids	N. Br. Neshaminy, Pine Run, Neshaminy Crk., Perkiomen Crk.	pH values periodically exceed 8.5	VI-8
Total Iron	Neshaminy Crk. below Warrington; Segments Perkiomen Crk.	Max. values periodically exceed 1.5 mg/l	VI-9
Copper	Segments of Perkiomen Creek	Suspected max. values periodically exceed 0.1 mg/l	VI-1
Total soluble Phosphate	N. Br. Nesh., Pine Run, Neshaminy Crk., & E. Br. Perkiomen Crk.	Average values exceed criteria	VI-
Streams with high heavy metals content.	Neshaminy Crk. below Doylestown	High Values Reported for two heavy metals	VI
	Perkiomen Crk.	High Values Reported for three or more heavy metals	

*Algae caused diurnal DO violations may not be shown because data is usually collected during daylight hours.

The COWAMP/208 Draft Report for Southeastern Pennsylvania, DVRPC, April 1978, shows the mainstem Neshaminy Creek, East Branch Perkiomen and Perkiomen Creeks as Water Quality Limited Stream Segments (p. 3-78, Fig. 3-17).

<u>North Branch Water Treatment Plant Operating Mode</u>

Applicant projects NBWTP water production as requiring the initial installation of 10 MGD capacity, requiring increased filtration rates and installation of sludge dewatering facilities to permit quadrupling production to 40MGD within four to nine years from initial construction.

Objections raised relative to pollution loading to N. Branch Neshaminy are applicable to Pine Run because during periods when the total flow of Pine Run is withdrawn for water supply purposes the only flows in Pine Run below the intake structure will be back flows from Lake Galena releases.

Design of NBWTP is presently unknown and it is not known whether it will include treatment for trihalomethane precursors, (one of which is algae), as per EPA's recommendations, or whether an exemption will be applied for. (See Exhibit C4)

<u>Reduction of Neshaminy Basin Stream Flows</u>

About 62% of the mean daily flows of N. Branch Neshaminy and 95% of the mean daily flow of Pine Run will be withdrawn for water supply during an average flow year. Although additional pumpages from Point Pleasant are required for partial replacement of the proposed water supply withdrawals, the replacement flows (Minimum releases) below the intakes are expected to be

less than normal flows most of the time and adverse effects on biota are anticipated.

Percentages of summertime low flows or of drought condition flows that will be withdrawn from the two streams are not given, and although mainstem Neshaminy Creek flows will obviously be reduced by the taking of tributary inflows, similar percentages for withdrawals from the mainstem are also omitted.

In view of the underestimation of pollution loading including priority pollutants from Lake Galena to N. Branch Neshaminy, discretion would indicate that maximum precautions be taken in the design of the North Branch Water Treatment Plant.

Sedimentation at NBWTP Intake Damsites and Downstream

Although the channel will be sloped downward as it approaches the intake structure, there is no evaluation of the of the volume or of the physical or chemical characteristics of the sediment which will accumulate either at these two sites or in the Neshaminy downstream. Neither is there an identicication, description, or analysis of the disposal site which will receive this accumulated sediment once it is dredged.

As water production increases, increased pumping at Point Pleasant and increased flushing rates of Bradshaw and N. Branch Reservoirs will increase sediment accumulation at the intake dams and downstream, with increasingly severe but unevaluated water quality impacts.

Full evaluation of the cumulative physical and biochemical impacts above is essential before any further consideration of the permit applications.

Considerations of a Dredging Proposal. Applicant states (Application, p.5), "There is no present use of the disposal site." The present Pine Run channel now provides ecological, aesthetic and recreational uses of a natural stream bed. Treatment Plant site now serves as a flood plain and terrestial habitat.

Applicant states (Application, p.5) "Excavated materials are from alluvial deposits and will consist of a mis of clay, silt, sands and gravels. While the bulk of this material will be sands and gravels, the clay and silt contents should be sufficient to permit compacting of the fills therefrom to a relatively dense and impervious state." What are alternate plans if clay/silt content is insufficient to permit compacting the fills?

Applicant states (Application, p. 1) that excavation will remove apx. 18,770 and 6,280 cubic yards, respectively, from the Pine Run side and the N. Br. Neshaminy side, and that after use to fill in and to reshape in the stream beds, the balance will serve to build up the plant site. Since it seems doubtful that this remaining excavated material would be sufficient to raise the plant site by 4 feet (DRBC, EA, p. 1-9) what is the intended source of the remaining fill? Will it be suitable for placement in a floodplain? How much additional fill will be required?

Leachates to be produced; groundwater protection plans.

Applicant states (Application, p. 6) "Not applicable" The same response is given to the question of "Chemical composition of material" to be disposed of. These answers are irresponsible and unacceptable. Some leachate commonly occurs when

soils are compressed. In the absence of any data, the claim that there will be no leachate or concommitant water quality impacts is unsubstantiated. Data should be developed giving the chemical characteristics of alluvial deposits to be dredged, excavated materials, any supplemental fill needed, as well as the soils at the fill sites. Such data for alluvial deposits should take into account upstream conditions such as abandoned lead mines (N. Br. Neshaminy) and industrial activities, for example PFD Penn Color Inc. on Pine Run Creek. Additionally, there are no assurances that this site, long vacant, has not been used as a dump site, possibly for toxic wastes, whether legally or illegally.

There are no calculations on the additional compression of fill sites resulting from the added weight of dredged fill, not from the installation of treatment plant facilities, including sludge lagoons. The Corps (EA for Permit Application 80-0813-3, March 19, 1981, page 2, describes the soils at the site as "...nearly level, deep, poorly drained soils on flood plains. They have a high water table, are wet most of the year, and are subject to flooding. Permeability is moderate or moderately slow, and available water capacity is high. Natural reaction is very strongly acid to slightly acid."

Groundwater protection plans must take into account municipal well(s) operated by the Borough of Chalfont located adjacent to the site.

INDEX OF SECTION C EXHIBITS

1. Neshaminy Water Resources Authority, Responses to Significant Concerns at and after Public Hearing of Environmental Report, May 30, 1979, p.20, Maintenance of Levels in Pa-617.

2. Letter from Terry L. Fought of E.H. Bourquard, Associates, Inc., to Harold D. Sursa, Bucks County Water and Sewer Authority, concerning Reservoir PA-617 Storage Allocation, March 8, 1976

3. Dr. Robert Dresnack, for NWRA, "Impact of the Delaware River Flow Augmentation on the Trophic State in Lake Galena, Nov. 1979.

4. Bruce Stewart, DRBC memo, Trihalomethane precursors, April 13, 1978.

SECTION VI

Impacts and needed studies of the Point Pleasant Diversion Project

The Point Pleasant Diversion Project cannot be assessed in isolated segments. The impacts to the environments downstream and inland have not been evaluated.

As substantial objections and questions have been raised in previous sections of this document as to the location and operation of specific portions of the Point Pleasant Diversion Project, and as these portions of the project are defined as integral to the successful and environmentally sound operation of the project as a whole; Del-AWARE submits that the Department of Environmental Resources has the public responsibility to review all aspects of the project: construction, secondary and cumulative impacts, as part of the system, and the system in its entirety.

It is obvious that the environmental impacts of this project are far from minimum. This project is a large scale water diversion that has far-reaching and serious impacts not limited to the Delaware River at Point Pleasant, and the confluence of the North Branch of the Neshaminy and Pine Run, but also, that the physical, socioeconomic, and environmental effects will be felt throughout the region.

"Comments to the DRBC have called for a complete and detailed financial plan to construct and operate the pro-

ject , including the social and economic costs, changes in tax structure, payments for liability and mistakes related to the generation of nuclear power." (DRBC, 1980 B). Such a financial plan and socio-economic evaluation of the Point Pleasant Diversion Project is certainly necessary.

Del-AWARE requests that the Department of Environmental Resources take its responsibility as representative of the State and the public interest in this project to insure that each aspect of the project is adequately addressed. It seems unreasonable to expect that such an analysis can be made using presently available information, as previous documentation is incomplete, inaccurate, and discounts the many design and circumstantial changes.

Del-AWARE also supports the conclusions reached in the ENVIRONMENTAL ASSESSMENT AND SECTION 404 ANALYSIS OF THE POINT PLEASANT DIVERSION PROJECT (draft, Betz, Converse, Murdoch, Nov., 1980) Sections 4.1 through 4.4.2 as follows:

"4.1 <u>GENERAL</u>

In Section 3 of this report, we have recommended that further studies should be performed to adequately assess the environmental impacts of the Point Pleasant Diversion Project. These studies are intended to address those significant issues which have not been given adequate coverage in previous studies. Note that no further work is recommended to supplement the environmental inventory of the project area which is contained in previous documents. Data gaps in the environmental inventory are not considered significant unless they impair the ability to adequately assess an environmental impact. Some further data collection is included as part of the scope of work recommended for studies of environmental impacts (e.g., identifying the project area wetlands). However, no data collection for the sole purpose of environmental inventory is recommended.

Our recommendations are summarized in Table 5. The table references sections of this report where data gaps are identified and where recommendations for further analysis are offered. The following sections describe the general purpose of each study, provide a preliminary study outline by task, and present an estimated study cost.

4.2 MODEL SYSTEM AND ESTABLISH OPERATION MODES AND RELIABILITY

4.2.1 Purpose of Study

The purpose of this study is to use a mathematical model of the Point Pleasant Diversion Project system to simulate how the system will operate in low, average and high flow conditions. The model will be used to establish the need for and projected use of any upstream reservoirs required to enable the system to operate. From the model, an operating procedure will be established to show what actions should be taken in response to various weather conditions and service priorities in order to operate the system in the most environmentally sound manner. On this basis, the quantities of water to be diverted and the in-stream flow rates projected in the previous environmental references can be verified.

(continued)

TABLE 5
RECOMMENDED STUDIES

TYPE OF STUDY	Section of Report in which is Recommended or Noted	
Model system and establish operation modes and reliability	2.2.2	Modes of Operation*
	3.3.3	Surface Water Qualit[y,] Quanity, and Biota
Analyze population data and secondary impacts of project	3.3.6	Land Use*
	3.3.3	Surface Water Qualit[y,] Quantity, and Biota
	3.3.4	Wildlife
	3.3.5	Terrestrial Vegetati[on]
	3.3.7	Socioeconomics
	3.3.8.1	Groundwater
	3.3.9	History and Archaeol[ogy]
	3.3.10.1	Recreation
	3.3.10.2	Aesthetics
	3.3.11	Air Quality
Evaluate financial plan and socioeconomic impact ov project	3.3.7	Socioeconomics*
Evaluate environmental impacts of intakes on Neshaminy Creek and Pine Run	3.3.3	Surface Water Quality, Quantity, and Biota*
Identify and evaluate impacts on wetlands	3.3.6	Land Use*

* These sections contain recommendations for conducting needed studies. The remaining sections note some specific purposes of the study.

Based on the results of this modeling effort, it will be possible to more accurately address issues such as the need for additional reservoirs, the degree to which reservoirs will be drawn down during low flows, the effect of the project on the salinity wedge in the Delaware River estuary, the degree of flow and velocity perturbations anticipated in the rivers and their effect on aquatic biota, the ability to reliably provide sufficient water to the nuclear power generating station at Limerick, to avoid any power production curtailments, and the ability to reliably

control the system to effectively minimize adverse environmental impacts.

4.2.2 Study Outline and Cost

Various models have been created and used to simulate conditions in the Delaware River Basin. The DRBC used one such model in their Level B study (Delaware River Basin Commission, 1979). The Corps of Engineers is conducting a more detailed modeling effort. However, nowhere in the references was such a model described. Therefore, the scope of work we are recommending assumes that no modeling has been done. A more appropriate scope of work and cost estimate can be made after the modeling needs of this project are compared to the models which exist or are being developed. With this provision, the tasks which should be accomplished are listed below:

1. Establish existing hydrographs for key points of water diversion system during low, average and high flow years.
   These points should include:
   - Delaware River above Point Pleasant intake
   - Delaware River below Point Pleasant intake
   - Delaware River at Trenton
   - North Branch Neshaminy Creek below discharge of North Branch transmission main
   - North Branch Neshaminy Creek below intake at North Branch treatment plant
   - Main stem Neshaminy Creek below confluence with Norht Branch Neshaminy Creek
   - East Branch Perkiomen below discharge of East Branch Perkiomen trasmission main
   - Perkiomen Creek below intake
   - Schuylkill River below intake

2. Develop a computer model of the system operation. Include all reservoirs needed to operate the system and all water courses affected by the project.

3. Establish the most beneficial mode of operating the system and evaluate the ability to reliably control the system in this mode. (Include in the evaluation consideration of who is responsible for operating the different components of the system.)

4. Create hydrographs for low, average and high flow conditions assuming that the system is operating.

5. Evaluate the expected environmental affects of the modified stream flows represented in the hydrographs.

The estimated cost of this study is $100,000 to $200,000; it is expected to take 12 to 18 months.

4.3 ANALYZE POPULATION DATA AND SECONDARY IMPACTS

4.3.1 Purpose of Study

The purpose of this study is to evaluate the secondary impacts associated with the Point Pleasant Diversion Project. An analysis should be made of the most recent population and water use data and trends. Projected secondary impacts should be forecast using the quantity and aerial extent of population growth induced or accommodated by the project. The interrelationship between the project and the operation of the nuclear power generating station at Limerick and its environmental impacts hould be described. However, the environmental impacts associated with the nuclear power generating station should be included by reference to existing sources.

4.3.2. Study Outline and Cost

The following tasks should be accomplished as part of this study:

1. Use current population estimates and trends to re-evaluate the population data used in designing the project.

2. Re-evaluate water needs in the service areas based on population data and water consumption trends. Include an evaluation of water conservation.

3. Evaluate the impact the project will have on the quantity and aerial extent of population growth.

4. Evaluate the secondary impacts of projected service area development on climate, air quality, wildlife, vegetation, surface water quantity and quality, aquatic biota, groundwater, aesthetics, recreation and cultural resources, and any additional relevant factors.

5. Describe the relationship between the operation of the nuclear power generating station at Limerick (and its attendant environmental impacts as previously assessed) and the Point Pleasant Diversion Project.

4.4 EVALUATE THE SOCIOECONOMIC IMPACT OF THE PROJECT

4.4.1. Purpose of Study

The taskswhich should be performed as part of this study are:

1. Obtain financial plan for project from PECO and the NWRA.
2. Analyze distribution of project costs to project users
3. Based on existing socioeconomic data for the affected area, evaluate the primary and secondary socioeconomic impacts of the project

The estimated cost of this study is $6,000; it is expected to take 4 months.

Obviously the operation, efficiency and environmental impacts of the Diversion cannot be adequately addressed until the full scope of the diversions capabilities and planned increase in size is considered. As noted in previous section, the facilities are capable of diverting up to 250 million gallons of water per day from the Delaware River. It is misleading to evaluate the project in terms of the presently proposed 95 million gallon per day capacity, when plans call for vast expansion of the system.

The Neshaminy Water Resources Authority Trust Indenture calls for additional water withdrawal, and since there has been no attempt on the part of the County Commissioners or the Authority to revise the figures contained in the indenture, and one commissioner (Elaine P. Zettick) has publicly acknowledged the

planned expansion of the system, it is unfounded to evaluate the project on anything other than it s known maximum capabilities.

The construction of upstream reservoirs, particularly the Merrill Creek Project in Warren County New Jersey, shoud be included in any evaluation of the project, as it seems that the projects successful operation especially in periods of low flow, is dependant on these reservoirs. Therefore, need for the construction of these reservoirs and the associated impacts should be assessed in conjunction with the water diversion project, as they are, in effect, part of it.

Regional Impacts of the Point Pleasant Diversion

The impacts of the Point Pleasant Diversion Project are many, and potentially serious with respect to the environments, communities and citizens in the region. The effect of the changed flow regimes in the Delaware and Schuylkill Rivers, as well as the North Branch of the Neshaminy and the East Branch Perkiomen Creeks; The effects on water quality in the recieving streams; the impacts of operating the nuclear generating station at Limerick, and the impacts on growth and development in Bucks and Montgomery Counties; and all associated impacts must be addressed.

The effects of this project on population growth and development in Bucks and Montgomery will be substantial. As a need is recognized for the sensible and well planned growth of our communities, as well as the preservation of open space and

farmlands, we submit that this project will have an exaggerated effect on the development of the counties. The effects of development are known to be increased costs for municipal services; changes in the tax structure and real estate values and a loss of aesthetic values integral to the preservation of the quality of life in the region. And in this case, create a dependence on an already oversubscribed surface water resource.

The Pennsylvania State Water Plan states that water should not be transferred from one basin to another when the receiving area has not fully developed its own water resources. This inter-basin diversion is not in accordance with this prerequisite. It is evident that local water resources are available in adequate supply and at less expense to the communities which will receive the water.

Areas of Impact

The diversion of water from the Delaware River at Point Pleasant, Pennsylvania, and the many components of the system used to divert, carry, direct , and distribute the water will all seriously affect the people, water, aquatic and terrestrial life of all areas which are directly and indirectly touched.

In previous documents prepared by the Delaware River Basin Commission (DRBC), the Neshaminy Water Resources Authority (NWRA), and the Philadelphia Electric Company (PECO), the impacts of this system have been inadequately studied, and must be addressed by the D E R Some specific concerns not mentioned previously, are addressed below:

Combined Transmission Main to Bradshaw Reservoir

The transmission main may leak, given the corrosive effects of the soils and the high operating pressures inherent in a head of water of three hundred and fifty feet. The impacts of raw river water leaking into the water table are nowhere considered.

Perkiomen Creek

The Environmental Assessment prepared for the Corps (Betz Converse & Murdoch, January 1980) states that the Philadelphia Electric Company no longer intends to utilize any of the natural flows of the Perkiomen Creek. Is this information correct? If so, will the utility's demand for Delaware River water increase? Will the potential for flooding on the East Branch Perkiomen increase?

Use of natural streambeds as open channel conveyances

This method of transporting water saves money but wastes water and degrades streams. Flooding is more likely. Water evaporates enroute. Bank erosion, streambed scour, turbidity, increased sedimentation, periodic dessication and increased pollutant loadings are among the impacts anticipated. Consideration must also be given to how much water the streams would be expected to carry when the system is enlarged.

In its Final Evironmental Assessment, August 1980, the DRBC states on page IV-63, "...doubling the velocity from 2 to 4 fps, the sediment increased 33 times..." This means any

increase is felt dramatically. We suggest that the use of open stream beds for conveyance of water is environmentally unacceptable.

A full assessment of the use of stream beds for the transport of water, and their inclusion in the regional water supply system is necessary, in order to evaluate all of the environmental as well as legal implications to the streams themselves and the resident water users that reside along them.

We challenge the evaporative use of 46.2 million gallons per day of water at the Limerick nuclear generating station, as unnecessary and detrimental to the water sheds of the region. And, we submit, that the Philadelphia Electric company, as the single largest user of the water, will be subjecting the environment and thousands of people to unnecessary adverse impacts by obtaining it's water from a relatively distant location, especially unnecessary in light of the fact that more local sources of water are available for their development.

CONCLUSION

We have outlined some of the unstudied concerns and potential adverse effects that the diversion of water at Point Pleasant may cause to the water quality in the region. In view of the considerable concern and opposition expressed by members of the public and elected representatives, we strongly urge that there be a full evaluation by the Department, including public hearings held in the areas of impact.

Hearings should deal with the following:

- -the adverse effects on the State Water Plan
- -the problems of salinity in the Delaware River
- -the potential impossibility of finding a safe and environmentally sound intake location in the Point Pleasant area .
- -the impacts of defferent operating scenarios, both as to the effects on the Delaware River and the economic and environmental effects on the service area
- -the impacts of transferring toxics from the Delaware River into the Neshaminy and Perkiomen watersheds
- -the relationship to the Limerick project, to which it is an adjunct

We expect a full technical review by the department, a thorough analysis of all evidence and a recognition of the interrelationships of the effects of the component parts and the project as a whole such that the decision made is in the best interests of the citizens of the region.

STATE OF NEW JERSEY
DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF WATER RESOURCES
WATER SUPPLY FACILITIES

DREDGING THE DELAWARE AND RARITAN CANAL PROGRAM PLAN AND PROGRAMMATIC ENVIRONMENTAL ASSESSMENT REPORT

INVESTIGATION BY
COLLEGE OF ENGINEERING
COOK COLLEGE
RUTGERS UNIVERSITY
1980-81

AUGUST 1981

TABLE 2.5a

ANALYSES ON WET SOLIDS

Organochlorine Pesticides, Polychlorinated Biphenyls and Herbicide Fraction
(milligram/kilogram)

Compound	Sample from Site D-2	D-4	D-6	D-8	D-11	D-13
Aroclor 1016	ND	ND	ND	ND	ND	ND
Aroclor 1242	↓	↓	↓	↓	↓	↓
Aroclor 1248	0.43	↓	0.46	0.43	0.40	↓
Aroclor 1254	ND	↓	ND	ND	ND	↓
α BHC	↓	↓	↓	↓	↓	↓
γ BHC (Lindane)	↓	↓	↓	↓	↓	↓
β BHC	0.13	↓	↓	↓	0.15	0.61
heptachlor	ND	↓	↓	↓	ND	ND
aldrin	↓	↓	↓	↓	↓	↓
heptachlor epoxide	↓	↓	↓	↓	↓	↓

ND - Not Detected

TABLE 2.5a
(continued)

ANALYSES ON WET SOLIDS

Organochlorine Pesticides, Polychlorinated Biphenyls and Herbicide Fraction
(milligram/kilogram)

Compound	Sample from Site					
	D-2	D-4	D-6	D-8	D-11	D-13
γ chlordane	ND	ND	ND	ND	ND	ND
p,p' - DDE	0.033	↓	0.021	↓	↓	0.054
dieldrin	ND	↓	ND	↓	↓	ND
endrin	↓	↓	↓	↓	↓	↓
o,p' - DDT	↓	↓	↓	↓	↓	↓
p,p' - DDD	0.021	↓	0.021	↓	↓	↓
p,p' - DDT	ND	↓	ND	↓	↓	↓
mirex	↓	↓	↓	↓	↓	↓
methoxychlor	↓	↓	↓	↓	↓	↓
toxaphene	↓	↓	↓	↓	↓	↓

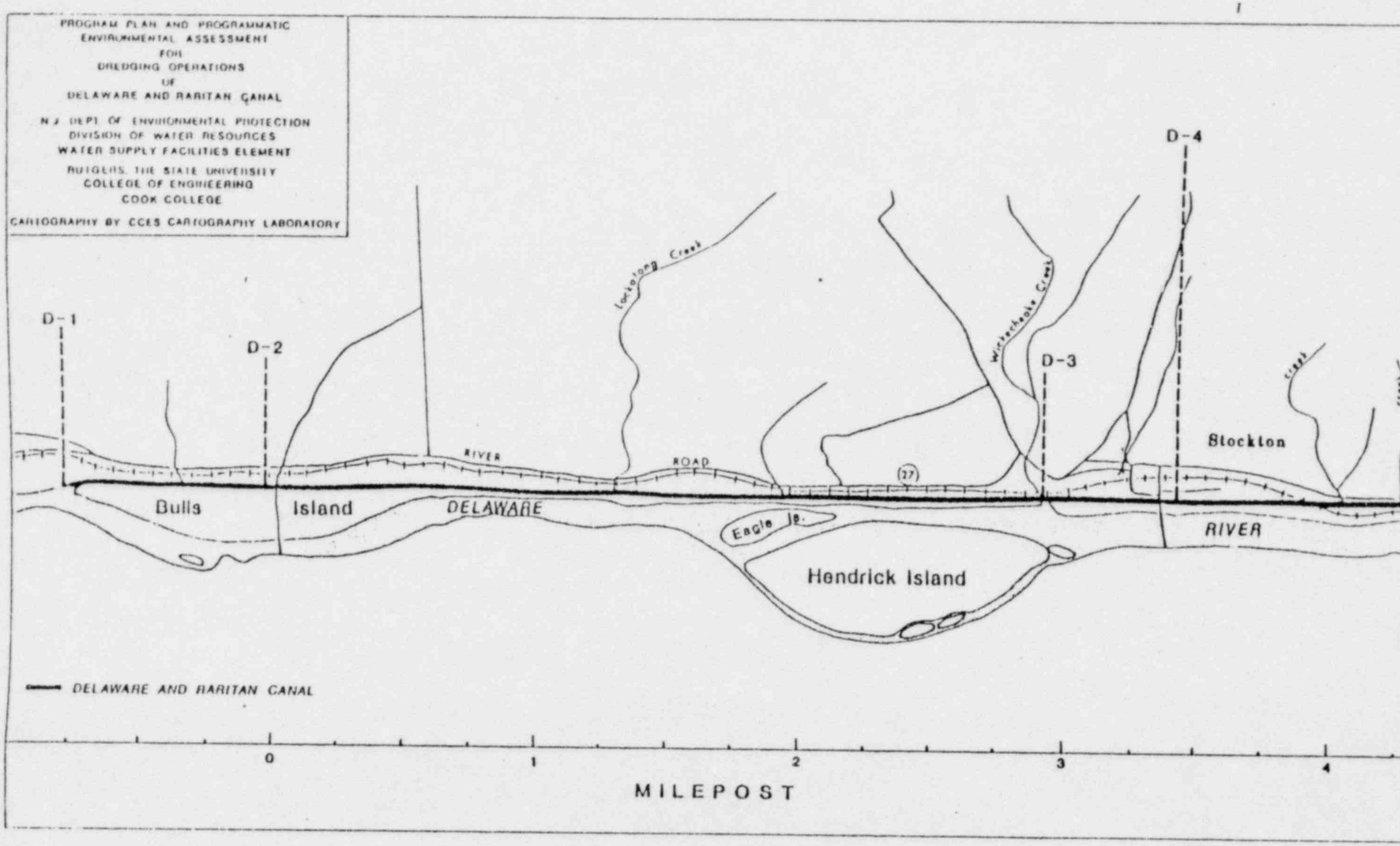
ND - Not detected

TABLE 2.5b

EP TOXICITY ANALYSES ON WET SOLIDS

Heavy Metals
(milligram/liter)

Element	Sample										
	D-1	D-2	D-4	D-5	D-6	D-7	D-8	D-9	D-10	D-11	D-12
Cd	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cr	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
Cu	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
Mn	3.2	3.2	.27	2.6	.93	1.2	1.6	.64	.35	.25	3.4
Ni	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.9
Pb	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	ND
Zn	1.5	.38	.09	.38	1.06	1.06	.68	.09	.22	.35	2.4



LOCATION OF SEDIMENT SAMPLING SITES

Figure 2.3

TABLE 3.7

COMPARISON OF RULES AND REGULATIONS FOR PCB DISPOSAL

PCB Concentration Ranges
milligrams/kilogram (ppm)

Regulation	0-10	10-50	50-500	50-1000	>1000
N.Y. State (Ref. 3.13)	minimize PCB loss for ordinary spoil site	minimize PCB loss from spoil site		incinerate or chemical landfill	incinerate
USEPA (Ref. 3.6)	plow into soil				
(Refs. 3.9, 3.10)	less than 50 ppm - no regulations		incinerate or chemical landfill		
NJDEP (REf. 3.7)	0.5 suggested upper limit for land spreading				